

This is the first extended study written within the framework of Government Phonology. Following the presentation of the main aspects of this theory, the process of vowel-zero alternations is addressed and analysed together with the idea that phonological processes are determined by principles of Universal Grammar along with parameters that distinguish languages. By using predominantly the alternation between schwa and zero in French, Monik Charette demonstrates that vowel-zero alternations are cases neither of insertion nor of deletion. Rather, they involve the interpretation of 'empty nuclei', i.e. nuclei with no segmental content, which must be licensed by proper government. It is when proper government fails to apply that a vowel is realized. Dr Charette also gives consideration to the constraints to which proper government is subject. She argues that these constraints result from phonological principles in conflict. This book represents a major development in the analysis of phonological processes. The extension of grammatical principles and parameters to phonological phenomena is well argued, and will interest theoretical phonologists and specialists of French alike.



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*Conditions on phonological government*

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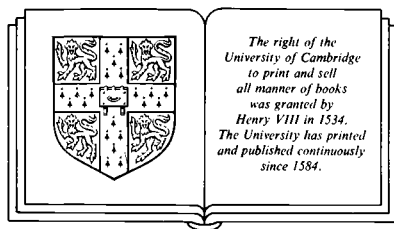
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# CONDITIONS ON PHONOLOGICAL GOVERNMENT

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# *Preface*

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This book represents an expanded and modified version of my Ph.D. dissertation (Charette 1988). The sections of my thesis which have been published will not be found here. The modifications involve certain refinements dealing with the level at which proper government operates. The notion of licensing is now more clearly defined, especially with respect to licensing as a condition for government. My treatment of compounds now directly follows from my analysis of word-internal empty nuclei. Some problematic data concerning the alternation of schwa with [ɛ] are now accounted for in terms of the effect of a floating consonant on a word-final empty nucleus.

This book is addressed to any linguist interested in phonological theories in general and Government Phonology, the framework in which it is written, in particular. Those who are unfamiliar with Government Phonology will find a fairly detailed presentation of certain aspects of this theory in chapter 1. The reader already familiar with this framework will be interested by new proposals and the sharpening of certain notions. This book may also be of interest for its new analyses of certain phenomena in French.

Since this book represents an expanded version of my dissertation, I wish to thank those who helped me with both the original work and the preparation of this book. In particular I am grateful to Jean Lowenstamm and Glyne Piggott for their help, support, comments and suggestions. I also want to thank the members of the African Project in Montreal and my colleagues and postgraduate students at the University of London. Thanks go to Jacques Durand and an anonymous reader of the manuscript of this book for their comments and suggestions. Finally, and above all, I would like to express my sincerest gratitude to Jonathan Kaye. Without his help, support, comments and suggestions neither my thesis nor my book would ever have been what they became.



# *Introduction*

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Let us consider the two following pairs of words from French and Khalkha Mongolian respectively.

- (1) mener [mne] 'to lead'            mène [men] '(he/she) leads'  
      amraa [amraa] 'one's lover'      amar [amar] 'lover'

The phonetic transcription of these pairs of related words illustrates an alternation between a vowel and zero. While a vowel is present in one form (cf. [men], [amar]) it is absent in the other form (cf. [mne], [amraa]). Vowel-zero alternation is a thorny problem. Confronted with such data linguists have to discover if they are dealing with a process of vowel epenthesis or of vowel deletion. In French, where the presence of the vowel is not always predictable, linguists have claimed that the language has a process of vowel deletion. Certain words contain an underlying schwa which is subject to deletion in some contexts.<sup>1</sup> In Mongolian, on the other hand, since the presence of the vowel is predictable it might be argued that the language has a process of vowel epenthesis. A similar analysis has been proposed for [i] in Yawelmani. This means that vowel-zero alternation has a dual interpretation: epenthesis or deletion.

I would like to suggest another approach to this phenomenon. Vowel-zero alternations involve neither epenthesis nor deletion. My claim is that the syllabic structure of a word is never modified by the application of a phonological process. If the structure of a word remains unchanged this means that I deny the possibility of modifying the syllabic structure of a word in the course of a phonological derivation. I must conclude that the so-called phonetic form given above has no linguistic reality.

If I consider that a vowel which has the property of alternating with zero is a nuclear position which is always present in the lexical representation of a word, I have to determine under which circumstances this

## 2 Introduction

nuclear position is or is not phonetically manifested. The following pages will be devoted to the subject.

Following a proposal made by Anderson (1982) and Kaye (1987, 1990b), I consider a vowel which alternates with zero as having the representation of an underlying empty nucleus. This nuclear position is present in the structure of a word whether or not it is phonetically expressed. Like empty categories in syntax, empty nuclei are subject to the Empty Category Principle. What determines if an empty nucleus may be left without phonetic manifestation is whether or not it is properly governed. It is only when an empty nucleus is properly governed by a following nucleus which itself is ungoverned that it may be realized as null. If proper government fails to apply, the empty nucleus must be phonetically expressed. Reconsidering the forms I gave in (1), the empty nucleus is properly governed and therefore not manifested when a vowel follows it (cf. /amθraa/ [amraa], /mθne/ [mne]). When there is no proper governor to properly govern the empty nucleus, it is phonetically realized (cf. [mən], [amar]). In terms of proper government, vowel-zero alternation is no longer language specific, nor accidental. One way languages may differ from one another is the way in which an ungoverned empty position is realized. It is realized as schwa in French, as [a] in Khalkha Mongolian, as [i] in Yawelmani, as [i] in Moroccan Arabic, and so forth.

The second notion that I will discuss is government-licensing. To understand licensing let us consider the following forms.

- (2)    **French**  
a. matelas [matla] 'mattress'    samedi [samdi] 'Saturday'  
b. brebis [brəbi] 'sheep'    marguerite [margərit] 'daisy'

**Tangale**

- c.        sumo-zi [sumzi]                    'your (fem) name'  
d.        landa-zi [lanzi] \*[landzi]        'your (fem) dress'

As predicted by my analysis, the forms in (2a) and (2c) are realized without a vowel. The empty nucleus is properly governed by a following nucleus which is itself ungoverned and is manifested as null. The problem is to account for the presence of schwa in the French forms given in (2b) and for the loss of a consonant in the Tangale form given in (2d). According to what I have said so far, zero should be possible in those forms since, as before, the empty nucleus is followed by a vowel.



To account for zero in *matelas* and schwa in *brebis* I propose the following. The head of an onset must receive its power to govern a complement (i.e. its licence to govern) from the nucleus governing it. Assuming that a properly governed empty nucleus has no such power there are two possibilities. The properly governable empty nucleus fails to be properly governed, is realized phonetically and government-licenses its onset. This is the case in French. Or proper government applies, resulting in the absence of manifestation of the empty nucleus and therefore preventing the empty nucleus from licensing its onset. If not government-licensed, an onset-head cannot govern its complement. This explains the case of Tangale.

Given what I have said so far, one thing we would not predict is an empty nucleus realized as null in word-final position in languages like French and Mongolian, where I claim that proper government operates from right-to-left. But forms like the following ones are attested in French.

- (3)    libre [libr] 'free'        librement [librəmā] 'freely'  
        forte [fɔrt] 'strong'      fortemment [fɔrtəmā] 'strongly'

Let us suppose that there is a parameter in the grammar according to which a word-final empty nucleus is or is not licensed (i.e. authorized to be realized as null even though not properly governed). If French selects the 'Yes' option and Japanese the 'No' option of this parameter, we can now distinguish two kinds of languages. Those which have words ending phonetically with a vowel or a consonant and those where words always end with a vowel (a word-final empty nucleus is manifested as [i] in Japanese). Within those languages which select the 'Yes' option of the above parameter, an additional distinction must be made. In some languages, such as French, words can phonetically end with a vowel, a single consonant or a consonant cluster. In other languages, such as Korean and Wolof, words can phonetically end with a vowel, a single consonant but never with a consonant cluster. Those two types of languages might be distinguished by a parameter according to which a licensed word-final empty nucleus is or is not a government-licenser for its onset. In French, where a licensed word-final empty nucleus is a government-licenser, it may then occur after a consonant cluster. In Wolof and Korean the word-final empty nucleus is not a government-licenser, which explains why zero is never found after a consonant cluster. In Wolof a so-called epenthetic schwa is realized after a conson-

#### 4 *Introduction*

ant cluster, and in Korean like in Tangale the empty nucleus is realized as null, which entails the loss of one of the consonants of the cluster.

These are the principal notions considered in this book. My analysis of vowel alternation with zero is mainly illustrated by the behaviour of schwa in French. In terms of proper government, government-licensing and stress assignment I account for the alternation of schwa with zero and [ɛ] in all the different contexts where the alternation is found.

Let us now turn to chapter 1, where I present the theory of Government Phonology.

# 1 *A theory of government in phonology*

---

## 1.0 Introduction

This study lies within the framework of the theory of phonological government as proposed by Kaye, Lowenstamm & Vergnaud (1985, 1989, 1990). In this first chapter I present the outline of the theory. In addition to presenting the idea behind government in phonology, I give a fairly detailed picture of certain aspects and properties of this theory.

## 1.1 The principle of prosodic government

It appears that Lowenstamm & Kaye (1982), with their principle of 'prosodic government', were the first to suggest that relations of government may be present in phonology as well as in syntax. As argued by Kaye & Lowenstamm, the phonological process of vowel shortening in closed syllables is found in so many languages that it cannot be either accidental or language specific. This process should follow from general principles of phonological theory. Let us first consider some cases of vowel shortening in closed syllables, assuming for the time being that a single word-final consonant does not occur within a branching rhyme.<sup>1</sup>

### (1) Quebec French

vert [vɛ:r]	[va'r]	'green (masc)'	verte [vɛrt]	[vart]	'green (fem)'
dort [dɔ:r]	[da'r]	'(he/she) sleeps'	dormir [dɔrmir]		'to sleep'
perd [pɛ:r]	[pa'r]	'(he/she) loses'	perdez [pɛrde]	[parde]	'(you pl) lose'
sert [sɛ:r]	[sa'r]	'(he/she) serves'	servir [sɛrvir]	[sarvir]	'to serve'

### Wolof

<i>imperfective</i>	<i>inversive</i>	<i>gloss</i>	
[rɔ:f]	[rɔppi]	'to put in/to take out'	→

6 *A theory of government in phonology*

[yɛ:w]	[yɛwwi]	'to tie/ to untie'
[tɛ:r]	[teddi]	'to start/to stop a vehicle'

**English**

[ki:p]	[kɛpt]	[hi:l]	[hɛld]
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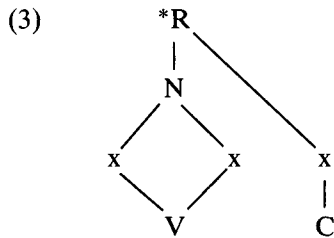
**Turkish**

<i>nominative</i>	<i>possessive</i>	<i>ablative</i>	<i>gloss</i>
[merak]	[mera:ki]	[meraktan]	'law'
[sevap]	[seva:bi]	[sevaptan]	'good deed'

To capture the apparent universal property of vowel shortening in closed syllables it is proposed that within the rhyme, the head (defined as the leftmost nuclear skeletal point) must govern all the skeletal points within its domain, i.e. the rhyme.<sup>2</sup> Government is based on the following notion of c-command proposed by Reinhart (1983: 18).

- (2) Node  $\alpha$  c(onstituent)-commands node  $\beta$  iff the branching node most immediately dominating  $\alpha$  also dominates  $\beta$ .

The configuration of a branching nucleus within a branching rhyme is excluded because in such a configuration, the branching nucleus has the effect of blocking the c-command of the rhymal complement by the nuclear head.<sup>3</sup>



The first branching node dominating the head is N, and N does not dominate the rhymal complement. If the nuclear head must c-command all the skeletal points within the rhyme, it follows that a branching nucleus cannot occur within a rhyme which is also branching.<sup>4</sup>

The principle of prosodic government, in addition to explaining why long vowels systematically shorten in closed syllables, provides an account as to how skeletal points are organized within the rhyme. There is a nuclear head which must be strictly adjacent to its complement.<sup>5</sup>

The formulation of the principle of prosodic government is, along with a number of proposals regarding the organization of the stress

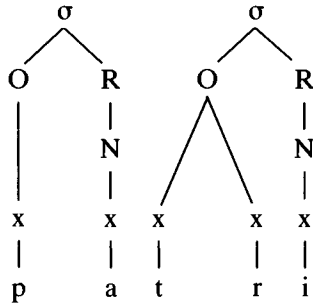
systems, among the first attempts at deriving phonological phenomena from universal constraints on the organization of skeletal positions. There are, however, many apparent counterexamples to the principle. For example, vowel shortening seems to be systematically violated in word-final position in some languages. According to the theory, if a long vowel fails to shorten in what appears to be a closed syllable, it is because the following consonant is not syllabified into the rhyme along with the branching nucleus. Interestingly many apparent violations of vowel shortening in closed syllables are found in word-final position. Following the spirit of Halle & Vergnaud (1980), who proposed that in languages like English and German word-final coronal consonants are not syllabified within the rhyme but within a post-rhymal constituent appendix, I proposed in Charette (1985) that languages in which vowel shortening is systematically violated in word-final position have a word-final appendix. While Halle & Vergnaud accounted for the asymmetry between word-internal and word-final consonant clusters, I accounted for the absence of vowel shortening in word-final position. My proposal was that a word-final consonant in languages like Quebec French, English, Wolof etc. was syllabified in the appendix and not in a coda.<sup>6</sup>

Prosodic government was then the first step towards a theory which derives syllabification of skeletal points and segments in terms of constraints on the relations they contract with each other. It remained to be discovered how segments and skeletal points are syllabified into constituents and how constituents are grouped together within a domain such as the word. Providing an answer to these questions on syllabification falls within the scope of the theory of phonological government.

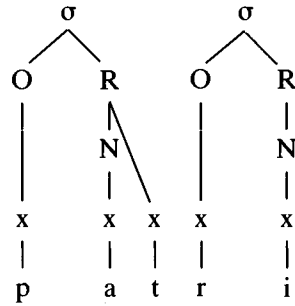
## 1.2 Phonological government

Except in the frameworks of Dependency Phonology (cf. Anderson and Ewen 1987) and Phonological Government (cf. Kaye, Lowenstamm & Vergnaud 1985, 1989, 1990), words are viewed as sequences of syllables. Such a conception of the internal structure of words raises problems. Consider for example the French word *patrie* 'native land'. If words are indeed constituted of sequences of syllables, the syllabification of *patrie* should be ambiguous. Since *patte* [pat] 'paw', *pas* [pa] 'footstep', *tri* [tri] 'sorting (out)' and *ri* [ri] 'laughed' are all well-formed syllables in French, *patrie* should have two possible syllabifications, namely *pa.tri* or *pat.ri*, as shown in (4) overleaf.

(4) a.



b.



The fact is that the word *patrie* has only one possible syllabification, namely (4a).<sup>7</sup> That the sequence obstruent–liquid does not have the structure given in (4b), in languages which have both branching onsets and branching rhymes, can be fully justified.<sup>8</sup> Stress assignment and the distribution of long vowels and heavy diphthongs are among many processes which show that the sequence vowel–obstruent before a liquid never constitutes a closed syllable. Preceding a cluster obstruent–liquid, a vowel seems always to behave like one in an open syllable. If the order of the two consonants is reversed, the preceding vowel now behaves like a constituent of a branching rhyme.<sup>9</sup> As an example, let us consider stress assignment in English.

### 1.2.1 Stress assignment in English

Without going into a detailed analysis of stress assignment in English, it is clear that stress is sensitive to the branching of the rhyme. Let us take words containing three syllables. Stress falls on the penultimate syllable if it is closed. If the penultimate syllable is open, it is the initial syllable which is accentuated. The following examples show that the sequence vowel–liquid–obstruent counts as a closed syllable, while the sequence vowel–obstruent–liquid counts as an open one.

(5)	Vowel–obstruent–liquid	Vowel–liquid–obstruent	
	álgebra	*algébra	recórder
	rétrograde	*retrógrade	*récorder
	páragraph	*parágraph	résultant
			*résultant
			resérvist
			*réservist

The stress pattern of words ending in *-oid* in English also leads to the same conclusion. That is, preceding a sequence sonorant–obstruent, a vowel behaves as in a closed syllable, while before a cluster obstruent–sonorant, it now behaves as occurring in an open one. The following

examples show that stress falls on the syllable immediately preceding *-oid* if it is closed, otherwise it is the antepenultimate syllable which bears the stress.

(6)	<b>Sonorant–obstruent</b>	<b>Obstruent–sonorant</b>
	plerocércoid	endopólyploid
	cysticércoid	érythroid
	conférvoid	mónoploid
	emúlsoïd	péllagroid
	dispérsoid	ámphiploid
	demántoid	héxaploid

As a second motivation for the difference in syllabification of an obstruent–liquid and a liquid–obstruent cluster, let us consider the distribution of long vowels and heavy diphthongs in Quebec French.

### 1.2.2 Long vowels and heavy diphthongs in Quebec French

Unlike standard French, Quebec French has long vowels and heavy diphthongs.<sup>10</sup> While a long vowel or heavy diphthong systematically shortens before a cluster liquid–obstruent, it remains long before a cluster of the type obstruent–liquid.<sup>11</sup> This is illustrated in (7).

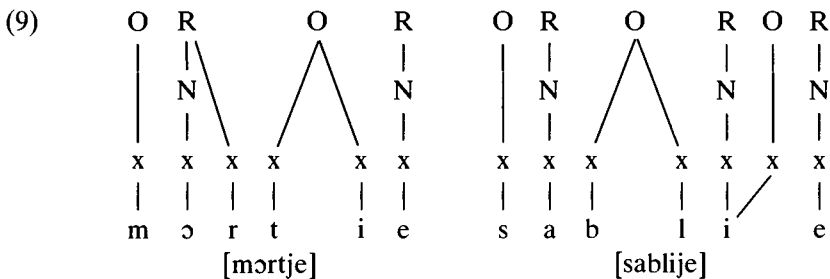
(7)	<b>a. Before a cluster liquid–obstruent</b>			
	mort [mɔ:r]	‘dead (masc)’	morte [mɔrt]	*[mɔ:rt] ‘dead (fem)’
	[ma <sup>u</sup> r]			*[ma <sup>u</sup> rt]
			mortuaire [mɔrtyɛ:r]	*[mɔ:rtɛ:r] ‘mortuary’
				*[ma <sup>u</sup> rtɛ:r]
	vert [vɛ:r]	‘green (masc)’	verte [vert]	*[vɛ:rt] ‘green (fem)’
	[va <sup>i</sup> r]			*[va <sup>i</sup> rt]
			verdure [vɛrɔdy:r]	*[vɛ:rdy:r] ‘greenness’
				*[va <sup>i</sup> rdy:r]
	fort [fɔ:r]	‘strong (masc)’	forte [fɔrt]	*[fɔ:rt] ‘strong (fem)’
	[fa <sup>u</sup> r]			*[fa <sup>u</sup> rt]
			fortement [fɔrtəmã]	*[fɔ:rtəmã] ‘strongly’
				*[fa <sup>u</sup> rtəmã]
	<b>b. Before a cluster obstruent–liquid</b>			
	pauvre [po:vɛ]	‘poor’	pauvrement [po:vɛmã]	‘poorly’
	maigre [mɛ:gr]	‘thin’	maigrement [mɛ:grmã]	‘meagrely’

Assuming that a branching nucleus cannot occur within a rhyme which is also branching, the distribution of long vowels and heavy diphthongs in Quebec French suggests that a sequence obstruent–liquid does not constitute an interconstituent cluster.

As a final example, let us consider the phonetic realization of the sequence -CCie- in French. In (8) below I give words ending in *-ier* and what is of importance is the phonetic realization of the sequence /ie/. When the vowel /i/ follows a cluster liquid–obstruent (i.e. a non-branching onset) it is realized as a glide. However, when /i/ follows a sequence obstruent–liquid it has to be realized as [i] followed by a glide.

(8)	<b>Liquid–obstruent</b>	<b>Obstruent–liquid</b>
	mortier [mɔrtje] ‘mortar’	platrier [platrije] ‘plasterer’
	portier [pɔrtje] ‘doorman’	encrier [ākrije] ‘inkpot’
	quartier [kartje] ‘district’	sucrier [sykrije] ‘sugar bowl’
	courtier [kurtje] ‘broker’	poudrier [pudrije] ‘compact’
	barbier [barbje] ‘barber’	cendrier [sādrije] ‘ashtray’
	coursier [kursje] ‘messenger’	sablier [sablrije] ‘hourglass’

Without going into a detailed analysis of the forms given in (8), let us suppose the following: (1) /i/ is realized as a glide when it is syllabified within an onset; (2) an onset is maximally binary. Given these two suppositions, it follows that unlike the cluster obstruent–liquid, the one liquid–obstruent does not constitute a branching onset. In words like *mortier* the consonant cluster does not constitute a branching onset and /i/ joins the *t* in the onset position and is realized as a glide. On the other hand, if the sequence obstruent–liquid forms a branching onset, /i/ may not join the consonants, is syllabified in a nuclear position (and spreads in the following empty onset), resulting in the phonetic realization [ij]. The point here is that we have another case showing that the two types of clusters seem to have different syllabifications.





Let us now consider what the theory of government proposes as principles of syllabification.

### 1.2.3 Government as the motor driving syllabification

Suppose that words are not constituted of sequences of syllables, but rather that they are formed of sequences onset–rhyme, those constituents being stitched together in terms of governing relations. In addition, skeletal points along with their segments are syllabified into constituents by governing relations which are similar to the governing relations that the constituents contract with each other. This means that the theory of government assumes that skeletal points are organized and associated with constituents in terms of governing relations.

Consequently, it is not the case that the governing relations that skeletal points contract with each other are determined from their syllabification into constituents. Indeed syllabification proceeds from government, not vice versa. This raises the question as to how governing relations are defined. Let me present the theory in a reconsideration of the French word *patrie*.

Let us suppose that the lexical representation of a word is as follows. At the segmental level the word is a linear sequence of segments. At the skeletal level it is a linear sequence of skeletal points which are associated to the segments. And at the constituent level it is a linear sequence of constituents onset–rhyme.<sup>12</sup> And finally, I propose that nuclear points along with their vocalic segments are lexically associated with a constituent nucleus. The lexical representation I assume for the word *patrie* is illustrated in (10).

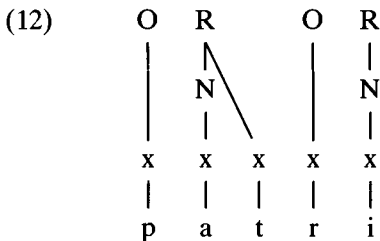
(10)	O	R	O	R
		N		N
	x	x	x	x
	p	a	t	r i

From the information present in the lexical representation, all the points along with their segments are projected onto constituents which will be grouped together to form a word. What needs to be determined is how points and segments are syllabified. As far as the first two segments or positions of the word *patrie* are concerned, there is no possible ambi-



all languages which have both branching onsets and branching rhymes, a consonant cluster of the type obstruent–liquid always forms a branching onset and a cluster liquid–obstruent a branching rhyme followed by an onset. These facts are well known and various proposals have been made to account for the absence of structures like (11a). These proposals either claim that when there is a choice in the syllabification of two consonants or non-nuclear points, we select a syllabification that maximizes the onset position (a sequence liquid–obstruent is not considered a possible onset), or that only sonorants can be syllabified within a rhyme.<sup>14</sup> According to the principle of maximization of onset, a word like *patrie* has the structure of an open rhyme followed by a branching onset (cf. (11b)).

As we will see below, government is inconsistent with a maximal onset approach. This latter proposal encounters problems in languages which have branching rhymes but no branching onsets. In those languages, a maximal onset approach will syllabify a sequence obstruent plus liquid in a rhyme followed by an onset. According to government, such a syllabification is universally impossible, as we will see below. Hence, a maximal onset approach would claim that the structure in (12) is well-formed in languages that have branching rhymes but no branching onsets.<sup>15</sup> In the framework of the theory of government, this structure is claimed to be universally ill-formed.<sup>16</sup>



In terms of government, the syllabification of segments and the organization of constituents within the word are derived from general principles of the phonological theory. To this end it is crucial to adopt a theory of the representation of segments which, among other things, attributes to all segments a charm value.<sup>17</sup>

#### 1.2.4 The notion of charm

Going into a detailed presentation of Kaye, Lowenstamm and Vergnaud's theory of representation of segments would lead me far beyond

the scope of this section. Therefore, I will limit this discussion to the outline of the theory.

They propose that the ultimate constituents of phonological segments are not the features but the elements. An element may be thought of as a complete matrix of features (it is phonetically interpretable) which contains at most one marked (or hot) feature specification. All segments are composed of an operator and a head. The resulting segment has all feature specifications of its head except for the operator's hot feature.

(13)	a.	<b>Operator</b>	<b>Head</b>		<b>Segment</b>
		–Round	–Round		–Round
		+Back	– <b>Back</b>		– <b>Back</b>
		– <b>High</b>	+High	→	– <b>High</b>
		–ATR	–ATR		–ATR
		+Low	–Low		–Low
		(A <sup>+</sup>	· I <sup>0</sup> )	→	[ɛ] <sup>0 18</sup>
	b.	<b>Operator</b>	<b>Head</b>		<b>Segment</b>
		–Round	–Round		–Round
		+Back	+Back		+Back
		+High	– <b>High</b>	→	– <b>High</b>
		–ATR	–ATR		–ATR
		–Low	+Low		+Low
		(v <sup>0</sup>	· A <sup>+</sup> )	→	[a] <sup>+19</sup>

The elements have a charm value. Very roughly speaking, charm is a property of elements which defines their combinatorial possibilities. Elements of identical charm value are repelled and there is an attraction between elements of unlike charm. For example, the positively charmed ATR element (i.e. I<sup>+</sup>) cannot combine with the positively charmed element A<sup>+</sup> (there is no ATR low vowel), while the charmless element I<sup>0</sup> can combine with it. Generally speaking, a segment has the charm value of its head except when a given operator has the property to transmit its charm value. Positive charm represents the property of ‘voweliness’, negative charm the one of ‘consonantiness’. A segment which is characterized by neither one nor the other property is called neutral, i.e. charmless. Nuclear governors have positive charm; non-nuclear governors have negative charm, and governees have neutral charm.

Concerning the internal representation of consonantal segments, in

addition to the elements  $I^0$ ,  $U^0$ ,  $A^+$ ,  $v^0$  involved in the representation of the vowels, the following elements are proposed.

(14) **Elements**

$R^0$	coronality	$H^-$	stiff vocal chords
$?^0$	constriction	$L^-$	slack vocal chords
$h^0$	aspiration	$N^+$	nasality

The first question is which elements give to a consonant its negative charm value. Kaye, Lowenstamm & Vergnaud propose the following:

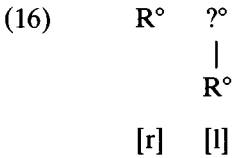
Negative charm is a property of elements whose hot feature involves the state of the vocal chords. Two elements (in the sense of Kaye, Lowenstamm & Vergnaud) are proposed:  $H^-$  (stiff vocal chords) and  $L^-$  (slack vocal chords). These elements control (non-spontaneous) voicing properties in consonants and represent tone on vowels.

From this we now understand how obstruents and non-strident fricatives are governors, i.e. negatively charmed. They represent the consonantal segments which have an element controlling their non-spontaneous voicing properties. The internal representations of some consonants are given in (15).<sup>20</sup>

(15)	<b>U</b> <sup>0</sup>	<b>U</b> <sup>0</sup>	<b>R</b> <sup>0</sup>	<b>R</b> <sup>0</sup>	<b>v</b> <sup>0</sup>	<b>v</b> <sup>0</sup>	<b>v</b> <sup>0</sup>	<b>v</b> <sup>0</sup>
	? <sup>0</sup>	? <sup>0</sup>	? <sup>0</sup>	? <sup>0</sup>	? <sup>0</sup>	? <sup>0</sup>	h <sup>0</sup>	h <sup>0</sup>
	H <sup>-</sup>	L <sup>-</sup>	H <sup>-</sup>	L <sup>-</sup>	H <sup>-</sup>	L <sup>-</sup>	H <sup>-</sup>	L <sup>-</sup>
	[p]	[b]	[t]	[d]	[k]	[g]	[f]	[v]

Note that a segment has all the property of its head (the element printed in bold) except for the hot value of its operators. The elements  $H^-$  and  $L^-$  contribute their charm value.

I mentioned earlier that charmless segments are governees. Although this is indeed the case, a word should be added. While a charmless consonant may always be governed by a negatively charmed segment, it may also be governed by another charmless segment. In this latter case, the governor must be more complex than its governee. The complexity is calculated by the numbers of operators a given segment is composed of. For example, the liquid [l] may govern [r] since [l] is more complex than [r]. This is illustrated overleaf in (16).



Finally, Korean has shown that certain languages possess a series of neutral stops. English and French also have a series of non-coronal charmless stops, as can be seen in words like *adopt*, *adopter*, *doctor*, *docteur*, where *p* and [k] are governed by *t*. The claim is then that the *p* in *adopt* is phonetically different from the *p* in *alpine*. While *p* is a governee in the former, it is a governor in the latter.<sup>21</sup>

The charm value attributed to a segment is crucial since it determines, among other things, how adjacent skeletal points are syllabified.<sup>22</sup> As a rough approximation, stops and non-strident fricatives are negatively charmed and all other consonants are charmless. Given this characterization of segments, the theory claims the following: (i) charmed segments are governors and charmless segments are governees; (ii) the syllabification of adjacent segments is determined by the governing relation they contract with each other. A governing relation between adjacent skeletal points is not optional. Two adjacent points always contract a governing relation. There are two principal types of governing relations: constituent and interconstituent.

### 1.2.5 Constituent government

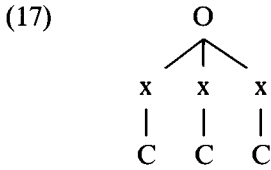
Constituent government determines what constitutes a well-formed branching constituent. To be sisters within a constituent, two adjacent skeletal points must be in a governing relation which is characterized as follows:

- (i) Constituent government is directional: the head is initial.
- (ii) Constituent government is strictly local: the governor must be strictly adjacent to the governee.

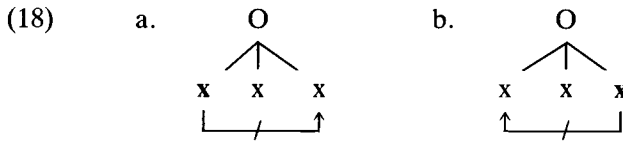
It follows from these two conditions that a branching constituent is maximally binary and that it constitutes a governing domain where the head governs a complement from left-to-right.

That constituents are maximally binary follows from both conditions. Suppose that an onset dominates three skeletal points.

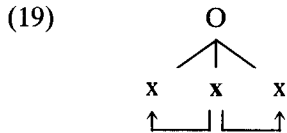
This configuration would violate either the directionality of government or the locality requirement between the head and its complement.



In such a ternary branching onset, if the head is initial, it would not be adjacent to both its complements, violating locality (the situation would be identical if the head were final). This is illustrated in (18). In (18a) the head of a ternary branching onset is initial and it cannot govern the rightmost point without violating strict adjacency. In (18b) the head of the onset is final, once again violating adjacency in governing the leftmost point.



In order to respect locality the head of a ternary branching constituent must be situated between its complements. But this would violate directionality. In medial position the head will govern from right-to-left the preceding complement and from left-to-right the following one.



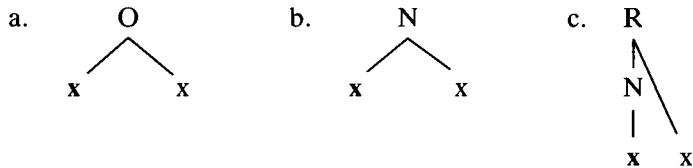
Consequently, according to the two conditions just mentioned, a branching constituent is maximally binary.

Now, consider what is a governor and what is a governee. Recall that the theory claims that governors are charmed segments and that governees are charmless ones. Since a stop consonant is negatively charmed, it is a potential governor.<sup>23</sup> In contrast, because it is charmless, a liquid is a potential governee.<sup>24</sup> In the French word *patrie* the internal cluster is one where the stop precedes the liquid, that is, where the governor precedes the governee. Given that the two adjacent skeletal points are always in a governing relation, it follows from government that the only possible internal syllabification for the two consonants is one where the two segments are sisters within a branching onset. When the segments

or consonants are syllabified in an onset, the two conditions of constituent government are met: the two consonants are strictly adjacent, and the governing consonant, the stop, precedes the governee.

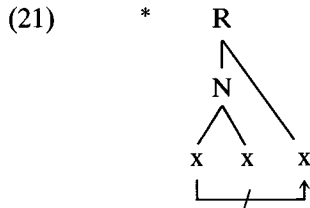
Under constituent government every branching constituent is a governing domain, and in order to be a governing domain the two conditions on directionality and locality must be respected.

(20) **Governing domains**



(where x indicates the head)

In a well-formed branching onset, nucleus or rhyme, the head is initial and adjacent to its complement. Note here that the strict locality requirement captures the impossibility of having a branching nucleus within a branching rhyme.



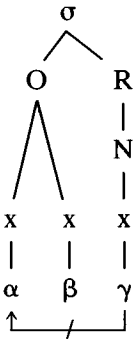
It is important to notice that the head of the rhyme is not the nucleus itself, but the nuclear point. In this theory a relation of government is a relation between skeletal points. In other words, heads and complements (governors and governees) are skeletal points and not constituents. Skeletal points receive their properties of governor/governee from the segments. It is not claimed that a constituent must constitute the domain of a governing relation. A constituent can dominate a head and its governee (e.g. branching constituent), only the head (e.g. non-branching), or it can even be empty.

In the theory of government the syllable is not recognized as a constituent of a word. What is generally assumed to be a syllable is a sequence of onset–rhyme. Note that if there were a **constituent** syllable, given constituent government, which says that the head is initial, the onset would be considered the head of the syllable, an undesirable result.



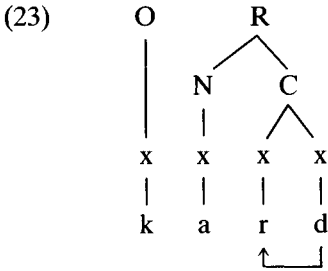
In order for the nucleus to be the head of the syllable, directionality would have to be relaxed. This move would clearly be ad hoc as the syllable would be the only constituent within which government flows from right-to-left. Notice that one cannot appeal to a generalization such as 'above the nucleus constituent government is from right-to-left', since this is not the case for the directionality of government within the rhyme. Since the rhyme is a projection of the nucleus, it is obviously a constituent above the nucleus. It then remains that the constituent syllable (along with the coda, which is denied as a constituent) would be the only constituent above the nucleus within which government flows from right-to-left and not from left-to-right. Moreover, since **constituent** government also requires strict adjacency between the head and its complement, it would also necessitate the relaxation of the strict adjacency requirement between the nuclear head and its complement onset in cases where the onset branches. This is illustrated in (22).

(22)



In addition we will see in the next section that the rhyme is in a governing relation with a preceding onset. Grouping these two constituents in a constituent syllable would lead to a redundancy between interconstituent government and the grouping of the two constituents in a syllable.

The reader will also have noticed the absence of a **constituent** coda. Given that there is no evidence for the presence of a constituent coda, this constituent is eliminated. If the coda were a constituent it would, like any other constituent, be potentially branching. This would necessitate the relaxation of directionality of constituent government, as illustrated overleaf in (23). While government would flow from left-to-right within the constituents onset, nucleus and rhyme, it would flow in



the opposite direction within the coda. Moreover, since the nucleus and the coda are both contained within a rhyme, the condition of strict locality between the nuclear head and its complement would be violated in (23). If one were to argue that it may be the case that the coda may not branch, it would still be necessary to explain why the coda would then be the only constituent with such a characteristic. The theory then proposes that the rhymal non-nuclear point is now considered the complement of the rhyme.

One could always propose that the head would be initial within the onset, nucleus and rhyme, while being final within the constituents syllable and coda. But there are problems with this. First, claiming that both the syllable and the coda are constituents is inconsistent with the proposal that government is strictly directional. Indeed, not only would one have to stipulate that the directionality of constituent government may vary from one constituent to another, but it would also lead to the conclusion that constituent government is also bidirectional. The nucleus would govern a complement to its left (the onset) and to its right (the coda). Moreover we will see that government between constituents flows in the opposite direction from that within constituents. What would then distinguish constituent from interconstituent government if directionality is no longer a criterion?

Constituent government determines what constitutes a well-formed branching constituent. We still need to consider the principles that determine the syllabification of adjacent skeletal points that do not meet the conditions of constituent government.

### 1.2.6 Interconstituent government

The fact that two skeletal points do not meet the conditions on constituent government, i.e. when the potential governor follows the potential governee, does not mean that no governing relation exists between

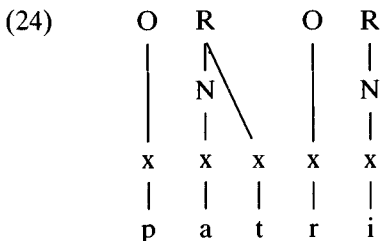
those two contiguous skeletal positions. The governing relation between adjacent points which cannot be analysed as a branching constituent may be one of interconstituent government. Hence, according to the theory, a governing relation is present between any two adjacent points. With respect to interconstituent clusters, government flows in the opposite direction to constituent government. A sequence of skeletal points is a well-formed interconstituent cluster if the following conditions are met:

**Interconstituent government**

- (i) Strictly local: the governor and the governee must be strictly adjacent.
- (ii) Strictly directional: the head is final.

Whereas the internal consonant cluster in *patrie* cannot constitute an interconstituent cluster because the governor precedes the governee, the one in *parti* respects the two conditions of interconstituent government. The two segments are adjacent and the governor follows the governee. Consequently, according to the governing relations just defined, the only possible syllabifications of *patrie* and *parti* are respectively *pa.tri* and *par.ti*. Interconstituent government is the mirror image of constituent government. Reversing the order of the segments of a well-formed branching onset gives a well-formed interconstituent cluster.<sup>25</sup>

It should now be clear that government differs from a maximal onset approach. In languages which have branching rhymes but no branching onsets, 'sequences' obstruent–liquid can be found. According to a maximal onset approach, in those languages a word like *patrie* would be formed of a branching rhyme followed by a non-branching onset.



However, the theory of government claims that such a syllabification is universally ill-formed. Even in languages which do not have branching onset, a sequence obstruent–liquid cannot form an interconstituent clus-

ter where the obstruent is in the rhyme and the liquid in the following onset. Such a syllabification violates the conditions on interconstituent government. Since the head (the obstruent) precedes the complement (the liquid), the two consonants cannot be in an interconstituent governing relation. In languages that do not have branching onsets, the two consonants must be syllabified in constituents that are not in a governing relation. The only possible syllabification is one where the two consonants belong to distinct onsets separated from each other by an empty nucleus.<sup>26</sup> The contrast between the two approaches for languages which do not have branching onset is illustrated in (25).

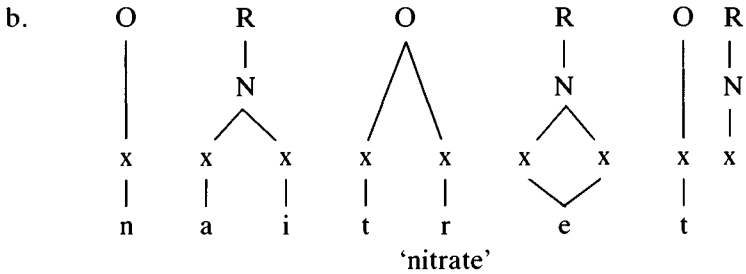
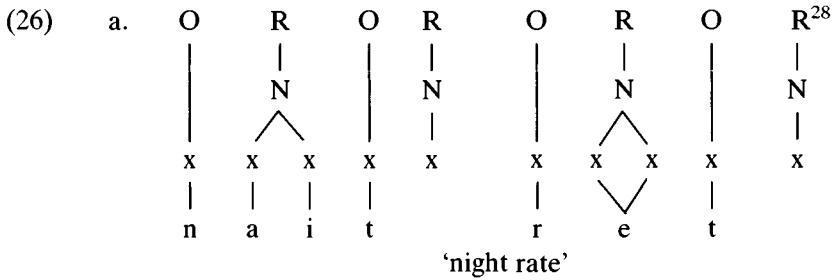
(25)

A maximal onset approach					Government					
O	R		O	R	O	R	O	R	O	R
	N	/								
x	x	x	x	x	x	x	x	x	x	x
p	a	t	r	i	p	a	t	r	i	i

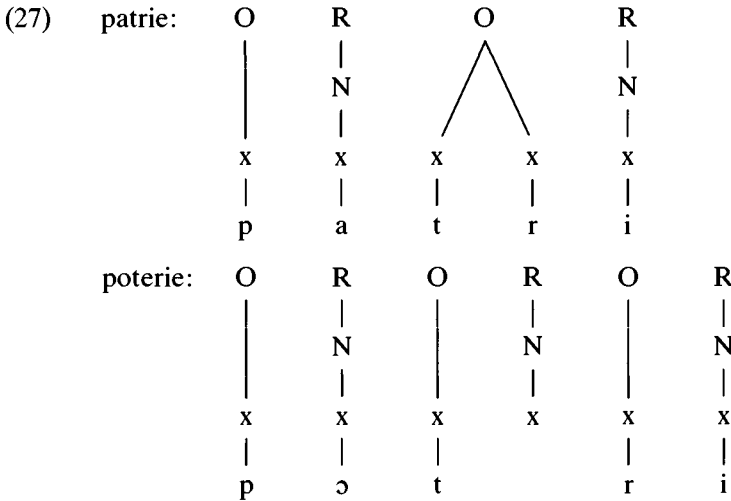
Under government nothing prevents a sequence obstruent–liquid from being found in languages where rhymes branch and onsets do not. However, the theory claims that even though the two consonants are phonetically adjacent, they cannot be in a governing relation. In the lexical representation a nucleus intervenes between the two consonants and they can only be syllabified in distinct constituents that do not contract a governing relation. More specifically, the two segments must be syllabified in distinct onsets. The nucleus which intervenes between the two non-nuclear points prevents a relation from holding between them.<sup>27</sup>

Note also that in languages that have branching onsets, the members of a sequence obstruent–liquid can belong to distinct constituents if they belong to different cyclic domains. This is the case for words like *night rate*, for example (see (26) opposite). Interestingly the two words *nitrate* and *night rate* differ phonetically with respect to the pronunciation of the stop. It is clear that in *night rate* the *t* of *night* is pronounced like a word-final segment, whereas the first *t* of *nitrate* is not.

Along the same lines I claim that in languages which have both branching onsets and branching rhymes, nothing forces a sequence



obstruent–liquid, or liquid–obstruent (phonetically adjacent), to be syllabified as a branching onset or a branching rhyme followed by an onset, respectively. Let us for example consider the words *patrie* [patri] ‘native land’ and *poterie* [pɔtri] ‘pottery’ (27). While these two words are phonetically identical (except for the leftmost vowel) I claim that they have



a different lexical representation. In *patrie* the two non-nuclear points are strictly adjacent and in *poterie* a nuclear point (empty nucleus) inter-

venes between them. This is justified by the fact that it is possible to realize *poterie* as [pətəri] while such a pronunciation is impossible for *patrie* \*[patəri]. Consequently, I assume that some languages allow nuclei with no phonetic content in the lexical representation of particular words. The fact that in a particular language a given word contains an empty nucleus and another phonetically very similar word does not is lexically determined and does not follow from constraints on governing relations.<sup>29</sup>

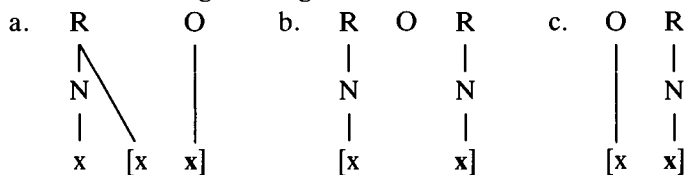
To this extent phonological government determines why adjacent skeletal points are syllabified the way they are. Government is a principle of phonological theory. The claim is that in any language which has both branching rhymes and branching onsets, the members of a sequence of underlyingly adjacent obstruent–liquid are always both projected to an onset. Reversing the order of the segments always gives a governing relation leading to the structure of a rhymal complement followed by an onset.

Interconstituent government is not restricted to the relation a rhymal complement contracts with a following onset. As mentioned earlier, a governing relation holds between any two adjacent skeletal points. Here the following two principles are proposed.

- (28) a. Only the head of a constituent can govern.  
 b. Only the nuclear head may govern a constituent head.<sup>30</sup>

According to the two principles given in (28), interconstituent governing relations are reduced to three configurations.

(29) **Interconstituent governing domains**



(the governors are printed in bold)

Let us first consider (29a, b). In (29a) we have a sequence of skeletal positions which are respectively associated with a rhyme and a following onset. According to the theory, there is always a governing relation between an onset and a preceding rhymal complement. A negatively charmed segment in the onset transsyllabically governs a charmless complement in the preceding rhyme.<sup>31</sup>

Let us now consider (29b). As in (29a) there is a sequence of adjacent skeletal points of the same nature. More precisely, we have a sequence of two adjacent nuclear positions (the intervening onset is empty, it does not dominate any skeletal point). Since the two positions are syllabified into distinct nuclei but are adjacent at both the skeletal and segmental level, an interconstituent governing relation holds between them. The head is final and governs the nucleus to its left. Interconstituent governing relations between adjacent nuclear points is principally designed to explain constraints on vowel sequences in some languages. Among other things, it captures the fact that in such languages, when two nuclear points are adjacent, the leftmost vowel is either deleted or harmonized to its governor. These two situations are illustrated in (30). While in Vata a vowel is harmonized to an adjacent following vowel, in Mongolian and French the first vowel in a sequence of two adjacent vocalic segments is syncopated.

(30) **Vata** (data from Kaye 1982)

la ɔ nɔ → [lɔ ɔ nɔ] 'call his mother'  
call his mother

ɔ pa ʊ → [ɔ pʊ ʊ] 'he throws them'  
he throw them

n le ɔ → [n lɔ ɔ] 'I eat it'  
I eat it

#### **Mongolian**

unɛ + ɛɛ → unɛɛ 'one's own price'

tɔlbɔ + ɔɔ → tɔlbɔɔ 'one's own spot or stain'

yatga + aa → yatgaa 'one's own musical instrument'

#### **French**<sup>32</sup>

le ami → [lami] 'the friend'

la école → [lekɔl] 'the school'

le ours → [lurs] 'the bear'

Now let us consider (29c). Here we have a sequence of an onset followed by a nucleus. According to the theory, an interconstituent governing relation between a nucleus and a preceding onset is always present. (Government between a nuclear head and a preceding onset always holds whatever the charm value of the segments.) It is from this relation contracted between a nucleus and a preceding onset that the





of government are always adjacent at their respective levels. Constituent and interconstituent government are not, however, the only types of governing relations. Bearing in mind that the theory of government seeks to derive phonological processes from government, the theory must allow government between constituents which are not adjacent at every level. This third type of government is similar to interconstituent government since it involves relations between constituents. Because only the nucleus can govern another constituent head, this type of government is restricted to governing relations between nuclei. In other words, the theory proposes another type of government which involves nuclei which are not adjacent at every level, but which are adjacent at a level called the level of nuclear projection. Government by projection is principally needed to account for vowel harmony and stress assignment. It allows two nuclear positions which are separated from each other by a non-nuclear point to be in a governing relation. It is this third type of government which is involved in various phenomena investigated in the chapters to follow.

A summary of the principal characteristics and principles of governing relations is given in (32).

(32) **Phonological government**

Governing relations must have the following properties:

- (i) Constituent government: the head is initial and government is strictly local.
- (ii) Interconstituent government: the head is final and government is strictly local.

Government is subject to the following principles:

- (i) Only the head of a constituent may govern.
- (ii) Only the nuclear head may govern a constituent head.

## 2 The ‘e-muet’ in French<sup>1</sup>

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### 2.0 Introduction

Descriptions of French typically assume the existence of a vowel schwa, the so-called ‘e-muet’ or ‘unstable-e’, the salient property of which is that it alternates with zero, thus making it phonologically different from all the other vowels of French. While in certain dialects of French, schwa is phonetically similar to the vowel /œ/, it is phonologically different from this phoneme.<sup>2</sup> In this chapter I present the properties of schwa along with some relevant data which lead to the conclusion that schwa is phonologically different from /œ/ as well as from all other vowels of the phonemic inventory. The [ə] (i.e. schwa), or [œ], which derives from schwa, has one salient property. Under certain circumstances it alternates with zero or with [ɛ].<sup>3</sup> Unlike the [œ]s which are allophones of schwa, those which express the phoneme /œ/ do not alternate either with zero or with [ɛ]. The latter alternates with the vowel [ø] (e.g. *ils veulent* [vœl] ‘they want’ versus *il veut* [vø] ‘he wants’, *malheur* [malœr] ‘misfortune’ versus *malheureux* [maløø] ‘unfortunate’).

### 2.1 The alternation between schwa and zero

I begin the overview of the facts by considering the alternation between schwa and zero. I present different types of cases where such an alternation is found.<sup>4</sup>

#### 2.1.1 Word-internal and word-final schwas

The alternation of schwa with zero can be observed in comparing the two groups of words given in (1). In both groups of words schwa is preceded by two consonants. In the left column it occurs in word-final position and it is never pronounced. In the right column schwa occurs in word-internal position and it must be phonetically realized.<sup>5</sup>

(1)	<b>Without schwa</b>		<b>With schwa</b>	
	forté	'strong'	fortement	'strongly'
	brusqué	'abrupt'	brusquement	'abruptness'
	fermé	'firm'	fermement	'firmly'
	fumisté	'shirker'	fumisterie	'fraud'
	ébénisté	'cabinet maker'	ébénisterie	'cabinet-making'
	hurlé	'roar!'	hurlement	'roaring'
	bordé	'hem!'	Bordelais	'from Bordeaux'
	embarqué	'board!'	embarquement	'boarding'
	désisté	'withdraw!'	désistement	'withdrawal'
	forgé	'forge!'	forgeron	'blacksmith'
	pauvre	'poor'	pauvrement	'poorly'
	orgé	'barley'	orgelet	'sty'
	parté	'(he/she) leaves (subj)'	appartement	'apartment'
	gouverné	'govern!'	gouvernement	'government'
	percé	'pierce!'	percevoir	'to perceive'
	libré	'free'	librement	'freely'
	tristé	'sad'	tristement	'sadly'
	calmé	'calm'	calmement	'calmly'

In another group of words, shown in (2), schwa is posited in similar contexts to those cited in (1). The difference between the words given in (1) and those in (2) is that in (2) schwa is preceded by only one consonant. In all these words, both word-finally and word-internally, schwa is never realized phonetically.

(2)	lenté	'slow'	lentément	'slowly'
	sagé	'sensible'	sagement	'sensibly'
	âné	'donkey'	ânerie	'stupidity'
	froidé	'cold'	froidement	'coldly'
	chaudé	'hot'	chaudement	'warmly'
	chemisé	'shirt'	chemiserie	'outfitter'
	sûré	'certain'	sûrement	'certainly'
	dupé	'dupe'	duperie	'dupery'
	rondé	'round'	rondissement	'roundly'
	rivé	'shore'	riverain	'waterside'
	galé	'scab'	galerie	'gallery'
	brève	'short'	brèvement	'shortly'
	duré	'hard'	durement	'hardly'
	sotté	'stupid'	sottément	'stupidly'
	légère	'light'	légèreté	'lightness'
	raré	'rare'	rareté	'rarity'
	cané	'duck (female)'	caneton	'duckling'

Based on the data presented in (1) and (2), the generalization is that a word-final schwa (at least before a pause, which is the only word-final context considered so far) is not realized phonetically regardless of the number of consonants that precede it. Word-internally the situation is different. Schwa is realized as zero when preceded by one consonant and as schwa when two consonants precede it. The same alternation is found in the initial syllable of bisyllabic words.

### 2.1.1.1 *Initial syllable of words*

It is almost always the case that a schwa in the initial syllable of a bisyllabic word and preceded by a single consonant is not realized phonetically.<sup>6</sup> It is interesting to compare bisyllabic words with polysyllabic words, where in the same position schwa must be phonetically realized.

- (3) a. **Bisyllabic words**
- |              |           |                    |
|--------------|-----------|--------------------|
| petit gars   | [ptiga]   | 'young boy'        |
| reviens-ici  | [rvjɛisi] | 'come back here!'  |
| demande moi  | [dmãdmwa] | 'ask me!'          |
| cheval       | [ʃfal]    | 'horse'            |
| demain matin | [dmɛmatɛ] | 'tomorrow morning' |
- b. **Polysyllabic words**
- |           |            |             |
|-----------|------------|-------------|
| petitesse | [pɛtitɛsɛ] | 'smallness' |
| chevalier | [ʃəvalje]  | 'knight'    |
| chevalet  | [ʃəvalɛ]   | 'easel'     |

While it is possible for a schwa to be realized as zero when it occurs in the initial syllable of a bisyllabic word whose onset contains a single consonant, it is impossible for this manifestation to occur if the onset is branching.<sup>7</sup>

- (4)
- |          |          |               |
|----------|----------|---------------|
| frelon   | [frəlɔ̃] | 'hornet'      |
| crevasse | [krəvas] | 'fissure'     |
| premier  | [prəmje] | 'first'       |
| brebis   | [brəbi]  | 'sheep'       |
| grenier  | [grɛnje] | 'garret'      |
| crever   | [krəvɛ]  | 'to puncture' |

With regard to the behaviour of schwa word-internally, there are certain cases where even if preceded by a single consonant, schwa is

manifested phonetically. One of these cases is when schwa precedes '*h*-aspiré'.<sup>8</sup> Compare the following forms.

- |     |                |           |                   |
|-----|----------------|-----------|-------------------|
| (5) | mets le dessus | [mɛlady]  | 'put it on!'      |
|     | mets le dehors | [mɛladəʁ] | 'put it outside!' |
|     | rétourne la    | [rturnla] | 'return it!'      |
|     | rehausse la    | [rəosla]  | 'raise it again!' |

While it is possible for a schwa to be realized as zero when it occurs in the first syllable of a word whose initial onset contains a single consonant, it is impossible for this manifestation to occur if an *h*-aspiré follows schwa.

There is also a strong tendency to pronounce a schwa occurring in the initial syllable when it is followed by a consonant cluster.<sup>9</sup>

- |     |            |             |           |            |
|-----|------------|-------------|-----------|------------|
| (6) | secrétaire | 'secretary' | degré     | 'degree'   |
|     | secret     | 'secret'    | chevreau  | 'kid'      |
|     | regret     | 'regret'    | chevreuil | 'roe deer' |

Along the same lines, the behaviour of a word-internal schwa followed by a sequence consonant–glide varies. While it may be omitted in Parisian French, there is a strong tendency for it to be realized in Quebec French.

- |     |                      |                |        |         |
|-----|----------------------|----------------|--------|---------|
| (7) | <b>Quebec French</b> |                |        |         |
|     | cimetière            | 'cemetery'     | depuis | 'since' |
|     | cafetière            | 'coffee-maker' | besoin | 'need'  |

#### 2.1.1.2 Word-internal sequences of schwas

Word-internally, we can also find sequences of adjacent syllables containing schwas. Any word-internal schwa conforms to the generalization concerning the number of preceding consonants. Schwa may be realized as zero when preceded by a single consonant (cf. (2)) and must be realized as schwa after a consonant cluster (cf. (1)). Let us suppose that a word contains two adjacent schwas. The first one is preceded by two consonants and only one consonant intervenes between the two vowels. In this case the first schwa is retained and the second one is not realized phonetically.

- |     |   |               |                             |
|-----|---|---------------|-----------------------------|
| (8) | <b>First schwa preceded by two consonants</b> |               |                             |
|     | entreténir                                    | 'to maintain' | contrevénir 'to contravene' |
|     | contrevénant                                  | 'offending'   |                             |

In another instance of adjacent word-internal schwas, if they are both preceded by a consonant cluster, they are both realized phonetically.

- (9) **Both schwas preceded by two consonants**  
 entrepreneur 'contractor'    entreprenant 'enterprising'

But it is also possible to find two adjacent schwas which are both preceded by a single consonant. In this case it is impossible for both schwas to be syncopated. The result is always the sequence schwa-zero.<sup>10</sup>

- (10) **Both schwas preceded by only one consonant**  
 ensevelir 'to bury'  
 semeler 'to sole'  
 devenir 'to become'  
 papeterie 'stationary'

I conclude this section on word-internal schwas with a consideration of compounds. More precisely I consider the behaviour of the final schwa of the first term of a compound.

### 2.1.1.3 *Compounds*

As in pre-pausal position, the word-final schwa of the first term of a compound is never manifested when it is preceded by a single consonant.

- |      |             |              |                 |               |
|------|-------------|--------------|-----------------|---------------|
| (11) | piqué-nique | 'picnic'     | passé-montagne  | 'Balaclava'   |
|      | cassé-noix  | 'nutcracker' | cassé-noisettes | 'nutcracker'  |
|      | passé-droit | 'privilege'  | passé-partout   | 'master'      |
|      | coupé-feu   | 'firebreak'  | coupé-papier    | 'paper knife' |

The situation is different, however, when in this context schwa is preceded by two consonants. In this case the manifestation of schwa varies. It seems that what determines its presence or absence is the number of phonetically expressed syllables the second member of the compound contains. The examples given in (12) are compounds in which the first members end with a consonant cluster followed by schwa. As illustrated in the right-hand column of (12), we see that if the second word has more than one phonetically expressed syllable, schwa is not manifested. On the other hand, as shown in the compounds given in the left-hand column of (12), if the second word is phonetically monosyllabic, schwa must be manifested.

(12)	<b>One syllable</b>		<b>Two or more syllables</b>	
	porte-clefs	‘keyring’	porté-manteau	‘coat rack’
	garde-fou	‘railing’	gardé-manger	‘meat-safe’
	garde-feu	‘curfew’	gardé-malade	‘nurse’
	couvre-lit	‘coverlet’	couvert-douillette	‘duvet cover’
	ouvre-boîte	‘can-opener’	ouvert-bouteille	‘bottle-opener’

Notice that the number of phonetically expressed syllables in the second term of the compound determines only the presence/absence of a preceding schwa preceded by a consonant cluster. When the first term ends with a schwa preceded a single consonant, the schwa is always realized as zero (cf. (11)).

The review so far covers almost all the alternations involving schwa and zero word-internally and word-finally before pause. I now consider the behaviour of word-final schwa in phrases.

#### 2.1.1.4 Word-final schwas in phrases

Similar to the situation with word-internal and word-final pre-pausal schwas, a word-final schwa preceded by one consonant is always unrealized phonetically. The examples in (13) show that however many consonants there are at the beginning of a following word, a word-final schwa is not pronounced if it is preceded by a single consonant.

(13)	<b>Word-finally and followed by another word</b>	
	longué route	‘long way’
	grossé grenouille	‘big frog’
	mangé vite	‘eat fast!’
	ampoulé brûlée	‘burned out bulb’
	petité prairie	‘small grassland’
	bonné stratégie	‘good strategy’
	robé bleue	‘blue dress’

Let us now consider word-final schwas preceded by two consonants that belong to the same word, and followed by another word. We have seen that before pause and preceded by two consonants a schwa is never realized phonetically. The situation is different, however, when another word follows the word-final schwa. Following the same pattern as compounds, in certain dialects of French (Parisian French, for example), the manifestation of a word-final schwa preceded by two consonants varies depending on what follows. The pattern attested in compounds is also

observed in sequences such as noun–adjective and verb–adverb. Compounds show the same behaviour in almost all dialects of French. On the other hand, in my dialect of Quebec French the pattern of alternation shown in (14) does not occur. Except in compounds, all word-final schwas preceded by a consonant cluster behave like pre-pausal schwas; they are never realized phonetically.

(14) **Parisian French***One syllable*<sup>11</sup>

arme blanche	'a white arm'
aigle noir	'a black eagle'
quatre jours	'four days'
notre père	'our father'
veste rouge	'red jacket'
il parle bas	'he speaks softly'
il parle mal	'he speaks badly'

*Two or more syllables*

armé turquoise	'a turquoise arm'
(un) aiglé grisâtre	'a greyish eagle'
quatré journées	'four days'
notré papa	'our dad'
vesté rouge et blanche	'red and white jacket'
il parlé trop bas	'he speaks too softly'
il parlé mal et vite	'he speaks badly and fast'

(15) **Quebec French**

armé blanche	armé turquoise
aiglé noir	aiglé grisâtre
quatré jours	quatré journées
notré père	notré papa
vesté rouge	vesté rouge et blanche
il parlé bas	il parlé trop bas
il parlé mal	il parlé mal et vite

**2.1.2 Schwa in monosyllabic words**

Let us now consider the behaviour of schwa occurring in monosyllabic clitics. The following data show that a schwa occurring in a clitic is not manifested phonetically when it is preceded by a single consonant. This means that in such contexts the schwa is realized as zero when a preceding word ends with a vowel.



(16) **Preceded by a word ending with a vowel**

pas <i>dé</i> scrupules	'no scruples'
pas <i>dé</i> lait	'no milk'
chien <i>dé</i> chasse	'hunting dog'
Marie <i>lé</i> dit	'Mary says it'
rien <i>dé</i> nouveau	'nothing new'
pas <i>dé</i> crapaud	'no toads'
tu <i>né</i> dis rien	'you say nothing'
Marie <i>sé</i> coupe	'Marie cuts herself'

Like schwa in word-internal position, a schwa followed by an *h*-aspiré must be realized as schwa.

(17) pas <i>de</i> haricots	'no beans'
beaucoup <i>de</i> haches	'many axes'
Marie <i>le</i> hache	'Mary chops it'

The examples given in (16) show that in clitics a schwa preceded by one consonant is not realized phonetically even if three consonants follow it (e.g. *pas dé scrupules*). Let us now see what happens when schwa is preceded by more than one consonant. In contrast with the examples given in (16), those in (18) show that schwa in the words *de*, *ne* and *le* is phonetically realized when it is preceded by a word ending with a consonant.

(18) a.	bol <i>de</i> riz	'a bowl of rice'
	bec <i>de</i> lièvre	'harelip'
	clair <i>de</i> lune	'moonlight'
	il <i>le</i> veut	'he wants it'
	jour <i>de</i> l'an	'new year'
	mal <i>de</i> tête	'headache'
	Erik <i>le</i> dit	'Erik says it'

Within a sentence we may also find sequences of clitics each containing a schwa. When these schwas are preceded by a single consonant, any of them can be realized as zero as long as two consecutive schwas are not both syncopated. In other words, the result must be a sequence of schwa-zero or zero-schwa, as illustrated in (19) overleaf.

Like traditional grammarians, I have considered almost all the different contexts where schwa alternates or fails to alternate with zero. I now present another property of schwa, its alternation with the vowel [ɛ].

(19) envie de te le demander 'desire to ask it of you'<sup>12</sup>

a.	ə	ə	ə	ə
b.	ə	∅	ə	∅
c.	∅	ə	∅	ə
d.	ə	ə	∅	ə
e.	∅	ə	ə	∅
f.	∅	ə	ə	ə
g.	ə	∅	ə	ə
h.	ə	ə	∅	ə
i.	ə	ə	ə	∅

## 2.2 Alternation between schwa/zero and [ɛ]

Under certain circumstances schwa alternates with [ɛ]. According to Dell (1973), schwa or zero are manifested as [ɛ] in the following contexts: (a) when schwa is the final phonetically expressed segment of a word (cf. *paqu[ɛ]ʔ*) and (b) when schwa phonetically occurs in a word-internal or word-final closed syllable (cf. *harc[ɛ]lément*, *hot[ɛ]l*). As a form like *harc[ɛ]lément* shows, the latter context can be the result of the deletion of a second schwa in a sequence of two,<sup>13</sup> as shown in (20).

(20)	Zero			ɛ		
	appeler	[aple]	'to call'	appel	[apɛ]	'a call'
	achever	[aʃfe]	'to finish'	achève	[aʃɛv]	'(he/she) ends'
				achèvement	[aʃɛvmã]	'ending'
	cacheter	[kaʃte]	'to seal'	cachet	[kaʃɛ]	'a seal'
	semeler	[səmle]	'to sole'	semelle	[smɛ]	'sole'
	paqueter	[pakte]	'to pack'	paquet	[pake]	'parcel'
	<b>Schwa</b>			<b>ɛ</b>		
	malmener	[malməne]	'to manhandle'	malmène	[malmen]	'(he/she) manhandles'
	ensorceler	[ãrsɔsəle]	'to bewitch'	ensorcelle	[ãrsɔsɛ]	'(he/she) bewitches'
				ensorcellement	[ãrsɔsɛlmã]	'spell'
	harceler	[arsəle]	'to harass'	harcelle	[arsɛ]	'(he/she) harasses'
				harcèlement	[arsɛlmã]	'harassment'
	bouquetière	[bukətjer]	'flower-seller'	bouquet	[buke]	'bouquet'
	dentellière	[dãtəljer]	'lace-maker'	dentelle	[dãtɛ]	'lace'
	hôtelière	[otəljer]	'hotel-keeper'	hôtel	[otɛ]	'hotel'

I conclude this section with the chart shown in (21), which summarizes the contexts where schwa alternates and fails to alternate with zero and [ɛ].

I turn next to a review of three previous analyses of schwa along with the problems raised by these earlier treatments of the vowel. Questions

(21) a. Alternation between schwa and zero

Contexts	Schwa realized as zero	Schwa retained
.. C—##	maladé	'sick'
.. CC—##	macabré	'macabre'
.. VC—CV . .	souvenir	'to remember'
.. VCC—CV . .		fortement 'strongly'
.. VC—CGV . .	cimétière	cimetièrè 'cemetery'
.. #C—CV . .	chéal	'horse'
.. #C—CCV . .		degré 'degree'
#C—CVCV . .		chevalet 'support'
.. (V) # C—hV . .		va dehors 'go out!'
.. (V) # CC—CV . .		la brebis 'the sheep'
.. VC # C—# CV . .		bol de lait 'bowl of milk'
.. V # C—# CV . .	pas de lait	'no milk'
.. VC—# CV(CV . .)##	piqué-niqué	'picnic'
	passé-partout	'master'
.. VCC# C <sub>1</sub> V(C)]##		porte-clefs 'keyring'
		parle bas '(he/she) speaks softly'
.. VCC—# CVCV . .	gardé-maladé	'nurse'
	parlé lentement	'(he/she) speaks slowly'
	vesté rouge et blanche	'red and white jacket'
.. C—C—CV . .	ensevelir	ensevelir 'to bury'
<b>b. Schwa realized as ɛ</b>		
.. —C(C)(é)##	app[ɛ]llé	'(he/she) calls'
	cél[ɛ]bré	'(he/she) celebrates'
	hôt[ɛ]	'hotel'
.. —C##	paqu[ɛ]t	'parcel'
.. —Cé [-seg]	ach[ɛ]vément	'ending'

which remained unanswered in previous analyses lead me to consider a new account of the behaviour of schwa.

# 3 *Earlier treatments of schwa*

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## 3.0 Introduction

Faced with the alternation between a vowel and zero one may consider that the presence or the absence of the vowel is determined by phonotactic constraints. It might be argued that epenthesis applies or deletion fails to apply when a cluster of three or more consonants would otherwise be created. Such analyses of vowel alternation with zero appeal to ‘la loi des trois consonnes’ (cf. Grammont 1914). Either a vowel is inserted to break a sequence of consonants or a vowel is not subject to deletion if its deletion creates a sequence of three or more adjacent consonants. Treating the alternation between schwa and zero in French in terms of phonotactic constraints raises many problems. Such a possibility must be rejected in the light of the examples in (1) below. The data show that what matters with respect to schwa deletion or schwa epenthesis is not the number of adjacent consonants the absence of schwa would create. The examples in (1a) show that schwa may be absent even though this results in a cluster of four consonants. These examples must be compared with those in (1b), where in a similar segmental environment the absence of schwa is not possible. It is clear that the consonantal environment cannot be what determines the presence or the absence of schwa.

- (1)
- |    |                  |              |               |
|----|------------------|--------------|---------------|
| a. | cassé-croute     | [kaskrut]    | ‘snack’       |
|    | porté-crayon     | [pørtkrɛjɔ̃] | ‘pencil rack’ |
|    | pas de scrupules | [padskrypyl] | ‘no scruples’ |
| b. | casque rouge     | [kaskəruʒ]   | ‘red helmet’  |
|    | porte-craie      | [pørtøkʁɛ]   | ‘chalk rack’  |

These examples show that one cannot appeal to phonotactic constraints to account for the presence or the absence of schwa.

Phonological analyses of French schwa have served as the testing

ground for a wide range of theories. Within the generative framework we may mention the Sound Pattern of English (SPE), metrical phonology, and syllable-based theories. In the framework of linear phonology (i.e. SPE), French schwa has been analysed by Schane (1968a, b) and Dell (1970, 1973) to mention only two. In 1974 Tranel proposed an autosegmental treatment of the behaviour of schwa where the vowel is analysed in terms of a floating segment. With respect to the metrical and syllable-based approaches, schwa has been analysed by Selkirk (1978), Bouchard (1981), Anderson (1982), Basbøll (1981, 1988), Durand (1976, 1986), Morin (1978, 1982, 1983, 1988), Encrevé (1988), Noske (1988) and Tranel (1988) among many others. The reader is invited to consult these articles for a rather different view of the phenomenon under consideration.

In this section I present a fairly detailed discussion of three previous analyses of schwa which are closely relevant to my own analysis. Dell represents the SPE framework, Anderson and Selkirk represent the syllable-based and the metrical theories, respectively.<sup>1</sup> I start with Dell, whose analysis of schwa became the point of departure for the others.

### 3.1 Dell's analysis of schwa

Dell (1973) argues that some phonological processes may be accounted for by proposing that schwa is underlyingly present in the representation of particular words. Schwa is however different from all other vowels of French principally because it has the special property of alternating with zero.

He starts his analysis by justifying the presence of underlying schwas in word-final position in certain words.<sup>2</sup> His argumentation runs as follows. The presence of underlying schwa in word-final position is motivated by the behaviour of the last consonant of certain adjectives in their feminine and masculine forms. Consider the adjective *petit* 'small'. Now compare its masculine forms with its feminine ones.

- (2) a. **Masculine forms**
- |               |             |                 |
|---------------|-------------|-----------------|
| petit clou    | [pətiklu]   | 'small nail'    |
| petit drapeau | [pətidrapo] | 'small flag'    |
| petit tapis   | [pətitapi]  | 'small rug'     |
| petit bois    | [pətibwa]   | 'small wood'    |
| petits abats  | [pətizaba]  | 'small giblets' |
| petits amis   | [pətizami]  | 'boyfriends'    |

(2) b. **Feminine forms**

petite clôture	[pətɪtklotɪr]	'small fence'
petite draperie	[pətɪtɔdrapɪ]	'small curtain'
petite tortue	[pətɪttɔrtɥ]	'small turtle'
petite boîte	[pətɪtbwat]	'small box'
petites amies	[pətɪtzami]	'girlfriends'
petites autos	[pətɪtzoto]	'small cars'

We see that the final *t* of *petit* is phonetically realized in the feminine forms but not in the masculine ones. Because Dell assumes a unique underlying representation for the adjective *petit*, he proposes that the final consonant *t* is underlyingly present in both the masculine and feminine representation. This consonant is subject to deletion before a consonant as well as in word-final position. The rule of consonant deletion is given in (3).

(3) **Rule of final consonant deletion**

$$[-\text{son}] \rightarrow \emptyset / \_ \quad \{ +\text{C} \\ \# \\ \#\# \}$$

The rule accounts for the following pronunciations:

- (4) a. petits amis [pətɪzami] /pətɪt+z # ami/ [-son] → ∅ / \_ +C  
 b. petit clou [pətɪklu] /pətɪt # klu/ [-son] → ∅ / \_ #C  
 c. plus petit [plypəti] /pətɪt##/ [-son] → ∅ / \_ ##

Dell's analysis accounts for the fact that the final *t* in the masculine forms of *petit* is not realized before another consonant. Whether the following consonant belongs to another word or if it is the plural morpheme, the presence of this following consonant triggers the application of rule (3). But Dell must now account for the realization of the *t* of *petit* in the feminine forms.

- (5) petites amies [pətɪtzami] 'girlfriends'  
 petite clôture [pətɪtklotɪr] 'small fence'  
 petite clef [pətɪtkle] 'small key'  
 la petite [lapətɪt] 'the small one'

To account for the apparent problem in the feminine forms, Dell proposes that the feminine morpheme is a final schwa. The underlying representation of *petit* and *petite* are now respectively:

- (6) petit: /pətɪt/    petite: /pətɪt+ə/

The final schwa, present in the feminine form even though not realized phonetically, prevents the preceding consonant from being deleted by rule (3). In the examples given in (7), the *t* of *petite* is no longer final or adjacent to a following consonant since schwa follows it in the lexical representation. Therefore the structural condition of rule (3) is not met and no consonant deletion occurs.

- |     |                              |               |                    |
|-----|------------------------------|---------------|--------------------|
| (7) | <i>petite</i> <i>clôture</i> | [pətɪtklotyr] | /pətɪt+ə # klotyr/ |
|     | <i>petites</i> <i>amies</i>  | [pətɪtzami]   | /pətɪt+ə+z # ami/  |
|     | <i>petite</i>                | [pətɪt]       | /pətɪt+ə # #/      |

The proposal that the difference between the masculine and the feminine is the presence in the latter of an underlying final schwa accounts for the manifestation of the consonant in the feminine forms as well as its absence in the masculine ones. In Dell's analysis there is one feminine morpheme: schwa. This schwa is present in feminine forms of all adjectives.

- |     |                  |        |                 |         |                   |
|-----|------------------|--------|-----------------|---------|-------------------|
| (8) | <b>Masculine</b> |        | <b>Feminine</b> |         |                   |
|     | <i>petit</i>     | [pəti] | <i>petite</i>   | [pətɪt] | /pətɪt+ə/ 'small' |
|     | <i>rare</i>      | [rar]  | <i>rare</i>     | [rar]   | /rar+ə/ 'rare'    |
|     | <i>flou</i>      | [flu]  | <i>floue</i>    | [flu]   | /flu+ə/ 'vague'   |

Given Dell's account of the phonetic manifestation of the final consonant in the feminine adjectives, he must generalize the presence of final schwa to any word which is phonetically realized with a final obstruent. The careful reader will have noticed that his rule of consonant deletion is not restricted to adjectives. The rule says that any obstruent is deleted in word-final position. Accordingly, he must analyse all words ending with an obstruent as having an underlying final schwa which prevents the consonant from being deleted. The question arises whether this strong proposal is motivated. It would be desirable to find phonetic evidence of the presence of such an abstract segment. Fortunately, the presence of final schwas can be found. Compare the two groups of words in (9), which show that a final schwa is manifested in some contexts.

The words given in (9b) show that a word-final schwa is phonetically manifested under certain circumstances. It is phonetically realized before words beginning with an *h*-aspiré and in compounds where the second term is phonetically monosyllabic. A comparison of the forms

given in (9a) with those in (9b) leads to the conclusion that word-final schwas alternate with zero.

(9) **Dell's facts**a. *Without schwa*

quelle outre	[kɛlutr]	'what water-skin'
petite auto	[pɛtitoto]	'small car'
porte-manteau	[pɔrtmãto]	'coat holder'
garde-malade	[gardmalad]	'nurse'

b. *With schwa*<sup>3</sup>

quelle housse	[kɛləus]	'what dust-cover'
petite hausse	[pɛtitəos]	'small raise'
porte-clefs	[pɔrtɛkle]	'keyring'
ouvre-boîte	[uvrəbwat]	'can-opener'

Moreover, the alternation of schwa with zero is not restricted to word-final position. It also occurs word-internally. Since schwa is sometimes manifested and sometimes not, this now raises the question as to whether schwa is an epenthetic vowel or if it is subject to rules of deletion. Dell poses this question in considering the type of examples given in (10).

(10)	a.	cette pelouse	[sɛtpəluz]	'this lawn'
		la pelouse	[lapluz]	'the lawn'
		<i>versus</i>		
		cette place	[sɛtplas] *[sɛtpəlas]	'this place'
		la place	[laplas]	'the place'
	b.	Marie secoue	[marisku]	'Mary shakes'
		Paul secoue	[pɔlsəku]	'Paul shakes'
		<i>versus</i>		
		Marie skie	[mariski]	'Mary skis'
		Paul skie	[pɔlski] *[pɔlsəki]	'Paul skis'

Any proposal that schwa is subject to epenthesis would require the following rule:

(11)  $\emptyset \rightarrow \text{ə} / \text{CC} \_ \text{C}$



This proposal would entail that a lot of words be treated as exceptions. For example, whereas *pelouse* and *secouer* would be subject to epenthesis of schwa, words like *place* [plas] and *skier* [skije] would not. In addition to this problem, proposing epenthesis and retaining the proposal of an underlying word-final schwa (to prevent certain consonants from being deleted in final position) would require both a rule of schwa deletion and one of schwa epenthesis. Consequently, Dell proposes that schwa is always underlyingly present and that it is subject to certain rules of deletion. To account for its deletion in the examples given in (10), he proposes the following two rules:

- (12) a. VC<sub>1</sub>: ə → ∅ / V #<sub>1</sub> C\_\_ A schwa is deleted when preceded by a word ending with a vowel.
- b. E-FIN: ə → ∅ / VC\_\_# A schwa preceded by one consonant is deleted in word-final position.

Rule (12b), which must be ordered before rule (12a), accounts for the deletion of the final schwa of *cette* and *place* as in *cetté placé*. Rule (12a) accounts for schwa deletion when it occurs in the first syllable of a word which is preceded by another word ending with a vowel (*Marie secoue* versus *Paul secoue*).

In his analysis, Dell considers all the cases of alternation between schwa, zero and [ɛ] reviewed in chapter 2 and he proposes linear rules to account for these alternations. The rules governing the alternation with [ɛ] are expressed and ordered in such a way that they account for the alternations as well as for the failure of schwa to alternate.

Dell provides a very careful analysis of schwa. He not only considers all the contexts where schwa alternates or fails to alternate with zero and [ɛ], but he also relates his analysis of schwa to other phonological phenomena present in French. We saw that proposing schwa as the feminine morpheme permits a unique representation of the feminine morpheme. In addition, it leads to an account of the behaviour of the final consonant of adjectives in their feminine and masculine forms. Dell also provides a way of distinguishing nasal vowels from sequences vowel–nasal consonant (at the phonetic level). His proposal is that all nasal vowels in French are derived from a sequence vowel–nasal consonant. The nasal consonant nasalizes a preceding vowel in a context where this consonant occurs before another consonant or before a word

boundary. The nasal consonant is then deleted after nasalization has taken place. The relevance of schwa to nasalization is that, according to Dell, the presence of schwa provides an account for the absence of nasality of the vowel in certain words. In words where a nasal does not nasalize a preceding vowel, a schwa follows the nasal consonant, preventing nasality from taking place. Compare the two words *caneton* [kantɔ̃] 'duckling' and *canton* [kɑ̃tɔ̃] 'district'. According to Dell, a schwa is present in the representation of the first word but not in the latter: *caneton*: /kanəton/ [kantɔ̃]; *canton*: /kanton/ [kɑ̃tɔ̃]. Because of a following schwa, in *caneton* the nasal consonant is not adjacent to a consonant and it cannot nasalize the preceding vowel.<sup>4</sup>

To summarize, the main features of Dell's analysis are that it provides a comprehensive description of the facts and serves as a basis for explaining other phonological phenomena present in French. Note also that a strong claim is made. All words ending with an obstruent phonetically expressed are analysed as ending with a word-final schwa which is subsequently deleted.<sup>5</sup> I will come back to this proposal later.

### 3.1.1 Problems with Dell's analysis

The problems raised by Dell's insightful analysis can be traced back to the SPE framework. Admittedly this was the only one available at the time. Linear analyses are arbitrary in the sense that while they do describe the observational facts, they do not explain why things are the way they are. Considering any rule, there is never an answer as to why things are not different, e.g. as to why a given process takes place in a given context and not in another one.<sup>6</sup> For example, a rule which says that schwa is deleted when preceded by one consonant but is not deleted when preceded by two consonants describes the facts, but does not explain them. Since the behaviour of schwa is not determined by phonotactic constraints, why is schwa not deleted after two consonants and preserved after a single one? A rule never provides an answer to such questions. In addition, it is possible to formulate rules that express attested as well as unattested processes. It would, for example, be possible to write a rule saying that schwa is deleted after a liquid, even if such a process is never attested. But these problems pertain to the framework and not to any particular analysis.

Dell's proposal to analyse words which end phonetically with an obstruent as ending with an underlying final schwa appears to be fully justified. Unfortunately, no attempt is made to extend this proposal to

words ending with any consonant. He considers that words ending phonetically with (i) an obstruent, (ii) a sonorant (in feminine forms of adjectives), (iii) a nasal when the preceding vowel is not nasal, have a final schwa in their representation. Moreover, while he claims that the feminine form of the invariable adjective *rare* [rar] 'rare' has a final schwa in its representation, Dell does not justify why a similar structure is not attributed to the masculine form. More precisely, while Dell considers, in the light of feminine adjectives, that a sonorant may be followed by a schwa, he makes no attempt to generalize his proposal to any word ending phonetically with a consonant. In addition, a linear analysis of schwa does not explain why schwa is the only vowel of French that is subject to alternation with zero. What is it that differentiates schwa from all the other vowels? A rule gives also no answer as to why some contexts block schwa deletion while others do not. Finally, there is no attempt to generalize the properties of French schwa to other languages where similar alternations are found. Dell's linear analysis is language specific; it is restricted to French; and the properties of schwa are also accidental. All these unresolved problems led linguists to consider alternative analyses of schwa. Let us consider what Selkirk (1978) proposes as a new account of the behaviour of schwa.

### 3.2 Selkirk's analysis of French schwa

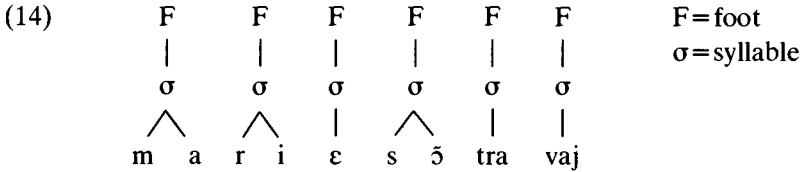
#### 3.2.1 Schwa alternation with zero

Faced with the alternation schwa and  $\emptyset$  in French, Selkirk provides an analysis of the phenomenon in metrical terms. A syllable containing schwa, she claims, forms a binary foot along with a preceding syllable. Feet are left dominant (labelled strong/weak). A schwa, which occupies the weak branch of a binary foot, is deleted. Selkirk agrees with Dell that schwa is a phonemic vowel of French which is subject to deletion. According to her, the vowel schwa is present in the lexical representation of particular words and it is subject to deletion.

In her analysis Selkirk seeks primarily to derive, in terms of principles of metrical theory, the following three rules of schwa deletion proposed by Dell:

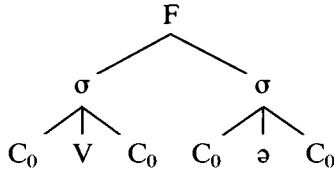
- (13) **Dell's analysis**
- (i)  $\text{ə} \rightarrow \emptyset / \text{VC} \_ \# \text{OBLIG}$
  - (ii)  $\text{ə} \rightarrow \emptyset / \text{VC} \_ \text{OBLIG}$
  - (iii)  $\text{ə} \rightarrow \emptyset / \text{V} \# \_ \text{C} \_ \text{OPT}$

Following work by Liberman (1975) and Liberman & Prince (1977), Selkirk postulates that syllables are grouped together into feet. The French foot, she claims, generally consists of a single syllable. Let us consider the representation of the sentence *Marie hait son travail* ‘Mary hates her work’.



The structure given in (14) contains a sequence of non-branching feet, each of them consisting of a single syllable. As Selkirk claims, however, the French foot can be more complex:

- (15) There are instances, however, where the French foot is more complex, I would claim. I submit that yet another principle is at work in the definition of the foot in French, a principle according to which a syllable containing ə may join together with a preceding syllable and with it constitute a foot. (Selkirk 1978: 143)



In addition, she argues that within a foot, the syllable containing schwa is weakened. According to the conventions of metrical theory, the syllable with schwa is labelled weak (w) and its sister is strong (s). Let us now consider the foot-formation rules proposed for French by Selkirk (see (16)).

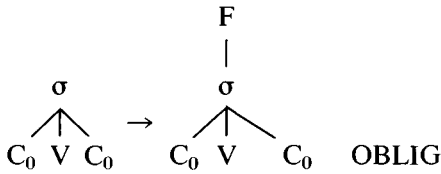
Principle I, i.e. the formation of the simple foot, says that any syllable is a foot. Principles IIa and IIb give to schwa a special treatment. IIa operates word-internally (between word boundaries), and is obligatory, while IIb has the entire utterance contained between pause boundaries as its domain and is optional. As claimed by Selkirk:

According to IIa, no syllable with ə can constitute a foot of its own inside a word – unless, of course, it’s a monosyllable (Selkirk 1978: 144).

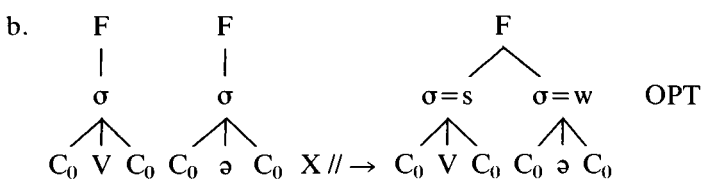
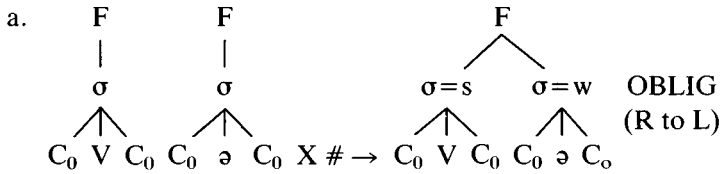
These principles are applied to some individual words in (17).

(16) French foot formation

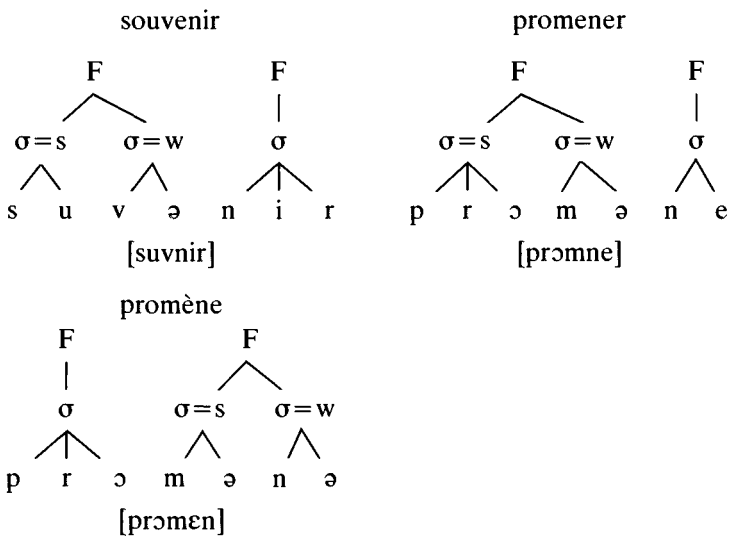
I. The simple foot



II. The derived foot



(17)

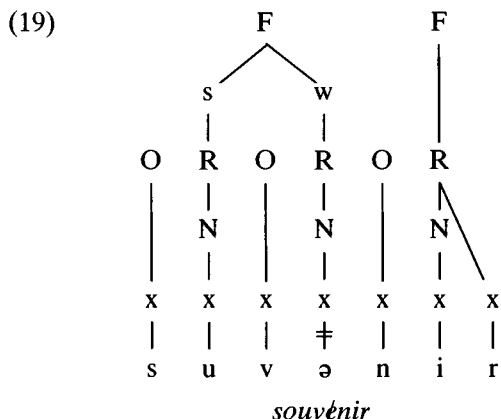


In order to account for schwa deletion, Selkirk proposes the rule shown overleaf in (18).

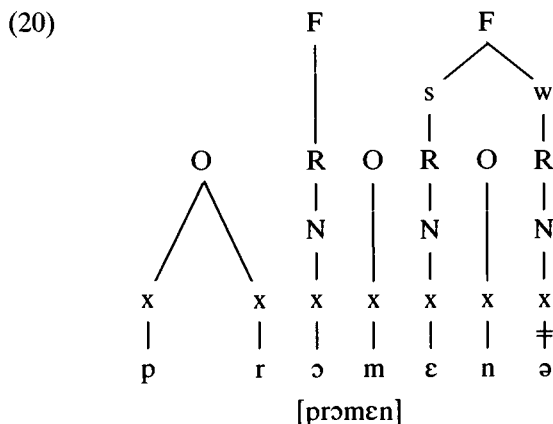
- (18)  $\text{ə}$  *syncope*  
 $\text{ə} \rightarrow \emptyset /_{\text{F}}[ \dots \text{VC} \text{---} \dots ]_{\text{F}} \text{OBLIG}$

The rule says that schwa is deleted when it is the right member of a binary foot and when it is separated by only one consonant from the preceding vowel.<sup>7</sup>

By proposing that a syllable containing a schwa constitutes a binary relation with another syllable, Selkirk accounts for the manifestation of zero word-internally. Selkirk's proposed structure is shown in (19).



Her analysis also accounts for the deletion of schwa in word-final position of polysyllabic words. Schwa deletion in word-final position is in fact what motivates Selkirk's proposal that schwa is in a binary relation with a preceding vowel. According to her analysis the final syllable containing schwa always forms a foot along with a preceding syllable. Being the weak member of the foot, schwa is deleted.



In order to account for the absence of schwa deletion in words like *fortement* 'strongly', that is, in cases where word-internal schwa is preceded by two consonants, she adds the specification that schwa must be separated from the preceding vowel by one consonant in order to be subject to deletion. While this specification allows her to account for the failure of schwa deletion to apply word-internally, it restricts the instances of schwa deletion in word-final position to cases where the final schwa is preceded by one consonant. That is, Selkirk accounts for the pronunciation of words like *bête* 'beast', *lenté* 'slow', *grandé* 'tall' etc., but not for that of words like *porté* 'door', *verté* green (fem)' etc. In fact she says the following:

In the case of *couleuvre*, the deletion depends on other factors, in particular the stress pattern of the sentence as indicated by Dell and others. (Selkirk: 1978: 146)

Although it remains unclear how she handles the possible syncope of word-final schwas preceded by two consonants, I suspect that she has to rely on the following linear rule of schwa deletion in word-final position proposed by Dell.

- (21) **Dell's rule of 'E-FIN<sub>2</sub>' (facultative)**  
 $\text{ə} \rightarrow \emptyset \quad / \text{CC}\_\#$

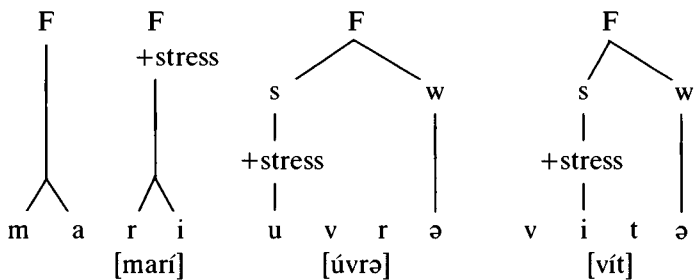
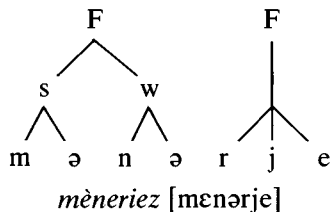
Having presented the outline of Selkirk's analysis of schwa alternation with zero, I now present what she proposes for its alternation with [ɛ].

### 3.2.2 Alternation with [ɛ]

Selkirk claims that the alternation of schwa with [ɛ] follows from stress. She argues against the proposal that the alternation takes place in a closed syllable (i.e. Closed Syllable Adjustment Rule) since in words like *mènerez* [mɛnɛrʒe] '(you plural) would lead', the underlying schwa in the initial syllable is manifested as [ɛ] even though it occurs in an open syllable.<sup>8</sup> As an alternative, she proposes the following analysis.

Extending her metrical analysis, she proposes the rule given in (22) below, according to which the nucleus of the last foot of a word is stressed.

Note that since the words *ouvre* 'open' and *vite* 'fast' contain only one foot, it is the strong node (the head of the foot) which bears the stress. With regard to the alternation of schwa with [ɛ], Selkirk proposes that /e/ and /ə/ become [ɛ] when they are followed by something else within the foot (something being simply a consonant or an entire dependent syllable containing schwa). The rule is given overleaf in (23).

(22)  $F \rightarrow [+stress] / \_ \#$ (23)  $\left\{ \begin{array}{l} \emptyset \\ e \end{array} \right\} \rightarrow [\varepsilon] / F [C_0 \_ W] F (W \neq \emptyset)$ 

Now that the two aspects of Selkirk's analysis have been presented, let us next consider the problems.

### 3.2.3 Problems with Selkirk's analysis<sup>9</sup>

The first thing I would like to say is that I consider Selkirk's analysis very interesting. Although her article is very short it seems that her metrical treatment can account for both the process of schwa deletion and accentuation in French. The main problem I see with Selkirk's treatment of schwa is the directionality she assumes for the relation of schwa with another vowel. More precisely, proposing that schwa contracts a relation with a preceding vowel results in an analysis which is restricted to the facts in Parisian French. Moreover, even with respect to the behaviour of schwa in this dialect, it appears that the analysis encounters some problems.

Although Selkirk accounts for word-internal and word-final schwa deletion when preceded by a single consonant, she has no metrical explanation as to why a word-internal schwa cannot be syncopated when two consonants precede it. In the absence of metrical explanation she is



forced to specify the context of application of her metrical rule of schwa syncope. The rule affects the schwas which are preceded by a vowel unless those schwas have a consonant cluster to their left. However, while her rule of schwa syncope accounts for the behaviour of both word-internal and word-final schwas preceded by a single consonant, it does not capture both the behaviour of word-internal and word-final schwa after two consonants. On the one hand, the fact that a word-internal schwa is not syncopated when it is preceded by a cluster is accounted for by the restrictive context of the rule (only one consonant can intervene between schwa and the preceding vowel). On the other hand, such a restrictive context is not always required for word-final schwa. Because the manifestation of word-final schwas after a cluster varies, Selkirk relies on the following linear rule proposed by Dell.

(24) **Dell's rule of 'E-FIN<sub>2</sub>' (facultative)**

$\text{ə} \rightarrow \emptyset / \text{CC} \_ \#$

The optionality of this rule does not, however, solve the problem of the behaviour of schwa in compounds. In compounds, the final schwa of the first member is sometimes realized and sometimes not. This behaviour does not follow from the optional application of rule (24). Preceded by a consonant cluster, the final schwa of the first term is always absent before a word which has more than one phonetically expressed syllable, and is attested when the second term is phonetically monosyllabic.

(25)	<b>With schwa</b>		<b>Without schwa</b>	
	porte-clefs	'keyring'	porté-manteau	'coat rack'
	porte-plume	'penholder'	porté-crayon	'pencil holder'
	porte-carte	'card holder'	porté-cigare	'cigar case'
	porte-voix	'megaphone'	porté-parole	'spokesman'
	couvre-livre	'book cover'	porté-bagages	'luggage rack'
	tourne-disque	'turntable'	porté-bonheur	'lucky charm'
	tourne-vis	'screwdriver'	porté-monnaie	'purse'
	ouvre-boîte	'can-opener'	ouvert-bouteille	'bottle-opener'
	garde-robe	'wardrobe'	gardé-manger	'meat-safe'
	garde-fou	'railing'	gardé-malade	'home nurse'
	garde-pêche	'water bailiff'	gardé-champêtre	'rural policeman'

In addition, Selkirk's metrical analysis does not account for the fact that schwa can be realized as zero in the initial syllable of bisyllabic

words. It is impossible, in a bisyllabic word where schwa is initial, to create a binary foot where schwa is the right branch of the foot.<sup>10</sup>

(26)	<i>ché</i> min	'road'	<i>ché</i> val	'horse'
	<i>sé</i> maine	'week'	<i>lé</i> ver	'to stand up'
	<i>mé</i> ner	'to lead'	<i>ché</i> mise	'blouse'
	<i>jé</i> ter	'to throw'	<i>réd</i> onner	'to give back/again'
	<i>ché</i> nil	'kennels'	<i>vé</i> nir	'to come'
	<i>dé</i> mander	'to ask'	<i>té</i> nir	'to hold'
	<i>sé</i> ringue	'syringe'	<i>dé</i> main	'tomorrow'
	<i>cé</i> rise	'cherry'	<i>pé</i> tite	'small'
	<i>ré</i> viens ici	'come back here!'		
	<i>dé</i> mande les	'ask for them!'		
	<i>ré</i> tourne les	'return them!'		
	<i>ré</i> garde moi	'look at me!'		

Another problem is that although her article is short and does not cover all the facts of French, she mentions words like *mèneriez*, to show the alternation of schwa with [ɛ], but she does not say anything about why the schwa in the second syllable of this word is not syncopated.

With regard to her treatment of the alternation with [ɛ], the main problem is as follows. She says that an underlying schwa is realized as [ɛ] when it is the head of a binary foot whose weak member is not zero. She then accounts for the fact that the leftmost underlying schwa in a word like *ensevelir* [ãsəvɛlir] 'to bury' is not realized as [ɛ]. But what she does not account for is the pronunciation of words like *entrepreneur* [ãtrəprənœr] 'contractor', where in a sequence of two adjacent realized schwas the leftmost one does not alternate with [ɛ].<sup>11</sup> Even though both schwas are retained, the two syllables must form a foot since she claims that a syllable with schwa cannot form a foot by its own. Consequently, the leftmost schwa should be the head of a foot whose weak member dominates the following schwa. Along the same lines, I do not see how she accounts for the realization of [ɛ] in a word like *paquet* [pake] 'parcel'. Is the underlying schwa final or followed by an unrealized one? In either case the manifestation of [ɛ] is not predicted by Selkirk. If final, the schwa cannot be the head of a foot. If followed by an unrealized schwa, the foot has zero as a weak member, preventing the alternation of schwa with [ɛ].

And finally, there is no explanation as to why schwa and no other vowel is incorporated into a metrical binary foot.

Those unanswered questions led Anderson (1982) to propose an alternative analysis of schwa. Let us next consider what he proposes to account for the special properties of schwa in French.

### 3.3 Anderson's analysis

In his analysis of schwa, Anderson seeks to provide an answer to the following questions: (1) Why is schwa the only vowel of French subject to alternation with zero? (2) Why are internal schwas always realized as zero after one consonant and always realized as schwa after a consonant cluster? To account for these, he proposes that schwa is the phonetic interpretation of an empty nucleus present in the lexical representation of particular words. The main aspects of his analysis can be summarized as follows.

#### 3.3.1 Zero as an alternant of schwa: a case of resyllabification

In French we are faced with an alternation involving schwa, zero and [ɛ]. Anderson agrees with Dell that schwa is not an epenthetic vowel. If schwa is not an epenthetic vowel, what must first be determined is the underlying value of the segment. There seem to be three possibilities: the underlying value may be schwa, zero or /ɛ/. Let us consider what leads Anderson to propose that zero must be chosen for the underlying representation of schwa.

Following Dell, Anderson considers schwa to be phonetically identical to the vowel /œ/. But the choice of /œ/ as the underlying value of schwa leads to a major problem, namely how to distinguish stable from unstable /œ/. Even if schwa is phonetically identical to the vowel /œ/, the two segments do not show the same behaviour. As shown by the examples in (27), there are properties that differentiate stable from unstable œ.

- (27) a. **Stable /œ/**
- (i) Stable /œ/ does not alternate with zero:
- |             |           |           |                 |
|-------------|-----------|-----------|-----------------|
| la jeunesse | [laʒœnes] | *[laʒnes] | 'the youth'     |
| le jeunet   | [lœʒœnɛ]  | *[lœʒnɛ]  | 'the youngster' |
- (ii) Stable /œ/ alternates with [∅]:
- |         |         |               |            |          |                  |
|---------|---------|---------------|------------|----------|------------------|
| veulent | [vœl]   | '(they) want' | veut       | [v∅]     | '(he/she) wants' |
| malheur | [malœr] | 'misfortune'  | malheureux | [mal∅rø] | 'unfortunate'    |

- (27) b. **Unstable /œ/ (i.e. schwa)**
- (i) Unstable /œ/ alternates with zero:
- |             |          |           |              |             |            |
|-------------|----------|-----------|--------------|-------------|------------|
| forte       | [fɔrt]   | 'strong'  | fortement    | [fɔrtœmā]   | 'strongly' |
| le cheval   | [ləʃfal] | 'horse'   | le chevalier | [ləʃœvalje] | 'horseman' |
| tu demandes | [tydmād] | 'you ask' | il demande   | [ildœmād]   | 'he asks'  |
- (ii) Unstable /œ/ alternates with [ɛ]:
- |          |          |                |              |           |              |
|----------|----------|----------------|--------------|-----------|--------------|
| appeler  | [aple]   | 'to call'      | (il) appelle | [apɛl]    | '(he) calls' |
| harceler | [arsœle] | 'to harass'    | harcèlement  | [arsœlmā] | 'harassment' |
| hôtelier | [otœlje] | 'hotel-keeper' | hôtel        | [otɛl]    | 'hotel'      |

The preceding data show that there are two kinds of /œ/: a stable and an unstable one, the so-called schwa. Whereas stable [œ] cannot be manifested as null, the unstable one can be. Whereas stable [œ] alternates with [ø] in open syllables, the unstable one alternates with [ɛ] in what seems to be a closed syllable. And finally, whereas stable [œ] occurring in word-final position can be accentuated, stress falls on the penultimate syllable of a word containing an unstable [œ] in this position. Thus, anyone who proposes /œ/ as the underlying representation of schwa is forced to find a way of distinguishing the two vowels. This led some authors (cf. Morin 1978) to propose marking unstable [œ] with a diacritic.

Since the vowel [ɛ] is also a manifestation of schwa or zero, a second possibility is to choose /ɛ/ as the underlying representation of schwa. Once again this option faces problems. The vowel /ɛ/, as in *rêver* 'to dream' and *allaiter* 'to nurse', alternates with neither zero nor schwa.

- (28)
- |             |         |          |         |                  |
|-------------|---------|----------|---------|------------------|
| rêver       | [rɛve]  | *[rœve]  | *[rve]  | 'to dream'       |
| tu rêves    | [rɛv]   | *[rœv]   |         | 'you (sg) dream' |
| allaiter    | [alɛte] | *[alœte] | *[alte] | 'to nurse'       |
| tu allaites | [alɛt]  | *[alœt]  |         | 'you (sg) nurse' |

On the other hand, the [ɛ] found in the second person singular forms of the verbs *appeler* 'to call', *haléter* 'to gasp' and *harceler* 'to harass' does alternate with either zero or schwa.

- (29)
- |             |          |           |          |                   |
|-------------|----------|-----------|----------|-------------------|
| appeler     | [aple]   | *[apɛle]  | *[apœle] | 'to call'         |
| tu appelles | [apɛl]   | *[apœl]   |          | 'you (sg) call'   |
| haléter     | [alte]   | *[alœte]  | *[alœte] | 'to gasp'         |
| tu halètes  | [alɛt]   | *[alœt]   |          | 'you (sg) gasp'   |
| harceler    | [arsœle] | *[arsɛle] | *[arsle] | 'to harass'       |
| tu harcèles | [arsɛl]  | *[arsœl]  |          | 'you (sg) harass' |

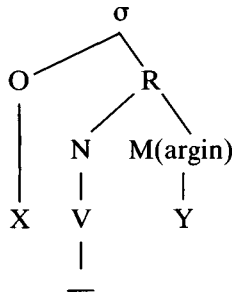
There remains a third possibility. Namely to propose that the underlying representation of schwa is zero and that under certain circumstances zero is realized as schwa or as [ɛ]. This third option is chosen by Anderson. He analyses schwa as an empty nuclear position present in the lexical representation. As he explains:

Such a representation relies on the fact that a structurally present syllable must . . . contain a nuclear position. Syllables with 'schwa' in French are then treated as analogous to 'empty nodes' in syntactic representation: elements which are structurally present, but to which no designated content is assigned in underlying form. (Anderson 1982: 551)<sup>12</sup>

There are many advantages to this representation. By assuming that French has a rule of schwa-spelling which realizes an unfilled empty nucleus as schwa, it is possible to explain why it is this segment and no other vowels that alternates with zero. According to Anderson, the alternation between zero and schwa is not accounted for by a rule of epenthesis or deletion, but by the following rule of schwa-spelling.

(30) **Anderson's rule of schwa-spelling**

$\emptyset \rightarrow [\text{ə}] /$

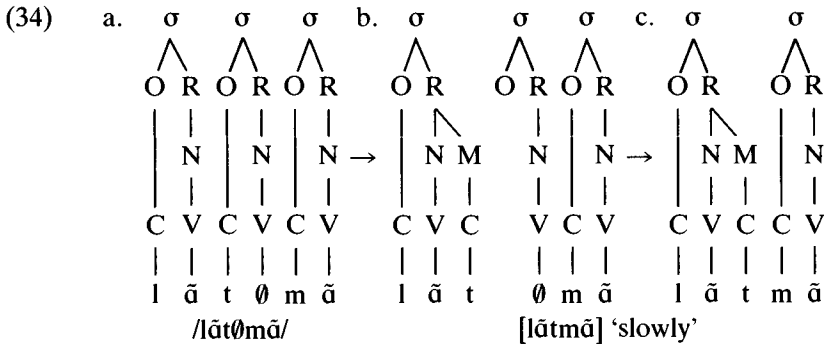


. . . (regardless of the content of the rest of the syllable), if its nucleus is unfilled, this segment [nuclear point – MC] is assigned the features of [œ]. (Anderson 1982: 552)

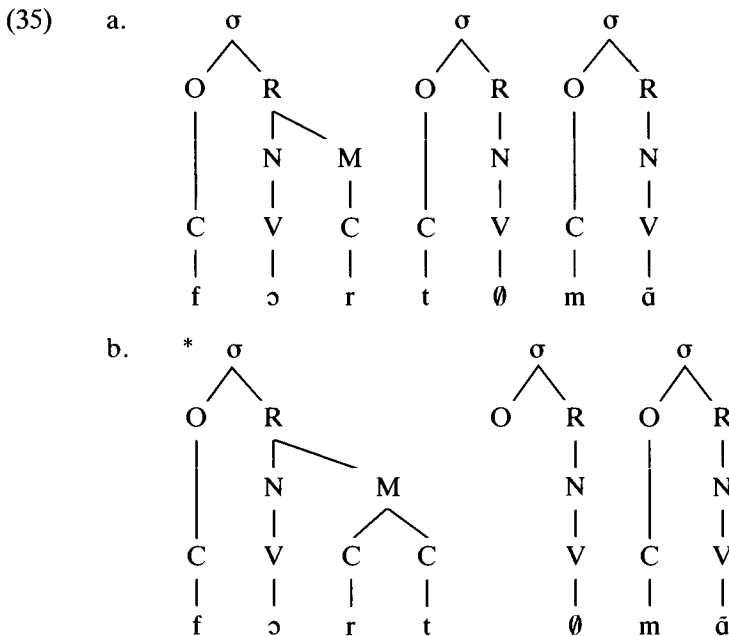
Now that it is clear what motivates Anderson to propose zero as the underlying value of schwa, let us consider the main points of his analysis. Anderson does not fully motivate the presence of syllables with empty nuclei in certain words. He adopts the underlying representations that Dell has postulated. He proposes, for example, the representation shown overleaf in (31) for a word such as *lentement* 'slowly'.

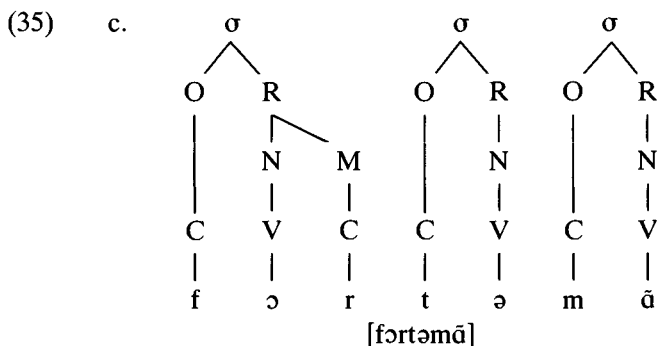
Consider, first, word-internal positions. We know that schwa is not manifested phonetically when it is separated from the preceding vowel by one consonant. In Anderson's terms, an empty nucleus receives no





The fact that zero is not possible when preceded by two consonants (cf. *fortement* [fɔrtəmā] \*[fɔrtmā] 'strongly') follows from the impossibility for a coda to branch, thus making it impossible for the onset to be resyllabified into the preceding rhyme (NB the coda is already filled). In the case of a liquid-obstruent cluster preceding a schwa, for example, the coda of the preceding rhyme is already filled and there is no room for another segment (cf. (35b)). Because the consonant remains in the onset position of the syllable containing the empty nucleus, this syllable is not subject to deletion and consequently the rule of schwa-spelling applies (cf. (35c)).<sup>13</sup>





The rule of empty-syllable deletion along with the resyllabification of the onset into a preceding open rhyme account for the alternation between schwa and zero word-internally.

Considering next the behaviour of word-final schwa, Anderson adopts Dell's proposals that French has a process of word-final consonant deletion and that the presence of a final schwa (i.e. a final empty nucleus) prevents a preceding consonant from being deleted. In contrast with the situation word-internally, the empty nucleus in word-final prepausal position is never interpreted phonetically (e.g. *petite* 'small', *forte* 'strong'). This fact is accounted for by the resyllabification of the consonant in the onset of the word-final syllable containing the empty nucleus, into a preceding coda. Note here that Anderson is forced to say that unlike a word-internal coda, a word-final one can branch.<sup>14</sup>

(36) **Word-final resyllabification**

$$[\sigma \text{ C}_0 \text{ V C}_0 ] [\sigma \text{ C}_0 \emptyset ] \#$$

1 2 3            4 5 6

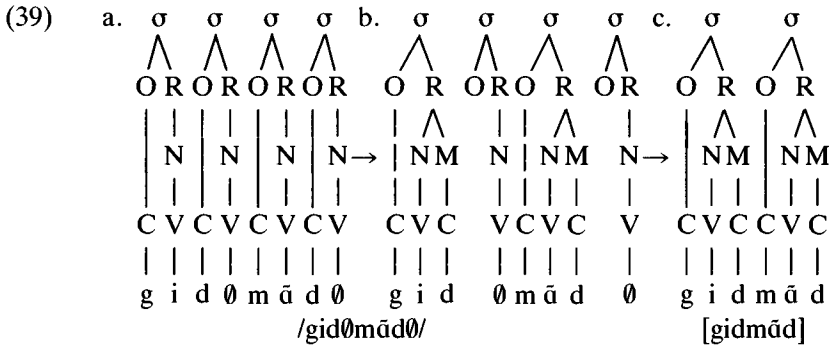
$$[\sigma \text{ 1 2 3 + 4 } ] [\sigma \text{ 5 } ] 6 \rightarrow [\sigma \text{ C}_0 \text{ V C}_0 \text{ C}_0 ] [\sigma \emptyset ] \#$$

The rule of word-final resyllabification accounts for the absence of schwa in the final syllable of words such as *petite* /pθtit+θ/ [pətit] 'small (fem)' and *forte* /fɔrt+θ/ [fɔrt] 'strong (fem)'. The onset of the syllable containing the empty nucleus is resyllabified into the preceding rhyme regardless of the fact that this preceding rhyme is already branching. After resyllabification, a final empty syllable remains and is deleted by the rule of empty-syllable deletion, as shown in (37).

The absence of schwa in the initial syllable of a word preceded by another word ending with a vowel is accounted for by the rule of resyllabification between words, shown in (38).



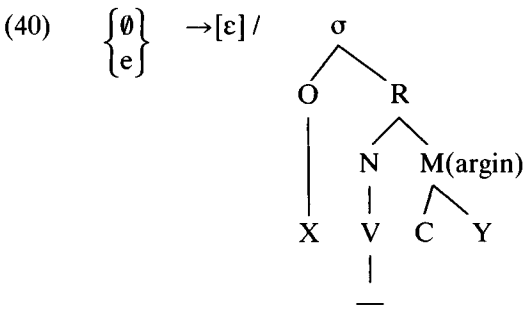




not possible, the syllable is not deleted and the empty nucleus is spelled out as schwa.

**3.3.2 Alternation with [ε]**

Concerning the alternation with [ε], Anderson proposes that an empty nuclear position occurring in a closed syllable ('where there is at least one consonant in the coda') is spelled out as [ε]. Recall that a syllable containing a coda is not subject to deletion, because if there is a coda, the syllable contains specified material. The rule is formulated as shown in (40).<sup>15</sup>



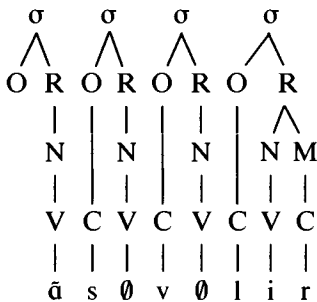
Let us first consider the difference between rule (40) and the rule of schwa-spelling. What distinguishes the contexts of the two rules is that while the rule of schwa-spelling applies whether or not the margin of the syllable is filled, rule (40) only applies when the margin is filled. More precisely, an empty nucleus is spelled out as schwa whether or not its syllable has a filled margin. On the other hand, rule (40) only applies when an empty nucleus occurs in a closed syllable.

According to schwa-spelling, an empty nucleus occurring in a closed syllable is manifested as schwa. According to rule (40), an empty nuc-

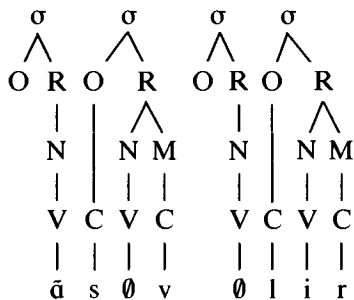
leus occurring in a closed syllable is manifested as [ɛ]. The question arises as to what determines the application of these rules when either may apply in a particular context. In order to resolve the conflict, Anderson proposes an order of application of those rules: rule (40) applies first, followed by rules of resyllabification, syllable deletion and schwa-spelling. Finally, rule (40) applies a second time. Note that if the first application of rule (40) is not possible (if the empty nucleus occurs in an open syllable, for example) but that the rule of resyllabification creates a situation where the empty nucleus now occurs in a closed syllable, this empty nucleus will be realized as schwa and not as [ɛ]. On the second application of rule (40), it has been bled by the earlier application of the rule of schwa-spelling. Given that rule (40) applies to /e/ and zero, but not to schwa, an empty nucleus which has undergone the rule of schwa-spelling cannot be manifested as [ɛ], since schwa is not one of the segments which is subject to rule (40). Thus, the application of the rule of schwa-spelling bleeds the reapplication of rule (40). This is illustrated in the following derivation of *ensevelir* [ãsəvlir] \*[ãsevliɹ] 'to bury'.

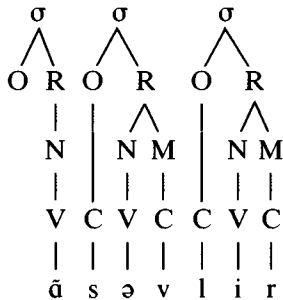
(41) **ensevelir 'to bury'** /ãsθvθliɹ/ [ãsəvlir]

a. *Non-application of rule (40)*



b. *Resyllabification*



(41) c. *Syllable deletion*  
*Schwa-spelling*

In this word the leftmost word-internal empty nucleus is not realized as [ε] because underlyingly it does not occur in a closed syllable. The derivation goes as follows: as shown in (41a), the first application of rule (40) is impossible because the two empty nuclei do not occur in a closed syllable. We see in (41b) that resyllabification applies, thus creating a context for both the application of the rule of schwa-spelling (cf. 41c), which manifests the empty nucleus in the second syllable as schwa, and the rule of syllable deletion, which deletes the following syllable containing an empty nucleus. The application of the rule of schwa-spelling bleeds the reapplication of rule (40).

To account for the lack of zero/[ε] alternation, Anderson claims that a consonant which precedes an empty nucleus is underlyingly syllabified in the onset of its syllable, and that the rule of alternation of /e/ and zero with [ε] precedes resyllabification. But he must now account for the fact that the alternation between zero and [ε] is possible. Let us consider the two words *appelle* [apɛl] and *paquet* [pakɛ]. We know that these [ε] are derived from empty nuclei since they alternate with zero, as in *appeler* [apɛl] 'to call', *paqueter* [pakɛ] 'to parcel'. Anderson accounts for the realization of [ε] as follows. Assuming Dell's proposal, he considers a nucleus to be in a closed syllable if it is followed by at least one consonant which is either: (a) final in word; (b) part of a cluster, except when that cluster consists of an obstruent followed by a liquid; or (c) followed by a schwa which is itself followed by a boundary. More precisely, he claims the following:

I assume (though I do not go into further here) that a separate rule, similar to rule (36) in its effects, assigns a consonant to the preceding syllable if it forms the onset of a syllable whose nucleus is such a

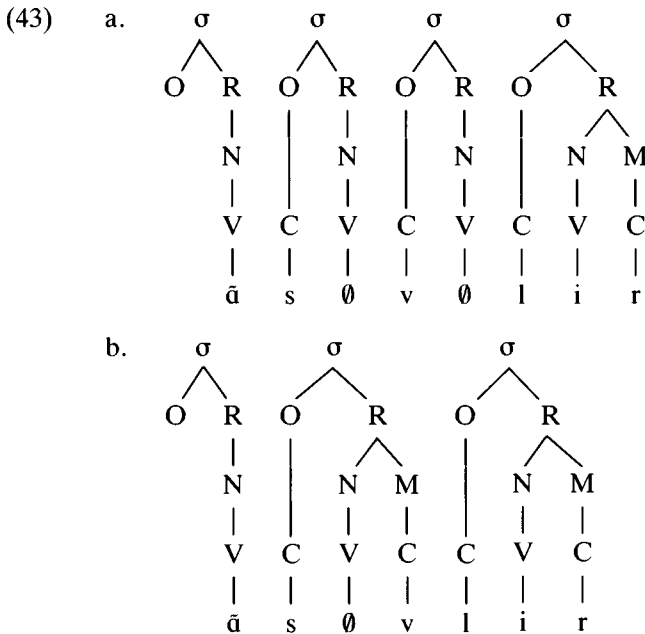


### 3.3.3 Sequences of empty nuclei

Let us now consider how Anderson proposes to account for the behaviour of sequences of empty nuclei.

In Anderson's analysis, the fact that two successive empty nuclei cannot both be realized as zeros (e.g. *ensevelir* [āsəvlir] \*[āsvlir] 'to bury'), follows directly from his rules of resyllabification.

Suppose we have an instance of two adjacent syllables containing schwa, subject to VCE [deletion – MC]. If we do not resyllabify the (single) consonant which separates the two nuclei in question, the second syllable will of course be preserved, since its onset will not be empty. In order to delete it, we must re-syllabify this consonant with the preceding vowel by one of the VCE rules; but once we do this, the preceding syllable is no longer subject to deletion, since its margin is now non-null. (Anderson 1982: 557)



Now let us consider a sequence of more than two empty nuclei as in *envie de te le demander* 'desire to ask it of you'. If we resyllabify into a preceding ryme each onset of syllables containing an empty nucleus, we will obtain the following results. By resyllabifying the onset of the first syllable of the verb *demander* into the preceding ryme, only the first empty nucleus of *demander* (more precisely the syllable) will be



### 3.3.4 Problems with Anderson's analysis

One reason why I would reject Anderson's analysis is because it cannot account for the possible absence of schwa in the initial syllable of bisyllabic words. That is, it offers no account of the fact that when a word like *cheval* 'horse' is not preceded by an article or any other words the first syllable can nevertheless be realized without a schwa.<sup>16</sup> The only way a syllable containing an empty nucleus can be deleted is when its onset is resyllabified into a preceding rhyme. In the examples given in (46), nothing precedes the syllable containing an empty nucleus. It should then be impossible for the onset to be resyllabified into a preceding rhyme. Nevertheless the empty nucleus can have no phonetic manifestation.

(46)	<i>cheval de course</i>	[ʃfaldəkurs]	'racehorse'
	<i>petit rat</i>	[ptira]	'small rat'
	<i>demande-la</i>	[dmādla]	'ask for it!'
	<i>reprends-la</i>	[rprāla]	'take it back!'
	<i>retourne là-bas</i>	[rturnlaba]	'go back there!'

Secondly, while Anderson can account for the absence of final schwa in words such as *porté* 'door', *ouvré* 'open', etc., he gives no explanation for the realization of these words when they are the first term of a compound.

(47)	a. <i>porte-clefs</i> 'keyring'	b. <i>porté-manteau</i> 'coat holder'
	<i>ouvre-boîte</i> 'can-opener'	<i>ouvré-bouteille</i> 'bottle-opener'

The first thing that must be determined is where the word-final position must be defined in compounds. Let us suppose that each term of a compound constitutes a domain. Consequently, the final syllable of the first term is a word-final syllable. If, according to Anderson, a word-final coda can branch, it is then possible for the onset of the last syllable of the word *porte* to be resyllabified into the preceding rhyme. This leads to a final syllable which has no segmental content and is consequently subject to deletion. This would account for the pronunciation of compounds which have as a second term a word with more than one phonetically expressed syllable (cf. 47b). But if the prediction is that zero is final in the first term of a compound, how can one explain that schwa must be manifested in compounds where the second term is phonetically monosyllabic, and that it must be absent when the second term has phonetically more than one syllable? In order to prevent the



final onset of the word *porte* in *porte-clefs* from being resyllabified into the preceding branching rhyme, it might be proposed that in compounds the word-final position is at the end of the compound. If this is the case, it is word-internal resyllabification which operates and not word-final resyllabification. Since a word-internal coda cannot branch, the final *t* of *porte* will not be resyllabified. But this would not solve the problem. The question would still remain as to why the *t* is resyllabified in compounds which have as a second term a word with more than one syllable.

Finally, Anderson's analysis cannot account for the fact that there are certain constructions where two consecutive empty nuclei can be both realized as zero.<sup>17</sup>

- |      |                    |               |                            |
|------|--------------------|---------------|----------------------------|
| (48) | mange de la soupe  | [mãždɫasup]   | 'eat some soup!'           |
|      | le chef de la gare | [ləʃɛfdɫagar] | 'the guard of the station' |
|      | l'oeuf de la poule | [lœfdɫapul]   | 'the egg of the hen'       |

To summarize, I think that the principal idea behind Anderson's analysis is excellent, namely the proposal to analyse schwa as an empty nucleus present in the lexical representation. I think, however, that to base an analysis on resyllabification raises many problems. Consequently, while I agree with him regarding the underlying representation of schwa, I consider that an analysis based on government of these empty positions is more illuminating. In fact, Anderson himself compared empty nuclei with syntactic empty nodes. If it is reasonable for Anderson to compare phonological and syntactic empty categories, it is as reasonable to try to analyse these two types of empty categories in terms of similar conceptual frameworks. In order to see the superiority of government over resyllabification, let us next consider the analysis of schwa in the framework of a theory of government.

## 4 *An analysis of schwa in terms of government*

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### 4.0 Introduction

In this chapter I propose a new account of the behaviour of schwa, aiming to demonstrate that its properties follow from general principles of phonological theory. From such a perspective, the behaviour of schwa is neither accidental nor is it specific to French. My analysis can be extended to other languages where similar phenomena are found. It will be argued that in languages where a vowel alternates with zero, the properties of this segment always follow from the same principles of the theory. What distinguishes one language from another is the nature of the segment which alternates with zero. Therefore, the alternation between [ə] and zero in French, between [u] and zero in Tangale, between [a] and zero in Khalkha Mongolian and between [i] and zero in Moroccan Arabic are accounted for in terms of the same set of principles and parameters. My analysis of schwa will also lead to a better understanding and to a sharpening of the theory of government.

Interestingly, my analysis embodies proposals that have been made by Selkirk (1978) and Anderson (1982) in their respective analyses of schwa. Like Anderson I analyse schwa as the phonetic interpretation of an underlying empty nucleus, and like Selkirk I consider that a given nucleus is in a binary relation with another nucleus. However, while Selkirk claims that schwa is deleted when it is the weak member of a left-dominant binary foot, and Anderson proposes that an empty syllable is deleted after the resyllabification of its onset, my view is that an empty nucleus may receive no phonetic interpretation when it is properly governed by a following nucleus.

I take as my point of departure for the analysis of schwa the work of Kaye (1987, 1990b). Kaye analysed the alternation between [i] and zero in Moroccan Arabic in terms of government. The main points of his analysis are presented below.<sup>1</sup>

#### 4.1 Alternation between [i] and ∅ in Moroccan Arabic

In Moroccan Arabic (henceforth MA), a vowel [i] alternates with zero in some contexts. For example, the radical *ktb* 'to write' is pronounced [ktib] in the singular imperfective form and [kitbu] in the plural imperfective form. Kaye accounts for this alternation between [i] and zero in terms of a theory of government. He makes the following proposal:

A. Such alternations involve empty nuclear positions, i.e. nuclei dominating a point which has no segmental content. At times these positions are expressed phonetically and at times not. The point is that all such positions are present at the level of lexical representation. We must then define under what conditions such positions are or are not expressed phonetically. Suppose that one nucleus may govern another (projection government) in MA and further that the direction of this government is from right to left. It is now possible to characterize the contexts in which an empty nucleus is/is not realized phonetically.

(i) A properly governed empty position is not realized phonetically.

It remains to define proper government. Proper government is considered to be a stronger form of government. That is, all the conditions necessary for a governing relation are still required. Further, some additional conditions are added. Two such conditions are . . .

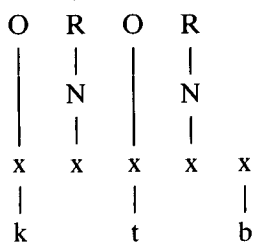
(i) The governor must have phonetic content.

(ii) The governor cannot govern across another governing domain.

(Kaye 1987: 10–11)

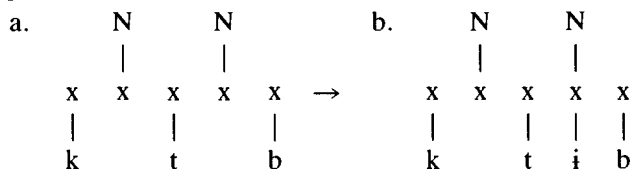
This means that in the lexical representation of the radical *ktb* 'to write', there is an empty nuclear position between the first two consonants as well as between the *t* and the *b*.<sup>2</sup>

(1) **ktb 'to write'**

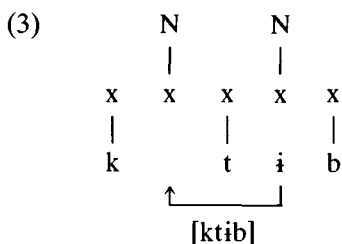


Since proper governors must have phonetic content, and since, as Kaye claims, governing relations apply from right-to-left in MA, an empty nucleus should be possible only when followed by a vowel. In other words, the vowel [i] should appear only when it is not followed by a nucleus which has segmental content. Let us first consider the form [ktib] '(he/she) writes'.

## (2) [ktib] 'he/she writes'

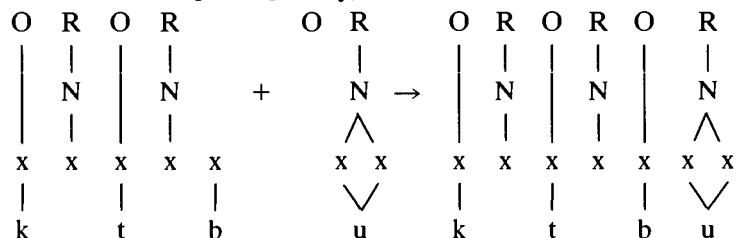


This verbal form has two syllables.<sup>3</sup> Each syllable contains an empty nucleus. The two empty nuclei are adjacent to each other at the level of nuclear projections.<sup>4</sup> At this level, from right-to-left, relations of proper government are determined.<sup>5</sup> In the lexical representation of the singular imperfective form, the final nucleus is empty. Because no vowel follows it, this final empty nucleus is not properly governed and so must have a phonetic interpretation. The vowel [i] is realized. Because it is not properly governed, the word-final nucleus receives a phonetic interpretation. But how about the first empty nucleus? Can it be properly governed by the final nucleus? The answer is yes. The realization of the vowel [i] in the final nucleus of the verb makes this final nucleus a potential proper governor. Because it has a phonetic content this nucleus may properly govern a complement. It can then properly govern the preceding empty nucleus. It follows that the first nucleus is properly governed by the following vowel and consequently no segment has to be manifested phonetically.



Let us now consider the plural form [kitbu].

## (4) ktb 'to write' [kɪtbu] '(they) write'







to a process of deletion. In a word like *souvenir* [suvnir] ‘to remember’, for example, I, like Anderson, propose that there is an empty nucleus in the lexical representation of the word. But I differ from Anderson and claim that the empty nucleus, even if it has no phonetic manifestation, is never deleted.<sup>9</sup> Consequently, I do not assume that the alternation between schwa and zero results from a process of vowel or syllable deletion. Zero represents the lack of phonetic content in an underlying empty nucleus. It does not represent the absence of a syllabic position.

According to Kaye, Lowenstamm & Vergnaud’s theory of the internal representation of segments that I present next, the absence of an element (in the composition of a segment, for example) is expressed by the presence of the so-called **cold vowel**. I assume therefore that an empty nucleus is a nuclear position which contains the cold vowel.

#### 4.2.1.1 *The internal representation of segments*

A word should be said about Kaye, Lowenstamm & Vergnaud’s theory of representation of segments. Segments, they claim, are composed of elements. An element may be thought of as a complete matrix of features (it is phonetically interpretable) which contains at most one marked (or hot) feature specification. For example, the element I<sup>0</sup> is marked for the feature Back, A<sup>+</sup> for the feature High, and U<sup>0</sup> for the feature Round.<sup>10</sup>

(6)	I <sup>0</sup>	U <sup>0</sup>	A <sup>0</sup>
	–Round	+ <b>Round</b>	–Round
	+High	+High	– <b>High</b>
	– <b>Back</b>	+Back	+Back
	–ATR	–ATR	–ATR
	–Low	–Low	+Low

In addition to the three proposed elements, I, U and A, the theory claims that there is an ATR element (I<sup>+</sup>), a Nasal element (N<sup>+</sup>), as well as an element which contains **no** marked feature specification, the so-called ‘cold’ element (v<sup>0</sup>).

Recall that this vowel [the cold vowel – MC] has no hot features. Accordingly, the cold vowel must be a high, back, unrounded, lax vowel: high, since [–HIGH] is the marked specification for the feature HI (cf. A), back, since [–BACK] is a marked specification for the feature BACK (cf. I), unrounded, since [+ROUND] is a marked specification for the feature ROUND (cf. U) and lax, since [+ATR] is

a marked specification for this feature. (Kaye, Lowenstamm & Vergnaud (1985: 309)

- (7) Cold element: +Back  
+High  
–Round  
–ATR

All segments are composed of one or more than one operator and of a head. The resulting segment has all the feature specifications of its head except for the operator's hot feature. If we consider the vowel [ɛ] for example, it is composed of the element I<sup>0</sup> as its head along with the element A<sup>+</sup> as its operator. For its part the vowel [e] has the same representation as [ɛ] except that it has an additional operator, namely the ATR element. The representation of the two vowels is given below.

- (8) a. 

<b>Operator</b>	<b>Head</b>	<b>Segment</b>
–Round	–Round	–Round
– <b>High</b>	+High	– <b>High</b>
+Back	– <b>Back</b>	→ – <b>Back</b>
–ATR	–ATR	–ATR
+Low	–Low	–Low

  
(A<sup>+</sup> · I<sup>0</sup>) [ɛ]
- b. 

<b>Operator</b>	<b>Operator</b>	<b>Head</b>	<b>Segment</b>
–Round	–Round	–Round	–Round
+High	– <b>High</b>	+High	– <b>High</b>
+Back	+Back	– <b>Back</b>	→ – <b>Back</b>
+ATR	–ATR	–ATR	+ATR
–Low	+Low	–Low	–Low

  
(I<sup>+</sup> · (A<sup>+</sup> · I<sup>0</sup>)) [e]

Considering now the vowel [a], it is composed of the element A<sup>+</sup> as its head. No other element counts in its representation. That is, its operator is zero, i.e. an element which does not transmit any of its feature specification. Such an element is the cold element.<sup>11</sup>

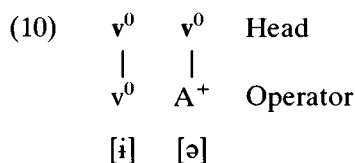
- (9) 

<b>Operator</b>	<b>Head</b>	<b>Segment</b>
–Round	–Round	–Round
+High	– <b>High</b>	– <b>High</b>
+Back	+Back	+Back
–ATR	–ATR	–ATR
–Low	+Low	+Low

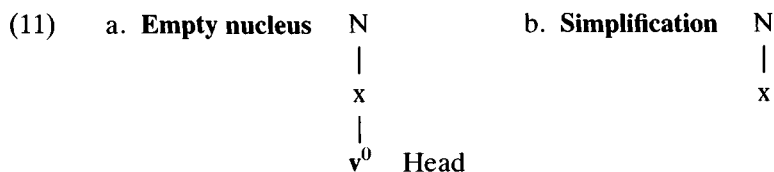
  
(v<sup>0</sup> · A<sup>+</sup>) [a]



As mentioned earlier, I propose that an empty nucleus is a position which dominates the cold element. Since the cold element represents the absence of an element in the representation of a segment, it is natural to assume that the absence of an element in a nuclear position represents the presence of the cold element in this position. The phonetic interpretation of this matrix of features is the vowel [ɨ]. The cold element is not phonetically interpretable in every language. Its phonetic realization is subject to parametric variation. In French, for example, the cold element cannot be realized phonetically. In contrast with French, the cold element is manifested in Moroccan Arabic. But in every language a nucleus dominating the cold element is different from a nucleus dominating any other segment. It is sometimes manifested phonetically and sometimes not. To be realized as zero a nucleus dominating the cold element must satisfy certain conditions; it must be properly governed. When such a nucleus does not satisfy the conditions for being properly governed, it must receive a phonetic interpretation. In Moroccan Arabic, given that the cold element may be expressed phonetically, a vowel [ɨ] is realized. In French, where the cold element cannot be expressed phonetically, the strategy is to add the element  $A^+$  to the internal representation of the empty nucleus.<sup>12</sup> This results in a segment composed of the cold element as its head and the element  $A^+$  as its operator. Such a representation corresponds to the vocalic segment schwa.<sup>13</sup>

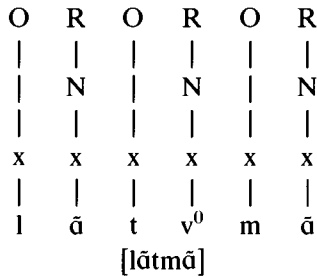


I am therefore considering an empty nucleus as a nuclear position dominating a nuclear skeletal point to which the cold element is attached. But in the rest of this discussion I will simplify the configuration of the empty nuclei. While I understand an empty nucleus as having the representation (11a), I will simplify it as in (11b).

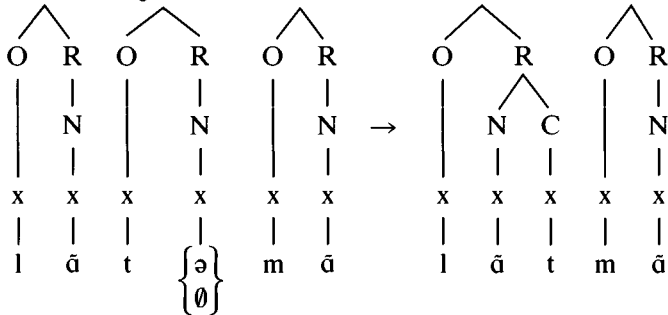


In (12) I give two derivations of the word *lentement* [lãtmã] ‘slowly’. (12a) reflects my view of the lexical representation of the word. This underlying structure remains unchanged at all the levels of the derivation. Even though the two consonants *t* and *m* are phonetically adjacent, I claim that a nucleus intervenes between them in the representation. By comparison, the structures given in (12b) could represent the position of anyone who treats schwa as underlyingly present but subject to deletion.

(12) a. **My analysis**



b. **Schwa subject to deletion**



Let us next consider how I propose to account for the alternation between schwa and zero.

**4.2.2 Motivation for the presence of empty nuclei**

For the purpose of this discussion, I consider separately word-final and non-word-final schwa. I start with the analysis of word-internal schwas, which I claim are present in the lexical representation of the words in (13).

(13) **Consonant-zero-nasal**

lentément	‘slowly’	sottément	‘stupidly’
entendément	‘understanding’	battément	‘beat’

rapidément	'quickly'	centénaire	'centenary'
cadéna	'padlock'	mainténir	'to maintain'
froidément	'coldly'	maintenant	'now'
lendemain	'the day after'	souténir	'to support'
publiquément	'publicly'	enjambément	'enjambment'
vaguément	'vaguely'	bravément	'bravely'
sagement	'wisely'	effectivement	'really'
avénant	'pleasant'	mouvement	'movement'
achèvement	'completion'	souvenir	'memory'
gisement	'deposit'	gauchement	'clumsily'
cauchémar	'nightmare'		

**Liquid-zero-nasal**

actuellement	'now'	sûrement	'certainly'
littéralement	'literally'	allémand	'German'
follément	'madly'	finalément	'finally'
harcèlement	'harassment'	seulement	'only'

**Nasal-zero-nasal**

promenade	'walk'	extrêmement	'extremely'
améner	'to bring'	ennémi	'enemy'

**Consonant-zero-liquid**

matélot	'sailor'	appéler	'to call'
attelage	'harness'	gobélet	'goblet'
envelopper	'to wrap'	matélas	'mattress'
péluce	'fluff'	chapélet	'rosary'
rondélet	'plumpish'	pélotte	'ball'
geler	'to freeze'	bracélet	'bracelet'
ciseler	'to chisel'	développer	'to develop'
engélure	'chilblain'	décéler	'to detect'
moquerie	'mockery'	maquereau	'mackerel'
coupéret	'chopper'	lapéreau	'young rabbit'
sautérelle	'grasshopper'	cérise	'cherry'
banqueroute	'bankrupt'	cassérole	'pot'
gâtérie	'little treat'	riverain	'waterside'
minérai	'ore'	chapéron	'chaperon'
Catherine	'Cathy'	dupérie	'dupery'
baucéron	'from Bauce'	pucéron	'greenfly'
papeterie	'stationery'	sécheresse	'drought' →

**Liquid-zero-liquid**

serrurerie	'locksmith shop'	bourrélet	'roll of fat'
hôtellerie	'hostelry'	galérie	'gallery'

**Liquid-zero-consonant**

durété	'hardness'	répas	'meal'
feuilléter	'to leaf through'	lègèreté	'lightness'
furéter	'to nose'	carréfour	'cross road'
rarité	'rarity'	soulever	'to lift up'
léver	'to raise'	sûreté	'safety'
rébours	'wrong way'		

**Consonant-zero-consonant**

cachéter	'to seal'	déchiqúéter	'to tear'
pétit	'small'	aquédúc	'aqueduct'
faussété	'falsehood'	honnêteté	'honesty'
saintété	'sainthood'	brèvété	'brevity'
sécours	'help'	taffétas	'taffeta'
achéver	'to finish'	achéter	'to buy'
médécin	'doctor'	chéval	'horse'
chéveux	'hair'		

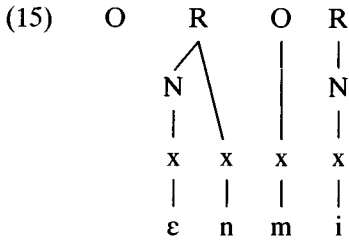
**Nasal-zero-consonant**

samedi	'Saturday'	ânerie	'stupidity'
mannéquin	'fashion model'	cannévas	'framework'
haméçon	'hook'	hannéton	'May-bug'
omélette	'omelette'		

All the words in (13) are realized without a schwa. In spite of their pronunciation, I propose that they contain an empty nucleus in their lexical representation.<sup>14</sup> I attribute to a word like *ennemi*, for example, the following structure:

(14)	O	R	O	R	O	R
	N		N		N	
	x	x	x	x	x	x
	ε	n		m	i	
	[ɛnmi] 'enemy'					

But, of course, a logical alternative to (14) would be to attribute to *ennemi* a structure with an initial branching rhyme.<sup>15</sup>



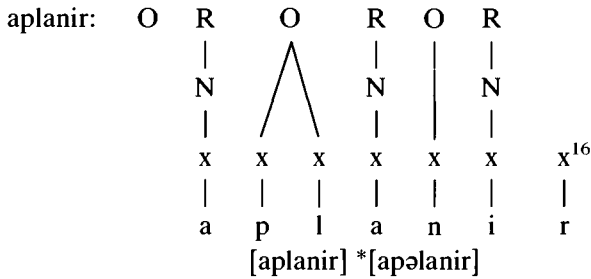
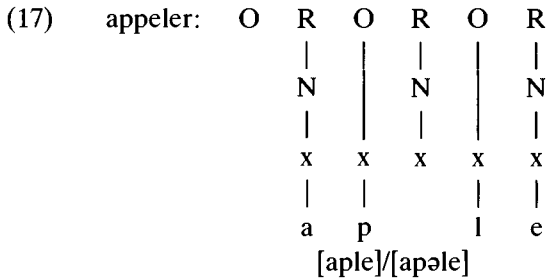
Indeed, word-internally in many words an empty nucleus is never phonetically manifested. Superficially then, the structure in (15), i.e. a branching rhyme followed by a non-branching onset, seems appropriate for many of the words I gave in (13). To justify a structure like that in (14) I give the following three arguments:

1. Some evidence for the presence of an empty nucleus in the words given in (13) is that it is possible to pronounce these words with a schwa. In poetry and careful speech, words like *ennemi*, *appeler*, *soulever*, *pelouse*, etc. can be realized with a schwa in the syllable identified as having one. That is, a word which is otherwise realized with, let's say, two 'syllables' may be regarded as a trisyllabic word for the purposes of syllable counting, for example. In contrast, in words like *aplanir*, *calvaire*, *pelter* and *place* a schwa cannot appear between the consonants of the clusters. Compare the following pronunciations:

- (16)
- |           |         |          |           |           |             |
|-----------|---------|----------|-----------|-----------|-------------|
| appeler:  | [aple]  | [apøle]  | aplanir:  | [aplanir] | *[apølanir] |
| soulever: | [sulve] | [suløve] | calvaire: | [kalver]  | *[kaløver]  |
| pelouse:  | [pluz]  | [pøluz]  | place:    | [plas]    | *[pølas]    |

It therefore seems clear that one must distinguish words like *appeler* from those like *aplanir*. I propose that the distinction lies in their lexical representation. Words which can be realized with a schwa contain an empty nucleus; those that cannot be realized with schwa do not contain one (see (17) overleaf).

2. A second source of evidence for the presence of an empty nucleus in the lexical representation of the words given in (13) may be found in considering the contrast between the infinitive and the imperative forms of verbs. Starting with regular cases, i.e. with verbs that can never be realized with a schwa, the infinitive is formed by adding the morpheme



[e] (-er) to a verbal stem. For those regular cases, the imperative is phonetically identical to the stem of the verb.

(18)	<b>Infinitive</b>		<b>Imperative</b>		<b>Gloss</b>
	parl-er	[parle]	parle!	[parl]	'to talk'
	pelt-er	[pelte]	pelte!	[pelt]	'to shovel' <sup>17</sup>
	racl-er	[rakle]	racle!	[rakl]	'to scrape'

Now consider the infinitive form of the following verbs:

(19)	achet-er	[ašte]	'to buy'	halet-er	[alte]	'to gasp'
	appel-er	[aple]	'to call'	soulev-er	[sulve]	'to lift'
	achev-er	[ašfe]	'to finish'			

In infinitive form, the verbs in (19) may be realized without a schwa in the second nucleus. This means that there is no phonetic evidence for the presence of a nucleus in the second syllable of the infinitive form *appeler*, for example. However, when we consider the imperative form of the verbs in (19), the result is not a form identical to the stem. That is, the imperative form of regular verbs is different from the imperative form of the verbs in (19). In their imperative form the verbs in (19) are realized with a vowel [ɛ] exactly in the position where an empty nucleus is posited.

- (20) achète! [aʃɛt] \*[aʃt] ‘buy!’      halète! [alɛt] \*[alt] ‘gasp!’  
 appelle! [apɛl] \*[apl] ‘call!’      soulève! [sulɛv] \*[sulv] ‘lift!’  
 achève! [aʃɛv] \*[aʃv] ‘finish!’

If the verbs in (19) are analysed as having an empty nucleus in their second syllable, it would not be surprising to find contexts where this nucleus receives a phonetic interpretation. On the other hand, linguists who posit for those verbs the structure of a branching rhyme in the first syllable must propose that the vowel [ɛ] is epenthetic in the imperative forms given in (20). The question would then arise as to why there is no similar epenthesis in the ‘imperatives’ of (21).

- (21) parle! [parl] \*[parɛl] ‘talk!’  
 pelte! [pɛlt] \*[pɛlet] ‘shovel!’  
 racle! [rakl] \*[rakɛl] ‘scrape!’

Faced with this difference between the imperative forms of the two types of verbs, I propose the following representation for the verbs *racler* and *appeler*, respectively.

- (22) *racler*:      O    R      O      R      R
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- (23) a. *souvenir* [suvnir] 'to remember'  
           *prévenir* [prevnir] 'to advise'  
           *devenir* [dəvnir] 'to become'  
           *convenir* [kɔ̃vnir] 'to suit'
- b. *parvenir* [pɑrvə'nir] 'to achieve'  
           *subvenir* [sybvə'nir] 'to provide'  
           *advenir* [advə'nir] 'to happen'  
           *survenir* [syrvə'nir] 'to occur'

There is a difference between the group of verbs in (23a) and those in (23b). The first group are phonetically bisyllabic. Words in (23b) are phonetically trisyllabic. Each is pronounced with a schwa in the second nucleus. Assuming that we do not want to treat schwa as an epenthetic vowel, it seems reasonable to propose that *venir* has a unique lexical representation in spite of the variation in pronunciation. Let us suppose that it is represented with an initial open rhyme. The nucleus of this rhyme is sometimes phonetically realized and sometimes not. The point is that while *souvenir* is almost never realized with a schwa, the presence of a nucleus in the first syllable of *venir* is phonetically manifested in words like *parvenir*.

- (24) a. *souvenir*    O   R   O   R   O   R
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### 4.2.3 Zero as the realization of a properly governed empty nucleus

#### 4.2.3.1 *Word-internally and preceded by one consonant*

We generally observe relations between nuclei in processes such as vowel harmony and stress assignment. This means that nuclei can contract relations with each other in spite of the fact that the two positions are not adjacent at all levels. In the metrical theory, feet are constructed on nuclear or rhymal projections and an intervening onset is not considered in the foot formation. In terms of government, nuclei are projected at a level called the level of nuclear projection. It is at this level of nuclear projection that relations between nuclei apply. An intervening non-nuclear point cannot block the adjacency between two nuclear positions since government between nuclei is a case of government at the level of nuclear projection.

My analysis of schwa involves government by projection where the nuclear governee is empty. For a governee to remain empty, it must not only be governed, it must be properly governed. While zero is an instance of an empty nucleus, properly governed, schwa represents the manifestation of an empty nucleus which is not properly governed. Governing and proper governing relations which apply at the level of nuclear projection are characterized as follows:

#### **Government**

A nucleus  $\alpha$  is in a governing relation with a nucleus  $\beta$  iff

- (i)  $\alpha$  and  $\beta$  are strictly adjacent at this level of nuclear projection
- (ii) the relation is directional (from right-to-left or left-to-right).

#### **Proper government**

A nucleus  $\alpha$  properly governs a nucleus  $\beta$  iff

- (i)  $\alpha$  governs  $\beta$
- (ii)  $\alpha$  is not itself governed (it has phonetic content).

In French, schwa should be the phonetic interpretation of an ungoverned empty nucleus. In addition, if schwa is subject to **exactly the same principles** that govern the distribution of the Arabic [i], the prediction is that zero should only be found when the empty nucleus is directly followed at the level of nuclear projection by a nucleus with phonetic

content. In the words presented in (13), schwas are not realized phonetically. In those words, the empty nucleus is directly followed by a nucleus with phonetic content. This nucleus, since it has phonetic content, properly governs the preceding empty nucleus. Consequently, the empty nucleus does not need to be manifested phonetically.<sup>19</sup> Following the spirit of Chomsky (1981), who proposed the Avoid Pronoun Principle, I propose a principle which imposes the choice of zero rather than a vowel for a properly governed empty nucleus.<sup>20</sup>

(25) **The Avoid ‘Vowel’ Principle**

An empty nucleus remains uninterpreted whenever possible.

Thus in (26), where an empty nucleus is properly governed by a following nucleus with phonetic content, it is not phonetically realized.

(26)	lentément:	N	N	N	chével:	N	N
		x	x	x		x	x
		l	ā	t		s	v
				m		a	l
				↑		↑	
				└───┘		└───┘	
				[lātmā]		[šfal]	

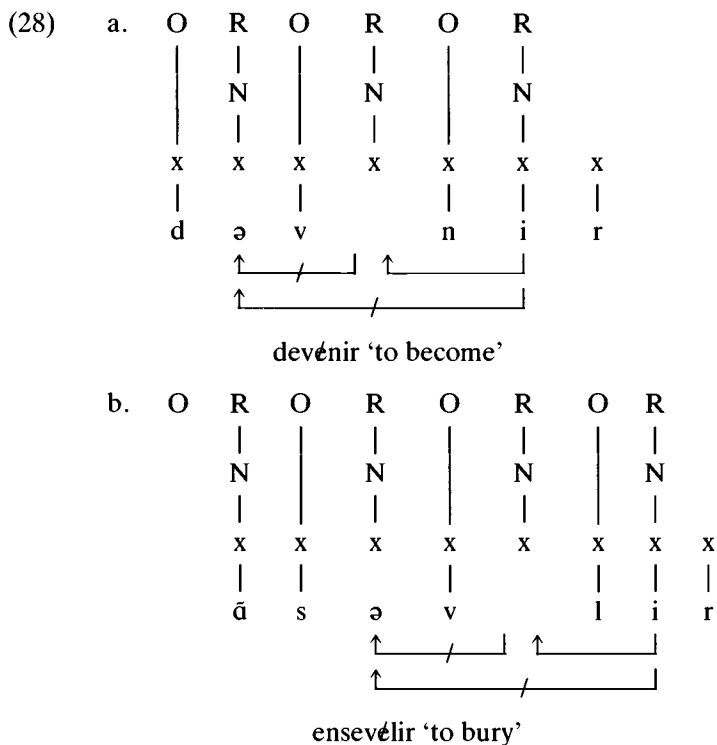
So far we have seen that, at least word-internally, French schwa seems to be subject to the same principles that govern the distribution of the Moroccan [i]. In both MA and French an empty nucleus is realized as zero when immediately followed at the level of nuclear projection by a nucleus with phonetic content which properly governs it.

The MA data show that a proper governor must have phonetic content and that government requires strict adjacency between the governor and the governee. In French, we can also demonstrate that a proper governor must have a phonetic content, i.e. cannot itself be governed. The words presented in (27) contain a sequence of empty nuclei. The fact that only the rightmost empty nucleus may be without phonetic interpretation shows that: (i) a proper governor cannot be properly governed, and (ii) that the governor and the governee must be strictly adjacent at the level of nuclear projection. Recall now that in some languages proper governing relations require strict adjacency, whereas in other languages they do not. In one dialect of MA we saw that a sequence of consecutive empty nuclei is not possible, while in another dialect the same sequence is allowed. Faced with this difference, it is

proposed that the strict adjacency requirement between a proper governor and its governee is subject to parametric variation.<sup>21</sup> The behaviour of sequences of empty nuclei in French shows that government is strictly local. Consider the data in (27).

- (27) a. ensevelir 'to bury'  
 b. papeterie 'stationery'  
 c. briqueterie 'brickyard'  
 d. semeler 'to sole'  
 e. devenir 'to become'  
 f. relever 'to stand'  
 g. rejeter 'to throw back'<sup>22</sup>

The forms given in (27) have sequences of two consecutive empty nuclei. From right-to-left, a vowel properly governs the immediately preceding empty nucleus. The properly governed nucleus, because it is properly governed, cannot itself properly govern the empty nucleus to its left.



Up to this point a theory of proper government accounts for the fact that word-internal empty nuclei are realized as zero and that, in a sequence of consecutive empty nuclei, only the one which is adjacent to a following nucleus with phonetic content is not manifested. The preceding examples showed that in French proper government relations require strict adjacency between the governor and the governee. The adjacency requirement accounts for the impossibility of having a sequence of empty nuclei where both nuclei are unrealized phonetically.

I would like to digress here to motivate the directionality I assume for governing relations between nuclei. Recall that while I claim that an empty nucleus is in a governing relation with a following nucleus, Selkirk (1978) claims that it is a preceding vowel which determines the behaviour of schwa. In the light of the words presented in (13) above, since almost all the empty nuclei occur in word-internal position, it is not clear if an empty nucleus is in relation with a preceding or with a following ungoverned nucleus. The question arises then as to whether in French, as in MA, an empty nucleus is properly governed by a following nucleus or, as claimed by Selkirk, it is the nucleus to its left that determines its behaviour. Let us consider what motivates my proposal that an empty nucleus receives no phonetic content when it is properly governed by a following nucleus which is not itself governed.

#### 4.2.3.2 *Are empty nuclei governed by a preceding or by a following vowel?*

The main factor which motivates Selkirk to claim that it is a preceding vowel which manifests a binary relation with schwa is the deletion of schwa in word-final position. While Selkirk's characterization of the binary foot seems to be motivated by many instances of schwa deletion in word-final position when preceded by a single consonant, it encounters problems with the behaviour of final schwas preceded by a consonant cluster. In the light of the behaviour of word-internal schwas preceded by a cluster, she claims that schwa is not subject to deletion when it is incorporated into a foot and more than one consonant intervenes between the two vowels. But the fact is that a word-final schwa may be manifested as null after a consonant cluster. Although Selkirk's treatment of word-final schwas occurring after a cluster is not clear, the fact is that she cannot have a unique treatment for those schwas. That is, her metrical treatment does not account for all the data motivating her claim that it is a preceding vowel which determines the presence or absence of schwa.

Secondly, Selkirk's claim that schwa is in a relation with a preceding vowel gives rise to another problem with words that contain a schwa in their leftmost nucleus. In my dialect of Quebec French, for example, in the initial syllable of bisyllabic words, schwa is not realized phonetically.

(29)	chémin	'road'	cheval	'horse'
	sémaine	'week'	léver	'to stand up'
	méner	'to lead'	chémise	'blouse'
	jéter	'to throw'	rédonne	'give again/back!'
	chénil	'kennel'	vénir	'to come'
	démande	'ask!'	ténir	'to hold'
	séringue	'syringe'	démain	'tomorrow'
	cérise	'cherry'	pétit	'small'
	réviens ici	'come back here!'		
	démandé les	'ask for them!'		
	retourné les	'return them!'		
	démain matin	'tomorrow morning'		

This fact is accounted for by an analysis which claims that it is a following vowel that determines the behaviour of schwa. According to my analysis, in the initial syllable of a bisyllabic word the empty nucleus is properly governed by the following nucleus with phonetic content. Being properly governed, the empty nucleus can be unrealized phonetically. On the other hand, according to Selkirk's analysis, it should never be the case that the first schwa is subject to deletion, because in such a position schwa cannot form a binary foot along with a preceding nucleus, and therefore should not be deletable. Recall that schwa is subject to deletion only when it is the weak branch of a binary foot.

Recall that Dell, Selkirk and Anderson mention that a schwa occurring in the leftmost nucleus of a word is syncopated when it is preceded by a word ending with a vowel. That is, they claim that while *la cerise* is pronounced [lasriz], *cette cerise* is realized with a schwa [setsəriz]. While I suspect that this is not the case in Parisian French, it is certainly not the case in my dialect of Quebec French, where in both cases schwa fails to be manifested (e.g. [lasriz], [setsriz]). Also, as shown by the imperative forms of verbs, a schwa is not manifested even when nothing precedes it (cf. *demande à Guy* [dmādagi] 'ask Guy', *retourne là-bas* [rturnlaba] 'go back there').

Finally, in analyses of French schwa where it is claimed that the

presence of a preceding vowel determines whether schwa is or is not phonetically realized, it is mentioned that a consonant cluster cannot intervene between the two vowels. While this accounts for the presence of word-internal schwa preceded by two consonants, it gives no explanation as to why a cluster prevents a schwa from being realized as zero whether or not there is a vowel to the left of the consonant cluster. The point is that it is not only the case that a cluster blocks a relation between schwa and a preceding vowel. A cluster prevents schwa from being realized as zero even if no vowel precedes. As the following data show, in the first syllable of a bisyllabic word, schwa is unrealized only if it is preceded by **one** consonant. If two consonants precede the empty nucleus, it must receive a phonetic interpretation.

(30)	a.	<b>Without schwa</b>		b.	<b>With schwa</b>	
		chémin	‘road’		brebis	‘sheep’
		chéval	‘horse’		breloque	‘bracelet’
		sémaine	‘week’		bretelle	‘suspenders’
		séringue	‘syringe’		breton	‘Breton’
		cérise	‘cherry’		brevet	‘diploma’
		chénil	‘kennel’		crevasse	‘fissure’
		pétit	‘small’		crever	‘to puncture’
		chemise	‘blouse’		frelon	‘hornet’
		démander	‘to ask’		fredonne	‘(he/she) hums’
		démain	‘tomorrow’		grenade	‘grenade’

Considering the preceding facts, it seems reasonable to propose that it is what follows that determines the behaviour of an empty nucleus.

#### 4.2.3.3 *Empty nuclei before h-aspiré*

A prediction which my analysis makes is that it should always be possible to find zero when an empty nucleus is immediately followed by a vowel (nuclei are adjacent at the projection level). There are, however, exceptions to this prediction. For example, a word-internal empty nucleus preceded by a single consonant is always realized as schwa when an empty onset follows it (cf. (31a)).

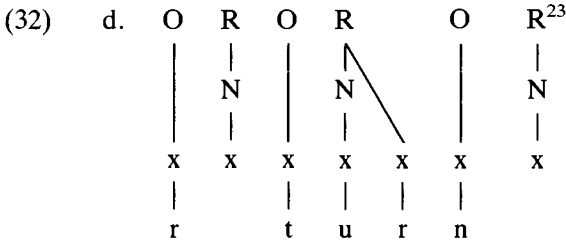
(31)	a.	va dehors	[vadəɔ̃]	*[vadɔ̃]	‘go outside!’
		rehausser	[rəose]	*[rose]	‘to raise again’
	b.	là-dessus	[ladəsy]	[ladsy]	‘on it’
		retourne	[rəturn]	[rturn]	‘go back!’

Let us consider how my analysis accounts for this fact. Each of the above forms contains an empty nucleus in the first syllable. In all cases, the second syllable contains a nucleus with phonetic content. This following nucleus with phonetic content should, in principle, properly govern the empty nucleus to its left, allowing for the manifestation of the latter as zero. While this is what happens in the forms in (31b), a schwa must be realized in the first syllable of (31a). The difference between these two groups of forms is that in (31a) an empty onset intervenes between the two nuclei, whereas in (31b) the intervening onset dominates a phonetically expressed consonant. The question arises as to why an empty onset (i.e. *h*-aspiré) determines the manifestation of a preceding empty nucleus.

Assuming the representation of *h*-aspiré proposed by Vergnaud (1982), the difference between an onset dominating an *h*-aspiré and one dominating any other consonant is the following one. *h*-aspiré is represented as a constituent dominating a skeletal point but no segment; this is the representation of an empty constituent. Thus, the forms given in (31) have the following representations, respectively:

(32)

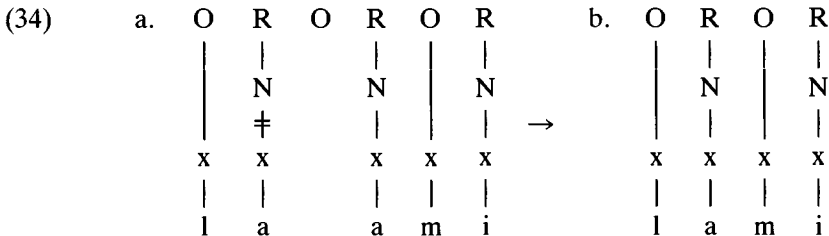
a.	O	R	O	R	O	R	
		N		N		N	
	x	x	x	x	x	x	x
	v	a	d		ɔ	r	
b.	O	R	O	R	O	R	
		N		N		N	
	x	x	x	x	x	x	
	r			o	s	e	
c.	O	R	O	R	O	R	
		N		N		N	
	x	x	x	x	x	x	
	l	a	d		s	y	



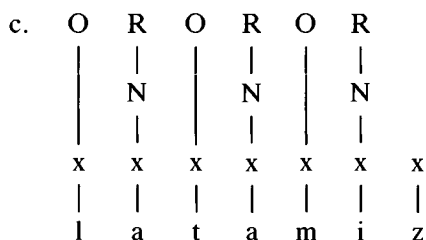
The representation I assume for *h*-aspire can be justified. It is a well-known fact that in French the vowel of an article deletes before a noun beginning with a vowel and remains before one beginning with a consonant. This is illustrated in (33).

- (33) a. la amie → [lami] 'the girlfriend'  
 la école → [lekɔl] 'the school'  
 le épi → [lepi] 'the ear'
- b. la Tamise → [latamiz] 'the Thames'  
 le pétrole → [ləpetrɔl] 'the petrol'  
 le képi → [ləkepi] 'the kepi'

The deletion of the vowel of the article preceding a noun beginning with a vowel can be accounted for by proposing that in a sequence of two adjacent nuclear points, the first one is deleted as a result of the Obligatory Contour Principle (OCP).<sup>24</sup> In words beginning with a vowel, the word-initial onset has no segment and no skeletal point. Consequently, two nuclear points are adjacent and the first one is deleted. Deletion does not take place when the noun following the article begins with a consonant, since in this case the word-initial onset or non-nuclear point prevents the two nuclear points from being adjacent.



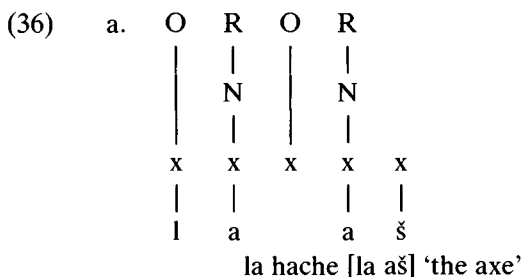




When an article precedes a word beginning with an *h*-aspiré, even though such a word begins phonetically with a vowel, the article behaves as before a word beginning with a consonant. The vowel is not subject to deletion.

- |      |                            |  |                       |  |                      |
|------|----------------------------|--|-----------------------|--|----------------------|
| (35) | <b><i>h</i>-aspiré</b>     |  | <b>Consonant</b>      |  | <b>Vowel</b>         |
|      | la housse ‘the dust-cover’ |  | la soupe ‘the soup’   |  | lé ours ‘the bear’   |
|      | la hache ‘the axe’         |  | le tapis ‘the carpet’ |  | lá amie ‘the friend’ |
|      | le héros ‘the hero’        |  | le bébé ‘the baby’    |  | lá épée ‘the sword’  |

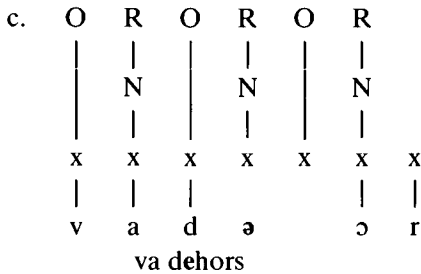
That words beginning with *h*-aspiré begin phonetically with a vowel means that at the segmental level these words have as word-initial onsets a constituent that dominates no overt segment. On the other hand the fact that they behave phonologically like words beginning with a consonant means that at the skeletal level the word-initial onset must dominate a skeletal point which prevents the two nuclear points from being adjacent. I then assume the following representation for words beginning with *h*-aspiré.<sup>25</sup>



Let us now return to the question of why an empty nucleus before *h*-aspiré must receive a phonetic interpretation. Consider the data in (37a) and the representations in (37b, c) overleaf.

An onset which contains an *h*-aspiré dominates a non-nuclear skeletal position with which no segment is associated. Such an onset is an empty

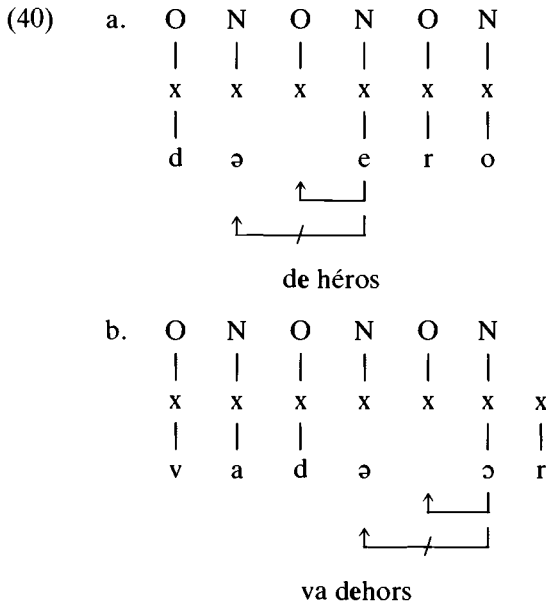
- (37) a. pas *dé* ami 'no friend'      pas de hache 'no axe'  
 pas *dé* ours 'no bear'      pas de housse 'no dust-cover'  
 pas *dé* école 'no school'      pas de héros 'no hero'
- là-déssus 'on it'      va dehors 'go outside'  
 rétourne 'go back'      rehausser 'to raise again'



position. Because it is empty, this onset, unlike onsets dominating an overt segment, must not only be governed, it must be properly governed. The first question is what is a proper governor for an empty onset. According to the theory, the only governor for an onset is the following nucleus. Indeed, given interconstituent government, a nucleus always governs a preceding onset. Recall that there is no governing relation between onsets since only a nuclear head has the property of governing another constituent head. Consequently, the only possible governor for any onset is a following nucleus. In the three words *dehors*, *rehausser* and *héros*, the empty onset is followed by a nucleus with phonetic content which has the required property to properly govern the empty onset to its left. Being properly governed, the onset may remain empty, as shown in (38). In words like *dehors* and *rehausser* the empty onset is itself preceded by an empty nucleus. There is then a situation where both an empty onset and an empty nucleus would have to be



governee, the empty nucleus to the left lacks proper government and must then be manifested.<sup>26</sup>



One may wonder why the interconstituent governing relation between the nuclear point and the preceding non-nuclear one, i.e. the governing relation between the nucleus and the empty onset to its left, has precedence over the governing relation between the two nuclei applying at the level of nuclear projection. One may also wonder why empty onsets do not alternate with consonants under certain circumstances, and finally why schwa is never found after *h*-aspiré. The difference in the nature of the two types of governing relation (applying at the level of nuclear projection and at the skeletal level) provides the answer.

Let us first consider why schwa is never found after *h*-aspiré and why *h*-aspiré never alternates with a phonetic entity (as an empty nucleus does with a vowel). In the lexical representation, skeletal positions along with the segments they dominate are organized into constituents according to the governing relation they contract with each other. Recall that nuclear heads are lexically associated with a constituent nucleus but that all the other points are projected onto a constituent following the governing relations that operate between them. Let us

suppose that a nuclear point has no segment attached to it. If the preceding non-nuclear point has also no phonetic content, a governing relation between those two points is absolutely impossible. The empty non-nuclear point needs to be properly governed and the following empty nucleus cannot assume this role of proper governor. Given that there must be a governing relation between a nuclear head and the preceding non-nuclear point, a configuration where both positions have no phonetic content is impossible. For the governing relation to apply, either the nucleus has phonetic content and the preceding onset can then be empty or the nucleus is empty and the preceding non-nuclear point has phonetic content. In the former situation the nucleus can properly govern the preceding onset while in the latter the onset only needs to be governed and an empty nucleus is a governor. From this proposal the following conclusions may be drawn. (i) Schwa never occurs after *h*-aspiré. Given that schwa is the manifestation of an empty nucleus and that an empty nucleus never occurs after an empty onset, it follows that schwa is never found in this position. (ii) An empty onset never alternates with a consonant since an empty onset is always properly governed by its nucleus.

With regard to why governing relations applying at the skeletal level have precedence over those applying at the level of nuclear projection, this follows from the fact that it is only when points are organized into governing relations that constituents are projected. The difference in the nature of the two types of government should make clear why proper government of an empty onset has precedence over proper government of an empty nucleus.

To summarize, an empty nucleus occurring before an *h*-aspiré must receive a phonetic content. The empty nucleus is always realized as schwa in this position (cf. *dehors*, *rehausser*). I propose that this follows from the fact that it is impossible for a proper governor to govern properly two empty governees. Since *h*-aspiré has the representation of an empty onset, it must be properly governed by the following nucleus. It follows that the nucleus properly governs the empty onset, but it cannot also properly govern the empty nucleus. Since it is not properly governed, the empty nucleus must be realized as schwa.

Up to now, I have considered the behaviour of word-internal empty nuclei preceded by a single consonant. In this context, the empty nucleus is properly governed by a following nucleus with phonetic content and it is realized as zero, except if an *h*-aspiré intervenes between the

two nuclei. There are, however, cases where, even if immediately followed by a vowel, an empty nucleus must receive a phonetic interpretation, namely, when the empty nucleus is preceded by more than one consonant. In the next chapter, I propose a principle to account for these facts.

# 5 *Licence to govern*

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## 5.0 Introduction

In this chapter I consider word-internal empty nuclei preceded by a consonant cluster. I provide a principled account for the fact that in this context a properly governable empty nucleus fails to be properly governed and receives a phonetic interpretation.<sup>1</sup> To do so I introduce a new notion: government-licensing.<sup>2</sup> I argue that a non-nuclear head can govern a complement only if (i) it has the required charm value or, if charmless, the required complexity, and (ii) it is government-licensed by the nucleus governing it. Government-licensing accounts for, among other things, the phonetic realization of an empty nucleus following a governing onset (i.e. a non-nuclear skeletal point which governs a complement), or for the simplification of a consonant cluster preceding an unrealized empty nucleus. If, in order to govern a complement, a non-nuclear point must be government-licensed and if a properly governed empty nucleus may not be such a licenser, in a situation where a properly governable empty nucleus follows a consonant cluster, the two following possibilities are predicted: (i) in order to government-license the consonant, the empty nucleus will fail to be properly governed, or (ii) proper government will apply, thus preventing the non-nuclear head from governing its complement, which entails the loss of this complement or of this non-nuclear head. I show that while French opts for the former strategy, explaining why a word-internal empty nucleus is always realized as schwa after a cluster, the Billiri dialect of Tangale opts for the latter one, accounting for the simplification of a consonant cluster before an empty nucleus.

In order to understand how government-licensing operates, the reader must recall the following two types of government relations: constituent and interconstituent government.

### 5.1 A summary of governing relations

As mentioned in chapter 1, the projection of skeletal points onto constituents is derived from the governing relations they contract with each other. As a reminder of the two types of governing relations, let us re-examine the French words *patrie* [patri] ‘native land’ and *parti* [parti] ‘party’. In their lexical representation, at the segmental level these words are a sequence of segments. At the skeletal level they are a sequence of skeletal points. Only the nuclear points are lexically associated with constituent nucleus.

(1)	a.	O	R	O	R	b.	O	R	O	R	
			N		N			N		N	
		x	x	x	x	x	x	x	x	x	
		p	a	t	r	i	p	a	r	t	i

Now let us consider the word-internal clusters *tr* and *rt* in *patrie* and *parti* respectively, and let us determine how these two consonants are syllabified. With respect to the sequence *tr*, the only possible syllabification is one where the two consonants are sisters within a branching onset, namely the syllabification *pa.tri*. The absence of ambiguity in the syllabification follows directly from constituent government. In a sequence of consonants where a negatively charmed segment precedes a charmless one, government applies from left to right. The stop governs the liquid and the two segments can only be sisters within a branching onset. In *parti*, on the other hand, the internal cluster is one where the charmless segment precedes the negatively charmed one. Consequently the two consonants cannot be sisters within an onset where government goes from left to right. In *parti* the governor stop follows the charmless liquid, resulting in a governing relation applying from right to left. In terms of government, in a sequence where a governor immediately follows the governee, the two segments can only be syllabified in a rhyme followed by an onset. In that case there is an interconstituent governing relation where the stop within the onset governs the preceding charmless liquid within the rhyme.

In chapter 1 I have also asserted that an interconstituent governing relation is always present between a nucleus and a preceding onset. That



an onset does not itself govern a preceding nucleus is accounted for by the assumption that only a nuclear head can govern another constituent head. I also claimed in chapter 4 that an onset which dominates an overt segment is governed by a following nucleus even if this nucleus is lexically empty and properly governed (e.g. *souvenir*). Moreover, I argued that empty positions, onsets or nuclei, are required to be properly governed, i.e. governed by a nucleus which is not itself properly governed. I then differentiated government of a position which has segmental content from government of an empty governee. An essential difference between government and proper government is that the latter, but not the former, requires the governor to have phonetic content, i.e. not to be properly governed. Proper government is then a stronger case of government.

With regard to proper government of empty nuclei, I have assumed that it operates at the level of nuclear projection. In this chapter I argue that this is not exactly the case. Rather, I propose a level of licenser projection and claim that it is at this level that proper government of empty nuclei applies. Before projecting the nuclei onto the level of nuclear projection, there is an intermediate level where the licensers are projected.<sup>3</sup> This means that in addition to the nuclei, which are the licensers of their onset, we also find an onset head when this non-nuclear head governs or more precisely licenses a non-nuclear complement. In proposing a level of licenser projection and in claiming that proper government applies at this level, I can account for the fact that proper government is blocked when a governing domain intervenes between the two nuclei, as well as for the fact that an empty nucleus fails to be properly governed when its onset has a complement to govern.<sup>4</sup> This being said, let us turn to the behaviour of word-internal empty nuclei preceded by a consonant cluster.

## 5.2 Government-licensing: a condition on government

At the end of chapter 4 we had reached the point of considering why a word-internal empty nucleus is always realized as schwa in French, after two consonants. Let us consider the data in (2).

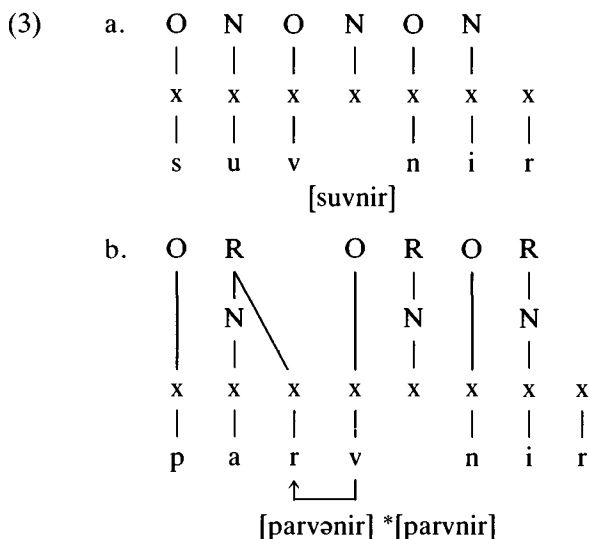
(2)	fermeté	'firmness'	fourberie	'treachery'	
	marguerite	'daisy'	hurlement	'roaring'	
	bordelais	'from Bordeaux'	orphelin	'orphan'	→

embarquement	'boarding'	surmener	'to overwork'
forteresse	'fortress'	parsemer	'to sprinkle'
forgeron	'blacksmith'	morceler	'to parcel out'
malmener	'to manhandle'	fumisterie	'fraud'
harceler	'to harass'	orgelet	'sty'
ensorceler	'to bewitch'	appartement	'apartment'
marteler	'to hammer'	tristement	'sadly'
percevoir	'to perceive'	versement	'payment'
parchemin	'parchment'	bordereau	'note'
gendarmerie	'police station'	tourterelle	'turtledove'
infirmerie	'infirmary'	garderie	'day nursery'
intervenir	'to intervene'	bergerie	'sheepfold'
porcherie	'pigsty'	fortement	'strongly'
parlement	'parliament'	département	'department'
gouvernement	'government'	corselet	'corslet'
porcelaine	'porcelain'	porcelet	'piglet'

A word-internal empty nucleus (printed in bold) is preceded by an interconstituent governing domain (i.e. a consonant cluster of the type liquid (or *s*) plus obstruent, nasal or liquid) and it must be realized phonetically. However, in all the examples the word-internal empty nucleus is followed by a nucleus with phonetic content. According to the analysis, the empty nucleus should be properly governed by the following nucleus, resulting in a null manifestation. In this chapter I propose an explanation for the absence of schwa in words like *souvenir* [suvnir] 'to remember', and its presence in words like *parvenir* [parvənir] 'to reach'.

### 5.2.1 Governing versus non-governing non-nuclear heads

In the case of *souvenir*, the empty nucleus is followed by a nucleus with phonetic content which properly governs it. It is therefore manifested as zero. What is of importance is that the empty nucleus is preceded by a single consonant, i.e. by a non-nuclear point which has no complement to govern. With regard to the word *parvenir*, the empty nucleus is followed by a proper governor, as is the case for *souvenir*. What distinguishes the two forms is that in *parvenir* the empty nucleus is preceded by a non-nuclear point which governs a rhymal complement. The difference between those two words, then, lies in the status of the consonant preceding the empty nucleus. The structure of the two words is given in (3).



In (3b) the empty nucleus is preceded by an obstruent which governs the preceding liquid. It is then the case that in a word like *parvenir* the onset of the sequence O-R containing the empty nucleus is a governor which governs a preceding rhyml complement. The situation is different in *souvenir*. Here the empty nucleus is preceded by a consonant which does not govern a complement. I claim that the manifestation of the empty nucleus is determined by the status of the preceding consonant. A properly governable empty nucleus fails to be properly governed (is phonetically manifested) when it is preceded by a consonant which governs a complement. Otherwise it can always be realized as zero. I propose the following constraint on government:

(4) **Government-licensing**

For a governing relation to hold between a non-nuclear head  $\alpha$  and its complement  $\beta$ ,  $\alpha$  must be government-licensed by its nucleus.

According to the principle in (4), for a non-nuclear point to govern the complement, two properties are needed: charm and government-licensing. We know that according to the theory of charm and government a negatively charmed segment has the required charm value to be a governor, while this is not the case for a charmless consonant.<sup>5</sup> But it appears that charm is not a sufficient property to allow a non-nuclear point to govern. While in words such as *parvenir* and *fortement*, the

consonant in the onset position has the required charm value to be a governor, this is not sufficient. It also needs to be government-licensed to assume its role as governor. This means that whereas charm gives to a non-nuclear segment the potential to govern, government-licensing allows the segment to realize this potential.<sup>6</sup> Government-licensing is then a required property for a non-nuclear head if it is to govern its complement.

### 5.2.2 **Licensers**

Let us determine what is the government-licenser for a non-nuclear head. From what we have observed, a governing relation between a governing consonant and its governee seems to be possible only if the nucleus which governs the non-nuclear head is not properly governed. Recall that an empty nucleus cannot be manifested as zero after a consonant cluster. This leads to the conclusion that the government-licenser is the nucleus of the sequence O–R which contains the governing consonant. In addition, since I have already asserted that an onset always contracts an interconstituent governing relation with the nucleus occurring to its right, and that government-licensing is done under government, this also leads to the conclusion that the government-licenser for an onset is the adjacent nuclear head. In other words, the head of the sequence O–R, the nucleus, is the governor as well as the government-licenser of the preceding onset. Now I claim that in order to government-license an onset a nucleus cannot be properly governed. In French, then, an empty nucleus which has to assume its role as government-licenser will fail to be properly governed.

#### (5) **Government-licenser**

The government-licenser of an onset is a nucleus which is not properly governed.

To summarize so far, to govern its complement a consonant needs two properties: the appropriate charm value and a licence to govern. An obstruent consonant may have the required charm value to govern a preceding liquid, but if it is not government-licensed it cannot govern. There are then two possibilities. (i) The governor has the required charm value and it is government-licensed. In this case it can govern the complement. (ii) It has the required charm value but it is not government-licensed. In that case the governing relation between the two consonants is impossible.<sup>7</sup> Needless to say, if a consonant does not have

the required charm value, the intrinsic property required for governors, government-licensing cannot help it to govern. Which means that even though it may be followed by an ungoverned nucleus, a charmless liquid could never govern a complement with greater complexity.

As we saw, schwa must be manifested after an interconstituent cluster in order to government-license the preceding onset. Interconstituent clusters are not, however, the only consonant clusters where a governor must govern a complement. Recall that within a branching constituent there is also a governing relation between the two skeletal points. Consequently, a nucleus which is preceded by a branching onset is preceded by a governing domain, even though the nuclear point is not adjacent to the governing non-nuclear head. If it is indeed the case that a governing non-nuclear head must be government-licensed by a following nucleus, schwa should always be present after a branching onset. The words in (6) show that it is indeed always the case that after a branching onset an empty nucleus is realized as schwa.

(6)	maigrement	'poorly'	crever	'to puncture'
	lisiblement	'legibly'	brebis	'sheep'
	librement	'freely'	sifflement	'whistle'
	encerclement	'surrounding'	tendrement	'tenderly'
	probablement	'certainly'	mercredi	'Wednesday'
	vendredi	'Friday'	Angleterre	'England'
	grelotter	'to shiver'	acreté	'acridness'
	tendreté	'tenderness'	diablerie	'devilment'
	sucrerie	'sweet things'	crevasse	'crack'
	engrenage	'gears'	simplement	'simply'
	effondrement	'collapse'	entretien	'discussion'
	écrevisse	'crayfish'	encombrement	'congestion'
	ameublement	'furniture'	entrevue	'meeting'
	durablement	'long lastingly'	épouvantablement	'dreadfully'
	entrelacer	'to interlace'	entreténir	'to maintain'
	contremaître	'foreman'	première	'first'
	entreprise	'firm'	brevet	'diploma'
	Bretagne	'Brittany'	frelon	'hornet'
	crevaisson	'flat tyre'	crevasse	'fissure'
	crevette	'shrimp'	grenouille	'frog'
	sacrement	'sacrament'	édredon	'eiderdown'
	bretelle	'strap'	entrepôt	'warehouse'

In the above examples the empty nuclei are potentially properly governable by a following vowel, but they are nevertheless phonetically realized. The presence of schwa after a branching onset follows from government-licensing. The non-nuclear head of a branching onset must govern its complement. In order to govern its complement this governing consonant must have the required charm value and it must be government-licensed by the following nuclear head. Consequently, the empty nucleus to the right of the branching onset fails to be properly governed, receives a phonetic content and may therefore government-license the preceding non-nuclear head.

Government-licensing is an instance of a relation of government between a nucleus and a preceding governing consonantal position. When a nucleus government-licenses an onset to govern a rhymal complement, the licensor and the licensee are strictly adjacent. This type of government-licensing is called **direct licensing**. However, the fact that a nucleus licenses the head of a preceding branching onset leads to the conclusion that government of a **head** is possible even though a complement intervenes between the 'head-governor' and the 'head-govenee'. In this latter situation we have an instance of **indirect licensing**.<sup>8</sup>

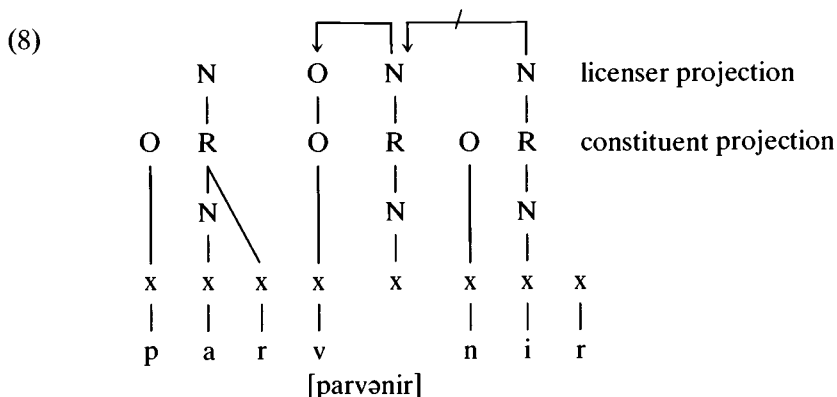
### 5.2.3 Principles in conflict

Up to now I have suggested two principles:

- (7) a. An empty nucleus is realized as zero when it is properly governed by an adjacent unlicensed nucleus.
- b. A non-nuclear head may govern a complement iff it is government-licensed, i.e. governed by a non-properly governed nucleus.

We saw that in French an underlying empty nucleus may be realized as zero when it is properly governed. But in cases where a potentially properly governable empty nucleus is in the position of government-licensor it should produce the following paradoxical situation. On the one hand this empty position should be realized as zero, since it is properly governable, and on the other hand, because of its status of government-licensor, proper government should fail to apply, thus allowing the onset to govern its complement. What happens in a situation where the two principles are in conflict? There are two possibilities: either principle (7a) or principle (7b) is retained but not both.<sup>9</sup> Let

us first consider a situation where principle (7b) is maintained, i.e. a situation where what is preserved is the requirement that a governing consonantal position must be government-licensed. Opting for principle (7b) means that even if properly governable, an empty nucleus which is a government-licenser would fail to be properly governed and will be manifested phonetically. Not being properly governed, it would government-license the preceding governor. A language which retains principle (7b) over principle (7a) would be exactly like French. The presence of schwa in *parvenir* shows that French chooses to preserve government-licensing and not proper government of an empty nucleus. The empty nucleus is not properly governed, it receives a phonetic interpretation in order to government-license the preceding onset to govern its complement. This is illustrated in (8) below, using *parvenir*. At the level of licenser projection, we find the nuclei and the onset head which governs (or licenses) its complement. Proper government applies at this level. In a situation where a properly governable empty nucleus is preceded by an onset, proper government fails to apply, thus allowing the empty nucleus to government-license its onset.



Let us now consider what the situation would be if, in cases where proper government of an empty position and government-licensing are in conflict, a language chooses to preserve proper government of an empty position instead of government-licensing. In such a language, in a situation where an empty nucleus is preceded by a governing onset, the empty nucleus would be properly governed and would then remain without phonetic content. If properly governed, this nucleus cannot be the government-licenser of the preceding governing consonant. We would then predict that something would happen to the governing rela-

tion between the two consonants, since the onset is not government-licensed and cannot govern its complement. In such a language we predict that, in a word like *parvenir*, the empty nucleus would be realized as zero, but we also predict that the two consonants will not be interpreted as forming a governing domain. The consonant cluster will be simplified. This means that *parvenir* would be realized as [parnir] or [pavnir]. While neither of those realizations conforms to the facts in French, one of them reflects the situation in one dialect of Tangale, a Chadic language spoken in Northern Nigeria that I consider next.

### 5.2.3.1 *Government-licensing in Tangale*

In this section I draw heavily on Nikiema's (1987a, b) analysis of Tangale, a language where some phenomena may find an explanation in terms of government-licensing. In addition, I show that the choice between proper government of an empty nucleus and government-licensing is subject to parametric variation. While French and the Kaltungo dialect of Tangale opt to preserve government-licensing, another dialect of Tangale called Billiri opts for proper government of empty nuclei. Let us consider Tangale, which has been studied by Kidida (1985), Kenstowicz & Kidida (1987) and Nikiema (1987a, b).

Tangale is very interesting in the context of the present discussion. Like French, it shows an alternation between a vowel and zero. Unlike French, however, the alternation may result from a process of vowel deletion.<sup>10</sup> Without going into details, the facts are that except in the initial syllable of a word, a short vowel is deleted when followed by another vowel.<sup>11</sup>

- (9)
- |           |   |        |                   |
|-----------|---|--------|-------------------|
| sana + do | → | san-do | 'her food'        |
| tana + go | → | tan-go | 'your (masc) cow' |
| dume + go | → | dum-go | 'hurt'            |
| sumo + zi | → | sum-zi | 'your (fem) name' |
| pido + no | → | pid-no | 'my tree'         |

In (9) we see that a stem-final vowel deletes when followed by a suffix. Nikiema (1987a, b) argues that in (9), a vowel is dissociated from its nucleus but that the position remains. The resulting empty nucleus has no phonetic interpretation if it is properly governed by a following nucleus with phonetic content. Proper government requires strict adjacency at the relevant level between the proper governor and the governee and it applies from right-to-left.





a vowel [u] is manifested (dobe+no+go→[dobungo]). If vowel deletion does not result in the deletion of the nuclear position, but only in the deletion of the segment, it is not surprising that a vowel may reappear in this position under certain circumstances.<sup>12</sup>

What is particularly interesting for us are the forms given in (12). I present two dialects of Tangale, called Billiri and Kaltungo. The forms given in (9) are the same for both dialects; except in syllable-initial position, a short vowel preceded by one consonant deletes when followed by another vowel. The two dialects are however different with respect to the forms in (12). In (12) I give some words where the stem-final vowel is preceded by two consonants. It can be observed that, unlike (9), the deletion of the stem-final vowel triggers some other processes.

(12) a. **Billiri**

landa + zi	→	lan-zi	‘your (fem) dress’
kambo + go	→	kam-go	‘your (masc) growth’
monde + go	→	mon-go	‘forgot’
simbe + go	→	sim-go	‘met’

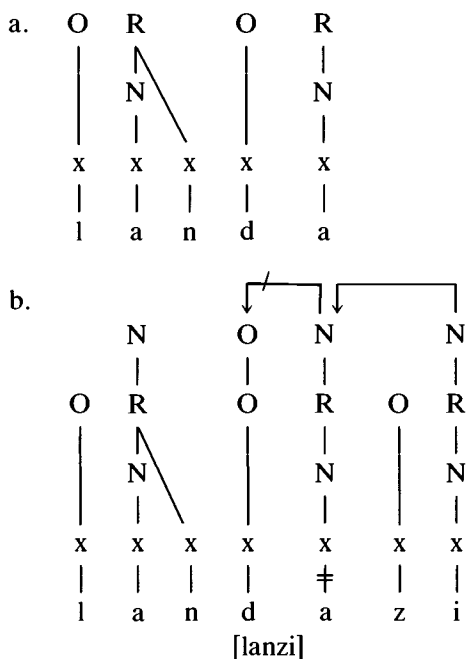
b. **Kaltungo**

landa + zi	→	landu-zi
kambo + go	→	kambu-go
monde + go	→	mondu-go
simbe + go	→	simbu-go

Let us first consider the Billiri dialect. Under the general process of vowel deletion, the stem-final vowel deletes when a suffix follows. In addition we can observe that one consonant of the cluster disappears (cf. /landa-zi/ → \*[land-zi], [lan-zi]). What is particularly interesting with these forms is that, unlike the situation in (9), the stem-final vowel of the words given in (12) is preceded by a consonant cluster. As I have already proposed, a governing consonant must be government-licensed by a following nucleus, and a government-licenser is a nucleus which is not properly governed. A nucleus preceded by a consonant cluster is then the potential government-licenser of the governing consonant to its left, and since government-licensing implies that the licenser may not be properly governed, this government-licenser must have phonetic content. We are then facing a situation where an empty nucleus is properly governable but is also a potential government-licenser. We saw that in

this situation French opts for government-licensing; schwa is realized after a consonant cluster. In Billiri, however, the dominant principle is the one requiring proper government of an empty position. An empty nucleus which is a potential government-licenser but which is properly governable is properly governed and remains without phonetic content. Being properly governed it lacks the required property to government-license the preceding governor. Because the governor is not government-licensed, a governing relation between the two consonants is impossible. What happens is that because it lacks the required properties to govern a complement, the non-nuclear point is not interpreted as a governor (or licenser of a complement). The form is realized with the governee as unique consonantal segment.<sup>13</sup>

(13) **Billiri**

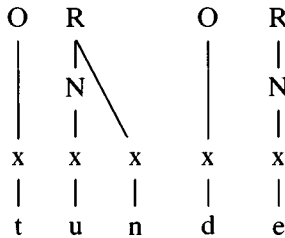


[dobungo]). Interestingly, when two suffixes are added to a stem of the type of *landa*, the stem-final nucleus is manifested (as [u]), thus allowing for the appearance of the preceding governing consonant.

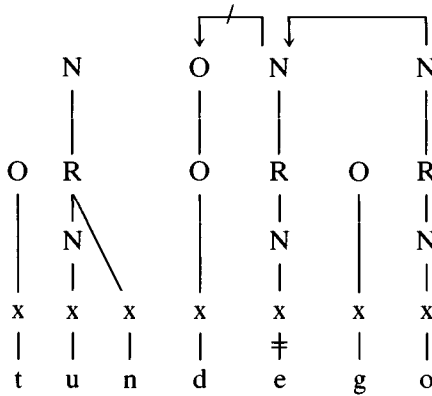
(14) **tunde ‘delay’**

tunde + go            [tungo]            \*[tundgo]    ‘delayed’  
 tunde + no + go    [tundungo]    \*[tunungo]   ‘delayed me’

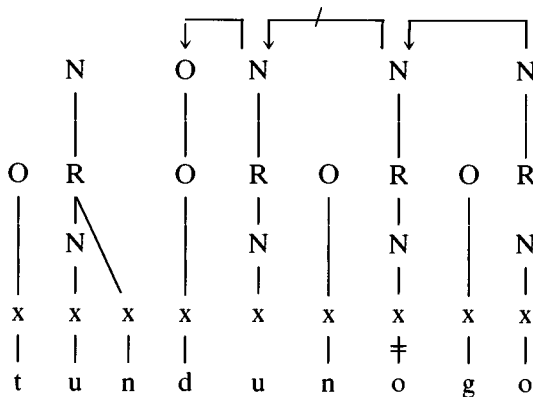
a. tunde [tunde]



b. tunde + go [tungo]



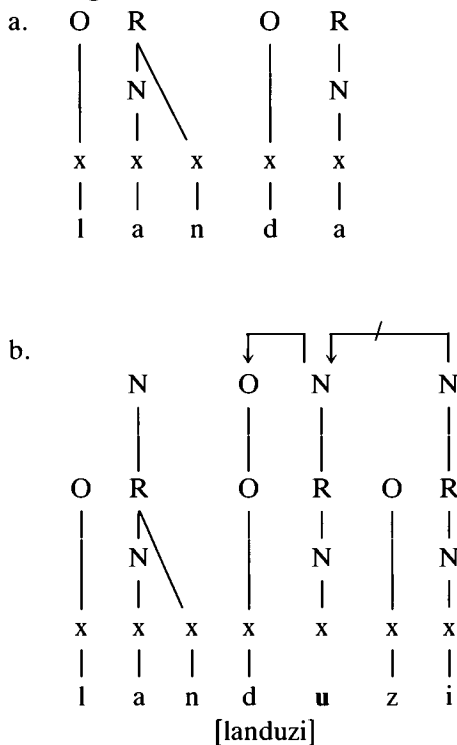
c. tunde + no + go [tundungo]



Since the nucleus to its right lacks proper government and has phonetic content, the consonant is now government-licensed and can therefore be interpreted as governing its complement.

Let us now consider the dialect of Kaltungo. As in Billiri, in Kaltungo a vowel deletes when followed by another vowel (see (9)). When the resulting empty nucleus is preceded by one consonant, this nucleus remains phonetically empty. However, when vowel deletion takes place and the empty nucleus is preceded by two consonants, a situation results where a properly governable empty nucleus is also the potential licenser of a preceding governing consonant. The data given in (12b) show that Kaltungo is like French. When government of empty positions is in conflict with the principle which says that a governing consonant must be government-licensed, Kaltungo retains government-licensing. Because it must government-license the onset, the empty nucleus is not properly governed and receives phonetic content: in Tangale, its realization is [u].

(15) **Kaltungo**



A comparison between the Kaltungo and the Billiri dialects of Tangale shows that when proper government of empty nuclei is in conflict with government-licensing of a consonant, the choice of which principle has precedence is determined parametrically. While Kaltungo and French opt for government-licensing, Billiri opts for proper government of empty nuclei.

To summarize, the facts observed in Tangale find a simple explanation if one assumes empty positions, proper government of these empty positions and government-licensing. We can see that my analysis of schwa is not only motivated by the facts of French. A similar analysis can also be applied to Tangale.

Returning to our analysis of French, we have seen that the notion of government-licensing allows us to explain the well-known observation that in French schwa must be phonetically realized when preceded by more than one consonant. In this analysis, this fact follows from a principle of the grammar – government-licensing – and not from a stipulation. Because government-licensors are nuclear positions which are not properly governed, and because in a situation where proper government is in conflict with government-licensing French opts for licensing, an empty nucleus receives a phonetic interpretation when it is the government-licensor of a preceding consonant. That is, schwa must be realized when preceded by a branching onset (cf. *crever* ‘to puncture’, *encombrement* ‘congestion’) as well as preceded by an interconstituent governing domain (cf. *fortement* ‘strongly’).

### 5.3 ‘Stable’ schwas aren’t schwas?

According to Morin (1978) and Durand, Slater & Wise (1988), the so-called stable schwas, i.e. those that do not alternate with zero, are no longer schwas. In a word like *brebis*, for example, where a schwa is always realized because it follows a consonant cluster, the vowel would have been reanalysed as /œ/. This is why, they claim, schwa does not alternate with zero in that type of word. The schwa is not a schwa.

If it is the case that a word like *brebis* does not contain a schwa but the vowel /œ/ because the vowel does not alternate with zero, one may wonder which vowel we have in a word like *librement*. Since the schwa in *librement* is absent in the related form *libre*, it seems that for this type of form the vowel is a schwa. It then seems that the proposal of a reanalysis is only based on the fact that a schwa in a given word does not

alternate with zero. That the schwa follows a consonant cluster seems to be irrelevant since while we have *brebis* and *marguerite* showing no alternation with zero, we also have *librement* and *fortement* showing an alternation with zero in the related forms *libre* and *forte* respectively. I then wonder if it is only an accident that the 'stable schwa' in *brebis* does not alternate with zero. Unlike in *librement*, the empty nucleus in *brebis* never occurs in a position where it is final in its domain. This seems to be the only reason why it never alternates with zero.

If there are cases where historical schwas have been reanalysed as /æ/, I would claim that it is in words where there is no reason why schwa fails to alternate with zero (cf. *la femelle* 'the female', *le menu* 'the menu').

In terms of my analysis, the behaviour of schwa in words such as *brebis* and *frelon* is accounted for in terms of government-licensing. While the empty nucleus is not properly governed in order to government-license its onset in words like *brebis* and *librement*, it is (as we will see in the next chapter) licensed in domain-final position in a form like *libre*.

I now consider the effect of a governing domain intervening between a proper governor and an empty nucleus.

#### **5.4 Proper government blocked by an intervening governing domain**

At the beginning of this chapter I claimed that a motivation for my proposal that there is a level where licensers are projected is provided by the fact that proper government fails to apply when a governing domain intervenes between two nuclei. If proper government operates at the level of nuclear projection, the level where vowel harmony and stress assignment are also said to apply, it is surprising that a consonant cluster never blocks vowel harmony while it clearly blocks proper government. But if proper government operates at the level of licenser projection, it will then operate at a level where nuclei and non-nuclear governing heads are projected. In projecting the licensers, we project all the nuclei along with the head of an onset which is a licenser for its complement. We may then explain why, unlike a consonant cluster whose head is projected and therefore intervenes between two nuclei, a single consonant has no effect on a relation between nuclei. Because it is not a licenser, a non-governing onset is not projected at the level of licenser projection.

I now illustrate that proper government fails to apply when a governing domain intervenes between a proper governor and its empty governee.

According to all the data presented so far, a relation of proper government always applies when one consonant intervenes between the proper governor and the empty governee (unless the empty nucleus is a government-licenser). The question is whether more than one consonant, e.g. a governing domain, can also intervene between the two members without blocking their relation. It should be remembered that in his analysis of [i] in Moroccan Arabic, Kaye (1990b) argues that proper government is subject to the following constraint: a relation of proper government cannot apply when a governing domain intervenes between two nuclei. The relevant data are of the type shown in (16).

(16) **Moroccan Arabic**

a. *Interconstituent clusters*

- |      |           |          |         |                         |
|------|-----------|----------|---------|-------------------------|
| i.   | /kØlbØ/   | [kilb]   |         | 'dog'                   |
| ii.  | /gØltØ/   | [gilt]   |         | 'puddle (masc)'         |
| iii. | /kØttØbØ/ | [kittib] |         | 'to make someone write' |
| iv.  | /kØlba/   | [kilba]  | *[klba] | 'bitch'                 |
| v.   | /gØlta/   | [gilta]  | *[glta] | 'puddle (fem)'          |

*versus*

b. *Absence of underlying cluster*

- |     |          |        |               |          |         |                |
|-----|----------|--------|---------------|----------|---------|----------------|
| i.  | /akØlØ/  | [akil] | '(he) eats'   | /akØlu/  | [aklu]  | '(they) eat'   |
| ii. | /kØtØbØ/ | [ktib] | '(he) writes' | /kØtØbu/ | [kitbu] | '(they) write' |

In (16a) the sequence liquid–stop is an interconstituent cluster. No underlying empty nucleus intervenes between the two consonants.<sup>14</sup> A form like [kilba] shows that the final [a] does not properly govern the empty nucleus to its left. An [i] must be realized in the initial nucleus (cf. \*[klba]). That a nucleus governs a preceding empty nucleus when a single consonant intervenes between the two nuclei can be seen when one considers the behaviour of the vowel [i] in the forms given in (16b) (cf. [aklu] \*[akilu]).

That proper government does not apply when a governing domain (an interconstituent cluster or a branching onset) intervenes between the empty governee and the proper governor is also motivated in French. Let us consider the following examples.



(17) a. Empty nucleus followed by a cluster obstruent–liquid

(un) chevreau	[ʃəvro]	‘(one) kid’
(un) chevreuil	[ʃəvrœj]	‘(one) roe deer’
(un) secret	[səkrɛ]	‘(one) secret’

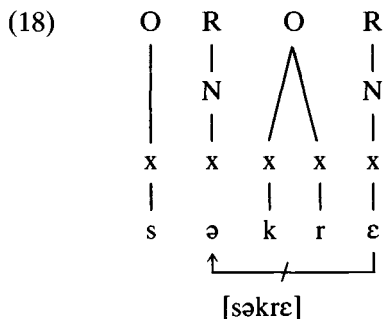
*versus*

(un) chemin	[ʃmɛ̃]	‘(one) road’
(au) secours	[skur]	‘help’

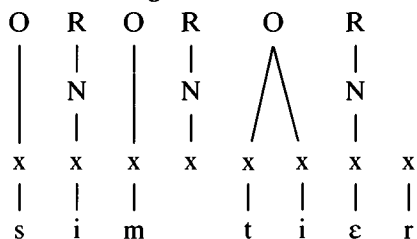
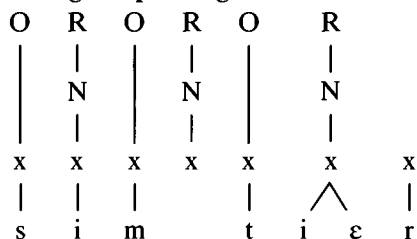
b. Empty nucleus followed by a cluster consonant–glide<sup>15</sup>

bouquetière	[bukətjɛr]	‘flower-seller’
chapelier	[ʃapɛljɛ]	‘hatter’
cimetière	[simətjɛr]	‘cemetery’
dentelière	[dɑ̃tɛljɛr]	‘lace-maker’
atelier	[atɛljɛ]	‘workshop’
cafetière	[kafətjɛr]	‘coffee-maker’
hôtelière	[otɛljɛr]	‘hotel-keeper’
noisetier	[nwazɛtjɛ]	‘hazel tree’
levier	[ləvjɛ]	‘lever’
concevoir	[kɔ̃səvwar]	‘to conceive’
devoir	[dəvwar]	‘to owe’
depuis	[dəpɥi]	‘since’
besoin	[bɛzwɛ̃]	‘need’

In my dialect of French a schwa is always realized when a consonant cluster intervenes between the empty nucleus and a vowel to its right. In (17a) a cluster obstruent–liquid, i.e. a branching onset, intervenes between the two nuclei. That in this configuration the empty nucleus cannot be realized as zero shows that it should be the case that the empty nucleus is not properly governed. If a relation of government cannot apply across a governing domain, this behaviour is accounted for.



Let us now consider the data given in (17b). In those examples the empty nuclei are followed by a cluster of the type consonant–glide. Phonetically it is impossible to know whether the high vowel, i.e. the glide, is syllabified within the onset along with the consonant or within the nucleus along with the following vowel. In other words, it is phonetically impossible to know if the high vowel is part of a branching onset or of a light diphthong.<sup>16</sup> The two possible structures are given in (19).

(19) a. **Branching onset**b. **Light diphthong**

Although it is phonetically impossible to distinguish the structure in (19a) from the one in (19b), I propose that the appropriate structure for the words given in (17b) is the one in (19a). The high vowel belongs to a branching onset. If the structure in (19a) is indeed the appropriate one we can account for the similar behaviour of an empty nucleus preceding a cluster of the type obstruent–liquid and one of the type consonant–glide. Proper government would not apply across a governing domain.

Interestingly, Kaye & Lowenstamm (1984) say that one property of light diphthongs is that they alternate with a vowel. They claim that since the glides in the forms given in (20) alternate with a vowel in some contexts, they belong to a nucleus.

If the forms in (20) are light diphthongs, we predict that a schwa to the left of these diphthongs will be realized as zero. As shown in (21), this is substantiated by the facts.



licensed in order to have the status of governor, in the next chapter I will extend licensing to other positions which have a special status.

In chapter 7 I consider an aspect that has been postponed since the beginning of the analysis: the presence of empty nuclei in word-final position. Word-finally, schwas are not pronounced. How can this fact be explained under my analysis of proper government and licensing?

## 6 *Word-final empty nuclei*

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### 6.0 Introduction

In this chapter devoted to word-final empty nuclei, I argue in favour of the principle of ‘Coda’ Licensing proposed by Kaye (1990c), according to which a consonant occurs within a rhyme if it is licensed by an adjacent segment in the onset position. It follows from this principle that every word or more precisely every domain contains a final nucleus in its representation. While in some languages a final nucleus may be underlyingly empty (e.g. French, English, Portuguese etc.), in some other languages it may not (e.g. Dessano, Dida etc.). The ‘Coda’ Licensing Principle is universal. But in those languages where a word-final nucleus may be underlyingly empty, subject to parametric variation, those word-final empty nuclei may or may not be manifested as null. From this parametric choice, languages like Brazilian Portuguese (BP) and Japanese are distinguished from others like English and French. While in French and English a word-final nucleus can be empty and realized as zero, this is not the case in languages of the type of Japanese and BP, where words always end with a vowel.<sup>1</sup> That is, while word-final empty nuclei are licensed in French and English they are not licensed in languages of the type of Japanese. In addition, in languages in which word-final empty nuclei are licensed, there is variation as to whether the empty nucleus may be manifested as null after a consonant cluster. While words like *bouc* [buk] ‘goat’, *quatre* [katr] ‘four’ and *carte* [kart] ‘card’ are well-formed in French, in languages like Korean, Wolof and Pulaar a word-final empty nucleus can only be realized as zero after a single consonant.<sup>2</sup> To account for the difference between the latter two types of languages I consider the two following hypotheses: (i) Unlike in English and French, in Korean, Wolof and Pulaar proper government operates from left-to-right. Since proper government does not apply across a governing domain, a word-final empty nucleus is

manifested after a consonant cluster in those languages where the proper governor precedes the empty governee. (ii) Proper government operates in the same direction in all languages and what distinguishes the two groups of languages is a parameter according to which a licensed word-final empty nucleus is or is not a government-licenser for a preceding onset. While a word-final empty nucleus is a government-licenser in French and English, it does not have this status in Korean, Wolof and Pulaar.

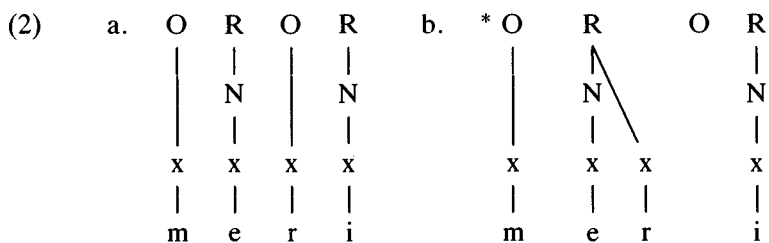
### 6.1 The 'Coda' Licensing Principle

In order to explain why an intervocalic consonant is always syllabified within an onset and not within a rhyme followed by an empty onset (cf. *Mary* [me.ri], \*[mer.i]), and to account for the behaviour of elements that are analysed as being in an extrametrical position, Kaye (1990c) proposes the following principle.

#### (1) The 'Coda' Licensing Principle

A non-nuclear point is syllabified within the rhyme iff there is a governor in the following onset.

According to 'Coda' Licensing, a word-internal or word-final branching rhyme is only possible when there is a following consonant in the onset position. This explains why a word like *Mary* has the structure in (2a) and not the one in (2b).



The principle also provides an account for the behaviour of elements that are analysed elsewhere as being in an extrametrical position. In this sense, the absence of vowel shortening in word-final 'closed' syllables, and stress assignment sensitive to the branching of the rhyme except for a word-final 'branching rhyme', do now directly follow from the fact that a word-final consonant cannot be syllabified within a branching rhyme.

What is proposed is that a word-final consonant occurs within an onset which, because of government constraints, is followed by a nucleus. This nucleus may or may not have phonetic content. Consequently, words ending phonetically with a consonant contain a final nucleus in their lexical representation. Let us consider how this proposal is justified in French.

## 6.2 Word-final nuclei in French

Following a proposal made by Schane (1968a) and Dell (1973), almost all analyses of French schwa assume the presence of a final schwa (or empty nucleus) in particular words. Recall that Dell claims that words which end phonetically with an obstruent as well as all feminine adjectives have a word-final schwa in their representation. Those word-final schwas are not manifested when they occur in word-final position, regardless of the number of consonants that precede them.<sup>3</sup> This is illustrated in the data given in (3) and (4) below.

(3) <b>Feminine forms</b>			<b>Ending with an obstruent</b>		
petite	[ptit]	'small'	site	[sit]	'site'
lente	[lāt]	'slow'	tante	[tāt]	'aunt'
bête	[bet]	'dumb'	fête	[fet]	'birthday'
grande	[grād]	'tall'	viande	[vjād]	'meat'
blonde	[blōd]	'blond'	monde	[mōd]	'world'
malade	[malad]	'sick'	promenade	[prōmnad]	'walk'
sadique	[sadic]	'sadistic'	cantique	[kātik]	'song'
publique	[pyblik]	'public'	colique	[kōlik]	'colic'
magique	[mažik]	'magical'	brique	[brik]	'brick'
longue	[lōg]	'long'	bague	[bag]	'ring'
sage	[saž]	'well-behaved'	rage	[raž]	'rabies'
rousse	[rus]	'red (hair)'	mousse	[mus]	'moss'
grasse	[gras]	'fat'	tasse	[tas]	'cup'
grise	[griz]	'grey'	brise	[briz]	'breeze'
mauvaise	[mōvez]	'wrong'	chaise	[šɛz]	'chair'
suave	[syav]	'sweet'	rivage	[rivaž]	'shore'
blanche	[blāš]	'white'	manche	[māš]	'sleeve'
sale	[sal]	'dirty'			
belle	[bel]	'beautiful'			
chère	[šɛr]	'dear'			
sure	[syr]	'sour'			

As illustrated in (3), following one consonant a word-final schwa is not expressed phonetically. As we can see in (4), this is also the case when a word-final schwa is preceded by a consonant cluster.

(4) <b>Feminine forms</b>	<b>Others</b>
a. <i>Liquid-consonant</i>	
forte [fɔrt] 'strong'	porte [pɔrt] 'door'
ouverte [uvert] 'open'	couverte [kuvert] 'blanket'
verte [vert] 'green'	alerte [alɛrt] 'alert'
lourde [lurd] 'heavy'	gourde [gurd] 'flask'
acerbe [asɛrb] 'sour'	barbe [barb] 'beard'
vierge [vjɛrʒ] 'virgin'	verge [vɛrʒ] 'yard'
infirmе [ɛ̃firm] 'disabled'	ferme [fɛrm] 'farm'
b. <i>Consonant-liquid</i> <sup>4</sup>	
souple [supl] 'supple'	people [pœpl] 'people'
lisible [lizibl] 'legible'	bible [bibl] 'bible'
tendre [tãdr] 'tender'	vendre [vãdr] 'to sell'
autre [otr] 'other'	montre [mɔ̃tr] 'watch'
maigre [mɛgr] 'slim'	pègre [pɛgr] 'underworld'
pauvre [povr] 'poor'	orfèvre [ɔrfɛvr] 'goldsmith'

All the words given in the left-hand column of (3) and (4) are feminine forms which, according to Dell, have a final feminine inflexion (i.e. schwa) in their representation. With respect to the forms in the right-hand column of (3) and (4), Dell also proposes that they end with a schwa. While in those latter forms the final schwa is not the feminine desinence, its presence is either motivated by the fact that the 'final' obstruent does not undergo the rule of word-final obstruent deletion (cf. (3) and (4a)) or because this final schwa can optionally be manifested (cf. [pœpl], [pœplə], [ɛ̃firm], [ɛ̃firmə]). This means that according to Dell and many others, a final schwa or empty nucleus is underlyingly present in words ending phonetically with: (i) a consonant cluster, (ii) a single obstruent, (iii) any consonant if it is a feminine adjective, (iv) a nasal when the preceding vowel is not nasalized. Thus, the only words which are not analysed as ending with a final empty nucleus (or schwa) are words (except for feminine adjectives) ending phonetically with a sonorant. Some of those words are given in (5).

While Schane and Dell's proposal that words may contain a final empty nucleus (i.e. schwa), is fully supported by the 'Coda' Licensing



(5)	bol	[bɔl]	'bowl'	colle	[kɔl]	'glue'
	mer	[mɛr]	'sea'	lire	[lir]	'to read'
	travail	[travaj]	'work'	filles	[fij]	'girl'

Principle, this proposal should not be restricted to particular classes of words. In the following discussion I motivate the idea that words do not differ with regard to the syllabification of their final consonant. For example, I argue that a word like *colle* [kɔl] 'glue' ends with an empty nucleus, as does the feminine adjective *folle* [fɔl] 'crazy'. While the empty nucleus belongs to the feminine morpheme in *folle*, the empty nucleus is present because of governing constraints in *colle*. Let us consider how this claim is justified, starting with words ending phonetically with a single consonant.

## 6.2.1 Word-final nuclei preceded by a single consonant

### 6.2.1.1 Long vowels in Quebec French

That a word-final consonant is not syllabified within a branching rhyme is motivated by the behaviour of long vowels and heavy diphthongs in Quebec French.<sup>5</sup> A comparison between the data given in (6a, b) with those in (6c) shows that while a long vowel may occur before a word-internal single consonant or a cluster of the type obstruent-liquid, a branching nucleus is never found before a sequence liquid-obstruent.

(6)	a.	rêver	[rɛ:ve]	[ra <sup>h</sup> ve]	'to dream'
		pâlir	[pa:lir]	[pa <sup>h</sup> lir]	'to become pale'
		empêcher	[ãpɛ:ʃe]	[ãpa <sup>h</sup> ʃe]	'to prevent'
		poêlon	[pwa:lɔ̃]	[pwe <sup>h</sup> lɔ̃]	'casserole'
	b.	sabler	[sa:ble]	[sa <sup>h</sup> ble]	'to sand'
		pauvrement	[pɔ:vɾəmã]		'poorly'
		prêtrise	[prɛ:triz]	[pra <sup>h</sup> triz]	'priesthood'
		encadrer	[ãka:dre]	[ãka <sup>h</sup> dre]	'to frame'
	c.	porter	[pɔ:rtɛ]	*[pɔ:rtɛ]	'to bring'
		partir	[partir]	*[pa:rtir]	'to leave'
		merci	[mɛ:rsi]	*[mɛ:rsi]	'thank you'
		poltron	[pɔltrɔ̃]	*[pɔ:ltrɔ̃]	'coward'

The examples in (6) show that a nucleus can only branch when it occurs within a rhyme which is not also branching. Interestingly, long

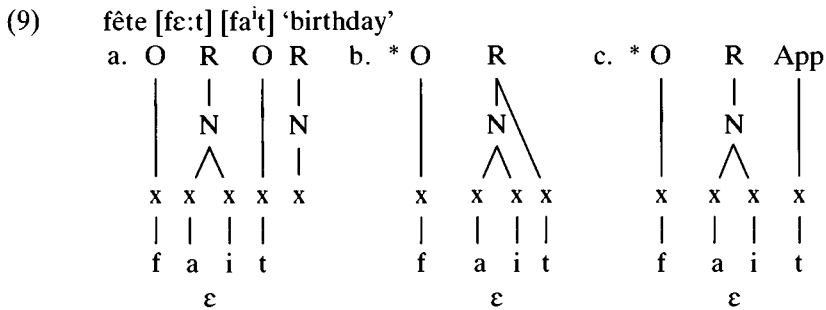
vowels have the same distribution in word-final position. While a vowel may be long or diphthongized before a single word-final consonant (cf. (7a)) or a cluster of the type obstruent–liquid (cf. (7b)), no such long vowel is possible when the preceding cluster is one of the type liquid–obstruent (cf. (7c)).

- (7) a. *bête* [bɛ:t] [baʰt] ‘stupid’    *rêve* [rɛ:v] [raʰv] ‘dream’  
       *rage* [ra:ʒ] [raʰʒ] ‘madness’    *crabe* [kra:b] [kraʰb] ‘prawn’  
       *rare* [ra:r] [raʰr] ‘rare’        *tasse* [ta:s] [taʰs] ‘cup’
- b. *sable* [sa:bl] [saʰbl] ‘sand’  
       *pauvre* [po:vʀ] ‘poor’  
       *maigre* [mɛ:gr] [maʰgr] ‘thin’  
       *prêtre* [prɛ:tr] [praʰtr] ‘priest’  
       *cable* [ka:bl] [kaʰbl] ‘cable’
- c. *forte* [fɔrt] \*[fɔ:rt] ‘strong’  
       *morte* [mɔrt] \*[mɔ:rt] ‘dead’  
       *palpe* [pɔlp] \*[pa:lp] ‘feel!’  
       *parc* [park] \*[pa:rk] ‘park’

What is crucial here is that before a word-final single consonant a vowel may be long or diphthongized as this is also the case word-internally. Moreover, the impossibility of having a long vowel before a (word-final) cluster liquid–obstruent leads to the conclusion that the word-final consonants in (7a) are not syllabified within a branching rhyme. If the final consonant is not a rhymal complement, we have an account for the possible occurrence of a long vowel before a single word-final consonant. Not being within the rhyme, the consonant is not governed by the preceding nuclear head. Then the nuclear head does not need to be adjacent to the non-nuclear point.<sup>6</sup> Anyone who argues that the structure in (9b) below (i.e. a final branching rhyme) is appropriate for the words given in (7a) would have to explain why a long vowel systematically shortens before a cluster of the type liquid–obstruent while it does not shorten before a (word-final) single consonant.

- (8) *fort* [fɔ:r] ‘strong’    *fortement* [fɔrtəmã] \*[fɔ:rtəmã] ‘strongly’  
       *forte* [fɔrt]        \*[fɔ:rt] ‘strong’
- vert* [vɛ:r] ‘green’    *verdure* [vɛrdyʀ] \*[vɛ:rɔdyʀ] ‘greenness’  
       *verte* [vɛrt]        \*[vɛ:rt] ‘green’
- mort* [mɔ:r] ‘death’    *mortuaire* [mɔrtyɛr] \*[mɔ:rtyɛr] ‘mortuary’  
       *morte* [mɔrt]        \*[mɔ:rt] ‘dead’

The occurrence of long vowels and heavy diphthongs before a word-final single consonant leads to the conclusion that a single final consonant belongs to a constituent which is not a word-final branching rhyme. In Charette (1985), following the spirit of Halle & Vergnaud (1980), I proposed that after a long vowel a word-final single consonant was syllabified within an appendix. In the framework of government, it is impossible for a constituent whose skeletal point does not belong to a governing domain to be present in a structure. If a consonant that I syllabified within an appendix is in fact syllabified within a constituent onset, then a word-internal or word-final long vowel or heavy diphthong is in both cases followed by a consonant syllabified within an onset. Since an onset has to be licensed, it is always followed by its governor, the nucleus. The structure of the words given in (7a) would then be similar to that in (9a). The final consonant is syllabified within an onset which is followed by a final nucleus which is not expressed phonetically.



Thus I propose that words ending with a single consonant preceded by a branching nucleus have their final consonant in an onset which is followed by an empty nucleus. With respect to words ending with a single consonant preceded by a short vowel, the question arises as to how the consonant is syllabified. According to the 'Coda' Licensing Principle, any word-final consonant is syllabified in an onset followed by an empty nucleus, regardless of the structure of the preceding nucleus and regardless of the nature of the consonant. If we consider first those words which end with a short vowel followed by a final consonant which is an obstruent, the proposal that the obstruent is syllabified within an onset would be in accordance with the fact that an obstruent, the stop *t* for example, is never syllabified within a rhyme word-internally.<sup>7</sup> Moreover, as we will see in the following section, anyone who agrees with the proposal that the feminine desinence contains an empty nucleus (or schwa), and with Vergnaud's analysis of floating consonants and rep-

representation of adjectives, would syllabify the final obstruent of the feminine adjective *petite* [ptit] ‘small’ within an onset. Since I see nothing which would prevent the attribution of the same structure to any word ending with an obstruent, I assume the ‘Coda’ Licensing Principle and turn next to its justification in adjectives.

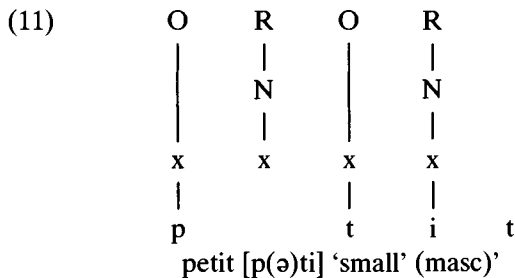
### 6.2.1.2 *Adjectives*

Following the spirit of Vergnaud (1982), I consider that the feminine desinence has the representation of an empty nucleus preceded, as in any well-formed sequence of constituents, by an onset. While neither constituent dominates a segment, unlike the onset the nucleus has a skeletal point attached to it.<sup>8</sup>

#### (10) **Feminine desinence**



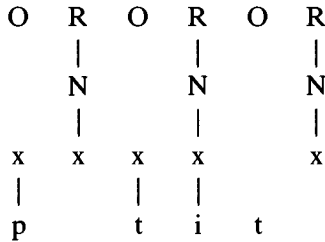
Following on from Vergnaud’s suggestion, the alternation between the masculine and the feminine form of adjectives of the type *petit* [p(ə)ti], *petite* [p(ə)tit] is accounted for in the following way. In the lexical representation of the masculine form, there is a final floating consonant, i.e. a segment which is associated neither with a skeletal point nor with a constituent. Since it is not associated to a position, this final segment is not manifested. This is illustrated in (11).<sup>9</sup>



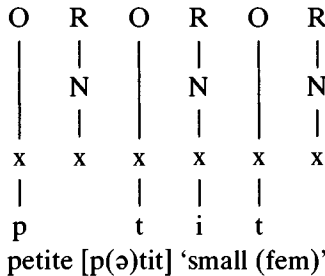
In the lexical representation of the feminine form of the adjective there is an additional sequence O–R (e.g. the feminine morpheme). The floating segment associates with the available onset constituent, this association triggering (as proposed by Vergnaud) the creation of a ske-

letal point. The representation I assume for the adjective *petite* is given in (12).

(12) a. **Before governing relations have been applied**



b. **After governing relations have been applied**



I then assume that adjectives ending phonetically with a vowel in their masculine form and with a consonant in their feminine form have in both forms a word-final nucleus. While the nucleus has phonetic content in the masculine form, it is empty in the feminine one.

Let us next consider adjectives ending with a single consonant in both their masculine and feminine forms.

(13)	<b>a. Masculine</b>	<b>b. Feminine</b>	<b>Gloss</b>
	rare [ra:r]	rare [ra:r]	‘rare’
	sale [sal]	sale [sal]	‘dirty’
	bête [bɛ:t]	bête [bɛ:t]	‘stupid’
	brave [bra:v]	brave [bra:v]	‘brave’

Each one of the forms in (13a) is phonetically identical to its feminine counterpart in (13b). Those adjectives are said to be invariable. There are two possibilities. They are either not marked for gender, or each adjective of the pair has the same structure but its word-final empty nucleus has a different status. That is, each form has a final nucleus in its representation and while in the masculine form the final empty nucleus is present because of constraints on governing relations, it is part of the

feminine desinence in the feminine form. Whether or not it is marked for gender, my claim is that each form has the same structure. Each form ends with a final empty nucleus. Let us suppose that invariable adjectives are, like the other adjectives, marked for gender.<sup>10</sup> The representation I propose for the masculine adjective *rare* is shown in (14).

(14) **rare (masc)**

a. Before governing relations have been applied O    N $\wedge$ x   x x   x   $\vee$   r    a    r	b. After governing relations have been applied O    N    O    N $\wedge$        x   x x   x   x   $\vee$   r    a    r
---	---

I claim that the final liquid of the adjective *rare* (masc) cannot be syllabified either within the rhyme (because it would not be licensed by a following onset) or within the nucleus.<sup>11</sup> Its skeletal point can only be projected onto a constituent onset. Since an onset must be accompanied by its governor, a nucleus occurs in final position.<sup>12</sup>

In its feminine form (as shown in (15)) the adjective has now the non-cyclic feminine morpheme in its representation. The liquid associates with the onset of the feminine desinence and the onset now being followed by the nucleus of the morpheme, its government is satisfied.<sup>13</sup>

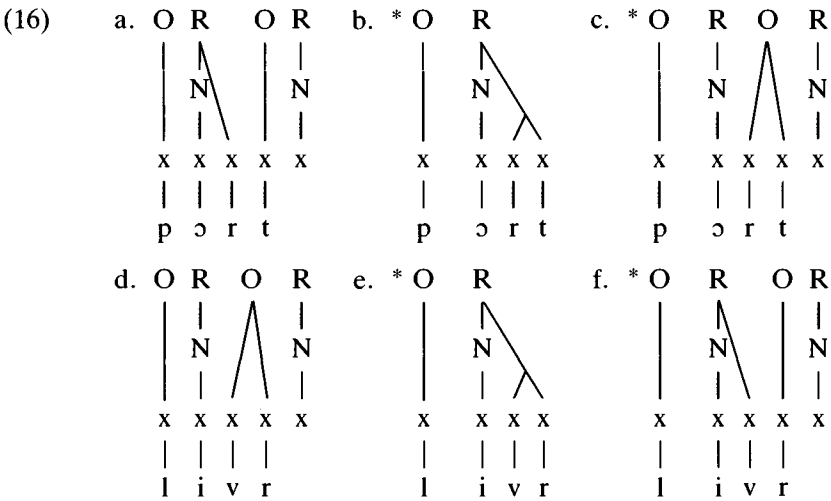
(15) **rare (fem)**

a. Before governing relations have been applied O    N    O    N $\wedge$   x   x x   x   x   $\vee$   r    a    r	b. After governing relations have been applied O    R    O    R                  N    N $\wedge$        x   x x   x   x   $\vee$   r    a    r
---	---

To summarize, I claim that every word ending phonetically with a single consonant ends with an empty nucleus. As we saw, this proposal is motivated by the presence of long vowels and heavy diphthongs before a word-final single consonant and by the feminine forms of adjectives. Let us next turn to the data I gave in (4), i.e. words ending with a consonant cluster.

**6.2.2 Word-final nuclei preceded by a consonant cluster**

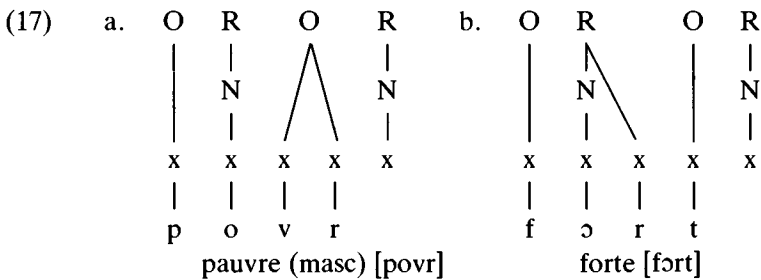
The theory attributes to nouns such as *porte* [pɔrt] ‘door’ and *livre* [livr] ‘book’ a structure containing a final nucleus. Since in both words the final consonant can only be syllabified within an onset, a nucleus must follow this onset to satisfy governing constraints. Recall that a ‘syllable’ is a sequence onset–rhyme and that an onset must always be governed by the head of this sequence of constituents: the nucleus. Consequently, a constituent onset can never appear without being followed by a nucleus.



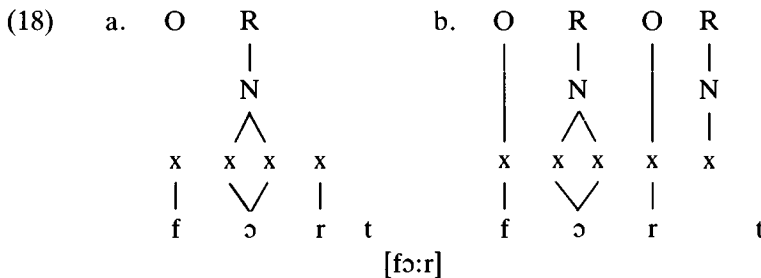
The lexical representations of *porte* and *livre* are the ones in (16a, d) respectively. While (16c) is excluded by constituent government, (16f) is excluded by interconstituent government. Within a constituent, government operates from left-to-right. It is impossible for a charmless liquid to govern a following negatively charmed obstruent (cf. 16c). Along the same lines interconstituent government excludes a structure as in (16f), where a liquid would govern a preceding obstruent. Finally, a syllabification where the two final consonants are both syllabified

within the rhyme (cf. (16b, e)) is excluded by constituent government, according to which within the rhyme (or any constituent) the head must be strictly adjacent to its complement. Consequently, it follows from government that words ending phonetically with a consonant cluster have a final nucleus in their representation.<sup>14</sup> Even though this final nucleus has no phonetic content, a point that I will consider shortly, the position is nevertheless underlyingly present.

Adjectives ending phonetically with a consonant cluster, such as *forte* [fɔrt] 'strong (fem)' and *pauvre* [povr] 'poor', have obviously (except for their segments) the same structure as *porte* and *livre* respectively.



The lexical representation of an adjective in its masculine form is a linear sequence of skeletal points to which segments are associated. With respect to constituents, only the nuclear points are lexically associated to a constituent nucleus. The skeletal points are projected onto constituents in terms of the governing relations they contract with each other. This is illustrated in (18), where I give the representation of the adjective *fort* [fɔ:r] 'strong (masc)'.

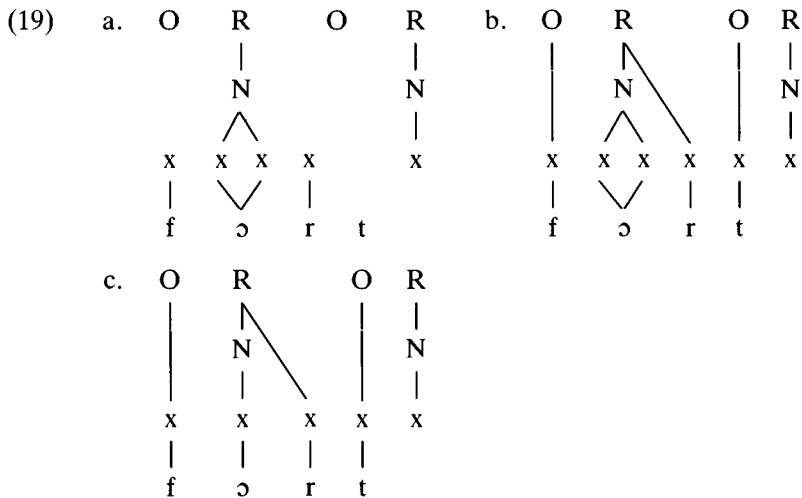


There is a sequence of four skeletal points with which are associated the segments (the final segment is floating). These points are projected onto constituents. I claim that the final liquid can only be projected onto a constituent onset. Since an onset is always governed by a following



nucleus, a word-final nucleus is present in the representation. Note that the floating stop cannot join the liquid within the onset because this would violate constituent government. Neither can the floating consonant be projected onto a constituent which is not available in the representation, since the segment is not associated with a skeletal position. Only skeletal positions are projected to constituents that are not already present in the representation. The masculine form of the adjective *fort* surfaces as [fɔ:r].

Consider the feminine form of this adjective. The lexical representation now contains five skeletal points, the rightmost one being dominated by the nucleus of the feminine desinence. The points are now projected onto constituents in terms of the governing relations they contract with each other. Since the feminine desinence is part of the representation, there are two additional constituents: the empty nucleus along with its skeletal point preceded by a constituent onset. The floating segment may now associate with the available onset and the preceding liquid into the rhyme (it is now licensed by an onset). When the liquid finds itself syllabified within the branching rhyme, the preceding vowel can no longer be long. This is illustrated in (19).



Both *fort* and *forte* have a final nucleus in their representation. There is however a difference between the two adjectives with respect to the final nucleus. In *fort* the final nucleus is present because of governing constraints. The final skeletal point to which the liquid is attached being syllabified (i.e. projected) in an onset, a nucleus must follow in order to

govern the onset to its left. With respect to the feminine form of the adjective, the empty nucleus is part of the representation as the feminine morpheme.

I have shown that it follows from the theory of government that words ending phonetically with a consonant have a final nucleus in their lexical representation.<sup>15</sup> Even though those final nuclei are not manifested in pre-pausal position (a property which I consider next), they are nevertheless underlyingly present.

### 6.3 **Word-final empty nuclei**

While I have shown that the ‘Coda’ Licensing Principle is motivated in French, it is still necessary to explain why a final empty nucleus is realized as zero. Indeed in French words either end with a nucleus which has phonetic content or which is realized as zero. However, I clearly demonstrated that word-internally zero is only possible when an empty nucleus is followed by a proper governor. Given that nothing follows a word-final empty nucleus, we would predict zero to be an impossible manifestation. To account for the manifestation of zero in word-final position I propose that in this position an underlying empty nucleus can be realized as zero in French because this language selects a parameter according to which a word-final empty nucleus is licensed (i.e. authorized to be realized as null while not properly governed). This means that along with the ‘Coda’ Licensing Principle, there is the following parameter.

#### (20) **Licensing of word-final empty nuclei**

A word-final **empty** nucleus is licensed: YES/NO

According to the parameter given in (20), we should find two types of languages:<sup>16</sup> those which do not license word-final empty nuclei and those which do license them. Languages which do not license word-final empty nuclei would obligatorily give phonetic content to those nuclei.<sup>17</sup> Such languages are Brazilian Portuguese, Japanese and the like, where words always end phonetically with a vowel. The second type of languages are those which license word-final empty nuclei. They authorize a word-final empty nucleus to be realized as zero even though it is not properly governed. In those languages words may end phonetically with a consonant. More precisely, all words have a final nucleus in their representation, but this final nucleus can have no phonetic content. This

means that in my dialect of Quebec French, for example, a word-final nucleus may or may not have phonetic content. Words may then end phonetically with a vowel or with a consonant (cf. *auto* [oto] ‘car’, *lame* [lam] ‘blade’, *carte* [kart] ‘card’).

The principle of ‘Coda’ Licensing, according to which a word always ends with a nucleus, along with the parameter according to which a word-final empty nucleus is or is not licensed, provide a way of differentiating languages in which words must end with a vowel from those which allow words to end phonetically with a consonant. But within this latter type of language, in which an underlying word-final empty nucleus can be realized as zero, an additional distinction must be made. On the one hand there are languages like French and English where words can either phonetically end with a single consonant or a consonant cluster. On the other hand there are languages like Korean, Wolof and Pulaar where, interestingly, words can phonetically end with a vowel or a single consonant but never with a consonant cluster. There seem to be two possible ways of accounting for the difference between French and English on the one hand and Korean, Wolof and Pulaar on the other.

1. Unlike English and French, Korean, Wolof and Pulaar do not license word-final empty nuclei. If not licensed, i.e. authorized to remain empty while not properly governed, those nuclei will be subject to proper government. In those languages proper government would operate from left to right and a word-final empty nucleus would be realized as null if it is properly governed. The final empty nucleus will be manifested after a consonant cluster since the governing relation cannot apply across a governing domain.

2. Or, as an alternative, the grammar would contain a parameter according to which a licensed word-final empty nucleus is or is not a government-licenser. While in English and French a word-final empty nucleus would be licensed and would be a government-licenser, it would also be licensed but would not be a government-licenser in Korean, Wolof and Pulaar. If it is licensed but it does not have the status of government-licenser, a word-final empty nucleus will receive segmental content when it is preceded by a non-nuclear head which has a complement to govern.

Starting with the second hypothesis, I next discuss how those two possibilities motivate my preference for the directionality of proper government.

**6.3.1 Are licensed word-final empty nuclei government-licensors?**

To explain why languages like Wolof, unlike English and French, have words ending phonetically with a vowel or a single consonant but not a consonant cluster, one might propose that the following parameter distinguishes those two types of languages.

- (21) A licensed word-final empty nucleus is a government-licensor:  
YES/NO

While Korean, Wolof and Pulaar select the ‘No’ option of the above parameter, French and English select the ‘Yes’ one. Let us consider the following data from Wolof.

*6.3.1.1 Licensing in Wolof*

- |      |                         |                           |                       |
|------|-------------------------|---------------------------|-----------------------|
| (22) | a. <i>musa</i> ‘Moussa’ | b. <i>lɛm</i> ‘to fold’   | c. <i>mu:s</i> ‘cat’  |
|      | <i>loxo</i> ‘hand’      | <i>ˀdox</i> ‘water’       | <i>ɕe:b</i> ‘rice’    |
|      | <i>tɛ:rɛ</i> ‘book’     | <i>lal</i> ‘make the bed’ | <i>si:s</i> ‘to sit’  |
|      | <i>xale</i> ‘child’     | <i>nag</i> ‘cow’          | <i>su:b</i> ‘to dye’  |
|      | <i>pa:ka</i> ‘knife’    | <i>xarit</i> ‘friend’     | <i>rɔ:f</i> ‘to put’  |
|      | <i>ˀburu</i> ‘bread’    | <i>def</i> ‘to do’        | <i>gɛ:w</i> ‘to meet’ |

Wolof is an African language which like Pulaar belongs to the West-Atlantic linguistic family. With respect to its syllabic structure, the rhyme and nucleus can branch but the onset cannot. What is relevant to our discussion is that, as shown in (22), Wolof like French has words ending phonetically with a vowel or a single consonant. Also, like French, words in Wolof can end with a consonant preceded by a long vowel. This means that in Wolof a word-final nucleus can be underlyingly empty and realized as null. While in (22a) the final nucleus has phonetic content, it is realized as zero in (22b, c).

Let me digress here to justify the claim that the Wolof words in (22c) end with a nucleus. As I claimed earlier, a ‘word-final’ consonant preceded by a long vowel is syllabified in an onset which is followed by an empty nucleus. Moreover, Wolof has a process of vowel shortening in closed syllables which is systematically violated in word-final position.<sup>18</sup> That is, a long vowel shortens before a geminate consonant (which is the only possible consonant cluster). Let us consider the following examples, where, in order for the nuclear head to be adjacent to the rhymal complement, a long vowel shortens when a following consonant must be syllabified within the rhyme.



In the latter examples a vowel schwa occurs in word-final position, that is, the final onset must be followed by a nucleus with phonetic content. We have seen that this is not always the case. In words like *cæeb* [cæ:p] ‘rice’, *nag* [nak] ‘cow’, the final onset is followed by a nucleus with no phonetic content. Why is it that after a geminate consonant the final empty nucleus must receive a phonetic interpretation? Let us observe the two groups of examples carefully. In one case the final consonant is preceded by a vowel. I claim that this consonant is not in the same constituent as the preceding vowel. Being preceded by a non-branching rhyme, the final onset has nothing to govern. Let us now consider the data where words end with a geminate consonant, that is, in a structure where the final onset must govern the preceding rhymal complement (the left member of the geminate). Since the final onset must govern the preceding rhymal complement, it must then be government-licensed. The only possible government-licenser for this onset is the nucleus occurring to its right. If the word-final nucleus must government-license the preceding consonant, and in this language a word-final empty nucleus is licensed but is not a government-licenser, it must then be realized phonetically after a consonant cluster. This explains why an ‘epenthetic’ schwa occurs in word-final position after a geminate consonant but not after a single consonant. In the former case but not in the latter, a governing consonant governs a rhymal complement and must then be government-licensed. In order to government-license the preceding governing segment, a word-final empty nucleus which is not a government-licenser is manifested.

Unlike Wolof, French allows words to end phonetically with either a single consonant or a consonant cluster. I propose that in French a final empty nucleus can be the government-licenser of a preceding governing consonant. We can see this status of government-licenser as a way for the empty nucleus to show that it is present in the lexical representation. It has no phonetic content but its presence is captured by its property of being a government-licenser. In French, then, there are three types of words: those that end with a vowel, those that end with a single consonant, and those that end with a consonant cluster. In the lexical representation of words of each type, a final nucleus is present.

Languages do not vary parametrically according to whether they are or are not governed by the ‘Coda’ Licensing Principle. However, languages do vary parametrically according to (i) whether they do/do not allow the final nucleus to be phonetically empty, and (ii) whether a

word-final empty nucleus does or does not have the property of government-licensing a preceding consonant. This is illustrated in the chart below.

(26)

	Word-final empty nuclei licensed		Licensed word-final empty nuclei are government-licensors	
	YES	NO	YES	NO
Japanese		×		
Brazilian Portuguese		×		
French	×		×	
English	×		×	
Wolof	×			×
Pulaar	×			×
Korean	×			×

Let us now consider an alternative to this proposal. What distinguishes languages is not the status of the licensed word-final empty nuclei, but the directionality of proper government.

**6.3.2 Directionality of proper government**

As an alternative, the difference between Korean, Wolof and Pulaar on the one hand and English and French on the other may be accounted for in terms of the directionality of proper government in those languages. Proper government would operate from right-to-left in French and English and a word-final empty nucleus would be licensed. In Wolof and similar languages a word-final empty nucleus would not be licensed unless it is properly governed, and proper government would operate from left-to-right. In the latter languages a word-final empty nucleus would be realized as zero if it is properly governed by a preceding proper governor, while in English and French an ungoverned word-final empty nucleus would be licensed. Note that if this is the case we can reduce our two parameters to one. Languages will vary as to whether they do or do not license word-final empty nuclei. However, we can now

propose that a licensed word-final empty nucleus is always a government-licenser.

Unfortunately Korean, Wolof and Pulaar do not have word-internal empty nuclei. Consequently the directionality of proper government may not be tested word-internally. But if proper government operates from left-to-right in those languages we can account for the following two facts that the three languages have in common: (i) the behaviour of word-final empty nuclei and (ii) the restriction on the type of consonants that can occur in 'word-final' position.

As mentioned earlier, the fact that an empty nucleus must receive a phonetic interpretation after a consonant cluster may follow from the condition that proper government cannot apply when a governing domain intervenes between the proper governor and the empty governee. While in languages where proper government operates from left-to-right a word-final empty nucleus would be properly governed when preceded by a single consonant, proper government would fail to apply when a cluster intervenes between the two nuclei. In addition, if the governing relation applies from left-to-right we can understand why those languages do not permit any type of consonants to occur in word-final position. Notice that in French, for example, where there is clearly no governing relation between a word-final nucleus and the one occurring to its left, it is also the case that any consonant can be found in word-final position. On the other hand, in languages like Korean, Wolof and Pulaar there are restrictions on the nature of the consonants occurring in a final onset. Wolof and Pulaar, for example, are said to have processes of spirantization and final devoicing. In word-final position, we only find the spirant and voiceless counterpart of a voiceless and voiced stop respectively. Supposing that phonological processes such as spirantization and devoicing are a type of lenition and that lenition involves the simplification of a segment, it is natural to propose that a segment will become less complex when it occurs within a governing domain. More precisely, lenition would take place when a consonantal segment is sandwiched between two nuclei which are in a governing relation with each other. It would then follow that in Wolof and Pulaar a phonetically word-final consonant lenites.<sup>20</sup>

In conclusion, the question as to whether English and French must be distinguished from Korean, Wolof and Pulaar by the status of the licensed word-final empty nucleus or by the directionality of proper government remains open. Only more research on languages of the type



of Wolof would provide a definite answer. However, it seems that in terms of directionality of proper government, not only can we account for the behaviour of word-final empty nuclei in the two groups of languages, but also for the fact that those languages vary with respect to the restrictions on the nature of the consonants that can occur in a word-final onset. If all languages license word-final empty nuclei, how is it that while Korean, Wolof and Pulaar restrict the consonants occurring before the empty nucleus, English and French impose no such restriction? Finally it becomes possible to restrict our analysis to one principle (i.e. 'Coda' Licensing) and one parameter (i.e. licensing of word-final empty nuclei). As I mentioned in 6.3.1, any licensed word-final empty nucleus would be a government-licenser.

Consequently, it seems that there are more motivations for the directionality of proper government than for the parameter on government-licensers.

I conclude this section with the consideration of an additional distinction that must be made between some languages. Namely, the difference between French and English with respect to 'word-final' consonant clusters.

#### **6.4 Direct and indirect government-licensing**

Since both English and French have words ending phonetically with a consonant cluster, I came to the conclusion that the two languages license word-final empty nuclei. There is, however, a difference between English and French. While in my dialect of Quebec French, for example, any cluster may be found in final position, in English those clusters are restricted to interconstituent domains. No branching onset can precede a word-final empty nucleus. That is, while both the words *quatre* [katr] and *carte* [kart] are possible in French, only words like *cart* [kart] (\*[katr]) occur in English. In the light of this difference, Nikiema (1989c) proposed a distinction between direct and indirect government-licensing. In direct licensing the government-licenser and the licensee are strictly adjacent (e.g. a nuclear point is adjacent to a non-nuclear head which governs a rhymal complement). For its part, indirect licensing involves cases where a nucleus government-licenses an onset which governs a complement occurring within the onset. In this case the non-nuclear complement intervenes between the government-licenser and the licensee. Nikiema suggests that while a word-final empty nucleus is

an indirect government-licenser (it directly and indirectly government-licenses a preceding onset) in French, it is only a direct government-licenser in English. We can then say that while any licensed word-final empty nucleus is a government-licenser, languages vary as to whether this nucleus may indirectly government-license a non-nuclear head.

- (27) A licensed word-final empty nucleus may indirectly government-license: YES/NO

French selects the Yes option of the parameter. A word-final licensed empty nucleus government-licenses an onset to govern a complement within the onset or in the preceding rhyme. Note that if a nucleus is an indirect government-licenser, it follows that it is also a direct one. For its part English selects the No option. A word-final empty nucleus is licensed; it is then a government-licenser but it may only directly government-license. It government-licenses an onset to govern a rhymal complement (the nucleus is strictly adjacent to the onset head) but it does not government-license an onset head to govern a complement occurring within the onset (the nucleus is not adjacent to the head of an onset when the constituent is branching).

Let me digress here to mention that there is a strong tendency in many dialects of French to lose the complement of a branching onset before a word-final empty nucleus. In fact speakers of Quebec and Parisian French (among other dialects) tend systematically to simplify a final branching onset before an empty nucleus. This can be a sign that indirect government-licensing is clearly more marked and that languages tend to avoid it. While a licensed word-final empty nucleus can always directly government-license an onset, it is much more difficult for it to indirectly government-license, and therefore it may not do so.

Following an observation made by Morin (1978) and Cavaco (personal communication) for French and European Portuguese respectively, it seems that the proposal that a licensed word-final empty nucleus may or may not indirectly government-license a preceding non-nuclear head should not be restricted to final empty nuclei. Rather, this notion might also be relevant for word-internal empty nuclei in certain languages.

According to Morin, in the dialect of French spoken in Saint-Etienne a word-internal empty nucleus may be realized as null after a cluster of the type liquid-obstruent. However, the empty nucleus is manifested as schwa after a cluster of the type obstruent-liquid.

In this variety of French, historical schwas are not normally pronounced in the words *marguërite*, *tourtérelle*, *bordereau*, *orphélin* . . . unless they are preceded by an OL group, thus: *gardérie*, *fourbérie*, *brusquërie*, *forgëron*, *fortëresse*, but (*sucrierie*). (Morin 1978: 87)

Along the same lines, Cavaco claims that in her dialect of European Portuguese, a word-internal empty nucleus may be realized as zero after a cluster liquid–obstruent, while it must receive a phonetic content (it is realized as [i]) after a cluster obstruent–liquid.

- (28) a. **After a branching onset**
- |              |              |                      |
|--------------|--------------|----------------------|
| [igrimi]     | /igrθmθ/     | ‘abrupt’             |
| [sikritária] | /sθkrθtaria/ | ‘secretary’s office’ |
| [fúnbrĩ]     | /funθbrθ/    | ‘funeral’            |
| [selbrĩ]     | /selθbrθ/    | ‘celebrity’          |
| [dĩngrĩr]    | /dθnθgrθrθ/  | ‘denigrate’          |
- b. **After an interconstituent cluster**
- |          |              |           |
|----------|--------------|-----------|
| [kársrĩ] | /karsθrθ/    | ‘jail’    |
| [salvmĩ] | /salvθ + mθ/ | ‘save me’ |
| [ɔʃpdĩ]  | /ɔʃpθdθ/     | ‘guest’   |
| [azɔrʃ]  | /azɔrʃθ/     | ‘Azores’  |

In the light of those facts it appears that in some languages word-internal empty nuclei may be properly governed (have no phonetic content) and nevertheless directly government-license an onset. While more research needs to be done on this type of language, it seems that direct and indirect government-licensing is an important notion of the grammar.

## 6.5 Conclusion

The parameter according to which a word-final empty nucleus is or is not licensed, along with the directionality of proper government, allows one to distinguish three types of languages: (i) those whose words always end with a vowel, (ii) those whose words end with a vowel or a single consonant and (iii) those whose words end with a vowel, a single consonant or a consonant cluster. Notice that a prediction is made. No languages should have words ending phonetically with a vowel and a consonant cluster but not a single consonant. If a language licenses a word-final nucleus to be empty, absolutely nothing would prevent this

empty nucleus from occurring after a single consonant and a consonant cluster. And if a language licenses a word-final nucleus to be empty if properly governed, then in this language words may only phonetically end with a vowel or a single consonant but never in a consonant cluster. To my knowledge, with respect to what may occur in word-final position there are only these three different types of language.

I turn next to the consideration of empty nuclei which, even though they occur in word-final position, have their realization determined by a following word.

# 7 *Compounds and phrases*

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## 7.0 Introduction

Up to this point in the analysis of schwa I claim that a word-internal empty nucleus is realized as zero if it is properly governed. Moreover, in the preceding chapter I argued that a word, or more precisely a domain, universally ends with a nucleus. In French a domain-final nucleus can be underlyingly empty; if it is empty, it is licensed (i.e. it is authorized to remain without segmental content). Finally, a licensed domain-final empty nucleus is a government-licenser for its onset. These proposals seem, however, to encounter a problem with compounds. While in certain types of compounds the final nucleus of the first term is never manifested, it must be phonetically expressed in others. The question now is why the final nucleus of the first term behaves as in word-final position (i.e. it is never manifested) in one type of compound while in another type it behaves as if it were word-internal (i.e. it is realized as zero unless it is preceded by a consonant cluster). To account for these facts I argue that while the final nucleus of the first term of a compound occurs in word-final position and is therefore licensed, its behaviour is determined by stress assignment. Let us first consider the facts.

## 7.1 The facts

One type of compound has as its first term a word whose final nucleus is underlyingly empty and is preceded by a single consonant. The second term can either be phonetically monosyllabic or polysyllabic. What is of importance in the present discussion is that whatever the syllabic structure of the second term, the final empty nucleus of the first member is never manifested when it is preceded by a single consonant. This is illustrated overleaf in (1).

(1) a. **Second term phonetically monosyllabic**

coupé-feu	[kupfø]	'firebreak'
cassé-tête	[kastet]	'puzzle'
cassé-noix	[kasnwa]	'nutcracker'
passé-droit	[pasdrwa]	'privilege'
cassé-crouste	[kaskrut]	'snack'
piqué-nique	[piknik]	'picnic'

b. **Second term phonetically bisyllabic**

coupé-papier	[kuppapje]	'paper knife'
coupé-circuit	[kupsirkɥi]	'cutout'
cassé-noisettes	[kasnwazet]	'nutcracker'
passé-partout	[paspartu]	'master key'
passé-montagne	[pasmōtaŋ]	'Balaclava'

While the final empty nucleus of the first term of a compound is never manifested when it occurs after a single consonant, the situation is different when it is preceded by a consonant cluster. In the latter case, the behaviour of the final empty nucleus depends on the number of phonetically expressed syllables in the second term. As shown in (2a), when the second term is phonetically monosyllabic the empty nucleus must be manifested. On the other hand, when the second term has more than one phonetically expressed syllable, the empty nucleus has no phonetic content, as shown in (2b).

(2) a. **Second term phonetically monosyllabic**

porte-clefs	[pørtəkʎe]	'keyring'
porte-plume	[pørtəplym]	'penholder'
porte-cartes	[pørtəkart]	'card holder'
porte-voix	[pørtəvwa]	'megaphone'
porte-scies	[pørtəsi]	'saw holder'
couvre-feu	[kuvrəfø]	'curfew'
couvre-lit	[kuvrəli]	'coverlet'
tourne-disque	[turnədisk]	'turntable'
tourne-vis	[turnəvis]	'screwdriver'
ouvre-boîte	[uvrəbwat]	'can-opener'
garde-robe	[gardərɔb]	'wardrobe'
garde-côte	[gardəkot]	'coastguard'
garde-fou	[gardəfu]	'railing'

(2)	b.	<b>Second term phonetically bisyllabic</b>		
		porté-manteau	[pɔrtmāto]	‘coat rack’
		porté-crayon	[pɔrtkrejɔ̃]	‘pencil holder’
		porté-cigare	[pɔrtsigar]	‘cigar case’
		porté-parole	[pɔrtparɔl]	‘spokesman’
		porté-drapeau	[pɔrtdrapo]	‘standard bearer’
		porté-couteau	[pɔrtkuto]	‘knife rest’
		porté-camion	[pɔrtkamjɔ̃]	‘truck carrier’
		ouvert-bouteille	[uv(r)butej]	‘bottle-opener’
		gardé-manger	[gardmāʒe]	‘meat safe’
		gardé-barrière	[gardbarjɛr]	‘level-crossing keeper’
		gardé-malade	[gardmalad]	‘nurse’
		gardé-champêtre	[gardʃāpetr]	‘rural policeman’

As mentioned earlier, I claim that the pattern of all the compounds can be accounted for in terms of stress assignment. In compounds where the second term is phonetically polysyllabic, the final empty nucleus of the first term is never involved in the metrical structure. In those compounds the final empty nucleus of the first term is never phonetically manifested. Things are different in compounds where the second term is phonetically monosyllabic. As we will see, in those compounds the final empty nucleus of the first term is involved in the metrical structure. I claim that when the final empty nucleus of the first term is in a position where it may be incorporated within a metrical foot, it results in the following situation. In becoming a complement within a foot, the empty nucleus is metrically governed. This, I propose, entails the loss of its property of government-licenser. As in word-internal position, if an empty nucleus is preceded by a consonant cluster, it escapes government in order to remain the government-licenser of its onset. It is phonetically manifested and is no longer a candidate for the recessive position of the binary foot. Which means that we find schwa in final position of the first term of a compound when the second term is phonetically monosyllabic. In compounds where the second term is phonetically monosyllabic, then, the final empty nucleus of the first term is realized as schwa following a consonant cluster and as zero following a single consonant. In the latter situation the empty nucleus has nothing to government-license and may be incorporated as the weak member of the binary foot.

Let us first consider how stress is assigned in French.

## 7.2 The behaviour of schwa determined by stress assignment

### 7.2.1 Stress assignment in French

In terms of government, stress is a manifestation of a governing relation nuclei contract with each other. Recall that all positions except one, the head of the domain, must be licensed. With the exception of the licensing of a word-final empty nucleus, licensing is done under government. Non-nuclear complements are licensed through government by the onset heads. For their part, the non-nuclear heads are licensed through government by their nucleus. We saw also that in some cases empty nuclei are licensed through proper government. And finally, in French, word-final empty nuclei have the property of being licensed. As for the licensing of the ungoverned nuclear heads, it operates at the level of nuclear projection. The nuclear heads are projected and contract governing relations with each other. Stress is thus one manifestation of this type of government.

In French stress falls on the rightmost expressed vowel of a word. All the other vowels of the domain are unstressed or at least they are all equal in having a lesser degree of accentuation than the final vowel. To account for the pattern of accentuation I propose that stress in French is assigned in the following way.

#### (3) **Foot construction**

At the level of nuclear projection, starting from the right edge of a domain, construct a maximally binary right-dominant foot.

I also claim the following:

- (i) An empty nucleus cannot be the head of a metrical foot.
- (ii) The recessive position of a binary foot is restricted to an empty nucleus.
- (iii) Except for the (binary) foot built at the right edge of the domain, the French word contains no other foot. All the nuclei of the domain which remain metrically unorganized are incorporated as recessive positions of the word-tree at the word-level.

Let me now account for these three conditions. French words, I claim, have a right-dominant binary foot built on the rightmost nucleus with segmental content. To prevent the foot from being built on a word-final empty nucleus I propose the following universal principle of metrical phonology.



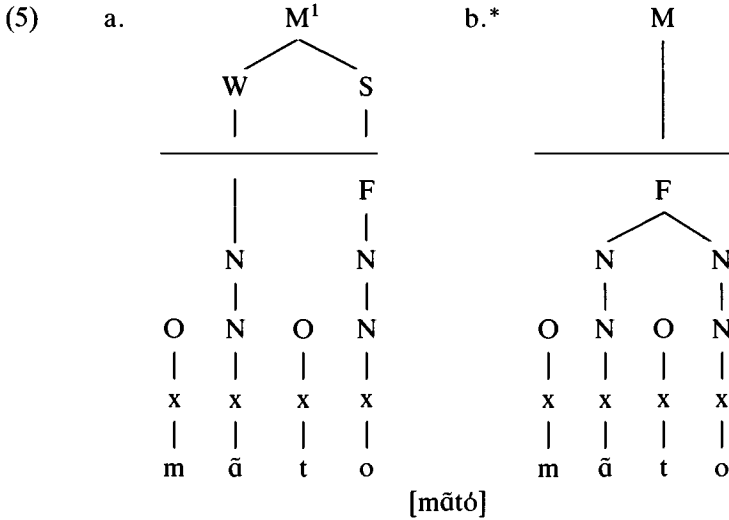
- (4) A nucleus with no segmental content cannot be the head of a metrical foot.

Principle (4) follows from the theory of government. While an empty nucleus is a perfect complement it is never a governor for a complement. It follows that an empty nucleus cannot be the head of a branching foot. This is also true for any branching domain. Note that the head of a branching onset, rhyme or nucleus always has a segmental content. But I also suggest that an empty nucleus cannot be projected as the head of a foot, whether the foot is branching or not. Since if projected this nucleus would be the head of its domain, this status is completely impossible for an empty nucleus.

Secondly, I claim that the recessive position of a binary foot may only be an empty nucleus. Here I follow Selkirk and differentiate what she calls 'full' vowels from schwa. In my terms I differentiate nuclei with segmental content from empty nuclei. While we both claim that an empty position contracts a metrical relation with another nucleus, I differ from Selkirk in the following way. A metrical (binary) foot, I would claim, is restricted to one per domain. If an unrealized empty nucleus is not adjacent to the metrical head, it is not metrically organized. Its relation with another nucleus is one of proper government, not one of 'metrical' government. With regard to all the other nuclei with segmental content, I follow Selkirk and claim that they cannot be a complement within a binary foot. But I differ from Selkirk in considering an underlying ungoverned empty nucleus (which is realized as schwa) as having a segmental content as is the case for any other non-empty nucleus. In this sense, schwa like any other vowel may not be the weak member of a binary foot but, as we will see in chapter 8, may be projected as the head of a metrical structure.

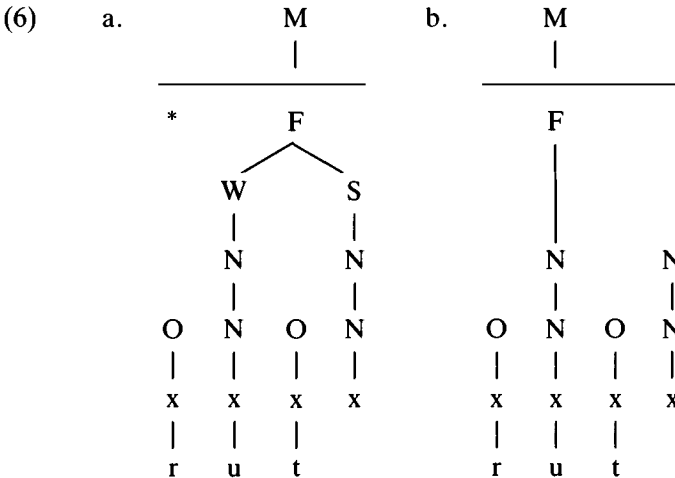
Finally, since all the other vowels of a word, except for the rightmost vowel of a domain, are unstressed, I claim that French words contain a unique foot. All the other nuclei which are equal in having a lesser degree of accentuation than the final one are simply incorporated at the word level as weak members of an unbounded right-dominant word-tree.

In (5) I illustrate the stress pattern I attribute to all words, starting with forms like *manteau* 'coat'. As shown in (5b), the first nucleus of *manteau* cannot be incorporated within a branching foot as a complement. This position, I claim, is restricted to empty nuclei. Since French words



contain a unique foot (branching or not), the first nucleus is metrically organized at the word level, where it is incorporated as a weak position within the word-tree.

Let us now see what metrical pattern I attribute to words which contain underlying empty nuclei. I start with a form like *route* [rut] ‘way’, which has a word-final empty nucleus.

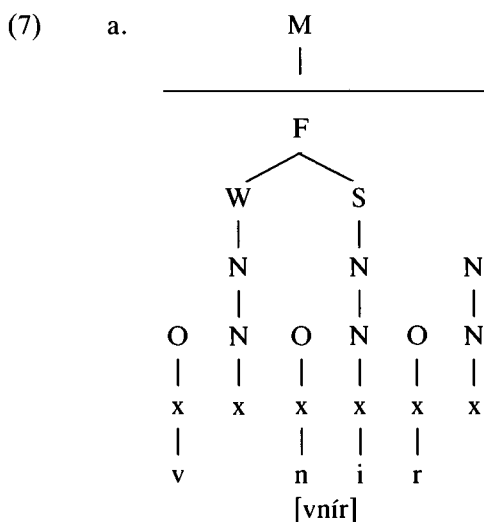


In the above example, a foot cannot be built on the word-final empty nucleus since the head of a foot (branching or not) cannot be a nucleus

with no segmental content. The only possible metrical structure is the one of a non-branching foot built on the nucleus with segmental content. Note that since the word-tree is a right-dominant structure, in pre-pausal position a domain-final empty nucleus will never be metrically organized.

Let us now consider what metrical pattern my analysis would attribute to a word like *venir* 'to come', which contains only one underlying nucleus with phonetic content.

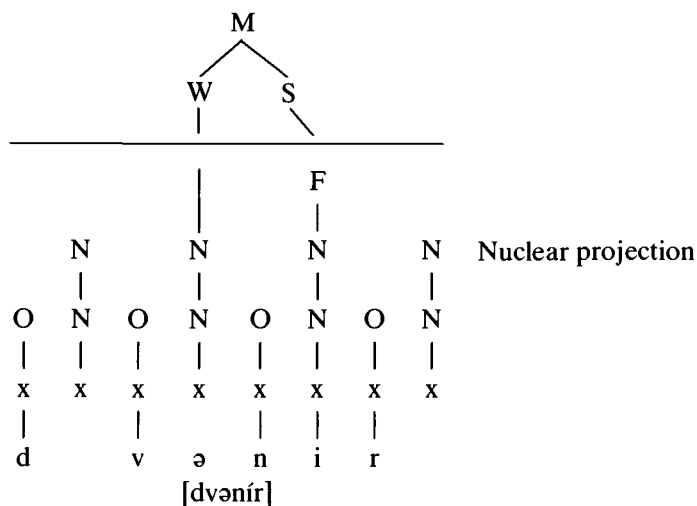
According to principle (4), a nucleus with no phonetic content cannot be the head of a metrical foot. One thing is then certain: the foot cannot be built starting from the word-final empty nucleus, which is always realized as zero. The foot is then built on the vowel *i*. The leftmost nucleus is underlyingly empty. If the empty nucleus is properly governed, we have the pronunciation [vnir]. If it is not properly governed, the word is realized with a schwa in the first nucleus.<sup>2</sup> My claim is that in a situation where the empty nucleus is properly governed, it is incorporated within a binary foot along with the vowel *i*. But in a pronunciation like [vəniɾ], where one chooses not to properly govern the empty nucleus, I claim that the word contains a unique non-branching foot. The nucleus dominating schwa is organized at the word level, as are any other nuclei having segmental content. The metrical structures of [vnir] and [vəniɾ] are given in (7a, b) respectively.





Although clearly more marked, the pronunciation [dvəniːr] is also attested. In this case I will attribute a different metrical structure from the one I proposed for [dævniːr]. In [dvəniːr], proper government fails to apply to the underlying empty nucleus preceding the vowel *i*. The nucleus is manifested as schwa and is therefore prevented from being incorporated within the metrical binary foot. The word then contains a single non-branching foot built on the rightmost expressed vowel. The preceding nucleus dominating the vowel schwa is incorporated at the word level. The properly governed empty nucleus occurring in syllable-initial position cannot be incorporated within the binary foot since it is not adjacent to the head of this foot. The unique foot of the word having been built, the properly governed empty nucleus in syllable-initial position is not metrically organized. It is licensed through proper government.

(9)



My proposal that at the right edge of a word the foot is branching is motivated by the analysis of compounds, which I now consider.

### 7.2.2 Stress assignment in compounds

In the cases under investigation, that is, in compounds, each term is a word which is joined to another word on a second cycle to form a complex noun. In saying that each term is a word, I assume that the final nucleus of each term occurs in word-final position and has the special property attributed to this position (i.e. it is licensed). More precisely, I

claim that even though the final empty nucleus of the first term may metrically contract a governing relation with the following nucleus, it remains a licensed domain-final nucleus. This proposal is justified by the compounds given in (10). In those compounds the second term has as initial onset an empty constituent (i.e. an *h*-aspiré). We saw earlier, in my analysis of words such as *dehors* 'outside' and *rehausser* 'to raise again', that a nucleus with phonetic content following an *h*-aspiré properly governs the empty onset to its left, but that it does not also properly govern the empty nucleus preceding the empty onset. If in compounds the final empty nucleus of the first term becomes unlicensed, it will be subject to proper government. The empty nucleus in final position within the first term should always be manifested in compounds of the type given in (10), where the initial onset of the second term has an *h*-aspiré. Given that the empty nucleus cannot be properly governed when an empty onset intervenes between this empty nucleus and its potential proper governor, zero should be an impossible manifestation. In the following compounds, the empty nucleus is realized as zero, showing that each term must be analysed as an autonomous word. Each word has a final nucleus which has the special properties attributed to word-final nuclei.<sup>3</sup>

- (10) serré-hanches 'hip-squeezer' coupé-haricot 'bean-cutter'  
 coupé-haie 'hedge-cutter' passé-hoquet 'hiccup-stopper'  
 repassé-housse 'iron-cover' coupé-houx 'holly-cutter'  
 lavé-hotte 'hood-cleaner' atrappé-hérisson 'porcupine-catcher'

An additional justification for my claim that the final empty nucleus of the first term of a compound is licensed (not subject to proper government) is provided by compounds where the second term begins with a branching onset. Recall that proper government does not apply when a governing domain intervenes between the proper governor and its governee. If the final nucleus of the first term is not licensed but subject to proper government, the empty nucleus should be realized as schwa in the forms given in (11), where the initial onset of the second term is branching. The first nucleus of the second term cannot properly govern the empty nucleus to its left since a governing domain intervenes between the two nuclei. The fact that the empty nucleus is realized as null shows that it is licensed.

- (11) taillé-clefs 'key-cutter'  
 passé-droit 'privilege'  
 cassé-crouste 'snack'

To summarize, the final empty nucleus of the first term of a compound can be realized as zero even if it is not governed because it occurs in final position of a domain and is therefore licensed.

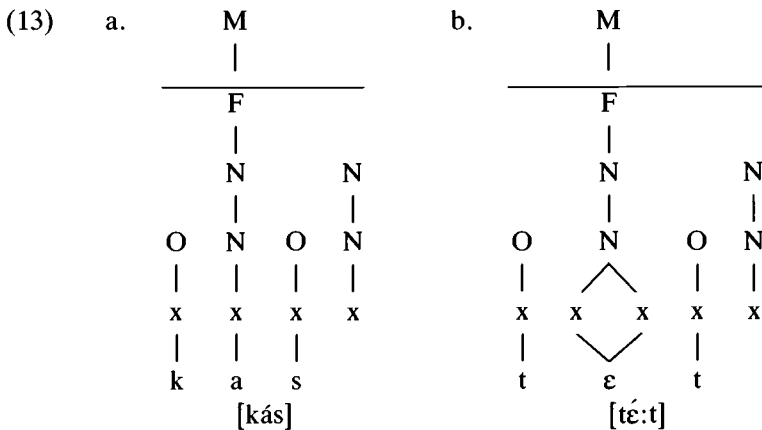
Let us next consider how stress is assigned in compounds, starting with those which have as their first term a final nucleus preceded by one consonant.

7.2.2.1 Compounds whose second term is phonetically monosyllabic

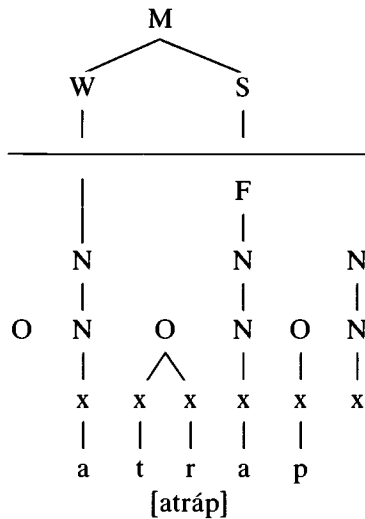
7.2.2.1.1 First term's final nucleus preceded by a single consonant

- (12) cassé-tête 'puzzle'  
 coupé-feu 'firebreak'  
 attrapé-mouche 'fly catcher'

In (12) the compounds are formed of a verb which is joined to a noun to form a complex noun. Each member is a lexical category which bears a stress (e.g. [kás] 'break', [té:t] 'head', [atráp]) 'catch').



(13) c.

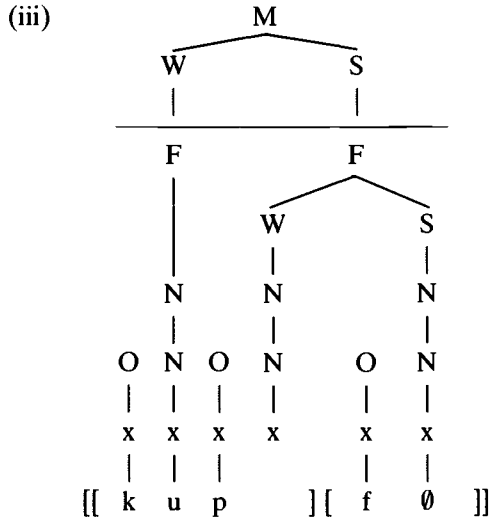
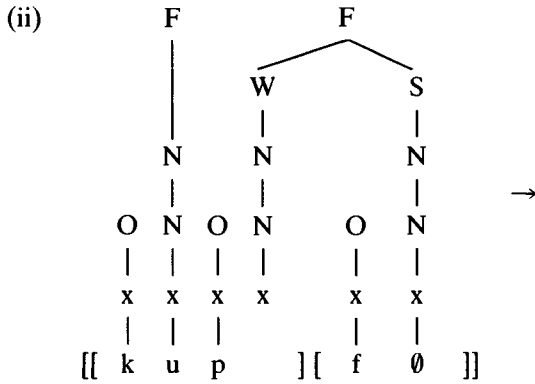
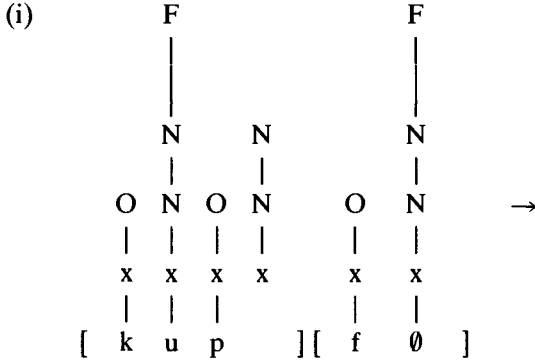


I propose that a compound is formed in the following way. A compound has the structure of two words which are joined together to form a complex noun. On a first cycle there is the leftmost term which comes with its accentual pattern. The term contains a non-branching foot unless its rightmost expressed vowel is preceded by an empty nucleus. In this latter case the foot is branching. Recall that, if empty, the final nucleus of the first term is not incorporated within the metrical structure on this first cycle. On the second cycle, the right term is adjoined to the preceding word. This second term also comes with its accentual pattern. In the compounds given in (12), since the second terms are phonetically monosyllabic, their unique expressed vowel is projected into a non-branching foot. When the compound is formed, the morphologically complex word undergoes the rule of stress assignment, which reapplies at the second cycle. Starting from the right edge of the word a binary foot labelled weak/strong is built if this is possible. In compounds where the second term is phonetically monosyllabic, it is now potentially possible, since the right term is now preceded by another word, to incorporate a preceding nucleus as the weak member of the foot. The final nucleus of the first term, being empty, is then incorporated into a binary foot at the second cycle. The fact that it is the rightmost vowel of the compound which bears the main stress even though the phonetically expressed vowel of the first term is also accentuated is accounted for in proposing that in French an accentual unbounded, right-dominant foot



is built on the foot projection. The derivation of compounding is illustrated in (14).

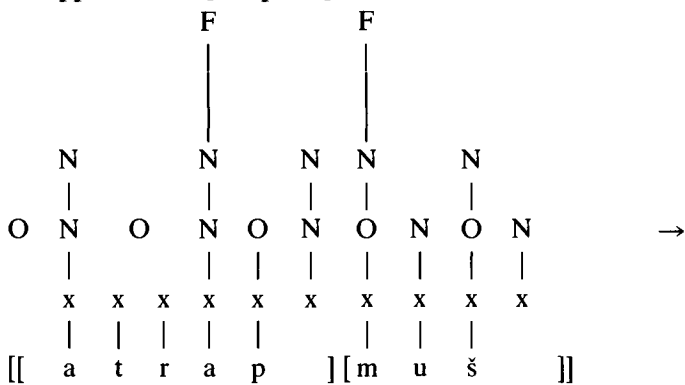
(14) a. coupe-feu [kùpfø] 'firebreak'



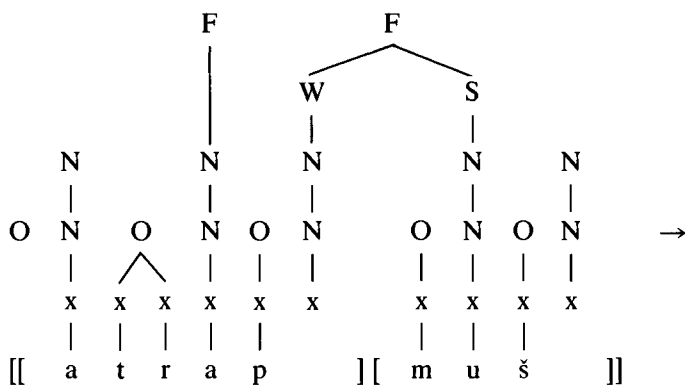


(14) c. **attrappe-mouche** [atrâpmúš]

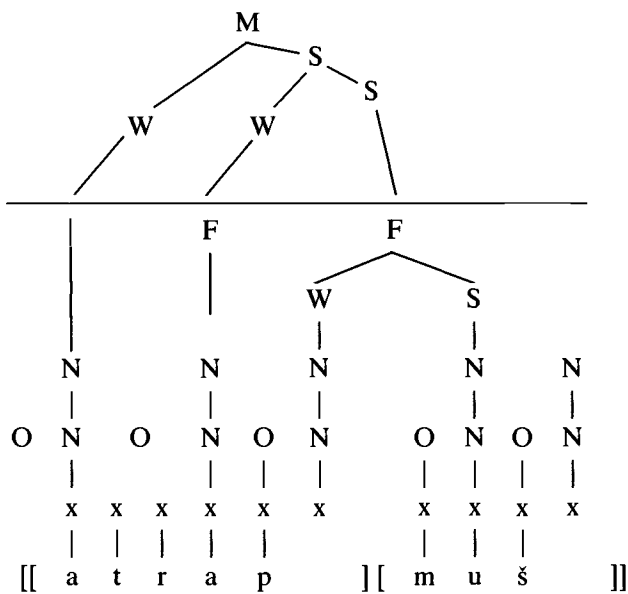
(i)



(ii)



(iii)



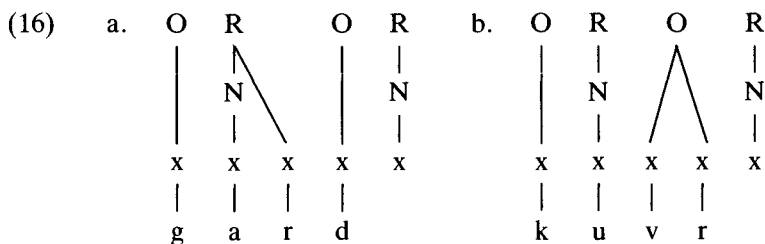
In the structures given in (14), the final empty nucleus of the first term is incorporated into the metrical foot on the second cycle. While this final empty nucleus is not contained in a metrical foot in the first cycle, it is incorporated into the rightmost binary foot when the compound is formed and stress is assigned to the compound. When the final nucleus of the first term occupies the governed position of the binary foot I propose that it loses its domain-final special property; it can no longer government-license a consonant. I then claim that an empty nucleus cannot govern, from within a metrical domain, something that is outside that domain.

This proposal will be supported by cases of compounds where the second term is phonetically monosyllabic, and the final empty nucleus of the first term is preceded by a consonant cluster. We will see that in those compounds the final empty nucleus of the first term is realized as zero when preceded by one consonant but as schwa after a consonant cluster. Recall that in French, in a situation where proper government is in conflict with government-licensing, the chosen principle is government-licensing. An empty nucleus fails to be properly governed when it has to government-license an onset. Knowing that the empty nucleus has indeed no phonetic content after a single consonant (i.e. when it has nothing to government-license), let us turn to compounds where the first term ends with a cluster followed by an empty nucleus.

#### 7.2.2.1.2 First term's final nucleus preceded by a consonant cluster

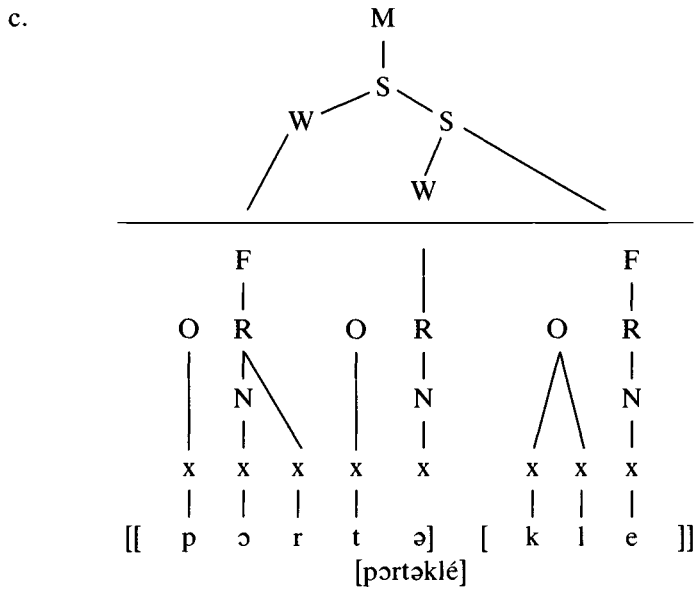
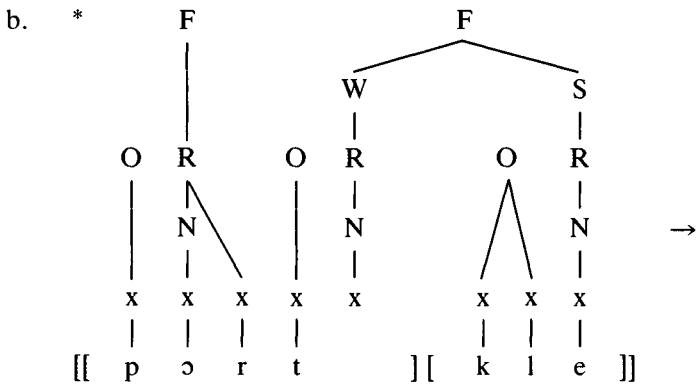
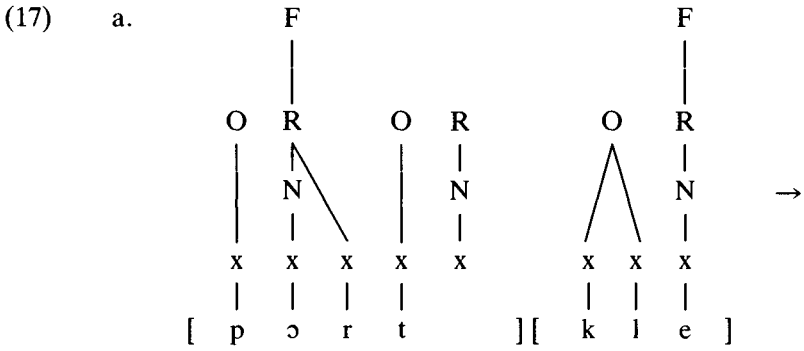
(15)	tourne-disque	[turnədisk]	'turntable'
	tourne-vis	[turnəvis]	'screwdriver'
	ouvre-boîte	[uvrəbwat]	'can-opener'
	couvre-tout	[kuvrətʊ]	'smock'
	timbre-poste	[tɛ̃brəpɔst]	'stamp'
	garde-robe	[gardərɔb]	'wardrobe'
	garde-côte	[gardəkɔt]	'coastguard'
	garde-fou	[gardəfu]	'railing'
	garde-pêche	[gardəpɛʃ]	'water bailiff'

The first member of these compounds must be analysed either like (16a) or (16b), as shown opposite. When those words are first terms of compounds of the type given in (15), the following situation results. In these compounds the second terms are phonetically monosyllabic words. Their final nuclei, if empty, are not metrically organized. The



foot dominates the rightmost nucleus which has phonetic content. When the compound is formed and that stress is reassigned, it becomes possible for the foot built on the second term to be branching. The final nucleus of the first term may be incorporated into this foot as the recessive position. But if it is incorporated within a branching foot, I claim that it will lose its power to government-license its onset. We are then facing a conflictual situation. On the one hand because it is empty the nucleus is a potential complement for the binary foot. On the other hand, this nucleus is preceded by a consonant cluster and must therefore government-license its onset. If it becomes the complement of the metrical head, it will no longer be able to government-license its onset. I propose that as this is the case word-internally when proper government is in conflict with government-licensing, the nucleus will not be incorporated within the foot in order to remain able to government-license its onset. The only possible way that the nucleus can avoid being metrically incorporated is for it to be phonetically manifested. The final empty nucleus of the first term is then realized as schwa, it is therefore no longer a potential complement of the foot and it may government-license its onset. The situation is illustrated overleaf in (17).

The proposal that the behaviour of the empty nucleus of the first term of compounds is determined by stress assignment captures the similarity between word-internal empty nuclei and the final empty nuclei of the first terms of compounds which have as their second term a phonetically monosyllabic word. In saying that in French a right-dominant binary foot is built at the right edge of a domain, and that only an empty nucleus can be the complement within this foot, we have a similar account for the behaviour of word-internal and compound first-term final empty nuclei. In both cases an empty nucleus will fail to contract a governing relation with a following nucleus if it has an onset to government-license. An empty nucleus is therefore realized as schwa after a cluster and as zero after a single consonant. Both word- and foot-



internally a properly governable empty nucleus must be manifested (i.e. not be properly governed) if it must government-license a preceding governing consonant. In other words, a nucleus with no phonetic content is not a government-licenser when it is contained within a governing domain.

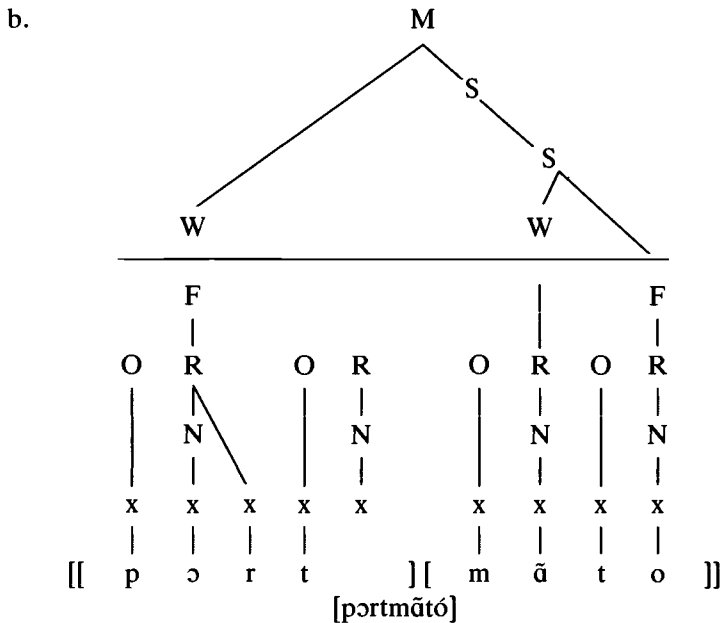
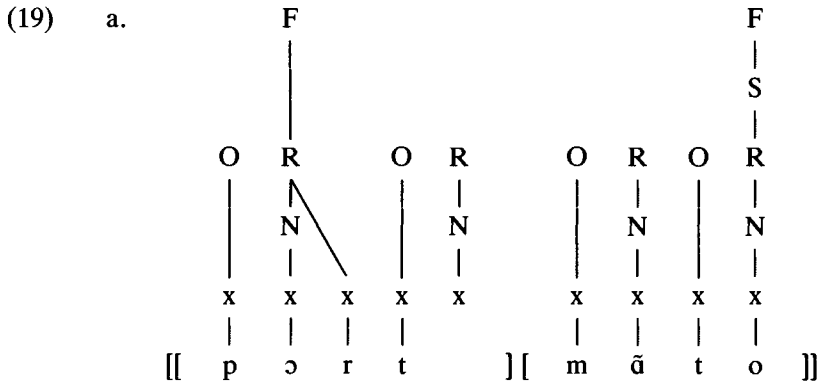
The next question is why the final empty nucleus of the first term of a compound is never phonetically realized when the second term has phonetically more than one syllable – and this regardless of the number of consonants that precede the final nucleus of the first term.

### 7.2.2.2 *Compounds whose second term is polysyllabic*

(18)	a.	coupé-papier	[kuppapje]	‘paper knife’
		coupé-circuit	[kupsirkɥi]	‘cutout’
		cassé-noisettes	[kasnwazɛt]	‘nutcracker’
		passé-partout	[paspartu]	‘master’
		passé-montagne	[pasmɔ̃taɲ]	‘Balaclava’
	b.	porté-manteau	[pɔrtmãto]	‘coat rack’
		porté-crayon	[pɔrtkreyɔ̃]	‘pencil holder’
		porté-couteau	[pɔrtkuto]	‘knife rest’
		ouvert-bouteille	[uvrbutɛj]	‘bottle-opener’
		gardé-manger	[gardmãʒe]	‘meat safe’
		gardé-barrière	[gardbarjɛr]	‘level-crossing keeper’
		gardé-malade	[gardmalad]	‘nurse’

What is interesting with this type of compound is that when the second member is phonetically polysyllabic, the final empty nucleus of the first term is not manifested even if it is preceded by two consonants. This behaviour is identical to that of an empty nucleus occurring in word-final pre-pausal position, where it is licensed and government-licenser, and directly follows from the analysis. At the right edge of a word, a binary foot is built if this is possible. The second term contains more than one filled nucleus. Consequently, when stress is assigned to the compound, only the nuclei of the second term are considered. At the right edge of the compound domain, a foot will be branching or not branching. But the final empty nucleus of the first term will never take part in the foot formation – either because the foot is already branching or because the final empty nucleus of the first term is not directly followed by the head of the foot of the second term. Consequently, the

final empty nucleus of the first term is never in a situation where it might be incorporated within the metrical domain. It will then remain final in its domain, i.e. licensed and a government-licenser for its onset.<sup>4</sup>

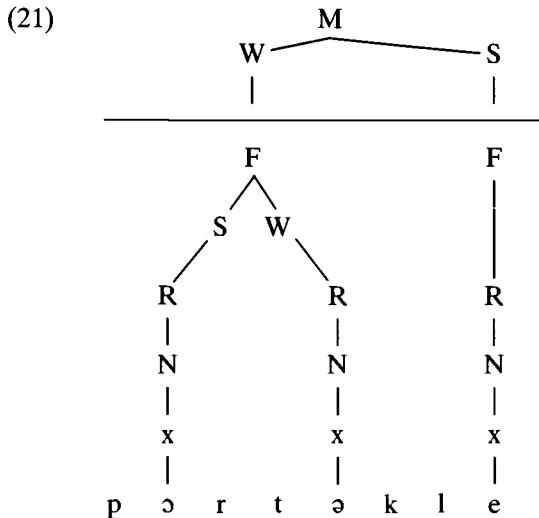


As in pre-pausal position, the final empty nucleus of the first term can be realized as zero and government-license the preceding consonant. This follows from the fact that it is never involved in the foot construction. It is not incorporated into a foot, it occurs at the end of a word and it can then be unrealized phonetically and government-license the pre-





nuclei. But what is relevant here is that the first term has a foot. Now the accentual foot, which must be right-dominant, will accentuate the right-most expressed vowel of the compound. Let us now consider the form *porte-clefs*.



Here is the flaw in Selkirk's proposal. How can she explain the fact that the final empty nucleus of *porte* is manifested in *porte-clefs* but not in *porte-manteau*? If both the syllable *man* of *manteau* and *kle* are non-branching feet, they should behave in the same way. More precisely, neither of them or both of them should incorporate or not incorporate the preceding nucleus. The first syllable of *manteau* and the syllable *kle* being metrically identical, they cannot be what determines the behaviour of the preceding empty nucleus. Maybe the behaviour of the empty nucleus of the first term is determined by the accentual foot. But this cannot be maintained since in both compounds the accentual foot incorporates the foot on the first term as a weak branch, resulting in both compounds being in a situation where the final empty nucleus of the first term is contained within the accentual foot.

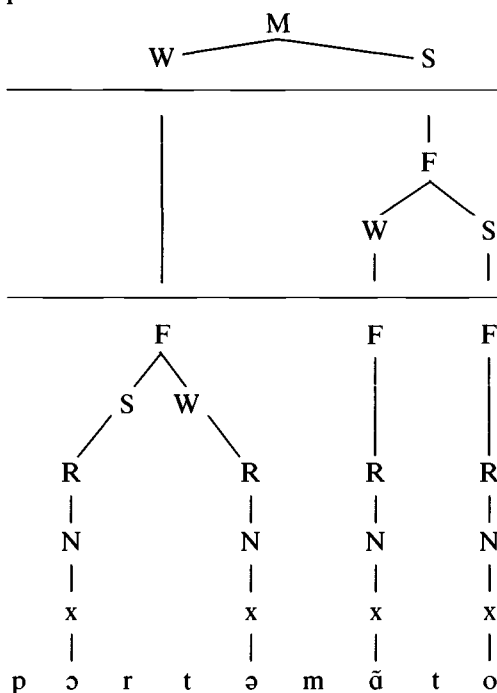
To summarize, according to Selkirk's analysis, the prediction is that *porte-clefs* and *porte-manteau* are identical with respect to the behaviour of the final empty nucleus of the first term. On the other hand, if, at the right edge of a word, a unique foot branches if immediately preceded by an empty nucleus, we then predict that it is only in compounds where

the second term is phonetically monosyllabic that the empty nucleus of the first term is manifested if it is a government-licenser. The latter prediction accords with the facts.

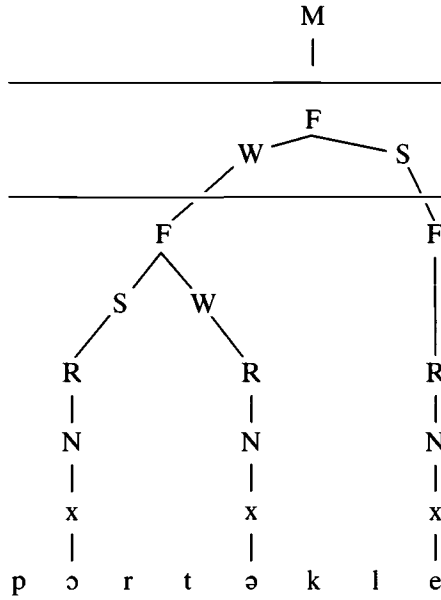
In Selkirk's analysis, the only possible account of the behaviour of the empty nucleus of the first term in the two types of compounds would be to propose that there is an intermediate level between the foot level and the word-tree. It would be at this intermediate level where the branching would be defined as significant. If there were an intermediate level, and the final empty nucleus of the first terms were incorporated within the branching intermediate foot, it would be potentially governed and realized as schwa if it is a government-licenser. This is illustrated below and overleaf in (22).

It has been pointed out to me that foot-based accounts such as Selkirk's, or its dependency version in Durand (1986), are capable of dealing with non-deletion of schwa in *porte-clefs* versus its deletion in *porte-manteau*. What must be distinguished is foot formation and word-stress formation see (23) overleaf.

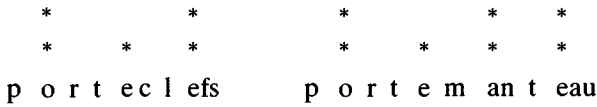
(22) a. porté-manteau



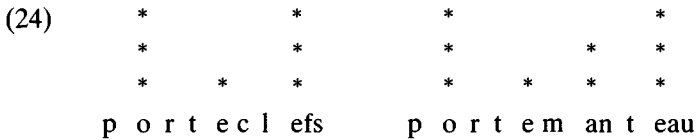
(22) b. porte-clefs



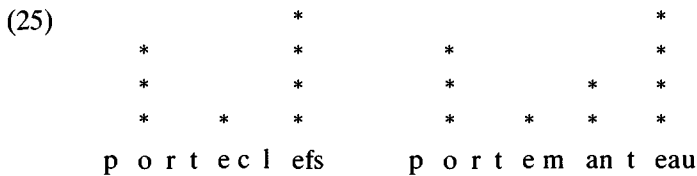
(23) Foot-prominence assignment (only schwa is not footed)



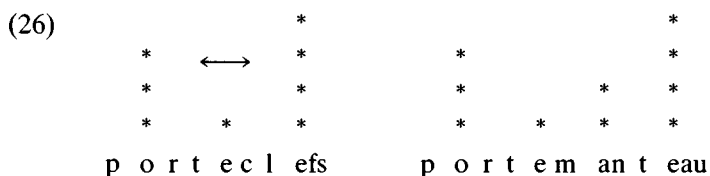
Durand mentions that all words receive a stress on the last foot. They obtain, before compounding cycle:



Then they assume that for compounds, an extra degree of stress is reassigned on the last word:



The fact that schwa is not deleted in *porte-clefs* is attributable to a clash-avoidance preference, i.e. in *porte-clefs*, deletion of the schwa renders adjacent two columns of three asterisks. This would not be true of *porte-manteau*.



The problem I see with this proposal is that while the authors may account for the behaviour of schwa in compounds of the type of *porte-clefs* and *porte-manteau*, the same analysis does not hold for compounds where the final empty nucleus of the first term is preceded by a single consonant. When the final empty nucleus of the first term is preceded by a single consonant, it is never realized. Which means that in those cases, nothing is done to avoid a clash. The authors have then one treatment for some compounds and rely on a different analysis for others. Under my analysis, however, all compounds are analysed in the same way.

As I pursue my analysis of schwa it will become clear why I consider that it is superior to that proposed by Selkirk. Many facts will find an explanation if one considers that a domain-final foot branches if the rightmost nucleus with phonetic content is immediately preceded by an empty nucleus which does not have to government-license an onset.

In this chapter I have proposed that the difference in behaviour of a final empty nucleus of the first term of a compound and of a nucleus in word-final pre-pausal position is not that in one case the empty nucleus occurs in word-final position while in compounds it does not. In both contexts the final nucleus occurs in final position of a word. The difference in their behaviour is determined by whether or not a word-final empty nucleus has to be incorporated within a binary foot. While this may happen with the final nucleus of the first term of a compound, it will never happen to a word-final empty nucleus occurring in pre-pausal position.

I now propose that my analysis of compounds, extended to phrases, accounts for the pattern of phrases in certain dialects of French (Parisian French for example).

7.3 **Phrases**

That the manifestation of a word-final empty nucleus is determined by the number of phonetically expressed syllables contained in the following word is not, in certain dialects of French, restricted to compounds. In the dialect of French spoken in Paris, the pattern of compounds is also found in phrases of the type noun–adjective, verb–adverb, verb–complement and so forth. Then, while in my dialect of Quebec French the following pairs of forms are not ambiguous, since they are not phonetically identical, they are phonetically identical in the dialect spoken in Paris.

(27) a. **Quebec French**

garde-fou	[gardəfu]	‘parapet’
Garde Fou!	[gardfu]	‘keep Fou!’ <sup>6</sup>
couvre-pierre	[kuvrəpjɛr]	‘stone-cover’
couvre Pierre!	[kuvrpjɛr]	‘cover Peter!’

**Parisian French**

b. garde-fou/Garde Fou!	[gardəfu]	‘parapet/keep Fou!’
couvre-pierre/couvre Pierre!	[kuvrəpjɛr]	‘stone-cover/cover Peter!’

In addition, in Parisian French, in the forms given in (28), whether or not the word-final schwas are realized as zero depends on what follows. As in compounds, a word-final schwa preceded by two consonants is realized as zero if the following word has more than one phonetically expressed syllable. If the following word is phonetically monosyllabic, schwa must be realized.

(28) veste rouge ‘red jacket’	vesté rouge et	‘red and white jacket’
	blanche	
veste bleue ‘blue jacket’	vesté turquoise	‘turquoise jacket’
parle bas ‘(he/she) speaks softly’	parlé trop bas	‘(he/she) speaks too softly’
parle fort ‘(he/she) speaks loudly’	parlé pas fort	‘(he/she) does not speak loudly’

In the light of these facts, Dell mentions:

Les schwas immédiatement précédés de deux consonnes appartenant au même mot ne tombent donc ni lorsque la syllabe suivante porte l’accent principal du mot composé, ni lorsqu’elle porte l’accent principal d’un groupe de mots situé devant une pause. [The schwas immedi-

ately preceded by two consonants belonging to the same word do not syncopate either when the following syllable bears the primary stress of the compound or when this syllable bears the primary stress of a group of words occurring before a pause.] (Dell 1973: 226–7)

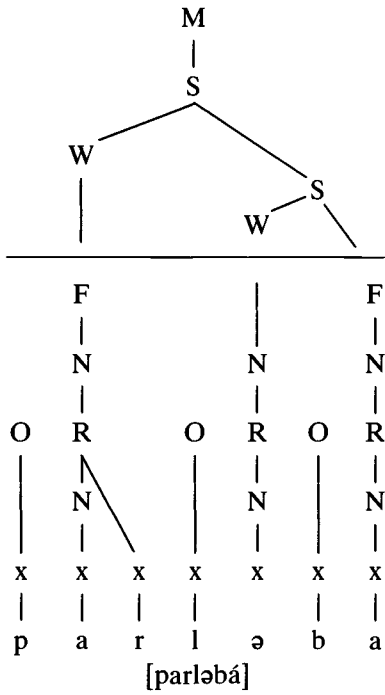
While Dell does attribute this behaviour of schwa to stress assignment, he does not provide a metrical analysis of the phenomenon. The suggestion that, after two consonants that belong to the same word, schwa is manifested when the following syllable bears the main accent is exactly what I propose for the analysis of empty nuclei in compounds.

In my dialect of Quebec French, however, except in compounds a word-final schwa is never phonetically realized after two consonants, however many phonetically expressed syllables there are in the following word. This means that for me, it is only in compounds that a following word determines the behaviour of a preceding schwa itself preceded by two consonants. Accordingly, this suggests that stress is assigned differently in Quebec than in some dialects of continental French. This is not surprising. This fact has indeed been observed by everyone who has compared the two dialects. It seems that in my dialect, except in morphologically complex nouns, any word constitutes a domain for stress assignment. In continental French stress is assigned in a larger domain. In this latter dialect, the behaviour of schwa in forms of the type given in (28) is accounted for simply by extending my analysis of compounds to phrases. In my dialect, however, stress assignment has as its domain the immediate projection of a given word. Let me take an example. In Parisian French the sequences *parle bas* and *parle trop bas* constitute a domain for stress assignment. The two forms have the representation given overleaf in (29).

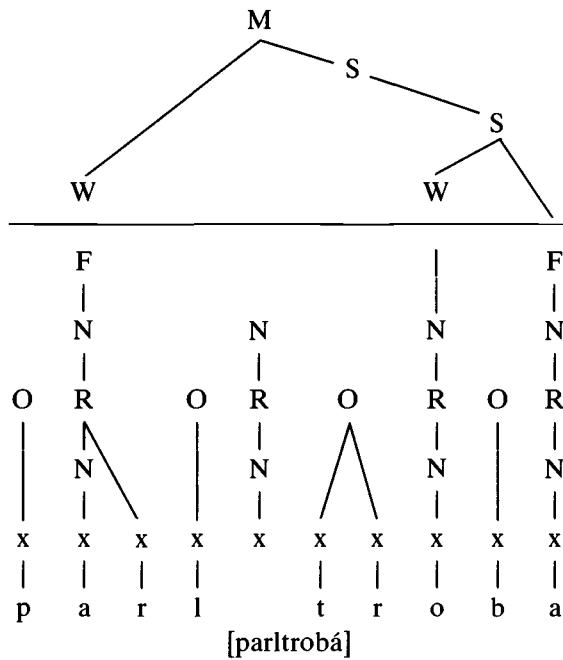
In (29a) the final empty nucleus of *parle* is realized as schwa in order not to be incorporated with the binary foot. In (29b), however, the final empty nucleus is not in a situation where it might be incorporated within a foot since it is not directly followed by the head of the second domain. It therefore remains licensed and government-licenser. Consequently, as in pre-pausal position, it can be realized as zero even if it is a government-licenser.

In my dialect of French, things are different. The sequences of words in (29a, b) do not constitute domains for stress assignment. Each word is a domain, which means that each word is independently accentuated. As a result the final empty nucleus is always in pre-pausal position and is never realized phonetically. This is illustrated overleaf in (30).

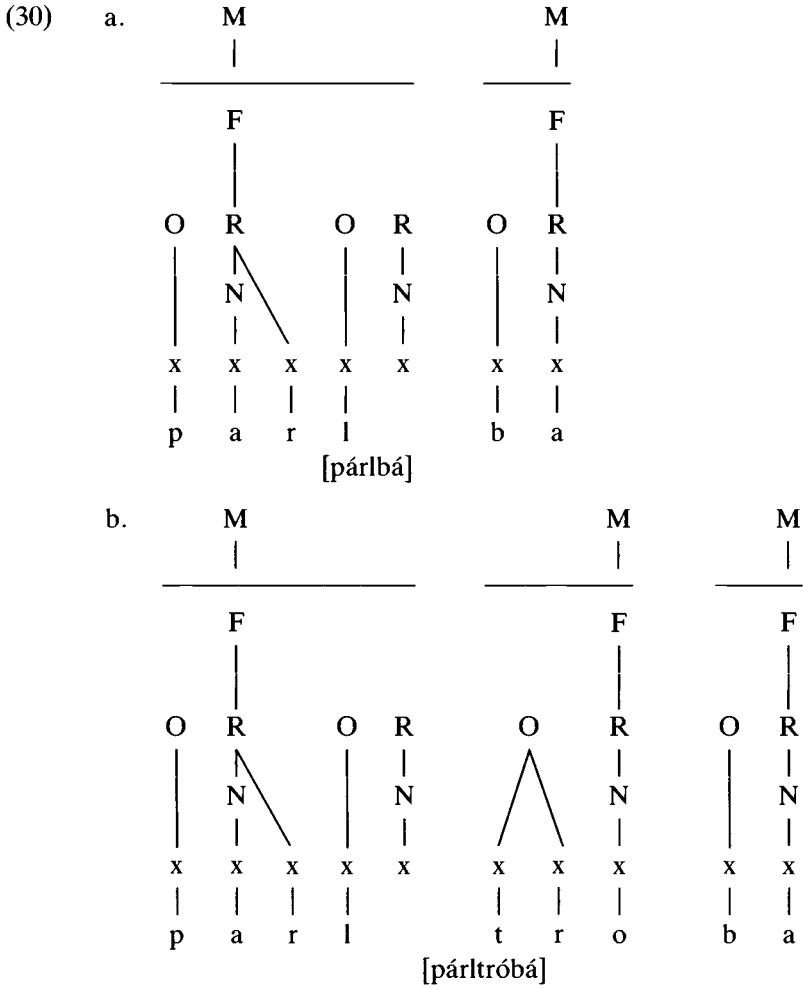
(29) a.



b.







My analysis accounts for the pattern of compounds, and phrases, in certain dialects of continental French.

I now turn to a proposal that the alternation of zero or schwa with the vowel [ɛ] may also be accounted for in terms of stress assignment.

## 8 *The alternation between schwa/zero and [ɛ]*

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### 8.0 Introduction

In chapter 7 I showed that when stress is assigned to a compound or a phrase, the final empty nucleus of the first term may occupy a position where it is a potential complement of a binary foot. I claim that when such a situation occurs the final empty nucleus of the first term is incorporated within the binary foot unless it must government-license its onset. Since a metrical incorporation entails the loss of its government-licensing property, the empty nucleus is phonetically manifested, thus preventing its metrical incorporation. In conclusion, as is the case for proper government, when ‘metrical’ government is in conflict with government-licensing French opts for government-licensing. An empty nucleus fails to be properly or metrically governed when it has to government-license its onset. In terms of stress assignment, we capture the behaviour of the final nucleus of the first member of a compound, and also the difference between certain dialects of French with respect to phrases. I turn next to the alternation between schwa or zero with the vowel [ɛ], which I claim is also a consequence of stress assignment.<sup>1</sup>

### 8.1 The alternation between schwa/zero and [ɛ]

Up to this point in the analysis we have considered cases where an underlying empty nucleus is realized either as zero or as schwa. We will now consider another manifestation of an underlying empty nucleus: its alternation with the mid vowel [ɛ]. Consider a verb such as *harceler* ‘to harass’, for example. In its infinitive form this verb is pronounced with a schwa in its second nucleus (cf. [arsəle]). Under certain circumstances this schwa is realized as [ɛ], as in *harcèle* [arsɛl] ‘(he/she) harasses’ or *harcèlement* [arsɛlmɑ̃] ‘harassment’. Similarly, the absence of a vowel in the second nucleus of a verb like *appeler* [aple] ‘to call’ becomes [ɛ] in a

form like *(il) appelle* [apɛl] ‘(he/she) calls’, *un appel* [apɛl] ‘a call’. The same alternation is found in the following examples:

(1)		<b>Zero</b>		<b>[ɛ]</b>			
	lever	[lve]	‘to stand up’	lève	[lɛv]	‘stand up!’	
	jeter	[ʃte]	‘to throw’	jète	[ʒɛt]	‘throw!’	
	appeler	[apɛ]	‘to call’	appel	[apɛl]	‘(a) call’	
	étinceler	[etɛsɛ]	‘to sparkle’	étincelle	[etɛsɛl]	‘spark’	
	déceler	[desɛ]	‘to detect’	décelle	[desɛl]	‘detect!’	
	ciseler	[sizɛ]	‘to chisel’	ciselle	[sizɛl]	‘chisel!’	
	atteler	[atɛ]	‘to harness’	attele	[atɛl]	‘harness!’	
	amener	[amɛ]	‘to bring’	amène	[amɛn]	‘bring!’	
	fureter	[fyrɛ]	‘to nose’	furète	[fyrɛt]	‘nose!’	
	cacheter	[kaʃtɛ]	‘to seal’	cachète	[kaʃɛt]	‘seal!’	
	étiqueter	[etikɛ]	‘to label’	étiquette	[etikɛt]	‘label’	
	acheter	[aʃtɛ]	‘to buy’	achète	[aʃɛt]	‘buy!’	
	renouveler	[rənɔvɛ]	‘to renew’	renouvelle	[rənɔvɛl]	‘renew!’	
	crocheter	[krɔʃtɛ]	‘to hook out’	crochète	[krɔʃɛt]	‘hook out!’	
	mener	[mɛ]	‘to lead’	mène	[mɛn]	‘lead!’	
	échelon	[ɛʃlɔ]	‘rung’	échelle	[ɛʃɛl]	‘ladder’	
	mamelon	[mamɔ]	‘nipple’	mamelle	[mamɛl]	‘breast’	
		<b>Schwa</b>		<b>[ɛ]</b>			
	pèser	[pəzɛ]	‘to weigh’	pèse	[pɛz]	‘weigh!’	
	harcèler	[arsəɛ]	‘to harass’	harcèle	[arsɛl]	‘harass!’	
	ensorcelèler	[ãsɔrsəɛ]	‘to bewitch’	ensorcelle	[ãsɔrsɛl]	‘bewitch!’	
	parsemèler	[parsəmɛ]	‘to sprinkle’	parsème	[parsɛm]	‘sprinkle!’	
	morcelèler	[mɔrsɛɛ]	‘to parcel’	morcelle	[mɔrsɛl]	‘parcel!’	
	martèler	[martəɛ]	‘to hammer’	martèle	[martɛl]	‘hammer!’	
	surmènèler	[syrmənɛ]	‘to overwork’	surmène	[syrmɛn]	‘overwork!’	
	crèver	[krəvɛ]	‘to puncture’	crève	[krɛv]	‘puncture!’	
	sevèrer	[səvrɛ]	‘to wean’	sèvre	[sɛvr]	‘wean!’	
				harcèlement	[arsɛlmā]	‘harassment’	
				renouvellement	[rənɔvɛlmā]	‘renewal’	
				morcellement	[mɔrsɛlmā]	‘parcelling (out)’	
				étincellement	[etɛsɛlmā]	‘sparkling’	
				ensorcellement	[ãsɔrsɛlmā]	‘bewitching’	
				martèlement	[martɛlmā]	‘hammering’	
(2)	rêver	[rɛvɛ]	*[rəvɛ] *[rvɛ]	‘to dream’	rêve	[rɛv]	‘dream!’
	allaïter	[alɛtɛ]	*[alətɛ] *[altɛ]	‘to nurse’	allaïte	[alɛt]	‘nurse!’
	serrer	[sɛrɛ]	*[sərə] *[srɛ]	‘to tighten’	serre	[sɛr]	‘tighten!’
	mêler	[mɛ:lɛ]	*[məɛ] *[mlɛ]	‘to mix together’	mêle	[mɛ:l]	‘mix together!’
	bêler	[bɛ:lɛ]	*[bəɛ] *[blɛ]	‘to bleat’	bêle	[bɛ:l]	‘bleat!’
	embêter	[übɛ:tɛ]	*[übətɛ] *[übte]	‘to bother’	embête	[übɛ:t]	‘bother!’
	fêter	[fɛ:tɛ]	*[fətɛ] *[fte]	‘to celebrate’	fête	[fɛ:t]	‘celebrate!’
	pêcher	[pɛ:ʃɛ]	*[pəʃɛ] *[pʃɛ]	‘to fish for’	pêche	[pɛ:ʃ]	‘fish for!’
	baigner	[bɛ:ɲɛ]	*[bəɲɛ] *[bɲɛ]	‘to bath’	baïgne	[bɛ:ɲ]	‘bath!’

As claimed by Dell, the underlying segment which undergoes the alternation between schwa/zero and [ɛ] must be schwa and not /ɛ/. If /ɛ/ was the underlying vowel, there would be no explanation for the fact that, as shown in (2), there are words with underlying /ɛ/ which alternate with neither schwa nor zero.

I agree with Dell that the underlying representation of [ɛ] in the examples given in (1) cannot be the vowel /ɛ/. In my terms a nuclear position where schwa or zero alternates with [ɛ] is underlyingly empty.

### 8.1.1 Is [ɛ] the realization of an empty nucleus in closed syllables?<sup>2</sup>

According to Dell (1973) and Anderson (1982), the realization of schwa as [ɛ] is accounted for by a rule of 'Closed Syllable Adjustment'.<sup>3</sup> They proposed that an underlying schwa/empty nucleus becomes [ɛ] in closed syllables. The rule is expressed as follows:<sup>4</sup>

(3) **Dell's rule**

$$\left\{ \begin{array}{c} \text{ə} \\ \text{e} \end{array} \right\} \rightarrow [\text{ɛ}] / \_ \text{C} \left\{ \begin{array}{c} \# \\ \text{C} \end{array} \right\}$$

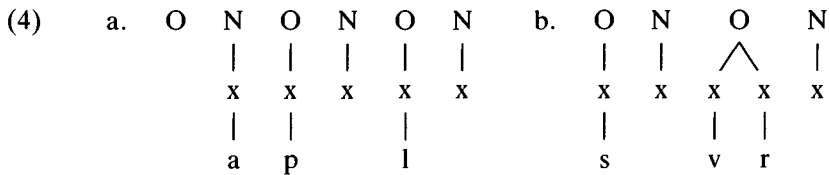
**Anderson's rule**

$$\left\{ \begin{array}{c} \emptyset \\ \text{e} \end{array} \right\} \rightarrow [\text{ɛ}] / \text{R}$$

$$\begin{array}{c} \diagdown \quad \diagup \\ \text{N} \quad \text{M} \\ | \quad \wedge \\ \text{—} \end{array}$$

The rules account for all the alternations between zero or schwa with [ɛ] for anyone who considers that all instances of [ɛ] in the words given in the right-hand column of (1) occur in a closed syllable. It is clear that under my analysis such a syllabification is not possible.<sup>5</sup> According to my view, a word like *achète* [aʃɛt] '(he/she) buys', for example, has a final empty nucleus in its lexical representation. Even though *achète* [aʃɛt] ends phonetically with an obstruent, this consonant is not syllabified into a branching rhyme. Along the same lines, a word like *sèvre* [sɛvr] '(he/she) weans' cannot be analysed either as ending with a branching coda or as having the *v* in the rhyme and the liquid in a following onset. While the first syllabification would violate, among other things, the adjacency requirement between the nuclear head and its complement, the latter syllabification would, for its part, violate interconstituent government. Recall that a charmless liquid cannot govern a preceding negatively charmed segment. In my analysis the only

possible underlying structure for the two words [apɛl] and [sevr] are the following (4a) and (4b) respectively.<sup>6</sup>



In the two structures given in (4), an empty nucleus occurs in final position, and, as we know, it is not realized phonetically. This word-final nucleus is licensed and government-licenses a preceding governing consonant. However, this nucleus cannot properly govern the empty nucleus to its left, resulting in the phonetic manifestation of this latter nucleus. The question to be addressed later is why is the penultimate empty nucleus realized as [ɛ] and not as schwa?<sup>7</sup>

### 8.2 [ɛ] as the realization of a schwa occurring in an accented nucleus

I propose the following alternative analysis for the alternation between schwa/zero and [ɛ]. An empty nucleus which must be manifested because it is not properly governed is realized as [ɛ] when it is stressed. In other words, an underlying empty nucleus occurring in a position where it is not properly governed is realized as [ɛ] when its nucleus is projected as the head-foot of its domain.

My analysis relies on the assumption that stress is assigned cyclically. What I understand by cyclically is different from what is assumed in the framework of **Lexical Phonology**. Unlike what is claimed in **Lexical Phonology**, I assume that phonological processes apply whenever their conditions are met. That is, a phonological process A applies when the conditions for its application are met – at any cycle. It does not apply at a given level X. Moreover, following the **Principle of Strict Cyclicity**, a process which took place at a given cycle (i.e. in a given domain) cannot be destroyed later on.<sup>8</sup> Let me take an example. Consider the past tense of weak and strong verbs in English, illustrated overleaf in (5).

What is significant in these forms is the length of the vowels. While in (5a) the long vowel of the weak verbs remains long in the past forms, it shortens in the past tense of the strong verbs, as shown in (5b). Since we know that in English no long vowel occurs word-internally before an

- (5) a. **Weak verbs**
- |      |        |        |         |
|------|--------|--------|---------|
| peep | [pi:p] | peeped | [pi:pt] |
| seal | [si:l] | sealed | [si:ld] |
| fool | [fu:l] | fooled | [fu:ld] |
| seem | [si:m] | seemed | [si:md] |
- b. **Strong verbs**
- |       |        |      |        |
|-------|--------|------|--------|
| keep  | [ki:p] | kept | [kɛpt] |
| leave | [li:v] | left | [lɛft] |

interconstituent consonant cluster, we have to explain why no shortening takes place in (5a). Let us suppose that vowel shortening is a process that operates in English. A long vowel shortens when it occurs in a branching rhyme. Now let us also suppose that the difference between the weak and the strong verbs, with respect to their past tense, is that while the past form of weak verbs is analytic, i.e. it contains two domains, the stem and the past tense morpheme, the past form of strong verbs is non-analytic, i.e. it is composed of a unique domain.<sup>9</sup> If this is indeed the case, and if vowel shortening applies whenever its conditions are met, and if a process cannot be destroyed in a later cycle (i.e. when another domain is attached), we now understand why a long vowel remains long in the past form of weak verbs while it shortens in the past form of strong verbs.

- (6) a.
- |    |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|
|    | O | N | O | N |   | O | N |
|    |   | ^ |   |   |   |   |   |
| [[ | x | x | x | x | x | x | x |
|    |   | v |   |   |   |   | ] |
|    | s | i | l |   | d |   |   |
- b.
- |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   | O | N |   | O | N |   | O | R |   | O | R |
|   |   | ^ |   |   |   |   |   | ^ |   |   |   |
| [ | x | x | x | x | x | x | N | x | x | x | x |
|   |   | v |   |   |   |   |   |   |   |   |   |
|   | k | i |   | p | t |   | x | x | p | t |   |
|   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   | k | ɛ |   |   |   |

In (6a) the past tense morpheme is attached as a different domain. The conditions for vowel shortening are not met in the first domain, and the suffixation of the morpheme cannot create a new context for its application. On the other hand, in (6b) we see that the past tense

morpheme is attached to the stem as part of its domain. Since the form is analysed as a unique domain, the conditions for vowel shortening are met. The *p* associates with the rhyme since it is now licensed by the governor *t* in the onset. The rhyme branching the vowel shortens. In conclusion, in an analytic form the relations of government apply independently in each domain. In a non-analytic form, however, there is a single domain and the morpheme is considered as part of the lexical representation of the word. The governing relations are established accordingly. This is why shortening takes place in strong verbs while it does not in weak verbs.

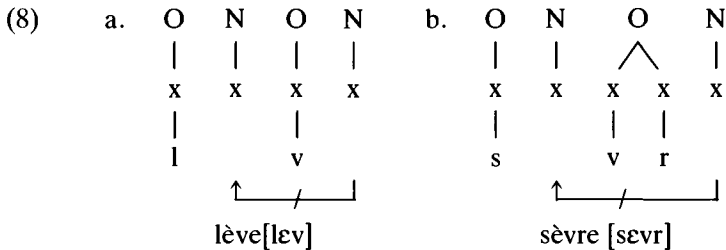
Going back to French, as discussed in the analysis of compounds, I propose that at each cycle, in each domain, at the right edge of the domain a foot is built on the rightmost nucleus with phonetic content. This foot is branching if it is preceded by an empty nucleus. If not, the unique foot of the domain is non-branching. The other nuclei of the domain are incorporated within a word-tree as recessive positions. Let us first consider the data in (7), where I give some non-analytic words (which contain a single domain, i.e. which are not morphologically complex). In all the forms an underlying empty nucleus is manifested as [ɛ].

(7)	lève	[lɛv]	‘(he/she) stands up’
	jète	[ʒɛt]	‘(he/she) throws’
	appelle	[apɛl]	‘(he/she) calls’
	appel	[apɛl]	‘call’
	feuillette	[fœjɛt]	‘(he/she) leafs’
	étincelle	[etɛsɛl]	‘spark’
	décelle	[desɛl]	‘(he/she) detects’
	ciselle	[sizɛl]	‘(he/she) chisels’
	attèle	[atɛl]	‘(he/she) harnesses’
	amène	[amɛn]	‘(he/she) brings’
	mène	[mɛn]	‘(he/she) leads’
	furète	[fyɛt]	‘(he/she) noses’
	cachète	[kaʃɛt]	‘(he/she) seals’
	étiquette	[etikɛt]	‘label’
	achète	[aʃɛt]	‘(he/she) buys’
	renouvelle	[rənuvɛl]	‘(he/she) renews’
	crochète	[krɔʃɛt]	‘(he/she) hooks out’
	ensorcelle	[ɑsɔrsɛl]	‘(he/she) bewitches’
	harcèle	[arsɛl]	‘(he/she) harasses’

→

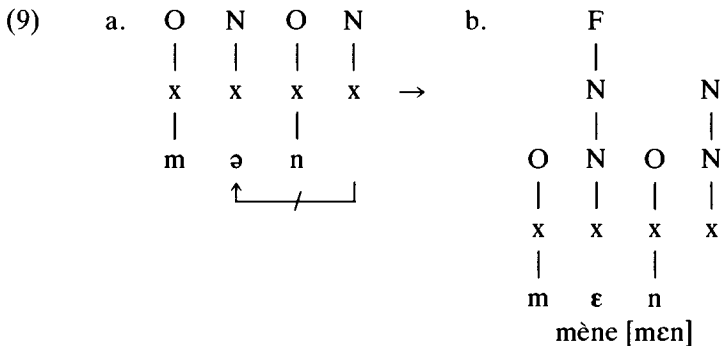
parsème	[parsem]	'(he/she) sprinkles'
morcelle	[mɔrsɛl]	'(he/she) parcels out'
martèle	[martɛl]	'(he/she) hammers'
surmène	[syrmen]	'(he/she) overworks'
crève	[krɛv]	'(he/she) punctures'
sèvre	[sɛvr]	'(he/she) weans'

All the words in (7) have a sequence of two adjacent empty nuclei in their lexical representation. More precisely, they all have a word-final empty nucleus which is preceded by another empty nucleus.



In the two forms given in (8), the word-final empty nuclei are realized as zero. As we now know, this is possible because French licenses domain-final empty nuclei. The empty nuclei occurring in the first sequence O–R of these words are not properly governed. Consequently, the leftmost empty nucleus in each word must receive a phonetic interpretation. To account for the realization of [ɛ], and not of schwa, in this position I propose that this ungoverned empty nucleus occurs in the accented nucleus of the word and that a stressed schwa is realized as [ɛ].

At the right edge of a word we build a right-dominant binary foot if this is possible. In the two forms given in (9), the head of the foot cannot dominate the final nucleus because it has no phonetic content. But given

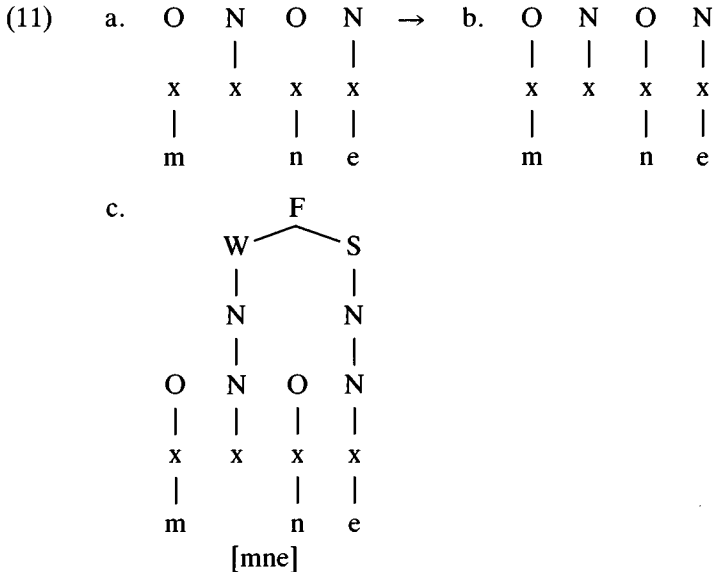






morceler	[mɔrsələ]	'to parcel out'
marteler	[martələ]	'to hammer'
surmener	[syrməne]	'to overwork'
crever	[krəve]	'to puncture'
sevrer	[səvre]	'to wean'

In contrast with words given in (7), those in (10) are not realized with an [ɛ]. This follows from the fact that in these infinitive forms, the penultimate empty nucleus is not the accented nucleus of the word. Indeed, from right-to-left the construction of a binary foot labelled weak-strong is now possible from the word-final nucleus, which now has phonetic content, namely the vowel [e].<sup>10</sup> The latter vowel is the head of the binary foot. The empty nucleus which precedes the infinitive morpheme is not manifested phonetically if it is properly governed and it is realized as schwa if proper government fails to apply in order for the onset to be government-licensed. What is important is that, properly governed or not, the empty nucleus occurring in the penultimate nucleus of the forms given in (10) will never bear stress. The representation of *mener* [mne] is given in (11).



Saying that [ɛ] is the manifestation of stressed schwa accounts for Dell's, Selkirk's and Anderson's observation that a schwa is never

stressed. Whether the syllable is open or closed, an interpreted empty nucleus (schwa) will be realized as [ɛ] if it bears the accent.

### 8.2.1 [ɛ] as the realization of a stressed ungoverned empty nucleus

Repeated in (12) are the examples given in (1) and (7). They are now divided into four groups. In group A we have principally the infinitive forms of some verbs. In these words we find either schwa or zero but not [ɛ] (*améner*, *martøler*). In group B we have morphologically derived words where a suffix *-ment* is attached to some stems. In these examples the underlying empty nucleus is preceded by a consonant cluster and it is phonetically realized as schwa. In group C we have mainly verbs in the third person singular (*app[ɛ]lle*, *ach[ɛ]te*). In these examples the empty nucleus is realized as [ɛ]. Finally, in group D, I give morphologically derived words where a suffix *-ment* is attached to some stems. In this last group of words the empty nuclei are once again preceded by a consonant cluster, but unlike in B they are realized as [ɛ] and not as either schwa or zero. (12)

Let us first consider the words in groups B and D. In both groups we have morphologically derived words. A cyclic morpheme *-ment* is suf-

(12)	<b>Group A</b>		
	échelon	[ešlɔ̃]	'rung'
	mamelon	[mamlɔ̃]	'nipple'
	déceler	[desle]	'to detect'
	ciseler	[sizle]	'to chisel'
	atteler	[atle]	'to harness'
	amener	[amne]	'to bring'
	fureter	[fyрте]	'to nose'
	cacheter	[kašte]	'to seal'
	étiqueter	[etikte]	'to label'
	acheter	[ašte]	'to buy'
	renouveler	[r(ə)nuvle]	'to renew'
	crocheter	[krošte]	'to hook out'
	étinceler	[etēsle]	'to sparkle'
	lever	[lve]	'to stand up'
	jeter	[šte]	'to throw'
	mener	[mne]	'to lead'
	appeler	[aple]	'to call'
	feuilleter	[føjtte]	'to leaf'

→

**Group B**

encombrement	[ākɔbrəmā]	'congestion'
justement	[žystəmā]	'precisely'
fortement	[fɔrtəmā]	'strongly'
lisiblement	[lizibləmā]	'legibly'
plausiblement	[plozibləmā]	'plausibly'
tristement	[tristəmā]	'sadly'
durablement	[dyrabləmā]	'long lastingly'
maigrement	[mɛgrəmā]	'poorly'
souplement	[supləmā]	'supplely'
largement	[laržəmā]	'widely'
lourdement	[lurdəmā]	'heavily'
ouvertement	[uvɛrtəmā]	'openly'

**Group C**

harcèle	[arsɛl]	'(he/she) harasses'
décèle	[desɛl]	'(he/she) detects'
ciselle	[sizɛl]	'(he/she) chisels'
attele	[atɛl]	'(he/she) harnesses'
amène	[amɛn]	'(he/she) brings'
furète	[fyɛt]	'(he/she) noses'
cachète	[kaʃɛt]	'(he/she) seals'
étiquette	[etikɛt]	'label'
achète	[aʃɛt]	'(he/she) buys'
crochète	[krɔʃɛt]	'(he/she) hooks out'
lève	[lɛv]	'(he/she) stands up'
pèse	[pɛz]	'(he/she) weighs'
jète	[žɛt]	'(he/she) throws'
appelle	[apɛl]	'(he/she) calls'
feuillette	[fœjɛt]	'(he/she) leafs'
crève	[krɛv]	'(he/she) blows'
mène	[mɛn]	'(he/she) leads'
sèvre	[sɛvr]	'(he/she) weans'
échelle	[eʃɛl]	'ladder'
mamelle	[mamɛl]	'breast'

**Group D**

harcèlement	[arsɛlmā]	'harassment'
renouvellement	[r(ə)nuvɛlmā]	'renewal'





property of government-licenser. If it is preceded by a consonant cluster, the underlying empty nucleus is realized as schwa, it is therefore not incorporated within the foot and remains the government-licenser for its onset.

To summarize, in words of group B a domain-final empty nucleus is realized as schwa in order not to be incorporated within a binary foot on the second cycle. This explains why this empty nucleus is not manifested on the first cycle and that it must be manifested on the second cycle. Given that the word-final nucleus of the first term is not the head of a foot – on either the first or the second cycle – it is never realized as [ɛ]. Let us now consider words in group D (repeated in (15)), where once again a cyclic suffix *-ment* is attached to some stems.

(15)	harcèlement	[arsɛlmã]	‘harassment’
	renouvellement	[r(ə)nuvɛlmã]	‘renewal’
	morcellement	[mɔrsɛlmã]	‘parcelling out’
	étincellement	[etɛsɛlmã]	‘sparkling’
	ensorcellement	[ãsɔrsɛlmã]	‘bewitching’
	martèlement	[martɛlmã]	‘hammering’

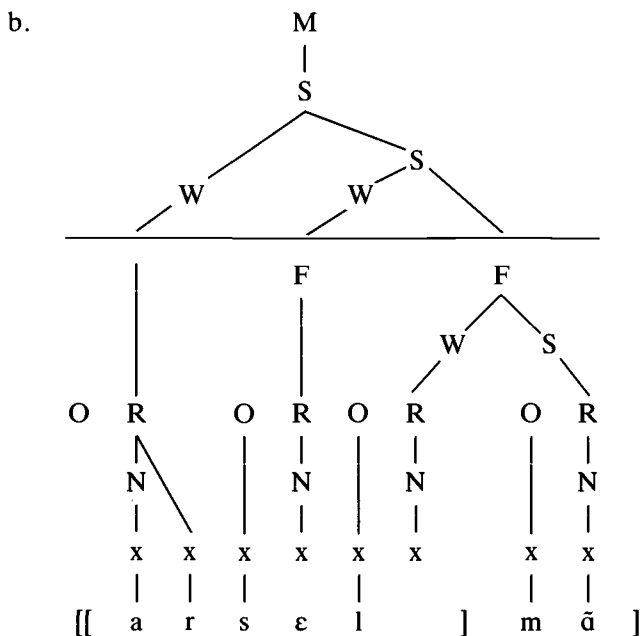
As the examples show, we find [ɛ] in group D words unlike those of group B. The difference between these two groups of words lies in the position where the empty nuclei occur. In group B words, the empty nuclei occur in the final nucleus of the stems. In group D words, on the other hand, there are two consecutive empty nuclei. One empty nucleus occurs in the stem-final position and it is preceded by another empty nucleus. Note that it is not the stem-final nucleus which is realized as [ɛ]; it is the empty nucleus occurring in the penultimate nucleus of the stem. Words like *harcèlement* [arsɛlmã] have a stem-final empty nucleus which is not manifested, and it is the penultimate one which is realized as [ɛ]. Let us investigate the derivation by first considering the bare stems, i.e. the first cycle. Note here that in considering the first cycle of words like *harcèlement* we are illustrating at the same time the group C words.

On the first cycle we have the stem, which is identical to what we have in group C. Let us then assign the stress to these stems (see (16) overleaf).

In both forms the word-final empty nucleus is not considered in the foot construction. This final empty nucleus cannot properly govern the preceding empty nucleus. This means that the empty nucleus occurring in the penultimate syllable is not properly governed and must be realized phonetically. It is not realized as schwa because it occupies the



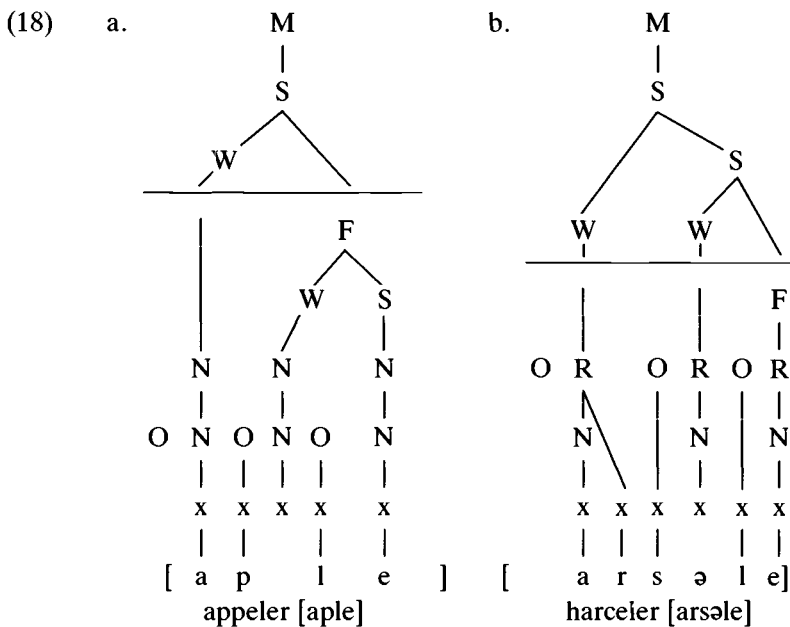




nucleus which was stressed on the first cycle. This follows from the Strict Cyclicity Principle, which prevents tampering with the internal cycle.

The last group of words are those in A of (12) above. In those words we do not find [ε]. The empty nuclei are realized as zero when preceded by a single consonant (cf. *appéler*) and as schwa when they follow a consonant cluster (cf. *martaler*). The reason why the empty nuclei are not realized as [ε] is because these words contain only one cycle. Since the empty nuclei are always followed by a nucleus with phonetic content, they never find themselves in the accented syllable. They are incorporated within the binary foot as the weak member if they are not the government-licenser of a preceding consonant. Recall that French opts for government-licensing rather than proper or metrical government (see (18) overleaf).

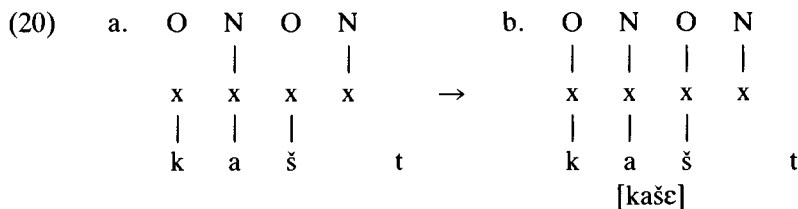
Proposing that the alternation between schwa/zero and [ε] is determined by stress assignment provides an account for almost all the alternations. However, there are still those cases where an underlying empty nucleus is manifested as [ε], while under my analysis it should not occupy the head position of a foot. Some examples of this type of word are given overleaf in (19).



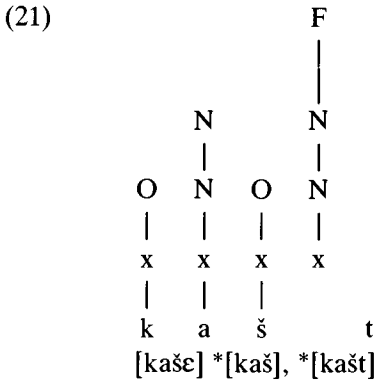
**8.2.2 Apparent counterexamples**

(19)	$\epsilon$		Schwa/Zero	
filet	[filɛ]	'net'	fileter	[filte] 'to thread'
crochet	[krøʃɛ]	'hook'	crocheter	[krøʃte] 'to hook out'
cachet	[kaʃɛ]	'seal'	cacheter	[kaʃte] 'to seal'
corset	[kørɛ]	'corset'	corsetière	[kørsətjɛr] 'corset-maker'
bouquet	[bukɛ]	'bouquet'	bouquetière	[bukətjɛr] 'flower-seller'

A comparison between the forms in the left-hand column of (19) and those in the right-hand column shows the following. Given their alternation with zero or with schwa, the final [ɛ]s are derived from underlying empty nuclei. Also, words in the left-hand column have a floating consonant in their representation. The presence of a floating consonant in those words is motivated by its appearance in the related forms given on the right. (20) shows the representation I attribute to *cachet* 'seal'.



In all the data considered so far, a word-final empty nucleus was either not phonetically manifested or, if it was (cf. compounds), it was never metrically projected as the head of a foot. It seems, however, that this is exactly what is happening in the nominal forms given in (19). For reasons not yet identified, it appears that an underlying word-final empty nucleus is phonetically manifested and metrically projected as the head of the foot. This is illustrated below in (21).



To account for the realization as [ɛ] of the empty nuclei present in the nominal forms in (19) I propose the following. We know that a consonant that is floating, even though it is not syllabified, always occurs in word-final position. Given its **floating** nature we would not expect such a segment to occupy a specific position in a representation. But let us suppose that a floating consonant does occupy a specific position and that this position is stem-final. In addition, I claim that since a floating consonant occupies the stem-final position, what precedes it is not final in the domain. What this means is that a floating consonant prevents the nucleus occurring on its left from occupying a domain-final position. More concretely, considering the adjective *petit* [pti] ‘small (masc)’ (which is realized as [ptit] in its feminine form) for example, my claim is that the nucleus dominating the vowel [i] is not final in the domain since a floating *t* follows it in the lexical representation of the adjective. Accordingly, if a floating consonant is preceded by an empty nucleus, this nucleus will not be domain-final, it will therefore not occur in a position where it is licensed and will consequently be subject to ECP. If no nucleus follows it, the empty nucleus will not be properly governed and it will be phonetically manifested. With this proposal in mind, let us investigate the nominal forms given in the left-hand column of (19).

One thing that was implicit in my analysis but never clearly stated was



- (23) a. 

O	N	O	N		O	N	O	N
x	x	x	x		x	x	x	x
k	a	š		t	k	a	š	t

 cachet [kašɛ] 'seal'
- b. 

O	N	O	N		O	N
x	x	x	x		x	
k	a	š		t	e	

 → 

O	N	O	N	O	N
x	x	x	x	x	x
k	a	š		t	e

 cacheter [kašte] 'to seal'
- c. 

O	N	O	N		O	N	O	N	O	N
x	x	x	x	x	x	x	x	x	x	x
k	a	š		t	k	a	š		t	

 → cachète [kašet] 'seal!'

proper government. Its manifestation as [ɛ] and not as schwa follows from stress assignment. As for the floating consonant it remains floating since no constituent is available for it. (23b) shows the representation of the infinitive verbal form of the noun. The presence of the infinitive morpheme in the representation provides a constituent for the floating consonant to attach to. The empty nucleus is properly governed and it is not phonetically manifested. Finally, (23c) shows the imperative form of the verb. I propose that the difference between the nominal and the imperative form is that the final consonant *t* is floating in the former word and linked to a skeletal point in the latter. Being associated with a point, the consonant is projected onto a constituent onset, and this association triggers the presence of a word-final (empty) nucleus to assure the government of the onset. The empty nucleus occurring on the left of the domain-final nucleus is not properly governed and is phoneti-

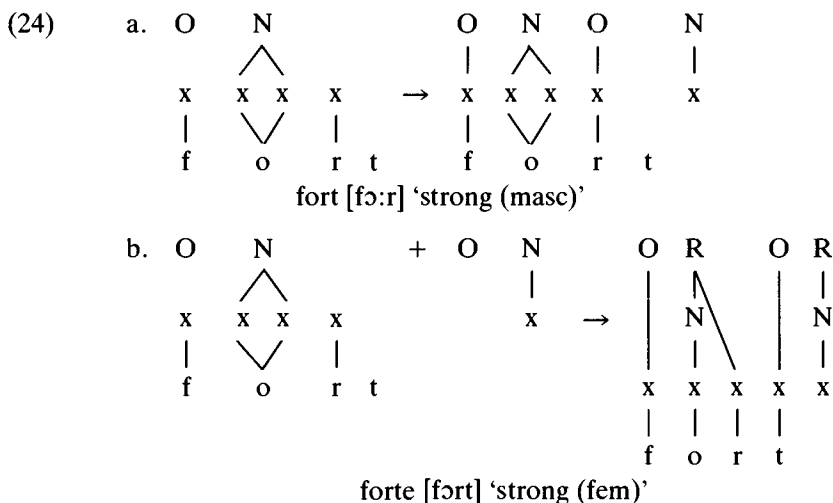
cally realized. Thus the realization of the empty nuclei as [ɛ] in the words given in (19) follows from the fact that these nuclei are not domain-final but domain-internal. They therefore occur in a position where they are not licensed.

In conclusion, I propose that a final floating consonant, which is unrealized phonetically, manifests its presence by making the nucleus to its left not final in the domain. Consequently, this nucleus fails to be licensed and if empty is subject to proper government. In order not to be manifested it needs to be properly governed. In the nouns given in (19) no proper governor follows the empty nucleus to assure its proper government. It follows from my analysis that those empty nuclei are realized as [ɛ] and not as schwa. The behaviour of 'final' empty nuclei provides a way of knowing that words contain a floating consonant.

I therefore propose that a final floating consonant makes the apparent word-final nucleus not final in the domain. How then can I explain that a word like the masculine adjective *fort* [fɔ:r], which also contains a floating consonant in its representation, is not realized as \*[fɔrɛ]?

Unlike words such as *cachet*, the adjectives of the type of *fort* do not lexically contain a final empty nucleus in their lexical representation. As we saw earlier in this section, some empty nuclei are given to assure the government of an onset, as is the case for the adjective. What this means is that in *fort* the floating consonant occupies the stem-final position and it is preceded by the liquid *r* and not by an empty nucleus. It is only when the governing relations apply that the liquid is projected onto a constituent onset and that a word-final empty nucleus is given to govern the onset. This type of empty nucleus occurs in word-final position. That is, it follows the stem. Accordingly, the empty nucleus follows the floating consonant, it does not precede it. Occurring in word-final position, the empty nucleus occupies a position where it is licensed. The representation of *fort* is given in (24).

(24a) shows the representation of *fort*. The structure contains four skeletal points. The stem-final one must be projected onto a constituent. It projects onto an onset, and a nucleus is present to assure its government. The floating consonant remains in its stem-final position and the empty nucleus occurs in a word-final one where it is licensed. (24b) shows the feminine form of the adjective. The feminine morpheme follows the stem and comes with a constituent onset with which the floating consonant may associate. (Recall that floating consonants may only associate with constituents which are present in the structure.) The



association of the floating consonant triggers the association of the liquid with the rhyme, this association triggering in turn vowel shortening.

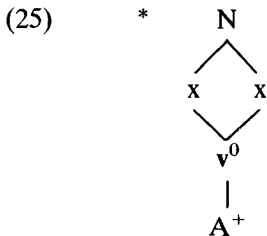
In conclusion, the difference between words like *cachet* and those like *fort* is the position of the so-called 'final' empty nucleus. In one case the nucleus is stem-internal and precedes the floating consonant, and in the other the nucleus is domain-final and follows the consonant. The occurrence of word-final empty nuclei is triggered by the conditions on government. My proposal is then that a floating consonant has a specified position in a given representation. It occurs in stem-final position. A word-internal nucleus will precede a floating consonant and a word-final one will follow the consonant. From this follows the behaviour of words like *cachet* and *fort*.

Let me briefly digress at this point to mention one prediction that I make. In French we find words ending in [o] but never in [ɔ] (*auto* [oto] \*[otɔ]). Whatever analysis one might propose to account for this observation, it would be desirable to claim that this phenomenon is not restricted to the back mid vowels, but that it affects any mid vowels. If so, we should only find words ending in [e] but never in [ɛ]. Anyone who knows a certain amount of French will know that this generalization is not correct. With respect to the mid front vowels we find words ending both with [e], *été* [ete] 'summer', and [ɛ] *était* [etɛ] '(he/she) was'. Following my analysis of the alternation of schwa with [ɛ], I would predict that any attempt to generalize the alternation [o]/[ɔ] and [e]/[ɛ]

will find no counterexamples for the back vowels while front vowels will be problematic. Indeed, if final [ɛ]s are not always derived from [e] but also from accented schwa, the counterexamples may only be apparent. That is, it might well be the case that all the counterexamples of the presence of [e] in word-final position are those [ɛ] which are derived from schwa. In distinguishing the underlying nature of the final [ɛ]s it will be possible to claim that we only find the +ATR version of the mid vowels in word-final position. While this proposal requires more investigation, it appears to be promising.

### 8.3 Why is stressed schwa manifested as [ɛ]?

This question still remains. Or, more precisely, the question should be: What prevents the segment schwa from being the head of a foot? Interestingly, Lowenstamm (1986), in order to explain why the vowels schwa and [ɨ] are never long, proposes 'la contrainte de cryocéphalie' (Cold Headedness Constraint), according to which a segment which has the cold element as its head cannot occupy two contiguous positions.



It seems very likely that while a segment which has the cold vowel as its head is not strong enough to be the head of a branching constituent, neither is it strong enough to be the head of a metrical foot. In order to become strong enough, an element **I** is added in its representation.

### 8.4 Conclusion

I have shown that treating the alternation between schwa/zero and [ɛ] in terms of stress assignment has many advantages over an analysis based on the structure of the rhyme. First, my analysis accounts for the observation that schwa is never stressed. This follows directly from the fact that in an accented nucleus an underlying empty nucleus which is not properly governed is realized as [ɛ]. Secondly, problems raised by the



rule of Closed Syllable Adjustment no longer exist. Forms like *ensevelir* [ãsəvlir] and *semeler* [səmlɛ] cannot be realized with [ɛ] since the empty nuclei never occur in the head position of a foot. Finally, a unique metrical analysis accounts both for the behaviour of schwa in compounds and for the alternation with [ɛ]. Nothing more than what is required to account for the alternation of schwa or zero with [ɛ] is required to account for the behaviour of the final empty nucleus of the first term of a compound.

## 9 *Miscellaneous issues*

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### 9.0 Introduction

I conclude the analysis of schwa by considering some additional contexts where schwa alternates with zero. While some of the facts discussed in this chapter follow directly from my analysis, some others do not. Some of the data do appear problematic for my treatment of schwa. In these instances I do not always have a clear understanding of the behaviour of the data, but I nevertheless suggest a direction of research which might be worth exploring. I also reconsider the controversial behaviour of schwa occurring in word-initial syllables. In attributing to a word-initial syllable a special status, I capture similarities between French and other languages and I account for the difference between Quebec and Parisian French with regard to the behaviour of empty nuclei in word-initial syllables of bisyllabic words. Finally, it follows from my proposal that the two dialects differ as far as proper government of an empty nucleus in initial syllable of bisyllabic words is concerned, but are similar in their treatment of this nucleus in initial position of polysyllabic words. I start with sequences of clitics, one of the classical problems with respect to the behaviour of adjacent schwas.

### 9.1 Sequences of clitics

Without going into a detailed syntactic analysis of clitics, we may roughly say that syntactically object clitics are always attached to a verb. As shown in (1a), when a verb moves from the head of VP to the head position of IP, the object clitic appears to the left of the verb under INFL. Example (1b) shows that when the verb remains in the head position of VP, the object clitic appears attached to the verb under V.<sup>1</sup>

- (1) a. Marie ne le fait pas      ne le + fait]<sub>INFL</sub>[<sub>VP</sub>pas  
b. Il ne faut pas le faire      . . . [pas le + faire]<sub>VP</sub>



- (4) a. [žəlvø]    O   N   O   N   O   N  
                   |    |    |    |    |    |  
                   x   x   x   x   x   x  
                   |            |            |    |  
                   ž   ə    l            v    ø
- b. [žləvø]    O   N   O   N   O   N  
                   |    |    |    |    |    |  
                   x   x   x   x   x   x  
                   |            |            |    |  
                   ž            l    ə    v    ø

A different sequence of two adjacent empty nuclei is given in (5). The rightmost one occurs in the initial syllable of a verb and is preceded by a clitic.

- (5) a. Jean te demandé  
       b. Jean te demandé  
       c. Jean tɛ demandé  
       d. \*Jean tɛ demandé
- } 'John asks you'

The form in (5b) shows that when the empty nucleus in the initial syllable of the verb *demandér* is realized as zero (it is word-internally properly governed), the clitic to its left must be realized with a schwa. The form in (5c) shows that it is possible to give phonetic content to the properly governable empty nucleus in the initial syllable of the verb. In that case, the empty nucleus of the clitic occurring to the left of the verb can be realized as zero.<sup>3</sup> Nevertheless, if one empty nucleus of the sequence receives no interpretation, the other one must be realized phonetically. This follows, needless to say, directly from the analysis. A 'word-internal' nucleus has no phonetic content only if it is properly governed by an unlicensed nucleus occurring to its right. If two adjacent empty nuclei were both realized as zero, the leftmost one would lack proper government.

No more has to be said. Clitics are dependent entities and their empty nuclei behave as in word-internal position. For the empty nucleus of a clitic to be realized as zero, it must be properly governed. As is the case word-internally, government between nuclei applies from right-to-left. Moreover, it is possible (even though this is marked) to give phonetic content to a properly governable empty nucleus. In this case the manifested nucleus can be the proper governor for an empty nucleus to its

left. From this follows the different realizations of sequences of empty nuclei.

(6) envie de te le demander 'desire to ask it of you'

. . .	ã	v	i	#	d	ə	#	t	ə	#	l	ə	#	d	ə	m	ã	d	e	. . .	
a.					∅	ə		∅	ə												
b.					∅	ə		ə	∅												
c.					ə	∅		ə	∅												
d.					∅	ə		ə	ə												
e.					ə	∅		ə	ə												
f.					ə	ə		∅	ə												
g.					ə	ə		ə	∅												
h.					ə	ə		ə	ə												

While analyses of French always mention the fact that two adjacent schwas or empty nuclei cannot both be realized as zero, there are particular constructions which show that this observation does not always correspond to the facts.

## 9.2 Sequences of zeros

The observation that adjacent empty nuclei cannot both be realized as zero is true for sequences of word-internal empty nuclei and in sequences of clitics.

(7)	devenir	[dəvnir]	[dvənr]	*[dvnir]
	je le veux	[ʒləvø]	[ʒəlvø]	*[ʒlvø]

There are, however, some cases where two adjacent empty nuclei can both be realized as zero, and this is in accordance with my claims that word-internal empty nuclei which are properly governed are realized as zero, and that in French word-final empty nuclei are licensed. Let us consider the data in (8).

(8)	a. mange de la soupe	[mãʒdlasup]	'eat some soup!'
	b. apporte de la lecture	[apɔrtdləlektyr]	'bring some reading!'
	c. l'ogre de la forêt	[lɔg(r)dlaforɛ]	'the ogre of the forest'
	d. quatre fenêtres	[kat(r)fnɛtr]	'four windows'
	e. douze chemises	[duzʒmiz]	'twelve blouses'

In (8) the final empty nuclei of the first words (cf. *mange*, *apporte*, *ogre*, *quatre* and *douze*) are realized as zero. The empty nucleus of *de* and the ones in the initial syllable of *fenêtre* and *chemise* are also realized as zero. It is then the case that there are sequences of two adjacent empty nuclei where both nuclei have no phonetic content. Let us first consider the forms in (8d, e). The fact that in these forms two adjacent empty nuclei have no phonetic content follows from the analysis. The final nuclei of the words *quatre* and *douze* are licensed. They are then realized as zero even though they are not properly governed. The empty nuclei in the initial syllable of the words *fenêtre* and *chemise* are word-internally properly governed by the nucleus to their right. Consequently, it follows from the analysis that if two adjacent empty nuclei belong to distinct autonomous words they could both be unrealized phonetically.

Let us now examine the forms in (8a, b, c). With respect to the realization as zero of the final nuclei of the first words, we just saw that this manifestation is accounted for by licensing. The question is: How does the empty nucleus of *de* also remain unrealized? To account for this fact, it would be possible to propose that the empty nucleus of *de* is realized as zero because *de la* forms a word and the empty nucleus in the initial syllable of *de la* is word-internally properly governed.<sup>4</sup> Thus, a sequence of adjacent empty nuclei both realized as zero is possible when the rightmost empty nucleus is word-internally properly governed and it is preceded by a licensed word-final empty nucleus.

The forms in (8) where *de* is part of the word *de la* can be compared with those in (9), which show that when the preposition *de* is not word-internally properly governed (not followed by *la*), the manifestation of the empty nucleus of *de* is determined by the preceding word. As shown in (9a), if *de* is preceded by a word ending with a nucleus with phonetic content, *de* has its empty nucleus realized as zero. On the other hand, the forms in (9b) show that when *de* is preceded by a word ending with a licensed word-final empty nucleus, the empty nucleus of *de* must be manifested as schwa. Notice that comparing the forms in (9a) with those in (9b) shows that it is the preceding word which determines the behaviour of the empty nucleus of *de* and not the word which follows it.

- (9) a. **Without schwa**
- |                |            |                         |
|----------------|------------|-------------------------|
| peu d  lait    | [p dl ]    | ‘a little drop of milk’ |
| pas d  crapaud | [padkrapo] | ‘no toads’              |

des oeufs <i>dé</i> poule	[dezødpul]	'hen's eggs'
vent <i>dé</i> mer	[vādmēr]	'sea wind'
pas <i>dé</i> lune	[padlyn]	'moonless'
cadeau <i>dé</i> fête	[kadodfɛ:t]	'birthday gift'
fond <i>dé</i> litre	[fōdlitr]	'bottom of a litre'
bout <i>dé</i> cigare	[budsigar]	'piece of cigar'
bout <i>dé</i> bois	[budbwa]	'piece of wood'
garçon <i>dé</i> ferme	[garsōdfɛrm]	'farm lad'
chien <i>dé</i> chasse	[šjēdšas]	'hunting dog'
jet <i>dé</i> gaz	[žɛdgaz]	'jet of gas'
coup <i>dé</i> tête	[kudtɛt]	'impulse'
bonnet <i>dé</i> nuit	[bōnɛdnyi]	'nightcap'

b. **With schwa**

bol de lait	[bōldələ]	'bowl of milk'
bac de crapauds	[bakdɛkrapo]	'tub of toads'
oeuf de poule	[œfdəpul]	'hen's egg'
port de mer	[pōrdəmēr]	'seaport'
clair de lune	[klɛrdələyn]	'moonlight'
jour de fête	[žurdəfɛt]	'holiday/birthday'
quart de litre	[kardəlitr]	'quarter of a litre'
boîte de cigares	[bwatdəsigar]	'box of cigars'
chaise de bois	[šɛzdəbwa]	'wooden chair'
cour de ferme	[kurdəfɛrm]	'farm's backyard'
cor de chasse	[kōrdəšas]	'hunting horn'
bec de gaz	[bɛkdəgaz]	'gas burner'
mal de tête	[maldɛtɛt]	'headache'
chemise de nuit	[šmizdənyi]	'nightdress'

The behaviour of the empty nucleus of *de* in the forms given in (9a, b) seems problematic for my analysis. On the one hand it follows from my proposal that in French a word-final empty nucleus is licensed, i.e. that words end with a nucleus with no phonetic content. However, it does not follow from my analysis that the behaviour of the empty nucleus depends on what precedes it. More precisely, a comparison of the data in (9a, b) shows that the word following *de* does not determine whether or not the empty nucleus of *de* is realized phonetically. It may be that what is special about the forms in (9) is their syntactic structure. For example, the pair of forms given overleaf in (10) show that the pattern in (9) no longer exists when *de* is followed by *la*.

- (10) (le) chef de gare [ʃɛfdəgar] (le) chef de la gare [ʃɛfdlagar]  
 (une) cour de ferme [kurdəfɛrm] (la) cour de la ferme [kurdlafɛrm]  
 (le) bord de mer [bɔrdəmɛr] (le) bord de la mer [bɔrdlamɛr]  
 (un) oeuf de poule [œfdəpul] (l') oeuf de la poule [œfdlapul]

I conclude my analysis of schwa by reconsidering its behaviour when it occurs in word-initial syllables.

### 9.3 Empty nuclei in syllable-initial position

A careful examination of words having underlying empty nuclei leads to the following observation. When nothing prevents a governing relation from holding between an unlicensed nucleus and an empty nucleus occurring to its left, the empty nucleus is always realized as zero when it occurs in a non-initial 'syllable'. This is true regardless of the number of 'syllables' the word contains. This description holds for Quebec and Parisian French.

- (11) **Word-internal empty nuclei**
- |            |                |                 |   |
|------------|----------------|-----------------|---|
| matélas    | 'mattress'     | matélasser      | 'to pad'                                    |
|            |                | matélassier     | 'mattress-maker'                            |
| cadéna     | 'padlock'      | cadénasser      | 'to padlock'                                |
| mannequin  | 'model'        | sauvégarder     | 'to safeguard'                              |
| cauchémar  | 'nightmare'    | cauchémardesque | 'nightmarish'                               |
|            |                | cauchémardeux   | 'full of nightmares'                        |
| Michéliné  | 'Micheline'    | madémoiselle    | 'Miss'                                      |
| mainténant | 'now'          | déconténancer   | 'to disconcert'                             |
| matélot    | 'sailor'       | madélinot       | 'inhabitant/native of the Magdalen Islands' |
| lapéreau   | 'young rabbit' | rapétisser      | 'to shorten'                                |
| agénoüe    | 'kneel!'       | agénouiller     | 'to kneel'                                  |
|            |                | agénouillément  | 'kneeling'                                  |
| pélerin    | 'pilgrim'      | pélerinagé      | 'pilgrimage'                                |
| clavécin   | 'harpsichord'  | clavécinisté    | 'harpsichordist'                            |
| vaudévillé | 'vaudeville'   | vaudévillisté   | 'writer of vaudeville'                      |
|            |                | vaudévillesque  | 'vaudeville'                                |
| Camérouné  | 'Cameroon'     | camérounais     | 'Cameroonian'                               |



However, things are different when the empty nucleus occurs in a word-initial syllable position. In syllable-initial position in bisyllabic words the empty nucleus is not realized in Quebec French, whereas it has phonetic content in Parisian French.

(12)	<b>Parisian French</b>	<b>Quebec French</b>	
	cheval	chéval	'horse'
	semainé	sémainé	'week'
	chenil	chénil	'kennel'
	demandé	démandé	'ask!'
	chenillé	chénille	'tracked vehicle'
	chemin	chémin	'path'
	cheveux	chéveux	'hair'
	petit	pétit	'small'

In polysyllabic words, on the other hand, empty nuclei occurring in syllable-initial position must be realized as schwa both in Quebec and Parisian French. Consider the following forms:

(13)	la	petitessé	'smallness'
	le	chevalier	'knight'
		chevaléresqué	'chivalrous'
	la	chevalérie	'chivalry'
	un	chevalet	'easel'
	la	chemisérie	'shirt department'
	un	chemisier	'blouse'
	la	chemisette	'short-sleeved shirt'
	la	chenilette	'tracker vehicle'
	le	cheminément	'progress'
	la	cheminée	'chimney'
	un	cheminot	'railwayman'
		chevaucher	'to be/sit astride'
	le	chevauchément	'overlapping'
		cependant	'however'
		secondaire	'secondary'
		seconder	'to assist'
		secourir	'to help'
	le	secourismé	'first aid'
	un	semestré	'semester'
		semestriel	'semestral'

A comparison of the forms given in (12) with those in (13) shows that in Quebec French in word-initial syllable position of bisyllabic words an empty nucleus has no phonetic content. The empty nucleus must however be manifested when it occurs in the syllable-initial position of a polysyllabic word. On the other hand, in Parisian French, whatever the structure of the word an empty nucleus occurring in a syllable-initial position must be phonetically realized. And finally, in non-initial syllables an empty nucleus which can be properly governed is realized as zero in the two dialects, regardless of the number of syllables a given word contains.

To account for those facts I would like to claim that, as is the case in other languages like Tangale, Mongolian, Tonkawa, Yawelmani, Turkish and so forth, a word-initial syllable has a special status in French. Recall that in Tangale a short vowel is deleted when it is followed by another vowel. However, a vowel in word-initial syllable position never undergoes the process of vowel deletion. Mongolian, Turkish and Yawelmani all have words with underlying empty nuclei.<sup>5</sup> As in French, the empty nuclei are realized as zero if they are properly governed by a following unlicensed nucleus. But in all those languages an empty nucleus occurring in syllable-initial position fails to be properly governed and receives a phonetic interpretation. It is realized as [a] in Mongolian, as [i] in Yawelmani and as [ɨ] in Turkish. Consequently, it appears that in some languages the initial syllable is different from the other syllables in the sense that it is inaccessible to proper government.

In view of these facts, I would like to claim that in French the initial syllable is also inaccessible to proper government. However, Quebec French is somewhat different in that the head of the domain, the accented nucleus of the word, has access to this position. Accordingly, an empty nucleus in syllable-initial position may be properly governed only if its proper governor is the head of the metrical foot. If not, it is inaccessible to proper government, and thus is manifested phonetically (cf. *ch eval* versus *chevalier*).

In Parisian French a word-initial syllable is inaccessible to proper government **whatever the status of the following nucleus**. In this dialect, even an accented nucleus cannot properly govern an empty nucleus occurring in the first syllable. Note that when preceded by an article the initial nucleus of a bisyllabic word is no longer analysed as initial in its domain, and it becomes accessible to proper government (cf. *chemise* versus *la chemise*).



## Conclusion

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I have tried to demonstrate, mainly on the basis of the alternation of schwa with zero in French, that in terms of proper government we can have a unique treatment of vowel-zero alternations in all languages where this process is found. Vowel-zero alternations involve neither epenthesis nor deletion. The underlying representation of a vowel which has the property of alternating with zero is an empty nucleus. When present in the representation of a word, an empty nucleus, like empty categories in syntax, is not manifested when it is properly governed. If not properly governed, the nucleus is phonetically manifested. In a language like French, where proper government operates from right-to-left, an empty nucleus is manifested as null if it is followed by an ungoverned nucleus (with phonetic content) which is the proper governor for the empty nucleus to its left.

In proposing that proper government operates at the level of licenser projection, I explain why an empty nucleus must be manifested when a cluster intervenes between this empty position and its potential proper governor. A governing non-nuclear head is, like any nucleus, a licenser. It is therefore projected at the level of licenser projection. Proper government is blocked when the two nuclei are not adjacent to each other because of the presence of an intervening onset head. This explains why in French, for example, zero is possible in a word like *souvenir* but not in one of the type of *secret*, where zero is manifested as schwa.

It is a well-known fact that an empty nucleus must be phonetically manifested when it occurs after a consonant cluster. This follows from the notion of government-licensing. A consonant which has to govern a complement must receive its 'licence to govern' (i.e. its governing power) from the nucleus governing it. A properly governed empty nucleus has no such power. In a situation where a properly governable empty nucleus is the potential government-licenser of an onset, there

are two possibilities: (i) Proper government fails to apply, thus allowing the nucleus to assume its role of government-licenser. This is the case in French and many other languages where a properly governable empty nucleus is phonetically manifested after a cluster. (ii) The empty nucleus is properly governed, with the result that it is impossible for the onset head to govern its complement. This is the chosen strategy in a dialect of Tangale called Billiri and in Korean.

Finally I proposed that languages which contain underlying empty nuclei differ with respect to whether or not they license word-final empty nuclei. While French and English allow a word-final empty nucleus to be manifested as null even if not properly governed, languages like Japanese do not. On the surface, words end with a vowel or a consonant in French and English but they always end with a vowel in Japanese. Also, languages where word-final empty nuclei may be realized as null must be divided into two groups: Korean, Wolof and Pulaar on the one hand, and English and French on the other. In the first group of languages, zero is possible after a single consonant but not after a consonant cluster. In the latter group of languages a word-final empty nucleus is manifested as zero whatever precedes it. A fuller understanding of the difference between the two groups of languages would require more research into languages of the type of Korean, Wolof and Pulaar. It remains to be discovered whether the languages differ with respect to the directionality of proper government or with respect to a parameter according to which a licensed word-final empty nucleus is or is not a government-licenser for an onset.

Further research will also involve analyses of languages where it appears that a word-internal properly governed empty nucleus may government-license an onset which has to govern a rhymal complement. Might it be the case that this situation is only possible when the empty nucleus is properly governed by the accented nucleus of the domain? If so, it would mean that, as in Quebec French, the head of the domain is a stronger proper governor than any other ungoverned nuclei. Also certain forms in English seem to be problematic for my proposal of government-licensing. Consider a word like *simple*. I would claim that there is an empty nucleus between the *p* and the *l* and that the *p* governs the nasal. How is it then that the empty nucleus occurring after *p* is realized as null given that its onset governs a complement? This seems to violate government-licensing. But it is interesting that in English word-internal unrealized empty nuclei are always followed by a liquid.

Traditionally, linguists claim that the liquid is syllabic. It occurs within a nucleus. In my terms I would claim that the liquid indeed occurs (or spreads) within the nucleus because of government-licensing. After an empty nucleus which is a government-licenser, a liquid moves into the nucleus and gives to the constituent the power to assume its role of government-licenser. This would also account for the fact that only liquids are found after unrealized empty nuclei.

In conclusion, while my proposals account for many facts in a wide range of languages, they also indicate that there is a need for more research on a variety of languages which exhibit apparent counterexamples to my proposals.

# Notes

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## Introduction

1. In addition to its alternation with zero, schwa alternates with the vowel [ɛ]. The two alternations are considered in this book.

## 1 A theory of government in phonology

1. In the last section of this chapter I will present a principle of the theory according to which a consonant is syllabified within a rhyme if it is followed by a governor in the following onset. From this principle, a word-final consonant never belongs to a rhyme.
2. McCarthy (1979, 1981), Hayes (1981), Halle & Vergnaud (1980), Kaye (1982), Kaye & Lowenstamm (1982), Clements & Keyser (1983) among others have proposed that the syllabic constituents are not directly associated with the segments. There is a level of representation called the skeletal or CV tier that intervenes between the constituents and the segmental level. The constituents are linked to the timing units and they in turn are linked to the segments. Among other things the skeleton allows light to be distinguished from heavy diphthongs. That is why the sequence [ia] behaves (let us say metrically) as a short vowel whereas the sequence [ai] behaves as a long one. While in the former case two segments are attached to a single skeletal point, in the latter case the two vowels are linked to different points. For a discussion of the role of the skeleton see McCarthy (1979), Kaye (1982), Lowenstamm & Kaye (1982), Levin (1985) and Kaye (1989).
3. Notice that the principle of prosodic government does not exclude the possibility of a non-branching nucleus being followed by a branching coda. If in a word like *part* [part], for example, the two final consonants are syllabified in a branching coda, the first branching node dominating the nuclear head is the rhyme and the rhyme also dominates the coda.
4. We will see that c-command is no longer needed as a condition on government. It is now replaced by the locality requirement between a constituent head and its complement. If the leftmost nuclear point must be strictly adjacent to all skeletal points within its domain, it follows that a branching nucleus cannot occur within a rhyme which is also branching. Notice that it also follows from the strict locality condition that the coda can never

branch, raising the question of how a word like *part* is then syllabified. I will come to this point shortly.

5. For a discussion on apparent violations of vowel shortening in closed syllables word-internally and word-finally, see Charette (1985), Lowenstamm (to appear) and Kaye (1990c).
6. It appears that a long vowel always shortens in closed syllables and in this book I will show that what appears to be a closed syllable at the surface level should not always be analysed as such phonologically.

For a detailed analysis in terms of government of apparent violations of vowel shortening in closed syllables, see Kaye (1990c).

7. Aware of these problems, phonologists propose constraints on syllabification. This point will be considered shortly.
8. In fact we will see that government phonology claims that (4b) is universally ill-formed. Even in languages which have branching rhymes but non-branching onsets, the theory claims that the sequence obstruent plus liquid, although found on the surface, never constitutes an interconstituent cluster.
9. More precisely a vowel occurring before a cluster sonorant–obstruent seems to behave as if it were a member of a branching rhyme.
10. See Dumas (1981) for an analysis of heavy diphthongs in Quebec French.
11. Shortening is systematically violated in word-final position before a single consonant. We will see later that I consider that French, like any other language, has no branching rhymes in word-final position.
12. As we proceed in the analysis, we will see that the constituent rhyme is only present when government forces a non-nuclear point to be syllabified to the left of an onset. In that sense, the rhyme can be viewed as a projection of the nucleus (cf. N') dominating a skeletal point which is adjoined to the nucleus. With respect to the claim that a rhyme is always preceded by an onset, I mean that a constituent onset is always present even though it may be empty, i.e. may not dominate a skeletal point. I will come back to this point in chapter 4.
13. That the sequence vowel–obstruent–liquid is not an interconstituent cluster has been demonstrated earlier in the discussion on stress assignment in English, the phonetic realization of the vowel /i/ (followed by a vowel) following a consonant cluster, and the distribution of long vowels and heavy diphthongs in Quebec French.
14. See Kahn (1976), Kiparsky (1979), Steriade (1982), Angoujard (1988) to name but a few. See also Lowenstamm (1981), who argues against a maximal onset approach.
15. Kiparsky (1979) claims that structures like the one given in (12) below are required in Finnish and Sanskrit. He gives no evidence or arguments. But as pointed out to me by an anonymous reader, the classic case in Finnish would be words of two syllables with medial /st/ or /ts/ clusters: *instuu* 'he', *katsoo* 'he looks'. Since Finnish has no branching onset it might be proposed that those two words have the structure of a branching rhyme followed by a non-branching onset, namely, *is.tuu* and *kat.soo* respectively. Here I would like to say that while I have never worked on Finnish, those two words are not



convincing examples for the structure in (12). It is generally the case that if *a-b* is a well-formed interconstituent cluster, the same sequence in the reverse order cannot also be analysed as such a cluster. For example, *r-t* as in *par.ty* is an interconstituent cluster but *patrie* can only be syllabified as *pa.tri*. In Finnish the absence of restriction on the order of the consonants *t-s*, *s-t* leads me to suspect that the two consonants do not form an interconstituent cluster. They may well both be syllabified in two distinct onsets which are separated by a nucleus which has no phonetic content. Such a syllabification will be considered shortly.

16. The theory of government does not claim that sequences of the type obstruent–liquid are not found in languages which have branching rhymes but no branching onsets. We will see later in this chapter that while nothing in the theory prevents those sequences from occurring, they cannot be analysed as underlying interconstituent clusters. Moroccan Arabic (MA) is one language which has branching rhymes but no branching onsets. In this language sequences of the type obstruent–liquid can be found. That these clusters do not constitute an interconstituent cluster is suggested by both the appearance of a vowel between the two consonants under certain circumstances and by stress assignment. In MA stress is sensitive to the branching of the rhymes. A vowel preceding a cluster liquid–obstruent is accentuated. However, before a cluster obstruent–liquid a vowel is never accentuated. It then seems clear that the members of a cluster obstruent–liquid are not syllabified in a rhyme followed by an onset. See Elmejjad (1985) and Kaye (1990b) for an analysis of stress and of the syllabic structure in MA.
17. The reader is referred to Kaye, Lowenstamm & Vergnaud (1985, 1989, 1990) and Harris (1990) for a discussion on the representation of segments. In chapter 4 I will briefly consider the representation of certain vowels.
18. The superscripts refer to the charm value of the elements or of the expression.
19. The cold vowel is an element which has no marked feature's specification. It is for example present in the representation of the vowel /a/ whose operator has nothing to contribute. In fact Kaye, Lowenstamm & Vergnaud consider the cold element as representing the absence of element in a given internal representation. In that sense the cold element may be compared with the number zero (0) in mathematics.
20. See Harris (1990) for a more detailed discussion on the representation of consonants.
21. Phonetic experimentation has demonstrated that this claim matches the facts.
22. Given that the charm value of segments determines what is a governor and a governee, one may consider charm as being another way of expressing the sonority hierarchy. But from what has already been discussed, this conception of charm cannot be maintained. Above all, charm determines how elements can combine with each other. Given that the charm value of elements is crucial with respect to the internal representation of segments, one cannot say that charm has the single objective of capturing sonority.

Note also that the charm value of a segment is determined by a calculus of the charm value of the elements which constitute this segment. Charm is therefore not attributed to segments in an arbitrary way. It is not sufficient to say that a liquid is neutral and a stop is negatively charmed. See Kaye, Lowenstamm & Vergnaud (1985, 1989, 1990).

23. I use the term **potential** governor and governee to indicate that it is not because a segment is negatively charmed or charmless that it is necessarily a governor or a governee. We will see shortly that, in a word like *tea*, for example, even though the stop is a negatively charmed segment it has no complement to govern.
24. I am aware that one may find counterexamples to the claim that a charmless consonant cannot govern a negatively charmed one. For example, it has been pointed out to me that Russian, which permits initial clusters such as *rt* and *rv*, may be problematic for the theory. In such circumstances, there are two possibilities: the violation of the theory is either real or apparent. The only way to find out is by careful analysis of the relevant data. Thus, it may well be that a given consonant cluster violates government but only at the phonetic level, since structurally the two consonants are separated from each other by an empty nucleus. Alternatively, one may find evidence that in a word such as *rita* the resonant is under a preceding rhyme (preceded by an empty nucleus) and followed by a non-branching onset (as would be the case for sCL-initial clusters as in the word *sprint*). Government requires us not to restrict our attention to the phonetic level. Only a careful analysis of the data will tell us if these Russian initial clusters do or do not constitute a violation of the theory. In chapter 4 I discuss the absence of governing relations between consonants. I consider cases where at the phonetic level, sequences of consonants seem to violate constituent or interconstituent government, and give clear evidence that the two consonants are separated from each other by an empty nucleus.
25. As to why, on the other hand, reversing the segments of a well-formed interconstituent cluster does not always give a well-formed branching onset, see Kaye, Lowenstamm & Vergnaud (1989, 1990).
26. Kaye (1990b) shows that in Moroccan Arabic, which has branching rhymes but no branching onsets, sequences of the type obstruent–liquid are found on the surface. He claims that the two consonants belong to distinct onsets and that a nucleus intervenes between them. As predicted by this proposal, under certain circumstances a vowel appears exactly in the position Kaye claims that there is a nucleus. Kaye's analysis of MA is discussed in chapter 4.
27. Constraints on empty nuclei will be considered in detail in the analysis of schwa. It is not the case that empty nuclei are posited when governing relations are violated at the surface level. I will demonstrate that empty nuclei are subject to specific constraints, and that in a position where it is claimed that there is an empty nucleus it is generally possible to find contexts where the nucleus is manifested. The manifestation of an empty nucleus is generally referred to as epenthesis.
28. The presence of a word-final empty nucleus will be motivated shortly.

29. I will present a detailed discussion of this proposal in my analysis of schwa.
30. This can be derived from the properties of the nucleus: it is the head of the sequence onset–rhyme; the only constituent that can occur as the unique member of a word; the only constituent to which a skeletal point is lexically associated; and the only constituent whose head can govern regardless of its charm value.  
See Lowenstamm (1988) for a different point of view. While I claim that only a nuclear head may govern another head, he proposes that onsets may contract a governing relation with each other.
31. Since I reject the idea that the syllable is a constituent, the term transsyllabic should be construed as a heuristic device.
32. Although sequences of vowels are found in French, in the context given here the vocalic sequence is not possible. What is of importance is that it is the second vowel which is maintained.

## 2 The ‘e-muet’ in French

1. In general the facts I refer to in this book are from my own dialect of Quebec French. The behaviour of schwa in my dialect is similar to the behaviour of this vowel in the dialect of French spoken in Paris. When I am aware of a difference between those two dialects with regard to the presence or absence of schwa, I mention it.
2. This is said to be the case in Parisian French.
3. This property of schwa is well established. The facts I consider in this chapter are presented in traditional grammars (cf. Fouché 1959) as well as in detailed analyses of schwa like Dell’s (1973), among others.
4. In some cases I will say that words contain a schwa even though the vowel may not be realized phonetically. I am aware that this may sound like a contradiction. My claim that words contain (unrealized) schwas will be motivated in the chapters which follow. For the time being let us assume that I consider orthographic schwas to correspond to underlying nuclear positions.
5. I use *ɛ* to represent a schwa which is not pronounced and *e* to represent a phonetically realized schwa.
6. This is the case in Quebec French. It seems that in Parisian French a pronunciation without a schwa is favoured when there is a preceding word ending with a vowel. I will discuss this difference between the two dialects in chapter 9.
7. In chapter 5 I will return to the status of those ‘stable schwas’ occurring after a consonant cluster which are not considered schwas by every phonologist.
8. It is a characteristic of words beginning with an *h*-aspiré that they begin phonetically with a vowel while they behave phonologically as if they began with a consonant. Following Vergnaud (1982) I consider that onsets with *h*-aspiré dominate a skeletal point but no segment. This will be considered further in chapter 4.

9. In fact a pronunciation without schwa is rejected by the majority of Quebec French speakers.
10. Or zero-schwa, as [dvənir], although less natural than [dəvnir], is also a possible realization. The fact is that it is impossible to syncope both schwas \*[dvnir].
11. Interestingly, while a schwa is pronounced after the consonant cluster, it may be omitted if the liquid occurring within the preceding branching onset is dropped. That is, the two following pronunciations are possible in Parisian French: *quatre jours*, *quat jours*. In Quebec French, whether or not the liquid is dropped, schwa is never realized phonetically (*quatr jours*, *quat jours*). This point will be considered in chapter 7.
12. This example is taken from Dell (1973).
13. According to Dell, the first schwa of a sequence of two is not realized as [ɛ] if a cluster obstruent-liquid follows it (cf. *ensevelir* ‘to bury’ [āsəvlir], \*[āsevlir]). Dell’s analysis will be considered in detail in the next chapter.

### 3 Earlier treatments of schwa

1. The fact that I limit the discussion to three analyses should not be considered to be a value judgement on my part concerning the myriad other treatments of this problem that have appeared in the recent literature. I am fully aware that I could have discussed other recent analyses of French instead of concentrating so exclusively on these three older analyses. But I must make clear that the aim of this book is not to provide yet another account of the behaviour of schwa, but rather to use the French facts to develop a theory. That is, I see French as a tool to contribute to the development of the theory of phonological government. Consequently, my choice of Dell, Selkirk and Anderson is motivated by the fact that each of them proposes something which is directly relevant to my analysis. Following Schane’s proposal that words ending with a consonant have a final schwa in their representation, Dell is, to my knowledge, the first person who has tried to unify the behaviour of word-internal and word-final schwas. This point will be crucial in my analysis. With respect to Selkirk, we both claim that the behaviour of schwa is determined by a neighbouring vowel. And finally, like Anderson I claim that the underlying representation of schwa is an empty nucleus.
2. As acknowledged by Dell, his proposal on the presence of word-final schwas has already been developed in Schane (1968a, b). Dell’s major contribution was to unify the treatment of word-final and word-internal schwas.
3. The pronunciations in (9) are those given by Dell (1973). It is not the case that before words beginning with *h*-aspiré those final schwas are manifested in all dialects of French. I will consider some differences between the dialects of French spoken in Paris and in Montreal in chapters 5, 6 and 7.
4. See Prunet (1986) for an analysis of nasalization in French in terms of a floating versus non-floating nasal segment.
5. As I have already mentioned, this was proposed by Schane.

6. But it is true that even in SPE there are some attempts at explanations – for example the SPE theory of markedness.
7. Selkirk's observation that only one consonant must intervene between schwa and the preceding vowel will be considered in chapter 5. I will propose a principle which accounts for this.
8. I will discuss the rule of Closed Syllable Adjustment in the following section devoted to Anderson's analysis.
9. See Basbøll (1981), Morin (1983), Tranel (1984, 1985) and Verluyten (1985), among others, for arguments against Selkirk's analysis.
10. Selkirk could argue that the words in (26) must be preceded by a clitic, e.g. determiner or pronominal. The imperative forms of verbs clearly show, however, that this claim cannot be maintained (at least in the dialect of Quebec French).
11. While this type of word could be treated as a sort of compound, e.g. having two domains, it would not be treated as such in a related word like *entreténir* 'to maintain', where schwa deletion has to be accounted for.
12. In 1980, Kaye and Lowenstamm had independently the same conception of the underlying representation of a vowel which alternates with zero (see their article 'De la syllabicité', Kaye & Lowenstamm, 1984).
13. We will see, however, that Anderson claims that a word-final coda can branch. I suppose that he has a principle preventing a branching coda followed by an empty onset, i.e. a principle preventing a word-internal coda from branching. See also Kahn (1976) and Kiparsky (1979), among others, for precedence of filling onsets.
14. After the resyllabification of the onset and the application of the rule of empty-syllable deletion, the coda finds itself in word-final position.  
The rule of word-final resyllabification is different from that of word-internal resyllabification. In the latter rule, the rhyme preceding the syllable containing the empty nucleus cannot be branching (cf. word-internal schwa must be manifested after two consonants). This restriction is not needed for the rule of word-final resyllabification. Unlike word-internally, a word-final schwa is manifested as zero following a single consonant or a consonant cluster.
15. The rule is said to apply both to an empty nucleus and to the vowel /e/.
16. Even though it is not always the case that a schwa occurring in the initial syllable is manifested as zero, such a situation is possible. The clearest cases are the imperative forms of verbs containing an empty nucleus in their initial syllable.
17. Anderson agrees with Dell that words ending phonetically with an obstruent have a final empty nucleus in their representation.

#### 4 An analysis of schwa in terms of government

1. For reasons of clarity I present Kaye's first analysis of Moroccan Arabic (cf. Kaye 1987). As I proceed in the discussion I will mention his later proposals.

2. Alternation of a vowel with zero is not the only evidence motivating the presence of an empty nucleus in the lexical representation of particular words. According to the charm values of the two stops *t* and *b* for example, there cannot be an interconstituent governing relation between those two segments. Both consonants must be syllabified in distinct onsets separated from each other by a nucleus.
3. While Kaye originally syllabifies the stem-final consonant into a final branching rhyme, he then proposes that the consonant belongs to an onset which is followed by an empty nucleus. In this section I leave the final consonant unassociated and I will consider its appropriate syllabification in chapter 6.
4. The level of nuclear projection is determined by projecting the heads of rhymes contained in a given domain such as the word. This point will become clearer as I proceed in my analysis of schwa.
5. The directionality may well be parameterized. While proper government operates from right-to-left in MA and French, Da Silva (in preparation) proposes that it operates from left-to-right in Brazilian Portuguese.
6. The reader is referred to Kaye (1987, 1990b) for a detailed discussion since there are some aspects of his analysis that I have not considered. Namely, the condition that proper government does not apply across a governing domain. Also, in his later analysis Kaye claims that words ending phonetically in a consonant have a word-final empty nucleus in their representation. In MA those final empty nuclei are licensed, i.e. are invisible to proper government. That proper government does not apply across a governing domain and that words end with a final empty nucleus will be considered in chapters 5 and 6 respectively.
7. I will show later in this chapter that in French a proper governor can only properly govern one empty governee. Consequently, it may be the case that languages do not vary as to whether strict adjacency is required between a proper governor and an empty governee but with respect to whether a proper governor properly governs one or more than one empty governee. However, Kaye himself in his later proposal questions the existence of dialect 2. That is, there is a controversy among Arabists with respect to the existence of a dialect where two adjacent empty nuclei are both realized as null. Consequently, it might be the case that proper government is universally strictly local or that a proper governor may universally properly govern one and only one empty governee.
8. See Morin (1978) for a different point of view.
9. Rialland (1985) also claims that the absence of manifestation of a word-internal schwa does not result in the deletion of its nucleus. She provides phonetic evidence that the consonant preceding an unrealized schwa is not resyllabified into the preceding rhyme. That is, she argues against Anderson's analysis based on resyllabification.
10. The superscripts attached to the elements represent their charm value. The reader is referred to Kaye, Lowenstamm & Vergnaud (1985) for a discussion on charm values, combinations of elements, matrix calculus, etc.

11. The cold element may be thought of as the number zero in mathematics. While  $1 + 0$  equals 1, the result of a head element X in combination with the operator  $v^0$  equals X.
12. Adding an element to the internal representation of an empty nucleus which must be manifested phonetically should not be compared with a process of epenthesis. While traditional analyses claim that epenthesis adds a position along with a segment to the representation of a given word, in my analysis nothing is added to the lexical representation. It is only the case that something is added to the internal representation of a null segment which is already present underlyingly.
13. Note that it follows from the representation I assume for an empty nucleus that adding  $A^+$  to the representation gives schwa and not [a]. The cold element being already present as a head, the added element acts as an operator.
14. In the syllables which contain an empty nucleus, this segment is represented by an 'é'.
15. See Morin (1978), who claims that words with unrealized schwa have been reanalysed as words containing no nuclear position. While I agree that this is indeed the case for some words, for example *pelter* 'to shovel' in Quebec French, I do not attribute the same treatment to words like those given in (13), which, unlike *pelter*, can be pronounced with a schwa or an [ε] under certain circumstances.
16. For the sake of clarity I have decided not to syllabify the word-final consonants until I discuss the presence of word-final empty nuclei in chapter 6.
17. This is the pronunciation in Quebec French, where, unlike in Continental French, the word has been reanalysed.
18. Anyone claiming that the evidence and arguments presented apply only to the words discussed and not to all the words in (13) should note that the first argument holds for all the data. More evidence for my proposal will be provided in the rest of the book.
19. I leave the discussion on word-final schwas or empty nuclei for chapter 6. In the present chapter and the one that follows word-final consonants will not be syllabified.
20. The Avoid Pronoun Principle says that when a pronoun is coreferent with its antecedent, we choose PRO instead of an overt pronoun.
21. That the parameter refers to adjacency rather than to the requirement that a proper governor must have phonetic content is justified by the phonetic realization of the singular form of the radical  $\sqrt{ktb}$  in the two dialects. We have seen that the plural form is manifested as [kitbu] in one dialect (dialect 1) and as [ktbu] in the other dialect (dialect 2). But the singular form of the verb is in both dialects realized as [ktib]. If the parameter referred to the content of the governor we would expect the following two realizations in dialects 1 and 2 respectively: [ktib], [ktb] (where in dialect 2 the rightmost empty nucleus would properly govern the one to its left).
22. While in a sequence of adjacent empty nuclei it is much more frequent to hear a pronunciation schwa–zero, it appears to be possible to block proper

government of the rightmost empty nucleus in order for it to properly govern a preceding one. That is, for some words zero–schwa is also attested. However, I cannot yet explain why some words may have the two patterns schwa–zero and zero–schwa (cf. [dəvnir], [dvənr]), while for other words zero–schwa appears to be impossible (cf. [səmle], \*[sməle]).

23. I will justify, in chapter 6, the proposal of a final open syllable containing an empty nucleus.
24. The OCP was first proposed for tones by Leben (1973). Note that while the vowel of an article is always deleted before a word beginning with a vowel, we find sequences of vowels word-internally (cf. *archaïque* ‘archaic’). In those words, it might be the case that the intervening onset dominates a skeletal point which prevents the adjacency between the two nuclear points. A detailed consideration of sequences of vowels in French would lead me far beyond the scope of the present analysis.
25. Piggott and Singh (1985) propose a different representation of the two types of empty onsets. While an empty onset always dominates a skeletal point, the onset of *h*-aspiré words has a null segment attached to the skeletal point. Their analysis provides an account for both liaison and elision effects.
26. Note that any claim that it is a preceding vowel which determines the presence of schwa cannot account for its presence before *h*-aspiré (cf. *tu réournes* versus *tu rehausse*).

## 5 Licence to govern

1. I use the term ‘properly governable’ to mean that the conditions for proper government to apply are met (i.e. there is an adjacent proper governor for an empty governee).
2. I use the term ‘licensing’ in an entirely different sense from Ito (1986). For her, prosodic licensing is a requirement to the effect that all phonological units belong to a higher prosodic structure.
3. In the current context ‘licensors’ may be viewed as synonymous with governors.
4. Later in this chapter I will consider cases showing that proper government is blocked when a governing domain intervenes between the proper governor and the empty governee. See also Kaye (1990a) for the relevance of this condition in Moroccan Arabic.
5. A charmless segment may govern another charmless segment if it has a complexity greater than its governee. (Complexity is measured in terms of the number of elements that constitute a segment.) For example, the liquid *l* and the nasals may govern *r* because they are more complex than *r* (e.g. *hurlement* ‘roaring’, *surmener* ‘to overwork’).
6. It seems that only the nuclear heads can govern without being licensed. Nuclear heads have inherent properties which give them the possibility of governing spontaneously. This might follow from the fact that (i) nuclear heads are themselves licensors, (ii) they are heads of the sequence onset–rhyme, (iii) they are the only lexically associated positions, and (iv) they are



the only positions which always govern a complement, and this regardless of their charm value. Moreover we saw that even when empty, a nucleus governs a preceding non-nuclear point in the onset position. In contrast with nuclear heads, non-nuclear heads cannot spontaneously govern a complement.

7. Interconstituent government is not optional. We will see later in this chapter what happens when a consonant is not government-licensed.
8. The terms **direct** and **indirect licensing** have been proposed by Nikiema (1989c).

In terms of Minimality (cf. Charette 1989), while a remote governor cannot govern a complement occurring within a branching constituent, nothing prevents a head from being governed from the outside. Government of a head from the outside is not a case of double government. Nothing within a governing domain already governs the head.

We will return to those two types of government-licensing later in this chapter.

9. The choice of dominance, i.e. whether principle (7a) takes precedence over (7b) or vice versa, is determined parametrically.
10. Unlike in French, in Tangale any vowel can alternate with zero.
11. Unlike short vowels, long vowels are never deleted when followed by another vowel. This follows from Minimality (cf. Charette 1989).
12. Following Kaye, Lowenstamm & Vergnaud (1989), Nikiema assumes that the Projection Principle operates in phonology. According to this principle, governing relations are defined in the lexical representation and remain constant throughout a phonological derivation. According to the Projection Principle, a governing relation holding between two nuclei remains throughout the derivation.
13. The interpretation of the nasal instead of the stop might be predictable. If the *d* remains it would be required to govern the preceding point but would lack government-licensing.
14. This is motivated by stress assignment. In MA a vowel followed by a cluster liquid–stop behaves as if it were in a closed syllable.
15. These pronunciations are in Quebec French.
16. See Kaye & Lowenstamm (1984) for an analysis of light diphthongs.

## 6 Word-final empty nuclei

1. Apparent counterexamples to this claim are words ending with a liquid in BP and in a nasal in Japanese. With regard to BP, liquids may occur within the nucleus. In word-final position, in a word like *Brazil* for example, the liquid occurs within the nucleus and is realized as a glide [braziw] (see Segundo (in preparation) and Da Silva (in preparation) for further discussion). As for word-final nasals in Japanese, Yoshida (1990) claims that words ending with a nasal end with a nucleus which contains a nasalized vowel (i.e. a nasalized *i*).
2. Unlike French, English does not allow a branching onset before a word-

- final empty nucleus. While words like *carte* [kart] ‘card’ and *quatre* [katr] ‘four’ are both well-formed in French, only words of the type of *card* are possible in English. Nikiema (1989c) introduced the notion of direct and indirect licensing. While a word-final empty nucleus is an indirect government-licenser in French, it is restricted to direct government-licensing in English. I will come back to this point later in the chapter.
3. When I say that word-final empty nuclei are not manifested in word-final position, I am assuming a context where what follows does not determine the behaviour of the preceding nucleus (e.g. in pre-pausal position and anywhere except in compounds in Quebec French). Contexts where the realization of a word-final empty nucleus depends on what follows are considered in the next two chapters.
  4. There is a tendency to simplify a branching onset occurring before a word-final empty nucleus. Words like those given in (4b) are then frequently realized without the ‘final’ liquid. I will come back to this point later in this chapter.
  5. See Dumas (1981) for an analysis of heavy diphthongs in Quebec French.
  6. Kaye (1990c) discusses why in some languages a long vowel shortens in a closed syllable as well as before a word-final single consonant.
  7. Certain languages, French and English for example, have a series of neutral stops (except for the dentals). While *p* and *k* are governors, i.e. negatively charmed, in words like *plan* [plā] ‘plan’ and *clef* [kle] ‘key’, they have a neutral charm value in words such as *apt* and *doctor*, where they are governees.
  8. Notice that the representation I assume for the feminine desinence does not contradict my account as to why no words have an *h*-aspiré followed by an empty nucleus. While the onset of an *h*-aspiré dominates a skeletal point, the onset of the feminine morpheme does not dominate anything. If governing relations apply between skeletal points, only the former type of empty onset needs to be properly governed. See Piggott & Singh (1985) for an alternative representation of the two types of empty onsets.
  9. See Piggott & Singh (1985), Prunet (1986), Encrevé (1988), among others, for an analysis of floating segments and liaison in French. Whatever representation one assumes for the feminine desinence, what is of importance in the present discussion is that the feminine morpheme contains an empty nucleus.
  10. If it is the case that invariable adjectives are not marked for gender, this would not contradict my claim that the adjectives end with a final nucleus.
  11. Languages vary as to whether a liquid may or may not be syllabified within a nucleus. While this is possible in Brazilian Portuguese it is not in French. Recall that a word like *Brazil* has a different realization in French and in BP (i.e. [brəzil] versus [braziw] respectively).
  12. Notice that the final liquid is not a floating segment. It is attached to a skeletal point and this point must be linked to a constituent, as is always the case for skeletal positions.
  13. We will see in chapters 7 and 8 that a final empty nucleus is required at the

end of a cycle. Consequently, when a cyclic suffix is attached to a stem on a second cycle, the final empty nucleus of the first cycle remains (cf. *enterrement* [[ãtɛ:rø]mã], where we can observe the absence of vowel shortening). However, a non-cyclic suffix is not added to a word, it is part of the word. More precisely, a non-cyclic suffix is present on the innermost cycle where the points are syllabified in terms of the governing relations they contract with each other. More concretely, this means that while a cyclic suffix does not modify the governing relations contracted on an earlier cycle, a non-cyclic suffix is part of the representation when the points are syllabified. This is why the final empty nucleus present at the end of the masculine form is not present in the feminine form. My understanding of cyclicity (and therefore of the difference between cyclic and non-cyclic) is different from what is proposed in *Lexical Phonology*, and will become clearer in the analysis of compounds presented in the next chapter. See Prunet (1986), Halle (1986) and Kaye (1990a) for motivation that the notion of cycle and Strict Cyclicity are crucial parts of Universal Grammar.

14. The prediction here is that the set of word-final clusters should be the same as the combined set of onset clusters and interconstituent clusters, which is in accordance with the facts.
15. As we will see, languages do not vary according to whether or not they have a nucleus in word-final position. They only vary as to whether or not a word-final nucleus may be empty.
16. In fact there are also the languages like Dessano and Dida which do not have underlying empty nuclei. The parameter in (20) is not relevant for those languages since it refers to final **empty** nuclei.
17. Unless proper government operates from left to right. If this is the case, an unlicensed word-final empty nucleus would be manifested as null if it is properly governed. I consider this point in 6.3.2.
18. See Charette (1985) for an analysis of vowel shortening in Wolof, where it is proposed that Wolof has extrametrical consonants.
19. In Pulaar a word-final empty nucleus occurring after a consonant cluster is manifested as [u] (e.g. [raddu] \*[radd] ‘to hunt’). Unlike in Wolof and Pulaar, in Korean a word-final empty nucleus preceded by a consonant cluster is not phonetically realized, which entails the loss of one of the two consonants (cf. /hulkθ/ [hul] or [huk] ‘earth’, /talmθ/ [tam] ‘resemble’).
20. See Harris & Kaye (1990) and Harris (1990a) for an analysis of lenition in terms of government.

## 7 Compounds and phrases

1. I use the symbol M for the word-tree in order to avoid confusion with W(eak).
2. The pronunciation [vəniʁ] is attested in Parisian French. The difference between Quebec and Parisian French with respect to the behaviour of an empty nucleus occurring in the syllable-initial position of bisyllabic words is discussed in chapter 9.

3. The following compounds are hypothetical words but are nevertheless semantically plausible. The pronunciation I give reflects the intuition of Quebec French speakers about how the words would be pronounced if they were produced.
4. The final empty nucleus of the first term is not projected into a non-branching foot since it has no phonetic content.
5. Under my analysis of compounds, the final schwa in *porte-clefs* has the same degree of accentuation as the vowel *ã* in *porte-manteau*. While one may disagree, it is still the case that the difference in the accentuation of the two vowels may be related to the nature of the segment schwa.
6. In the sense that there is a dog called Fou and someone is being told to keep it or look after it.

### 8 The alternation between schwa/zero and [ɛ]

1. I agree with Tranel (1988) about the need to differentiate the alternation of /e/ with [ɛ] from the one of schwa (or zero) with the mid open vowel, although our reasons are different. Tranel mentions (referring to Anderson's analysis) that the unification of these two alternations into one phonological process is inconsistent with the representation of schwa as an empty nucleus. Since an empty nucleus is by its nature different from a nucleus with phonetic content, it should not be subject to the same constraints. However, Tranel's objection might be disregarded if it is only when an empty nucleus is not properly governed and therefore realized phonetically that it will undergo the alternation with the mid vowel. In that sense a unique phonological process would involve schwa and /e/ and not an empty nucleus and /e/. While I choose not to consider the alternation of /e/, I think that it is different from the alternation of schwa with [ɛ]. Unlike schwa, the vowel /e/ would become charmless, i.e. [ɛ], when it occurs in a branching rhyme or when it is followed by an empty nucleus. However, my claim is that a branching constituent never has an empty head. Given that I also deny resyllabification as a phonological process, I would treat the alternation of schwa with [ɛ] differently from that of /e/ with [ɛ].
2. See Morin (1988) and Tranel (1988) for a morphological account of the alternation under discussion. In my analysis the alternation is a manifestation of a phonological process. However, we will see that the morphological structure of a word plays a crucial role in the application of the process.
3. Selkirk (1978) proposed that 'schwas change to [ɛ] if followed by something else inside the foot. And that something else may be simply a consonant or an entire syllable with ə.'
4. They say that the vowel /e/ also undergoes the rule. See Tranel (1988) for a different point of view.
5. See Picard (1983), who also argues against the proposal that schwa is realized as [ɛ] in closed syllables.
6. Under my analysis [ɛ] is not the manifestation of a schwa or an empty nucleus occurring in a branching rhyme. In fact, I claim that an empty

nucleus never occurs within a branching rhyme. This follows from the fact that I consider that the head of a branching constituent can never be empty. (See Kaye & Lowenstamm 1984, who discussed the distribution of empty skeletal points.) If the head of a branching rhyme, the nucleus, cannot be empty, we understand why no words in French have the sequence schwa–charmless consonant–negatively charmed consonant–(charmless consonant). In other words, no words have a schwa followed by a consonant in the rhymal position which is followed by an onset (branching or not).

7. Recall that I mentioned earlier that if schwa is realized as [ɛ] in closed syllables, it follows that according to Anderson the pronunciation of a word like *ensevelir* should be \*[ɛ̃sevlir] and not [ɛ̃səvlir]. One may argue that Anderson would syllabify the *v* and the *l* in a branching onset. If so, the empty nucleus preceding this onset would not occur in a branching rhyme. The problem with this proposal is that Anderson accounts for the absence of manifestation of the empty nucleus between the *v* and the *l* by resyllabifying the *v* in the preceding rhyme. Consequently, this consonant cannot be in the onset. It must be resyllabified in the preceding rhyme, resulting in the deletion of the syllable which now contains only an empty nucleus (cf.  $\tilde{a}.s\emptyset.v\emptyset.lir \rightarrow \tilde{a}.s\emptyset.v.\emptyset.lir$  [ɛ̃səvlir], \*[ɛ̃sevlir]).
8. See Chomsky (1973), Kean (1974), Mascaró (1976), Prunet (1986) and Kaye (1990a) for discussion of the Principle of Strict Cyclicity.
9. See Kaye & Vergnaud (1990).
10. The infinitive forms are non-analytic. In other words, the infinitive morpheme together with the stem are part of the same domain. This means that no final empty nucleus is present in those forms.
11. That *-ment* is a cyclic suffix is motivated by the absence of vowel shortening in Quebec French. A word like *enterrement* ‘burial’, for example, is pronounced [ɛ̃tɛ:rmã]. The fact that the vowel /ɛ/ is long shows that the vowel occurs in a non-branching rhyme. This is only possible if *-ment* is cyclic [[ɛ̃tɛ:rɔ] mã]. If *-ment* was non-cyclic the final empty nucleus of the stem would not be present in *enterrement* since it would not be final in a domain, or cycle. If *-ment* was a non-cyclic suffix, we would predict the pronunciation \*[ɛ̃tɛrmã], that is with a short vowel /ɛ/.

## 9 Miscellaneous issues

1. In his analysis of finite verb raising, Emonds (1978) says that *ne* is under INFL and *pas* at the beginning of VP. (1a) then shows that the clitic and the verb are both dominated by INFL. In (1b), since a verb [–tense] remains in its position within the VP we can see that the clitic is attached to it under V.
2. These two patterns are not restricted to adjacent clitics. In a sequence of two adjacent word-internal empty nuclei, the variation is also sometimes possible: *revenir* [rəvnir], [rvənr], *devenir* [dəvnir], [dvənr].
3. While this pronunciation is possible, it is not as natural as the one in (5b).
4. The proposal that *de la* constitutes a word might be justified by the definite

articles *du* and *des*, which are the contracted forms of *de le* and *de les*, respectively.

5. As in French, the languages show an alternation between a vowel and zero.
6. The special status of the word-initial syllable in Mongolian and Turkish certainly follows from the fact that the initial nucleus is the head of the harmonic domain. One would not expect the head of a domain to be governable by an element contained within that domain.

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