

CATALAN PHONOLOGY
AND
THE PHONOLOGICAL CYCLE

by

JOAN MASCARÓ

lic., Un. de Barcelona

1972

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF
PHILOSOPHY

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

August, 1976

Signature of Author *Joan Mascaro*
Department of Foreign Literatures and
Linguistics, June 29, 1976

Certified by *Mavis Horn*
Thesis Supervisor

Accepted by *Mavis Horn*
Chairman, Departmental Committee on
Graduate Students



CATALAN PHONOLOGY AND THE PHONOLOGICAL CYCLE

by

Joan Mascaró

Submitted to the Department of Foreign Literatures and Linguistics on June 29, 1976 in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

ABSTRACT

The analysis of the phonological structure of Catalan leads to a reexamination of the Phonological cycle, and a more general and precise formulation, which centers on the notion "proper cyclic application" is proposed. Cyclic rules are allowed to apply only if their structural description makes use of specific information introduced by virtue of its cycle. This formulation is shown to cover correctly the earlier versions of the Strict Cycle Condition and the Alternation Condition (Chomsky (1973), Kean (1974), Kiparsky (1974)), as well as other phenomena of Catalan. A characterization of cyclic rules as obligatory neutralization rules is proposed also. These results are presented in the Introduction. Chapter 1 deals with stress rules and other stress-related phenomena. The interaction between stress rules modifying underlying stress patterns and other rules is shown to be cyclic in the sense proposed. Further support for the Phonological Cycle is drawn from the analysis of consonantal phenomena that are discussed in Chapter 2. In Chapter 3 the analysis of the accentual system presented in Chapter 1 is carried over the verbal system and some consequences are discussed.

Thesis Supervisor: Morris Halle

Title: Professor of Modern Languages and Linguistics

PREFACE

The present work deals with some phonological aspects of Catalan and their theoretical consequences. In Chapter 1 I examine the stress pattern and vowel alternations, Chapter 2 deals with consonantal phenomena, and Chapter 3 is an analysis of the verb morphology. The main theoretical results are presented in the Introduction, which repeats discussion in Chapter 1. I have used the dialectal variety of Catalan spoken in Barcelona as the source for my data. Most divergences from Standard Catalan regard the verbal morphology. The reader can find some information about Catalan Phonology in Fabra (1912), Badia (1951), Alcover and Moll (1930) and other references in the Bibliography. A very good source is also the extensive and careful analysis within the generative framework of Wheeler (1974), which is more "standard", both in the variety of Catalan described, and in the framework he adopts.

I am indebted to many people who have contributed to the present work with their criticisms and comments. I would like to thank especially Morris Halle, Noam Chomsky and Paul Kiparsky, with whom I have discussed all the material in this work and who have contributed with many valuable comments, criticisms and ideas.

TABLE OF CONTENTS

Abstract -----	2
PREFACE -----	3
INTRODUCTION: THE PHONOLOGICAL CYCLE -----	7
CHAPTER ONE: THE ACCENTUAL SYSTEM -----	19
1. Introduction -----	19
2. Stress Assigned by Rule -----	21
3. Discussion -----	26
4. Underlying Stress -----	33
5. Some Segmental Processes -----	37
6. Vowel Reduction -----	40
7. Further Support for Underlying Stress -----	47
8. The Cycle -----	50
9. Strict Cyclicity -----	52
CHAPTER TWO: CONSONANTAL ALTERNATIONS -----	61
1. Assimilation of Nasals -----	61
2. Assimilation of Stress and the Strict Cycle Condition -----	63
3. Nonstops and Laterals -----	67
4. Distribution of r and \bar{r} and the Rule of Contraction -----	69
5. Assimilation, Contraction and the Cycle -----	75
6. Simplification of Consonant Clusters -----	77
7. Assimilation of Nasals and Cluster Simplification -----	80
8. N-Deletion -----	86
9. R-Deletion -----	93
10. B to Glide -----	97
CHAPTER THREE: VERBAL MORPHOLOGY -----	100
1. The Verbal System -----	102

2. Regular Verbs -----	102
3. Class IIIa and Other Anomalous Verb Forms -----	110
4. "Regular" Conj. II Verbs and Irregular Participles -----	116
5. Verbs with Root Final G -----	119
6. Verbs with Root Final W -----	126
7. On Accounting for Subregularities -----	132
8. Verbs with Alternating Root Vowel -----	141
9. Other Irregular Verbs -----	145
APPENDIX I -----	148
APPENDIX II -----	152
FOOTNOTES (Chapters 1, 2, 3) -----	156
BIBLIOGRAPHY -----	161

INTRODUCTION

Twenty years ago, Chomsky, Halle and Lukoff (1956) proposed a convention on rule application by which rules "apply no more than once to each constituent, applying a rule to a constituent of order n only after having applied it to all constituents of order $n+1$; i.e. beginning with the smallest constituents and proceeding to larger and larger constituents" (p. 75). Since then, this convention, known as the Cycle, has been applied to numerous languages and some modifications have been proposed. In the present work I shall offer evidence from Catalan in favor of a notion "phonological cycle" that covers some of the proposed modifications, as well as other theoretical proposals not connected with the cycle, and other empirical material.

Cyclic application can be formulated as follows:

(1) Given a bracketed expression $[_n \dots [_{n-1} \dots, [_1 \dots]_1, \dots]_{n-1} \dots]_n$,

and a (partially ordered) set of cyclic rules C ,

A. C applies to the domain $[_j \dots]_j$ after having applied to the domain $[_{j-1} \dots]_{j-1}$, each rule in C applying in the given order whenever it applies properly in j .

B. Proper application of cyclic rules. For a cyclic rule to apply properly in any given cycle j , it must make specific use of information proper to (i.e. introduced by virtue of) cycle j .

Thus the set of cyclic rules applies to the string enclosed in the innermost pairs of brackets, then moves to the second cycle, and so on until the outermost constituent is reached. Within each cycle, each rule has a chance to apply in the given order if it makes specific use of information proper to this cycle (1B.). This condition ensures that no

"improper" cyclic application, that is, multiple application of a rule, opposite rule ordering, etc on the same cycle results. In other words, it makes it impossible for rules to "return to earlier stages of the cycle after the derivation has moved to larger, more inclusive domains" (Chomsky, (1973), 243), which would decisively reduce the empirical content of the cycle. (1B) covers in part, and is in fact a more general formulation of the basic idea of the Strict Cycle Condition (or Strict Cycle, or Strict Cyclicity), which in turn should form part, as pointed out before, of any meaningful notion of the cycle. The Strict Cycle Condition was proposed in Chomsky (1973) for syntax,¹ and Kean (1974) for phonology. Although (1B) is just part of the definition of "phonological cycle" I shall continue to refer to it as the Strict Cycle Condition (SCC) for convenience.

Before examining several cases where the phonological Cycle makes crucial predictions, let's consider an example that illustrates its operation. Three cyclic rules that will be motivated in the first chapter interact in the derivation of the Catalan phrase /prudúirá#ksidásyó/ 'it will produce oxydation'. Destressing (24) removes all but the rightmost stress within a word, Glide Formation (36) forms glides from unstressed high vowels after another vowel, and Vowel Reduction (49) reduces unstressed vowels, ə, e.g., going to u. More detailed discussion of the derivation can be found in section 9 of Chapter 1, (62).

(2)	[[[prudú]]]rá]	[[ksid]]á]syó]]
GL. FOR.		
DESTRESS	u	ə
VOW. RED.		u
GL. FOR.		
DESTRESS.	i	a
VOW. RED.		ə
GL. FOR.		w
DESTRESS.		
VOW. RED.		

pruduiráwksidəsyó

We can distinguish three different cases under which a cyclic rule might meet condition (1B), the SCC. Each one is a sufficient condition for a rule to apply properly in any given cycle. Correspondingly, when none of the cases is met the SCC blocks the rule (i.e. the rule cannot apply properly on the given cycle).

(3) A cyclic rule R applies properly on cycle j if either a, b or c is met:

a. R makes specific use of information uniquely in cycle j. That is, it refers specifically to some A in $[_j XAY[_{j-1} \dots]Z]$ or $[_j Z[_{j-1} \dots]XAY]$.

b. R makes specific use of information within different constituents of the previous cycle which cannot be referred to simultaneously until cycle j. R refers thus to some A, B in $[_j X[_{j-1} \dots A \dots] Y [_{j-1} \dots B \dots] Z_j]$.

c. R makes specific use of information assigned on cycle j by a rule applying before R.

(3a) is Strict Cyclicity as it appears in Kean (1974). She proposes that "on any cycle A no cyclic rule may apply to material within a previous cycle B without making crucial use of material uniquely in A" (p. 179). Notice that Kean's version is stronger than (3) in a sense, since it blocks application of a cyclic rule even if cases (3b) or (3c) are met.

Thus counterexamples to her proposal are cases of rules that apply when (3b) or (3c) obtain, and counterexamples to the version proposed here would be cases that fall under (3b) or (3c) where application of a rule is blocked. Cases that fall under (3a) constitute evidence for or against, if the rules should be blocked) both versions.

Let us first examine the cases where a rule is allowed to apply in each of the three cases in (3), and then consider the cases where it is blocked.

Application of cyclic rules under (3a) can be illustrated with [lɔ#yntimitát] 'the intimacy' and [á:l] 'high' (/ált/). Cluster Simplification, which will be presented in Chapter 2, section 6, has as one of its effects the deletion of t in the context l__##. I assume the lexical root is a cyclic node:

(4) [[la[[íntim]litát]] [#[#ált#]#]

GL. FOR.	---		
DESTRESS.	<u>i</u>	∅	CLUST. SIMP.
GL. FOR.	y		
DESTRESS.	---		

Underlying forms should be as in (4), since we have [íntim] 'intimate' and [áltɔ] 'high' (fem); see Chapter 1 for details concerning underlying stress. Both the a (ə after Vowel Reduction) in the first example and one # in the second are made reference to by the corresponding rules, and are uniquely within the domain of the outermost cycle.

Other similar examples can be found in this work and in other cyclic accounts of phenomena in other languages as well.

Condition (3b) can be illustrated with the compound franco-italià 'Franco-Italian'. Its members are pronounced in isolation [frányku], [italyá], but the compound is [fránykuytalyá] (irrelevant constituent structure and boundaries omitted):

(5) [[frányku] [italyá]]
 GL.FOR. y

When the last cycle is reached, all the crucial information for Glide Formation, i.e. the sequence ui, is within the previous cycle,

but the rule can refer to both u and i only as a result of the last cycle. Notice that (3b) is also involved in our previous derivation (2), in the last cycle.

(3c) asserts that a cyclic rule applies properly on a given cycle if it is fed (in the sense of Kiparsky (1968), 196, 197) by a rule that has applied on the same cycle. The rules of Vowel Reduction (Chapter 1, (49)) have the effect of converting unstressed vowels a, ɛ, e to ə and ɔ, o to u. The rule of Destressing mentioned before will supply specific information which is crucial for Vowel Reduction. Thus according to (3c), Vowel Reduction should apply even if the vowel is within an inner cycle. And in fact from [plát] 'dish' we get [plətét] 'small dish' and from [dirəktɔ́ri] 'directory', [dirəkturiál] 'directorial':

(6)	[[plát] ɛ́t]	[[[dirəktɔ́r]i]ál]
	(last cycle)	
	DESTRESS.	a
	VOW. RED.	ɔ
		u

So far I have presented evidence that favors the notion "phonological cycle" presented in (1), but that would be consistent with a weaker formulation (e.g. the extremely weak version (1) without the requirement of proper application). This is so because all the cases discussed involved rules that were allowed to apply. In order to show that the condition on applicability of cyclic rules should be as strong as (1), we should present evidence that supports the cases of blocking of cyclic rules predicted by (1).

Before proceeding, recall that the kind of evidence presented disfavors Kean's earlier version of the SCC since it allows rules to apply that violate (3a) but fall under either (3b) or (3c). It might be therefore useful to check the status of the evidence presented there and in other works based on it, and compare it to (1). As was pointed out above, counterexamples to (1) would be cases that fall under (3b)

or (3c) and where a cyclic rule is blocked. Interestingly enough none of the cases presented known to me (Kean (1974), Wilkinson (1974), Halle (1973a) and Halle (1973b)) fall in this category. That is, they all fall under (3a) and are therefore correctly included in our version of the SCC. Consider for example one of the crucial derivations for Klamath in Kean (1974):

(7) (47a)		[nt 'iw[otn [el 'g+a]]]]
VOW. RED.(21)		otn əl'g a
VOW. DEL.(18)		otn l'g a
SON. CLUST.(40)		otən l'g a
VOW. RED.	nt'iw	stən l'g a
VOW. DEL.	nt'iw	tən l'g a
SON. CLUST.		(not applicable)

(Sonorant Cluster (40) $\emptyset \rightarrow \text{ə} / [\text{XC} \text{ — } \begin{matrix} \text{[-syll]} \\ \text{[+son]} \end{matrix}] (\text{CZ}) \text{#}]$). The string is analyzed by Sonorant Cluster in the third cycle as

(8)	[nt 'iw[tən [l 'g a]]]]
	[] $\underbrace{\hspace{2em}}_{\text{X}} \text{C}\emptyset : \text{C} \underbrace{\hspace{2em}}_{\text{Z}} \text{]$
	$\begin{matrix} \text{[-syll]} \\ \text{[+son]} \end{matrix}$

and no specific (i.e. nonvariable) material used by the rule is either uniquely in the third cycle, or is proper to that cycle in the sense of (1B) or (3).

Thus the evidence presented for the earlier version of the SCC is consistent with, and favors, the version proposed here.

Let us now turn to some of the evidence presented in the present work where a cyclic rule is blocked by (1), because it doesn't apply properly on a given cycle. In order for a rule not to apply properly on some cycle none of the three conditions in (3) should be met, since each one is sufficient for proper application.

Notice that (3a) predicts that no rule applies to innermost constituents. (3b) cannot be met obviously in that case, and for (3c),

a rule should have applied first, but this rule itself would be subject to (3c), and so on. (3a) requires that there is some A referred to by the rule in $[_j XAY[_{j-1} \dots]Z]$ or $[_j Z[_{j-1} \dots]XAY]$, which cannot be the case for innermost constituents. I shall call the domain of innermost constituent the 0th cycle and first cycle the smallest constituent that contains the 0th cycle, that is, the domain to which cyclic rules apply first.

Consider the following derivation, which involves $[[[trióm]ál]ízm]$ 'triumphalism' (cf. $[trióm]$ 'triumph', $[triumfál]$ 'triumphal').

(9) $[_2[_1[_0 trióm]_0 ál]_1 ízm]_2$

<u>1st</u>			
GL. FOR.	--		
DESTRESS.	o		
VOW. RED.	u		
<u>2nd</u>			
GL. FOR.	SCC		
DESTRESS.		a	
VOW. RED.		ə	
(ə-Ins.)			ə
	[triumfəlízmə]		

On the first cycle (cycle 1) Glide Formation can't apply because the o hasn't been reduced nor destressed. Destressing can apply by (3a) because it uses specifically the stressed vowel outside the 0th cycle. Vowel Reduction applies then by (3c) since a previous rule, Destressing, has introduced the crucial information removing the stress on the o. On the second cycle the S.D. of Glide Formation is met, but its application would be improper. The sequence iu is wholly within a previous cycle, and conditions (3b) and (3c) don't apply, obviously. Therefore the SCC blocks it. Finally Destressing and Vowel Reduction apply again, meeting (3) as in the first cycle and ə is inserted word-finally (by rule (11), Chapter 3)

Another interesting example is provided by words ending in suffixes

that shift the stress to the preceding syllable, like i, ik, or gráf ([fut₅gráf] 'photographer', [fótu] 'photo', [sifilítik] 'syphilitic', [sífilis] 'syphilis', etc). Whenever one of these suffixes occurs, the preceding stressed vowel can be a, ɛ, i, ɔ, u, but never e or o. Furthermore there are alternations like [numéru] 'I enumerate'~[numÉrik] 'numerical', [sférə] 'sphere'~[sfÉrik] 'spherical', [dirəktó(r)] 'director'~[dirəktóri] 'directory', etc. A rule with the effect é --> É and ó --> Ó would handle these cases. The rule doesn't apply when no prestressed suffix is present as the preceding alternations show. On the other hand, a separate rule is needed that stresses the vowel before a prestressed suffix. Saying that this rule, and the é --> É, ó --> Ó rule both apply before some specific set of suffixes would amount to stating the same idiosyncratic environment twice. One could also say that the vowel change takes place if the stress has been assigned to it by the other rule, introducing global conditions. Both solutions are undesirable. Now consider what is predicted by (1) if both rules are cyclic. The alternating pair [séntri] 'he centers' (subj.)~[sÉntrik] 'centric' will have the common root morpheme /séntr/ and the (unstressed) subjunctive morpheme /i/, and the (prestressed) morpheme /ik/.

(10)		[[séntri]]	[[sÉntrik]]
	IC-RULE	--	é
	é --> É	--	É

On the 0th cycle no rule applies. On the 1st cycle the IC-Rule applies in the second example stressing the é. Now é --> É will be able to apply in this case by condition (3c) since a previous rule assigned specific information required by the rule in question. This is not the case in the first example, and the SCC will block application of the second rule. (10) also shows that for a cyclic application to be proper it is sufficient that a rule on the same cycle assigns infor-

mation specifically required by the rule, regardless of whether or not this information was already present on previous cycles.

The formulation of the phonological cycle in (1) thus covers the evidence for Strict Cyclicity, as well as other empirical phenomena. Yet there is another interesting consequence of this revision of the SCC. Kiparsky (1974) proposed a condition on application of phonological rules by which

(11) (ALTERNATION CONDITION)

Neutralization processes apply only to derived forms. . . [A] neutralization process can apply only if the input involves crucially a sequence which arises in morpheme combinations or through the application of phonological processes. (p. 65) . . . [the Alternation Condition] must be restricted to obligatory rules.

(p. 85)

As I shall show, the Alternation Condition is in fact covered by the SCC, and the numerous pieces of evidence brought forward in Kiparsky (1974) apply equally to it. To make the notion "derived" in (11) clearer and show its connection with the notion "proper cyclic application" in (1) and (3), let's consider the Finnish examples in Kiparsky (1974).

Rule (12) (= (2-1)) applies in (13a) and (13b) but not in (13c):

(12) $t \rightarrow s / \underline{\quad}i$

- (13) a. across morpheme boundary (e.g. /halut+i/ \rightarrow halusi)--t \rightarrow s applies;
- b. morpheme-internally, with derived i (e.g. /kante/ \rightarrow kansi)--t \rightarrow s applies;
- c. morpheme-internally, with underlying i (e.g. /koti/ \rightarrow koti)--t \rightarrow s does not apply.

(13a), [[halut]i] in our terms, allows (12) to apply by (3a),

since the rule crucially mentions material uniquely on the outer cycle. (13b) is a case covered by (3c), because a rule e --> i applying on the outer cycle introduces information which is crucial for (12). On the other hand, in [kotil], no rule applies on the 0th cycle, and on later cycles either, since (12) involves only the sequence ti within the 0th cycle.

There still are two main differences between the Alternation Condition and the part of the Phonological Cycle that covers it. First, the SCC applies only to cyclic rules; secondly, the Alternation Condition applies only to obligatory neutralization rules. There are several possible ways of avoiding this problem; we could, e.g., modify the SCC, or keep it unchanged and changed the predictions of the Alternation Condition. Although much has to be done in this domain, I shall take the strongest position, namely that all and only obligatory neutralization rules are cyclic.²

Before returning to this proposal, it will be appropriate to discuss some methodological questions. It should be clear that there is no a priori reason to prefer a theory with cyclic grammar to a theory with noncyclic grammars (or, correspondingly, with cyclic or noncyclic components). A change from cyclic to noncyclic, or vice-versa, changes the class of languages generated but does nothing at all to the class of grammars. Hence no question of restrictiveness can be raised. On the other hand, a theory which allows rules (in general or in a given component in the grammar) to be cyclic or noncyclic language particularly defines a much larger set of possible grammars, and is thus a priori less preferable to a theory with cyclic rules, a theory with noncyclic rules, or a theory which gives some universal criterion for distinguishing cyclic from noncyclic rules.

All this does not mean that questions of restrictiveness can't be posed a posteriori in connection with cyclicity. It might very well be argued for example, that in order to account for some data, changing from a cyclic to a noncyclic theory forces us to resort to some mechanism that in fact increases the class of grammars. That was the case with the discussion of (10) where the Phonological Cycle made global rules unnecessary.

Returning to the takeover of the Alternation Condition by the SCC, it is clear that the solution proposed, restricting cyclic rules to a particular type of rules narrows the class of grammars in the desired way. The evidence presented in Kiparsky (1974) in favor of the Alternation Condition, can be easily reanalyzed cyclically, as far as I can see, although a cyclic alternative was not considered there and a reexamination of the examples would be in order. The data of Catalan covered in the present work, on the other hand, favor the proposal. The twenty-two rules presented have the following characteristics (I indicate in parentheses the number of the rule and the section where the argument for or against cyclicity appears; Roman numerals refer to the number of the chapter).

Six rules are neutralizing and obligatory, and can apply either cyclically or noncyclically, as far as I can see (IC-Rule (I, section 4), N-Deletion (II-46), R-Deletion (II-50), B to W (II-56), 1st and 2nd \emptyset -Insertion (III-(10), (11)). The other eight obligatory and neutralizing rules have to be cyclic (Destressing (I-24) I.8, Glide Formation (I-36), I.8, I.9, Vowel Reduction (I-49) I.8, I.9, Major Assimilation of Nasals (II-36) II.7, Cluster Simplification (II-28) II.7, Assimilation of Continuants (II-10) II.5, Contraction (II-23) II.5, D-Insertion (III-14) III.3). Of these rules, only the last is cyclic just because it obeys the

part of the SCC covered by the Alternation Condition and could be covered by it alone. Finally, the remaining rules are optional or non-neutralizing. Neither can be cyclic because the SCC would wrongly prevent application (Assimilation of Stops (II-7) II.2, Assimilation of Labial Stops (II-8) II.2, Minor Nasal Adjustment, (II-39), II.7 G to ŋ (II-9) II.2, Assimilation of Laterals (II-12) II.7, Final R (II-17) III.4, Initial R (II-18) III.4).

Footnotes

1. Although the present formulation of the cycle was intended for Phonology, it is interesting that all the arguments presented in Bach and Horn (1976) against the formulation of SCC in Chomsky (1973) are covered by the present version. All the examples involve a rule operating on the outer cycle that introduces specific information used by a later rule that operates within the domain of the previous cycle.
2. Other proposals to characterize the class of cyclic rules have been made in Brame (1972) and Brame (1974).

CHAPTER ONE: THE ACCENTUAL SYSTEM

1. Introduction

The most superficial observation about Catalan stress is that words are either unstressed, or else stressed on one of the last three syllables. To take the simplest cases, consider a few monomorphemic words with no or zero flexion marks.

(1)	u	'it'	ú	'(letter) u'
	popá	'dad'	pápa	'pope'
	morít	'husband'	mérit	'merit'
	putási	'potassium'	prótazi	'protasis'
	difícil	'difficult'	défisit	'deficit'

Although oxytones are more common than paroxytones, and proparoxytones are least common, there is no clear correlation between place of stress or any other general property of morphemes.¹ There are, of course, some obvious observations to be made. Items belonging to major lexical categories (nouns, adjectives, verbs and adverbs) are always stressed. Monosyllabic words cannot be proparoxytone. Polymorphemic words show only one stress on the surface, the position being determined by the inherent properties of their constituent morphemes.

Affixes might be divided into three types, stressed, unstressed, and prestressed. Unstressed affixes don't affect the stress of the stem and, of course, show up unstressed on the surface. Stressed prefixes don't show any stress on themselves, nor do they affect the stress on the stem, but their stress is needed, since it has an effect upon other phonological processes that will be discussed later. Stressed suffixes show stress on the surface (provided no other stressed suffix follows, in which case it gets stressed) and cause the stem (and any preceding stressed suffix) to

lose its stress. Finally, prestressed suffixes show no stress on themselves, but cause the stress of the stem to be positioned on its last syllable, i.e. the one preceding the suffix. Here are some examples:

(2) Unstressed

in-, -ə innúmarə (root, númar) 'countless' (fem.)

dəz-, -i dəzgásti (root, gást) 'he wears away' (subjunctive)

Stressed

-ál numərál 'numeral'

mál-, -á malgəstá 'to waste'

Prestressed

-ik numérik 'numerical'

Most inflectional suffixes are unstressed. Thus the feminine marker ə, the masculine marker u and most verbal suffixes don't bear or affect stress. A few verbal flexion markers, however, are stressed. The same is true of most derivational suffixes. Some of them belong to the class of prestressed suffixes, like ik. Prefixes never affect the stress of the stem, and can be unstressed or stressed.

So far we just have a rather simple outline of stress patterns in Catalan. Nonetheless we can begin to make some assumptions about the general characteristics of stress assignment, i.e., of the formal devices that will account for stress in Catalan. I will discuss two basic types of treatments. They can be distinguished by the presence or absence of prosodic (in particular, stress) features in underlying representations. So in the first type, stress is assigned to words solely by rule, in terms of segmental, morphological and syntactic properties of strings. This is the kind of analysis developed in Chomsky and Halle (1968) and in numerous subsequent work based on it. Under the second type of treatment, stress is predicted on the basis of both phonological rules and un-

derlying prosodic properties of lexical items. To give a somewhat more external characterization of the two approaches, the basic idea or guiding hypothesis in the first one is that, since stress is discovered to be largely predictable, finding the correct stress assignment rules will simplify underlying representations to the point of getting rid of prosodic information in the lexicon. The second solution, on the other hand, argues that prosodic information in the lexicon and a reduction of phonological rules and diacritic features is the right answer. Needless to say--yet important to remember--that the question of grammar simplicity, and a fortiori the question of relative simplicity of different parts in the grammar, is empirical. In other words, we should determine which of the solutions is empirically supported, and construct the formalism so that the other solution is either excluded or less highly valued. This does not mean, of course, that questions of restrictiveness--as distinct from questions of simplicity--cannot be raised.

In the next section, I shall present an analysis of the first type, where stress is assigned by two rules. In section 3 some inadequacies of the analysis will be pointed out, and in section 4 an alternative that belongs to the second type will be proposed.

2. Stress Assigned by Rule

An example of "standard" treatment is the detailed analysis by Wheeler (1974), chapter II and 129-131, 310-311. It also has the merit of being part of a work dealing with other phenomena relevant to stress, so that the solution reached has rather considerable motivation, given the framework.

I will first discuss the Major Stress Rule and the Minor Stress Rule, and then deal with two sets of verbal forms that require special

only vowel in monosyllables even if it is final (4f).

A considerable number of lexical items, which are marked [+E], do not undergo the MSR. They are instead subject to the Minor SR which reads

(6) [+syll] --> [+stress] / [X__C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ [+segm] ([+segm])(+C)#]

and can be expanded into

(7)

a. __C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ [+segm][+segm]†C#]

ərmónium†s
'harmoniums'

ipó†təzi†s
'hypothesis' (pl.)

b. __C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ [+segm][+segm]#]

ərmónium (sg) índəks
ipó†təzi (sg) 'index'

c. __C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ [+segm]†C#]

ábit†s áreə†s
'habits' 'areas'

d. __C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ [+segm]#]

ábit (sg) áreə (sg)

C₀ $\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ accounts for the extra syllable the stress is shifted

backwards for items marked [+E], the following [+segm] ensuring that

$\begin{bmatrix} +\text{syll} \\ +\text{E} \end{bmatrix}$ is nonfinal.

Before discussing the inadequacies of MSR and Minor SR, let me present some cases connected with verbal morphology that are dealt with in a special way.

Some tenses, mainly the past indicative and the past subjunctive, show paroxytone stress not predicted by the MSR (recall that verbs are redundantly marked [-E]):

(8) pint†á†bə†w 'you-pl painted'

bib†í†ə†m 'we lived'

pint†é†si†m 'we painted' (subjunctive)

Two alternative solutions are proposed. One consists of a rule

assigning the feature [+E] to the appropriate verb forms so that they undergo the Minor SR,

$$(9) \quad V \rightarrow [+E] / \left[\begin{array}{l} +\text{PRET} \\ -\text{INF} \end{array} \right] X \text{ --- } \left[\begin{array}{l} -\text{syll} \\ +\text{lab.} \end{array} \right]$$

$\left[\begin{array}{l} +\text{PRET} \\ -\text{INF} \end{array} \right]$ defining the corresponding tenses, and $\left[\begin{array}{l} -\text{syll} \\ +\text{lab.} \end{array} \right]$ the class containing m and w, the 1st and 2nd person markers, respectively. Under the second alternative the MSR is modified so that final s and n (2nd sg. and 3rd pl.) suffixes are extended to m and w in the appropriate tenses.

$$(10) \quad V \rightarrow [+stress] / [X \langle [-\text{PRET}] \rangle_c \text{---} C_0 ([+\text{segm}]) \langle \left[\begin{array}{l} +\text{syll} \\ +\text{high} \end{array} \right] +V \rangle \left(\left[\begin{array}{l} -\text{vocal} \\ -\text{obstr} \\ +\text{cont.} \\ \langle +\text{cor} \rangle_d \end{array} \right] \right) \#]$$

condition: if c then d

A second case in verbs where stress falls on the syllable preceding the one normally stressed by the MSR, involves two irregular verbs, caber, 'to fit in' and saber, 'to know' which show the following forms in the present subjunctive:

- (11) kápigə sápigə
 kápigəs sápigəs
 kápigə sápigə
 kəpigém səpigém
 kəpigéw səpigéw
 kápigən sápigən

The MSR would stress the 1st and 2nd plural forms correctly but would wrongly stress the vowel i in the remaining forms. To prevent this, a rule is proposed that assigns the feature [+E] to 1st, 2nd and 3rd sg. and 3rd pl. in present subjunctive for verbs saber and caber.

For unstressed words several rules affecting boundaries are proposed. Thus prepositions and conjunctions are assigned word boundaries in the lexicon (or alternatively by rule). In the case of unstressed

prepositions or conjunctions (a, amb, de, en, per, i, que) a special rule deletes the word boundary so that stress rules can't apply. Compounds are treated as two-stress words (compounds are discussed later, sections 6 and 8).

3. Discussion

To summarize, the assignment of stress works as follows. Two rules, MSR and Minor SR, assign stress to lexical items. One rule assigns stress to a last nonfinal vowel (i.e., /__C₀ [+segm]#) optionally followed, in N's and A's, by the following sequences of suffixes, characterized in the S.D. of the rule by their segmental properties: i+a, u+a, plural marker s, 2nd person sg. s, 3rd person pl. n. The Minor SR assigns stress in similar though not identical conditions, one syllable further back.

MSR and Minor SR are disjunctive. Disjunctivity is attained in the following way. Items are marked either [+E] or [-E]. A redundancy rule marks [+E] items with a rule feature, [-MSR]. Some verb forms that are subject to the Minor SR are marked also [+E] by a special rule.

One of the main characteristics of this system is that disjunctivity is gotten through the use of diacritic features and rule features, instead of restricting it to the use of parentheses. Notice that the former procedure doesn't force the S.D. of one of the rules to be a proper subset of the other. Thus, in this case, a) MSR and Minor SR share identical expansions, and b) there are strings that never meet the S.D. of the rules. In the first case either of the specifications of the diacritic feature E would do to get the correct stress assigned, in the second the implicit claim is that some class of strings never receive stress. As one might expect, most of the examples that would fall in the second

case (S.D.'s not met) are either impossible or nonexistent phonological representations. Actual examples, however, are also found. Consider the words vértēbra, ómicron, íntēgra, 'honest' (fem), Hélsinki, Júpiter, déficit. They should be marked [+E], since the only case where the MSR yields proparoxytones is when the sequence $\begin{bmatrix} +\text{syll} \\ +\text{high} \end{bmatrix} +V$ occurs (like in karísi+a). Now consider how these items would be stressed by the Minor SR (6). The +C part of the rule never plays a role since no final consonant is a morpheme on its own.

(12) ((7b))

((7d))

	$\text{---}C_0 \begin{bmatrix} +\text{syll} \\ +E \end{bmatrix} [+ \text{segm}] [+ \text{segm}]$		$C_0 \begin{bmatrix} +\text{syll} \\ +E \end{bmatrix} [+ \text{segm}]$	
bértə	¬b r + ə	bértə	b ¬r + ə	NO STRESS
intə	¬g r + ə	intə	g ¬r + ə	NO STRESS
ɛlsi	¬ŋ k i	ɛlsi	ŋ ¬k i	NO STRESS
ɔmi k	¬r u n	ɔmí	kr ¬u n	*ɔmíkrun
župi	¬t ə r	župí	t ¬ə r	*župíter
dɛfi	¬s i t	d fí	s ¬i t	*dɛfísit

(where ¬ means S.D. not met)

For three items the S.D. is not met and they are left unstressed², whereas for the other three the wrong vowel gets stressed. It might be possible that changing the form of the rules might account for vértēbra, íntēgra, Hélsinki and similar examples, but for the rest a new rule and a new feature would be needed. Words like deficit could in fact be stressed on any of the vowels (cf. dɛfísit, sulísit 'solicitous', pləbísít 'plebiscite').

A second case of nonpredictable stress is provided by polysyllabic words ending in a stressed vowel. Under either MSR or Minor SR the stress would be assigned to one of the nonfinal vowels. Wheeler (1974), p. 310,

proposes an underlying final r for these cases. There is a general rule deleting final r, as illustrated by the following alternations (see also Chapter 2, section 9):

(13)	kārē	'street'	kārāró	'alley'
	pó	'fear'	purúk	'fearful'
	dú	'hard'	dúra	'hard' (fem)
	fló	'flower'	flurétə	'small flower'
	sənsé	'whole'	sənséra	'whole' (fem)
	klá	'clear'	kləritát	'clarity'

But for some words with no derivative there is no evidence of an underlying final r:

(14)	mərsé	'mercy'	šimpanzé	'chimpanzee'
	busté	'you' (polite)	kumité	'committee'
	tərənná	'disposition, way of acting'	bisturí	'scalpel'
	təbú	'taboo'	məmə	'mum'
	papú	'Papuan'	puré	'pure'
	pəpá	'daddy'	rundó	'rondo'
	bəmbú	'bamboo'	sufá	'sofa'
	munəstí	'monastery'	šəmpú	'shampoo'

Furthermore, in cases where derivatives occur, no r appears:

(15)	kafé	'coffee'	kəfətəría	'coffeehouse'
	pəruné	'fibula'	pəroneál	'fibular'
	frənəzí	'frenzy'	frənəziə	'frenzy'
	pəru	'Peru'	pəruá	'Peruvian'

Of course there is an expansion of MSR that would stress a final vowel, namely $_C_0\# (= (4f))$, but in polysyllabic words the expansion $_C_0 [+\text{segm}]\#$ would apply first. Hence a new diacritic feature triggering

the appropriate expansion would be needed to stress word final vowels.

Another set of cases that also involve oxytone stress is treated in a different way. Future and conditional tenses have stress on the desinence, whereas MSR would predict stress on the thematic vowel for future singular and 3rd plural and stress on the desinence for 1st and 2nd plural and conditional. Minor SR would give even worse results, retracting stress further back. The following examples correspond to the verb cantar 'to sing', the underlined vowel being the one stressed by MSR.

- | | | |
|------|-------------------|--------------------|
| (16) | kant <u>ar</u> é | kantar <u>í</u> a |
| | kant <u>ar</u> ás | kantar <u>í</u> as |
| | kant <u>ar</u> á | kantar <u>í</u> a |
| | kant <u>ar</u> ém | kantar <u>í</u> em |
| | kant <u>ar</u> éw | kantar <u>í</u> aw |
| | kant <u>ar</u> án | kantar <u>í</u> on |

The solution proposed goes along the lines of Harris (1969), 91-98 for future and conditional in Spanish. These tenses are analyzed as an infinitive (cantár) and an inflected auxiliary verb (é, ás, etc.; ía, íes, etc.), namely the verb haver, also used to form perfect compound tenses (he cantat, etc.). See Appendix II for conjugation of haver.

No real argument is offered to support the claim that future and conditional are compound forms, except, of course, that stress is correctly assigned by MSR. In addition the conditional desinence differs from the corresponding form of haver and a v deletion rule which is not independently motivated has to be posited³.

- | | | | | | | | | |
|------|------------|-----|--------|---|------------|-----|-----------|---|
| (17) | [#kantar] | aux | [#e#]# | v | [[#kantar] | aux | [#avia#]# | v |
| | stress-as. | | é | | | | í | |
| | v-delet. | | | | | | ∅ | |
| | truncation | | | | | | ∅ | |
| | kantar | | é | | kantar | | ía | |

Of course there exist similarities between future and conditional on the one hand, and infinitive+haber on the other. But this does not mean that such similarities have to be accounted for by the grammar. The explanation is, at least in part, historical. Future and conditional were once compound forms as shown by the fact that clitic pronouns could appear between infinitive and auxiliary. The question is rather whether the forms that are similar for historical reasons are analyzed today as compounds. Verbs with allomorphic roots usually have the same allomorph for infinitive, future and conditional (as would be expected historically) but this is not always the case: we thus have, along with the normal 1st person sg. form for cantar in (17), the following 1st person sg. forms.

(18)	<u>Future</u>	<u>Conditional</u>	<u>Infinitive</u>	
	pu r é	pu r ía	pu r é	'can'
	sábré	sábría	sábré	'to know'
	kábré	kábría	kábré	'to fit in'
	áwré	áwría	ábré	'to have'
	suldré	suldría	sulé	'to use to'
	báldré	báldría	bálgé	'to be worth'
	buldré	buldría	bulgé	'to want'
	tindré	tindría	tánir	'to have'
	bindré	bindría	banír	'to come'
	ániré	ániría	ánár	'to go'

If, as will be proposed in Chapter 3, Future and Conditional forms have been reanalyzed, into a sequence of verb stem-desinence (tense and person markers) as all other tenses, these facts can be easily explained. In a synchronic analysis, just as we have different stems, e.g. for the

first two verbs in (18), as in gerund pugént, səpigént, respectively, and 3rd person Pl. Present Indicative pódan, sában, respectively, we find the same allomorphic stems pugé and səpigé in the Infinitive, and pód and sáb in Future and Conditional (in these tenses the stem vowel changes because it is destressed; see note 3). Diachronically, if Present, Future and Conditional were formed on the Infinitive, we would expect any change in the Infinitive stem or desinence to be carried over to these tenses, which is not the case. On the contrary, if Future and Conditional are independent tenses, we expect the facts in (18), namely that they take their own allomorphic stems, not necessarily the same as those of the Infinitive. The same is true of the desinence. In Chapter 2, section 9, I shall argue that a class of verbs has an irregular Infinitive marker ə (instead of r). As expected, Future and Conditional show up with the r of their tense marker even though the Infinitive lost its r at some previous stage.

Another characteristic of the system under discussion is the use of phonological information to characterize the morphological environment in which a rule applies. In the MSR, for example, the rule applies regardless of the presence or absence of the plural marker (s), the 2nd sg. marker (s), and the 3rd pl. marker (n). Stating this as $(\begin{matrix} +[-\text{vocal}] \\ +[\text{coron}] \\ -[\text{distr}] \end{matrix})$ at the end of the environment amounts to claiming that the generalization is of phonological nature. Given the fact that the number of morphemes consisting of a single consonant is scarce, this claim is difficult to support or discredit. However, let's imagine a situation where this would be possible. Suppose Catalan changes some of its suffixes. In the Present Indicative the present 1st person sg. marker is u and the 1st person plural marker is m. Thus surt+u 'I go

Of course to say that one would expect or find more natural to have the stress pattern preserved in spite of minor phonological changes in underlying representations does not make (21) a counterexample. Although some real, more detailed case of that sort would be needed, it is perhaps worth observing that in the evolution from Latin, stress pattern tends to be preserved in the Romance Languages. Just to give an example, consider the Present Indicative in Latin, Catalan, Italian and Spanish (respectively):

(22)	<u>ámo</u>	<u>ámo</u>	<u>ámo</u>	<u>ámo</u>
	<u>ámas</u>	<u>ámes</u>	<u>ámi</u>	<u>ámas</u>
	<u>ámat</u>	<u>áma</u>	<u>áma</u>	<u>áma</u>
	<u>amárus</u>	<u>amém</u>	<u>amiámo</u>	<u>amámos</u>
	<u>amátis</u>	<u>améu</u>	<u>amáte</u>	<u>amáis</u>
	<u>ámant</u>	<u>ámen</u>	<u>ámano</u>	<u>áman</u>

Moreover, the hypothetical form with ut instead of u does actually occur in a Catalan dialect close to the one discussed here. The actual form is [súrtut] and not [surtút] as would be predicted by the MSR.⁴

4. Underlying Stress

In the following paragraphs I will present a system that follows from a quite different assumption, namely that for Catalan,

(23) stress, rather than being a feature added in the course of the derivation, is like other segmental features part of the underlying representation of morphemes.

This doesn't mean that there are not generalizations to be captured or that surface stress is entered in the lexicon. First, conditions on well-formedness of underlying representations will restrict it to one of the three last vowels, the rest remaining unstressed. As far as

monomorphemic nominals are concerned, this condition will do. Furthermore, such regularities as nonexistence of unstressed major lexical categories, oxytone character of verbal stems, can be easily accounted for in a similar way. In the case of polymorphemic words, three different situations may arise. In case only one stressed morpheme is present, the word stress falls on its accented syllable. If there are several stressed morphemes in the word, the word stress falls on the stressed vowel of the last one. Therefore a rule destressing all but the last stressed vowel is needed:

(24) $V \rightarrow [-str] / \# \# X _ Y [+str] Q \# \#$

The third case, where prestressed suffixes are involved, poses interesting problems. It is not possible to predict the effect of a prestressed suffix from the underlying stress pattern of the suffix. Consider the following cases, where the two possible alternatives (i.e. [+stress] and [-stress]) are considered for ic (desgásten 'they wear away', malgastadór 'spendthrift', atómic 'atomic').

(25)	<u>des+gást+en</u>	<u>mál+gást+á+dór</u>	<u>átom+íc</u>	<u>átom+ic</u>
Destressing	- - -	a a a -	a - -	- - -
	<u>desgásten</u>	<u>malgastadór</u>	<u>atomíc</u>	<u>átomic</u>

If ic has no underlying stress, it will behave like en in mal-gásten, and stress will remain in the position it had in the stem (penult since 'atom' is átom). If, on the other hand, we enter íc stressed, Destressing will apply. So we will get either atomíc, or átomic but not the actual atómic. One might think of different solutions to the problem. In any event, prestressed suffixes must carry the information that distinguishes them from both unstressed and stressed suffixes; some kind of boundary, for instance, might be proposed. Another in-

interesting possibility is to adopt an autosegmental representation of stress in underlying form where suffixes like ic had penultimate stress.⁵ Under any proposal, however, it is clear that there must be some rule, call it IC-Rule, assigning stress to the vowel preceding the suffix. I will return to this problem later.

Let us now turn to the problem of dealing with the facts accounted for by MSR and Minor SR and the problems that arose.

For the stress of words ending in ita, uta, (section 2) (e.g. agonía vs. angúnia) there is no more need for setting up an otherwise little motivated underlying /iyta/, /uwta/ to get the stress on penultimate syllable. Instead, the first word will have underlying stress on the last syllable of the root, the second word on the penultimate: /agoníta/, /angúnita/.

The use of the diacritic feature [E] (section 2) and the others that are also needed (see section 3) will be dispensed with. Differences in stress pattern that are lexically idiosyncratic will be differences in underlying representation, and not differences of membership in classes of lexical items as defined by a set of diacritic features. Notice that diacritic features like [E] are operative just for stress. There won't be need for rules assigning rule features either. Let's consider the cases involving verb forms. A detailed and systematic analysis will be presented in Chapter 3. A verb form has a stem consisting of a root, possibly with derivational affixes, and a thematic vowel. The stem is followed by tense markers, and these by person markers (in the finite forms). Under the present system the stress should fall on the root when no stressed suffixes follow, and on the last stressed suffix if there are any. Such an analysis is compatible with the data furnished by verbal morphology. Considering the thematic vowel and the

future and conditional markers stressed (as well as the root and any derivational suffix in the stem), and all other suffixes unstressed, accounts for all the verbal stress patterns. See Chapter 3 for details. I shall give here only a set of illustrative forms (verb bullir 'to boil'; whole paradigm in (1), Chapter 3).

(26)	ROOT	THEMATIC VOWEL	TENSE MARKER	PERSON MARKER	SURFACE FORM	
	búλ	ø	u	ø	búλu	'I boil'
	búλ	í	ə	s	buλíəs	'you boiled'
	búλ	í	si	m	buλísim	'we boiled (subj.)'
	búλ	í	ré	ø	buλiré	'I shall boil'
	búλ	í	ø	m	buλím	'we boil'
	búλ	í	ríə	s	buλiríəs	'you would boil'

It will be recalled that some verb forms presented some problems to stress assignment by MSR and Minor SR. Since verbs were redundantly marked [-E], the MSR had to apply to them. MSR assigns stress to the penultimate vowel only if the verb ends in a vowel ((4d)) or in n, s preceded by morpheme boundary. Thus cases (4a, b, c) are excluded. Proparoxytones like the irregular forms in (27d, e) (also in (11)) cannot be stressed at all by MSR. The solution proposed to deal with (8) and (11) involved some complications in the rule and use of rules assigning diacritic features to some verb forms. Consider now the underlyingly stressed forms and their phonetic counterpart.

(27)	<u>THEMATIC VOWEL</u>		<u>THEMATIC VOWEL</u>	
a.	pínt+á+bə+m	píntábəm	f. sápig+é+m	sápigém
b.	bíb+í+ə+m	bibíəm		
c.	pínt+é+si+m	pintésim		
d.	kápig+ø+ə	kápigə		
e.	sápig+ø+ə	sápigə		

In the cases where there is no thematic vowel the stress falls on the root, otherwise on the thematic vowel. Cases (d), (e), (f) are irregular. But notice that the irregularity involves suppletive forms for some tenses. In the present system there is no need to make stress assignment "irregular" as well, since surface stress follows from our system automatically. The irregularity of caber and saber consists of having two allomorphic roots /káβ/ and /kápig/.

Notice also that the previous system couldn't state the generalization that "irregular" stress occurs whenever "irregular" suppletive stems occur, since some forms, namely capiguém, capiguéu, etc. get the "normal" stress. Under the present analysis, however, all forms in (27) are irregular, in the sense of having an allomorphic root /kápig/, but the fact that [kəpigém], [kəpigéw] don't get penultimate but final stress, follows from the fact that they have--as in other verbs--a stressed thematic vowel. Destressing (24) erases the "anomalous" stress on the root.

For future and conditional no compound structure needs to be posited in order to get stress assigned correctly. Future markers ré, ré, and rá are stressed suffixes and so is the conditional marker ría. Destressing (24) will eliminate the root and the thematic vowel stress and the future and conditional forms will appear stressed, correctly, on the desinence.

5. Some Segmental Processes

Before continuing the discussion of our proposed stress system, some phonological processes have to be motivated and formulated in detail.

B₂Devoicing. The combination $\left[\begin{array}{l} +\text{syll} \\ +\text{stress} \end{array} \right] \left[\begin{array}{l} -\text{son} \\ +\text{lab} \end{array} \right]_1$ is almost always

realized phonetically as $\check{V}pl$:

(28)	kóplə	'music band'	ublík	'oblique'
	féplə	'feeble'	ublidá	'to forget'
	mšplə	'furniture item'	ubligá	'to force'
	dóplə	'double'	sěmblə	'it is likely'
	əstáplə	'stable'	fébrə	'fever'
	amáplə	'kind'	bídra	'glass'
	pšplə	'people'	abl+ətív	'ablative'

Only the following exceptions are known to me:

(29)	rəpúblikə	or	rəpúplikə	'republic'
	públik	or	púplik	'public'
	bíblia			'Bible'
	bíblík			'biblical'

Furthermore, there exist some alternations $\underline{b} \sim \underline{p}$ in cases like those in (28):

(30)	mšplə	'furniture item'	mubilyári	'furniture'
	nšplə	'noble'	nubilyári	'relative to nobility'
	bukáplə	'word'	bukəbulári	'vocabulary'
	diáplə	'devil'	diabšlik	'devilish'
	pusíplə	'possible'	pusibilitát	'possibility'
	prubáplə	'probable'	prubəbilitát	'probability'

The structure of words where the labial is always voiceless is $X\check{V}plə$, since final $\underline{ə}$ is either epenthetic (no word ends up in surface structure as XC [+sonor]##. See rule (11), Chapter 3), or the feminine suffix. For the exceptions in (29) there are two possible analyses for the first two examples: rəpúblik+ə, públik, or rəpúblik+ə, públik since relation to pšplə in (28) is debatable. For bíblia there is no independent morpheme bibl and it should be analyzed as bíbli+ə

and excluded from the process of devoicing. Let's therefore propose tentatively the following rule, that would apply to items in (28) and (30) and exclude or not, depending on morphemic analysis, those in (29):

(31) $b \rightarrow p / \check{V} _lt \dagger$

The following examples might indicate that the process should be extended to g:

(32) $\bar{r}\acute{e}kl\grave{o}$ 'rule'
 $s\acute{e}kl\grave{o}$ 'century'
 $\bar{r}\acute{e}kl\grave{o}$ 'ruler'
 $s\acute{i}kl\grave{o}$ 'cycle'
 $\grave{a}\bar{r}\acute{e}kl\grave{o}$ 'he arranges'

The only possible alternation, however, is $r\acute{e}kl\grave{o} \sim r\acute{e}gl\grave{o}$ 'rule' ~ 'regular' where the relatedness is dubious. (31), thus extended, would not apply to words like $[\acute{e}glug\grave{o}]$ 'eclogue' since there is no morpheme boundary after l. Finally, $[s\acute{i}gl\grave{o}]$ 'acronym' is $s\acute{i}gl\grave{o} + a$ and constitutes hence a counterexample to extending (31) to g. A modification for the status of (31) will be proposed at the end of section 9.

Glide Formation. Consider the following alternations:

(33) i $t\acute{o}rn\grave{o}$ 'he returns there' $t\acute{o}rn\grave{o}$ y 'return there!'
 $s\acute{a}l$ i $p\acute{a}$ 'salt and bread' $p\acute{a}$ y $s\acute{a}l$ 'bread and salt'
 u $t\acute{o}rn\grave{o}$ 'he returns it' $t\acute{o}rn\grave{o}$ w 'return it!'
 $f\acute{e}z$ un $s\acute{a}l$ '(make a) jump!' $f\acute{e}$ wn $s\acute{a}l$ 'to (make a) jump'

In general an unstressed high vowel becomes a glide after another vowel and across word boundaries (the boundary between clitics i and u, and the verb should be weaker than boundaries between words). But the rule is also operative across morpheme boundary. Masculine marker is usually \emptyset , but in a reduced number of cases it is u (feminine marker is ə):

(34)	<u>Masculine</u>		<u>Feminine</u>
	máku	'beautiful'	mákə
	gánsu	'calm; phlegmatic'	gánsə
	buráču	'drunk'	buráča
	mónžu	'monk'	mónžə ('nun')

Derivative

fěru	'iron'	fěrik	'ferric'
súru	'cork'	suré	'cork' (adj.)
bětu	'veto'	batá	'to veto'
gánsu	'hook'	gənsút	'hooked'

When u or the prestressed suffix ik appear after a vowel, they show up as w, yk:

(35)	dėw	'god'	dəízma	'deism'
	impíw	'impious'	impiətát	'impiety'
	əwrupėw	'European'	əwrupėja	'European' (fem.)
	kunrėw	'cultivated land'	kunreá	'to cultivate land'
	əlžəbráyk	'algebraic'	əlžəbrə	'algebra'
	diərėyk	'diarrhoeic'	diərėja	'diarrhoea'

The distribution within morphemes, where both glide and vowel appear (rėyna 'queen', rəimėt 'small grape') will be dealt with later. Glide Formation can be formulated as follows, where #₀ stands for any number (including zero) of boundaries:

$$(36) \begin{bmatrix} +\text{syll} \\ +\text{high} \\ -\text{str.} \end{bmatrix} \rightarrow [-\text{syll}] / [+ \text{syll}] \#_0 _$$

6. Vowel Reduction

Catalan has seven distinct vowels, and the derived vowel ə⁶

(37)	<u>ɔ</u>	<u>o</u>	<u>u</u>	<u>a</u>	<u>ɛ</u>	<u>e</u>	<u>i</u>	<u>ə</u>
back	+	+	+	+	-	-	-	+
ATR	-	+	+	-	-	+	+	+
CP	-	-	-	+	-	-	-	-
hi	-	-	+	-	-	-	+	-
lab	+	+	+	-	-	-	-	-

as in the following examples:

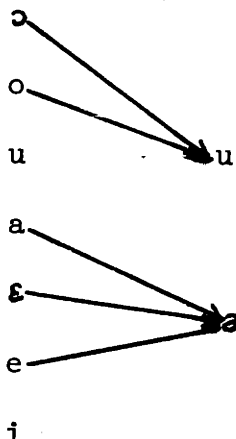
(38)	pórt	'harbor'	sák	'sack'	prím	'thin'
	gós	'dog'	pél	'hair'	par	'for'
	lúm	'light'	sérp	'snake'		

In unstressed position, the vowel system is generally reduced to three vowels, u, ə, i, as shown by the following derivatives of the examples in (38):

(39)	səkét	'small sack'		λuminós	'light' (adj.)
	purtuári	'related to harbor'	..	palút	'hairy'
		(adj.)			
	gusás	'big dog'		sarpóta	'big snake'
	əprimá	'to make thin'			

It is clear that the rule that will account for these alternations will have as input the vowels of (38) and derive those in (39), but not in the opposite direction, since ə and u have different sources. The rule should have this effect:

(40) +stress -stress



Although this accounts for the vast majority of cases, there are examples where the process described does not take place. I will divide these "exceptions" in three groups:

1) Contextual exceptions

Underlying e, ɛ, followed by a, ə (derivable from a), are phonetically e (instead of ə) when unstressed:

- (41) teátrə 'theater' pərunetál 'fibular'
 řealitát 'reality' line+ál 'linear'
 meándrə 'meander' kre+ətrá 'he'll create'
 əsteárik 'stearic' kunře+á 'to cultivate'
 useanógráf 'oceanographic' kunře+ətrá 'he'll cultivate'
 (cf. pəruné 'fibula', krÉə 'he creates' and kunřÉə 'he cultivates')

2) Lexical exceptions

Some lexical items do not undergo the rule, but this property doesn't correlate to any other phonological or morphological property, i.e., it is lexically idiosyncratic.⁷

- (42) kláse 'class' cf. with plásə 'square'
 bóston bɔsfur̄ 'Bosphorus'
 sopráno
 báter 'restroom'
 kátedrə '(university) chair'
 óperə
 deskártəs 'Descartes' daskártəs 'you discard'
 kólerə 'cholera' kólərə 'rage'

Two things have to be said with respect to the class of cases exemplified in (42). First, ə appears in these forms, and, since it is not

present in underlying representation, the Vowel Reduction rule must have applied in some cases to the corresponding underlying source, a. Secondly, although the change to u and ə is blocked, ɔ, ɛ never appear in unstressed position (but o, e do appear).

3) Morphological exceptions

Some compounds, prefixed words, or phrases show a single stress, and an unstressed non-reduced vowel before it:

- (43) sɛmi séntɾə 'semi-center' sensə gánə 'without hunger'
 r̄entə pláts 'dishwasher' kap r̄əó 'no reason'
 kɔr ágrə 'heartburn' kɔm kántə 'how he sings'

Since Vowel Reduction has been traditionally considered a general process, cases like (43) are usually treated as though the first element with the non-reduced vowel had a (secondary) stress on it. There is, however, evidence in Mascaró (1975), summarized here in Appendix I, that this is not the case. It is worth noting that here neither a "reduces" to ə nor ɛ, ɔ are "reduced" to e, o respectively. The seven vowel distinction in stressed position remains in the case of morphological exceptions.

The formulation of the rule of Vowel Reduction poses no problem if the three kinds of exceptions just discussed are ignored. It might take, for example, the following form:

$$(44) \begin{bmatrix} +\text{syll} \\ -\text{hi} \\ -\text{str.} \\ \langle +\text{lab} \rangle \end{bmatrix} \dashrightarrow \begin{bmatrix} +\text{back} \\ +\text{ATR} \\ \langle +\text{hi} \rangle \end{bmatrix}$$

But it seems that at least the contextual exception should be built into the rule, its characterization being purely phonological. One problem is that the context most easily definable--most "natural"--is the context in which the rule does not apply, i.e. before [+CP].

Recall that the a's before which e appears will be a at the time Vowel Reduction applies. The context under which the rule applies is its complement, namely [-CP], [-syll], #. But assuming the latter generalization (i.e., before a non-CP vowel, a consonant, or word-finally) were to be right, we would still be faced with the problem of stating the structural change correctly. Recall that some kind of "partial" reduction with the effect $\varepsilon \rightarrow e$ is needed ($kr\varepsilon + \acute{a} \rightarrow kre + \acute{a}$). Consider one possibility:

$$(45) \begin{bmatrix} +\text{syll} \\ -\text{hi} \\ -\text{str} \\ \langle +\text{lab} \rangle_a \\ \langle +\text{back} \rangle_b \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ATR} \\ \langle +\text{hi} \rangle_a \\ \langle +\text{back} \rangle_c \end{bmatrix} / \text{---} \langle \begin{bmatrix} +\text{syll} \\ +\text{CP} \end{bmatrix} \rangle_d$$

CONDITION: $((\sim b \wedge \sim c) \leftrightarrow d) \wedge (b \rightarrow c)$

(45) is a scheme for the following rules ($V^1 = \begin{bmatrix} +\text{syll} \\ -\text{hi} \\ -\text{str} \end{bmatrix}$):

(46)	CONDITION	RULE	EFFECT
	a b c d		
	T T T F i)	$\begin{bmatrix} V^1 \\ +\text{lab} \\ +\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ATR} \\ +\text{hi} \\ +\text{back} \end{bmatrix}$	$\{o\} \rightarrow u$
	F T T F ii)	$\begin{bmatrix} V^1 \\ -\text{lab} \\ +\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ATR} \\ -\text{hi} \\ +\text{back} \end{bmatrix}$	$a \rightarrow \partial$
	F F T F iii)	$\begin{bmatrix} V^1 \\ -\text{lab} \\ -\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ATR} \\ -\text{hi} \\ +\text{back} \end{bmatrix}$	$\{e\} \rightarrow \partial$ (disjunctive with iv)
	T F F T	no [+lab, -back] segment existing in Catalan	
	F F F T iv)	$\begin{bmatrix} V^1 \\ -\text{lab} \\ -\text{back} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{ATR} \\ -\text{hi} \\ -\text{back} \end{bmatrix} / \text{---} a$	$\{e\} \rightarrow e / \text{---} a$

The fact that back has to be added to the SD of the rule (since $a \rightarrow \partial / \text{---} a$, cf. [sə́arik] 'saharic!') and that Boolean conditions on expansions of brackets had to be introduced is a consequence of the

assumption that what we have been calling "Vowel Reduction" is a single process and has to be captured by a single rule. Since no evidence has been brought so far to strongly support such a claim, it might be advisable to consider some alternatives. Suppose we consider that the fact that e, ɛ are realized as e before a has to be taken care of by a separate rule. Now this rule would have to be ordered with respect to the rule that accounts for the rest of the cases of Vowel Reduction. If ordered before, it would have to apply to e, ɛ, and if after, to ə since e, ɛ would have been converted into ə by the rule. To give an example,

(47)	a.	krɛ+á	b.	krɛ+á
		ɛ, e → e		Vowel Red.
		Vowel Red. *ə		ə → e
		e		ə
				e

Quite clearly, only the second ordering could work, since under the ordering ɛ, e → e -- Vowel Reduction, the output of ɛ, e → e would feed Vowel Red. and the final output would be *[krəá]. But consider what happens under the alternative ordering. The rule has to be formulated ə → e / __a, and at this stage ə is the reflex not only of unstressed e, ɛ but also of unstressed a. Cases of aa, which would feed the rule also, show that the result is not ea but əa: [səárik] 'Sahara' (cf. [sáara] 'Sahara'), [bəál], 'Baal' ; furthermore ə couldn't possibly have any other source than e, ɛ or a. Even worse, the context of application, namely -a has been subject to Vowel Reduction and appears as -ə, but -ə originates also from -e, -ɛ, in which case we don't want the rule to apply:

(48)	krɛ+á	krɛ+a+syó 'creation'	paeλ+ét+a 'small pan'
	Vowel Red.	ə	ə ə
	ə → e	e	e
		kreá	*peəléta
		kreasyó	

The second rule would wrongly apply to yield [pealéta], since at this stage the e,ɛ~a distinction is lost.

Before rejecting the hypothesis that contextual exceptions are to be accounted for by a separate rule, let us pursue it a little bit further. In order to avoid the contrary results of the two possible orderings discussed, ə → e should apply to a representation that will not undergo e reduction to ə later and to a representation that has the distinction e,ɛ ~ a. The only way to achieve this without recourse to an increase in the power of phonological rules, allowing them to refer to more than one representation, is to split Vowel Reduction into two separate rules, (49a) and (49c), ə → e being ordered between them.⁸

(49)

- a.
$$\left[\begin{array}{l} +\text{syll} \\ -\text{hi} \\ -\text{CP} \\ -\text{str} \\ \langle +\text{back} \rangle \end{array} \right] \dashrightarrow \left[\begin{array}{l} +\text{back} \\ \langle +\text{hi} \rangle \end{array} \right]$$
- b.
$$\left[\begin{array}{l} +\text{syll} \\ +\text{back} \\ -\text{lab} \\ -\text{CP} \end{array} \right] \dashrightarrow [-\text{back}] / \text{---} \left[\begin{array}{l} +\text{syll} \\ +\text{CP} \end{array} \right]$$
- c.
$$\left[\begin{array}{l} +\text{syll} \\ -\text{hi} \\ -\text{str} \end{array} \right] \dashrightarrow [+ATR]$$

This solution avoids the use of rule-specific Boolean conditions on brackets, but has to state the whole process in three (perhaps two, see note(8)) steps. The need for having a single rule rests upon the need for capturing thereby a significant generalization. Rather, evidence can be presented that suggests that the opposite is true. In other words, in order to capture some generalization, two rules instead of one are needed. Recall that what we called "lexical exceptions"

were words that didn't show so to say "full" reduction but only partial reduction of unstressed vowels. Furthermore, one case, namely a, showed "full" reduction to ə:

(50)	partially reduced	totally reduced
	a ----->	ə
	ɛ ---->	e
	e ---->	e
	ɔ ---->	o
	o ---->	o

If rule (45) is adopted, some of its expansions must be prevented from applying to these kind of items and, furthermore, a separate rule must be introduced to achieve the partial reductions. Under the revised formulation of (49), however, it is sufficient to say that lexical exceptions are not subject to rule (49a), i.e., that they don't undergo $o, \text{ɔ} \rightarrow u$ and $e, \text{ɛ} \rightarrow \text{ə}$ reduction.⁹ They will undergo (49c), however, that makes unstressed vowels [\uparrow ATR], thus with the effect needed, i.e. $e, \text{ɛ} \rightarrow e$; $o, \text{ɔ} \rightarrow o$; and $a \rightarrow \text{ə}$ ([-CP] supplied by convention, see note 8).

Thus, having a separate "Major" Vowel Reduction rule captures the fact that (except for morphological exceptions which are dealt with later below) no ɛ, ɔ or a appear unstressed in surface phonetic form, whereas o, e appear unstressed in some specific cases.

7. Further Support for Underlying Stress

One of the consequences of underlying stress is that before the Destressing rule applies, representations will have a considerable number of phonetically nonrealized stresses, a situation that didn't arise in the theory of stress outlined in section 2. It is possible at this

point to look for empirical evidence that would bear on this difference. In section 5 two rules were presented that had something in common, namely the feature [±str] in the S.D. A theory that predicts stress by assigning it only to the vowels that will show it in surface phonetic form predicts that rule (31) will apply only to b after phonetic stress, and that (36) will fail to apply only if, the rest of the S.D. being met, the second vowel is phonetically stressed. If stress is underlying, on the other hand, it might be possible that underlying but not phonetically realized stress has an effect on rules (31) and (36). It might be possible that b devoices even after a phonetically unstressed vowel and i doesn't become a glide after another vowel even if unstressed. But, in addition, the conditions under which this could happen are limited precisely to the cases where an underlying stress further deleted by Destressing was present.

Let's now consider some of these situations. (cf. with (30) and (33)):

(51)	<u>o b ligaré</u>	'I'll force'	<u>sa u quér</u>	'elder'
	<u>enno b liré</u>	'I'll make noble'	<u>re u matísme</u>	'rheumatism'
	<u>mo b láble</u>	'furnishable'	<u>re i etó</u>	'kinglet'
	<u>su b limáble</u>	'sublimable'	<u>arr u inát</u>	'ruined'
	<u>pro b lemátic</u>	'problematic'	<u>re i ncidír</u>	'to relapse'
	<u>dia b lería</u>	'devilry'	<u>raí met</u>	'small grape'
	<u>no b lésa</u>	'nobility'	<u>arca i tzava</u>	'It was archaic'

In all cases the stress shows up in the surface to the right of the vowels that would be involved in the rules of B-Devoicing and Glide Formation. But the actual phonetic forms show p in some cases, b in others for the first set of examples, and i and y alternate similarly in the second set. Furthermore, (52) below shows that there is

a clearcut correlation between those alternations and the presence of an underlying stress predicted by our theory. In other words, b devoices if the preceding vowel, though phonetically unstressed, was stressed underlyingly; i doesn't become a glide if, although unstressed, it had a stress underlyingly. The presence of the crucial underlying stress in our examples (marked ˘) is determined by the related forms in the second column:

	<u>Related forms or derivatives</u>	
(52) <u>o[ɸ]lligaré</u>	<u>oblíga</u>	'he forces', <u>obligár</u> 'to force'
<u>ennò[ɸ]lliré</u>	<u>nóble</u>	'noble', <u>ennoblír</u> 'to make noble'
<u>mò[ɸ]lláble</u>	<u>móble</u>	'furniture', <u>moblár</u> 'to furnish'
<u>su[ɸ]llimáble</u>	<u>sublím</u>	'sublime', <u>sublimár</u> 'to sublimate', <u>*súblim...</u>
<u>pro[ɸ]llèmatic</u>	<u>probléma</u>	'problem', <u>*próblem...</u>
<u>dià[ɸ]llería</u>	<u>diáble</u>	'devil'
<u>nò[ɸ]llésa</u>	<u>nóble</u>	'noble'
<u>sa[ù]lquér</u>	<u>saúc</u>	'elder'
<u>rè[w]mátisme</u>	<u>réuma</u>	'rheumatism', <u>reumátic</u> 'rheumatic', <u>*reúm...</u>
<u>rè[ɸ]létó</u>	<u>réy</u>	'king', <u>reiét</u> 'little king', <u>*reí...</u>
<u>arru[ì]lnát</u>	<u>ruína</u>	'ruin'
<u>re[ɸ]lncidír</u>	<u>*(re)íncid.</u>	. . .
<u>ra[ì]lmét</u>	<u>raím</u>	'grape'
<u>arcà[ì]ltzára</u>	<u>arcáic</u>	'archaic', <u>arcaítza</u> 'it is archaic'

Clearly, if B-Devoicing and Glide Formation apply before Destressing has wiped out the crucial stresses, the S.D. of the former will be met in the appropriate cases, and the S.D. fo the latter won't be met in the appropriate cases:

(53)	<u>oblígaré</u>	<u>nóblésa</u>	<u>reincídír</u>	<u>raímét</u>
B-Devoicing	---	p	---	---
Glide Form.	---	---	y	---
Destressing	<u>o[ɸ]lligaré</u>	<u>no[ɸ]llésa</u>	<u>re[ɸ]lncidír</u>	<u>ra[ì]lmét</u>

Having underlying stress allows this to correctly predict some phenomena difficult to handle by the previous theory. It might be pointed out the one could propose, under the previous stress-assignment theory, that stress is assigned cyclically and a Destressing rule similar to (24) eliminates the superfluous stresses. Although such a modification would do, as far as the present data are concerned, it should be noticed that cyclic application is not necessary to handle them. In other words, only one aspect of the cycle, a multiply-stressed structure, would be needed. Underlying stress restricts its power to just this aspect.

8. The Cycle

Let us return now to the morphological exceptions to Vowel Reduction mentioned in section 6, which have not been accounted for so far. As I said, compounds (including some phrases) showed only one stress, but had a nonreduced (not even partially as in lexical and contextual exceptions) vowel. Since stress is present underlyingly, we would have to have this vowel stressed, which would prevent Reduction (49). We already motivated a Destressing rule (24) that would yield finally the desired nonreduced unstressed vowel. So Destressing seems to be a general process accounting for the monoaccented character of words, simple or compound. The problem arises when we are faced with the fact that destressed vowels don't reduce in compounds as just discussed, but do reduce in simple words (see (38) and (9) for example). It looks like opposite Destressing ~ Vowel Reduction orderings are required for each case. Consider one example with $n\acute{o}bl+éza$ 'nobility' and $p\acute{o}k+a\#barg\acute{o}p+a$ 'wicked person',¹⁰ phonetically [nuplézə] and

[pəkəbærgónə]:

(54)		nóbl+é z+a	pók+a#bargón+a
	1st DESTRESS	ə -	ə -
	Ordering VOW. RED.	u - ə	*u ə ə - ə
	2nd VOW. RED.	- - ə	- ə ə - ə
	Ordering DESTRESS	*ɔ -	ɔ -

The ordering paradox in (54) can be solved by cyclic application of the rules involved but, unlike the case discussed in the preceding paragraph, it needs cyclic application or a device with equivalent power.

(55)		[*#nóbl+é z+a#*#]	[*#pók+a]	[*#bargón+a#*#]
	1st DESTRESS		---	---
	CYCLE VOW. RED.	u ə	ə	ə ə
	2nd DESTRESS		ɔ	
	CYCLE VOW. RED.		-	

To block Vow. Red. in the second cycle we have to assume that this is a word level rule, i.e., that it applies in the domain [Q__Q'] to the whole string (Q, Q' not containing #). So the apparent exception to the process of Vowel Reduction can be derived from a general principle of rule application. Destressing can be applied generally to any lexical item, but in simple words the cycle predicts that Vow. Red. will reduce the vowels just destressed, and in compounds this will not happen since it will have been restricted to previous cycles where the stress was still present.

Consider yet another case. As discussed in the preceding section, underlying stress prevents i and u from becoming a glide, even when this stress is removed later in the derivation. But Glide Formation (36) applied also across word boundary, and we would expect blocking of the rule also in that situation, but instead we get the glide. In this particular case, namely Glide Formation across #, the theory of underlying stress seems to fail. Consider the derivations of a obrir '(in order)

to open' and no instar 'not to instate'.

(56)	a# ǫbrír	nó# ínstár
(36) GLIDE FORM.	---	-
(24) DESTRESS	ɔ	i
(49) VOW. RED.	ə u	-
	*əubrír	*nóinstár

If we want Glide Formation to apply to get the correct [əwbrír] and [nóynstár], (36) should apply after Destressing, but this would yield the wrong result in our previous cases in (52). Here again we can take advantage of the fact that the destressed vowel is within the inner brackets ([ǫbrír], [ínstár]) and the preceding vowel in the outermost. Cyclic application, while not affecting our previous data in section 7, correctly predicts the ones in (56):

(57)	[A[ǫbrír]]	[nó[ínstár]]
GLIDE FORM.	-	-
DESTRESS	ɔ	i
VOW. RED.	u	-
GLIDE FORM.	w	y
DESTRESS	-	-
VOW. RED.	ə -	-
	əwbrír	nóynstár

9. Strict Cyclicity

In the two previous sections certain processes requiring what we might term multiple application of rules were presented. It was shown that for stress assignment the full effect of the cycle was not needed-- and therefore cyclicity of stress assignment not justified. Rather, the presence of stresses not found in surface phonetic form was correctly predicted by a system where stress is not assigned by rule but predicted on the basis of the presence of [†stress] in underlying form, and a few stress rules. Interestingly enough, arguments for the cycle appear in connection with those processes involving phonological rules

(Destressing, Glide Formation) and not with such regularities as distribution of underlying stress. In this section I will discuss some cases that bear on the notion "phonological cycle", as defined in the Introduction.

A first problem arises by overapplication of cyclic rules. In section 8 it was shown that Destressing and Glide Formation, as well as Vowel Reduction, apply cyclically. Furthermore, in section 7 it was argued that Glide Formation preceded Destressing. This prevented underlyingly stressed vowels from becoming glides. But under cyclic application Glide Formation would have a chance to apply after the vowel had been destressed. Consider, for example ruīnosíssim 'very ruinous' derived from ruīnós 'ruinous', which in turn is derived from ruína 'ruin' (the final vowel in ruína is the feminine marker).

(58) [[[r̄uín] óz] ísim]

GL. FOR.	-
DESTRESS.	<u>i</u>
GL. FOR.	*y
DESTRESS.	<u>o</u>

After Vowel Reduction we would get [r̄uynuzísim] instead of [r̄uinuzísim].

In other cases the ordering Glide Formation-Vowel Reduction prevents the former from applying. In [káus] 'chaos', [ætíup] 'ethiopian' [diuptríə] 'diopter', the u doesn't become a glide because it is underlyingly ɔ and Glide Formation applies before it is reduced to u. The u is not underlyingly stressed since in this case it would show its stress, being the rightmost, on the surface. But the vowel must be ɔ, because when stress is shifted by a prestressed suffix, ɔ shows up: [kə́stik] 'chaotic', [ætíspik] 'ethiopic', [diśptrik] 'dioptric'.¹¹ Here again, even though ordering correctly prevents Glide Formation from applying, reapplication of this rule in a later cycle would give the wrong result:

(59)	[[súpār̄] [ká̄s]]		
GL. FOR.	- -		
VOW. RED.	<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 0 10px;">ə</td> <td style="border-bottom: 1px solid black; padding: 0 10px;">u</td> </tr> </table>	ə	u
ə	u		
GL. FOR.	w		
VOW. RED.	<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 0 20px;">---</td> </tr> </table>	---	

And, instead of [supə̄rká̄us], *[supə̄rká̄ws] would be derived. But re-application of rules in both (58) and (59) would be "improper" under the notion of "phonological cycle" developed in the Introduction, since Glide Formation would, in both cases, return to earlier cycles without making use of information "proper" to its cycle. Three cases under which a rule R applies properly on any given cycle j where distinguished in the Introduction ((3)). I shall continue to refer to (60) as the Strict Cycle Condition (SCC):

- (60) a. R makes specific use of information uniquely in cycle j.
 That is, it refers specifically to some A in [_j XAY [_{j-1} . . .] _{j-1} Z] _j or [_j Z [_{j-1} . . .] _{j-1} XAY] _j.
- b. R makes specific use of information within different constituents of the previous cycle, which cannot be referred to until cycle _j. R refers thus to some A, B in [_j X [_{j-1} . . . A . . .] _{j-1} Y [_{j-1} . . . B . . .] _{j-1} Z] _j
- c. R makes specific use of information assigned on cycle j by a rule applying before R.

None of these cases applies to either (58) or (59) and Glide Formation can't apply.

Consider also the derivation of raonament 'reasoning' where both the fact of being underlyingly [-hi] and the fact of having underlying stress, prevent o from becoming a glide. For justification of a being stressed underlyingly, see the parallel nominal derivatives in Chapter 3 (section 2, (4)). Recall also that (60a) prevents rules from applying

on the 0th cycle (see Introduction).¹²

(61) [[[raón] á] mén]

<u>1st</u>	
GL. FOR.	--
DESTRESS.	o
VOW. RED.	<u>a u</u>
<u>2nd</u>	
GL. FOR.	blocked by S.C.
DESTRESS.	a
VOW. RED.	<u>a</u>

Glide Formation is blocked because at the stage it can apply, it applies to the string au that contains no crucial information proper to the third cycle.

In general it is the case that Glide Formation operates only across cyclic boundaries. Thus we find in front of the examples just mentioned those in (33) and (35) like [[tórna]w] and [[əlžəbrá]yk]. We find therefore contrast between VV and V-Glide sequences, like in the following derivations:

(62) [[[saúk]é] [[fbrid]át]] [[[pruduí]rá] [[[sksid]á]syó]]

<u>1st</u>																														
GL. FOR.	--	--	--	--	--																									
DESTRESS.	u	i	i	o																										
VOW. RED.	<u>a-</u>	<u>--</u>	<u>--</u>	<u>u</u>																										
<u>2nd</u>																														
GL. FOR.		y		--																										
DESTRESS.	--			a																										
VOW. RED.	<u>--</u>			<u>a</u>																										
	s	a	u	k	é	y	b	r	i	d	á	t																		
<u>3rd</u>																														
GL. FOR.														w																
DESTRESS.														--																
VOW. RED.														<u>--</u>																
														p	r	u	d	u	i	r	á	w	k	s	i	d	a	s	y	ó

Underlying stressed are justified by [saúk] 'elder', [fbrid] 'hybrid', [pruduí] 'to produce', [pruduí]m 'we produce', [sksit] 'oxide', [uksidá] 'to oxidize'. See also Chapter 3, sections 2, 3 for evidence that thematic vowels as í, á in the verbal forms mentioned are underlyingly stressed. The phonetic forms that result from the derivations in (66)

show both two sequences of nonconsonants, one of the form vowel--high vowel, the other of the form vowel--high glide. (60) correctly prevents application of Glide Formation on the first cycle, but doesn't on the last cycle, by virtue of which some crucial information is used.

I still haven't presented any case which falls positively under (60c). Recall that part δ allows a cyclic rule to apply if crucial information in the form of the result of application of a previous phonological rule is introduced during the given cycle. I showed earlier (see (25) and corresponding discussion) that the stress of words with prestressed suffixes like ik had to be predicted by rule, since underlying stress and Destressing were insufficient. Whenever a prestressed suffix appears the preceding vowel is either a, i, u, ɔ, or ɛ but never e or o.

(63)	pú <u>d</u> ik	'modest, chaste'	tə <u>l</u> ɛ <u>f</u> un	'telephone'
	ə <u>r</u> ábik	'Arab'	mik <u>r</u> ɔ <u>f</u> un	'microphone'
	mít <u>i</u> k	'mythical'	mə <u>g</u> á <u>f</u> un	'megaphone'
	kánt <u>i</u> k	'canticle, song'	dəká <u>m</u> ə <u>t</u> rə	'decameter'
	tɔ <u>k</u> sik	'toxic'	tə <u>l</u> ɛ <u>m</u> ə <u>t</u> rə	'rangerfinder'
	ə <u>s</u> pléndit	'splendid'	tə <u>r</u> m <u>ə</u> mə <u>t</u> rə	'thermometer'
	bá <u>l</u> it	'valid'	dəs <u>í</u> mə <u>t</u> rə	'decimeter'

Furthermore, morphemes with stressed é, ó change it to ɛ́, ɔ́ before these suffixes:

(64)	sén <u>tr</u> ə	'center'	sɛ <u>́</u> n <u>t</u> rik	'centric'
	glukó <u>z</u> ə	'glucose'	gluk <u>ɔ́</u> mə <u>t</u> rə	'glucometer'
	num <u>é</u> ru	'I enumerate'	num <u>ɛ́</u> rik	'numerical'
	péd <u>r</u> ə	'stone'	pɛ <u>́</u> tri	'stony'
	tó <u>r</u> u	'I toast'	tɔ <u>́</u> rit	'torrid'
	dibiz <u>ó</u> (r)	'divisor'	dibiz <u>ɔ́</u> ri	'divising'

əduktéru	'I adulterate'	əduktéri	'adultery'
ió(n)	'ion'	iónik	'ionic'
umér̄	'Homer'	umérīk	'Homeric'

Therefore, a rule is needed with the effect

$$(65) \begin{bmatrix} +\text{syll} \\ -\text{hi} \\ +\text{str.} \end{bmatrix} \rightarrow [-\text{ATR}] \text{ under certain conditions}$$

To determine the conditions under which this takes place, we might just refer to the class of prestressed suffixes in an ad hoc manner. But it would be surely better to refer to them in some general way, i.e., by some shared property. The most obvious property of the class is that they attract stress to the preceding syllable. But to build such a condition into the rule itself would mean to increase considerably the power of phonological rules and correspondingly so decrease their empirical content. To abandon the reference to the stress attracting property on the other hand, would mean to lose a generalization by allowing two rules, namely the rule attracting stress (IC rule) and (65) to refer twice to an arbitrary set of morphemes.

The only way of allowing reference to the prestressing property is to derive it from some general principle of the grammar. In other words we can ask ourselves if (65) applies just to the class of words containing a prestressed suffix without having to put any additional constraint on the rule itself. Consider the four possible cases, a word without suffix, with a neutral suffix, with a stressed suffix and with a prestressed suffix (a in [séntrə] is epenthetic, see rule (11), Chapter 3):

(66)	séntrə	'center'	səntɾ+ál	'central'
	séntr+i	'he centers' (subjunctive)	séntr+ik	'centric'

[sənrál] is no problem since the root vowel is going to be destressed and reduced to ə anyway. Rule (65) would predict correctly [sɛ́ntrik], but would give incorrect results * [sɛ́ntrə] and * [sɛ́ntri]. But what distinguishes [sɛ́ntrə] and [sɛ́ntri] from [sɛ́ntrik] is precisely the property in (60c). Our theory of underlying stress makes all the information crucial for rule (65); i.e. [+syll, -hi, +str.], underlying information. No crucial information will be introduced by any cycle in [sɛ́ntrə] and [sɛ́ntri]. But for [sɛ́ntrik] there is a rule that stresses a preceding vowel when a prestressed suffix appears. On the cycle where this occurs, crucial information for rule (65), namely [+str], will be introduced, and the rule allowed to apply. Furthermore, notice that the rule applies whether or not the vowel was already stressed (cf. [símbul] 'symbol' -- [simbólik] with [sɛ́ntrə] -- [sɛ́ntrik]). Thus the sole fact that crucial information was introduced by virtue of that cycle, whether or not it was already present, allows the rule to apply.

To give some additional support to the analysis presented for the data in (63) and (64), recall that one of the Vowel Reduction rules, (49c), read as follows:

$$(67) (= (49c)) \begin{bmatrix} +syll \\ -hi \\ -str \end{bmatrix} \rightarrow [+ATR]$$

and (67) and (65) can be collapsed:

$$(68) \begin{bmatrix} +syll \\ -hi \\ \bullet str. \end{bmatrix} \rightarrow [-\cancel{ATR}]$$

Returning to Vowel Reduction, it should be noticed that in cases like [sənr+ál] in (66), Vowel Reduction will not be blocked by the SCC, because on the corresponding cycle Destressing will apply first, introducing information specifically required by the rule: [sɛ́ntr+ál] ---> [sentr+ál] --- [sənr+ál]. Therefore destressed vowels will reduce and

restressed vowels (like é in [séntrik]) will become é, é. On the other hand, the SCC predicts that underlyingly stressed vowels that are not restressed will remain the same, as they do, as I have shown. Finally, never-stressed vowels should, except for a which is not an underlying segment, be entered in the lexicon in their surface form.¹³ This is the only consequence of the SCC not given support so far. Notice that it will imply some kind of morpheme structure condition to disallow underlyingly unstressed vowels other than a, i, u. If this is true, that is, if there exist separate rules of morpheme structure and phonological "Vowel Reduction", we would expect as a possibility that they evolve separately. It is a well known fact that lexical exceptions to Vowel Reduction mentioned in section 6, are recent. Thus words with unstressed e and o like [bóston], [kátédrə], [séperə] will have to be underlyingly /bóston/, /kátédrə/, /séperə/. This means that the rules of Vowel Reduction can now apply obligatorily and lexical items will not have to be marked as exceptions for some of the rules, contrary to what was proposed in section 6. Instead, words like those just mentioned will violate an otherwise quite general condition on underlying forms that prohibits unstressed e, o. The SCC will prevent obligatory Vowel Reduction from applying to these items since the rule is obligatory and neutralizing and makes no further use of information introduced during the cycle. Now recall that Destressing (24) was presented in its more general form, assigning [-stress] to any vowel in the context $\neq\#X_Y$ [+stress] $Q\neq\#$. In other words, the vowel in the S.D. need not be stressed. Since Vowel Reduction specifically mentions [-str] if this feature specification is introduced during any given cycle, Vowel Reduction will no longer be blocked by the SCC. Like in the cases where a stressed vowel was restressed and underwent the rule forming

ĕ, ě ([séntrik] --> [s'ntrik]), here the SCC predicts that any destressed vowel, whether or not underlyingly unstressed, will reduce. And here are the facts:

		'Bostonian'			'chairholder'		
(69)		[bóston]	[bóston+yá]	[kátedra]	[kátedra+tik]	[špera]	
IC RULE	--	--	--	--	á	--	
DESTRESS.	--	o o	--	13	a e	--	
VOW. RED.	SSC	u u	SCC	ə	k t drátik	SCC	per
		bóston	bustunyá	kátedra			
		'operistic'					
		[šper+íst+ik]					
IC RULE		í					
DESTRESS	o e						
VOW. RED.	u ə						
		uparístik					

We should also revise B-Devoicing, rule (31), in the light of the SCC. The process in neutralizing, because both b and p are underlying segments, and obligatory. Therefore SCC should block application on the first and subsequent cycles. Since the sequence $\acute{V}pl$ is always within the 0th cycle.¹⁴ It follows that B-Devoicing cannot be a phonological rule. The restatement of (31) as a morpheme structure condition is quite natural, since B-Devoicing always applies within morphemes.

CHAPTER TWO: CONSONANTAL ALTERNATIONS

In this chapter I shall examine in detail several consonantal phenomena found in Catalan. The cyclic nature of some segmental processes that was argued for in the case of vowel alternations in Chapter 1 is extended here to other segmental rules. They will be used to test the proposal about the phonological cycle presented in the Introduction. The analysis of stress presented in the preceding chapter will be given additional support. In addition to the argument presented in section 10, it should be noticed that although several of the rules discussed are sensitive to stress ((46), (50), (56)), they are, as those in Chapter 1, applying after a putative rule of Stress Assignment, and therefore are consistent with the theory that maintains that stress is present underlyingly.

1. Assimilation of Nasals

Regressive assimilation is a common feature of Catalan consonants. There are assimilations of voicing, point of articulation, nasality, and total assimilations.

Regressive assimilation takes place in a sequence of a nasal and a consonant. The following examples illustrate the different possibilities.¹

(1) Place of Art.

(VOWEL)	so[m]lamics	so[n]lamics	
	'we are''friends'	'they are'	
LABIAL	so[m]pocs	so[m]pocs	ti[ŋ]pa
	'few'		'I have''bread'
LABIODENTAL	so[m]feliços.	so[m]feliços	â[ɲ]feliç.
	'happy'		'year'
DENTAL	so[m]ldos	so[ŋ]ldos	<u>etc.</u>
	'two'		
ALVEOLAR	so[m]sincers	so[n]sincers	
	'sincere'		
POSTALVEOLAR	so[m]rics	so[ɲ]rics	
	'rich'		

LAMINOPALATAL	so[m][z̃]ermans 'brothers'	so[n,][z̃]ermans
PALATAL	so[m][λ̃]iures 'free'	so[n,][λ̃]iures
VELAR	so[m]grans 'big'	so[ŋ]grans

(1) shows that assimilation in point of articulation isn't complete in many cases. First of all, high nasals, ɲ and ŋ never assimilate to the following consonant. Secondly, m assimilates only to a following labiodental: so[ɱ]feliços, but so[m]grans. Finally, although palatal consonants trigger assimilation of n, this does not become homorganic with them, but only laminopalatal: so[n,][λ̃]iures instead of *so[ɲ]-[λ̃]iures. In (1) nasal and consonant were separated by word boundary. Assimilation takes place also within words:

(2)	si[ɱ]flonia	i[ɱ]flinit
	'symphony'	'infinite'
	diume[n,z̃]e	i[n, z̃]ust
	'Sunday'	'unjust'
	a[ŋ]gllès	e[ŋ]kllitic
	'English'	'enclitic'

The different points of articulation are defined by the following features:

(3)	p̣ḅm	p, ɱ	ṭḍṇḷ	t'd'n l s z	ṭḍṇ ṛṛ	ṭ, ḍ, j̣ s z c	ɲ λ	kg
back	-	-	-	-	+	-	-	+
labial	+	+	-	-	-	-	-	-
high	-	-	-	-	+	-	+	+
anterior	+	+	+	+	+	-	-	-
coronal	-	-	+	+	+	+	-	-
distributed	+	-	+	-	-	+	+	+

The specifications for [bk], [lab], [ant] and [cor] are clear from the articulatory characteristics of the consonants (see Badia (1951), 85-86). For [distr] see the palatograms in Barnils (1933), 31-36 and the measurement thereof in Mascaró (1972) 63-65. Evidence of at least the trilled

[r̄] being [+hi] will be given below, section 3.

Using the variable notation for assimilation processes, we might propose tentatively the following rules, to be modified later, which apply across any number of boundaries.

- (4)
$$\begin{bmatrix} +nas \\ +cor \end{bmatrix} \rightarrow \begin{bmatrix} \alpha bk \\ \beta lab \\ \gamma ant \\ \delta cor \\ \epsilon distr \end{bmatrix} / \begin{matrix} \begin{bmatrix} +cons \\ \alpha bk \\ \beta lab \\ \gamma ant \\ \delta cor \\ \epsilon distr \end{bmatrix} \\ \#_0 \end{matrix}$$
- (5)
$$\begin{bmatrix} +nas \\ +lab \end{bmatrix} \rightarrow [+distr] / \begin{matrix} \begin{bmatrix} +cons \\ +lab \\ +distr \end{bmatrix} \\ \#_0 \end{matrix}$$

The omission of [hi] in (4) accounts for the partial assimilation of n to palatals, as in so[n,λ]iures. The other case where n is before a [+hi] consonant is before a velar. In this case n becomes [+hi] by linking conventions and the feature need not be mentioned in the rule (cf. Kean (1974), 120-121 and 28-29).

2. Assimilation of Stops and the Strict Cycle Condition

The assimilation of stops to a following consonant is parallel to that of nasals: t, d assimilate in point of articulation to any following consonant, but only partially to a palatal, and p, b assimilate only to a labiodental. In addition, however, t, d become nasals or laterals if the following consonant is a nasal or a lateral, respectively; and p, b become nasals before m. k, g don't assimilate, but g is nasalized before [n] morpheme internally. Here are some examples:

- (6) se[t] 's. seven' ca[p] 'no' po[k] 'few'
 se[m]mans 's. hands' ca[m]ma 'n. hand' po[k]pa 'f. bread'
 se[p,]focs 's. fires' ca[p,]foc 'n. fire' po[k]sol 'f. sun'
 se[l]linies 's. lines' ca[p]signe 'n. sign' po[k][s̃]lai 'f. lamb'
 se[t,][s̃]lais 's. lambs'

se[l,][[λ]libres 's. books' ca[p]casa 'n. house'

se[k]cases 's. houses'

i[ŋ]nōrancia 'ignorance'

re[ŋ]ne 'kingdom'

ma[ŋ]nífic 'splendid'

All the processes illustrated in (6) are optional. When there is no assimilation in place of articulation the stop appears agreeing in voicing with the following consonant as a result of the rule of voicing assimilation. se[m][m]ans or se[d][m]ans, se[k][k]ases or se[t][k]ases, ca[m][m]a or ca[b][m]a, po[g][λ]iure, etc.

The corresponding rules are ((7) and (8) (optional)):

$$(7) \quad \begin{bmatrix} -\text{son} \\ -\text{cont} \\ +\text{cor} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha \text{bk} \\ \beta \text{lab} \\ \gamma \text{ant} \\ \delta \text{cor} \\ \epsilon \text{distr} \\ \zeta \text{nas} \\ \eta \text{lat} \end{bmatrix} / \text{---} \#_0 \begin{bmatrix} +\text{cons} \\ \alpha \text{bk} \\ \beta \text{lab} \\ \gamma \text{ant} \\ \delta \text{cor} \\ \epsilon \text{distr} \\ \zeta \text{nas} \\ \eta \text{lat} \end{bmatrix}$$

$$(8) \quad \begin{bmatrix} -\text{son} \\ -\text{cont} \\ +\text{lab} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha \text{distr} \\ \beta \text{nas} \end{bmatrix} / \text{---} \#_0 \begin{bmatrix} +\text{cons} \\ \alpha \text{distr} \\ \beta \text{nas} \end{bmatrix}$$

$$(9) \quad \begin{bmatrix} -\text{son} \\ -\text{cont} \\ +\text{bk} \end{bmatrix} \rightarrow [+nas] / \text{---} \begin{bmatrix} +\text{nas} \\ +\text{cor} \end{bmatrix}$$

Rule (9) requires some comments. It could be argued that since the rule applies within morphemes converting XgnY into XŋnY it might be dispensed with and the corresponding morphemes set up underlyingly XŋnY. First of all there seems to be no case of ŋ+n but there is no case of g+n either, to my knowledge. But g would then also be the only stop not appearing before n. Cf. hi[b̄n]osi 'hypnosis', è[d̄n]lic 'ethnic'. There is in fact no word of the form XgnY. Foreign words with gn are pronounced with ŋn, e.g. Wa[ŋ]nler. But these facts alone don't justify the rule. We still could have a morpheme structure condition

disallowing gn but allowing ɲn. This in fact would be required by the SCC which would prohibit the application of a rule such as (9) on the 0th cycle, i.e., within the morpheme. But there is no evidence whatsoever that [ɲ] is an underlying segment in Catalan. To see this, consider the cases where phonetic ɲ appears. It can appear a) before n, as we have seen, b) before a velar consonant, as a result of nasal assimilation (section 1), and c) word finally. In this last case in most cases there is evidence of a velar consonant being deleted, so c) can be reduced to b) (see sections 6 and 7). Now if ɲ is not an underlying segment, the SCC doesn't prevent (9) from deriving X nY from XgnY, (9) being noncyclic.

The other rules discussed, however, will be affected by the SCC. Thus simpàtic 'kind' will have to have underlying /mp/ since assimilation of nasals would be prevented from applying to [[simpátlic]. The SCC therefore implies that there is a morpheme structure condition with the effect of disallowing sequences /np/.

Consider now the case of assimilation of coronal stops. This rule being optional, the SCC doesn't apply and we will be able to have underlying sequences /dn/, /tp/, etc. Nothing prevents the existence of sequences /nn/, /pp/, etc., and, in fact, they exist. We therefore find contrasts between stops presenting always "total assimilation" and stops having two variants, one with "total assimilation", the other just with voicing assimilation: [pərénnə]~*[pərédnə] 'perennial, but [ɛ́nnik]~[ɛ́dnik] 'ethnic'; [ɔ́bbi]~*[ɔ́dbi] 'obvious' but [əbbén]~[ədbén] 'Advent'. Interestingly enough, some of the examples belonging to the first group (always "total assimilation") must have belonged at some stage to the second group: [kónnə]~*[kódnə] 'crackling' Lat. CUTINAM through [kótnə] by normal evolution (Coromines(1971), 358). At some stage the assimilation must have been obligatory, at least for [kótnə] and similar cases.

In such a situation, cotna would have to change its underlying form /kótna/ to /kónna/, for the SCC would prevent obligatory assimilation tn --> nn from applying. If the rule then becomes optional, as it must have, since cotna has changed its underlying form, it will not be subject to it and should show up, as it actually does, always as [kónnə]. If its underlying form were to be, against the requirements of the SCC, /kótna/ or /kódna/, at the time the rule became optional, we would expect cotna reappearing with the two variants as other words, i.e., [kónnə] and *[kódnə]. A more recent example of reanalysis is the word [fubbɔ́l] 'soccer' from Eng. [fʊtbɔ́l]. Other possible direct sources of the borrowing, Spanish [fútbol] or [fúβol] (cf. Real Academia (1973), 20) or early (football) and actual (futbol) orthographic forms don't show assimilated b. In my own speech at least, futbol hasn't the variant *[fudbɔ́l]. Another case is the sequence tλ, phonetically [d,λ] (see(6)): se[d,]λlibres 'seven books'. If there were morpheme-internal /tλ/ (or /dλ/), they would appear as [d,λ], but there are only examples with [λλ]: [əspállə] 'back' (body part), [rɔ́λλu] 'roll', [mɔ́λλu] 'mold', [əmméλλə] 'almond'. Thus a morpheme structure condition disallowing /tλ/ or /dλ/ is independently motivated. If this condition didn't exist, the morphemes with underlying /tλ/ or /dλ/ would have to undergo complete assimilation, so the rule of assimilation would have to be modified to yield complete assimilation to palatals, but only within morphemes. Moreover, some of these forms arose from words with tλ or dλ <tλ, dλ <tλ, dλ: SPATULAM >[əspállə], ROTULUM >[rɔ́λλu], MODULUM >[mɔ́λλu], AMIDDULA [əmméλλə] (Badia(1951) 216, 217). Here again, if after undergoing complete assimilation to [λλ] they had been represented underlyingly as /tλ/ or /dλ/, the actual rule which doesn't yield complete

assimilation would wrongly predict * $[\text{əspád}, \lambda \text{ə}]$, etc.

3. Nonstops and Laterals

f never assimilates in point of articulation. The case of sibilants is a little bit complicated because of an independent rule that merges sequences of identical nonstops, e.g., $[\text{pěš}][\text{šík}] \rightarrow [\text{pěšík}]$ 'small fish', $[\text{búf}][\text{šrt}] \rightarrow [\text{búfšrt}]$ 'strong blow', $[\text{més}][\text{sál}] \rightarrow [\text{mésál}]$ 'more salt'. Merging occurs also between different sibilants, e.g. $[\text{més}][\text{šík}] \rightarrow [\text{měšík}]$ 'smaller'. For cases with šš one could either postulate the existence of assimilation yielding šš and subsequent merging to š, or just suppose that a single rule deleted the first of two sibilants, thus šš $\rightarrow \emptyset\text{š}$. Cases with identical sibilants would be handled by either solution. But consider the following cases involving sequences šs and sr (r, a trilled r). $[\text{pěš}][\text{səlát}]$ becomes $[\text{pěs}'\text{əlát}]$ 'salted fish'. What I transcribe as s' has been described as a sound 'intermediate between s and š' (Badia (1951), 105) or as a sequence šs, š being more weakly articulated (Coromines (1971), 247-248). What is of interest for the present discussion is that in any case the duration of the resulting sound is that of a single sibilant. The merging rule has applied, quite naturally, also in the case of šs. But if the process were to be formulated as the truncation of the first segment without assimilation, we would expect $[\text{pěš}][\text{səlát}] \rightarrow *[\text{pěsəlát}]$. The phonetic output of sequences sr also indicates that assimilation precedes the rule of merging, provided that the latter applies also to r, as will be argued for below. $[\text{més}][\text{ršbə}]$ 'more clothing' results as $[\text{mér}'\text{šbə}]$, but also, in more careful speech style, as $[\text{mézr}'\text{šbə}]$, or $[\text{méur}'\text{šbə}]$ (ɹ a fricative untrilled r). If the only possible output of sr were r, it would be possible to suppose a rule sr $\rightarrow \emptyset\text{r}$ in effect, but the variants zr,

ɹ̄ suggest that assimilation takes place first, optionally except for voicing, and the rule of merging takes place once and just in case s is totally assimilated to ɹ̄.

The structural description of the rule assimilating nonstops should refer to the sequence {s, z, š, ž} {s, z, š, ž, r̄}, given the cases of assimilation presented above. The odd element in the second class is r̄, but it could be naturally included in it if we characterize it as continuant. Further motivation for this characterization will be given below, sections 4 and 6. As other high consonants, namely ɹ and ɻ, r̄ does not assimilate: Ba[r̄s]lelona, pe[r̄] [ž]ugar 'in order to play'.

$$(10) \quad \begin{bmatrix} +\text{cont} \\ +\text{cor} \\ -\text{hi} \end{bmatrix} \dashrightarrow \begin{bmatrix} \alpha\text{ant} \\ \beta\text{distr} \\ \gamma\text{son} \end{bmatrix} / \dashrightarrow \begin{matrix} * \\ \circ \end{matrix} \begin{bmatrix} +\text{cont} \\ +\text{cor} \\ \alpha\text{ant} \\ \beta\text{distr} \\ \gamma\text{sonor} \end{bmatrix}$$

The (high) palatal lateral ɺ doesn't assimilate to a following consonant, but l does:

- (11) e[l] 'the'
 e[l]pa 'the bread'
 e[l]foc 'the fire'
 e[ɺ]dia 'the day'
 e[l]sol 'the sun'
 e[l]ric 'the rich'
 e[l],[ž]ermá 'the brother'
 e[l],[ɺ]libre 'the book'
 e[ɺ]gos 'the dog'

l assimilates to dentals, alveolars (vacuously), postalveolars, lamino-palatals, palatals, and velars, but it doesn't assimilate the features [hi] (like nasals and stops) nor [cor]. This means that before nonhigh nonlabials there is complete point of articulation assimilation, but

before palatals and velars only partial assimilation: e[l,][[λ]ibre, e[ɫ]gos (l, being [-ant, +cor, -hi]; ɫ a velarized l, being [+bk, +cor, -hi]).

(12)

$$\begin{array}{c} [+lat] \\ [-hi] \end{array} \longrightarrow \begin{array}{c} \alpha bk \\ \beta ant \\ \gamma distr \end{array} / \begin{array}{c} +cons \\ -lab \\ \alpha bk \\ \beta ant \\ \gamma distr \end{array}$$

Notice that (12) is similar to the pair (4), (5) in that both don't assimilate the feature [hi]. Nonetheless nk results in ŋk, ŋ being [+hi], and lk in ɫk, ɫ being [-hi]. But [+hi] was assigned by linking convention to the assimilated nasal, and linking doesn't apply to the assimilated l which is coronal.

4. Distribution of r and \bar{r} and the rule of Contraction

Under "Contraction" I shall group a set of processes like the one described in the preceding section (merging of fricatives), having to do with the reduction of two segments to a single one.

As in other languages, two immediate occurrences of the same segment are resolved, in some cases, in a geminate, phonetically long, segment. Here are some examples:

- (13) cap porta káp:ʃrt 'no door'
set trens sé:t:réns 'seven trains'
un nas ún:ás 'a nose'
el límit əl:ímit 'the limit'
ell llegeix éλ:əžés 'he reads'
poc gust póg:úst 'little taste'
som molts sóm:óls 'there are a lot of us'

As can be observed from the examples, there is gemination with stops, laterals and nasals. The rest of the consonants, i.e. continuants,

affricates and \bar{r} are not subject to gemination when two identical instances of one of them occur. Thus the pairs of phrases in (14a) are phonetically distinct ([C] vs. [C:]), but those in (14b) are undistinguishable phonetically:

- (14) a. pšt astá pšt tastá b. u sén us sén
 he can be taste it he hears/you
 un ús un nús laz ónas laz zónas
 a use knot the waves zones
 éλ uĕš éλ luĕš matéž ōw matéž žšw
 he hears shines same egg yoke

There is also merging, as opposed to gemination, in the case of affricates, although here examples are scarce, especially due to the fact that word-initial affricates are scarce:

- (15) mosqui[c], [c]e-tse → mosqui[c]e-tse
 mosquitoes tsetse
 mi[č], [č]ec → mi[č]ec
 half Czech

So far it is possible to distinguish the class of consonants that are realized as geminate (stops) from the class that is reduced to a single segment (fricatives and affricates). It appears that the same classification can be carried over sonorants. We saw in the preceding section that \bar{r} was grouped with continuants in the environment of nonstop assimilation (rule (10)), which correctly excluded nasals and laterals from triggering assimilation. Here again manner of articulation determines the kind of contraction that results, and laterals and nasals are grouped together with stops, and \bar{r} with affricates and continuants. But before we proceed, the distribution of $[\bar{r}]$ and $[r]$ has to be examined. \bar{r} (trill) and \underline{r} (flap) contrast intervocally but are otherwise neutralized. a) Morpheme initially, and therefore word initially, only \bar{r} can appear; b) Word finally \underline{r} appears before vowel, \bar{r} otherwise (C or pause); c) Morpheme internally \bar{r} appears preconsonantly and after \underline{l} ,

n, s, and r̄ after other consonants; d) they contrast, as said, intervocalically, and are not found, as other liquids, between consonants:

(16) a.	[r̄]ítmic	'rhythmic'	b.	pu[r̄]	'pure'
	a[r̄]ítmic	'arhythmic'		pu[r̄]íssim	'very pure'
	no [r̄]ítmic	'not rhythmic'		pu[r̄] alcohol	'pure alcohol'
	poc [r̄]ítmic	'little rhythmic'		pu[r̄] cafè	'pure coffee'
c.	po[r̄]ta	'door'	d.	ce[r̄]a	'wax'
	ful[r̄]ar	'to line'		se[r̄]a	'saw'
	hon[r̄]lat	'honest'		ba[r̄]li	'Barium'
	Is[r̄]ael	'Israel'		ba[r̄]li	'neighborhood'
	k[r̄]lit	'scream'		co[r̄]al	'coral'
				co[r̄]al	'farmyard'

Whereas in intervocalic position there must be a contrast, in other positions the result can be predicted by rule. We could have in principle rules $r \rightarrow \bar{r}$ or $\bar{r} \rightarrow r$, in the appropriate contexts. Directionality doesn't matter for morpheme internal cases, but consider pur. The final liquid should be /r/ underlyingly since we have the feminine form [púr+ə] (contrasting with, e.g., fem. [əskér+ə] 'left'). Therefore there must be a rule converting this final /r/ into [r̄] in absolute final position or before a consonant. And this same rule will account for the pre-consonantal examples with [r̄] in (16c):

(17) $r \rightarrow \bar{r} / _ \# [-\text{syll}]$

Let's consider now the case of initial r̄ (16a). Whereas morpheme finally there is a contrast, if a vowel follows ([púr+ə] vs. [əskér+ə]), morpheme initially we find the trill r̄. There is however one exception, namely the future and conditional morphemes /rá/, /ríə/, etc. Thus we have [pur̄tə+rá] 'he will bring', [bulit̄ríə] 'he would boil'. Future and

conditional forms involve stem and inflectional suffixes /rá/, /ríə/, etc., whereas in cases like a[r̄]ítmic the root is preceded by a derivational suffix, and in this case the internal boundary should be # instead of +. This choice has independent justification since morphological exceptions to Vowel Reduction had also # necessarily (Chapter 1, section 8) and they included prefixed words (Chapter 1, section 6).

The \bar{r} appearing after l, n, s can be also included in the rule:

$$(18) \quad r \rightarrow \bar{r} / \# \left(X \left[\begin{array}{l} +\text{cor} \\ +\text{son} \\ +\text{cont} \end{array} \right] \right) \text{ ---}$$

Arguments against an alternative with underlying / \bar{r} / will be given directly. Now notice that (18), (and (17)) would violate the SCC. The solution that would be imposed by the SCC, namely a morpheme structure condition, is impracticable, since it would apply equally to [r̄ímm] and the future marker [rá]. This apparent contradiction will be solved in favor of the SCC in the following paragraphs.

Having determined the distribution of \underline{r} and \bar{r} , we can find two cases where Contraction might apply, namely $\underline{r}\#\bar{r}$, and $\bar{r}\#\bar{r}$.²

(19) $\underline{m}\bar{a}\bar{r}$ $\bar{r}\bar{s}\check{c}$ $\underline{m}\bar{a}\bar{r}\bar{s}\check{c}$ $\underline{p}\bar{u}\bar{r}$ $\bar{r}\bar{e}\bar{a}\bar{l}\bar{i}\bar{z}\bar{m}\bar{a}$ $\underline{p}\bar{u}\bar{r}\bar{e}\bar{a}\bar{l}\bar{i}\bar{z}\bar{m}\bar{a}$
 sea red Red Sea pure realism pure realism

$\underline{i}\bar{n}\bar{t}\bar{a}\bar{r}\bar{e}\bar{g}\bar{n}\bar{a}$ cf. $\bar{r}\bar{e}\bar{g}\bar{n}\bar{a}$ 'kingdom', $\underline{i}\bar{n}\bar{t}\bar{a}\bar{r}\bar{p}\bar{u}\bar{l}\bar{a}$ 'to interpolate'
 interregnum

$\underline{s}\bar{u}\bar{p}\bar{e}\bar{r}\bar{e}\bar{a}\bar{l}\bar{i}\bar{z}\bar{m}\bar{a}$ cf. $\bar{r}\bar{e}\bar{a}\bar{l}\bar{i}\bar{z}\bar{m}\bar{a}$ 'realism', $\underline{s}\bar{u}\bar{p}\bar{e}\bar{r}\bar{s}\bar{o}\bar{n}\bar{i}\bar{k}$ 'supersonic'
 superrealism

But contraction of [rr] is also possible if occurrences of intervocalic trilled [r̄] are considered to be underlying sequences /rr/, as Harris (1969), 50-51, does for Spanish, and Mascaró (1972), 47-49 and Wheeler (1974) 216-217 do for Catalan. I shall repeat and extend slightly the arguments offered in the two last references.

Contraction and the rules for the distribution of \underline{r} and \bar{r} already predict that /rr/ will be realized as [r̄]. The first \underline{r} in the sequence

will become \bar{r} by (17), and the second will become \bar{r} by (18), since it follows a sonorant coronal. $\bar{r}\bar{r}$ being a sequence of continuants, it will be merged into \bar{r} by Contraction. Consider now the distribution of underlying /r/ and / \bar{r} / in word final position. Whereas any sonorant can appear word finally, \bar{r} cannot, but \underline{r} can (the examples on the second column show the unchanged underlying sonorant):

(20)	ca[\bar{r}]	'expensive'	ca[r]lissim	'very expensive'
	pu[\bar{r}]	'pure'	pu[r]lesa	'purity'
	moto[\bar{r}]	'motor'	moto[r]lisme	'motorism'
	esque[\bar{r} ə]	'left'(mas.)	esque[\bar{r}]ans	'leftists'
	fe[\bar{r} u]	'iron'	fé[\bar{r}]ic	'ferric'
	co[\bar{r} ə]	'he runs'	co[\bar{r}]eria	'he would run'
	be[λ]	'beautiful'	be[λ]lissim	'very beautiful'
	rea[l]	'real'	rea[l]lesa	'royalty'
	antòno[m]	'autonomous'	autono[m]lisme	'autonomism'
	empe[ʃ]	'he pushes'	empe[ʃ]eria	'he would push'

The impossibility of underlying / \bar{r} / to appear word finally (which is perfectly general) could be handled by an ad hoc condition, but follows from independent generalization if its underlying form is /rr/ rather than / \bar{r} /. To see this consider the realization of other geminate sonorants in final position:

(21)	ba[$\lambda\lambda$ ə]	'mayor'	ba[$\lambda\lambda$]ia	'mayorship'
	mo[$\lambda\lambda$ ə]	'mold'	emmo[$\lambda\lambda$]em	'we mold'
	pere[nnə]	'perennial'	pere[nn]itat	'perenniality'
	su[mmə]	'supreme'	su[mm]um	'maximum'

In these cases, like in the cases of final underlying / \bar{r} /, the consonants don't ever appear in word final position. Instead, a vowel is inserted after them. To formulate the vowel insertion rule as operating after

sequences of geminates and after \bar{r} would amount to losing a generalization that can be captured once intervocalic $[\bar{r}]$ is represented underlyingly as $/rr/$.

The fact that the opposition $/r/\sim/\bar{r}/$ is neutralized everywhere except intervocalically can now be explained, too. Quite independently, sequences of liquids cannot appear except intervocalically. Thus we find $pe[\bar{r}l]a$ 'pearl', $fa[l]l]era$ 'anxious desire' $bu[\lambda\lambda]lofa$ 'blister' but no word with initial or final rl , ll , $\lambda\lambda$, etc. or with one of these sequences preceded or followed by a consonant. If our previous \bar{r} is represented as $/rr/$ in intervocalic position, it follows--correctly--that the same is true for this case.

Returning to rule (18) it is now clear that the SCC will no longer prevent it from operating since \bar{r} is no longer an underlying segment and therefore (18) is not neutralizing, hence not cyclic (see Introduction).

Contraction takes place also despite some minor differences between the two consonants. One case is the sequence $\check{s}s$ (and, similarly, $\check{z}z$, $\check{c}s$, $\check{j}z$) mentioned at the beginning of section 3, where the difference is probably in the feature $[ant]$. Another case is the sequence stop-fricative where the result is an affricate: $ca[p]forat \rightarrow ca[\text{pf}]orat$ 'no hole', $se[d,][\check{z}]ocs \rightarrow se[\check{j}]ocs$ 'seven plays' (cf. (6)). But an affricate is also formed from two affricates or the sequences stop-affricate and affricate-continuant. The consonant must, of course, be homorganic, either underlyingly or as a result of assimilation.

- (22) $m\check{i}\check{c}$ $\check{c}\check{e}k$ $\check{s}\check{i}k$ $t\acute{o}t$
 half Czech small all
- $m\check{i}\check{c}\check{e}k$ $t\acute{o}\check{c}\check{e}k$
- $m\check{i}\check{c}\acute{i}k$ $t\acute{o}\check{c}\acute{i}k$

Affrication thus takes place when the sequence is $[-cont]$, $[+DR]$

(continuants being [+DR]). Otherwise the rule is the same as the one forming geminate stops or nongeminate fricatives. In all cases the segments have to be homorganic (except probably for [ant]). There is no natural way in the present framework to express the fact that the result of Contraction is a geminate if the two consonants are [-cont, -DR]; an affricate if they are [-cont], [+DR], respectively, a simple consonant if they are both [+cont], and that there is no contraction in the rest of the cases (i.e. [+DR], [-cons, -DR] and [+cont] [-cont]). I shall leave the question of how to represent what seems to be a natural process open, and state the rule as follows.

(23) A sequence of two homorganic (except for [ant]) consonants is contracted into a single segment in the following cases:

- a) two stops into a geminate stop
- b) two continuants into a single continuant
- c) a stop or an affricate followed by an affricate or a continuant into an affricate.

5. Assimilation, Contraction and the Cycle

The consideration of Contraction as a single phenomenon forces a specific solution to the problem that arises with the interaction between Contraction and Assimilation. Clearly the latter must precede the former, since, as has been justified in the preceding paragraphs, Contraction operates on homorganic clusters. Thus, we have [tótžšk] --> [tód,žšk] --> [tójšk] but no contraction in [dós fšks]. Now consider the words [rābšst+s] 'pantries' and [žalát+s] 'chilly' (pl.). As the rules are formulated, in [rābšstžalát+s] the word final s will assimilate to the following ž giving [rābšstžžalát+s] and Contraction will apply to žž yielding *[rābšstžalát+s]. If Contraction is supposed to be iterative, the pre-

But reapplication of Assimilation is prevented by the SCC, since Assimilation would make no specific use of information made available as a result of the third cycle.

6. Simplification of Consonant Clusters

Morpheme final or word final two consonant clusters are simplified by deleting the second consonant under certain conditions. The clusters in question consist of a sonorant or s³ followed by a stop. Deletion of the stop depends on the nature of the cluster and its right environment. In (25) the effect of both factors, deletion (=DEL) or optional deletion (=DEL) is summarized (ll stands for pause. Clusters are represented with a voiceless stop, but voiced stops can appear also).

(25) CLUSTER	(right) ENVIRONMENT
	+V ##V ##ll +C #C ##C
mp, nt, lt	DEL DEL DEL DEL DEL
ŋk	(DEL) DEL DEL DEL DEL
rt	(DEL)(DEL) DEL DEL DEL
st	(DEL)(DEL) DEL DEL
lp, lk, rp, rk, sp, sk ..	

To illustrate (25) with some examples, let's take the words camp 'field', punt 'point', malalt 'sick' (person), banc 'bench', hort 'orchard', gust 'taste', and as representatives of the last group, serp 'snake' and disc 'disc'. The environment +V is represented by the diminutive morpheme ét (feminine éta), +C by the plural morpheme s. In word final position ##V will be illustrated by és 'is' and ##C by sigui 'is' (subjunctive).⁴

(26)	<u>+V</u>	<u>##V</u>	<u>##ll</u>	<u>+C</u>	<u>##C</u>	
	kəmpét	kám	és	kám	kám s	kám sígi

<u>+V</u>	<u>##V</u>	<u>##l</u>	<u>+C</u>	<u>##C</u>
puntÉt	pún és	pún	pún.s	pún sígi
məɫəltÉt	məlál és	məlál	məlál s	məlál sígi
bəŋkÉt	bəŋ(k)és	bəŋ	bəŋ s	bəŋ sígi
úrÉt	úr(t)és	úr(t)	úr s	úr sígi
gustÉt	gús(t)és	gús(t)	gús	gús sígi
sərpɛtə	sərp és	sərp	sərp s	sərp sígi
diskÉt	dísk és	dísk	dísk s	dísk sígi

Before giving some examples for the environments with a single word boundary (+V and ##C), let's recall that the three way distinction + / # / ## is not set up merely for the purpose of describing the behavior of clusters in the situations presented above. First, in most cases the distinction is clear on syntactic grounds: ## separates major lexical categories, # clitics from words on which they cliticize, etc. But, in addition, the distinction + / # / ## is also necessary to differentiate the three corresponding stress patterns examined in more detail in the first chapter: where X and Y are morphemes or words, in X+Y X might have an underlying stress which must be erased and which cannot affect Vowel Reduction. In X##Y the stress of X can be erased but affects Vowel Reduction, and in X#Y, X has a secondary stress. To repeat an example, compare [r̄antə+dóɾə] 'washing machine', [r̄entə#plác] 'dishwasher', and [r̄èntə##plác] 'he washes dishes' or [r̄èntə##dɔsɾə] 'he washes early'.

The following illustration of the environments +V and ##C contains present participles or imperatives followed by clitics, and compounds with a single #, as shown by their unreduced unstressed vowel:

(27) <u>+V</u>	intə̀rɔmp u	sant əndréw	súr̄t i	pɔstə̀lbɛul
	interrupt it	saint Andrew	go out	postalveolar
			there	
<u>##C</u>	intə̀rɔm lu	san simó	súr̄ li	pɔzdə̀ntál
	him	Simon	to him	postdental

Returning to (25), it is clear that a following consonant, two word boundaries, and pause contribute to deletion. On the other hand, it is also clear that the nature of the stop alone does not determine deletion. Notice however that after Assimilation has applied, the first two groups of clusters in (25) are homorganic. Quite clearly, this is not the case for non-deletion cases lk, lk, rp, rk, sp, sk, where there is no assimilation. As for rt and st, they also have to be distinguished from the other groups. The second consonant cannot make the distinction, since t is in the set with obligatory deletion in most contexts (nt, lt), and in the set with optional deletion (rt, st). The first consonant of the cluster, however, is m, n, ŋ or l in the first set (1st and 2nd group in (25)), and r̄ or s in the second set. This partition indicates once more that [+cont] should be assigned to r̄ (recall /r/ is realized [r̄] before C), and [-cont] to nasals and laterals, as has been argued earlier, sections 3 and 4. Let's then consider a possible formulation of the rule:

(28)

$$\begin{bmatrix} \text{-cont} \\ \alpha \text{bk} \\ \beta \text{lab} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} +\text{cons} \\ \alpha \text{bk} \\ \beta \text{lab} \\ \langle \text{-cont} \rangle \\ \text{a} \end{bmatrix} \text{---} \left\{ \begin{array}{l} \#_0 \text{C} \\ \text{b} \langle \# \# \rangle \end{array} \right\} \quad \begin{array}{l} \text{CONDITIONS:} \\ \text{a then b} \\ \sim \text{a, then b OPTIONAL} \end{array}$$

There are still two cases that are not correctly covered by the rule, namely the non-deletion in st+C (obligatory deletion predicted by (28)), and the optionality in the case of ŋk#V (obligatory deletion predicted by (28)). In the case of st+C, notice that the example presented in (26), and the only one known to me, is st+s in masculine nominals where s is the plural morpheme. Masculine nominals ending in st, sk or in a sibilant form the plural either by adding s or us. But whereas for sibilants us is added to oxytones and s to nonoxytones, for st and sk the normal solution is, in my own speech, us, the cases with s being un-

predictable and exceptional. Along with gúst~gústus 'pleasure', tríst~trístus 'sad', lést~léstus 'clever', bást~bástus 'vaste', etc., we find uést~uéstus 'West', dəzgást~dəzgástus 'wear' əgzáwst~əgzáwstus 'exhausted', rəbóst~rəbóstus 'pantry'. The class of exceptions to stop deletion is then the same as the class of exceptions to the normal plural formation with us.

The second case, namely ŋk#V is more complex, since the presence of the stop is dependent on syntactic structure (e.g. el ba[ŋk] obre 'the bank opens' but sé obre el ba[ŋ∅] obre la botiga 'if opens the bank, opens the shop'). But sometimes instead of [k], [g] appears although /k/ was the underlying segment (cf. [bəŋké] 'banker') el ba[ŋg] obre (cf. Badia (1951), 110). This suggests that k or g are deleted regularly after ŋ, as our rule predicts, and that a different rule inserts g between ŋ and V, in some contexts.

7. Assimilation of Nasals and Cluster Simplification

The discussion of the preceding sections assumed a given ordering between the rules of Assimilation (at least Assimilation of nasals) and Cluster Simplification. This is so because the notion "homorganic cluster" was used to characterize the clusters that underwent Simplification, and it was formally expressed in the rule itself. That is, those clusters whose members were homorganic either underlyingly (nt, lt, rt, st) or as a result of Assimilation (mp, ŋk), underwent Simplification, but those that were not didn't. The ordering should therefore be Assimilation~Simplification. Furthermore, in the cases where both Assimilation and Simplification apply, if the latter were to apply before the former, the consonant that triggers Assimilation would be

no longer present at the time this rule applies. The two cases where this can occur are np --> mp --> m and nk --> ŋk --- ŋ. It could be argued that words ending in /np/ have really underlying /mp/, in fact a requirement of the SCC. But this is not the case for nk, since there is no independent underlying ŋ in Catalan (see section 2). Moreover, there is a set of cases where nk is a derived sequence. Consider the following verb forms:

(29)		<u>3rd Sg Pst</u>	<u>2nd Sg Prs</u>	<u>3rd Sg Prs</u>	<u>1st Sg Prs</u>
		<u>Ind</u>	<u>Ind</u>	<u>Ind</u>	<u>Ind</u>
a.	'to cost'	bəɫiə	báɫs	bál	báɫk
	'to grind'	muɫiə	múɫs	mól	mólk
b.	'to sell'	bəniə	béns	bén	béŋ
	'to melt'	fuɲiə	fóns	fón	fóŋ

The 1st Sg Pres Indicative in (29a) are formed with the verb roots bál, múɫ, by adding k; the same thing happens with bén, fón in (29b), but there Assimilation and Simplification apply giving the derivations bénk --> béŋk --- béŋ, and fónk --> fóŋk --> fóŋ.

Let's consider now cases with a nasal-stop cluster followed by another consonant. The output of our rules would be a nasal assimilated to the point of articulation of the stop, followed by the other consonant, i.e. NC₁C₂ --> N₁C₂. But the result is different:

(30)	bíntɛ	bín	bím	pans	bín,	šáys	
	'twentieth'	'twenty'	'twenty'	'breads'	'twenty'	'lamps'	
	fént	u	fén	fém	mə	fén,	lúm
	'doing'	'it'	'doing'	'doing'	'to me'	'doing'	'light'
	bíŋ	káps	féŋ	gas			
	'twenty'	'heads'	'doing'	'gas'			

The first column indicates that the underlying forms are /bínt/ and /fént/, t not being deleted because of the following vowel (cf.

sét 'seven' sətɛ́ 'seventh', fém 'let's do', fɛ́mu 'let's do it'). In the rest of the cases the t is deleted because it is word final or followed by a consonant. But the nasal shows up homorganic, not with the deleted stop, but with the following consonant. For these cases an ordering reverse of that suggested before would work. The ordering conflict can be illustrated with the sentence venc vint páns 'I sell twenty bread loaves'.

	<u>ASS. -- SIMPL.</u>		<u>SIMPL. -- ASS.</u>
	bɛ́nk bínt páns		bɛ́nk bínt páns
ASS.	ŋ n	SIMPL.	∅ ∅
SIMPL.	∅ ∅	ASS.	m m
	bɛ́ŋ *bíŋ páns		*bɛ́m bím páns

Let's consider two possible ways of overcoming the ordering problem. One solution would consist of having two separate rules of nasal assimilation, one assimilating them to velars, the other to any point of articulation, and order in between them the rule of Cluster Simplification. We then would have the derivation bɛ́nk bínt páns--> bɛ́ŋk bínt páns --> bɛ́ŋ bínt páns --> bɛ́ŋ bím páns. A second solution would keep the previous rules, but extend nasal assimilation so as to assimilate n to a consonant C₁ in the environment __ (t) # C₁, that is allowing an intervening t (or d) between them. The derivation would be bɛ́nk bínt páns --> bɛ́ŋk bínt páns --> bɛ́ŋ bím páns. Notice that Simplification would have to be modified since it has to delete t in the nonhomorganic cluster mt.

Although these alternatives are technically feasible, they share a common drawback, namely the loss of a generalization. In addition to the lack of any evidence in favor of splitting Assimilation in the way presented, or modifying both Assimilation and Simplification, there is loss of a generalization in each case. In the first solution Assimilat-

of assimilation does not violate the SCC. In the third cycle no rule would apply since Assimilation of nasals only applies to coronals and labials, hence not to n.

There is still a problem left. The rules as stated predict that after the loss of the stop as a result of Simplification the preceding consonant should retain the point of articulation of the deleted stop (unless further assimilation takes place). This is true, as we have seen, for ŋ from /nk/. But in other cases the prediction is wrong:

- (33) punt 'point' málált 'sick'
- | | | | |
|-------|-------------|--|-------------------------|
| ASS. | <u>n</u> | | <u>l</u> |
| SIMP. | ∅ | | ∅ |
| | *p <u>n</u> | | *m <u>al</u> á <u>l</u> |

Instead we get [pún] and [málál] with alveolar, and not dental l, n. The underlying forms must be /púnt/, /málált/ as shown by (26). The problem here is similar to the preceding one. The reverse ordering would give the right result: púnt (SIMP) --> pún (ASS, inapplicable) --> pún. But notice that here the situation is slightly different. The opposite orderings are necessary, bánk (ASS.) --> baŋk (SIMP) --> báŋ and púnt (SIMP) --> pún (ASS, inappl.) --> pún, but both within the same cycle. Thus no cyclic solution will make any difference. Consider however the rules proposed to account for nasal assimilation, (4) and (5) repeated here as (34) and (35).

- (34) $\begin{bmatrix} +nas \\ +cor \end{bmatrix} \rightarrow \begin{bmatrix} \alpha bk \\ \beta lab \\ \gamma ant \\ \delta cor \\ \epsilon distr \end{bmatrix} \xrightarrow{\#_0} \begin{bmatrix} +cons \\ \alpha bk \\ \beta lab \\ \gamma ant \\ \delta cor \\ \epsilon distr \end{bmatrix}$
- (35) $\begin{bmatrix} +nas \\ +lab \end{bmatrix} \rightarrow [+distr] / \xrightarrow{\#_0} \begin{bmatrix} +cons \\ +lab \\ +distr \end{bmatrix}$

They are difficult to collapse, because n assimilates [lab] and m assimilates only to a labial, so both [βlab] and [+lab] have to be pres-

ent in the rule. There is however another possible formulation with two rules, where the first one is simplified by eliminating the feature [distr]:

(36)
$$\begin{bmatrix} +nas \\ +cor \end{bmatrix} \rightarrow \begin{bmatrix} \alpha bk \\ \beta lab \\ \gamma cor \\ \delta ant \end{bmatrix} / \text{---} \#_0 \begin{bmatrix} +cons \\ \alpha bk \\ \beta lab \\ \gamma cor \\ \delta ant \end{bmatrix} \quad \text{ASSIMILATION OF NASALS}$$

(37)
$$\begin{bmatrix} +nas \\ -hi \\ \alpha lab \end{bmatrix} \rightarrow [\beta distr] / \text{---} \#_0 \begin{bmatrix} +cons \\ \beta distr \\ \alpha lab \end{bmatrix} \quad \text{NASAL ADJUSTMENT}$$

Under this formulatin, first n assimilates to "major" points of articulation, and then m and n undergo a "minor" adjustment in point of articulation when the following consonant is already partly homorganic with the following consonant (i.e. mf --> mf, nt --> nt, but not mt --> *mt, etc.). (37) is a more "phonetic" rule, never causing neutralization of underlying distinctions, and should be noncyclic, according to the conclusion reached in the Introduction. It applies therefore after all cyclic rules have applied, therefore after (36). This gives the correct result for [pún]. The general Assimilation rule (36) will apply before Simplification, and Nasal Adjustment (37) after the latter. So we shall have púnt (ASS, vacuous) --> púnt (SIMPL) --> pún (ADJUST, inappl.) --> pún, but diminutive [púntét] by púntét (ASS, vacuous) --> púntét (SIMP, inappl.) --> púntét (ADJUST) --> púntét.

I repeat some of the examples, with the rules proposed.

(38)
$$\begin{array}{l} \text{1st} \\ \text{ASS.} \\ \text{SIMP.} \\ \text{2nd} \\ \text{ASS.} \\ \text{SIMP.} \\ \text{3rd} \\ \text{ASS.} \\ \text{SIMP.} \end{array} \begin{array}{c} \begin{bmatrix} \text{[[[b'n]k][[b'ínt][[p'íntə]s]]]} \\ \text{2 1 0} \quad \text{1 0} \quad \text{1 0 1} \end{bmatrix} \text{combs'} \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \end{array} \quad \begin{array}{c} \text{[[pún]]} \\ \text{1 0} \end{array}$$

$$\begin{array}{c} \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \end{array} \begin{array}{ccc} \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \\ \text{ } & \text{ } & \text{ } \end{array} \begin{array}{c} \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \\ \text{ } \end{array}$$

-->(ADJ.) bÉŋ bím píntəs

8. N-Deletion

In most morphemes, a final n doesn't appear when it is word final, but appears elsewhere:

(39)	<u>sg.</u>	<u>plural</u>	<u>derivative</u>
	plá 'even'	plán+s	plán+ísim 'very even'
	kuzí 'cousin'	kuzín+s	kuzín+ét 'small cousin'
	šil+é 'Chilean'	šil+én+s	šil+én+ízmə 'Chileanism'
	upurtú 'opportune'	upurtún+s	upurtún+itát 'opportunity'
	distribú+s+jó 'distribution'	distribú+s+jón+s	distribú+s+jún+ál 'distributional'

However, not every word final n is deleted. In (39) already, all contexts of deletion are \check{V} ~~##~~. After a consonant or proparoxytones there is no deletion: [kárn] 'meat', [kuntórn] 'contour', [əspésimən] 'specimen', [ipérbəton] 'hyperbaton'. After an unstressed vowel in paroxytones n is normally retained, but there seem to be also cases of deletion. Thus, besides [átun] 'atonic' [urízn] 'origin', [əgzámən] 'examination, and the majority of paroxytones, we find the following eleven cases in (40a) (from Fabra (1968), 110; examples in orthographic form):⁶

(40)	a.	b.	c. <u>plurals</u>
	jove 'young'	joveníssim 'very young'	joves
	home 'man'	homenet 'small man'	homes
	orfe 'orphan'	orfenet 'small orphan'	orfes
	ase 'donkey'	asenet 'small donkey'	ases
	freixe 'ash tree'	freixeneda 'ash tree plan- tation'	freixes

(40, cont.)		<u>plurals</u>
a.	b.	
rave 'radish'	ravenar 'radish field'	raves
cove 'pannier'	covenada 'pannier load'	coves
argue 'winding machine'	arguenell 'fishing machine with pulley'	argues
orgue 'organ'	organista 'organist'	orgues
marge 'margin'	marginal 'marginal'	marges
terme 'limit'	terminal 'terminal'	termes

The derivatives in b) are all in the Diccionari General (=Fabra (1932)), but some of them (asenet, freixeneda, covenada, arguenell, as well as argue) are not familiar in my own idiolect. Even putting aside this fact, there is a very clear cut distinction between (39) and (40). In (39), n is not present if it is word final, but appears elsewhere. In (40), on the other side, n doesn't show up word finally, and in general in any flexionally related forms, it appears on derivationally related forms.

But the normal case of deletion, ∇ ##, has also exceptions:

(41) a.	<u>plural</u>	<u>derivatives</u>
són 'sleep, sleepi- ness'	sóns	sunéta 'small sleep'
žuán 'John'	žuáns	žuánét 'little John'
arān 'close'		arāná 'to cut close, short'
uzón 'ozone'	uzóns	uzónik 'ozonic'
žén 'gene'	žéns	ženutípus 'genotype'

(41, cont.)

səgón
'second'

səgóns

b.

ún 'one', (fem. únə)

ú '(number) one' (pl.
úns)

əlgún 'some' (fem. əlgúnə)

əlgú 'someone'

miǰán 'middle'

miǰá 'middle' (fem.
miǰánə)

bón 'good' (fem. bónə)

bó 'good' (fem. bónə)

bén 'well' (cf. benəstá 'well-being')

bé 'well'

kín 'which' (fem. kínə)

kí 'who'

(41a) are simply exceptions to N-deletion that cannot be characterized but idiosyncratically. The examples in the first column of (41b) are interesting in that they are closely related to identical words (second column in (41b)) that undergo deletion regularly. Non-deletion occurs when the words in question are modifiers preceding the modified head, i.e., determiners or adjectives preceding N or NP, or adverbs preceding participles or adjectives. It is worth noting that this includes the case when the head has been deleted, or left unfilled lexically. Sentences are in orthographic form:

- (42) Tinc un llibre. En tinc un Compta desde u
I have one book. PRO I have one Count from one.
(of them)
- Algun amic t'ajudarà. Algun t'ajudarà. Algú t'ajudarà.
Some friend will help some will help someone will help you
you (of them) you
- Vindré a mitjan agost. Faré el curs mitjà
I'll come in the middle of I'll do the course middle
August
- És un bon lloc El lloc és bo
It's a good place the place is good
- Està ben fet. Ho han fet bé.
It's well done it they've done well

(42 cont.)

Quin equip juga?
which team plays

Quin juga?
which plays
(of them)

qui juga?
who plays

But there is a number of adjectives that can appear before the head and nevertheless show regular N-deletion word finally, as witnessed by the contrast between feminine and masculine forms:

(43) masculine

feminine

ple estiu
full, midst summer
of

plena primavera
spring

el cinquè dia
the fifth day

la cinquena setmana
the week

el comú interès
the common interest

la comuna causa
cause

el diví càstig
the divine punishment

la divina justicia
justice

el veí Portugal
the neighbor- Portugal
ing

la veïna Franca
France

These examples suggest that unless there is some property distinguishing (41b) and (43), which seems not to be the case, the prehead modifiers of (41b) are lexically marked so as not to undergo N-deletion. That is, they belong to the same class as (41a). This raises the question of why should they be exceptions just when they appear in prehead position. But there are independent reasons to believe that prehead variants are separate lexical entries, since they share different syntactic and semantic properties from the head or posthead variants. First of all, not all adjectives can appear before the head; u refers only to the number 1. algú and qui are necessarily human, but algún and quin can be nonhuman; mitjan is only used in the expression a mitjan de, before masculine time nouns or noun phrases (e.g. *a mitjan camí 'in the middle of the way'; *a mitjana setmana (fem.) 'at the middle of the week').

To summarize, we have five types of cases: after stressed vowel
a) normally, deletion, b) exceptionally, non-deletion; after unstressed
vowel, c) normally, non-deletion, d) exceptionally, deletion in flexion;
after C e) regular non-deletion:

(44)	<u>-##</u>	<u>-ts##</u> (plural)	<u>-t[derivat. suff.]</u>
a.	plá	plá <u>ns</u>	plá <u>n</u> ísim
b.	són	só <u>ns</u>	sun <u>é</u> ta
c.	átun	átu <u>ns</u>	atun <u>i</u> sítát
d.	žóbə	žóbə <u>s</u>	žubə <u>n</u> ét
e.	kárn	kárn <u>ns</u>	kərn <u>é</u> ta

d) can be excluded from the N-deletion rule by letting it apply in the
context V ##, and morphemes in the class b) can be marked as exceptions
to this rule.

One way to treat the remaining cases, c) and d), would be to extend
deletion to the context V ts, to have [žóbənts] --> [žóbəts], and mark
[átun] and similar cases as exceptions to the rule. First of all, the
context V ts is wrong, since we have derivatives like [žubəntsá] 'young'
[žubəntséλ] 'youngster'. Of course the rule could be modified so as
to apply only before the plural marker s, i.e., in the context

$$V \quad \langle s \rangle \quad \# \#$$

←str>

But the major problem with such an analysis is that it treats d)
as regular cases and c) as exceptions, while the latter are in fact the
rule, and d) is reduced to the few examples in (40). The right solution
is, I think, to have the rule apply in the context \hat{V} ##, thus excluding
correctly c) and e), and treat the alternations in d) like [žóbə][~]
[žubənét] as idiosyncratic. That is to say that the morpheme for 'young'
has two allomorphic variants, žóbə and žóbən. The noun žóbə has the first
variant, and forms the plural [žóbəs] regularly by adding s. The dimin-

utive and other derivatives have the second variant with n: [žubənét], [žubəntút] 'youth'. One consequence of this analysis is that it would be possible that in the cases of allomorphy the variant without n appeared in nonfinal position and the variant with n in final position, i.e., the reverse of the rule-governed cases. At least the first case can be attested. [ʒmə] 'man' forms an adjectival derivative, not with the variant ʒmən (like in [umən+ét]) but with a variant without n: [umá] (cf. [bʒsk] 'forest', [buská] 'silvester', [λúɾ] 'far' (adverb), [λɥɾá] 'far' (adj.)). And from [žóbə], there is the derivative [žubén]. é, and therefore n must belong to the suffix, otherwise the stress wouldn't be explained. On the other hand, the existence of suppletion of the kind presented in (40) is independently attested in the language. Consider the regular derivations from a) to b) with those from c) to d) in (45):

(45) a)	b)	c)	d)
λét milk	λatéra milk can	kafé coffee	kafatéra coffee pot
žənól knee	žənuλéra knee guard	pít chest	pitréra bosom
méksik Mexico	məksiká Mexican	bérgə name of town	bərgədə inhabitant of b.
flús weak	flušəža to weaken	tú you	tutəžá to address some- one with 'tu' (as op- posed to polite <u>busté</u>)
fúm smoke	fumós smoky	pédra stone	pədrəgós rocky
mór+tu snout	muṛál nosebag	káp head	kəpsál bedhead

The words in (45c) show the same pattern as (40): plurals are [kafés], [tús], [píts], [bérgəs], [tús], [pédras], [káps].

In addition the extra consonant is not present regularly in all derivatives: [kəfə́inə] 'caffein', [pitĕ́t] 'small chest, bib', [fĕ́rik] 'ferric', [pədrĕ́tə] 'small stone').

It might still be argued that the examples in (40) are different from (45c, d) because, first, they are a larger set showing the same additional consonant, and second, because this alternation is related to an independently motivated phonological rule, N-deletion, whereas there are no independent rules deleting t, r (at least after C), d or g.

It would be certainly useless to claim that those facts--the alternations in (40)-- are accidental. Yet to include them under the rule of N-deletion would mean to have to allow rules to have so-called "positive" exceptions: /žóban/ and /žóban+s/ would have to undergo the rule, even though they wouldn't meet its structural description, because of the preceding unstressed vowel. The structural description has to contain a stressed vowel, since otherwise the n would be incorrectly deleted in the regular cases ([urížan], etc.) where it stays. And there are other reasons, as we have seen, to believe that the alternation is present underlyingly.

This apparent contradiction vanishes once it is realized that the fact that a given regularity exists doesn't entail that it should be accounted for by the grammar. It is on the contrary the notion "grammar" or "possible grammar" that defines what a linguistic regularity is. The arguments given above suggest that the alternation -ñ-∅ is a phonological regularity for (39) but not for (40). Yet the number of items affected by the alternation in (40) suggests that its existence is not accidental. They are indeed the result of some rules once operative in the grammar. A word like [šmə] originated from Latin HOMINEM to a

stage where [ʃmen] and pl. [ʃmens] der. [ʃmen--] coexisted. The rule deleting n operated after stressed and unstressed vowels to give Old Catalan [ʃme]~[ʃmens]~[ʃmen]+der. suf. (Coromines(1971), 313-314), a system still found in occidental and southern dialects. Another process reduced ns to s in some cases to give [ʃme]~[ʃmes]~[ʃmen]+der. suf. At this stage the rule was modified so as to apply only after stressed vowels, as words introduced later in the language ending in Vn ([uríʒən], etc.) witness.

N-deletion will have therefore the following form:

$$(46) \begin{bmatrix} +nas \\ +cor \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} +syll \\ +str \end{bmatrix} \text{ — \#\#}$$

9. R-Deletion

Consider the following adjectives in their masculine and feminine forms.

(47)	<u>masc.</u>	<u>fem.</u>	<u>masc.</u>	<u>fem.</u>
a.	nú 'naked'	nuə	tót 'all'	tótə
b.	fí 'fine'	fínə	sá 'sane'	sánə
c.	dú 'hard'	dúrə	primé 'first'	primérə
d.	púr̄ 'pure'	púrə	sunór̄ 'sonorous'	sunórə
e.	kúr̄ 'short'	kúrtə	fár̄ 'fed up'	fártə

Class a), like the majority of adjectives, forms the feminine by adding the morpheme ə, but the same can be said of other cases. In d) the alternation r̄~r in masc. and fem. is predicted by rule (17), and b) and e) will have underlying forms like /fín/--/fínə/ and /kúrt/--/kúrtə/. The masculine phonetic forms [fí] and [kur̄] (or [kúrt], since in this case (28) is optional) will be predicted by the rules of N-deletion (46) and Cluster Simplification (28), respectively. Similarly, a rule of fin 1 R deletion would account for [dú] [primé] from underlying /dúr/

/primér/. The situation for final r is partially parallel to the one of final n discussed in the preceding section. The majority of final r's are deleted, but there are also numerous exceptions. These words with word final phonetic r̄ that are exceptions to R-deletion should not be confused with those arising from rt --> r̄ by Cluster Simplification. They are distinguished in words where r̄ is followed by another morpheme beginning with a vowel, since there the t is not deleted (cf. [púrə] vs. [kurtə] in (47)), and also because Cluster Simplification applies optionally to rt: [kúr], [kúrt] but [púr̄], *[puṛt].

So far the cases of deletion presented suggest an environment $\uparrow _ \#\#$. r never appears after a consonant word finally, but instead of deletion what happens in cases of underlying Cr is insertion of epenthetic a. The verbal root bát 'beat', when added the infinitive marker r becomes [bátrə]; see Chapter 3, section 2, and rule (11). If R-deletion operated after a-Insertion it could be formulated applying just before $\#\#$. But the nonoxytone words with final r would disqualify such an approach:

(48)	šófār	'chauffeur'	mízār	'miserable'
	fʃstūr	'phosphorus'	sátir	'satyr'
	murtífār	'deadly'	əfímār	'ephimer'
	zéfir	'zephyr'	səməfūr	'traffic light'
	útar	'uterus'	əlmíbār	'syrup'
	kərníbur	'carnivorous'	žúpitar	'Jupiter'

As the examples in (48) show, paroxytones and proparoxytones conserve their final r. There is a single exception, [kánti] 'jug', diminutive: [kəntirét]. This alternation can be included in the class of lexical alternations already discussed (cf. (40) and (45c, d)), and excluded from the scope of R-deletion. It should be made clear that this

kind of move is not equivalent to allowing rules to have "positive exceptions". Although it allows some degree of irregularity it confines it to a specific place in the grammar, namely the lexicon, where, in addition, most idiosyncracies are lodged anyway.

Unlike n, r is also deleted before the plural marker s, exactly in those cases where it is deleted also word finally.

(49)		<u>plural</u>	<u>feminine</u>
dú	'hard'	dús	dúrə
klá	'clear'	klás	klára
pijó	'worse'	pijós	--- cf. <u>ə</u> mpijurá 'to get worse'
sənsé	'whole'	sənsés	sənséra
kuló	'color'	kulós	--- <u>dim.</u> kulurét
pəpé	'paper'	pəpés	--- <u>dim.</u> pəpərét
pintá	'to paint'	--	pintár u 'to paint it' pintársə 'to paint oneself' pintálzi 'to paint to them'

The deletion before plural s does not make these cases similar to those in (40) which were excluded from the rule of N-deletion. First, those in (49) are far from exceptional, and second, they have, as expected, their r appearing when there is a feminine form, or when a clitic beginning with a vowel or a single consonant follows. So R-deletion will have the following form:

$$(50) \begin{bmatrix} +\text{son} \\ -\text{lat} \\ -\text{nas} \end{bmatrix} \rightarrow \emptyset / \begin{bmatrix} +\text{syll} \\ +\text{str} \end{bmatrix} \text{---} (+ \begin{bmatrix} +\text{cont} \\ +\text{cor} \end{bmatrix}) \# \begin{Bmatrix} \# \\ \text{CC} \end{Bmatrix}$$

This formulation of the rule being justified, it provides an argument for the analysis of Future and Conditional in Chapter 1. The infinitive morpheme is r for all verbs. This r gets deleted by (50) unless a clitic beginning with a vowel or a single consonant follows,

as illustrated in (49). When the verbal stem ends in a consonant, in most cases an epenthetic a is inserted, as said, after the r: [bát] (stem), [bátrə] 'to beat', [kábl]~[kábrə] 'to fit in', [káv]~[kávra] 'to fall'. But after m, ɲ, š, rr, rs and ns, apparently a is inserted between the stem and the infinitive marker r, as the following verbs, in orthographic form, show (ny=[ɲ], ix=[š]): témer 'to fear', plányer 'to pity', córrer 'to run', tòrcer 'to twist', vèncer 'to win'. If a is inserted in these cases, R-deletion will not apply, since the inserted vowel preceding r is unstressed. But whereas the "inserted" vowel always stays, the final r appears to be deleted. This analysis conflicts with our decision to restrict R-deletion to apply after stressed vowels. But the analysis seems to be incorrect. In fact r not only deletes word finally or before a clitic beginning with two consonants, but it deletes everywhere, i.e. it never shows up:

(51)	-#r	-#l 'him'	-#u 'it' ⁷
	témə	téməl	témaw
	plájə	plájəl	plájaw
	kunéšə	kunéšəl	kunéšaw
	kórə	kórəl	kórəw
	tórsa	tórsəl	tórsaw
	bénsə	bénsəl	bénsaw

We are forced therefore to set up a different morpheme for the infinitive in these cases, namely a. Otherwise, not only would rule (50) have to be extended to apply after unstressed vowels in verbs, but even in right environments where the general rule never applies. In fact it could be formulated as "delete the infinitive marker r everywhere, in verbs whose stem ends in m, ɲ, š, rr, rs, ns".

The more plausible solution with a separate marker a for these cases

is consistent with the treatment of future and conditional adopted in Chapter 1. But the other alternative discussed there is incompatible with it. This alternative claimed that a future form like [pintaré] is formed by an infinitive and inflected auxiliary verb, i.e. [_V[_{INF}pin- tar]e]. If this were true the future and conditional of the verbs in (51) would be *[tamaé], *[tamaí], *[kunašəé], *[kunašəíə]; etc. The solution adopted in Chapter 1, on the other hand, sets up future and conditional markers /ré/, etc., /ríə/, etc., respectively, and predicts the correct forms. See also Chapter 3, section 4.

(52) <u>Future</u> (1st Sg.)	<u>Conditional</u> (1st Sg.)
tamaré	tamaría
plənaré	plənaría
kunašərə	kunašəría
kuřərə	kuřəría
tursərə	tursəría
bənsərə	bənsəría

10. B to Glide

A large number of items show an alternation between postvocalic [w] and intervocalic obstruents, mainly [b].

(53) a.	tów	'soft'	tóbə	(fem.)
b.	péw	'foot'	pədəstrə	'on foot' (adj.)
c.	paláw	'palace'	palətí	'palatine'
d.	pərdíw	'par- tridge'	pərdigót	'male partridge'
e.	déw	'ten'	dəkágun	'decagon'
f.	préw	'price'	dəprəsyá	'to depreciate'

(53) can be divided into two groups. The first group, exemplified by a) has a large number of alternations w~b and only a few exceptions

(i.e. intervocalic b that doesn't show up as w in word final position); see Lleó and Mascaró (1973) for details. The second group (53b-f) has a limited number of alternations, and, in most cases an intervocalic obstruent d, t, g, k, s shows up (devoiced) in word final position without turning to w. Furthermore in some of the derivatives of examples like (53b-f) w shows up instead of the obstruent: [pəwét] 'small foot', [pərdiwásə] 'big partridge', [prəwá] 'to price'.

Lleó and Mascaró (1973) propose rules of glide formation from b, t-d, and k-g to account for these alternations, assigning to the last two the character of "minor" or "morphological" rules; cases like (53f) are the result of two rules, $t \rightarrow w$ and $t \rightarrow s$. But examples like [pəwét] suggest that these cases have two roots (e.g. /préw/ and /prés/), and that a rule is only operative in the case of b.

Some of the cases where b doesn't become a glide can be excluded by the rule. Consider the following examples:

- (54) a. nów 'new' nóbə (fem.)
 bíw 'alive' bíbə (fem.)
 bláw 'blue' blabísim 'very blue'
 žuéw 'jewish' žuébə (fem.)
- b. búlp 'bulb' bulbós 'bulbous'
 bǣrp 'snake' bǣrbál 'verbal'
 árəp 'Arabic' arábik 'Arab'
 bisílp 'disyllabic' bisilábik 'disyllabic'

If the rule is formulated to apply after a stressed vowel, the cases in (54) with final p instead of w will be correctly excluded. The rule should also apply before a plural s, but not before any consonant:

(55)

Plural

nǫw	'new'	nǫws	
tów	'soft'	tóws	
bláw	'blue'	bláws	
λíbra	'book'		
mópla	'piece of fur- niture'	mubilyári	'furniture'
ə dǎptáplə	'adaptable'	ə dǎptəbilitat	'adaptability'
əskriptó	'writer'	əskribén	'copyist, clerk'

B to Glide can therefore be formulated as follows:

(56) -son
 +lab --> [-cons] / $\left[\begin{array}{l} +syll \\ +stress \end{array} \right]$ _ (C) ##
 +voice

CHAPTER THREE: VERBAL MORPHOLOGY

1. The Verbal System

Most of the material discussed in the two previous chapters dealt with nominal phonology, although other categories were also mentioned and discussed. The object of this chapter is threefold. First, to present an analysis of Catalan Verb Morphology that moves towards the goal of achieving descriptive adequacy. Second, to determine what contributions such an analysis can make to linguistic theory, in this particular case to try to give a characterization of the rules that operate on phonological representations. In the third place, to test the conclusions, both theoretical and descriptive, reached in the first two chapters: the theory of underlying stress, several of the rules proposed, the distinction made about derived and underlying regularities, and the Strict Cycle Condition.

Catalan has an inflecting verbal system which consists of seven finite simple tenses, three nonfinite forms, and several tenses formed by an auxiliary verb and a verb in nonfinite form. Among the simple tenses, there are two presents and two pasts (indicative and subjunctive), a future, a conditional, and the imperative. The nonfinite forms are the (past) participle, the gerund (or present participle) and the infinitive. The participle can be inflected for gender and number, like adjectives, and is, not surprisingly, the most irregular of all forms. The tense called "passé simple", "passato remoto", "pretérito indefinido" in other Romance languages is confined to literary use in the dialect under study, at least as a simple form, since there is a completely equivalent form with the verb "vaig" (see section

9 and Appendix II) + infinitive. I shall therefore not **include** it in my presentation. The imperative has all but the first person singular. Third person forms are used to address the hearer in the polite form, so they might be regarded as second person forms, but morphologically they are identical to third person forms. Since the third person singular and the first plural always are identical in the imperative to the same persons in the present subjunctive, I shall omit them in the paradigms and in the discussion. I shall follow the traditional grammars in distinguishing three conjugations: I, II and III (IIIa and IIIb). In addition to the distinction within III, I shall introduce a classification of II in groups and subgroups for convenience, especially among what we might call the "subregular" verbs. Verbs will be named by their infinitive in standard orthographic form. The verbal forms (the inflected forms) will be always in phonetic transcription omitting a few details (minor assimilations). To make distinctions between morphemes possible, the Imperative second and third plural persons, the Infinitive and the gerund will be transcribed as if a clitic beginning with a vowel followed so that rules applying to word final segment won't obscure the form of the morphemes. Similarly the participle will be transcribed as if the feminine marker ə followed. Thus we shall find [féz], [fázint], [fént], [fér], [mirád], instead of the phonetic form of these words in isolation which is [fés], [fázin], [fén], [fé], [míráat], as predicted by the rules discussed in Chapter 2, and the general process of devoicing of final obstruents. The tenses and persons will be abbreviated as follows:

Present Indicative:	PI	1st singular:	1
Imperfective Indicative:	II	2nd singular:	2

Present Subjunctive:	PS	3rd singular:	3
Imperfective Subjunctive:	IS	1st plural:	4
Future:	F	2nd plural:	5
Conditional:	C	3rd plural:	6
Infinitive:	Inf		
Gerund (present participle):	Ger		
Participle (past participle):	Pa		
Imperative:	Imp		

2. Regular Verbs

In this section I shall examine the regular verbs starting from the traditional classification of Catalan verbs and modifying it later.¹ The basic hypothesis concerning the structure of the verbal system will be presented here and developed later in the analysis of irregular morphology.

The verbal system of Catalan has been traditionally divided into three conjugations, I, II, III. (Fabra (1968), 41). Here are the paradigms of three corresponding verbs, mirar 'to look', batre 'to beat', and bullir 'to boil':

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6 Imp</u>
mír u	mir ábə	mír i	mir és	mir əré	mir əríə	mir ár
mír əs	mir ábəs	mír is	mir ésis	mir ərás	mir əríəs	mir ánt
mír ə	mir ábə	mír i	mir és	mir ərá	mir əríə	mir ád
mir ém	mir ábəm	mir ém	mir ésim	mir ərém	mir əríəm	mír ə
mir éw	mir ábəw	mir éw	mir ésiw	mir əréw	mir əríəw	mir éw
mír ən	mir ábən	mír in	mir ésin	mir ərán	mir əríən	mír int

(1 cont)

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6 Imp</u>
bát u	bət íə	bát i	bət és	bat ré	bət ríə	bát rə
bát s	bət íəs	bát is	bət ésis	bət rás	bət ríəs	bət ént
bát	bət íə	bát i	bət és	bət rá	bət ríə	bət úd
bət ém	bət íəm	bət ém	bət ésim	bət rém	bət ríəm	bát
bət éw	bət íəw	bət éw	bət ésiw	bət réw	bət ríəw	bət éw
bát ən	bət íən	bát in	bət ésin	bət rán	bət ríən	bát int
búl u	buł íə	búl i	buł ís	buł iré	buł iríə	buł ír
búl s	buł íəs	búl is	buł ísis	buł irás	buł iríəs	buł ínt
búl	buł íə	búl i	buł ís	buł irá	buł iríə	buł íd
buł ím	buł íəm	buł ím	buł ísim	buł irém	buł iríəm	búl
buł íw	buł íəw	buł íw	buł ísiw	buł iréw	buł iríəw	buł íw
búl ən	buł íən	búl in	buł ísin	buł irán	buł iríən	búl int

The main characteristic of the three paradigms in (1) is that the root doesn't change, except for stress or rules already motivated. This is the case of batre whose root vowel a is turned into ə when unstressed by the rule of Vowel Reduction (Chapter 1). The problem of regular verb morphology is thus to account for the regularities of the verbal endings and the alternations of stress.

Except for 2 and 6Imp, there is an exact correlation between person and ending, namely persons 2, 4, 5, 6 end always in s (or z), m, w n, respectively, and 1 and 3 show presumably no person marker.

The question becomes more complex when we try to find the correspondances between tense and ending. To facilitate the examination of tense markers, let's consider the following chart, which corresponds

to (1), once the root and the person markers are removed, as well as epenthetic ə in Inf [bátrə] (cf. rule (11)).

(2)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf</u> , <u>PP</u> , <u>Pa</u> , <u>Imp2</u> , <u>Σ</u>
I	u	ábə	i	és	ərə	əríə	ár
	ə	ábə	i	ési	ərə	əríə	ánt
	ə	ábə	i	és	ərə	əríə	ád
	é	ábə	é	ési	ərə	əríə	ə
	é	ábə	é	ési	ərə	əríə	é
	ə	ábə	i	ési	ərə	əríə	i
II	u	íə	i	és	ərə	əríə	r
	-	íə	i	ési	ərə	əríə	ént
	-	íə	i	és	ərə	əríə	úd
	é	íə	é	ési	ərə	əríə	-
	é	íə	é	ési	ərə	əríə	é
	ə	íə	i	ési	ərə	əríə	i
III	u	íə	i	ís	iré	iríə	ír
	-	íə	i	ísi	irá	iríə	ínt
	-	íə	i	ís	irá	iríə	íd
	í	íə	í	ísi	iré	iríə	-
	í	íə	í	ísi	iré	iríə	í
	●	íə	i	ísi	irá	iríə	i

Is it possible to single out any further systematic generalization in (2)? All three morphological elements, tense, person and conjugation seem to intervene in the determination of the ending. But upon closer examination, an asymmetry appears in (2). Consider separately the first

vowel of the ending and the rest of the ending. The second part of the ending is largely invariable across conjugations, the exception being the imperfective indicative of I. As for the first vowel of the ending, the stress distinguishes two cases. In unstressed endings (separated by a line in (2) from stressed endings), the vowel is, like the second part of the ending, invariable across conjugations, the exceptions being 1, 2 PI and Imp of conjugation I, and Inf of II. But when the vowel is in a stressed ending, it does vary across conjugations: in no case does a form show the same vowel in all three conjugations. This observation suggests that these vowels be treated differently from the rest of the ending. In particular, I shall classify the constituents of the whole ending in the following form, the thematic vowel, as its varying across conjugations suggests, is a marker of the conjugation, and can vary also according to person and tense; it appears only in stressed endings. The tense markers (i.e. the unstressed single vowels, and what follows the thematic vowel in (2)) vary according to tense, and exceptionally according to conjugation and person. Finally, the person markers which are invariable \emptyset for 1 and 3, and z, m, w, n for 2, 4, 5, 6 respectively. This segmentation of a verb form into root, thematic vowel or conjugation marker, tense marker, and person marker seems to me rather plausible, given the facts of regular verbs. Of course, Catalan being an inflectional language, each of these morphemes will be mainly determined by its morphological correlate (root, conjugation, tense and person), but also secondarily by other morphological properties. Consider incidentally what the two other extreme alternatives would be. One could group together all identical endings and state for each one that a verb takes that ending in the corresponding forms, e.g. it takes és in IIS

conjugations I and II, and 3IS conjugations I and II. This is the method more or less followed by traditional grammars, quite correctly, I think, given their objectives. On the other hand, one could try to regularize the markers more, so that they are less conditioned by other than their morphological correlate; a set of phonological rules would then derive the surface forms. The first alternative should be rejected from the beginning, since it refuses to capture any of the existing generalizations. Let's look a little bit more into the second alternative. We might, for example, claim that the II marker is bə, the PS marker i and the IS marker si (or perhaps even generalize the subjunctive marker as i as opposed to indicative \emptyset). We then would have to posit rules deleting b in conjugations I and II after the theme vowel, deleting i after the theme vowel (to get 4PS and 5PS), and deleting i word finally (to get 1IS and 3IS). Along the same lines, one could propose that there is a specific thematic vowel for each conjugation, and that some rules derive the surface thematic vowels in the appropriate cases. The crucial point is that the force of such an analysis rests entirely on the independent motivation of such rules. If they are specific of verb forms morphologically characterized, then it is exactly equivalent to stating that a given marker appears in some morphologically characterized set of verb forms. Notice furthermore that in this analysis the morpheme is given an underlying form whose choice is arbitrary. That is, there is no reason to prefer having, e.g., underlying II marker bə and delete b, to having underlying ə and insert b in the appropriate places. This indeterminacy of choice of underlying representation, to which I shall return later, indicates that our former proposal is preferable.

← The analysis proposed will be strengthened with the discussion in later sections, but I shall present here two cases dealing

with stress and nominal derivational morphology that also support it.

Note that there are still two unexplained facts in the paradigms of regular verbs: the correlation between the appearance of the thematic vowel and the stressed character of the ending, and the distribution of stress itself. In Chapter 1 it was shown that stress, rather than being assigned by rule was present in underlying representations. According to that view, the morphemes proposed to mark conjugation, tense and person should also share that property. Thus we can propose the thematic vowel to be stressed underlyingly. The only instances of unstressed thematic vowel are the future and conditional (see (1) or (2)). But precisely future and conditional are stressed on the tense marker, and that is why appearance of thematic vowel was correlated to stress in the ending (i.e., stress on the thematic vowel itself or on the tense marker). We already know that within a word, a rule deletes all but the rightmost stress (rule (24), Ch. 1), so the thematic vowel can be set up stressed underlyingly and it will be destressed by an independently motivated rule in the appropriate cases. The distribution of stress in regular verbs in (1) follows from the assumptions discussed and justified in Chapter 1, namely that morphemes are underlyingly stressed or unstressed and that surface stress is predicted by a Destressing rule. The verb root will always be stressed, and more specifically stressed on the last syllable,³ the thematic vowel will also bear stress, and the rest of the markers will be unstressed, except for future and conditional which will be stressed. After Destressing has applied, stress will show up on the future and conditional markers in these tenses, on the thematic vowel in the other forms where this appears, and otherwise on the stem, e.g.:

(3)	búλ+í+rá+s	mír+é+si+m	mír+ə+s
DESTR.	u i	i	-
	buλirás	mirésim	mírəs

The existence of a thematic vowel, in particular of a stressed thematic vowel, is supported by deverbal derivatives, where in fact a thematic vowel also appears. Consider the productive suffixes dó(r), which forms nouns or adjectives with the meaning 'the one that X', 'the property of Xing' (where X is the verb); mén(t), which forms nouns with the meaning 'the action or state of Xing'; and plə, which forms adjectives parallel to English adjectives in -able.⁴ The verbs that correspond to them are in 3PI; recall that that form consists of root +ə in I conjugation and the bare root in conjugations II and III.

(4)	Conj. I	Conj. II	Conj. III
	pur̄tədó	pərdədó	kuλidó
	púr̄tə 'he bears'	pért 'he loses'	kúl 'he picks up'
	trənsfurmədó	kunəsədó	muɣidó
	trənsfórmə 'he transforms'	kunés 'he knows'	múr 'he milks'
	pəgámén	rəbámén	rətrupimén
	pága 'he pays'	rép 'he receives'	rətrúr 'it booms'
	miλuramén	bənsimén	səntimén
	iniλórə 'he improves'	béns 'he wins'	sén(t) 'he feels'
	kəntáplə	kunsəbíplə	dəskuzíplə
	kántə 'he sings'	kunsép 'he conceives'	dəskús 'he unstiches'
	kuɣfúrtáplə	təmíplə	buλíplə
	kuɣfúr̄tə 'he comforts'	tém 'he fears'	búl 'he boils'

The underlined vowels á, ə, í, i clearly show up because the nouns or adjectives are deverbal. This can be seen comparing (4) with the cases where there exist derivatives which are not deverbal: [miλórə]

(ə the feminine marker) 'improvement', [kántik] 'canticle, song', [təmór̄] 'fear', [búλ] 'boil'. Furthermore this vowel corresponds to the thematic vowel in verbal forms: a, ə for conj. I, ə, i for conj. II, and i for conj. III. Most suffixes are stressed, so the thematic vowel shows up unstressed but in plə (underlyingly bl, see note 4) the last stress of the word is on the thematic vowel, and it gets the stress as expected.

In (4) a particularity of conjugation II already observable in (2) is repeated; namely that the thematic vowels of that conjugation are the same as those of either conj. I or conj. II, depending on the derivational suffix. The same thing happens in the verbal paradigms ((1) or (2)): in some forms the thematic vowel of conj. I and II coincide, in some forms they coincide in II and III. I would like to suggest that the explanation for this particular distribution is that so-called "regular II conj. verbs" (referred to as groups R-1 and R-2 later) are in fact irregular, their irregularity consisting of having a mixed conjugation marker (or thematic vowel), sometimes belonging to conj. I, sometimes to III, sometimes a thematic vowel of their own (é and ú in Ger and Pa, and lack of thematic vowel in the Inf). There is a reason, of course, why a verb like bátre has been included in a II regular conjugation. The particular type of "mixing" of thematic vowels that it shows is the most common among verbs that don't belong to conj. I or to conj. III. Other verbs, and this favors this analysis, present different kinds of "mixing", that is, they have the thematic vowel of conj. III or conj. I in other tenses or persons than bátre (see sections 5, 6). In addition, all verbs formed by derivation from other words belong to conj. I or to conj. III (Fabra (1968), 138-141).

3. Class IIIa and Other Anomalous Verb Forms

The verbs formed by derivation belonging to conj. III that were just mentioned, as well as other conj. III verbs, differ slightly from the paradigm given for conj. III in (1). Thus besides batre we have unir 'to unite' with the following paradigm:

(5)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
	un éš <u>u</u>	un íə	un éš <u>i</u>	un ís	un iré	un iríə	un ír
	un éšəs	un íəs	un éš <u>is</u>	un ísis	un irás	un iríəs	un ínt
	un éš	un íə	un éš <u>i</u>	un ís	un irá	un iríə	un íd
	un ím	un íəm	un ím	un ísim	un irém	un iríəm	un éš
	un íw	un íəw	un íw	un ísiw	un iréw	un iríəw	un íw
	un éšən	un íən	un éš <u>in</u>	un ísin	un irán	un iríən	un éšint

Unir differs from bullir in that it presents an increment éš in certain forms. That éš doesn't belong to the root is clear from the fact that the vast number of verbs that follow the paradigm of unir have different roots but the same increment éš in the same forms. Now compare the forms in which bullir and unir differ:

(6)	PI:	1	búl <u>u</u>	un éš u
		2	búl <u>s</u>	un éš əs
		3	búl	un éš
		6	búl ən	un éš ən
	PS:	1	búl i	un éš i
		2	búl is	un éš is
		3	búl i	un éš i
		6	búl in	un éš in
	Imp	2	búl	un éš
		6	búl int	un éš int

Notice first of all that the forms differ just in the increment éš, and in stress. The only exception, 2PI, where we get [unéšəs] instead of *[unéšs] is the result of a ə insertion rule that will be discussed directly. The increment éš is always placed between the root and the tense and person markers, that is in the same place as the thematic vowel. Given these facts, and the fact that éš is characteristic of a class of verbs (i.e. a conjugation) we might assign to éš the same status as the thematic vowel, and call it thematic increment.

Recall that in (2) a distinction in the class of initial vowels of the ending was proposed to define the thematic vowel. Interestingly enough, this same distinction appears when we try to determine the class of forms where éš appears: the forms in (6) are exactly the forms that lack a thematic vowel. This fact, i.e. éš appearing whenever the thematic vowel í doesn't appear, gives further support to the distinction between forms with and without thematic vowel put forward before.

As for the stress, considering éš as thematic element along with the thematic vowel, exactly predicts the placement of stress in (6). éš, as the thematic vowel, will be stressed underlyingly, and the rule of Destressing will eliminate the root stress in all cases.

There are also some other verbs that seem not to conform to the paradigms in (1). As we shall see, their diverging from (1) is due to the effect of general phonological rules.

The desinence of 2 and 3PI is different for conj. I and conjs. II, III; conj. I takes əs, ə, and conjs. II, III take s, ə (cf. (2)). But there are some verbs that, although they belong to II or III, as witnessed by their Ger and II, seem to take the endings of conj. I in 2, 3PI:

(7) a.		<u>II</u>	<u>Ger</u>	<u>2PI</u>	<u>3PI</u>
	<u>cosir</u>	'to sew'	kuz fə	kuz ɪnt	kúz əs

(7a cont)		<u>II</u>	<u>Ger</u>	<u>2PI</u>	<u>3PI</u>
<u>tossir</u>	'to cough'	tus íə	tus ínt	tús əs	
<u>fugir</u>	'to flee'	fuž íə	fuž ínt	fúž əs	
<u>tòrcer</u>	'to bend'	turs íə	turs ént	tšrs əs	
<u>vèncer</u>	'to win'	bəns íə	bəns ént	béns əs	
<u>créixer</u>	'to grow'	krəš íə	krəš ént	krés əs	
<u>conèixer</u>	'to know'	kunəš íə	kunəš ént	kunéš əs	
b. <u>obrir</u>	'to open'	ubr íə	ubr ínt	šbr əs	šbrə
<u>omplir</u>	'to fill'	umpl íə	umpl ínt	ómpl əs	ómplə
<u>córrer</u>	'to run'	kur íə	kur ént	kór əs	kórə

(7a), rather than being verbs that take irregularly the tense markers of another conjugation, are regular verbs subject to a rule that inserts ə between sibilants. This rule seems to be operative also in other cases. Consider the plurals of "invariable" feminine adjectives, i.e. adjectives which take no feminine ending ə:

(8) <u>Fem. Sg.</u>	<u>Fem. Pl.</u>
fásil 'easy'	fásils
bulgár 'vulgar'	bulgárs
sublím 'sublime'	sublíms
fəlıs 'happy'	fəlısəs
bəlıs 'quick'	bəlısəs
fugás 'fleeting'	fugásəs

The examples in (7b) are similar. In Chapter (2) it was shown that ə was inserted after geminates before C or word finally. In fact this rule should be extended to cover other cases, in particular sequences of stop + liquid:

(9)		<u>Diminutive</u>	<u>Plural</u>
šísklǝ	'scream'	šísklét	šísklǝs
áŋglǝ	'angle'	aŋglét	áŋglǝs
ábrǝ	'tree'	abrét	ábrǝs
súkrǝ	'sugar'	sukrét	súkrǝs
bídrǝ	'glass'	bídrét	bídrǝs
tríplǝ	'triple'	triplét	tríplǝs
teátrǝ	'theater'	teátrét	teátrǝs

The diminutive and other suffixes, can be added to the consonant ending roots šískl, áŋgl, etc. and an epenthetic ǝ inserted word finally and before C.

Both rules of ǝ insertion should be examined in more detail to accommodate other cases and exclude some also, but I shall not try to deal with them and formulate the rules as (10) and (11) for future reference.

$$(10) \quad V \rightarrow \text{ǝ} / \left[\begin{array}{l} +\text{cont} \\ +\text{cor} \end{array} \right] \left[\begin{array}{l} +\text{cont} \\ +\text{cor} \end{array} \right]$$

$$(11) \quad V \rightarrow \text{ǝ} / [-\text{cont}] [+son] \left[\begin{array}{l} \# \\ \# \\ C \end{array} \right] \text{ and other contexts}$$

Notice that (11) will take care of the last examples in (7b), [kór̄ǝs], [kór̄ǝ] since we can represent its phonetic continuant r̄ by the sequence of two (noncontinuant) r's /rr/, as shown in Ch. 2. Similarly, the exception encountered when we examined the verbs taking the increment éš, namely 2PI [unéšǝs] instead of * [unéšs] (cf. (6) and following discussion), will be accounted for by (10).

Other apparently anomalous verb forms are found in verbs of conjugation II that, having other irregularities, will be dealt with in the next section. One of their characteristics is to lack the thematic vowel in the Infinitive, Future and Conditional. When the root of such a verb

ends in l or n one would expect Infinitive, Future, and Conditional in lr, nr; lré, etc., nré, etc.; lríə, etc., nríə, etc., respectively. Instead we get ldr, ndr, ldré, ndré, ldríə, ndríə. The d could not belong to a particular tense marker for this class of verbs, since it doesn't show up but in this case, namely when the phonological environment lr or nr is found. We can therefore suppose the d inserted by rule. But morpheme internally lr, nr, and ldr, ndr contrast:

(12) a.		b.	
unrát	'honest'	indrēt	'place'
ənṛəwná	'to speak'	sándrə	'ash'
ənṛík	'Henry'	téndrə	'tender'
kunṛéw	'cultivated land'	əndréw	'Andrew'
fulṛá	'to line'	bəldrík	'sword belt'
tulṛá	(family name)	buldró	'bunch of higher plants in a field'

Across morphemes we also find both solutions:

(13) a.		b.	
són#ṛóks	'they are rocks'	bən+dré	'I shall sell'
ból#ṛóks	'he wants rocks'	bul+dríə	'he would like'
ənṛéntən	'they wash some of them'	fón+drə	'to melt'
əlṛéntən	'they wash him'	pun+drá	'he will lay'
ənṛérə	'backwards'	(cf. 3PI: bən, ból, fón, pón)	
cf. dəṛera	'behind'		
inṛəbés	'upside down'		
cf. ṛəbés	'reverse'		
ənṛəžulá	'to tile'		
cf. ṛəžlə	'tile'		

The rule should therefore be formulated so as not to apply across any number of #'s, that is,

$$(14) \quad \emptyset \rightarrow d / \left\{ \begin{matrix} n \\ l \end{matrix} \right\} _r$$

so that it applies to (13b) but not to (13a), nor to (12a) (in (12b) the d is present underlyingly). In (12a) nr is within a morpheme and the SCC will block its application. Here are the derivations of three illustrative cases:

(15)	[[unr]+át]	[ən#[rérə]]	[[bén]+rə]
D-INS r → \bar{r}	$\frac{\text{blocked by SCC}}{\bar{r}}$ un \bar{r} át	$\frac{\text{---}}{\bar{r}}$ ən \bar{r} érə	$\frac{d}{-}$ b \bar{e} ndrə

For morpheme-internal lr or nr D-insertion will not be able to apply because it cannot apply properly on any cycle: all information used by the rule is within the 0th cycle and no crucial information is introduced on later cycles. The r will then become a trill since it follows n or l. r will also become \bar{r} in words like [ən#[rérə]] but D-insertion will be inapplicable. On the other hand, D-insertion will apply on the first cycle in [₁[₀bén]₀+rə]₁ and similar cases, and the r no longer following n or l, it will remain flapped. Recall that the SCC will not apply to r → \bar{r} rules, because they are postcyclic, since they are not neutralizing (see the Introduction).

To sum up, I have presented the paradigms of three conjugations (mirar I, bullir IIIb, unir IIIa; batre was classified as irregular) and considered their forms as constituted of four morphemes. The root and the thematic vowel, or thematic increment for IIIa, form the stem. the desinence is formed by tense marker and the person marker. The set of morphemes of the flexional ending of regular verbs is given below.

(16) Thematic vowel or increment

	I	IIIb	IIIa
1, 2, 3, 6PI; C	∅	∅	éš
II Inf C r P	é	í	í

(16 cont)	I	IIIb	IIIa
4, 5PI; 4,5PS; 5Imp	é	í	í
IS	é	í	í

Tense

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Imp</u>	<u>Inf</u>	<u>Ger</u>	<u>Pa</u>
<u>1</u> u	<u>I</u> bə	<u>1,2,3,6</u> i	<u>1,3</u> s	<u>1</u> ré	riə	<u>I2</u> ə	r	nt	d
<u>6</u> ə	<u>III</u> ə	<u>4,5</u> ø	<u>2,4,5,si</u> <u>6</u>	<u>4,5</u> rĕ		<u>III2,5</u> ø			
<u>I2,3</u> ə			<u>2,3,6</u> rá			<u>6</u> i			
<u>others</u> ø									

Person

1. ø
2. s; Imp: ø
3. ø
4. m
5. w
6. n; Imp: nt

4. "Regular" conj. II Verbs and Irregular Participles

The so-called second conjugation is defined by the mixed character of its thematic vowels (sometimes those of conjs. I and III, sometimes different, sometimes lacking in forms where I and III have it), and it is characterized by being by and large irregular. This irregularity can be attributed--as I shall try to show--for each verb or group of verbs to the distribution of the thematic vowel and polymorphism of the root, which is however subject to subregularities. Tense and person marker are mostly unaffected by irregularity, and discrepancies from the regular markers are reduced to otherwise quite irregular participle.

The group of verbs to be analyzed in this section is characterized by having fixed root and thematic vowel (except for the participle), the thematic vowel and the tense markers having the following distribution, as already indicated before:

(17)	<u>Thematic Vowel:</u> R-1, R-2	<u>Tense Markers</u>
	1,2,3,6PI; 2,6Imp 1,2,3,6PS	∅ = I = III as in (16)
	II	í = III follows conj. III
	4,5PI; 4,5PS; 5Imp	ê = I
	IS	é = I
	Ger	é
	Inf, F, C	∅
	Pa	ú

Group R-1. It's formed by batre, whose paradigm was already presented and discussed together with I and II conjugation verbs in the preceding section.

Group R-2. It comprises the verbs mentioned in Chapter 2, section 9, where it was argued that their infinitive marker is not r, but ə. Apart from the infinitive, the only forms where they differ from group R-1 is future and conditional. Compare the following forms with the corresponding for batre (1):

(18)	<u>córrer</u> 'to run'	<u>vêncer</u> 'to win'
	<u>F</u> <u>C</u>	<u>F</u> <u>C</u>
	kurr əré kurr əríə	bəns əré bəns əríə
	kurr ərás kurr əríəs	bəns ərás bəns əríəs
	kurr ərá kurr əríə	<u>etc.</u> <u>etc.</u>
	kurr əréḿ kurr əríəḿ	<u>plánger</u> 'to pity'
	kurr əréw kurr əríəw	pləŋ əré pləŋ əríə
	kurr ərán kurr əríən	pləŋ ərás pləŋ əríəs

The expected forms would be [kurrɾɛ́], [bənsrɛ́], [plajɾɛ́], etc. The inserted ə in córrer is already taken care of by (11), and in the other examples by extending (11) to the appropriate environments.

No verb of conj. I has an irregular participle, but conjs. IIIa and IIIb, as well as the groups of conj. II examined so far, have some verbs whose participles have endings other than the regular íd for III and úd for II. Admetre 'to admit' (and other verbs in -metre, Engl. -mit) has a root alternant ədmɛ́z, no thematic vowel, and ∅ participle marker, and similarly imprimir 'to print' with the root alternant imprɛ́z. Merèixer 'to merit' and créixer 'to grow' have the roots mərɛ́sk and krɛ́sk with the normal thematic vowel and tense marker ú and d, and the same holds for córrer 'to run' with the root kórrg which undergoes ə insertion (cf. with the verbs that add g, next section). The rest of the examples have no thematic vowel and the marker t: estrènyer 'to narrow, constrain' has əstrɛ́, morir 'to die' and oferir 'to offer' have their regular roots mɔ́r and ufɛ́r, and sofrir 'to suffer', obrir 'to open', cobrir 'to cover' and establiir 'to establish' have, respectively, sufɛ́r, ɔbɛ́r, kubɛ́r, and əstəblɛ́r. Here are the participle forms with the corresponding 4PI forms that show their regular root (except for the reduced root vowel) and the conjugation they belong to (ending ím for III and ending ém for II):

(19) 4PI	Participle
ədmət ím	ədmɛ́z
imprim ím	imprɛ́z
mərəš ém	mərəsk úd
krəš ém	krəsk úd
kuṛ ém	kuṛəg úd
əstrɔp ém	ɔstrɛ́ t

(19 cont)

mur ím	mór t
ufər ím	ufér t
sufr ím	sufér t
ubr ím	ubér t
kubr ím	kubér t
əstəpl ím	əstəplér t

5. Verbs with Root Final G

In this class I shall include verbs that, in addition to some minor irregularities, show a root final velar g in some forms. I shall present first the paradigm of one of such verbs (excluding the participle), and later the forms of other verbs that differ from those in the example paradigm. Participles, which show most irregularities, will be treated at the end of the section.

Group G-1. Fondre 'to melt' presents the following forms:

(20) <u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>2, 5, 6Imp</u>
fónj	fun íə	fónj i	fujg és	fun dré	fun dríə	fón drə
fón s	fun íəs	fónj is	fujg ésis	fun drás	fun dríəs	fun ént
fón	fun íə	fónj i	fujg és	fun drá	fun dríə	
fun ém	fun íəm	fujg ém	fujg ésim	fun drém	fun dríəm	fón
fun éw	fun íəw	fujg éw	fujg ésiw	fun dréw	fun dríəw	fun éw
fón ən	fun íən	fónj in	fujg ésin	fun drán	fun dríən	fónj int

The alternations in the thematic vowel are the same as for bátre, mentioned before (section 4), some forms having the thematic vowel of conj. I, others that of conj. III:

(21) Thematic vowel: G-1, G-2 (also W-4, and one variant of W-3)

1,2,3,6I-; 1,2,3,6PS; 2,6Imp $\emptyset = I = III$

II

í = III

(21 cont)

4,5PI; 4,5PS; 5Imp	é = I
IS	é = I
Ger	é
Inf, F, C	∅

The alternations between o and u in the root are due to the Vowel Reduction rule studied in Chapter 1, which operates on unstressed vowels. The d in F, C, and Inf is the result of the D-Insertion rule examined before, and the a in the Inf [fónðrə] is inserted by rule (11), after D-Insertion has applied. As for the tense endings, they are already taken care of by (16) and (17), but the tense marker for 1PI is different:

(22) Tense marker: G-verbs

1PI	∅
-----	---

The only forms still unaccounted for are 1PI, and PS and IS. 1PI is [fónŋ] and in the other cases a g appears before the ending (2PS [fónŋ-gil], etc.) The alternations between n and ŋ throughout the paradigm can be handled with the rule of Assimilation of Nasals presented in Chapter 2, and by the same rule plus Cluster Simplification; [fónŋ] from /fónŋg/ --> fónŋg --> [fónŋ].

The question that arises is how the alternation fón~fónŋ should be handled. The g clearly doesn't belong to tense or person endings, since it is separated from them by the thematic vowel in 4,5PS and in IS. It could be regarded as a thematic increment similar to és of class IIIa (section 2), but here the clear-cut correlation between appearance of thematic increment and lack of thematic vowel (see (6)) is missing. There are three other possible alternatives to account for this alter-

nation: a) the root of fondre is fóng and g is deleted in the appropriate environments; b) the root is fón and g is inserted appropriately; c) there are two underlying roots fong and fon. I shall return to the problem of determining the underlying form for the root in such cases, when more irregular verbs have been examined. Notice however that the determination of the two environments is not statable in phonological terms; besides the great disparity of all the forms that it covers, 4PI [funém] and 4PS [fúŋgém] are phonologically identical but for g, yet they would have to be differentiated. The same is true of 5PI and 5Imp [funéw], and 5PS [fuggéw].⁵

Group G-2. The verb prendre 'to take' is similar to fondre. It has the parallel forms préng~prén, but shows another change in the root in F, C, and Inf. Here are these forms together with some examples of the rest of the forms, that don't exhibit the change:

(23)		F: pən dré	C: pən dría	Inf: péndrə
	1PI	préŋ	pən drás	pən drías
	3PI	prén	pən drá	pən dría
	4II	prən íə	pən drém	pən drím
	1PS	préŋg i	pən dréw	pən dríəw
	6IS	prəŋg ésiw, etc.	pən drán	pən drían

It is clear that the lack of r in the forms in prén-, as opposed to préng or prén, is determined (if by any phonological environment at all) by the following d, or r, or both. But one should be cautious before attributing the loss⁶ of r to a phonological rule: if indeed there is such a phonological rule, one should expect to find its effects in other places as well. A rule of that sort might have been active in the past, and actually in varieties of the dialect discussed here, since one finds forms [pugrámə] 'program', [pubblémə] 'problem' instead of

[prugrámə], [prublémə]. But most speakers, myself included, get words involving two sequences of C+liquid, like the two last examples and the following:

(24)	tríplə	'triple'	prɛ#ndrés	'pre-arrangement'
	prugrés	'progress'	tri+ándrə	'triandric'
	frustrá	'to frustrate'	prə+skríw	'he prescribes'
	frətrísídə	'fratricide'	sobrə#prén	'it supervenes'

It is difficult to decide whether the rule is still operative, restricted to verbs (the only examples are prendre and its compounds), or prendre has the root variants préng, prén and pén, the latter for Inf., F, and C. Since there is no other verb of the form CrV₁^{n} of the II conj.,

I don't find a way to choose one of the alternatives and shall leave the question open.

Group G-3. The verbs soler and valer, 'to use to' and 'to cost, to be worth', respectively, have Inf and Ger differing from the paradigm of fondre (20):

(25)	1PI	sólk	bálk	Inf	sul ér	bəlg ér
	2PS	sólg i	bálg i	Ger	sul ént	bəlg ént
	4PI	sul ém	bəl ém			

Notice incidentally that g is not deleted in 1PI as in fóng --> fong --> fón, but devoiced: sólk, bálk, as Cluster Simplification (rule (29) in Chapter 2) and the general process of final obstruent devoicing predict. For the Inf and Ger we would expect [sóldrə], [báldrə], and [sulént], [bəlént].

As we noticed before, conj. II verbs are characterized for their irregularity in the choice of the thematic vowel: in some tenses they have conj. I thematic vowels, in others conj. II, and in others a

different or no thematic vowel. Soler and valer differ from the normal distribution of thematic vowels of (21) by having é in Inf and Ger. In addition, valer extends the g of 1PI, PS and IS to these two tenses, too. The distribution of the thematic vowel is thus the following:

(26) Thematic vowel: soler, valer

1,2,3,6PI; 1,2,3,6PS; 2,6Imp	∅ = I = III
II	í = III
4,5PI; 4,5PS; 5Imp	é = I
IS	é = I
Inf, Ger	é
F, C	∅

Group G-4. A final group of verbs belonging to this class are characterized by the alternation of g with a root final š. Another property of this group is the fact that for some tenses there is free variation between g and š. The group divides itself in two sets, a) compounds of the root pəřéš (aparèixer 'to appear' comparèixer 'to present oneself, to appear', etc.); and b) conèixer 'to know' and its compounds (reconèixer 'to recognize', desconèixer 'not to know', etc.). Here are the forms that present some anomaly, for aparèixer and conèixer (other forms are regularly formed from the root ending in š, Pa apart).

(27)

1PI	əpəřéš u	kunéš u, kunék
Inf	əpəřéš ə	kunéš ə
F	əpəřəš əré	kunəš əré
	əpəřəš ərás	kunəš ərás
	<u>etc.</u>	<u>etc.</u>
C	əpəřəš əríə	kunəš əríə
	əpəřəš əríəs	kunəš əríəs
	<u>etc.</u>	<u>etc.</u>

(27 cont)

PS	əpərəš i, əpərəg i	kunéš i, kunég i
	əpərəš is, əpərəg is	kunéš is, kunég is
	<u>etc.</u>	<u>etc.</u>
IS	əpərəg és, əpərəš és	kunəš és, kunəg és
	əpərəg ésis, əpərəš ésis	kunəš ésis, kunəg ésis
	<u>etc.</u>	<u>etc.</u>

Inf, F, and C are perfectly "regular" in that they lack as most conj. II verbs, the thematic vowel in these tenses. Future and Conditional receive a vowel ə by rule (11); the Infinitives [əpərəšə], [kunéšə] have the special marker ə, as other verbs discussed before. Although in some cases one of the forms in free variation might be slightly favored, both š and g roots appear in PS and IS, as well as in lPI for conèixer. In the participle, which will be dealt with at the end of the section, the form with g is the only one.

Let's examine now the participles of the verbs of conj. II considered so far. In (28) a form containing the root of the verb, for each root, is present along with the participle, the proposed alternant roots underlined:

(28)	<u>3PI</u>	<u>Pa</u>	<u>Thematic Vow. of Pa</u>	<u>Pa Marker</u>
	<u>bát</u>	<u>batúd</u>	ú	d
	<u>umét</u>	<u>uméz</u>	∅	∅
	<u>əstréŋ</u>	<u>əstrét</u>	∅	(t)
	<u>ətéŋ</u>	<u>ətéz</u>	∅	∅
	<u>kórə</u>	<u>kurəgúd</u>	ú	d
	<u>nés</u>	<u>nəskúd</u>	ú	d
	<u>fón</u> <u>fóŋgi</u>	<u>fóz</u>	∅	∅

(28 cont)

<u>əntén</u>	<u>əntéŋgi</u>	<u>əntéz</u>	∅	∅
<u>bén</u>	<u>béŋgi</u>	<u>bəŋgúd</u>	ú	d
<u>pán</u>	<u>pəŋgi</u>	<u>póst</u>	∅	t
<u>rəzól</u>	<u>rəzólgi</u>	<u>rəzólt</u>	∅	t
<u>prén</u>	<u>préŋgi</u>	<u>préz</u>	∅	∅
<u>sól</u>	<u>sólgi</u>	<u>sulgúd</u>	ú	d
<u>bál</u>	<u>bálgi</u>	<u>bálgúd</u>	ú	d
<u>əpərəs̃</u>	<u>əpərəgi</u>	<u>əpərəgúd</u> , <u>əpərəskúd</u>	ú	d
<u>kunés̃</u>	<u>kunégi</u>	<u>kunəgúd</u>	ú	d

Some of the participles have been already discussed, section 4.

We might distinguish three cases within the participle forms:

a) those that, most regularly, take the thematic vowel ú and the participle marker d, b) those that don't have thematic vowel and show a participle marker t, which we shall find later in other verbs, and c) those that don't show any specific thematic or participle morpheme at all and form the participle on a suppletive root. Under a) we find the group that forms the participle most regularly on the root, represented in (28) by [batúd], those that form it from their g final root ([bəŋgúd], [sulgúd], [bálgúd], [əpərəgúd], [kunəgúd]; also [kuṛəgúd] whose only g root is in the participle and that has undergone ə insertion), and a group of verbs, represented by [nəskúd] and [əpərəskúd] that form it from a root ending in sk that appears only in the participle. Under b) there is [rəzólt], [póst], and perhaps [əstrét] if the suppletive root is əstré and not əstrét itself. [póst] could be analyzed as [póst+t], the z being related to the z of some verbs in c), like [uméz], [ətéz], [fóz], [əntéz], [préz]; these z alternates with the root final consonant in other forms (t, p, n), but is followed by no participle marker in

these cases, as compared with [pʒz+t].

6. Verbs with Root Final W

Putting aside the participle forms, that are specially irregular (like for G-verbs) the class I shall refer to as "root-final W" is characterized by presenting a root ending in Vw in certain forms, and can be subdivided in seven groups. These groups are determined by the alternants of the root in Vw: Vb, Vg, Vsk, Vg, Vyg and Éy, and an irregularity in the thematic vowel (thematic vowel of III in forms where I is expected).

Group W-1. Formed by beure 'to drink', moure 'to move', deure 'must', ploure 'to rain' and their compounds. They have roots in VG in the same forms as in the G class, namely lPI, PS, IS, and Pa. But in addition the root VW, characteristic of the class, appears in 2, 3, 6PI, Inf, F, and C. In the rest of the forms the root is VB; as the paradigm of beure reveals:

(29)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
	bÉk	bəb íə	bÉg i	bəg és	bəw ré	bəw ríə	bÉw rɔ
	bÉw s	bəb íəs	bÉg is	bəg ésis	bəw rás	bəw ríəs	bəb ént
	bÉw	bəb íə	bÉg i	bəg és	bəw rá	bəw ríə	bəg úd
	bəb Ém	bəb íəm	bəg Ém	bəg ésim	bəw rém	bəw ríəm	bÉw
	bəb Éw	bəb íəw	bəg Éw	bəg ésiw	bəw réw	bəw ríəw	bəb Éw
	bÉw ən	bəb íən	bÉg in	bəg ésin	bəw rán	bəw ríən	bÉg int

The thematic vowel distribution and the tense and personal endings are the same as in (21). The rest of the alternations (devoiced g in [bÉk], É → ə if unstressed) are already familiar. The way to account for the alternations in the root-final consonant will be faced in the

next section, after all seven groups have been examined.

Group W-2. It is formed by escriure 'to write' and its compounds. Except for the participle, that has the root variant əskrí and takes the participle marker t mentioned in (28) and following discussion, the root forms are the same as for group W-1, i.e. əskríw, əskrib, əskríg for the same forms. But for escriure, the thematic vowels for forms with əskrib is always í, that is, it takes the conj. III thematic vowel instead of conj. I for these forms. Compare them with those for beure:

(30)	<u>PI</u>		<u>II</u>		<u>Ger</u>
4	bəb ém--əskrib ím		bəb íə--əskrib íə		bəb ént--əskrib ínt
5	bəb éw--əskrib íw		bəb íəs--əskrib íəs		
			bəb íə--əskrib íə		<u>5Imp</u>
			bəb íəm--əskrib íəm		bəb éw--əskrib íw
			bəb íəw--əskrib íəw		
			bəb íən--əskrib íən		

The II makes no difference, since these conj. II verbs have normally thematic vowel í already. Other forms show the alternations of group W-1 (e.g. əskrík, əskríw, etc.) but in the subjunctives both stems əskríg (+ thematic vowel ø, é, or é) and əskribí do appear:

(31)	<u>PS</u>		<u>IS</u>	
	əskríg i		əskrig és,	əskrib ís
	əskríg is		əskrig ésis	əskribí sis
	əskríg i		əskrig és,	əskrib ís
	əskrig ém, skrib ím		əskrig ésim,	əskrib ísim
	əskrig éw, skrib íw		əskrig ésiw,	əskrib ísiw
	əskríg in		əskrig ésin,	əskrib ísin

The thematic vowel distribution is thus the following:

(32) Thematic vowel: escriure (and viure) (W-2, W-3)

1,2,3,6PI; 1,2,3,6PS; 2,6Imp $\emptyset = I = III$

II; 4,5PI; Ger; 5Imp (4,5PS; $\acute{i} = III$
IS)

(4,5PS) $\acute{e} = I$

(IS) $\acute{e} = I$

Inf, F, C, Pa \emptyset (\acute{u} for Pa of viure)

Participle takes t: əskríť, and lacks thematic vowel.

Group W-3. Viure 'to live' and its compounds are very similar to escriure. The distribution of the thematic vowel is the same, and so are the variant forms in the subjunctive. The only difference is in the root final g which is instead sk, and the participle that is formed from the root in sk with regular thematic vowel úə and participle marker d. We thus have, instead of əskríw~əskríb~əskríg, bíw~bíb~bísk:

(33)	<u>PI</u>	<u>PS</u>		<u>IS</u>	
	bísk	bísk i		bisk éś,	bib íś
	bíw s	bísk is		bisk éśis,	bib íśis
	bíw	bísk i		bisk éś,	bib íś
	bib ím	bisk ém, bibím		bisk éśim,	bib íśim
	<u>etc.</u>	bisk éw, bibíw		bisk éśiw,	bib íśiw
		bísk in		bisk éśin,	bib íśin

Group W-4. Coure 'to cook', plaure 'to please', coure 'to close' and their compounds present -ŵw~-ŵg root alternations, but no b appears corresponding to group W-1 -ŵb root. Thus, besides the forms [kók], [kŵws], [kŵgil], etc, we find

(34)	<u>PI</u>	<u>II</u>	<u>Ger</u>	<u>5Imp</u>	<u>Pa</u>
	4 ku ém	ku íə	ku ént	ku éw	kúy t
	5 ku éw	ku íəs			

(34 cont)

<u>PI</u>	<u>II</u>	<u>etc.</u>
	ku íə	
	ku íəm	
	ku íw	
	ku íən	

The participle is formed by adding the participle marker t already mentioned before to the root kúy without thematic vowel. Coure when it has derived meaning (e.g. 'to smart'), and ploure, make the participle regularly, as Group R-1: [kugúd], [pləgúd]. Cloure has [klɔz], without thematic vowel or participle marker.

Group W-5. Caure 'to fall' and its compounds have the following paradigm:

(35)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp.</u>
	káy k	kéy ə	káyg i	kəyg és	kaw ré	kəw ríə	káw rə
	káw s	kéy əs	káyg is	kəyg ésis	kəw rás	kəw ríəs	kəy ént
	káw	kéy ə	káyg i	kəyg és	kəw rá	kəw ríə	kəyg úd
	kəy ém	kéy əm	kəyg ém	kəyg ésim	kəw rém	kəw ríəm	káw
	kəy éw	kéy əw	kəyg éw	kəyg ésiw	kəw réw	kəw ríəw	kəy éw
	káw ən	kéy ən	káyg in	kəyg ésin	kəw rán	kəw ríən	káyg int

Abstracting away from the II, which is characteristic of groups W-5, W-6 and W-7, as we shall see, W-5 is entirely parallel to group W-1, having, instead of Vw~Vb~Vg, Vw~Vy~Vyg, respectively (cf. (29) and (35)).

One might consider the alternative of extending the set of thematic vowels to cover unstressed vowels appearing after the root (see section 2). This proposal might seem attractive to handle the II [kéyə], etc.,

deriving it from /kɛ+i+ɔ/, i being the thematic vowel. After stress had been assigned to ɛ, Glide Formation would derive [kɛyɔ]. The analysis consistent with the position taken here would instead have a root kɛy and postulate absence of thematic vowel in II for caure and similar verbs. Two facts favor, I think, my solution--and therefore the theory that is consistent only with it. First notice that the root in II is idiosyncratic anyway, since it has the vowel ɛ instead of the á of other root-stressed forms; in addition the y of the root posited for II appears also in other forms with and without g: [kayg+i], but also [kay+ɛm], [kay+ént], etc. Secondly, Glide formation doesn't apply across + in verbs,⁷ as [krɛ+i] 'he creates' (subj.), [lú+i] 'it shines' (subj.), [fi+ɛm] 'we confide', [sutés] 'he sweated' (subj) show. It could be argued that it doesn't apply in the contexts C__V and V__C, but that it does in V__V. So part of the force of the argument would rest on independent motivation of Glide Formation for this context. The only examples I can think of, [ɔzəu+ɛt] 'Esau' (diminutive) and [bənžui+ási] 'benzoinaceous' suggest the contrary. Therefore caure will have the following root alternants and thematic vowels:

(36)	<u>Thematic vowel:</u>	<u>caure</u> , <u>creure</u> (W-5, W-6, W-7)	<u>Root:</u>
	1,2,3,6PI; 1,2,3,6PS; 2,6Imp	∅ = I = III	<u>káw</u> 2,3,6PI; 2Imp; F; C; Inf
	4,5PI; 4,5PS, 5Imp	ɛ = I	
	PS	é = I	<u>káyg</u> PS, IS, Pa, 1PI, 6Imp
	Ger	é	
	Pa	ú	<u>kéy</u> 4,5PI; II; Ger; 5Imp
	Inf, F, C, II	∅	

Group W-6. It is formed by creure 'to believe', seure 'to sit', jeure 'to lie', treure 'to take from' and their compounds. They have

a paradigm similar to the last group: [krɛw]~[kɔw], [krəyɛm]~[kəyɛm], [krɛyɔ]~[kɛyɔ], but in the forms that in group W-5 take Vyg, they have

Vg:

(37)	<u>1PI</u>	<u>PS</u>	<u>IS</u>	<u>Pa</u>	<u>6Imp</u>
	krɛk	krɛg i	krəg ɛs	krəg úd	krɛg int
		krɛg is	krəg ɛsis		
		krɛg i	krəg ɛs		
		krəg ɛm	krəg ɛsim		
		krəg ɛm	krəg ɛsim		
		krəg ɛw	krəg ɛsiw		
		krɛg in	krəg ɛsin		

The root alternants are thus the same of (36) but with g instead of yg. In addition, one verb of the group, treure has irregular participle [trɛ+t].

Group W-7. Riure 'to laugh' and its compounds are similar to creure of group W-6, but lack the root final y in all forms where creure has it, except for II. Compare the following forms with those in (35) for caure (which are similar for creure):

(38)	<u>PI</u>	<u>II</u>	<u>Ger</u>	<u>5Imp</u>
	4 r̄i ɛm	r̄ɛy ə	r̄i ɛnt	r̄i ɛw
	5 r̄i ɛw	r̄ɛy əs		
		r̄ɛy ə		
		r̄ɛy əm		
		r̄ɛy əw		
		r̄ɛy ən		

Thus, whereas caure of group W-5 has y after the root vowel in most forms, creure of W-6 lacks them before root final g, riure of W-7 has it only in II. Otherwise, putting participles aside, the stem forms are

(39 cont)	Inf	F;C;2,3, 6PI;2Imp	II	5Imp;4, 5PI	Ger	1,2,3,	4,5PS;IS 1PI;6Imp	Pa
<u>témer</u> R-2	-	-	-	-	-	-	-	-
<u>fondre</u> G-1	-	-	-	-	-	g	g	see (28)
<u>prendre</u> G-2	-	-	-	-	-	g	g	see (28)
<u>soler</u> G-3	-	-	-	-	-	g	g	g
<u>valer</u> "	g	-	-	-	-	g	g	g
<u>aparèixer</u> G-4	š	š	š	š	š	š,g	š,g	g
<u>conèixer</u> "	š	š	š	š	š	š,g	š,g	g
<u>beure</u> W-1	w	w	b	b	b	g	g	g
<u>escriure</u> W-2	w	w	b	b	b	g	b,g	g
<u>riure</u> W-3	w	w	b	b	b	sk	b,sk	sk
<u>coure</u> W-4	w	w	-	-	-	g	g	g
<u>caure</u> W-5	w	w	y	y	y	yg	yg	yg
<u>creure</u> W-6	w	w	y	y	y	g	g	g
<u>riure</u> W-7	w	w	y	-	-	g	g	g

As (39) suggests, most irregularities in the allomorphic variants of the root are due to alternations in the last or last two consonants (the other cases of alternation, which are not present in (39), are the alternations prén~pén in prendre and the change in the stressed vowel of the stem to é in II in caure, and riure). This fact, and the fact that a small number of alternation defined by cross classification a considerable class of verbs, indicate that the root alternations are not just cases of suppletion, and that the existing regularities ought to be expressed in the grammar.

The perhaps obvious way to capture such regularities is to set up a single underlying form for every verb root (except in real cases of suppletion), and derive the root alternants by phonological rules. Under this solution it is the phonological rule that captures the regu-

larities. In fact, if we used "root alternations" in a broader sense, to include any surface phonetic alternation, we already have made use in the preceding discussion of phonological rules to account for such alternations: ə Insertion, D-Insertion, and several of the rules presented in Chapters 1 and 2. The verb perdre 'to lose', for example, which belongs to the "regular" conj. II (i.e. group R-1) like batre, has surface roots pé̄rd in 1PI [pé̄rdul], pé̄rt in 3PI [pé̄rd], pé̄r in 2PI [pé̄rs], and pə̄rd in 4PI [pə̄rdém]. But an underlying root /pé̄rd/ and rules of r → r̄, Final Obstruent Devoicing, Cluster Simplification and Vowel Reduction will account for the alternations. We can thus have a homogeneous treatment of root alternations, and claim that wherever regularities exist they have to be captured by an underlying root and phonological rules that derive the surface forms that correspond to it. I would like to suggest that this approach is inadequate, and that the rules accounting for surface~root alternations are not homogeneous, but divided into two sets, morphological rules and phonological rules.

If the rules that account for the alternations in (39) were to be considered phonological rules, they would present the following peculiar properties. 1) Underlying character of input and output. Whereas phonological rules can, but must not operate in terms of underlying segments, it appears that all the alternations in (39) (and any other alternation that characterizes differences among alternating verb stems) are alternation among underlying segments. Notice also that although some phonological rules effect changes in terms of underlying segments, since they are stated in terms of phonological features the same rules can effect very often other changes that don't involve underlying distinctions. The only case that might be viewed as conflicting with this claim is found in the verb

caber to be discussed later, in section 8. There the alternation involves also stress. But it was shown in Chapter 1 that stress is present underlyingly, which allows us to save the proposed generalization. 2) Indeterminacy of directionality. It is a curious fact that these rules could be formulated, for any rule of the form $A \rightarrow B$, also as $B \rightarrow A$. In other words, there is no evidence that suggests that either A or B is the underlying segment for any given alternation $A \sim B$. Although I don't want to argue that this is always the case for morphological rules, it is a fact that it is never the case for phonological rules. For every phonological rule discussed so far there are reasons to determine the direction in which the rule has to apply. Even in cases where this seems at first glance difficult to determine, there is evidence to decide the underlying representation and the directionality of the rule (recall, e.g., the discussion of $r \rightarrow \bar{r}$ in Chapter 2, section 4). 3) Morphological conditioning. Any careful inspection of the contexts in which such rules operate will reveal that there is no natural phonological context definable. This is particularly striking because the set of endings after the root being relatively small, it becomes easier to define a phonological context for any arbitrary set of forms. Although both phonological and morphological rules might mention phonological and morphological properties, it is obvious which properties are more likely to determine phonological or morphological processes. 4) Segregation. In all cases where the ordering of such alternations with respect to a phonological rule is crucial, the phonological rule is ordered after. In foŋg ~ fón, for example, if Assimilation of Nasals and Cluster Simplification were ordered before the rule that accounts for the alternation, instead of 1PI fón and 3PI fón, we would get, depending on the direc-

tionality of the rule, 1PI fón, 3PI *fón; or 1PI *fóng, 3PI fón.

I shall illustrate these properties with the discussion of what I think is the best case for a phonological treatment of an alternation of the sort examined, namely the alternation b~w. This is the only case where there is an independent phonological rule with the same effect, the rule presented in Chapter 2 which read

(40) $b \rightarrow w / \left[\begin{array}{l} +\text{syll} \\ +\text{stress} \end{array} \right] _ \text{(C)##}$

In the three groups where this alternation occurs (W-1 beure, W-2 escriure, W-3 viure), the forms and contexts of appearance of b and w are the same, so I shall illustrate the alternation with just one example, beure;

(41)	<u>b</u>		<u>w</u>		
	<u>II</u>	<u>PI</u>	<u>PI</u>	<u>F</u>	<u>C</u>
	bəb íə	4 bəb ém	2 béw s	bəw ré	bəw ría
	bəb íəs	5 bəb éw	3 béw	bəw rás	bəw ríəs
	bəb íə		6 béw ən	bəw rá	bəw ría
	bəb íəm	<u>5Imp</u>	<u>2Imp</u>	bəw rém	bəw ríəm
	bəb íəw	bəb éw	béw	bəw réw	bəw ríəw
	bəb íən	<u>Ger</u>	<u>Inf</u>	bəw rán	bəw ríən
		bəb ént	béw rə		

It is tempting to account for the cases where w appears word finally or before a word final consonant deriving it by (40), and extend this rule to cover the rest of the cases, namely 6PI, Inf, F, and C forms. Notice incidentally that a rule w → b would not work since it would apply to verbs where no b appears to give *[kubíə], *[kubém], *[kubént] for coure (cf. (33)). Let's consider several arguments against accounting for (41) and similar cases by rule (40). First, it was argued in

Chapter 2 that b → w didn't apply before a consonant, despite some instances of alternations -bV-~wC-. Second, one would expect [bɛbən] and not [bɛwən] in 6PI. Notice that there is one way out of this objection: one could argue that the form at the time (40) applies is bɛb+n, i.e. root and G marker n, without any tense ending. There is some reason to take this position. Consider the 6PI forms in the three conjugation, along with some other forms (all forms from (1)):

(42)	<u>6PI</u>	<u>2PI</u>	<u>3PI</u>
	mír ən	mír əs	mír ə
	búλ ən	búλ s	búλ
	bát ən	bát s	bát

ə could be just a tense marker for conj. I, and have ∅ for the tense marker of present for conjs. II, and III, ə being inserted by rule before n. But there exist a couple of verbs in conjs. II and III with root final vowel, lluir 'to shine', and dur 'to bring' (cf. section 9). Here the forms expected, if there were a ə-Insertion rule applying to 6PI, would be *[λún] and *[dún], and we get instead the forms predicted by the existence of tense marker ə, [λúən], [dúən]. Notice that formulating ə-Insertion in the environment ∇ __+n won't help, because then the future forms for 6 would be subject to it and we would get *[mirərəən], *[batráən], and *[buλiráraən] (cf. (1)); even for beure itself: *[bawráən].

Finally, consider other verbs with root final b, rebre 'to receive', concebre 'to conceive', saber 'to know', caber 'to fit in'. In all the forms where beure has b (41), they show b (except for 5Imp and Ger in saber and caber, which show an additional irregularity in these tenses). But in those where w appears for beure, b stays (assimilated in voicing or devoiced word finally), as some of the forms illustrate:

(43)	<u>lII</u>	<u>4PI</u>	<u>3PI</u>	<u>2PI</u>	<u>F</u>
	r̄əbía	r̄əbém	r̄ép	r̄éps	rəbré
	kunsəbía	kunsəbém	kunsép	kunséps	kunsəbré
	səbía	səbém	sáp	sáps	səbré
	kəbía	kəbém	káp	káps	kəbré

The previous discussion and the four properties of root alternations suggest that they are separate from phonological rules in two respects: they are ordered before all phonological rules (therefore distinct from them, i.e. there exists a b~w alternation and a b → w rule), and they have different properties, i.e. they are characterized differently as for their form. Some of these properties were outlined above, but, being restricted here to a small domain of allomorphy, Catalan verb morphology, I will not try to give a narrower characterization of them. There is however one property that deserves special attention, namely the indeterminacy in setting up an underlying form for the root and determining the direction in which the rule operates. One might propose, seeking to overcome this difficulty, that the root of conèixer, for example, is kunéC with an unspecified, or perhaps partly specified, final consonant. A rule then derives the root alternants kunés and kunég in the appropriate environments. But this approach runs into serious difficulty when faced with alternations like Ø~g, w~sk.

These difficulties can be overcome once a more articulate theory of the lexicon is presented. It is indeed in the lexicon where one expects to find lexical subregularities of the type discussed to be accounted for. Jackendoff (1975) presents a theory of the lexicon derived from the Lexicalist Hypothesis where lexical entries are fully specified and regularities are expressed by rules which, instead of being operative in derivations serve as means for the evaluation measure in de-

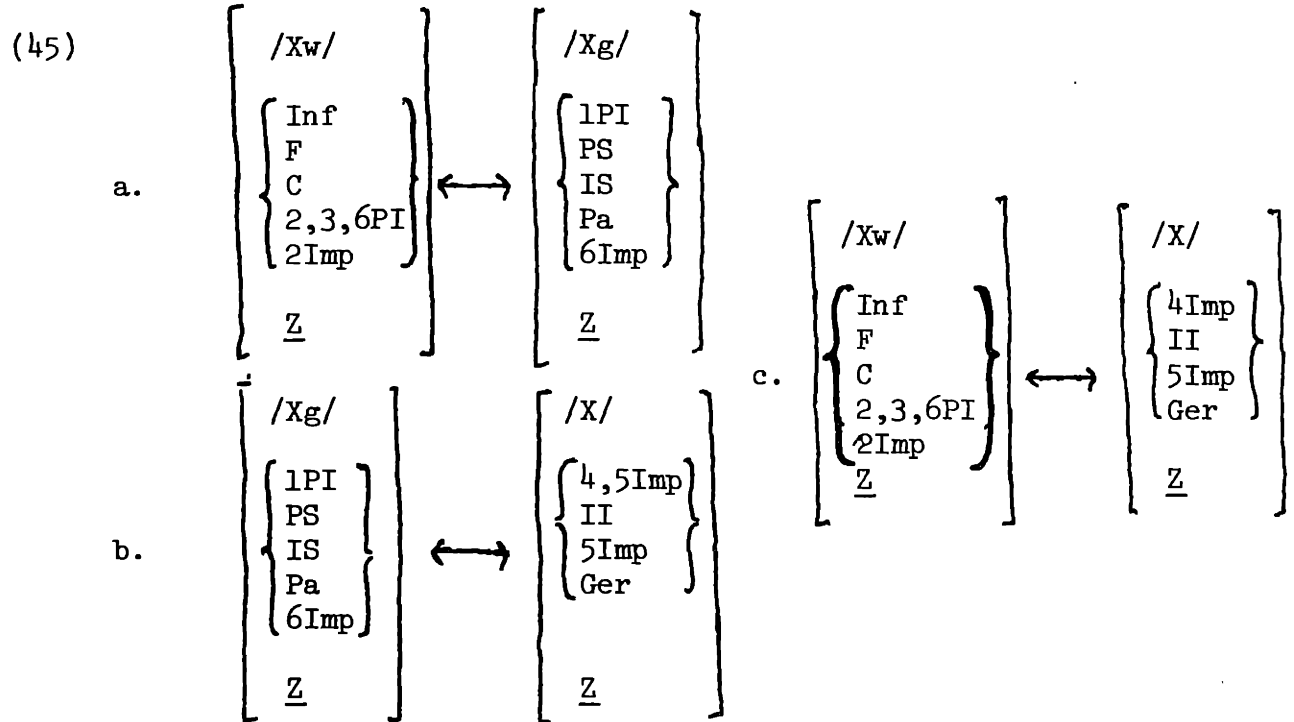
termining the amount of idiosyncratic information in the lexicon. Thus, for example, both decide and decision are entered in the lexicon with all their phonological, syntactic and semantic properties. Instead of having a rule deriving nouns with the meaning X' from verbs with the meaning X by adding the suffix -ion, a parallel rule will relate the fully specified entries. In other words, it will relate nouns with the meaning X' of the form Yion with verbs with the meaning X of the form Y. Such a rule expresses the generalization that deverbal nominalization with -ion is a morphological process in English, and is used by the evaluation measure to reflect the fact that a lexicon with decide and decision is less complex than a lexicon with decide and jelly, ceteris paribus. Jackendoff (1975) applies the "full entry" theory to derivational morphology, compounds, and idioms. Here I shall try to show that it can be extended to inflectional morphology (or at least irregular inflectional morphology) as well. This extension of the "full entry theory" would have as a consequence that what we have been calling root alternants will be entered separately in the lexicon. One might further assume that the whole inflected form is entered, as in Halle (1973c). I shall remain neutral with respect to this possibility. At least, then, for a verb like coure (group W-4), we shall have separate entries for the root alternants /k^hw/, /k^hg/ and /k^h/:

(44)

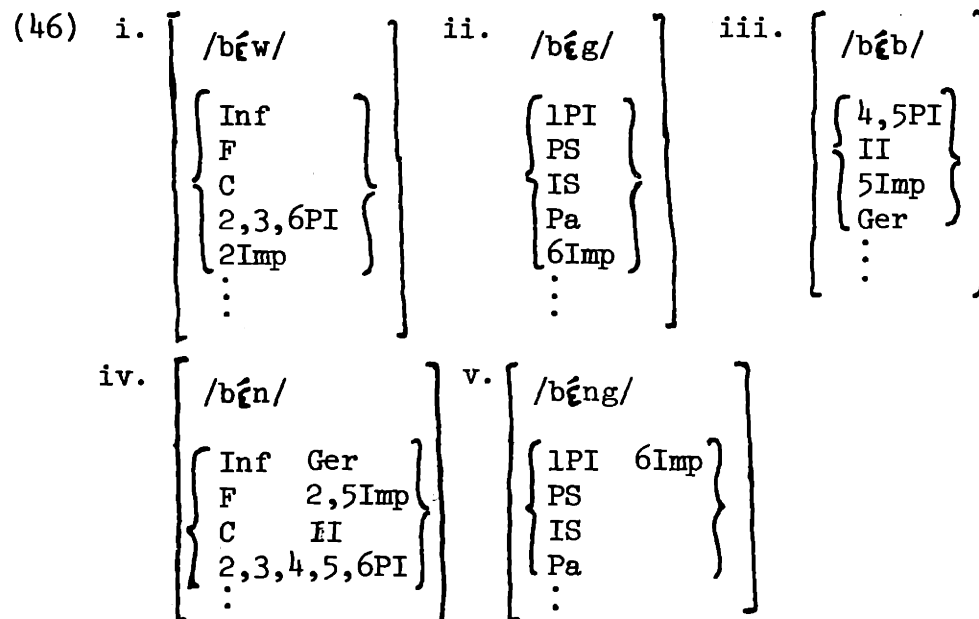
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">/k^hw/</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">{</div> <div style="margin-right: 5px;">Inf</div> <div style="margin-right: 5px;">F</div> <div style="margin-right: 5px;">C</div> <div style="margin-right: 5px;">2,3,6PI</div> <div style="margin-right: 5px;">2Imp</div> <div style="margin-right: 5px;">⋮</div> <div style="margin-right: 5px;">}</div> </div> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">/k^hg/</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">{</div> <div style="margin-right: 5px;">1PI</div> <div style="margin-right: 5px;">PS</div> <div style="margin-right: 5px;">IS</div> <div style="margin-right: 5px;">Pa</div> <div style="margin-right: 5px;">6Imp</div> <div style="margin-right: 5px;">⋮</div> <div style="margin-right: 5px;">}</div> </div> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">/k^h/</div> <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">{</div> <div style="margin-right: 5px;">4,5PI</div> <div style="margin-right: 5px;">II</div> <div style="margin-right: 5px;">5Imp</div> <div style="margin-right: 5px;">Ger</div> <div style="margin-right: 5px;">⋮</div> <div style="margin-right: 5px;">}</div> </div> </div> </div>
--	---	--

Rules (45a, b, c) relate these lexical entries and are used by the evaluation measure to determine the relative complexity of the set of

entries in (44) (as well as parallel ones). It should establish, for example, that (44) is more complex than the entries for batre, which has only one root bât, but less complex than ser (section 9) that has roots síg, fó, ér, etc. For the important question of how the evaluation measure should account for these facts, see Jackendoff (1975).



Notice that (44a, b) are not used just for coure and verbs in the same group, like ploure and cloure, but for other classes as well. (45a), for example, will relate the entries (46i) and 46ii)--and another rule (46i) and (46iii), etc.--and rule (45b) will relate (46iv) and 46v):



Venir has four root alternants bén, bé, bín, bíng. The distribution of the thematic vowel is also irregular, namely:

(47) Thematic vowel: venir, tenir

1,2,3,6PI; 1,2,3,6PS; 2,6Imp	∅ = I = III
II; 4,5PI; 5Imp; Ger: (Inf)	í = III
4,5PS	é = I
IS	é = I
(Inf)	∅
Pa	ú

The ŋ in 1PI bíng and in other forms before g, as well as the epenthetic d in Inf, F, and C have been already dealt with for other verbs (see section 5). Consider now the alternation bén~bé. Bé appears only in 3PI [bé], the only form where it is word final. In Chapter 2 a rule deleting word final n after a stressed vowel was motivated, so it might be possible to reduce the root alternants to three and account for bé by the N-Deletion rule. But whereas in nominals the general case is deletion, and non-deletion is exceptional, in verbs the opposite is true. The only case of deletion is 3PI in venir, tenir and their compounds. But in other cases, even in venir and tenir in the future, there is no deletion:

(48)

prén 'he takes'	bindrán (6F)
fón 'he melts'	tindrán (6F)
són 'they are'	
fán 'they make'	

It would be very odd to extend the treatment of nominals to verb forms in this respect, since it would mean to mark as exceptional the majority of verbs that have a form with root final n in the context \hat{V} __##, and mark all the 6F forms as exceptional, too, for any verb.

A more striking example that favors the treatment of bé as a root alternant is furnished by the compounds of venir and tenir that form 2Imp on the root bén, tén, and not on bíng, tíng. Compare 3Pi and 2Imp of prevenir 'to prevent, to warn' avenir 'to get on well', obtenir 'to obtain', and detenir 'to stop, to arrest':

(49)	<u>3PI</u>	<u>2Imp</u>
	prəbé	prəbén
	əbé	əbén
	upté	uptén
	dəté	dətén

If the 3PI forms are subject to the rule and the forms of 2Imp are exceptions, the root should be marked as an exception in 2Imp but not in 3PI. Notice incidentally that here again we find a clear illustration of the property of morphological conditioning assigned to rules determining allomorphy in the preceding section. There is no hope to find a phonological environment to distinguish 3PI from 2Imp in (49), since both would be underlyingly /prə+bén/, etc.

Tenir 'to have, possess' is exactly parallel to venir except in 2Imp where it shows up as [tiŋgəz]. In addition to forming 2Imp on the root alternant with final g, and having the tense marker ə, the 2nd person marker z, which was replaced in Imperatives by the marker \emptyset in most verbs, is here extended to Imperatives also.

Poder 'to be able to', shows the following paradigm.

(50)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
	púk	puđ íə	púg i	pug és	puđ ré	puđ ríə	pug éř
	pút s	puđ íəs	púg is	pug ésis	puđ rás	puđ ríəs	pug ént
	pút	puđ íə	púg i	pug és	puđ rá	puđ ríə	pug úd

(50 cont)

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
pud ém	pud íəm	pug ém	pug ésim	pud rém	pud ríəm	púg əz
pud éw	pud íəw	pug éw	pug ésiw	pud réw	pud ríəw	pug éw
pód ən	pud íən	púg in	pug ésin	pud rán	pud ríən	púg int

Here the alternations in the root vowel show up when it is stressed, for otherwise ɔ merges with u by Vowel Reduction. Notice that in root-stressed forms u appears always with the root final consonant g, and ɔ with d, which allows to set up, just two root alternants, pód and púg. The t in [pódts] and [pódʔ] is gotten through the general rules of Final Obstruent Devoicing and Voicing Assimilation, and 2Imp [púgəz] with tense marker ə and person marker z is similar to [tíŋgəz] of tenir. The thematic vowels are the ones typical of conj. II except for Inf and Ger where instead of lack of thematic vowel and thematic vowel é, respectively, we find a thematic vowel é in both cases. Thus poder is similar to the verbs in G3 soler and valer in this respect.

Voler 'to want' follows the pattern of poder, with roots ból and búlg, but presents an anomalous form for 1PI, where instead of [búlk] we get the alternant root [búy].

Except for 1PI saber 'to know' and caber 'to fit in' have parallel forms. The root alternants of these verbs are special in that one of them has exceptionally penultimate stress, thus originating after addition of endings the only proparoxytone verb forms in Catalan verb morphology. The roots are káb~kápig for caber, and sáb~sápig, and sé (for 1PI) for saber. Here is the conjugation of caber and the diverging 1PI of saber:

(51)	<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
	káb u	kəb íə	kápig ə	kəpig és	kəb ré	kəb ríə	kəpig ér
	káp s	kəb ís	kápig əs	kəpig ésis	kəb rás	kəb ríəs	kəpig ént
	káp	kəb íə	kápig ə	kəpig és	kəb rá	kəb ríə	kəpig úd
	kəb ém	kəb íəm	kəpig ém	kəpig ésim	kəb rém	kəb ríəm	kápig əz
	kəb éw	kəb íw	kəpig éw	kəpig ésiw	kəb réw	kəb ríəw	kəpig éw
	káb ən	kəb ín	kápig ən	kəpig ésin	kəb rán	kəb ríən	kápig int

Notice that LPI of caber takes the tense ending u of R-1 group, and that the distribution of thematic vowels, with é in Inf and Ger, is the same as for voler and poder.

9. Other Irregular Verbs

To complete the presentation of Catalan Verb morphology, I shall extend the analysis developed in the preceding sections to the eleven remaining irregular verbs that are included in Appendix II.

Dir 'to say'. The roots are díw, díg, déy, dí. It is similar to riure, group G-7, except that the root dí appears in F, C, Inf, and Pa, instead of the root with w, and root díg appears in 2,5Imp, which shows the familiar ending əz in 2 (see (50)).

Dur 'to bring' just has three roots: dú, dúg and dúy. dú appears in the same forms as dí and díw in dir, and in addition in 2,5Imp.

Veure 'to see'. It has the familiar roots béw, béy, and instead of the root with g it has béž (but béy appears in IS, 4,5PS and 5Imp).

Notice that LPI is béc and not bés by Final Obstruent Devoicing. The affrication of word final ž is a general process of Catalan as the following alternations show:

(52) mərəžá 'to make dizzy' mərəžć 'dizziness'

(52 cont)

bšžə	'mad' (fem)	bšč	'mad' (masc)
rəžét	'small jet'	ráč	'jet'
rūžó	'redness'	ršč	'red'
pasəžá	'to walk'	paséč	'walk'

The root for Pa is bíz (see end of section 5) with tense marker t.

Fer 'to make'. The root fěy is restricted to II, in this case.

The root with ž, faž, has the same distribution as in the preceding verb, veure. The other roots are fá, fé, and f. Tense and person markers are the regular ones (16) and (22), except for the second person marker in 2Imp.

Anar 'to go' shows the root with final ž in the same forms as the two preceding verbs (báž). The other roots are bá (2,3,6PI) bé for 2Imp (with person marker z), and án which takes thematic vowels of conj. III (F and C) and of I, and has thematic vowel é in free variation with é in 4,5PI; 4,5PS and 5Imp.

"Vaig" is the auxiliary used for the perfective preterite tense, and is used for that reason only in the present. There are roots báž and bərəž for 1, bá for 3 and bá and bərə for the other persons.

Eixir 'to get out' is a perfectly regular IIIb conjugation verb, but has two alternant roots, ís and ás. Notice that this looks like a good case for positing a phonological rule, since the alternation is correlated with stress. However, presence of stress on the root is also correlated with presence of a thematic vowel or a stressed desinence (since if the ending is stressed, Destressing will wipe out the root's stress). And, in turn, the presence of the thematic vowel and a stressed desinence are determined morphologically. Therefore either characterization of the environment will do. Since this alternation seems to have

the property of indeterminacy of directionality that was discussed above, it seems more plausible to express it through a morphological rule.

Estar 'to be, to stay' has roots əstíg for PS, IS, 1PI and 2,6Imp, and ást with thematic vowel of conj. I for the rest of the forms. In addition to tense and person markers of 2Imp ə, z, it has the particularity of extending the thematic vowel to 2,3,6PI.

Donar 'to give' has a regular conj. I paradigm, but in addition to the regular conj. I forms it has forms with a root dóng for the forms that typically show root final velar (1PI, PS, IS, 6Imp).

Haver 'have' has the familiar root forms áb, áǒ, áw, ág and the thematic vowel é in Inf and Ger (like soler and valer of group G-3). In addition, it has monovocalic roots for PI: é and í for 1, á for 2, 3,6 and é for 4,5. When used in the construction haver de+Inf, 'to have to', the 1PI has the root of 1,2,3,6PS áǒ. It should be noted that the forms [ás], [á], [án] can be destressed and reduced to [əs], [ə], [ən], but not in the construction just mentioned: [əmirát] 'he has looked' but [ádəmirá] 'he has to look'.

Ser 'to be' is the verb that shows more polymorphism in the root, and most suppletion also. The roots are síg, sé, fó, ér, sóg, ét, só, és. As in W-5, W-6, W-7, dir, dur, veure, fer, there is no thematic vowel in II, but this also happens in roots fó, sé, só. Person markers are regular (z in 2Imp as many verbs in conj. II) but we find the irregular tense marker rə along with the regular ríə in the conditional.

APPENDIX I: Perceptual Level of Nonmain Stress in Compounds

I summarize here one of the experiments described in Mascaró (1975). Compounds of the type exemplified in (43) in Chapter 1, two-word phrases with a secondary stress and a simple words with a single stress were used to test the assumption that compounds (and some phrases) have a secondary stress in addition to the main stress (see, e.g., Marvâ (1932), 405; Fabra (1912), 193-195; Badia (1951). For a different point of view, see Barnils (1933), 18-19, 28-29).

A list of 36 words or phrases containing pairs of homonyms was recorded in random order, and three subjects* were asked to identify each word with two written choices, one being the word read, the other its homonym. Four extra items were recorded at the beginning to get the subjects practice before the test. Examples of the items recorded and the words (or phrases) in the answer sheet are given below. (the vowel whose stress level has to be determined is underlined).

<u>Word Recorded</u>	<u>Answer Sheet</u>	
Mitja nit [mìjə#nít]	mitja nit [mìjə#nít]	'half a night'
	mitjanit [mìjə#nít]	'midnight'
sistemes [sistéməs]	sis temes [sìs#téməs]	'six topics'
	sistemes [sistéməs]	'systems'
hipo-polar [ìpu#pulár]	hipo-polar [ìpu#pulár]	'hipopolar'
	i popular [ìpupulár]	'and popular'

The pair of choices in the answer sheet were identical to each other phonetically, except, in principle, for the first vowel which had

secondary stress (in two-word phrases like [mìjə#nít]), was unstressed (in simple words like [sistéməs]) or its stress level had to be determined by the experiment.

The question to be answered then is whether the problem vowel (P) is identified with the secondary stressed vowel (S), with the unstressed vowel (U), or is kept distinct from both.

The following figure gives the results of the experiment. The stimuli are grouped according to their vowel and the vowel of the homonym presented as a second choice. Number of correct and incorrect identifications of the word (or phrase) recorded, as well as total for pairs containing and not containing a secondary stressed vowel (S) are given.

<u>Options Presented</u>		<u>Answers</u>			
A stimulus	B	correct	incorrect	total	
S	P	8	1	9	
S	U	10	2	12	
P	S	8	1	9	
P	U	11	21	32	
U	S	11	1	12	
U	P	19	14	33	
Total U, P <u>vs.</u> S (SP, SU, PS, US)		37	5	42	<u>Percentage correct</u> 88
Total U <u>vs.</u> P (PU, UP)		30	35	65	48

These are the basic results. However I will introduce a slight modification. It was observed after the test, that an item ([ùn#tán] 'a quantity') might have been uttered with unstressed first vowel, [un] being both indefinite article and numeral. If this were true it would belong to category U or P, but not S. The results when [un#tán] is discarded are given below. I present also the number of homonymic

pairs P~U or U~P for which the same option was chose, and related figures to be discussed directly.

<u>Options Presented</u>		<u>Answers</u>			
A~stimulus	B	correct	incorrect	total	
S	P	8	1	9	
S	U	9	0	9	
P	S	8	1	9	
P	U	11	21	32	
U	S	9	0	9	
U	P	19	14	33	
					<u>Percentage correct</u>
Total U, P <u>vs.</u> S		34	2	36	94
Total U <u>vs.</u> P		30	35	65	48
<u>Number of pairs of stimuli with same/different response</u>					(same word chosen for both homonyms)
		equal	different		
		19	13		
after dis- carding [un#tán]		21	14		

The main conclusions of the experiment are that for the data used there is just a binary distinction between secondary and zero stress. There is a clear distinction between S stressed words on one side, and U and P stressed words on the other (88 percent correct identification; 94 percent after correction). In addition, the subjects were unable to distinguish between U stressed and P stressed homonyms, which means that, perceptually at least, there is no stress distinction between them (48 percent correct identification). The correction introduced by eliminating one item makes the conclusion more clear, but it is sufficiently supported without the correction.

It might be objected that it is possible that subject might have tended to choose a specific option because of some other factor such as frequency of use, likelihood to appear in isolation, etc. As the last figure in the preceding section shows, there seems to be some tendency towards making the same choice for both homonyms. However, when the two pairs of homonyms for which the same choice was selected by the three subjects are discarded, the percentage of correct choices drops only to 45 percent, which assigns little importance to that factor.

* The words were read by myself. I am grateful to Cristina Bech, Rafel Andreu, and Dolores Ferrer, who were the subjects.

APPENDIX II: Paradigms of Irregular II Verbs

dir 'to say'

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
dík	déy ə	díg i	dig és	di ré	di ría	dí r
díw s	déy əs	díg is	dig ésis	di rás	di rías	di ént
díw	déy ə	díg i	dig és	di rá	di ría	dí t
di ém	déy əm	dig ém	dig ésim	di rém	di ríəm	díg əz
di éw	déy əw	dig éw	dig ésiw	di réw	di ríəw	dig éw
diw ən	déy ən	díg in	dig ésin	di rán	di ríən	díg int

dur 'to bring'

dúk	dúy ə	dúg i	dug és	du ré	du ría	dú r
dú s	dúy əs	dúg is	dug ésis	du rás	du rías	du ént
dú	dúy ə	dúg i	dug és	du rá	du ría	dú t
du ém	dúy əm	dug ém	dug ésim	du rém	du ríəm	dú
du éw	dúy əw	dug éw	dug ésiw	du réw	du ríəw	du éw
dú ən	dúy ən	dúg in	dug ésin	du rán	du ríən	dúg int

veure 'to see'

béč	béy ə	béž i	bəy és	bəw ré	bəw ría	béw rə
béw s	béy əs	béž is	bəy ésis	bəw rás	bəw rías	bəy ént
béw	béy ə	béž i	bəy és	bəw rá	bəw ría	bís t
bəy ém	béy əm	bəy ém	bəy ésim	bəw rém	bəw ríəm	béw
bəy éw	béy əw	bəy éw	bəy ésiw	bəw réw	bəw ríəw	bəy éw
béw ən	béy ən	béž in	bəy ésin	bəw rán	bəw ríən	béž int

fer 'to make'

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
fáč	fěy ə	fáž i	fés	fə ré	fə ría	fé r
fá s	fěy əs	fáž is	f ésis	fə rás	fə ríəs	fé nt
fá	fěy ə	fáž i	f és	fə rá	fə ría	fé t
f ém	fěy əm	f ém	f ésim	fə r' m	fə ríəm	fé z
f éw	fěy əw	f éw	f ésiw	fə r' w	fə ríəw	f éw
fá n	fěy ən	fáž in	f ésin	fə rán	fə rían	fáž int

anar 'to go'

báč	ənáb ə	báž i	ən és	ən iré	ən iría	ən ár
bá s	ən ábəs	báž is	ən ésis	ən irás	ən iríəs	ən ánt
bá	ən ábə	báž i	ən és	ən irá	ən iría	ən ád
ən ém*	ən ábəm	ən ém*	ən ésim	ən irém	ən iríəm	bé z
ən éw*	ən ábəw	ən éw*	ən ésiw	ən iréw	ən iríəw	ən éw*
bá n	ən ábən	báž in	ən ésin	ən irán	ən irían	báž int

*also ən ém, ən éw

"vaig" (defective auxiliary)

báč, báráč

bás, bárəs

bá

bá m, bár əm

bá w, bár əw

bá n, bár ən

eixir 'to get out'

íš u	əš íə	íš i	əš ís	əš iré	əš iría	əš ír
íš əs	əš íəs	íš is	əš ísis	əš irás	əš iríəs	əš ínt

(eixir cont)

<u>PI</u>	<u>II</u>	<u>PS</u>	<u>IS</u>	<u>F</u>	<u>C</u>	<u>Inf, Ger,</u> <u>Pa, 2, 5,</u> <u>6Imp</u>
ís	ǎš íǎ	ís i	ǎš ís	ǎš irá	ǎš iría	ǎš íd
ǎš ím	ǎš íǎm	ǎš ím	ǎš ísim	ǎš irém	ǎš iríǎm	ís
ǎš íw	ǎš íǎw	ǎš íw	ǎš ísiw	ǎš iréw	ǎš iríǎw	ǎš íw
ís ǎn	ǎš íǎn	ís in	ǎš ísin	ǎš irán	ǎš iríǎn	ís int

estar 'to be, to stay'

ǎst ík	ǎst áb	ǎstíg i	ǎstíǎg és	ǎstǎ ré	ǎstǎ ría	ǎst ár
ǎst ás	ǎst áb s	ǎstíg is	ǎstíǎg ésis	ǎstǎ rás	ǎstǎ ríǎs	ǎst ánt
ǎst á	ǎst áb	ǎstíg i	ǎstíǎg és	ǎstǎ rá	ǎstǎ ría	ǎst ád
ǎst ém	ǎst ábǎm	ǎstíǎg ém	ǎstíǎg ésim	ǎstǎ rém	ǎstǎ ríǎm	ǎstíǎg ǎz
ǎst éw	ǎst ábǎw	ǎstíǎg éw	ǎstíǎg ésiw	ǎstǎ réw	ǎstǎ ríǎw	ǎst éw
ǎst án	ǎst áb n	ǎstíg in	ǎstíǎg ésin	ǎstǎ rán	ǎstǎ ríǎn	ǎstíǎg int

donar 'to give'

dón u, dónǎ	dun ábǎ	dón i, dónǎg i	dun és, dunǎg és	dunǎ ré	dunǎ ría	dun ár
dón ǎ s	dun ábǎs	dón is, dónǎg is	dun ésis, dunǎg ésis	dunǎ rás	dunǎ ríǎs	dun ánt
dón ǎ	dun ábǎ	dón i, dónǎg i	dun és, dunǎg és	dunǎ rá	dunǎ ría	dun ád
dun ém	dun ábǎm	dun ém, dunǎg ém	dun ésim, dunǎg ésim	dunǎ rém	dunǎ ríǎm	dón ǎ
dun éw	dun ábǎw	dun éw, dunǎg éw	dun ésiw, dunǎg ésiw	dunǎ réw	dunǎ ríǎw	dun éw
dón ǎ n	dun ábǎn	dón in, dónǎg in	dun ésin, dunǎg ésin	dunǎ rán	dunǎ ríǎn	dón int, dónǎg int

PIIIPSISFCInf, Ger,
Pa, 2, 5,
6Imphaver '(to) have'

é, í, áč	əb íə	áž i	əg és	əw ré	əw ría	əb ér
á s	əb íəs	áž is	əg ésis	əw rás	əw rías	əb ént
á	əb íə	áž i	əg és	əw rá	əw ría	əg úd
ém	əb íəm	əg ém	əg ésim	əw rém	əw ríəm	-
éw	əb íəw	əg éw	əg ésiw	əw réw	əw ríəw	-
án	əb íən	áž in	əg ésin	əw rán	əw ríən	-

ser 'to be'

só k	ér ə	síg i	sig és, fó s	sə ré	sə ría, fó rə	sé r
ét s	ér əs	síg is	sig ésis, fó sis	sə rás	sə rías, fó rəs	sé nt
és	ér ə	síg i	sig és, fó s	sə rá	sə ría, fó rə	sig úd
só m	ér əm	síg ém	sig ésim, fó sim	sə rém	sə ríəm, fó rəm	síg əz
só w	ér əw	síg éw	sig ésiw, fó siw	sə réw	sə ríəw, fó rəw	sig éw
só n	ér ən	síg in	sig ésin, fó sin	sə rán	sə ríən, fó rən	síg int

FOOTNOTES

Chapter 1

1. As will be pointed out later, almost all verb stems have final stress. See (5) and corresponding discussion.
2. The first three items are either left unstressed or are wrongly stressed if instead of Minor SR, MSR applies. The forms Helsínki and Helsinkí are, I think, also found, but the same is true of Hélsinki (see Coromines (1971), 58), and therefore the stress rules should have a way to stress this word on the antepenultimate syllable.
3. Wheeler includes /v/ in the phoneme inventory. The a's in (17) later reduce to ə by a rule to be discussed in section 6.
4. See Moll (1929).
5. See Goldsmith (1976) for an exposition of autosegmental theory. If autosegmental character was extended to stress patterns, stress, although still underlying, would not be a feature on vowels, but on a separate (autosegmental) representation. It would then be possible to have monosyllabic suffixes like ik with penultimate stress that would be associated later in the derivation with the syllable preceding ik.
6. For the features ATR (Advanced Tongue Root) and CP (Constricted Pharynx) see Halle and Stevens (1969) and Perkell (1971), respectively. The physiological evidence available (Cerdà (1972)) is not decisive for the determination of the phonetic specification of ə with respect to [ATR]. The only motivation to characterize it phonologically as [+ATR] lies in the phonological processes to be discussed in this section.

7. Most grammars don't register these cases, which are rather recent. Influence from Spanish must have been a determining factor, but these words show up with ú, é, e, etc., which are not found in Castilian Spanish, and therefore they are not just cases of foreign pronunciation.
8. It might be possible to collapse (49a) and 49b) into a rule stating that u, o reduce to u, and e, e to e unless followed by a, but this is not crucial. Notice that [-CP] is assigned to "reduced" a by convention since* [+CP, +ATR].
9. Later in this chapter I shall treat lexical exceptions as exceptions to morpheme structure conditions rather than as exceptions to (49a).
10. Literally [p^ska] 'little', [b^ər̄g^oɾə] 'sense of shame'.
11. It could also be o since ó becomes o before prestressed suffixes like ik by a rule to be discussed later in this section.
12. raonament should be underlyingly /raónámént/, the final t being deleted by Cluster Simplification, rule (28) in Chapter 2.
13. This entails that the part of Vowel Reduction that has the effect a --> e should in fact be a separate rule, not affected by the SCC. Notice that if it is formulated as a separate rule, it won't be affected by the SCC since it will not be a neutralization rule, and therefore not cyclic.
14. A crucial case would be a proparoxytone ending in -Vbl, which should show up as -Vbl, but as Vpl if a prestressed suffix followed, since assignment of stress by the IC-Rule would constitute introduction

of specific information for the SCC. I don't know of any such case.

Chapter 2

1. Most of the phenomena described in this chapter can be found in Badia (1951) (see however the review in Coromines (1971), 245-275), and also in a generative framework, in Lleó (1970) and Wheeler (1974).
2. [inta[̄]ré[̄]ɲə] and the following examples are compounds and have therefore internal~~#~~; see Chapter 1, section 8.
3. The first element in the cluster could be also z, since the stop is devoiced word finally and z assimilates in voicing to it.
4. śrt és with deletion comes out as [śrés], since the rules (17) and (18) don't apply. gúst és is, with deletion [gúzés] by a rule that voices continuants across~~#~~, before a following vowel; [gúsc] and [gúsígi] by Contraction (23).
5. The u is probably inserted between sibilant and s by a rule similar to (10) in Chapter 3.
6. Probably also verge 'virgin'~virginal 'virginal', and orde '(ecclesiastic) order'~ordenar 'to ordain'. These are not mentioned in Fabra's list because they don't alternate in some dialects with plurals with n.
7. w appears as a result of the rule of Glide Formation discussed in the first chapter.

Chapter 3

1. The forms of Barcelona dialect I present here differ in some cases from Moll (1929). His data were collected in 1916 and 1920. I also

haven't included all cases of coexisting forms in Barcelona, restricting to free variant coexisting forms that are very common.

2. The voicing specification of 2nd person sg. marker can be determined when it appears in Imperatives of some irregular verbs. In this tense a clitic can follow the verb form and the rules that devoice final obstruents and voice sibilants before vowels across don't apply. We have, e.g. (see section 8) [tíŋgəs] 'have!', but [tíŋgəzu] 'have it!' (But for tossir 'to cough' a regular conj. II verb with bare root Imperative [tús] 'cough!' we have [túsi] 'cough there!').

3. With the exception of two irregular verbs, caber and saber which will be discussed in section 8.

4. /dór/ and /mént/ are phonetically [dó] and [mén] as a result of R-Deletion and Cluster Simplification discussed in Chapter 2. [plə] derives from /bl/ by B-Devoicing (Chapter 1) and ə-Insertion, rule (11) below.

5. It should be noted that roots like fong should be "derived" in some sense in order to allow the SCC not to block application of Assimilation of Nasals.

6. r could not have been inserted, i.e. /pén/ --> [prén], etc., because then we would expect also /bén/ 'he sells' --> * [brén], /dapén/ 'he depends' --> * [dəprén], etc.

7. This could seem to run against the analysis of Glide Formation presented in Chapter 1, but in nominals i does become a glide ([əɫʒəbrátyk], see Chapter 1, section 5). It is worth noting that all the cases where Glide Formation doesn't apply to verbs are cases where the thematic

vowel is lacking (when it is present and destressed, underlying stress prevents application of Glide Formation): [krɛ̃+∅+i], [λú+∅+i], etc.

BIBLIOGRAPHY

- Alcover, A.M. and F.B. Moll (1930), Diccionare Català--Valencià--
Balear, Palma de Mallorca 1930-1961.
- Bach, E. and L. Horn (1976) "Remarks on 'Conditions on Transformations'",
Linguistic Inquiry 7, 265-299.
- Badia, A.M. (1951), Gramática Histórica Catalana, Barcelona.
- (1952), Gramática Catalana, Madrid.
- Barnils, P. (1933), 'Escrits de P. Barnils' in Anuari de l'Oficina
Romànica de Llengua i Literatura, VI.
- Brame, M. (1972), "The Segmental Cycle" in M. Brame (ed.), Contributions
to Generative Phonology, Univ. of Texas Press, Austin.
- (1974), "The Cycle in Phonology: Stress in Palestinian, Maltese,
and Spanish", Linguistic Inquiry 5, 39-60.
- Cerdà, R. (1972), El Timbre Vocálico en Catalán, Madrid.
- Chomsky, N. (1973), "Conditions on Transformations" in S. Anderson and
P. Kiparsky (eds.), A Festschrift for Morris Halle, New York.
- Chomsky, N. and M. Halle (1968), The Sound Pattern of English, New York.
- Chomsky, N., M. Halle and F. Lukoff (1956) "On Accent and Juncture in
English" in For Roman Jakobson, The Hague, 65-70.
- Coromines, J. (1971), Lleures i Converses d'un Filòleg, Barcelona.
- Fabra, P. (1912), Gramática de la Lengua Catalana, Barcelona.
- (1932), Diccionari General de la Llengua Catalana, Barcelona.
- (1968), Gramàtica Catalana, Barcelona.
- Goldsmith, J. (1976), Autosegmental Phonology, unpublished Ph.D. thesis,
M.I.T.
- Halle, M. (1973a), "The Accentuation of Russian Words", Language 49,
312-348.

- Halle, M. (1973b), "Stress Rules in English: A new Version", Linguistic Inquiry 4, 451-464.
- (1973c) "Prolegomena to a Theory of Word Formation", Linguistic Inquiry 4, 3-16.
- Halle, M. and K. Stevens (1969), "On the Feature 'Advanced Tongue Root'", Quarterly Progress Report no. 94, R.L.E., M.I.T., 209-215.
- Harris, J. (1969), Spanish Phonology, M.I.T. Press.
- Jackendoff, R. (1975), "Morphological and Semantic Regularities in the Lexicon", Language 51, 639-671.
- Kean, M.L. (1974) "The Strict Cycle in Phonology", Linguistic Inquiry 5, 179-203.
- (1975), The Theory of Markedness in Generative Grammar, unpublished Ph.D. thesis, M.I.T.
- Kiparsky, P. (1968), "Linguistic Universals and Linguistic Change", in E. Bach and R. Harms (eds.), Universals in Linguistic Theory, London 1968.
- (1974) "Phonological Representations" in O. Fujimura (ed.), Three Dimensions in Linguistic Theory, Tokyo.
- Lleó, C. (1970), Problems of Catalan Phonology, Univ. of Washington, Seattle.
- Lleó, C. and J. Mascaró (1973), "Contribució a la fonologia generativa del català: reestructuració en la gramàtica?" in R.B. Tate and A. Yates (eds.), Actes del Tercer Colloqui de Llengua i Literatura Catalanes, (Cambridge 1973), València, 1976.
- Marvà, J. (1932), Curs Superior de Gramàtica Catalana, Barcelona.
- Mascaró, J. (1972), Fonologia Catalana: Processos Segmentals i Ordenació Cíclica, unpublished lic. thesis, Univ. de Barcelona.

- Mascaró, J. (1975), "Perceptual Level on Nonmain Stress in Catalan", unpublished paper, M.I.T.
- Moll, F.B. (1929), "La flexió verbal in els dialectes Catalans", Anuari de l'Oficina Romànica de Llengua i Literatura II (1929), 73-184; III (1930), 73-168; IV (1931), 9-104; V (1932), 9-72.
- Perkell, J.S. (1971), "Physiology of Speech Production: A Preliminary Study of Two Suggested Revisions of the Features Specifying Vowels", Quarterly Progress Report no. 102, R.L.E., M.I.T., 123-138.
- Real Academia Española, (1973), Esbozo de una Nueva Gramática de la Lengua Española, Madrid.
- Wheeler, M. (1974), Some Rules in a Generative Phonology of Modern Catalan, unpublished Ph.D. thesis, Univ. of Oxford.
- Wilkinson, . (1974), "Tense/Lax Vowel Harmony in Telugu: Influence of Derived Contrast on Rule Application", Linguistic Inquiry 5, 251-270.