

SYLLABLES IN TASHLHIYT BERBER AND
IN MOROCCAN ARABIC

Syllables in Tashlhiyt Berber and in Moroccan Arabic

by

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TO MORRIS HALLE

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SYMBOLS AND ABBREVIATIONS

y	IPA [j]
š	IPA [ʃ]
ž	IPA [ʒ]
x	IPA [χ]
ɣ	IPA [ʁ]
h	IPA [ħ]
<u>A</u>	1. syllable nucleus; 2. (only in §3.6) dorsoparyngealized ('emphatic')
<A> ²	1. extrametrical (Rifian); 2. example in Chap 8 stop release
	pause
»	ranked higher than (constraints)
+	cover symbol ranging over –, =, #
–	word-internal morpheme boundary
=	boundary between clitic and host
#	word boundary other than =
.	(period) syllable boundary
~	(tilde) the preceding symbol represents the first half of a geminate
÷	occurs between two identical letters to indicate that they do not represent an underlying geminate
*	(asterisk) precedes an ill-formed item
AD	/ad/ (complementizer)
aor	aorist
AR	/ar/ (imperfective preverb)
aug	augmentative
aux	auxiliary
b	bound state
C	any segment which is not a V
C:	geminated C
CA	Classical Arabic
D	coda
cau	causative
col	collective
dat	dative
DE	Dell and Elmedlaoui
def	definite
dem	demonstrative

det	determiner
dim	diminutive
dir	directional
do	direct object
DT	Dell and Tangi
f	feminine
FD	François Dell
fut	future
G	glide
gen	genitive
H	1. high vocoid; 2. heavy syllable
hv	(potential) high vowel
id	idem
IFDQ	inferred from direct questioning
imper	imperative
impf	imperfective
indiv	individuative
int	interrogative
InV	initial vowel
IP	Intonational Phrase
ITB	Imdlawn Tashlhiyt Berber
IYT	clitic <i>iyt</i>
ko	kind of
L	light syllable
lit	literally
loc	locative
m	masculine
MA	Moroccan Arabic
ME	Mohamed Elmedlaoui
n	noun
N	nucleus
name	proper name
O	onset
OT	Optimality Theory
p	plural
PNG	person-number-gender affix
prep	preposition
prt	participle
Pword	word+clitics
R	1. rime; 2. consonantal sonorant (Resonant)
RAD	future preverb
rcp	reciprocal
(R)AD	AD or RAD
RIPI	representation which is an input to phonetic implementation

Rt	feature-geometric Root node
s	singular
σ	syllable
SVV	short voiced vocoid
SWF	Syllable Well-Formedness
u	free state ('u' for 'unbound')
V	vowel (syllabic vocoid)
V _i G _i	homorganic vowel-glide sequence (<i>iy</i> , <i>uw</i>)
VTV	voiced transitional vocoid
WH	<i>wh</i> -word
X	prosodic position (skeletal slot)

PREFACE

This book is intended primarily as an original contribution to the investigation of the phonology of the two main languages spoken in Morocco. Its central topic is syllable structure. Our theoretical outlook is that of generative phonology.

Most of the book deals with Tashlhiyt Berber. This language has a syllable structure with properties which are highly unusual, as seen from the vantage point of better-studied languages on which most theorizing about syllabification is based. On the one hand, complex consonant sequences are a common occurrence in the surface representations. On the other hand, syllable structure is very simple: only one distinctive feature bundle (phoneme) may occur in the onset, the nucleus or the coda. The way these two conflicting demands are reconciled is by allowing vowelless syllables. Any consonant may act as a syllable nucleus. When a string is syllabified, nuclear status is preferentially assigned to the segments with a higher degree of sonority than their neighbours. Consider for instance the expression below, which is a complete sentence meaning ‘remove it (m) and eat it (m)’:

/kks=t t-šš-t=t/ [k:st:š:t:^h] .k.kst.t.šš.štt.

The sentence must be pronounced voiceless throughout, as indicated by the IPA transcription between square brackets; the syllabic parse given after the IPA transcription indicates that the sentence comprises four syllables (syllable nuclei are underlined).

The differences between the dialects of Berber have to do primarily with the phonology and the lexicon. Tashlhiyt appears to be the dialect in which the avoidance of vowel epenthesis is pushed to the greatest extremes. In Chapter 6 we briefly compare Tashlhiyt with Rifian Berber, which resorts to vowel epenthesis. Rifian is similar in this respect to Tamazight Berber, which was the main source of the Berber data used in phonological theorizing during the Seventies and the Eighties.

In the last two chapters we take a fresh look at syllable structure in Moroccan Arabic and we argue that our conclusions about Tashlhiyt Berber carry over to a certain extent to Moroccan Arabic. The inventories of syllable types of the two languages are very similar. Unlike Tashlhiyt, Moroccan Arabic has an epenthetic vowel; but the range of contexts in which vowel epenthesis occurs is much more restricted than is suggested by the standard transcriptions. As in Tashlhiyt, any consonant can act as a syllable nucleus. When they occur at the end of an Intonational Phrase, syllables in which

the nucleus is an obstruent are subject to epenthesis. The inserted vowel combines with the obstruent to form a complex nucleus. Consider for instance the word in (i) below, which is the 3rd fem sg imperfective form of /žbd/ ‘pull’. This word is usually transcribed as (ii):

- | | | | |
|---------|--------|----------|------------------|
| (i) | (ii) | (iii) | (iv) |
| /t-žbd/ | t@žb@d | .tž.b@d. | .tž.b <u>d</u> . |

In our account, the surface representation is (iii) when this word occurs at the end of an Intonational Phrase, and it is (iv) elsewhere. While in variant (iv) the nucleus of either syllable is a bare consonant, (iii) has a final syllable with a complex nucleus @*d*.

This book is organized as follows. Chapters 1 to 3 set the stage for the discussion in Chapters 4, 5, 6 and 7, which provide a detailed analysis of the syllable structure of Tashlhiyt. Chapters 8 and 9 develop an account of Moroccan Arabic syllabification that builds on the results of our discussion of Tashlhiyt.

Our deepest gratitude goes to Michael Kenstowicz and to Jean Lowenstamm. Their moral support came at two decisive moments during the writing of this book. They read a complete draft in painstaking detail and suggested many improvements. We are also deeply grateful to two anonymous reviewers for Kluwer for their comments, as well as to an anonymous reviewer for Cambridge University Press, who commented in 1999 on an earlier draft which dealt only with Berber.

We owe a special debt to Nick Clements, Morris Halle and Lisa Selkirk, who have discussed with us much of our earlier work on Berber. Talking with them and reading their work has been an important source of inspiration. We have also learned much from Lionel Galand, and ME wishes to thank him for his support and ever-readiness to help during the initial stages of his formation in Berber linguistics.

Vast thanks are due to Oufae Tangi and Fouad Saa for spending many hours answering questions about their native languages.

We would also like to thank the Faculté des Lettres in Oujda in the person of its dean, Mohamed Laamiri, without whose understanding and assistance this book could not have been written, as well as the following persons, who have helped us in various ways: Claude Brenier-Estrine, Salem Chaker, Redouane Djamouri, Paulette Galand-Pernet, Mohamed Lahrouchi, Alain Peyraube, Rachid Ridouane, Miriam Røvsing-Olsen, Chakir Zeroual and also Jacqueline Bergsma, Iris Klug and the other persons at Kluwer who turned our manuscript into a book.

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CHAPTER ONE

INTRODUCTION

In this chapter we first state our goals and general outlook, and indicate how the content of this book relates to our earlier work on Berber. We then present background information on our subject matter and on the relevant literature.

1.1. GOALS AND GENERAL OUTLOOK

During the last twenty years, syllabification in Berber has been used on several occasions as a source of evidence in favor of important theoretical innovations in phonology, notably in Vergnaud, Halle et al. (1979), Hyman (1985) and Prince and Smolensky (1993).¹ By contrast, the main thrust of this book is descriptive.

Our aim is to describe syllabification in one Berber dialect, viz Imdlawn Tashlhiyt, and at the same time to provide a point of reference for further work on closely-related dialects. We intend our work to be of use to berberists and to linguists without any previous knowledge of Berber. Besides the information directly relevant to syllabification in Tashlhiyt, we will endeavor to present background information to help non-berberists in forming a coherent picture of the overall phonological and morphological make-up of the specific dialect under scrutiny. Since the Berber dialects of Morocco are relatively uniform in their morphological structure, we hope that the information given in this book will provide a useful point of reference for researchers working on other dialects.

Despite its relative celebrity among theoretical phonologists, Berber is not a very well studied language. Searching the literature for useable information about it may be a frustrating experience for non-berberists. The language is divided into many dialects. No varieties of Berber have more prestige than others. There are very few dialects for which one can piece together a comprehensive picture of the morphology and phonology. The transcriptions used by most authors are bare phonemic transcriptions, with little additional information supplied about actual pronunciations. The

¹ Vergnaud, Halle et al. proposed templatic syllabification as a means of locating the sites for vowel epenthesis. Hyman's 'weight units' were the direct precursors of moras as the term is understood in much current work. Prince and Smolensky's monograph inaugurated Optimality Theory, which has since become the chief competitor to the rule-based, derivational model of SPE (Chomsky and Halle 1968).

similarity of these transcriptions across dialects is misleading; it obscures differences which are crucial for the unravelling of syllable structure.

The syllable structure of Imdlawn Tashlhiyt Berber was discussed in Elmedlaoui (1985), an unpublished doctoral dissertation, and in DE (1985, 1988). What mainly caught the attention of most readers of these works was the challenge posed by Tashlhiyt for any syllabification procedure which first identifies certain segments in a string as syllable nuclei, and then apportions the remaining segments between onsets and codas. Our discussion in DE (1985, 1988) gave little sense of how our analysis of syllabification fitted into the larger scheme of Tashlhiyt phonology and morphology; nor did it deal with the differences between the analysis of syllable structure we presented for Tashlhiyt and those proposed in the literature for other dialects of Berber, or for Moroccan Arabic, which has been in intimate contact with Berber for centuries and resembles it in many respects. Another area of concern was the nature of our data about syllable structure. Most of these data consisted of ME's native speaker judgements about syllable count. Although most judgements elicited from ME remained consistent over time, they were not always consistent with those elicited from other Tashlhiyt speakers and there seems to be little chance that the divergences could be due to dialectal variation.

Work done subsequently puts us now in a position to address these concerns. First, a fairly detailed picture of the morphology of Imdlawn Tashlhiyt and of its morphologically-governed alternations is now available through various works.² It is out of question to present a systematic summary of these works in the present book, but we will freely draw on their results when relevant.

Second, instead of using direct judgements about syllable count as a source of data, as we did in our 1985 works, we will continue the practice which we began in DE (1997a) of concentrating on syllabification in singing. The advantages of this shift are explained in § 4.1.

Third, we can now reap the benefits of first-hand experience we have gained with other languages spoken in Morocco. One of us has supervised doctoral dissertations on the phonology and morphology of two Berber dialects of Eastern Morocco (Tangi 1991, Saa 1995) and has co-authored

² The verbal morphology of Imdlawn Tashlhiyt was described in a systematic fashion in a monograph-sized work published in two parts (DE 1989, 1991). This work also surveys various idiosyncratic alternations which occur when preverbs, clitics and verbs are strung together. Several major templatic processes for deriving nouns and adjectives were discussed and abundantly exemplified in DE (1992). The inflectional morphology of nouns is discussed in detail in Jebbour (1988) and Dell and Jebbour (1991, 1995). These three works describe Tiznit Tashlhiyt, a dialect which presents a few phonological differences with Imdlawn Tashlhiyt as well as numerous lexical ones. But most of the regularities stated in these works are also valid for Imdlawn.

further work on one of these dialects. We will present facts which point to important differences between the syllable structure of Tashlhiyt Berber and that of Rifian Berber. Furthermore, we have turned our attention to Moroccan Arabic.

Our starting point for Moroccan Arabic was syllabification in nursery rhymes and in *melhun*, a verse genre which has practitioners in Morocco and in Algeria. Tahar (1975) discovered the basic principles of its versification and Kouloughli (1978) pointed out the relevance of some of Tahar's findings for the syllable structure of Algerian Arabic. The syllabification of Arabic required for singing in Moroccan Arabic resembles very much that required in Tashlhiyt singing. This resemblance could suggest at first that the two languages have basically the same syllable structure. However a closer look reveals significant differences between the two languages, as will be shown in the last chapters of this book. Although our discussion of Moroccan Arabic is informed by that of Berber in the previous chapters and cannot be read separately, the last chapters are meant as a contribution to the study of Moroccan Arabic in its own right. Including it at the end of a book on Berber is justified by the light which each language sheds onto the other.

We stated at the outset that our primary goal is descriptive. We do not mean to imply that theoretical concerns are absent from this work. Obviously, our reason for dwelling at such length on the syllable structure of Tashlhiyt is its relevance for linguistic theory. What we meant, rather, was that we will not deal head-on with issues which are directly relevant for an adequate characterization of the human language faculty, e.g. we will not draw on evidence from Tashlhiyt Berber to assess the merits of sequential derivations or of moraic representations. We want to impart to our readers the main aspects of the syllable structure of Tashlhiyt, as well as its basic resemblances to and differences from that of Moroccan Arabic. This cannot be done in a theoretical vacuum. We adopt the general orientation and the basic assumptions of generative phonology, on which see Kenstowicz (1994a) and the essays gathered in Goldsmith (1995). However, we want to write a book which can still be read with profit by non-berberists long after the theoretical interests of linguists have moved away from the issues which are currently at the center of attention. Since our primary concern is empirical coverage, we will allow ourselves to take a pragmatic view of devices such as rules and constraints, which are the stock-in-trade of generative phonologists, and to use them as mere descriptive tools.

This descriptive stance is our main reason for adopting a constraint-based approach in our discussion of syllabification in Tashlhiyt and in Moroccan Arabic. Like most other work done at the time, our work of 1985 and 1988 relied on sequential derivations in which syllable structure was built in a stepwise fashion. Unlike in some other languages, in Tashlhiyt Berber

the basic syllable shapes are very simple and can be characterized almost entirely by generalizations which are surface-true. Consequently step-by-step derivations do not seem to be necessary. Instead we will use constraints which are familiar from the literature on syllabification or are reminiscent of them. We will not attempt strictly to adhere to a constraint-based approach, however; we will depart from it whenever we feel that the moves required to maintain theoretical uniformity would not be rewarded by proportionate gains in insight. For instance, we will revert to sequentially-ordered phonological rules when this seems to us the most convenient way to characterize the phenomena under discussion. In such cases we will not explore alternative constraint-based accounts. At times we will even be content with stating generalizations in plain English.

Most of the data presented in this book come from one of the authors (ME), who grew up speaking both Tashlhiyt Berber and Arabic in the countryside in western Morocco (see below § 1.6). The languages which are the object of our inquiry will be referred to as ‘Imdlawn Tashlhiyt Berber’ and as ‘Lmnabha Moroccan Arabic’, labels based on the places where these languages are spoken. A few remarks are appropriate here about how we use these denominations.

Linguists who are engaged in the description of specific languages or dialects usually characterize what they are describing by using such expressions as ‘Eastern Massachusetts English’, ‘French as currently spoken in academic circles in Paris’, and so on. Such designations are useful, but they are misleading if they are taken to refer to a collective entity shared by many speakers. From our point of view, the only meaningful objects of inquiry are the grammars stored in the brains of individual speakers on the one hand, and on the other hand Universal Grammar (UG), which is common to the entire human species.³ Groupings such as ‘the speakers of Russian’, ‘the speakers of Harrari’, etc. may be of great importance from a sociological or historical point of view, but they have no direct relevance for the line of inquiry to which this book belongs, the ultimate aim of which is a theory of the language faculty.

We are not denying the obvious practical importance of labels like ‘Russian’ or ‘Harrari’; such labels indicate where one is most likely to find persons whose language has certain properties. We are simply denying that these labels can be made to refer to well-defined empirical objects which would be relevant for our line of research.

In our discussion of Tashlhiyt Berber as well as in that of Moroccan Arabic, we will often refer the readers to places in the literature which are evidence that a particular feature which we have observed in ME’s language is independently attested in other speakers. In view of what we

³ We adopt the general outlook proposed in Chomsky (1986: 15–50).

have said in the preceding paragraphs, the point of our references to the literature in such cases is not to buttress our own factual observations; it is rather to give an idea of the extent to which a trait of ME's language is widespread, or to give credit to other researchers who earlier observed the regularity in question or a similar one.

1.2. THE BERBER LANGUAGES

Berber is a family of closely related languages or dialects spoken over an area of North Africa which stretches from the Atlantic to the oasis of Siwa in western Egypt. Berber belongs to the Afroasiatic family. Before the Arab conquest, the language was presumably spoken over a vast continuous tract of North Africa. The present-day linguistic map shows an archipelago of Berber islands in an Arabic-speaking sea. These islands are mostly mountainous or desert areas.

Berber languages are spoken by significant numbers of people in eight African states, viz Morocco, Algeria, Tunisia, Libya, Egypt, Mauritania, Mali and Niger. There are also sizeable Berber-speaking communities in Europe, e.g. in France, Belgium and the Netherlands. Galand (1988: 209) gives a conservative estimate of 15 million for the total number of Berber speakers in 1983. Of these, 9 million lived in Morocco and 5 in Algeria.⁴

Until some 25 years ago the Berbers of different areas had no sense of all being related to one another. The relevance of the term 'Berber' was strictly historical; it had no sociological implications. Berber dialects do not have terms grouping together the various Berber dialects or their speakers. Only the local dialects and their speakers have names, e.g. Tashlhiyt for the dialects of southwest Morocco, Tamazight for those of central Morocco, etc. As pointed out by Galand (1988: 209) the use of 'Tamazight' as a blanket term for all varieties of Berber is an innovation which has arisen recently in certain intellectual circles. Here are the names of some important dialects outside of Morocco (on Berber in Morocco, v. below): Taqbaylit (Kabylie region, Algeria), Tashawit (Aurès region, Algeria), Tahaggart or Tamasheq, the language of the Tuaregs (Sahara). Among the Berber dialects there is none which is considered as a standard, or even one which has more prestige than the others.⁵

Except for Tuareg, none of the present-day Berber languages has an instituted writing system.⁶ The literary tradition is primarily an oral one.

⁴ According to Galand the total population of either country was approximately 25 million in 1981.

⁵ This is true in particular of Tamazight, whose name is now also used by some people to refer to any variety of Berber (v. above). On the history of 'Amazigh' and 'Tamazight', v. Galand (1985: 179–180).

⁶ On writing Berber, v. Galand (1989: 344–346).

For overviews of Berber, v. Basset (1952), Applegate (1970), Galand (1975, 1988), Mitchell (1993: 5, n. 2). General maps of Berber dialects are found at the end of the volume which contains Galand (1988) and in Camps (1984: 10–11). Galand (1979) gathers in book form (with indexes at the end) yearly surveys of Berber linguistics which the author originally published from 1965 to 1975 in the *Annuaire de l'Afrique du Nord*. Besides their extensive bibliographical coverage, with short comments, these surveys are a precious source of information about meetings and about institutions and individuals active in the field. Chaker (1992) is a collection of similar surveys for later years. For other sources of references, see the *Encyclopédie berbère* edited by G. Camps, Brenier-Estrine (1994–97), Chaker and Bounfour (1996), Bougchiche (1997).

1.3. BERBER IN MOROCCO

The majority of the people who speak a Berber language live in Morocco, and more than one third of the Moroccan population speaks a Berber language.⁷ The three main dialect groups are Tashlhiyt and Tamazight, which were mentioned above, and Tarifit (spoken in the Rif mountains, in northern Morocco).⁸ Tamazight is sometimes also referred to as B(e)raber.⁹ The differences between the three groups have to do primarily with the sound structure and the lexicon. Intercomprehension between the three groups is limited, witness the following two facts. First, Berber speakers from different areas generally use Moroccan Arabic to communicate. Second, on television, each day, versions of the same news bulletin in the three dialects are delivered in succession by three speakers.

Like almost all Moroccans today, Berber speakers are Muslims.¹⁰

The aggregation of the myriad local dialects into entities such as Tashlhiyt or Tarifit reflects the speakers' own usage, not a decision made by scholars. Imagine you are travelling through Morocco to do a survey of Berber. At every stop on your way you ask the local people how they call the language they speak. In some areas of Morocco the answer will be 'Tashlhiyt', in others 'Tarifit' and so on. When researchers working on Berber write that a dialect spoken in a certain place belongs to Tashlhiyt or to Tarifit, as the case may be, they do nothing more than restate a local naming practice. The practice in question carries hardly any information about the similar-

⁷ A linguistic map of Morocco is found at the end of Boukous (1995).

⁸ On Tarifit, see e.g. Chtatou (1982), Tangi (1991), Dell and Tangi (1992) and references therein.

⁹ On Tamazight, see e.g. Penchoen (1973), Saib (1976, 1978), Guerssel (1976), Willms (1991) and references therein.

¹⁰ There used to be a small minority of Berber-speaking Jews, some of them living in wholly Jewish villages, see e.g. Galand-Pernet and Zafrani (1974).

ities and differences between the structure of the dialect and that of other Berber dialects, for it does not require comparing one variety of Berber with another: speakers may know that their native tongue is called Tashlhiyt even if they have never heard any other variety of Berber. All this is to say that while we often use the traditional nomenclature of Berber dialects in this book, we never take it as more than what it is: a folk taxonomy, and one of the crudest sort at that.

1.4. TASHLHIYT

Most Berbers in Morocco speak Tashlhiyt.¹¹ This language is spoken over a continuous area with roughly the shape of a four-sided polygon. This polygon is bounded by the Atlantic Ocean to the west, by the northern slopes of the Haut Atlas mountains to the north and by the southern slopes of the Anti-Atlas mountains to the south. The eastern side of the polygon lies to the east of the city of Ouarzazate. On its northeastern boundary, Tashlhiyt gradually shades into Tamazight. One part of the area just delimited is traditionally known as the Sous (*sus*) region. The Sous was the cradle of the Berber Almohad dynasty, which ruled North Africa and Spain from 1130 to 1269. In parts of Morocco lying outside of the domain of Tashlhiyt, the speakers of Tashlhiyt are often indiscriminately referred to as Soussis, i.e. people from the Sous, even though the Sous only forms one part of the Tashlhiyt-speaking area. See Schuyler (1979: 9–18) for a concise introduction to the Tashlhiyt-speaking region and its people.

The form used to refer collectively to the people who speak Tashlhiyt is *i-šlḥ-iy-n*, the masculine plural of the word *a-šlḥ-iy*. *a-šlḥ-iy* is both an adjective and a noun.¹² The noun designates a male speaker of Tashlhiyt. Its feminine singular form *t-a-šlḥ-iy-t* has two meanings.¹³ It may designate a female speaker of Tashlhiyt, or it may designate the language itself.¹⁴ In this book we will refer to the language as Tashlhiyt. Otherwise we will uniformly use the masculine singular form. We will write about ‘the Ashlhiys’ or about ‘Ashlhiy music’. In Moroccan Arabic the Ashlhiys are collectively referred to as *šluḥ*, a masculine plural noun,¹⁵ and their language is called *šlḥ-a* (fem sg).

¹¹ The name of the language is often given with a short *i*, e.g. ‘Tashlhit’, ‘Tachelhit’. This is due to the fact that *iy* has shortened to *i* in some dialects of Tashlhiyt.

¹² The suffix *-iy* is used to form occupational nouns and adjectives indicating an origin, e.g. *a-rudan-iy* ‘from the city of Taroudant’ (*t-a-rudan-t*).

¹³ On feminine singulars with the shape */t- . . . -t/*, v. § 2.5.

¹⁴ Whereas French, for instance, uses masculine singular forms of adjectives to designate languages (*le provençal*, *le portugais*), Berber uses feminine singular forms, e.g. *t-a-brtqqis-t* ‘the Portuguese language’ or ‘Portuguese female’, cf. *a-brtqqiz* ‘Portuguese male’.

¹⁵ Whence the French adjective *chleuh* (pronounced [šlō]). The singular of *šluḥ* is *š@lḥ*.

Native speakers of Tashlhiyt live in great numbers outside of the Tashlhiyt-speaking region we have just delimited. They form a diaspora specialized in commerce, with its own social and economic network throughout the country. They are most visible in retail trade. In most large cities of Morocco, for instance, grocery stores are typically run by Ashlhiys. The Ashlhiy diaspora has grown successful offshoots in Europe.

Dialectal variation is pervasive across the Tashlhiyt domain but it does not hinder intercomprehension. According to Stroomer (1998: 38) dialect differentiation is less conspicuous in Tashlhiyt than in Tamazight or in Tarifit.

For references to work on Tashlhiyt, see e.g. Chaker (1994). Aspinion (1953) is a useful grammar of Tashlhiyt. Roux (1955) contains a good collection of Tashlhiyt texts. Stroomer (1998) presents an overview of some aspects of dialect differentiation in Tashlhiyt and a list of published sources on various Tashlhiyt dialects. Galand-Pernet (1967) discusses the implications of dialect variation for the common poetic language of the Ashlhiys. On the Ashlhiy literary tradition recorded in the Arabic script, see e.g. Stroomer (1992) and Boogert (1997, 1998).

1.5. TASHLHIYT AND MOROCCAN ARABIC IN CONTACT

In many rural areas of the Tashlhiyt domain, Tashlhiyt is still the sole language used for all purposes, except in the recitation of Koranic texts. Even today young speakers of Tashlhiyt who do not understand Moroccan Arabic (henceforth MA) are a common occurrence but they can only be found in remote places and MA is steadily gaining ground in its competition with Tashlhiyt. The main factors in this evolution are urbanization and the ever-increasing availability of the modern media.¹⁶ Children raised in Ashlhiy families which have migrated to cities tend to be bilingual with the local variety of MA as their dominant language. As the use of Tashlhiyt tends to become confined to the home, the command of the language tends to deteriorate and adaptations from the dominant language are increasingly resorted to.¹⁷ This process of attrition is even more advanced in children from Ashlhiy families residing outside of Morocco.

We give below four examples to illustrate the phenomenon. Each example consists of three sentences with the same meaning. Sentence (a) is one which would normally be used by a monolingual speaker of Tashlhiyt, or one living in an area where most people are native speakers of Tashlhiyt. Sentence (b),

¹⁶ On the competition between Berber and MA, see Boukous (1995: 90–93, 102–104).

¹⁷ See Boukous (1995: 108–111).

also in Tashlhiyt, could be uttered by a young Ashlhiy raised in an Arabic-speaking city. Sentence (c) is the MA equivalent of (a).¹⁸

- (1) a. !krad w-ulaw-n d=kilu n=t-asa
three b-heart:p-p and=kilo gen=f-liver
'three hearts and one kilogram of liver'¹⁹
b. tlt qluba d=kilu n=l-kbd-a
c. tlt qluba u=kilu d=l-kbd-a
three heart:p and=kilo gen=def=liver-f
- (2) a. ur=d a-ħanw=ann a ra y-f[ttš]
not=be u-room=dem AD fut 3ms-search
'it is not that room that he will search (but this one)'
b. maši l-bit=ann ad ra y-f[tt@š]
c. maši hadak l=bit lli γadi y-f[tt@š]
not dem def=room WH fut 3ms:impf-search
- (3) a. i-lla=gigi l-f[tq]
3ms-be=in:1s l-hernia
'I have a hernia'
b. i-lla=gigi l-f[t@q]
c. kayn f=iya l=f[t@q]
prt:be in=1s def=hernia
- (4) a. [qu:d]
'go to the devil!' (lit 'pimp!')
b. [quw@d]
c. [quw@d]

The first two examples illustrate the influence of bilingualism on the choice of words. The linguistic situation in cities also impinges on the phonology. The speakers try to divest themselves of those features of their pronunciation which are telltale signs of a rural origin. On the one hand, speakers of dialects with characteristic features which set them apart from the other Tashlhiyt dialects try to suppress those features, e.g. speakers of Haha Tashlhiyt, who normally spirantize the noncoronal obstruents, endeavour

¹⁸ Like all the abbreviations used in this book, those in the glosses are listed after the Table of Contents. Their meaning will become clear in the next chapter.

¹⁹ Uttered by someone buying meat.

not to do so.²⁰ On the other hand, in their efforts to rid their pronunciation of MA of anything that may give away their Ashlhiy background, some speakers end up ‘arabicizing’ their pronunciation of Tashlhiyt. While speaking Tashlhiyt they may for instance break up consonant clusters with schwas which are not acceptable for monolingual speakers.²¹ This phenomenon is illustrated by the pronunciation of the last word in examples (2)b and (3)b. *fttš* ‘search’ and *l-ftq* ‘hernia’ originate from Arabic, but nowadays they have become fully integrated into the lexicon of Tashlhiyt; even monolingual speakers of Tashlhiyt use them. In the pronunciation of these speakers the voiceless sequences /fttš/ and /ftq/ must not be broken up by a voiced vocoid, see (2)a and (3)a. On the other hand a schwa must be pronounced before the last consonant in the MA words *ftt@š* and *l-ft@q* when these appear before a pause, see (2)c and (3)c. The Tashlhiyt pronunciations in (2)b and (3)b by young bilingual speakers mimic the MA pronunciation. The last example illustrates an analogous phenomenon involving the realization of geminate glides. Tashlhiyt and MA being each analyzed independently of the other, the underlying form of the word in (4), an imperative verb, is /qwwd/ in either language. In Tashlhiyt, as exemplified in (4)a, a geminate glide which is followed by a prepausal obstruent can only be realized as the corresponding long vowel, hence the steady-state [u:] in (4)a.²² In MA, on the other hand, /qwwd/ is realized with a final [C@C] syllable, like the other trilateral verbs with a medial geminate.

The state of affairs just described has obvious implications for the students of Tashlhiyt who wish to collect data on the language without doing fieldwork in a rural area where it is spoken. In particular, it is well to keep in mind that as a rule university students who are native speakers of Tashlhiyt grew up in a city.

1.6. IMDLAWN TASHLHIYT

Most of the data about Tashlhiyt presented in this book was provided by one of us, Mohamed Elmedlaoui, henceforth ME. ME was born in 1949 in Imdlawn.²³ His father is a monolingual speaker of Imdlawn Tashlhiyt,

²⁰ P.c. from R. Ridouane, a native speaker of Haha Tashlhiyt.

²¹ Boukous (2000: 46) has observed MA-like schwas in the speech of Ashlhiy children living in the city of Agadir. Boukous compared the command of Tashlhiyt by children raised in the countryside and children raised in cities. His article contains numerous telling examples of language decay in the latter.

²² The form is nonetheless dissyllabic: .*qu.wd*. On geminate glides in Tashlhiyt, see § 7.4.

²³ *i-mdlaw-n* is the plural form of *a-mdlaw* ‘man from the Imdlawn valley’, v. also *t-a-mdlaw-t* ‘woman from the Imdlawn valley’ (plural *t-i-mdlaw-in*). The Imdlawn valley lies in the south corner of the map entitled ‘Le cadre orographique des Seksawa’ which occupies pp. 8 and 9 in Berque (1955/1978), i.e. the right-hand side corner at the top of page 9. The Imdlawn are very similar to the Isksawn, the people described in Berque’s monograph.

while his mother also spoke Lmnabha Moroccan Arabic. After his birth his family settled down in Igudar (Lmnabha), 50 kilometers to the south of Imdlawn, but up to the present day they maintain close ties, both social and economic, with their home town in Imdlawn. ME has lived in Lmnabha until he was thirteen.

Up to this day the only language spoken in the Imdlawn valley is Tashlhiyt. The Lmnabha area, on the other hand, is an Arabic-speaking enclave whose inhabitants live in intimate contact with the Ashlhiys. Tashlhiyt and Arabic were both spoken in the hamlet in Lmnabha where ME's family lived. ME's mother tongue was Tashlhiyt, but he has been bilingual as far back as he can remember. He spoke Lmnabha Moroccan Arabic in school and Tashlhiyt and Arabic at home. Between 13 and 19 he was a boarder at the Islamic Institute, first in Taliwin, a Tashlhiyt-speaking city, and later in Taroudant, a city where the prevailing language is Arabic. In both cities the language spoken in the Institute was almost exclusively Tashlhiyt, the students, staff and faculty all being native speakers of Tashlhiyt. At 19 ME left the Sous region and was for four years a university student in Fes, where he studied Arabic Language and Literature. At 24 he went to Oujda, in Eastern Morocco, where he has resided ever since. He first taught Arabic Philology at Mohammed I University in Oujda; he now teaches Biblical Hebrew.

At the time of writing this book, ME speaks both Tashlhiyt and Arabic to the full satisfaction of monolingual speakers of either language.²⁴ Completely bilingual speakers like ME are not an unfrequent occurrence in the Sous area, as already noted by Destaing (1937) in his foreword.

²⁴ But Arabic speakers of eastern Morocco can hear that he comes from the western part of the country.

CHAPTER TWO

SYNTAX AND MORPHOLOGY, AN OVERVIEW

Our aim in this chapter is to present an overall view in which to fit the more local facts which will be discussed in the following chapters.

2.1. SOUND SYSTEM

Table (1) lists the phonemes of Imdlawn Tashlhiyt, abstracting away from length distinctions.

(1)	A	B	C	D	E	F	G
		t !t		k k ^w	q q ^w		
	b	d !d		g g ^w			
	m	n !n					
	f	s !s	š !š		x x ^w	ħ	
		z !z	ž !ž		ɣ ɣ ^w	ʕ	h
	w	l !l	r !r	y			
	u			i		a	

Key: A = labial; B = dental/alveolar; C = palato-alveolar; D = velar/palatal; E = uvular; F = pharyngeal; G = glottal.

Unless specified otherwise, the phonetic symbols in this book have their IPA values. The following equivalences are valid throughout this book, even for languages other than Berber. ‘š’ and ‘ž’ represent palato-alveolar fricatives (IPA [ʃ] and [ʒ]). ‘x’ and ‘ɣ’, which represent velar fricatives in the IPA, will always stand for uvular fricatives here (IPA [χ] and [ʁ]). ‘ħ’ stands for a murmured glottal fricative (‘voiced *h*’). ‘y’ stands for an unrounded palatal glide (IPA [j]). ‘r’ represents a voiced alveolar flap or trill depending on the context. Exclamation marks indicate ‘emphatic’ (i.e. dorsopharyngealized) consonants. When a word contains an ‘emphatic’ phoneme, dorsopharyngealization is spread over the whole word at the phonetic level (v. § 3.6). ‘!’ indicates that all the segments in the following morpheme or word are emphatic, i.e. dorsopharyngealized.

The voice contrast among the obstruents of Tashlhiyt sounds like that of Standard French. Prevocalic voiceless stops are unaspirated.

Unlike *C+w* sequences, the labialized consonants *k^w*, *g^w*, *q^w*, *x^w* and *ɣ^w* are single segments, as shown by their behaviour in syllabification (v. Chapter 4) and in templatic morphology (v. DE 1992).

Tashlhiyt has a lexical contrast between simple and geminate consonants,

e.g. *i-mi* ‘mouth’ vs. *immi* ‘Mom’. Except for those in the last row, each symbol in (1) stands for a pair of segments which are distinguished by gemination (length) in the underlying representations. In this book we use the pairs ‘geminate/simple’ and ‘long/short’ interchangeably. Tashlhiyt has contrastive vowel length in surface representations, but it does not have long vowels in its underlying representations. [a:] will be notated throughout as *aa*. Some instances of *aa* derive from a sequence /a+a/ while others are realizations of /ʕ/, /ʕa/ or /aʕ/ (v. § 3.7). The long vowels [i:] and [u:] are the standard manifestations of tautosyllabic *iy* and *uw* sequences. *iy* sounds like [i:] in *niyš* ([ni:š]) ‘aim at’, where it is tautosyllabic, but like [iy] in the corresponding imperfective *tt-niyaš*, where it is not.

Stress and intonation in Tashlhiyt are still *terrae incognitae*, as far as we know.¹ Whereas in an English or Italian sentence every polysyllabic word has its own prominence peak, it is highly dubious that the same obtains in Imdlawn Tashlhiyt. If Imdlawn Tashlhiyt has a phenomenon that could be called stress or accent, it is likely that it is a property of units larger than words. Our preliminary observations suggest that in general, the main pitch event in an intonational phrase occurs near its end, viz on the last or next-but-last syllable nucleus which is a sonorant.

2.2. NOTATIONAL CONVENTIONS

Let us first indicate how we use certain terms. When referring to segments in phonological representations, we use ‘vocoid’ to denote any member of the set {a, i, u, y, w}, and ‘contoid’ to denote all the other segments of ITB. Note that according to this definition *h* is a contoid.² A syllabic segment is any segment associated with a syllabic nucleus. A vowel is any syllabic vocoid; there are only three vowels in ITB, /a, i, u/. A consonant is any segment which is not a vowel. The set of consonants contains the nonsyllabic vocoids (aka glides) *y, w* and the contoids, syllabic or not, e.g. syllabic *n* and syllabic *h* are consonants. Throughout this book, V stands for ‘vowel’, C stands for ‘consonant’ in the sense just defined, H stands for a high vocoid, i.e. for a member of the set {i, y, u, w}, and G stands for a glide.

The terminology and conventions we are introducing in this section will be followed strictly throughout this book. In particular, we beg readers to keep in mind the following point. While it is often harmless to use the term ‘vowel’ loosely to mean ‘vocoid’ or ‘vowel-like sound’, in this book nothing is referred to as a vowel unless it is a vocoid meeting the following conditions: (i) it is a segment, i.e. it has its own distinctive features or prosodic position, and (ii) it is associated with a syllable nucleus.

¹ See DE (1985) for some observations, especially pp. 119–120 on certain prepausal syllables.

² On transitional vocoids, which are not segments, see below.

In our transcriptions hyphens indicate morphological boundaries inside words; boundaries between clitics and their hosts are marked by equal signs '='; other word boundaries are indicated sometimes by '#' and sometimes by a blank. Our choice between '#' and a blank has no significance; it is only a matter of typographical convenience. Finally, the plus sign '+' is a cover symbol ranging over '-', '=', and '#'.

Unless specified otherwise the term 'word' is used to refer to syntactic words, i.e. to maximal strings dominated by an X^0 node.³ We take each clitic in a sentence to be a word on its own. For instance sentence (2) contains five words:

- (2) ħra=tn=d !zra-nt !t-myar-in
 just=do3mp=dir see-3fp bf-woman-fp
 'the women just saw them'

By a Pword we mean a sequence which comprises a word together with all the clitics attached to it, if there are any. A word which has no dependent clitics is a Pword all by itself. Sentence (2) is comprised of three Pwords. 'Morpheme boundary' ('-') designates a morpheme edge which is not also a word edge; 'clitic boundary' ('=') designates a clitic edge which is not also the edge of a Pword. 'Pword boundary' ('#' or a space) designates the edge of a Pword.

As a rule every word is given with its ultimate morphemic breakdown the first time it appears in an example. In a few instances we depart from that policy to avoid excessive cluttering. All those instances involve sequences of grammatical morphemes, e.g. the demonstrative modifiers meaning 'this' and 'that', which we simply note =*ad* and =*ann*, are actually combinations of an independently attested =*a* 'this' (*i-fullus-n=a* 'these chickens') with the directional morphemes =*d* 'hither' and =*nn* 'thither', which are also verbal enclitics (they can occur in position 3 in (14) below).

If it is necessary to indicate that two morphemes are components of a portmanteau, their glosses are separated by a colon. For instance the English words *boys* and *men* would be glossed as 'boy-p' and 'man:p'.

In this book all transcriptions not enclosed between slanted lines are phonetic representations given in a 'broad' transcription. This transcription is akin to a phonemic transcription in the structuralist sense. It abstracts over the variations in vowel quality which are due to neighbouring consonants. It also glosses over the predictable transitional vocoids which are heard between consonants in certain clusters but do not play any role in the morphology and phonology of Imdlawn Tashlhiyt, and about which we must now say a few words.

Throughout this book we use the term vocoid to refer to any stretch of

³ See e.g. Jackendoff (1997: 29, 113, 120).

time, however short, not occupied by a glottal consonant or by an articulation which is consonantal in the sense of Chomsky and Halle (1968: 302). Note that this definition does not say anything about voicing.

The voiced vocoids one hears in Imdlawn Tashlhiyt utterances fall into three categories, (i) the glides *y* and *w*, (ii) the full vowels, i.e. those vocoids which are uncontroversial allophones of /a, i, u/ and (iii) short vowel-like sounds which will be referred to as voiced transitional vocoids, henceforth VTVs. VTVs often give the impression of having a shorter duration than full vowels. Whereas full vowels are manifestations of segments already present in the lexicon or introduced by word formation processes (e.g. *i* in *kriz*, the negative stem of *krz* ‘plough’), VTVs’ location and vowel quality are entirely predictable from the phonetic environment and the location of certain morphological boundaries. VTVs are not represented in the broad phonetic transcriptions used throughout this book. The various transcriptions we will use are illustrated in (3) below. For each example in (3) we give (I) its underlying representation, (II) its broad phonetic transcription, (III) a narrower phonetic transcription, and (IV) a phonetic transcription of an intermediate kind, in which all VTVs are uniformly represented by ‘@’.^{4,5}

(3)	I	II	III	IV
a.	/t-a-!znk ^w d-t/	!taznk ^w tt	[!taznukɔt: ^h]	[!tazn@kɔt: ^h]
b.	/i-dlh/	idlh	[idlɛh]	[idl@h]
c.	/i-šnnq=tt/	išnnqtt	[išn:ʌq ^h t: ^h]	[išn:@q ^h t: ^h]
d.	/t-ssutl-m/	tssutlm	[ts:ötɫəm]	[ts:ötɫ@m]

In each of the examples in (3) the first vocoid is a full vowel and the second is a VTV. As the examples illustrate, VTVs come in many varieties, IPA [ə] among them. In most contexts they are central vocoids with an aperture ranging between high and open-mid. Unless indicated otherwise, we shall use the symbol ‘@’ to represent any VTV regardless of its vowel color, see column IV in (3). For more on VTVs, see Chapter 6.

Unless indicated otherwise, the phonetic transcription of an expression (i.e. of a word or a sequence of words) represents that expression as pronounced in isolation. This point deserves special emphasis. As we shall see later, an important constraint on the phonetic representations of Imdlawn Tashlhiyt is the prohibition of hiatus: adjacent vowels are disallowed. A common way of avoiding hiatus is for /i/ and /u/ to be realized as the corresponding glides next to another vowel. For instance the noun /i-kru/

⁴ The morpheme-by-morpheme glosses of the examples in (3) and their meanings are the following: (a) /f-u-gazelle-fs/ ‘female gazelle’; (b) /3ms-collide/ ‘he collided’; (c) /3ms-wring:neck=do3fs/ ‘he wrung her neck’; (d) /2-surround-2mp/ ‘you surrounded’.

⁵ Here and elsewhere, a raised ‘h’ represents an audible explosion burst. In 3(a), the voiceless [u] which occurs between *k* and *t* represents the explosion burst of /k^w/.

‘kid’ has four contextual variants, *ikru*, *ikrw*, *ykru* and *ykrw*. The variants with a glide on one end only occur adjacent to a vowel and those with a vowel on one end only occur adjacent to a pause or a consonant, e.g. *ikru* (pronounced in isolation), *ikrw a-mzwaru* ‘the first kid’, *!t-zra ykru* ‘she saw the kid’ and *azu ykrw=ann* ‘skin that kid!’. Throughout this book, whenever we write that a given unit, word or morpheme, begins (resp. ends) in a high vowel at the phonetic level that assertion is meant to characterize the pronunciation of the unit in question in contexts in which it follows (resp. precedes) a pause or a consonant. The point is of special importance because Tashlhiyt has an underlying contrast between high vowels and glides and that contrast is neutralized next to a vowel.

2.3. SYNTAX

2.3.1. Basic sentence structure

In basic assertive sentences the verb precedes all its arguments and the subject precedes all other arguments:

- (4) t-ga t-frux-t i-fullus-n γ=t-gmmi
 3fs-put bf-child-fs up-chicken-mp in=bf-house
 ‘the girl put the chickens into the house’

The word order in (4) is not the only possible one. The subject may precede the verb, e.g.

- (5) tafruxt tga ifullusn γ tgmimi
 girl,u put chickens in house
 ‘the girl, she put the ckickens into the house’

In (5) there must be an intonational break between the verb and the preceding phrase. When the subject appears to the left of the verb, as in (5), it must have its free state form (*tafruxt*), whereas it must be in the bound state (*tfruxt*) when it follows the verb (on state, v. § 2.5).

Nouns are inflected for gender (masculine vs. feminine), number (singular vs. plural) and state (free vs. bound). Verbs agree with their subjects in person, number and gender. A list of the agreement markers, which will henceforth be called PNG (from ‘person, number, gender’), can be found below in the first column in (13).

In a noun phrase the complements follow the head noun:

- (6) a-mgala ngr=t-mzgida d=w-anu
 u-distance between=bf-mosque and=b-well
 ‘the distance between the mosque and the well’

- (7) !krad id-lxmis i-zwar-n n=w-ayyur
 three p-thursday prt-first-prt gen=b-month
 'the first three thursdays of the month'
- (8) sna-t t-srdan=ad=nnk !t-i-bukad-in
 two-f bf-mule:p=dem=gen2ms f-p-blind-fp
 'these two blind mules of yours'

The last word in example (8) is an adjective. Adjectives have the same morphology as nouns; they agree in gender and number with the head noun.

2.3.2. Verbal clitics

The word order exemplified in (4) is that which obtains when the arguments of the verb all contain lexemes. Certain items must be cliticized onto the verb or onto some grammatical morpheme which precedes it. For instance (4) becomes (9) if 'the chickens' (mp) and 'the house' (fs) are replaced by the corresponding personal pronouns:

- (9) t-ga =tn =gi-s t-frux-t
 3fs-put 3mp in-3s bf-child-fs
 'the girl put them (m) into it (f)'

Some of the morphemes which always precede the verb always attract the clitics to them. An example is *is*, a complementizer used for making yes/no questions, among other things. (10) and (11) are the interrogative counterparts of (4) and (9) respectively:

- (10) is tga tfruxt ifullusn γ tgm̐mi
 int put girl chickens in house
 'did the girl put the chickens into the house?'
- (11) is =tn =gis tga tfruxt
 int them in-3s put girl
 'did the girl put them (m) into it?'

Morphemes such as *is*, which have the property of attracting after them items which otherwise follow the verb, will be called preverbs. Aside from *ar* (imperfective), *rad* (future), *ur* (negation) and *ħra* (immediate past) all the other preverbs are complementizers or subordinating conjunctions, e.g. *ad* 'that', *iγ* 'if', *maγ* 'until' (v. DE (1989: 171) for others). Cliticization is a process which is internal to clauses. For instance sentence (12) contains two clauses each enclosed in a pair of brackets:

- (12) [is =a-m i-nna [mas =tt i-ħubba]]
 int dat-2fs 3ms-say that do3fs 3ms-love
 ‘did he tell you (f) that he loved her?’

The higher clause begins with the complementizer *is*, and the sentential complement of *inna* ‘he said’ begins with the complementizer *mas*. Both complementizers are preverbs, and each triggers cliticization within the limits of its own clause, as we can see from the fact that *tt*, the 3fs direct object pronoun of the embedded clause, must be located to the right of *mas*.

The verbal clitics can be divided in four classes: (A) the pronominal clitics, (B) the directional clitics *d* and *nn*, (C) the adverbial clitics, and (D) *iyt* and the imperative clitics. We briefly review the four classes below.

The pronominal clitics are the object clitics, i.e. clitic pronouns which are direct objects of verbs, and the clitic prepositional phrases. When governed by a preposition, personal pronouns have special forms which are enclitic to the preposition. Moreover, for certain prepositions, the prepositional phrase as a whole behaves as a clitic if the preposition governs a pronoun. An example is *gi-s* ‘into it’, in (9). Prepositions such as *γ*, which form clitic prepositional phrases, will be called cliticizable prepositions.⁶ Along with the paradigm of the PNGs, (13) gives the complete paradigms for the object pronouns and for clitic prepositional phrases headed by *i* (dative), *dar* and *γ*.

(13)		PNG	do	i	dar	γ
	1s	-x	iyi	iyi	dar-i	gig-i
	2ms	t- -t	k	a-k	dar-k	gi-k
	2fs	idem	km	a-m	dar-m	gi-m
	3ms	i-	t	a-s	dar-s	gi-s
	3fs	t-	tt	idem	idem	idem
	1p	n-	ax	ax	dar-nx	gi-(t)-nx
	2mp	t- -m	k ^w n	a-wn	dar-un	gi-wn / gi-t-un
	2fp	t- -mt	k ^w nt	a-wnt	dar-unt	gi-wnt / gi-t-unt
	3mp	-n	tn	a-sn	dar-sn	gi-(t)-sn
	3fp	-nt	tnt	a-snt	dar-snt	gi-(t)-snt

In order to avoid clutter, the morphological breakdown indicated by the hyphens in (13) is only a partial one. The final *t* in the 2fp and 3fp forms is a suffix on its own, as can be seen by comparing them with the corresponding masculine forms. Similarly, comparing the 2p pronominal forms

⁶ There are seven cliticizable prepositions: *i* dative, *γ* locative, *d* ‘and’ or ‘with’ (comitative), *f* ‘upon’, *s* ‘toward’ or ‘with’ (instrumental), *ssγ* ‘from’, and *dar* ‘at X’s place’ (cf. French *chez*).

with their 3p counterparts shows that in all these forms *n* and the preceding segment belong to different morphemes.

Depending on the person, number and gender of the subject, the PNG marker on the verb may be a prefix, a suffix or a combination of both: *n-ut* ‘we struck’, *ut-n* ‘they (m) struck’, *t-ut-m* ‘you (mp) struck’. The object clitics are the only ones which distinguish gender in the 3s. Except in the first person singular,⁷ the clitic prepositional phrases all make use of the same set of pronominal forms, those after *gi-* in the last column of (13). These forms are used as objects of noncliticizable prepositions as well.⁸

The directional clitics are *d* ‘hither’ and *nn* ‘thither’, which are realized as *id* and *inn* in certain contexts. The facts concerning their meanings and uses in Imdlawn Tashlhiyt are similar to those described in Bentolila (1969).

Here are a few clitic adverbs: *ak^{wk}* ‘completely’, *ka* ‘only’, *sul* ‘still, finally’, *žžu* ‘never:past’. V. DE (1989: 170) for a more complete list.

When a clause contains several clitics they are always adjacent to one another. Nonadverbial clitics occur in a fixed order. Dative pronouns (1) always precede object pronouns (2), which always precede directionals (3), which always precede prepositional phrases. Moreover items 1 to 3 must form an uninterrupted sequence;⁹ no clitic adverb is allowed between them. Clitic adverbs may however occur before clitic prepositional phrases. This is summarized in (14).

- | | | | | | | |
|------|-----|---------|--------|-------------|---------|--------------|
| (14) | CL: | datives | object | directional | adverbs | prep.phrases |
| | | 1 | 2 | 3 | 4 | 5 |

The sequence CL in (14) may contain two dative pronouns in a row, but only one object pronoun and one directional. It can also contain more than one adverb and more than one prepositional phrase. In a clause with no preverbs the sequence CL immediately follows the verb. *ašku* ‘because’ does not belong to the class of preverbs, and consequently the sequence CL (in boldface) must follow the verb in the clause below:

- | | | | | | | | |
|------|---|---------|-----------|-------------|-------------|--------------|-------------|
| (15) | ašku | t-srs | =t | =inn | =sul | =gi-s | t-frux-t |
| | because | 3fs-put | do3ms | dir | finally | in-3s | bf-child-fs |
| | ‘because the girl finally put it (m) into it’ | | | | | | |

⁷ Here are the 1s clitic prepositional phrases, listed in the order corresponding to that of the prepositions in note 6: *iyi*, *gigi*, *didi*, *flli* or *fla* (free variants), *sri*, *ssgigi* and *dari*. With the other prepositions the form of the 1s pronoun is *iyi*, e.g. *gr-iyi* ‘between-1s’, *nnig-iyi* ‘beyond-1s’.

⁸ The optional *t* in the plural is allowed by all the prepositions of note 6 except *i* and *dar*. It is also allowed by *gr* ‘between’. All the cliticizable prepositions except *dar* have a special form when they appear in a clitic prepositional phrase. These forms are (in the order of note 6) *a*, *gi*, *di*, *fla*, *sr* and *ssgi*. They do not seem to be deriveable by any regular phonological processes of Tashlhiyt.

⁹ Setting aside the behavior of *iyt*, on which v. below.

In a clause which contains one or more preverbs, CL immediately follows the rightmost of these:¹⁰

- (16) is a =t =inn =sul =gi-s t-srus tfruxt
 int AR do3ms dir finally in-3s 3fs-put:impf girl
 ‘does the girl finally put it (m) into it?’

The clitic *iyt* can be ordered freely with respect to the other clitics. When using *iyt* speakers imply that the truth of the proposition expressed in the utterance is indifferent to them. The two sentences below are variants of one another.¹¹

- (17) i-g =iyt =a-sn =t =inn =gi-s
 3ms-put:aor IYT dat-3mp do3ms dir loc-3s
 ‘let him put it (m) in it for them (m) (it does not matter to me)’
- (18) i-g =asn =t =iyt =inn =gis

On the clitics *at* (2mp) and *amt* (2fp), which are the second person plural imperative markers, v. DE (1989: 178–179).

We have just seen how a clitic sequence can follow a verb or a preverb. The same clitic sequences can also occur immediately after a noun or a bare preposition. This happens with relative clauses, as we shall now see.

2.3.3. Relative clauses

Relative clauses follow the nouns that they modify. Some relative clauses do not begin with a relative pronoun or a complementizer. Such is, for instance, the case in the sentence below, where the edges of the relative clause are indicated by brackets.

- (19) manza tasrdunt [=ax i-fka baba=k]
 where mule [=dat1p 3ms-give father=2ms]
 ‘where is the mule that your father gave us?’

If the relative clause in (19) stands on its own as an independent sentence, one gets the following sentence:

- (20) i-fka=ax baba=k tasrdunt
 3ms-give=dat1p father=2ms mule
 ‘your father gave us a mule’

In (20) the placement of the dative clitic accords with the regularities

¹⁰ When the rightmost preverb is the negation *ur* there are additional complications, on which v. DE (1989: 173).

¹¹ V. DE (1989: 180) for other variants.

stated earlier: since the sentence does not contain any preverb, the clitic follows the verb. As argued in detail in DE (1989: 180–187), the left edge of relative clauses acts as a ‘silent’ preverb, i.e. as one whose phonological representation is empty; in particular it attracts clitics. This is the reason why in (19) the clitic *ax* precedes its verb even though no overt preverb is present at the beginning of the relative clause.

When the relativized noun phrase is the object of a cliticizable preposition, the preposition appears at the beginning of the relative clause without any overt object behind it. If the relative clause contains any clitics, these immediately follow the preposition. This happens in the following sentence, in which the relativized noun is the object of the preposition *d* ‘with’ (the clitic sequence is in boldface):

- (21) sqqsa-x γ=!imħdarn [d **=km =nn=sr-s**
ask-1s loc=pupils [with=do2fs=dir=toward-3s
y-iwi]
3ms-bring]
‘I asked about the pupils with whom he took you there’

In the sentence below, in which the relative clause in (21) is a sentence all by itself, the clitic sequence follows the verb since there is no preverb:

- (22) y-iwi **=km =inn=sr-s** d=!imħdarn
3ms-bring=do2fs=dir=toward-3s with=pupils
‘he took you there with the pupils’

When the relativized noun phrase is a subject the verb of the relative clause takes on a special form that some students of Berber call a participle. Sentences (24) and (25) below both contain a relative clause which is related to sentence (23). In (24) the relativised noun phrase is the object, and the verb in the relative clause assumes the same form as in (23): it agrees with its subject (*!tmγart*). In (25), on the other hand, the relativised noun phrase is the subject, and the verb in the relative clause is a participle.

- (23) t-γ^wi !tmγart amakr
3fs-seize woman,b thief
‘the woman caught the thief’
- (24) is t-ssn-t amakr [t-γ^wi !tmγart]
int 2-know-2s thief [3fs-seize woman,b]
‘do you know the thief whom the woman caught?’
- (25) is t-ssn-t !tamγart [i-γ^wi-n amakr]
int 2-know-2s woman,u [prt-seize-prt thief]
‘do you know the woman who caught the thief?’

Participles are formed with the prefix /i/ and the suffix /n/. They do not agree in number nor in gender with their antecedents, except in a small class of residual cases, on which v. DE (1989: note 34 p. 182). The so-called participles should probably be considered as impersonal forms,¹² and their initial /i-/ as a default 3ms PNG. The phonological behaviour of the initial /i/ in the participle is identical with that of the 3ms PNG, v. DE (1989: 182–183). All factual assertions which we will make in this book about the 3ms PNG are meant to include the prefixal part of the participial marker as a special case. Nonetheless, for the sake of convenience, we will continue to use the term ‘participle’ and we will treat the participle marker /i- . . . -n/ as a compound PNG, alongside those in the first column in (13).

Let us end this syntactic sketch with a few words on the conjoined construction,¹³ in which two clauses follow each other without any connective word. When the verb in the second clause has a perfective meaning, it must have an aorist stem, v. DE (1989: 174ff). The two clauses describe two successive events, as in (26), or the first clause expresses some condition and the second an injunction, v. (27):

- (26) t-fra=t t-šš=t (3fs-pay=do3ms 3fs-eat:aor=do3ms)
 ‘she payed for it and ate it’
- (27) iγ=t t-šša t-fru=t (if=do3ms 3fs-eat 3fs-pay:aor=do3ms)
 ‘if she ate it, let her pay for it’

Aorist verbs followed by enclitics are a useful source of consonant clusters, because there are a number of common verbs in which the aorist stem is the only stem which is vowelless. The conjoined construction is one of the rare environments in which clitics can be seen to occur after an aorist verb, for as a rule verbs in the aorist are introduced by a preverb, in which case the clitics precede the verb, as we have seen. The conjoined construction occurs in many examples in this book.

2.4. VERBAL MORPHOLOGY

The bulk of the morphology of Tashlhiyt is found in verbs and nouns. Tashlhiyt has both derivational and inflectional morphology. In the remainder of this chapter we present the overall structure of the inflectional paradigms of verbs and nouns and the affixal part of these paradigms. Since we have described the morphology of verbs in detail elsewhere,¹⁴ we will devote little space to it here. We will dwell at greater length on

¹² V. Basset (1949: 35).

¹³ V. Leguil (1981).

¹⁴ DE (1989, 1991).

nouns. A clear picture of their prefixal morphology is a prerequisite for our discussion of the syllabification of high vocoids in Chapter 7.

Verbs are inflected for the person, number and gender of their subject. This is done with a prefix, a suffix or a combination of both, see (28). All the verbs in the language use the same set of PNGs.

(28)			‘dwell’	‘remember’	‘remember, rcp’
a.	pf	3ms	i-zdγ	i-kti	i-mm-kti
a’.		1s	zdx-x ¹⁵	kti-x	mm-kti-x
a’’.		2fp	t-zdγ-mt	t-kti-mt	t-mm-kti-mt
b.	impf	3ms	i-zddγ	i-ktti	i-tt-mm-ktay
b’.		1s	zddx-x	ktti-x	tt-mm-ktay-x
b’’.		2fp	t-zddγ-mt	t-ktti-mt	tt-mm-ktay-mt ¹⁶

Each line in (28) displays the same PNG in three verbs. The verbs in the top block are perfective verbs while those in the bottom block are their imperfective counterparts. A list of PNGs has already been given in the first column in (13). Two items should be added to that list for it to be complete. One is /i- . . . -n/, the PNG which marks participles. The other is zero: bare aorist and imperfective stems are used to express 2s perfective and imperfective imperatives, e.g. *!amz* ‘seize! pf’ (cf. (29)a), *!tt-amz* ‘seize! impf’.

PNGs are the outer layer in the morphology of verbs. A verbal stem is the string which remains when a verb is stripped of its PNG. In Tashlhiyt every verb has four stems, viz. perfective affirmative, perfective negative, aorist and imperfective. The name of the perfective affirmative will henceforth be shortened to ‘perfective’, and that of the perfective negative, to ‘negative’. The four stems are exemplified in (29) with verbs in the 3mp (the 3mp PNG is /-n/).

(29)	pf	neg	aor	impf	
a.	!umz-n	!um(i)z-n	!amz-n	!tt-amz-n	‘seize’
a’.	!n-yamaz-n	!n-yamaz-n	!n-yamaz-n	!tt-n-yamaz-n	‘seize rcp’
b.	usi-n	usi-n	asi-n	tt-asi-n	‘carry’
b’.	ss-usi-n	ss-usi-n	ss-asi-n	ss-asay-n	‘carry cau’
c.	krz-n	kr(i)z-n	krz-n	kkrz-n	‘plough’
d.	mmuylt-n	mmuyl(i)t-n	mmuylt-n	tt-muylut-n	‘feel sick’

¹⁵ Due to regressive devoicing, /γ-x/ is realized as xx. On regressive devoicing, see DE (1996a).

¹⁶ /t-tt-/ is realized as tt. This happens only in those sequences in which /t-/ is a PNG and /tt-/ is the impf prefix, v. DE (1989: 193).

The means of marking the differences between the four stems vary from one verb to the next, but they are to a large extent predictable from the phonological make up of the verbs in the lexicon. Except for the imperfective prefix /tt-/, the phonological processes involved are nonconcatenative. These fall into three classes: (i) alternations between vowels, e.g. *u~a* in lines a, b, (ii) alternations between zero and a vowel, v. for instance the optional *i* which occurs in some negative stems and the vowel which appears before the last segment in the imperfective stems in lines b', d, and (iii) consonant gemination, as in the imperfective stem in line c, and also in the imperfective stems of 'dwell' and 'remember' in (28).

Let us use the term 'base' to refer to the unit which underlies the four stems belonging to the same line in (29). For instance, we shall say that the four forms in (29)a all belong to the base *!umz* 'seize' (bases are named after their pf stem) and that the forms in line (29)a' all belong to the base *!n-yamaz* 'seize one another'.

Here are for instance sentences each containing one of the four stems of the base *!umz* 'seize'.

- | | | |
|---------|----------------------------|------------------------------------|
| (30) a. | <i>!y-umz=tt</i> | 'he seized her' |
| b. | <i>ur=tt !y-um(i)z</i> | 'he did not seize her' |
| c. | <i>!y-amz=iyt=stt</i> | 'let him seize her (I don't mind)' |
| d. | <i>ar=tt=sul !i-tt-amz</i> | 'he still seizes her' |

When the category of the stem of a verb in an example is not indicated in the gloss it is the perfective, unless the verb is in the (perfective) imperative, in which case it has an aorist stem.

Two different verbal bases may share the same root, as is the case for *!umz* 'seize' and *!n-yamaz* 'seize one another' (v. (29)a, a'), or with *usi* 'carry' and *ss-usi* 'cause to carry' (v. (29)b, b'). Whereas the four stems of a given base share the same argument structure, two different bases sharing the same verbal root have different argument structures. Verbal bases fall into two categories, primary and secondary. Secondary bases are causative, reciprocal and passive. All other bases are primary. Like stem formation, base formation resorts to prefixation, to nonconcatenative processes or to a combination of both, as one can see by comparing the third column with the second in (28) or line a' with line a and line b' with line b in (29). The starting point of a secondary base may be another secondary base. For instance the causative base *s-m-ħada* (cau-rcp-next) 'put next to one another' is derived from the reciprocal base *m-ħada* 'be next to one another' (from *ħada* 'be next to').¹⁷

A verbal kernel is the string which remains after a verb has been stripped

¹⁷ V. DE (1989: 78–79) on the various possible combinations of the causative, reciprocal and passive morphemes within a single base. V. Guerssel (1992) on similar combinations in Ait Seghrouchen Tamazight.

of all its (concatenative) affixes. The kernel of *!umz-n* (seize-3mp) ‘they seized’ is *!umz*, that of *!tt-amz-n* (impf-seize:impf-3mp) is *!amz*, and that of *!tt-n-yamaz-n* (impf-rcp-seize:rcp-3mp) ‘they seize one another’ is *!yamaz*. In most of this book we shall take kernels as given, without attempting to elucidate the mechanisms whereby kernels sharing the same root are related to one another.

To sum up, the successive morphological elements in any verbal form of Tashlhiyt can fit into the sequence of slots represented in (31):

(31) PNG *tt* PFX* kernel PNG

All the slots may be empty, except that for the kernel. There are ten PNGs, the nine listed in the first column in (13), plus the participle marker (on which v. above in § 2.3.3). *tt* is the imperfective prefix and PFX* stands for a sequence of one or more of the prefixes which are used to form secondary bases. Setting aside defective paradigms and particular cases of suppletion, as well as limitations due to the syntactic and semantic properties of some verbs, a verbal base gives rise to 42 inflected forms: each of its four stems can be combined with 10 PNGs, and to the 40 resulting forms one must add the two naked stems (aor and impf) which serve as imperative 2s forms.

2.5. NOMINAL MORPHOLOGY

In Tashlhiyt as in the other dialects of Berber nouns are marked for number (singular or plural), for gender (masculine and feminine) and for state (free or bound). When the number and state of a noun in an example are not indicated in the gloss, it is the singular and in the free state.

The distribution of gender in the lexicon is roughly the same as in French. Grammatical gender correlates with biological gender for nouns denoting human beings and certain animals, e.g. *a-frux* (m) ‘boy’, *t-a-frux-t* (f) ‘girl’. It is idiosyncratic for the other nouns, e.g. *ayyur* ‘moon’ is masculine whereas *t-afuk-t* ‘sun’ is feminine. Pairs of nouns distinguished only by gender are not limited to a subset of the animate nouns, however, as Tashlhiyt also uses gender marking as a process of derivational morphology, for instance to create diminutive and augmentative nouns. The feminine form of many nouns which are lexically masculine is a diminutive. For instance, alongside *udm* ‘face’, which is masculine, we find the feminine *t-udm-t* ‘little face’. Similarly, the masculine form of many nouns which are lexically feminine is an augmentative, e.g. the masculine noun *a-ryal* ‘large basket’ is derived from the feminine *t-aryal-t* ‘basket’. Feminine forms are put to various uses besides the formation of diminutives. They are for instance used to derive countable nouns from nouns with a collective meaning, e.g. *!t-a-zalim-t* ‘(bulb of) onion’ from *!a-zalim* ‘onion(s)’, *!t-a-qaymrun-t* ‘shrimp, indiv’ from *!qaymrun* ‘shrimp, col’. They also

serve to derive names denoting actions or occupations from agentives, e.g. *!t-a-šffar-t* ‘theft’, from *!a-šffar* ‘thief’, or language names, e.g. *t-a-brtqqis-t* ‘Portuguese (the language)’, from *brtqqiz* ‘Portugal’.

Let us say that gender is secondary in those nouns in which it comes from derivational morphology and that it is primary in other nouns. We shall thus say that the feminine gender of *t-aryal-t* ‘basket’ is primary whereas that of *!t-a-zalim-t* ‘(bulb of) onion’ is secondary.

State is a category akin to case. A noun takes the bound state form when it is governed by a preposition, when it is a subject and follows its verb, or when it follows one of the cardinal numbers from one to ten or *mnnaw* ‘how many, several’; otherwise it is in the free state.

Setting aside various gaps, accidental or systematic, the paradigm of a noun is comprised of eight forms. Here is for instance the paradigm of *a-frux* (m) ‘boy’, *t-a-frux-t* (f) ‘girl’.

(32)		I	II	III	IV
		m, free	m, bound	f, free	f, bound
	a. s	a-frux	u-frux	t-a-frux-t	t-frux-t
	b. p	i-frxa-n	i-frxa-n	t-i-frx-in	t-frx-in

In a nominal form the stem is what remains once one has taken away the prefixes and suffixes marking gender, number and state. Here are a few examples (singular forms are given for comparison at the end of lines):

(33)	<i>noun</i>	<i>stem</i>		
	a. t-i-funas-in	funas	‘cows’	(s t-a-funas-t)
	b. a-m-kraz	m-kraz	‘plowman’	(p i-m-kraz-n)
	c. una	una	‘wells’	(s anu)
	d. i-fass-n	fass	‘hands’	(s a-fus)

Certain stems contain derivational affixes, as is the case in (b), a noun derived from the verb *krz* ‘plow’. Certain nominal forms are naked stems, v. (c).

The inflectional morphology of nouns resorts both to concatenative processes (prefixation and suffixation) and nonconcatenative ones (vowel alternations and the like). The concatenative processes operate in a uniform fashion for all nouns, whereas the nonconcatenative processes are lexically governed to some extent.

The marking of gender and state only makes use of prefixes and suffixes. Number marking uses both concatenative and nonconcatenative processes. On the nonconcatenative processes involved in the formation of plural nouns, cf. Jebbour (1988).¹⁸

¹⁸ Jebbour’s work deals with the variety of Tashlhiyt in use in Tiznit, whose morphology resembles very much that of Imdlawn Tashlhiyt.

As a rule free state masculine nouns which are not loans begin with a vowel, and so do free state feminine nouns if one sets aside their initial *t-*, which is the feminine marker, v. e.g. *a-frux* (m) ‘boy’, *t-a-frux-t* (f) ‘girl’. We will deal later with those nouns which do not have an initial vowel. Let us simply give an example for the time being.¹⁹

(34)	I	II	III	IV
	m,free	m,bound	f,free	f,bound
a. s	xixxi	xixxi	t-i-xixxi-t	t-xixxi-t
b. p	id xixxi	id xixxi	t-i-xixxit-in	t-xixxit-in ²⁰

We shall use the expression ‘initial vowel’ (henceforth InV) to denote the leftmost vowel in a free state noun, provided that if that vowel is preceded by a consonant, the consonant should not belong to the stem. The InV in *uššn* ‘jackal’ is *u* and that in *t-i-xixxi-t* ((34)III-a) is *i*, but the noun *xixxi* ((34)I-a) has no InV, for *x*, the consonant which precedes its leftmost vowel, does belong to the stem. We shall use the expression ‘vowel-initial noun’ to denote nouns which contain an InV.

2.5.1. Vowel-initial nouns, the basic facts

Let us begin with the morphology of the vowel-initial nouns, dealing first with the alternations which affect the InV. The analysis we will outline was originally proposed by Basset (1932, 1945) as a historical reconstruction. Starting with Guerssel (1983) it has since been adopted as a synchronic account for various dialects of Berber, v. e.g. Bader and Kenstowicz (1987), Dell and Jebbour (1991), Tangi (1991).

Whereas in certain nouns (the minority) the InV belongs to the stem, in the others it is a prefix. Let us use the term ‘augment’ to refer to those initial vowels which are prefixes. Tables (35), (36), (37) and (38) below summarize the facts concerning all those nouns which have an InV. In (35) we give the complete paradigm of *aylal* ‘bird’, whose stem begins with /a/,²¹ and we give in (36) that of *adrar* ‘mountain’, whose initial /a/ is an augment. In the phonological representations of the bound state forms the vowels subject to deletion are marked with a slash for the sake of conspicuousness (on deletion, v. below).

¹⁹ *xixxi*, *tixixxit* ‘person full of shit’.

²⁰ The *t* which appears at the end of the stem before the plural suffixes in (34) III-b and (34) IV-b has nothing to do with the fs suffix *-t*; it occurs in masculine nouns as well. It is an epenthetic consonant which is inserted at the end of vowel-final stems when they precede a plural suffix, e.g. *afat-n* ‘summits’ (s *afa*), *i-sqsit-n* ‘questions’ (s *a-sqsi*).

²¹ *t-aylal-t* is a diminutive.

(35)	I (free)			II (bound)	
a. ms	aylal	/aylal/	waylal	/u-aylal/	
b. mp	aylaln	/aylal-n/	waylaln	/u-aylal-n/	
c. fs	taylalt	/t-aylal-t/	taylalt	/t-aylal-t/	
d. fp	taylalin	/t-aylal-in/	taylalin	/t-aylal-in/	

(36)	I (free)			II (bound)	
a. ms	adrar	/a-drar/	udrar	/u- a -drar/	
b. mp	idrarn	/i-drar-n/	idrarn	/u- i -drar-n/	
c. fs	tadrart	/t-a-drar-t/	tadrart	/t- a -drar-t/	
d. fp	tidrarin	/t-i-drar-in/	tdrarin	/t- i -drar-in/	

These tables illustrate the following regularities, which hold for all vowel-initial nouns: (i) in those nouns in which the plural is marked by a suffix, that suffix is /-n/ in the masculine and /-in/ in the feminine; (ii) feminine nouns begin with prefix /t-/;²² (iii) unless their gender is primary and their stem ends in a vowel, feminine singular nouns end with suffix /-t/.²³

Table (35) summarizes the facts for those nouns in which the initial *a* belongs to the stem, and (36) for those in which it is an augment. The difference between an augment and an InV which belongs to the stem can be seen in bound state forms and in plural forms. Augments drop as a rule in bound state forms (v. (36)II), which never happens to nonprefixal InVs (v. (35)II). In the plural the augment is *i* in all nouns, whereas a nonprefixal InV is subject to the various ablaut processes which affect the leftmost vowel in plural stems. That vowel alternates in some nouns but not in others. For instance the initial *a* in *anu* ‘well’, which belongs to the stem, alternates with *u* in the plural (*una*), in the same manner as the stem’s leftmost vowel in *a-safu* ‘torch’ (p *i-sufa*). In *aylal*, on the other hand, the initial *a* remains unchanged in the plural (v. (35)b,d), in the same way as the stem’s leftmost vowel in *a-baddaz* ‘maize couscous’ (p *i-baddaz-n*).

Here is how one derives the bound state form of a vowel-initial noun from the corresponding free state form. First, one prefixes /u/ to the free state form (v. (35)a,b and (36)a,b), provided that the free state form begins with a vowel.²⁴ Second, if there is an augment, it drops (v. (36)II). The

²² There are only a handful of exceptions, e.g. *immi* ‘Mom’, *illi* ‘daughter’, *išša*, *!ittu* (proper names for women). These are also exceptional in that the prefixation of *u-* (see below) is only optional in the bound state.

²³ There are a few exceptions, e.g. *t-ašš* ‘ill-fated, f’, *!t-a-mubil* ‘automobile’. There is no suffix at the end of *t-a-rga* ‘ditch’, for instance, because the feminine gender is primary and the stem ends in a vowel.

²⁴ This restriction accounts for the fact that /u/ does not show up before the initial *t-* in the feminine.

combination of these two operations, *u*-prefixation and augment deletion, makes it look in some cases as though the augment had simply changed its vowel colour, v. e.g. (36)a, where free state *adrar* (/a-drar/) alternates with bound state *udrar* (/u-a-drar/).

The bound state prefix /u/ materializes in some cases as a vowel *u* or *i* and in others as a glide *w* or *y*. The surface backness of the bound state prefix depends on the following vowel. The prefix surfaces as a back vocoid when the following vowel is /a/ (v. (35)II-a,b and (36)II-a) or /u/;²⁵ it surfaces as nonback before /i/ (v. (36)II-b and (37)II-a below). The rule which accounts for the backness assimilation of the prefix to a following /i/ must be ordered before that which deletes the augment in the bound state: in /u-i-drar-n/ (v. (36)II-b) the bound state prefix first assimilates its backness to that of the plural augment (hence /i-i-drar-n/), then the augment deletes, hence /i-drar-n/. The free state forms and the bound state forms of the nouns with an *i* augment are homophonous, and yet they have different underlying representations. Whereas the initial *i* in (36)I-b is a reflex of the plural augment, the initial *i* in (36)II-b derives from prefix /u/.

Whether the bound state prefix surfaces as a vowel or a glide is determined by syllable structure, see Chapter 7. It is a glide when it precedes a vowel in the surface form (v. (35)II-a,b), and a vowel otherwise (v. (36)II-a,b). Owing to their syntactic properties, bound state nouns cannot occur after a pause; everywhere in this book transcriptions and statements about the pronunciation of bound state forms are intended to cover the pronunciation of these forms when the preceding word ends in a consonant, e.g. *y-aggug u-drar* ‘the mountain is far away’; when the preceding word ends in a vowel the bound state prefix is realized as a glide to avoid hiatus, e.g. *i-buɣla w-drar* ‘the mountain is full of greenery’.

The singular augment is /a/ in certain nouns and /i/ in others. There is no augment /u/; when /u/ is a InV, it always belongs to the stem, and Table (35) above also provides an adequate summary of the facts concerning those nouns with *u* as an InV, e.g. the bound state of *uday* ‘Jew’ is *w-uday* and that of its plural *uday-n* is *w-uday-n*; in the feminine the bound state forms are identical with the corresponding free state forms (s, *t-uday-t*; p, *t-uday-in*). Let us now exemplify the difference between those InVs which belong to the stem and those which are augments in nouns beginning with /i/. Our examples are *isk* ‘horn’ and *i-nrfl* ‘tail (of a shirt)’.²⁶

²⁵ I.e. the bound state form of *ul* ‘heart’ is *w-ul* and that of *ussan* ‘days’ (s *ass*) is *w-ussan*.

²⁶ In *isk* the initial /i/ changes colour in the plural, but there also exist stems in which it remains unchanged, e.g. *ird* ‘grain of wheat’ (b *y-ird*), plural *ird-n* (b *y-ird-n*).

(37)		I (free)		II (bound)
a. ms	isk	/isk/	yisk	/u-isk/
b. mp	askiwn	/askiw-n/	waskiwn	/u-askiw-n/
c. fs	tiskt	/t-isk-t/	tiskt	/t-isk-t/
d. fp	taskiwin	/t-askiw-in/	taskiwin	/t-askiw-in/

(38)		I (free)		II (bound)
a. ms	inrfl	/i-nrfl/	inrfl	/u-ĩ-nrfl/
b. mp	inrfln	/i-nrfl-n/	inrfln	/u-ĩ-nrfl-n/
c. fs	tinrflt	/t-i-nrfl-t/	tnrflt	/t-ĩ-nrfl-t/
d. fp	tinrflin	/t-i-nrfl-in/	tnrflin	/t-ĩ-nrfl-in/

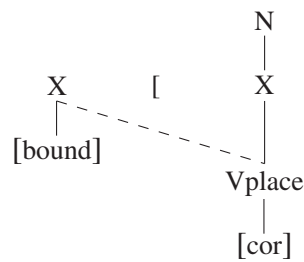
Setting aside various complications,²⁷ one way to tell apart those nouns in which the InV belongs to the stem from those in which it is an augment, is by the syllabic shape of their bound state forms at the phonetic level: in the bound state the former nouns begin with CV, but not the latter, compare *waylal* ((35)II-a), which begins with CV, and *udrar* ((36)II-a), which does not.

2.5.2. Alternations involving the augment

To account for the prefixal morphophonemics of vowel-initial nouns a grammar of Imdlawn Tashlhiyt must contain the following rules. The first is a morphological rule; the others are phonological rules and they must apply in the order given.

(39) PlAug: in the plural the augment is /i/

(40) WI/YI:



(41) AugDel: $X \longrightarrow \emptyset / \begin{array}{c} X \\ | \\ \text{[bound]} \end{array} [\text{ ____ } [$

²⁷ On the exceptions to the rule of augment deletion, v. below.

The rule WI/YI states that when a bound state prefix is followed by *i*, the timbre of *i* spreads onto the prefix. The rule operates in a transparent fashion in *y-isk* (/u-isk/), v. (37)II-a. The front vocoid which follows the bound state prefix must be syllabic, for *y* does not spread, witness the bound state form of *a-ynnri* ‘medicinal plant with a comestible root’, which is *u-ynnri*, not **i-ynnri* and that of *a-ydi* ‘dog’, which is *w-iydi*, not **y-iydi*.²⁸ Rule (40) is obligatory and does not have any exceptions. Aside from forms such as *w-iydi*, in which *iy* is a realization of an underlying *y*, there are no bound state forms beginning with *wi*.

The sound structure of Imdlawn Tashlhiyt does not in general disfavor the sequences *wi* and *uy*, either morpheme-internally or across morpheme or word boundaries, which is why the operation of rule WI/YI must be confined to sequences with a specific morphological make up. Imdlawn Tashlhiyt has another assimilatory phenomenon similar to WI/YI but it is doubtful that both can be subsumed under a single process in a synchronic analysis. The phenomenon in question involves the masculine empty noun *bu* and its feminine counterpart *mmu*. These empty nouns are used productively as heads of phrases meaning ‘the one with X’ or ‘the one which has X’, where X is the meaning of an immediately following bound state noun, e.g. *bu=t-ħanu-t* ‘the one (m) with the shop’, *mmu=t-ħuna* ‘the one (f) with the shops’.²⁹ *bu* and *mmu* are optionally realized as *bi* and *mmi* when they precede a noun whose first segment is a front vocoid, e.g. *mmu=yd-xixxi* or *mmi=yd-xixxi* ‘the one (f) with those (m) full of shit’, *bu=y-zakar-n* or *bi=y-zakar-n* /*bu=u-i-zakar-n*/ ‘the one (m) with the ropes’. In *biyzakarn* the segment which triggers the assimilation has itself been subject to rule WI/YI, for according to the analysis presented here, in the bound state form *i-zakar-n* (/u-i-zakar-n/) the initial *i* is a reflex of the bound state prefix /u-/. The fronting of the vowel in *bu* and *mmu* is triggered by the surface front glide which is a realization of the bound state prefix /u-/, but not by underlying /y/, e.g. fronting can occur in /*bu=u-iza-n*/, ‘the one (m) surrounded by flies’, which can be pronounced *bu=y-iza-n* or *bi=y-iza-n*, but it may not occur in /*istt-mmu=yumayn*/ ‘the two day ones (f)’,³⁰ which can only be pronounced *istt-mmu=yumayn*.

Rule AugDel (41) deletes the augment in bound state nouns. It is stated so as to delete a one slot morpheme which immediately follows a bound state prefix. The rule operates in a transparent fashion in feminine nouns, v. (36)c,d and (38)c,d.

The analysis presented here predicts that only those nouns whose InV belongs to the stem have bound state forms which begin with a CV sequence

²⁸ On the bound state forms of nouns whose stems begin with glides, v. Chapter 7.

²⁹ The free state forms for ‘shop’ are *t-a-ħanu-t* (s) and *t-i-ħuna* (p).

³⁰ E.g. those women who have worked two days, to contrast them with others who have worked for another length of time. *yumayn* ‘two days’.

at the phonetic level. This is slightly at variance with the facts, however, because some nouns are exceptions to rule AugDel. These exceptions fall into three classes. First, in some nouns the augment does not drop in any bound state form. Consider for instance *tallunt* (p *tilluna*) ‘tambourine’. We know the InV in this noun is an augment because there are no nouns whose stem-initial vowels alternate between *a* in the singular and *i* in the plural, and yet the augment in question does not drop, i.e. the bound state forms of this noun are homophonous with its free state forms (**tllunt*, **tlluna*). Other such nouns are *tawwunt* (p *tiwwuna*) ‘stone’ and *tazzrt* (p *tizzar*) ‘kind of pitchfork’. In most nouns of that type the stem begins with a geminate, but stem-initial geminates do not always block augment deletion. Second, there exist a handful of nouns whose augment regularly drops in plural bound state forms but not in singular ones, e.g. *afud* ‘knee’, b *ufud* or *wafud*, p *ifaddn*, b *ifaddn* (**yifaddn*). In some of these, as in the example just given, augment deletion in the singular is only optional, while in others it is prohibited, e.g. the bound state form of *asif* ‘river’ can only be *wasif* (**usif*), whereas its plural form is *isaffn* (**visaffn*). Third and last there are nouns in which the deletion of the augment is optional both in the singular and in the plural, e.g. *ifr* ‘wing’ (p *ifrawn*), *ixss* ‘bone’ (p *ixsan*). Nouns of the latter type behave as though their InVs were at times analyzed as augments and at others as being stem-initial.

In the formulation in (40) the label [bound] is intended to prevent spreading in masculine pronouns of the form *w-i* . . . , e.g. *w-i=nn-k* ‘yours’ (m-/i/=gen-2ms), i.e. ‘that/those (m) which belong(s) to you (ms)’. These pronouns belong to a set of forms at the beginning of which there is a systematic contrast between *w* and *t* which signals the distinction between masculine and feminine. These forms comprise the following, among others: (i) a paradigm of ‘demonstrative’ pronouns whose heads are *w-a* (ms), *t-a* (fs), *w-i* (mp) and *t-i* (fp), e.g. *man=t-a* (which=f-s) ‘which one (f)?’, *w-i=nn-a* (m-p=WH:ever) ‘whichever ones (m)’. (ii) A paradigm of possessive pronouns, i.e. pronouns followed by a genitive complement; their heads may be *w-i* (m) or *t-i* (f), e.g. *w-i n=!brahim* ‘the one (m) / those (m) which belong(s) to Brahim’, *t-i=nn-un* ‘the one (f) / those (f) which belong(s) to you (mp)’.³¹ (iii) Ordinal numerals formed on numbers greater than one, e.g. *w-i-ss-mraw* ‘tenth, m’, *t-i-ss-mraw* ‘tenth, f’. (iv) a handful of nouns such as *w-ašš* ‘ill-fated, m’, whose feminine counterpart is *t-ašš*. Like the consonant-initial nouns (v. below), these items have the same form in the bound state and in the free state. We have assumed that the prefix /u-/ at the beginning of masculine nouns in the bound state is a marker of the bound state. The forms in (i)–(iv) might instead be taken to suggest that it is a marker of the masculine which occupies the same morphological slot as the feminine prefix /t-/. On such an analysis the underlying

³¹ Words of types (ii) and (iii) do not distinguish between singular and plural forms.

form of free state masculine nouns would begin with the masculine marker /u-/, e.g. the underlying form of *a-drar* ‘mountain’ (v. (36)I-a) would be /u-a-drar/. In order to account for the lack of any surface reflex of /u-/ at the beginning of masculine nouns in the free state one could posit a special rule deleting the masculine marker which would somehow be blocked in bound state forms as well as in the pronominal forms above.

It may make good sense, from a historical perspective, to argue that the prefix at the beginning of the masculine forms in (i)–(iv) above and that at the beginning of the masculine bound state nouns in tables (35) to (38) are descendents from the same morpheme, which was a masculine marker in earlier times, but we doubt that this analysis is still tenable on synchronic grounds. One fact suggesting that the two prefixes are no longer instances of the same morpheme is that rule WI/YI does not affect pronouns of the form *w-i* . . . , e.g. *w-i=lli* ‘the aforementioned ones (m)’ (m-p=afore-mentioned) cannot be pronounced as *yilli.³²

2.5.3. Consonant-initial nouns

Let us now turn to the nouns which do not have an InV; we call them consonant-initial nouns. Unlike vowel-initial nouns, consonant-initial nouns do not distinguish between bound state and free state, and they do not begin with prefix /t-/ when they are feminine. We interpret both properties as consequences of the absence of an InV, for we assume that the bound state marker /u-/ and feminine /t-/ can only be prefixed to bases which begin with a vowel. This assumption accounts for the absence of /u-/ from those vowel-initial nouns which are feminine (v. e.g. (35)II-c,d): in the nouns in question the base to which /u-/ would have to be prefixed begins with a consonant, viz. /t-/. Consonant-initial nouns are of two kinds, which we will examine in turn.

2.5.3.1. IC-initial nouns

We dub those of the first kind the IC-initial nouns. They begin with an /IC/ cluster (e.g. *lbanan* ‘bananas, col’), or else they begin with a geminate coronal (e.g. *!rrgg* ‘ground’). Most of them are recent loanwords. They truly belong to Imdlawn Tashlhiyt, because they are used even by those speakers of Imdlawn Tashlhiyt who do not know Arabic. We assume that noun-initial geminate coronals are derived from underlying /IC/ clusters where /C/ is a coronal: at the beginning of nouns /I/ completely assimilates to a following

³² On the other hand the genitive preposition /n/ does assimilate to the initial glide of a *w-i* . . . pronoun as it does to the initial vocoid of a bound state noun (on the assimilation of genitive /n/, see § 3.2.1.2). /i-xf n=w-a=nna/ ‘the head of anyone (m)’ can be pronounced *ixfnwanna* or *ixfuwanna*.

coronal; *!r-rgg* derives from *!l-!rgg*/.³³ The evidence in favor of this analysis is twofold.

First there are alternations: the initial */l/* often surfaces in the plural, where the initial cluster is broken up by a vowel. Here are a few examples:

(42)	SG	PL	
	lbrad	labrarid	‘teapot’
	!lhud	!laḥwad	‘watering-trough’
	ssuq	laswaq	‘market’
	!ttrf	!ladruf	‘edge’ ³⁴
	žžnb	lažnub	‘pocket’
	!ššrd	!lašrud	‘condition’

Complementary gaps in the distribution of initial clusters and geminates also support our analysis. All geminate consonants which are found to occur at the beginning of nouns are coronals, and aside from the exceptions mentioned in note 33 there are no nouns which begin with an *lC* cluster in which *C* is coronal.³⁵ The proposed analysis provides a simple explanation for that fact, if one assumes that all geminate consonants are forbidden word-initially in the underlying representations of nouns and that the only source of geminates at the beginning of nouns is the complete assimilation of */l/* to a following coronal.

Initial */l/* is the reflex of the definite article */l/* of Arabic, where it is subject to the well-known rule whereby it completely assimilates to a following coronal: MA *l-brrad* ‘the teapot’ vs. *brrad* ‘a teapot’, *!ž-žrda* ‘the garden’ vs. *!žrda* ‘a garden’. Due to the massive borrowing of Arabic nouns by Berber the assimilation rule has become part of the grammar of Berber. But in Berber */l/* is no longer an autonomous syntactic unit; it cannot be omitted: **brrad*, **!žrda*. It is a prefix which is part of the lexical representations of those nouns in which it appears. We consider it a prefix rather than part of the kernel, because it is regularly omitted by certain processes of derivational morphology, which does not happen to consonants which belong to the kernel, e.g. *l* is absent from *a-kssab* ‘cattle farmer’ and *a-ksasb-iy* ‘idem’, which are derived from *l-ksib-t* ‘cattle’.

As a rule *lC*-initial nouns which are feminine singular end with *l-t/*, e.g. *š-šbk-t* ‘fishing net’, *!l-blas-t* ‘place’. This suffix corresponds to *-a*, the suffix which ends feminine singular nouns in MA and has the variant *-t* in the construct state, e.g. before possessives, as in MA *šbk-a* ‘a net’,

³³ There are exceptions, e.g. *l-ždd* ‘ancestor’, *l-žnn-t* ‘paradise’, *l-žamaa* ‘Friday’.

³⁴ In the singular *!l-!drf/* yields *!l-ddrf/*, whence *!ttrf*. As a rule the geminate reflex of *!d* is *!tt*.

³⁵ Nb: this generalization concerns words, not kernels. Noncoronal geminates can be found at the beginning of noun kernels which are not word-initial, as in *a-g^wg^wrdi* (p *i-g^wg^wrda-n*) ‘flea’, *!a-ḥḥram* (p *!i-ḥḥram-n*) ‘bastard’, *a-bbankik* (p *i-bbankik-n*) ‘big stone’.

šbk-t=i ‘my net’, *!blas-a* ‘a place’, *!blas-t=i* ‘my place’. In a synchronic account of Imdlawn Tashlhiyt there is no reason not to consider this /-t/ as the same suffix as that which occurs at the end of feminine vowel-initial nouns.

In general the plural forms of the IC-initial nouns mimic those of their counterparts in MA; they resort to suffixes and nonconcatenative processes akin to those of MA, e.g. *lgns*, p *lgnus* ‘nation’ (MA *gns*, *gnus*), *lksibt*, p *laksayb* ‘cattle’ (MA *ksiba*, *ksayb*), *lbrrad*, p *labrarid* ‘teapot’ (MA *brrad*, *brard*), *!sff*, p *!lasfuf* ‘row, line’ (MA *!s@ff*, *!sfuf*).

Like the vowel-initial nouns, IC-initial nouns can give rise to secondary masculine nouns (augmentatives) and secondary feminine nouns (e.g. diminutives, individuatives). These secondary nouns all have stems formed by prefixing *a* to the stem of the source noun. For instance *lbanan* ‘bananas, col’ yields *albanan* ‘big banana’ and *talbanant* ‘banana, indiv’, and *ššbkt* ‘net’ yields *aššbk* ‘big net’ and *taššbkt* ‘small net’. Secondary nouns derived from IC-initial nouns inflect like nouns whose InV belongs to the stem, v. (35); their initial vowel is retained in bound state forms and it does not become *i* in the plural, e.g. the bound state form of *albanan* ‘big banana’ is *walbanan* (**ulbanan*) and the plural of *talbanant* ‘banana, indiv’ is *talbananin* (**tilbananin*), b *talbananin* (**tlbananin*).³⁶ We noted earlier that in the plural the source nouns often resort to nonconcatenative processes and suffixes akin to those of MA. On the other hand the secondary nouns only make use of the regular plural suffixes of Berber, viz /-n/ in the masculine and /-in/ in the feminine. Whereas the plural of *š-šbk-t* ‘net’ is *š-šbayk* (v. MA *šbk-a*, p *šbayk* or *šbk-at*), the plural form of the augmentative *aššbk* is *aššbk-n* (b *w-aššbk-n*) and that of the diminutive *t-aššbk-t* is *t-aššbk-in*.

There exist nouns which are phonologically and morphologically similar to the /t-a-l-CZ/ derivatives, and we shall analyze them as such, although /CZ/ does not exist as an independent noun. Such is for instance the case of *alfluk* ‘small boat’ (b *w-alfluk*, p *alfluk-n*); there is no **lfluk* in Imdlawn Tashlhiyt. Given the existence of the l-assimilation rule we can also analyze as /a-l-CZ/ a number of nouns of the form /aC:Z/ (‘C:’ a coronal geminate) whose initial *a* is part of the stem. Such is for instance the case of *arrfad* ‘plot of land’ (b *w-arrfad*, p *arrfad-n*), *aššbar* ‘barricade’ (b *w-aššbar*, p *aššbar-n*), whose phonological representations we shall take to be /a-l-rfad/ and /a-l-šbar/.

³⁶ In the Tiznit dialect, on the other hand, the initial *a* in those nouns behaves as an augment, v. Dell and Jebbour 1995.

2.5.3.2. *Other consonant-initial nouns*

Let us now turn to the remainder of the consonant-initial nouns. What these nouns have in common is the fact that they do not resort to suffixation and/or nonconcatenative processes in the plural; they prefix *id-* (m) or *istt-* (f) instead.³⁷ They belong to the Berber stratum of the lexicon, or else they are loans from languages other than Arabic. For the sake of expository convenience we divide them in three classes.

The first class comprises a few nouns which begin with *w-* if they are masculine, and with *t-* if they are feminine.³⁸ One of these is *w-ašš* ‘unlucky person, ms’, fs *t-ašš*, mp *id-w-ašš*, fp *istt-t-ašš*; most of these nouns are *war-Z* compounds meaning ‘Z-less’, e.g. *war-laman* ‘undependable person, ms’, from *laman* ‘confidence’, fs *tar-laman*, mp *id-war-laman*, fp *istt-tar-laman*.

The second class comprises monomorphemic nouns such as *millus* ‘slovenly brat’, *furisti* ‘forester’, *sbbalyun* ‘Spain’, and *bu* (m) and its feminine counterpart *mmu*, which have already been mentioned in connection with rule (40). Besides acting as heads in noun phrases of the form *bu+N* and *mmu+N* whose meanings are fully compositional, *bu* and *mmu* occur as first terms in a whole gamut of compounds which are transparent to various degrees, e.g. *!buykurayn* or *!biykurayn* ‘the one with the sticks’ (v. *!i-kuray-n*, ‘sticks’), *butagant* ‘wild boar’ (v. *t-agan-t* ‘forest’), *bufqqus* ‘kind of date’. Imdlawn Tashlhiyt does not have any other words built on *-fqqus*, but the composite nature of *bufqqus* is apparent in the fact that it contains two labial consonants, which is otherwise prohibited in Imdlawn Tashlhiyt words.

The third class comprises compounds in which both terms are ‘full’ lexemes, e.g. *ħri-bri* ‘kind of soup’, from *ħri* ‘scrape off’ and *bri* ‘grind’, *frd-xxi* ‘useless person’, from *frd* ‘graze’ and *xxi* ‘shit’, *slm-ag^wg^wrn* ‘kind of insect’, from *slm* ‘eat (something powdery)’ and *a-g^wg^wrn* ‘flour’.

Like the IC-initial nouns, the other consonant-initial nouns give rise to secondary masculine and feminine forms which begin with *a-*, but for the consonant-initial nouns which are not IC-initial, the prefixed vowel is an augment, i.e. it becomes *i-* in the plural and it drops in bound state forms. Columns III and IV in (34) give the complete set of secondary feminine forms corresponding to *xixxi*. Here are two other examples. *sbbalyun* ‘Spain’, *a-sbbalyun* (b *u-sbbalyun*) ‘Spaniard, m’, *i-sbbalyun-n* ‘id., mp’, *t-a-sbbalyun-t* (b *t-sbbalyun-t*) ‘Spaniard, fs’, *t-i-sbbalyun-in* (b *t-sbbalyun-in*) ‘Spaniard, fp’; the diminutive of *ħri-bri* ‘kind of soup’ is *t-a-ħribri-t* (b *t-ħribri-t*), p *t-i-ħribrit-in* (b *t-ħribrit-in*).

³⁷ A few IC-initial nouns have plural forms beginning with *id-*, e.g. *rribab* (p *id-rribab*) ‘single-stringed violin’, *lk^wmmiyt* (p *id-lk^wmmiyt*) ‘ceremonial dagger’. Some of these are feminine, v. the second example. IC-initial nouns never use *istt* in the plural.

³⁸ V. our discussion of the *w-/t-* contrast at the end of our survey of the vowel-initial nouns.

PHONOLOGICAL BACKDROP

In the first half of this chapter (sections 3.1 to 3.5) we review the properties of the geminates. In the remaining sections we present information about several phonological phenomena of Imdlawn Tashlhiyt. These phenomena are not central to the concerns of this book but their effects are seen in many examples and they come into play at one point or another of our discussion.

3.1. PRELIMINARIES ON GEMINATION

Like the other dialects of Berber, Imdlawn Tashlhiyt has a lexical contrast between two sets of consonants. The consonants in one set have greater duration than their counterparts in the other set, and they are articulated with greater energy. In this chapter we review the evidence that the underlying contrast in question is indeed one of length, not of tenseness. The evidence is overwhelming. Unless proof to the contrary is given, the same analysis must be assumed for the other dialects of Berber, as we shall argue.

Here are some minimal pairs illustrating the lexical contrast in question in Imdlawn Tashlhiyt.

- | | | | | | |
|-----|----|---------------------|----------------|------------------------------------|-----------------|
| (1) | a. | i-mi | ‘mouth’ | immi | ‘Mom’ |
| | b. | t-ut | ‘she struck’ | ttu=t | ‘forget him!’ |
| | c. | kks=t | ‘remove him!’ | kks=tt | ‘remove her!’ |
| | d. | i-g ^w ra | ‘he picked up’ | i-g ^w g ^w ra | ‘he is last’ |
| | e. | t-a-mda | ‘pond’ | t-a-mdda | ‘brown buzzard’ |
| | f. | y-ukr | ‘he stole’ | y-ukrr | ‘he dragged’ |

As illustrated in (1)b,c, long and short consonants contrast after or before a pause. The contrast in these contexts shows no tendency towards neutralization, unlike in Ait Iraten Kabyle (Chaker 1984: 86).

Except in certain cases where it serves a morphological purpose, length cannot be predicted from other properties of the words in which it occurs. In general the presence of length in a morpheme and its location within that morpheme remain invariant throughout all occurrences of that morpheme. Like voicing or labiality, length must already be present in the lexical entries of morphemes. Geminates are found in a wide range of environments. We give a sample of these environments below. The examples are grouped in quasi-minimal pairs to illustrate the relative freedom of occurrence of length.

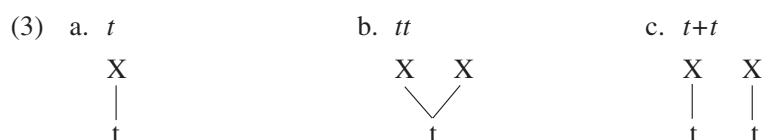
- (2)
- | | | | |
|------------------------------------|-------------------|--------------------------------------|-------------------|
| a. a-brrkal | 'old age (horse)' | i-frkki | 'bark' |
| b. a-ḥḥram | 'bastard' | t-a-frruy-t | 'fresh honeycomb' |
| c. !a-ddžar | 'neighbour' | !a-dg ^w g ^w al | 'in-law' |
| d. g ^w g ^w z | 'go down' | !gzz | 'crunch' |
| e. !kkd | 'poke (an eye)' | bdd | 'stand up' |
| f. zzf | 'unveil' | fss | 'be silent' |
| g. skubbr | 'crouch' | !žžukrr | 'drag' |
| h. a-žžbir | 'kind of bag' | a-žbbud | 'act of pulling' |

The stricture of long consonants is steady-state, without any momentary relaxation in its time course. Although they are made of successive parts the doubled symbols (*mm*, *g^wg^w*) should be taken as unitary. Like the symbol *g^w* in *i-g^wra* 'he picked up', the sequence *g^wg^w* in *i-g^wg^wra* 'he is last' represents a single uninterrupted period of velar closure with labialization. *mm* and *g^wg^w* represent IPA [m:] and [g^w:].

Besides sounding longer than their short counterparts the long consonants of Imdlawn Tashlhiyt also give the impression of being articulated with greater energy.

At present there is no consensus on the phonological nature of the contrast between long and short consonants in Berber. Some authors see it as a length distinction (v. below) while others take it to be primarily a tenseness distinction. Lionel Galand was the first to suggest the latter analysis and he has recently written a whole article (1997) in support of it. We will argue in favor of the former analysis and show that the long consonants of Imdlawn Tashlhiyt are geminates.

Following a commonly accepted view,¹ we assume that a geminate is a single melodic unit (i.e. a single feature bundle) associated with two prosodic positions. Here are for instance the representations of (a) a simple *t*, (b) a geminate *t* (i.e. *tt*), and (c) a sequence of two simple *ts*.



In the diagrams in (3) each occurrence of X represents a prosodic position and the letter *t* stands for the bundle of distinctive features which defines [t]. More precisely, it stands for the Root node of the feature tree which

¹ V. Leben (1980) and McCarthy (1979, 1981). For recent overviews, v. Inkelas and Cho (1993), Kenstowicz (1994a), Broselow (1995) and Perlmutter (1995).

defines [t].² Throughout this book the term ‘geminate’ is used to refer to doubly associated feature bundles such as (3)b.

We shall see that in Imdlawn Tashlhiyt almost all the properties of long consonants accord with representation (3)b. Since in what follows almost all the data is drawn from Imdlawn Tashlhiyt, our conclusions are only valid for Imdlawn Tashlhiyt: each dialect of Berber must be described on its own terms. Our discussion should nonetheless be beneficial to the analysis of some other dialects of Berber, inasmuch as these show facts similar to those presented below.

We now compare the merits of two conceptions of consonant length in Imdlawn Tashlhiyt. One is what we will call the ‘configurational’ conception; it holds that in Imdlawn Tashlhiyt long segments differ from short ones in the number of prosodic units that they are comprised of, v. (3). According to the other conception, the contrast between the long and short consonants of Imdlawn Tashlhiyt is one between two values of a distinctive feature, say [tense]: /t/ and /tt/ are identical in all respects but one: /t/ is [-tense] whereas /tt/ is [+tense]. Let us dub this conception of consonant length in Imdlawn Tashlhiyt the ‘featural’ conception.

The term ‘tense’ (or ‘fortis’, ‘strong’, etc.) has been used in different ways for different languages and to this day it lacks a commonly accepted meaning, v. Catford (1977: 199–204) and Ladefoged and Maddieson (1996: 95–98) for discussions. We use the term with the second sense mentioned by these authors. In that sense, tense segments require more articulatory energy than their lax counterparts. Actually the precise phonetic characterization of [tense] will not matter for our arguments against the featural view of length in Imdlawn Tashlhiyt. All that will matter is that according to that view the only difference between the members of pairs such as *t/tt* resides in the specification of some binary feature F.

3.2. THE LONG SEGMENT AS A SEQUENCE OF TWO PROSODIC POSITIONS

The geminate consonant represented in (3)b is comprised of two X slots, like the cluster in (3)c, but it is comprised of one feature bundle only, like the simple consonant in (3)a. Such a representation leads one to expect that the behaviour of the geminate in (3)b will in some respects be like that of a consonant cluster, and, in others, like that of a single consonant. The long segments of Imdlawn Tashlhiyt do indeed exhibit such a dual behaviour, as we shall now see. In this section we review some circumstances in which long segments behave like sequences of two units.

² Concerning the internal structure of segments we shall adopt the version of ‘feature geometry’ advocated in Clements and Hume (1995), in which all the features defining a segment are organized in a tree structure. The Root node is the node dominating the whole tree.

Saib (1976) and Guerssel (1977) were the first to argue in detail that the long consonants of Berber are sequences. They both discussed varieties of Tamazight.³ The facts they used to support their conclusions have analogues in Imdlawn Tashlhiyt or in Ath Sidhar Rifian. These facts are (a) fusion (v. § 3.2.1.1), (b) the fission of some final geminates in the imperfective, as when pf *bdd* ‘to stand’ yields impf *tt-bdad*,⁴ and (c) similarities between geminates and clusters in some processes involving schwa.⁵

3.2.1. Heteromorphemic geminates

The merger of two adjacent short consonants into a long one is a pervasive phenomenon in Berber. We present three such processes which are found in Imdlawn Tashlhiyt. These will be seen at work in many of the examples cited in this book. The purview of all three processes is limited to sequences of short consonants. This shared property will provide us with our first reason to prefer the configurational analysis.

3.2.1.1. Fusion of adjacent short consonants into a long one

Morphology or syntax can create sequences of two identical short consonants, as in /t-zri-t=t/ ‘you overtook him’, where the 2s PNG /t/ is immediately followed by the do3ms pronoun /t/. In Imdlawn Tashlhiyt such sequences of identical short consonants are in general⁶ homophonous with the corresponding long consonant. /t-zri-t=t/ is homophonous with /t-zri=tt/ ‘she overtook her’, where /tt/ is the do3fs pronoun. Similarly /gn-n/ ‘they slept’ (sleep-3mp) is homophonous with /g=nn/ ‘put yonder!’ (put:aor=dir). Similar mergers do not occur in analogous sequences in which one consonant is long,⁷ e.g. the sequence /t+tt/ is phonetically distinct from /tt/ and /t/, and so are the sequences /tt+t/ and /tt+tt/.

In our view the homophonous forms in the last example have at the underlying level the representations in (4).

³ Willms (1962) had already reached the same conclusion for Kabyle, basing himself on evidence about the phonotactics of Kabyle syllables.

⁴ Verb-final geminates are split by the ‘chameleon’, a vowel which is inserted to form certain imperfective stems, v. DE (1991: 96) and § 5.2 in this book.

⁵ On schwa epenthesis in Rifian Berber, v. § 6.5.

⁶ ‘In general’, that is: unless the first consonant is released, which happens only in certain contexts, about which v. § 6.3.3.

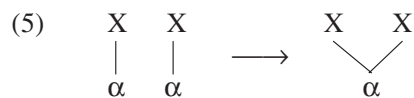
⁷ There are a few exceptions to this statement. After a verb, for instance, a suffix or clitic comprised of one short consonant which immediately follows its long counterpart merges with it, e.g. /dd=d/ must be pronounced as though it were /dd/ in /s-bidd=d a-gždi/ (cau-stand=dir u(beam) ‘raise the beam on this side!’).



In (4)b a single occurrence of the feature complex defining *n* is associated with units which correspond to two successive points in time. The relationship between (4)b and the corresponding realization ([gn:]) is a rather direct one. In order to account for the homophony of /gn-n/ with /g=nn/ one must confront two problems, which we dub the problem of articulatory fusion and the problem of duration. Let us consider these problems in turn and see how the two competing analyses of length in Berber fare in dealing with them.

The underlying representation in (4)a contains two occurrences of the feature bundle defining *n*. If the first *n* were realized as a full-fledged consonant ending with the release of its oral constriction, the realization of /gn-n/ would sound something like [gnɔ̃n], which is not homophonous with [gn:]. In order to account for the homophony of /gn-n/ with /g=nn/, the two successive *n* sounds allowed by (4)a must be merged into a seamless whole, or more precisely one must derive from (4)a a surface representation whose phonetic implementation may only comprise a single uninterrupted coronal closure. This is what we call ‘the problem of articulatory fusion’. Let us turn to the problem of duration. Having ensured that the sequence /n-n/ in (4)a is realized as an uninterrupted coronal closure, one must in addition make sure that that closure has the same duration as the closure of /nn/ in the realization of /g=nn/.

Simplifying somewhat,⁸ here is how we propose to solve these problems. We posit a fusion process which merges into one two identical feature bundles which are adjacent, preserving at the same time their associations with the prosodic positions.



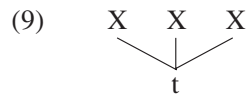
By (5) representation (4)a is turned into a representation identical with (4)b, hence the homophony.

Let us now see how the featural analysis would account for the homophony in question. (6)a and (6)b are the underlying representations which such an analysis would assign to *gn-n* and *g=nn*.

⁸ V. § 6.3.3.2 for details.

followed by the corresponding long one into their short counterpart ($t+tt > t$)?¹¹

The proponents of the featural analysis might retort that it is more restrictive than the configurational analysis. If length in Imdlawn Tashlhiyt is characterized by a binary distinctive feature, the length contrast can only be a binary one. But if length depends on the number of prosodic units contained in a segment, one can conceive of segments comprising more than two prosodic units. One could for instance entertain treble segments like that in (9).



If Fusion is formulated as in (5), what prevents it from operating on sequences which contain long consonants, changing for instance $/t+tt/$ or $/tt+t/$ into the treble consonant represented in (9)?

This brings us to the other half of our argument. Imdlawn Tashlhiyt possesses several rules of total assimilation. Like the rule of fusion presented above, these rules only operate on sequences of short segments. The configurational analysis allows us to consider this common restriction as a consequence of a separate component in the grammar, as we shall see. Under the featural analysis, on the other hand, the similarity between fusion and the rules of total assimilation cannot be factored out.

Treble segments like (9) are not found at any level in the derivations in Imdlawn Tashlhiyt. All representations in Imdlawn Tashlhiyt meet the following condition:¹²

- (10) NO-TREBLE: A melodic unit (i.e. a Root node) may not be associated with three prosodic positions which are adjacent.

In the text above (4) we stated that fusion only affects adjacent consonants which are both short, e.g. $/t+tt/$ remains unaffected by rule (5). If (5) did merge the two consonants in $/t+tt/$, the merger would yield (9), in violation of NO-TREBLE.

NO-TREBLE constrains all the representations in the phonological component. In particular it constrains those created by assimilation rules. In addition to the *l*-assimilation rule which operates in Arabic loans (v. § 2.5.3.1) Imdlawn Tashlhiyt has two rules which completely assimilate a

¹¹ The special fusion exemplified in note 7 does not weaken our argument against (7). In order to account for this fusion, (5) and (7) must be supplemented with devices of comparable complexity.

¹² The formulation in (10) is only a first approximation, v. § 6.3.3.

segment to the one which follows it. Both rules involve grammatical morphemes which occur very frequently and their effect will be seen in many places in this book.

3.2.1.2. *The genitive preposition*

The genitive preposition /n/ completely assimilates to the initial segment of the following word if that segment is a sonorant other than *a*. This assimilation is optional. It is exemplified in (11), where a slanted line separates two pronunciations which are both acceptable. Assimilation does not take place in the first example because the word which follows the preposition does not begin with a sonorant.

- (11) a. a-qššab n dadda 'my older brother's smock'
 b. a-ydi n msaawd / aydi m msaawd 'Messaoud's dog'
 c. a-yda n l-qqayd / ayda l lqqayd 'the chief's estate'
 d. t-i-gira n !rmdan / tigira r !rmdan 'the end of the Ramadan'
 e. i-xf n u-γγul / ix f u wγγul 'the donkey's head'
 f. i-xf n i-zikr / ix f i yzkr 'the end of the rope'
 g. i-xf n w-aassas / ix f u waassas 'the watchman's head'
 h. ifr n !wizugn / if!r u wizugn 'the cicada's wing'
 i. lgdr n yumayn / lgdr i yumayn 'two days'time'

Before we proceed, a word of explanation is in order for lines e and f. In line e, *u-γγul* is the bound state form of *a-γγul*. On the syllabification of the bound state prefix, v. § 7.4. The assimilation of /n/ to the bound state prefix creates a geminate high vocoid, which is syllabified as a vowel-glides sequence since it occurs between two consonants.¹³ Similarly, in line f, *i-zikr* is the bound state form of *i-zikr*. Note also that /ʕ/ does not trigger the assimilation, as one would expect if ʕ were a sonorant, as has sometimes been suggested: *a-fus n !ʕumar* 'Omar's hand' (**afus !ʕumar*).

The assimilation rule is given in (12).

- (12) N-ASSIM (OPT):
- $$\begin{array}{ccc}
 X &]_p & N \\
 | & \text{---} & | \\
 \neq & \text{---} & \\
 n & & \left[\begin{array}{c} +\text{son} \\ -\text{low} \end{array} \right]
 \end{array}$$

Rule (12) says that if *n* is located at the end of a preposition and is followed by a nonsonorant, that sonorant spreads onto the prosodic position occupied by *n* (i.e. it becomes associated with that position) and the link

¹³ After a vowel the geminated high vocoid created by assimilation is pronounced as a geminate glide, e.g. *t-a-wada n u-γγul / tawada w w-γγul* 'the donkey's gait'.

between *n* and that position is deleted. The unassociated *n* will subsequently be deleted, in accordance with the Stray Erasure Convention, which deletes all unlinked material.¹⁴ As a result of the rule, the sequence /nm/ in (11)b is for instance changed into a geminate *m*.

Assimilation does not occur when the sonorant following /n/ is a geminate. The prepositional phrases in (13) only have one acceptable pronunciation.

- (13) a. *n lluz* / **l lluz* 'of the almonds'
 b. *n !rrg* / **!r rrg* 'of the turban'
 c. *n mmu t-wnza* / **m mmu twnza* 'of the one (f) with the fringe'

NO-TREBLE (10) accounts for the fact that long consonants cannot assimilate /n/. There is nothing in rule (12) itself which would prevent it from applying in /n lluz/ (13)a, for instance, but if it were to do so, it would create a treble *l*, in violation of NO-TREBLE.

Let us now see how these facts would be accounted for under the featural analysis of length in Imdlawn Tashlhiyt. We give in (14) an alternative formulation of the assimilation rule which is compatible with that analysis. To make things simpler we have left out the condition which requires /n/ to be the last segment of a preposition.

$$\begin{array}{ccccccc}
 (14) & n & \left[\begin{array}{c} -\text{tense} \\ +\text{son} \\ -\text{low} \end{array} \right] & \longrightarrow & \emptyset & [+tense] & \\
 & 1 & 2 & & 1 & 2 &
 \end{array}$$

Rule (14) takes a sequence comprised of *n* and a short nonlow sonorant and changes it into the corresponding long sonorant. The rule calls for two comments.

The first comment is analogous to one we made in the preceding section concerning the fusion rule. It has to do with the fact that the assimilation gives rise to a long segment. If one compares how rules (12) and (14) deal with length, one finds again the changes portrayed in (8)a and (8)b, and the remarks we made earlier about these are also valid here.

Our second comment concerns the specification [-tense] on the left-hand side of the arrow in (14), whose presence is necessary to prevent the rule from applying when the noun begins with a long segment. If it did, this would amount to simply deleting /n/, which is incorrect, e.g. the rule would predict, incorrectly, that /n=lluz/ 'of the almond' can be pronounced homophonous with /lluz/ 'almond'. Within the featural analysis, then, one must incorporate an ad hoc specification into the assimilation rule in order to prevent it from applying when the noun begins with a

¹⁴ On Stray Erasure v. e.g. Marantz (1982: 446).

geminate. No ad hoc restriction on the rule is necessary within the configurational analysis, on the other hand, because assimilation by geminates is precluded by an independent constraint, viz. NO-TREBLE (10).

To sum up: in Imdlawn Tashlhiyt one property which fusion and complete assimilation have in common is that they only affect sequences of short consonants. The configurational conception of length allows us to ascribe that property to a component of the grammar (NO-TREBLE) which is independent of the fusion and assimilation rules. Furthermore that component may very well belong to UG; we know of no counterexample to NO-TREBLE in other languages. The featural conception of length does not allow us to factor out that similarity between fusion and complete assimilation, thus forcing us to treat it as a coincidence.

3.2.1.3. (R)AD's final consonant

When the complementizer /ad/ and the future marker /rad/ precede certain grammatical morphemes, the final /d/ drops in certain cases, and completely assimilates to the following segment in others. Complete assimilation is obligatory in certain contexts and optional in others. For a review of the various morphosyntactic environments with systematic exemplification, v. DE (1989: 188–190). A few examples will suffice here.

- (15) a. /rad=zwar i-šš/ ra[dz]war ~ ra[zz]war
 fut=first 3ms-eat:aor
 'he will first eat'
- b. /rad=fll-i i-zri/ ra[ff]lli
 fut=on-1s 3ms-pass
 'he will pick me up on the way'
- a'. /ur rad=žžu i-lkm/ ra[žž]u
 neg fut=never 3ms-arrive
 'he will never arrive'
- b'. /rad=ssgi-s i-ffi/ ra[ss]gis
 fut=from-3s 3ms-pour
 'he will pour from it'

Assimilation is optional before an adverb (v. (15)a) and obligatory before a pronoun (v. (15)b), but *d* fails to assimilate when it precedes a long consonant, and it deletes instead, v. (15)a',b'. (R)AD's behaviour thus strengthens our case in favor of constraint NO-TREBLE and of the configurational analysis of length in Imdlawn Tashlhiyt.

3.2.2. Syllable structure

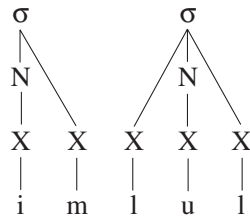
This subsection anticipates the results of our discussion of syllable structure in Chapter 4.

In Imdlawn Tashlhiyt a geminate consonant can belong to two syllables at once, whereas a simple consonant cannot. Consider the following examples.

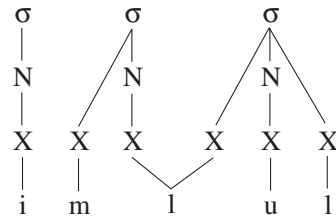
- (16) a. *imlul* ‘be white aor’ (im.lul)
 b. *i-mllul* ‘be white pf 3ms’ (i.ml.lul)
 c. *a-mlħaf* ‘haik’ (a.ml.ħaf)

According to native judgments the first word is disyllabic and the other two are trisyllabic, and furthermore in the trisyllables the peak of the second syllable coincides with *l*. In our view, these judgments are a reflection of the syllable structures that the words in question have in the terminal representations of the phonological component. We take these syllable structures to be as given in parentheses after the glosses in (16) (a dot stands for the edge of a syllable). The syllabic parsings in (16) are nothing but convenient stand-ins for the representations in (17).

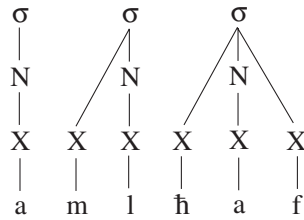
- (17) a. *im.lul*



- b. *i.ml.lul*



- c. *a.ml.ħaf*

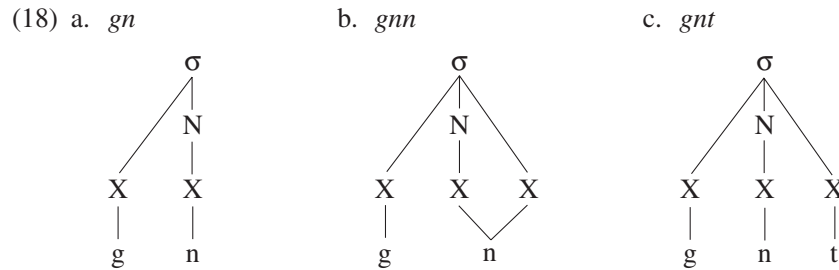


The units which are grouped into syllables are not the melodic units but the prosodic positions. In (17)b the first position in /ll/ is the nucleus of the second syllable; the second position is the onset of the third syllable. Through the mediation of the skeleton, then, the feature bundle /l/ in *imllul* belongs at once to two syllables.

The difference between a short consonant and a long one is in some cases sufficient to create a difference in syllable count, as in the contrast between

imlul and *imllul*. It can also create a difference in syllable weight in poetry, as we now explain.

The versification of Tashlhiyt distinguishes between light and heavy syllables. Let us say as a first approximation that a syllable is light if its nucleus is syllable-final and heavy otherwise. In (17) the light syllables are *i* and *ml* (v. (17)b), and *a* and *ml* (v. (17)c); all the others are heavy. The relevant fact for the present discussion is this: a syllable is heavy if its nucleus belongs to a tautosyllabic geminate. Consider the words *gn* ‘sleep!’, *g=nn* (put:aor=dir) ‘put yonder!’ and *g-nt* (put:aor-3fp) ‘let them put’. When they precede a word beginning with CV, their boundaries are also syllable boundaries; *gn* is a light syllable, whereas *gnn* is heavy, like *gnt*. The three syllables are represented in (18).



Syllable (18)b is heavy: like that of syllable (18)c, its nucleus is not syllable-final. The representations in (17) and (18) are examples of how length and syllable structure mesh if length is represented configurationally. The proponents of the featural analysis of length have yet to indicate what their conception of syllable structure is and how the representation of length and that of syllable structure are interrelated.¹⁵

Consonants can be syllable nuclei in Imdlawn Tashlhiyt and the above discussion relies crucially on this fact. The bipositional nature of long consonants is no less evident in the syllabification of those dialects of Berber which allow only vocoids as syllable nuclei, v. § 6.5.

3.2.3. *Templatic morphology I*

Templates in Imdlawn Tashlhiyt are discussed in DE (1992). In this section we limit ourselves to the facts relevant for the analysis of length.

We will draw our evidence from a class of nouns and adjectives which have the form *uCCiC* and are derived from verbs. A few examples are given

¹⁵ Ouakrim (1995: 102) claims that in Ihahan Tashlhiyt tense consonants (what we call geminates) cannot be ambisyllabic. Take *t-nna* ‘she said’, which is disyllabic in Imdlawn Tashlhiyt (*tn.na*). If it is also disyllabic in Ihahan, the only syllabifications compatible with Ouakrim’s claim are *t.nna* and *tnn.a*.

(19) a.	ukris	krs	‘trousseau / tie in a bundle’
b.	urkim	rkm	‘rotten / rot’
c.	!uttid	!ttd	‘coagulated blood / coagulate’
d.	ukkim ¹⁶	k ^w k ^w m	‘a blow / strike’
e.	!ugziz	!gzz	‘mouthful / crunch’
f.	t-ugmim-t	g ^w mm	‘mouthful / hold (liquid) in one’s mouth’

(20) a. *uCCiC* template

u i
| |
V C C V C

b. *urkim*

u i
| |
V C C V C
 | |
 r k m

c. *!uttid*

u i
| |
V C C V C
 \ /
 !t d

Let us now see how mapping onto templates deals with consonant length. Note first that a single C position in the template is never occupied by a long consonant; forms like *ummlis* or *umllis* are not possible UKRIS words. This fact follows directly from the template (20)a. The template can only

¹⁶ In free variation with *uk^wk^wim*. In Imdlawn Tashlhiyt labialized consonants optionally delabialize when they occur to the right of a rounded vowel belonging to the same word. We only give the delabialized variants in order to avoid cluttering.

give rise to words of the form VCCVC, whereas the shape of *ummlis* and *umllis* is VCCVC under the configurational analysis of length. Under the featural analysis of length, on the other hand, the canonical shape of *ummlis* and *umllis* is VCCVC. Within that analysis, templatic mappings must be regulated by the following convention.

- (21) Individual C positions in templates must be allowed to associate only with [-tense] consonants.

The behaviour of long consonants in templatic mappings is illustrated by the examples in (19)c–f. Examples (19)c,d illustrate the fact that a CC sequence in the template can be occupied by a long consonant. Under the configurational analysis of length this fact follows directly from template (20)a, e.g. one can see from the representation of *!uttid* ((19)c), which is given in (20)c above, that its canonical shape is indeed VCCVC. Under the featural analysis of length, on the other hand, convention (21) must be supplemented with a codicil allowing [+tense] consonants in derived words to count as CC sequences in the template. This codicil is yet another manifestation of the equivalence between a long consonant and a sequence of two short ones. The configurational theory of length acknowledges the central position of this equivalence: it takes it as a primitive and incorporates it into the phonological representations, v. (3). Under the featural analysis of length, on the other hand, the equivalence in question goes unrecognized, and it is forced to manifest itself in different guises: in the conditions of phonological rules (v. (8)b) or in the conventions on how to interpret templates.

The proposed emendation to convention (21) allows a long consonant to be equivalent to a sequence of two short ones in the case a derived word is examined in order to determine whether it matches the template. Even emendated thus, convention (21) is still inadequate, however, for it has nothing to say about examples (19)e,f. The purpose of these examples is to show that a long consonant in the source word can give rise to two short ones in the derived word. A detailed account of such cases can be found in our general discussion of templates in Imdlawn Tashlhiyt in DE (1992). Our analysis there relies crucially on the fact that the long consonant in the source verb, e.g. in *!gzz* in (19)e, contains two prosodic positions.

All the data in the discussion above are drawn from the UKRIS forms, but Imdlawn Tashlhiyt possesses other classes of templatic words which present the same problem for the featural analysis of length.¹⁷

Templatic forms will again be brought in in the next section, where they will provide evidence on another aspect of the structure of long segments.

¹⁷ V. DE (1991: 96–99), DE (1992).

3.3. THE LONG SEGMENT AS A SINGLE MELODIC UNIT

Let us now review the Imdlawn Tashlhiyt evidence that geminates are comprised of a single melodic unit (a single bundle of distinctive features), as implied by representation (3)b.

3.3.1. *Templatic morphology II*

An important factual generalization about the templatic morphology of Imdlawn Tashlhiyt is the following: whereas derived forms do not retain any trace of the vowels of their source forms, the consonants of the source forms are retained in the derived forms, where they all appear unchanged *except for length*. We will refer to this property as ‘consonantal invariance’. Consider the following UKRIS forms:

- | | | | |
|---------|--------|-------|--|
| (22) a. | utlif | tlf | ‘lost soul / be confused’ |
| b. | ubbiz | bbz | ‘a punch / to punch’ |
| c. | !ugziz | !gzz | ‘mouthful / crunch’ |
| d. | ulmis | lmmus | ‘something bland / be bland’ |
| e. | uqsif | qssf | ‘squat person / be narrow’ |
| f. | udmiγ | dmmγ | ‘mentally retarded person / be retarded’ |

Forms a to c are only given for the sake of comparison. They are similar to examples given earlier in (19). Forms d to f illustrate one aspect of the special status of length in consonantal invariance: in certain circumstances a consonant which is long in the source form has a short reflex in the derived form. Consider for instance the fact that mapping *qssf* onto the *uCCiC* template yields *uqsif* (v. (22)e). (23)a is template (20)a, repeated here for convenience, (23)b is the phonological representation of *uqsif* and (23)c is that of *qssf*.

- | | |
|---|--|
| (23) a. <i>uCCiC</i> | b. <i>uqsif</i> |
| $ \begin{array}{ccccc} & u & & i & \\ & & & & \\ & V & C & C & V & C \end{array} $ | $ \begin{array}{ccccc} & u & & i & \\ & & & & \\ & V & C & C & V & C \\ & & & & & \\ & & q & s & & f \end{array} $ |
| c. <i>qssf</i> | |
| $ \begin{array}{cccc} C & C & C & C \\ & \diagdown & / & \\ q & & s & f \end{array} $ | |

The template contains three C positions; it can accommodate either three short consonants, as in *utlif* (22)a, or a long consonant and a short one, as in *ubbiz*

(22)b. In going from *qssf* (23)c to *uqsif* (23)b the feature content of the source is preserved in its entirety: both forms contain the same sequence of consonantal melodies: *q, s, f*. Cases where a consonantal melody gets lost in a templatic mapping are only a handful in Imdlawn Tashlhiyt, e.g. *t-i-γzi* ‘length’, which results from mapping *γzzif* ‘be long’ onto the template (C)CCi (conformity with consonantal invariance would have yielded *t-i-γzfi* instead).

Consonantal invariance has to do with melodic units (feature bundles), not with prosodic positions (C positions), and it is one of the merits of the theoretical framework adopted here that it provides a plane of representation on which a long consonant is equivalent to its short counterpart: on the melodic plane /ss/ consists of one feature bundle, like /s/.

The fact that long consonants sometimes become short in templatic mappings certainly does not make life easier for the proponents of a featural analysis of length; but above all it poses a direct challenge to another view of length, the strictly sequential view, according to which a long segment is simply a sequence of two identical consonants.

Imagine that we adopt unilinear representations in the manner of Chomsky and Halle (1968), and that instead of being a single feature bundle *s* associated to two positions (v. (23)c), the long consonant in *qssf* is represented as two identical *s* feature bundles standing side by side. The representation of *qssf* is a sequence of four feature bundles, but the template has only room for three of them, so one of the four must fail to transfer to the derived form. How does one explain the fact that the feature bundle left out in the transfer is one of the *s* bundles, rather than *q* or *f*, i.e. why is the derived form not *ussif* or *uqsis*, instead of *uqsif*? Of course, unilinear representations could be supplemented with conventions which would allow one of two adjacent identical segments to be disregarded for certain purposes. But then it would have to be shown that the resulting framework would not be a notational variant of that adopted here.

One might object that our argument is without force because it relies on assumptions about the templatic morphology of Imdlawn Tashlhiyt which are erroneous. We have been tacitly assuming that in derivations with templates, what is mapped onto a template is the source word, but what is mapped instead, our opponent might claim, is only the source word’s consonantal root, as in root-and-pattern descriptions of Arabic and Hebrew. While we are assuming that it is the form *qssf* itself which is mapped onto the *uCCiC* template to derive *uqsif*, an advocate of the strictly sequential conception of length might claim that (i) the source word *qssf* is itself the result of mapping a consonantal root /qsf/ onto a template *CC_iC_iC* and that (ii) it is the root /qsf/ rather than the word /qssf/ which is mapped onto the *uCCiC* template to derive *uqsif*. Regardless of the validity of (i), a question which we leave open for the time being, (ii) is untenable. According to our opponent’s assumptions, in the derivation of *ubbiz* from

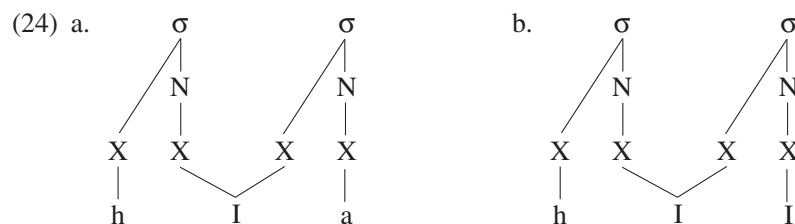
bbz (v. (22)b) and of *!ugziz* from *!gzz* (v. (22)c), the objects mapped onto the *uCCiC* template would be the roots */bz/* and *!/gz/*, but then there would be no explanation for the fact that in Imdlawn Tashlhiyt the templatically derived forms preserve as much as possible the length of the consonants in the source words; *bbz* does not yield *ubziz*, nor does *!gzz* yield *!uggiz*.

3.3.2. Feature changes in long consonants

One prediction implicit in the assumption that long segments contain a single feature bundle is that an alternation cannot involve one ‘half’ of a long segment while leaving the other ‘half’ invariant. Imagine a language with a length contrast and a rule which rewrites */t/* as *s* before *i*. */tt/* would not be realized as *ts* in that context: since */tt/* contains a single feature bundle, it contains in particular a single occurrence of the specification [–cont] that could be changed by the rule; */tt/* can either become */ss/* or remain */tt/*. Imdlawn Tashlhiyt has a number of processes which affect long segments and which agree with that prediction, e.g. the realization of emphatic */dd/* as [!tt], the occlusivization of */γγ/* and */γ^wγ^w/*, which surface as *qq* and *q^wq^w*,¹⁸ sibilant harmony (v. § 5.4) and labial dissimilation.¹⁹ It also has two processes which contradict the prediction in question.

The vowel *i* is optionally lowered to [e] after *ħ*, e.g. */tħi-n/* ‘they jostled’ may be realized as [tħen]. When it occurs between two consonants, */yy/* is normally realized as [i:], e.g. */nyyš/ niyš* [ni:š] ‘aim’. When the preceding consonant is *ħ*, however, */yy/* is realized as [ey], that is, only */yy/*’s first half undergoes lowering. */ħyyd/* ‘step back’, which we transcribe as *ħiyd*, is actually pronounced as [ħeyd]. This is an impossible outcome in the framework adopted here. Given our assumptions about the representation of length, */yy/* can only surface as [i:] or as [e:] in the context in question.

The other problematic case also has to do with the pronunciation of geminate glides. When a geminate glide occurs between a consonant and a vowel it is realized as a high vowel followed by a glide (v. § 7.4), e.g. */hyya/* ‘be magnificent’ is pronounced *hiya*. The surface representation of */hyya/* is given in (24)a.



¹⁸ */ww/* is also realized as *g^wg^w* in certain morphological environments, v. § 7.4.

¹⁹ On labial dissimilation, v. Elmedlaoui (1995a: 43–78).

As will be seen in § 4.6, we assume that a glide and the corresponding high vowel share the same melodic unit, e.g. *i* and *y* are comprised of the same feature bundle, which is represented as ‘I’ in (24). The symbol ‘i’ stands for a syllabic I, and the symbol ‘y’, for a nonsyllabic one, hence the transcription ‘hiya’ for the object depicted in (24)a. Consider next the neg 3ms form of *hiya*, which is *i-hiyi*. The representation of its kernel is given in (24)b. In that word the sequence we transcribe as *iyi* sounds like that in the French word *Chantilly* [šātiyi]: the glide gives the impression of having a greater degree of constriction than the adjacent vowels. Strengthening of glides in onset position is a commonplace phenomenon, v., e.g., Harris and Kaisse (1999) for Spanish, Rubach (1993) for Slovak, Booij (1995) for Dutch. If, as in the preceding references, the strengthening of onset glides in Imdlawn Tashlhiyt is a phonological phenomenon, i.e. if it must be represented by the feature contents of the terminal representations of the phonological component of the grammar, it presents a serious problem for the view of length adopted here, since in /hyya/ and /i-hyy-i/ the feature specification representing the strengthening must only be associated with the second half of the long glide, which is impossible, given the representations in (24).

The two facts just discussed are problematic for the conception of length we have adopted,²⁰ but we will retain that conception here, as we are unable to propose a better one. Note that these two facts can give no comfort to the advocates of the featural analysis of length in Berber, since what these two facts challenge is the assumption that long segments are comprised of a single feature bundle, an assumption which is also part of the featural analysis.

3.4. “TENSION”

The previous literature concerning Berber geminates has dealt with two issues:

- (i) Is a geminate a sequence or a single segment?
- (ii) What are the phonetic correlates of the simple vs. geminate contrast, and what is their phonological relevance?

Since Saib (1976)²¹ and Guerssel (1977), who were the first to discuss question (i) in any detail, all the authors working on Berber within generative grammar have adopted the configurational analysis in one form or another, depending on their particular views about the structure of phonological representations, v. e.g. Elmedlaoui (1985, 1988), DE (1985, 1992,

²⁰ Hayes (1990) and Selkirk (1990) discuss other problems with that conception.

²¹ In chapter three, published as Saib (1977).

1996a), Bader and Kenstowicz (1987), Boukous (1987a, b), Dell and Tangi (1992, 1993), Jebbour (1995, 1996), Bendjaballah (1995). Outside of generative grammar, on the other hand, the discussion of question (i) has been summary at best,²² and a featural analysis of length has in general been accepted, v., e.g., Chaker (1984), Galand (1988, 1997).

Answering question (ii) has been a more pressing concern for the advocates of the featural analysis of length than for those of the configurational analysis. One reason for this is easy enough to see. If one holds that geminates and simple segments differ only in their distinctive features, one cannot give a complete distinctive feature analysis of the underlying inventory unless one is able to say what the distinctive feature involved in the length contrast is. On the other hand, if one adopts a configurational conception of length, the phonetic correlates of the length contrast may be considered irrelevant to the functioning of the phonological component.

Most proponents of the featural analysis accept Galand's view that the distinctive feature involved in the length contrast in Berber is tension: what we call geminates are tense whereas their simple counterparts are not.

To its advocates, tension seems best suited to provide a common source to the following four phenomena:

(A) the greater duration of the closure period in long consonants, v. Applegate (1958: 13) on Ifni Tashlhiyt, Chaker (1975) on Ait Iraten Kabyle, Ouakrim (1993)²³ on Haha Tashlhiyt and Louali and Puech (1994) on Tiznit Tashlhiyt.

(B) Long consonants seem to require greater articulatory energy. This is suggested by the palatograms in Mitchell (1957) on the dialect of Zuara (Libya), by Louali and Puech's air pressure tracings and by the greater acoustic energy in stop bursts in the spectrograms in the works by Ouakrim and by Louali and Puech.

(C) Whenever a simple consonant and its geminate counterpart differ in continuancy, the long consonant is a stop whereas the short consonant is a fricative, and not the other way around,²⁴ v. the pairs γ/qq and w/g^wg^w in Imdlawn Tashlhiyt. In some dialects all the simple stops in the native vocabulary have become fricatives while their geminate counterparts have remained stops, v., e.g., Saib (1974) on Ayt Ndhir Tamazight and Chaker (1984) on Ayt Iraten Kabyle.

(D) Whenever a simple consonant and its geminate counterpart differ in voicing, the short consonant is voiced and the long one is voiceless,

²² E.g. Chaker (1984: 84–85). Kossmann (1994: 59–60) poses problem (i) and discusses various relevant facts in Figuig, but in the end he leaves the question unanswered.

²³ Published with slight revisions as Ouakrim (1995).

²⁴ V. Elmedlaoui (1993) for some discussion.

and not the other way around, v., e.g., the realization of /!dd/ as [!tt], a pan-berber fact, and the devoicing of geminate /d/ and /b/ in Zenaga Figuig (Saa 1995).

In DE (1997b) we review the various arguments which have been adduced in favor of a featural analysis of length in Berber. We refer the reader to that article, where it is argued that facts (A) to (D) are no reason for preferring a featural analysis.²⁵

3.5. CONCLUSION ON THE GEMINATES

In view of the above discussion, the nature of the length contrast in Berber dialects should not be a controversial matter. The burden of proof clearly lies with the proponents of a featural analysis of length.

3.6. DORSOPHARYNGEALIZATION

This section deals with emphasis (i.e. dorsopharyngealization) and its distribution in phonological representations and at the surface level.²⁶ In a nutshell: In phonological representations, emphasis is a property of individual segments; Imdlawn Tashlhiyt has a set of emphatic phonemes, all coronal. At the surface level, on the other hand, emphasis can affect all the segments comprising a word or even a sequence of words. For instance /t-i-g^wmmad-in/ '(river) banks, dim' only contains one emphatic segment, /d/.²⁷ The pronunciation of this word sounds something like [tuɡ^wm:ɑduŋ], with emphasis spread over the entire word.

The articulation of dorsopharyngealized segments in Imdlawn Tashlhiyt and their featural representation are discussed in Elmedlaoui (1995a: 161ss). As is the case in other dialects of Berber the presence of emphasis in a word cannot be predicted on the basis of other phonological properties in that word, witness the existence of minimal pairs in which the only distinguishing feature is emphasis:

- | | | | | |
|---------|-------|---------------|--------|---------------------------|
| (25) a. | a-fud | 'knee' | !afud | 'leave!' |
| b. | izi | 'fly' | !izi | 'gall' |
| c. | ndr-n | 'they moaned' | !ndr-n | 'they flew off' |
| d. | frd | 'graze!' | !frd | 'clear (of undergrowth)!' |
| e. | smsr | 'pursue!' | !smsr | 'trade!' |

²⁵ In that article we also examine an argument by Ouakrim (1995) based on duration measurements in Ihahan Tashlhiyt. We suggest that the author's conclusions probably rest on a faulty phonological analysis of the data on which the measurements were made.

²⁶ On emphasis in Tashlhiyt, v. Elmedlaoui (1985), Boukous (1987a) and the references cited in these works.

²⁷ In §3.6, emphasis is indicated by underlining or by '!'. The two are equivalent.

When examining an expression (a word or a group of words) there is never any doubt whether it contains emphatic segments, and in an expression in the surface forms of which there are both emphatic and nonemphatic segments it is often possible to obtain clearcut judgements about the exact location of the endpoints of an emphasis span, even if they fall in the middle of a consonant cluster.

3.6.1. Auditory properties

We present below some of the auditory impressions to which emphasis gives rise in Imdlawn Tashlhiyt. We deal first with the vowels. Setting aside certain special cases, /u, i, a/ are realized as [u, i, æ] in nonemphatic contexts. In emphatic contexts, on the other hand, /u/ sounds like [o], /i/ sounds like a lowered [u]²⁸ and /a/ is close to [ɑ].²⁹ Recall that at the phonetic level Imdlawn Tashlhiyt also has three long vowels: [u:] for tautosyllabic *uw*, [i:] for tautosyllabic *iy* and [æ:] for *aa*. In emphatic contexts these long vowels are pronounced with the same color as their short counterparts, but longer. Here are words exemplifying the emphatic vowels: /!bdu/ ‘share!’, /!mdi/ ‘taste!’, /!bda-n/ ‘they shared’, /i-!duwš/ ‘it squirted’, /i-!siyf/ ‘he spent the summer’, *i-!daaf* ‘he is lean’. In this book the emphatic variants of /u, i, a/ and their long counterparts are most of the time notated simply as ‘u’, ‘i’ and ‘a’ to avoid the proliferation of phonetic symbols.

For a nonnative speaker becoming acquainted with Imdlawn Tashlhiyt, the auditory differences between the emphatic realizations of the vowels and their nonemphatic realizations are easy to perceive from the start. Only a little training is needed to learn to detect the corresponding differences in consonants. Whether a given consonant is plain or emphatic is often clearly audible even in the absence of any neighbouring vowel. The constriction phase of emphatic sonorants and fricatives gives rise to an auditory impression which is different from that of their nonemphatic counterparts. In noncontinuants the explosion burst sounds different in emphatics and

²⁸ This sound is identical with the emphatic variant of /i/ in Moroccan Arabic, which various authors describe as [e], erroneously in our opinion.

²⁹ /a/ is furthermore subject to a phenomenon of prepausal backing. Immediately before a pause it is realized more posterior than its nonprepausal counterpart, e.g. whereas /sala-n/ ‘they finished’ is realized as [sælæn], before a pause /sala/ ‘finish!’ sounds more or less like [sələ] (v. Heath (1987: 23) for a similar phenomenon in Moroccan Arabic). Prepausal backing also occurs in emphatic contexts, e.g. /a/ in prepausal /t-!bda/ ‘she shared’ is even more posterior than /a/ in /!bda-n/ ‘they shared’. Prepausal backing does not obliterate the difference between emphatic *a* and nonemphatic *a*; the vowel in /t-!bda/ ‘she shared’ and that in /t-bda/ ‘she began’ are both back *a*’s, but that in the first word sounds more back than that in the second.

Prepausal backing and emphasisation have the same influence on *aa* as on *a*. The only audible difference between *a* and *aa* in the various contexts where they contrast is one in duration. On *aa*, see the next section.

nonemphatics. These differences are enhanced by concomitant glottal vibrations but they are easily perceived even in the absence of voicing. They give rise to surface contrasts such as those in the minimal pairs below, where the broad phonetic transcription used throughout this book is followed by a narrower transcription.

- (26) a. fttštt!šštt [ft:št:š:t:^h]³⁰ /fttš=t t-!ššd-t/
 examine=do3ms 2-slide:aor-2s
 ‘examine it and slide!’
- b. fttšttšštt [ft:št:š:t:^h] /fttš=t t-šš-t=t/
 examine=do3ms 2-eat:aor-2s=do3ms
 ‘examine it and eat it!’
- (27) a. !tkktt [t^hk:^ht:^h] /t-!kkd-t/
 ‘you poked (eye)’ 2-poke-2s
- b. tkktt [t^hk:^ht:^h] /t-kk-t=t/
 ‘(and then) you went through it’ 2-pass:aor-2s=do3ms

The hushing sound of the sibilant in (26)a clearly has a lower pitch than that in (26)b. The explosion bursts in (27)a have a lower pitch than those in (27)b. Exploded plain *t* is furthermore slightly affricated, which is never the case with [!t]. The lowered pitch of the friction noise due to emphasis is more easy to perceive in some voiceless fricatives than in others. It is quite salient in [!š] and [!h]³¹ while it is not easy to make out in [!f] and [!s].³² The auditory differences due to emphasis in fricatives are analogous with – but not identical to – those due to lip-rounding, *v.* for instance [š] in Eng. *shoot*, which has a lower pitch than in *sheet*.

Here are now examples involving voiced segments.

- (28) a. šš!tsttlt [š:tst:lt^h] /šš t-!sttl-t/
 eat:aor 2-shave:head:aor-2s
 ‘eat and shave your head!’
- b. šštsttlt [š:tst:lt^h] /šš=t s=l-tlt/
 eat:aor=do3ms with=/l/-third
 ‘swindle him by proposing him one third!’³³

³⁰ We are unable to determine whether the long *t* which immediately precedes [!š:] is emphatic or not.

³¹ The existence of a marked audible difference between the plain variant of the pharyngeal fricative /h/ and its emphatic variant is evidence that the secondary articulation of Imdlawn Tashlhiyt which we are calling emphasis is not mere pharyngealization.

³² On the other hand the difference between [z] and [!z] is easy to perceive, even in the absence of an adjacent vowel.

³³ Literally ‘eat him with a third’.

- Apart from a difference in the releases of the final stops (v. above) a salient difference between the two expressions in (28) lies in the coloration of the liquid, which sounds more or less like the ‘dark *l*’ of English *bottled* in (28)a but not in (28)b. In (29) one hears a short voiced vocoid between the release of the coronal closure of /n/ and the onset of the velar closure of /g/. The vocoid in question sounds like a short lax *i* in (29)b, whereas it is lower and more central in (29)a.

At present our knowledge of the regularities which govern the distribution of emphasis in words and sequences of words in Imdlawn Tashlhiyt is rather patchy, but it is sufficient to allow us to map out the distribution of emphasis in lexical representations, as we shall now see.

The basic facts are contained in the following two statements about the lexicon of Imdlawn Tashlhiyt: (i) there are two types of roots, emphatic and nonemphatic, and (ii) all emphatic roots contain a coronal consonant. These facts can be explained by assuming that in the lexicon of Imdlawn Tashlhiyt, emphasis is a property of certain coronal segments, and that the emphasis of an underlying consonant propagates to the neighbouring segments. Let us dwell briefly on the two generalizations we have just stated.

Starting with words pronounced in isolation, one can divide them into two classes, the emphatic words, which contain emphatic segments, and the nonemphatic words, which do not. *!t-i-bggar-in* (*tibggarin*), ‘women who deal in cattle’, from */t-i-bggar-in/*, is an emphatic word, while *i-gzzar-n* ‘butchers’ is a nonemphatic word. In sentences the emphasis spans overlap with emphatic words but often their edges do not coincide with word boundaries.

Whether a word is emphatic or not only depends on the phonological properties of its kernel: the words built on a given kernel are either all emphatic or all nonemphatic. Similarly all the kernels which are morphologically related agree with respect to emphasis, a generalization which has very few exceptions in Imdlawn Tashlhiyt.³⁴ For instance the following

³⁴ A few nouns have singular and plural kernels which do not agree with respect to emphasis, e.g. *a-ydi* 'dog' vs. *!i-yda-n* 'dogs'. There are also a few nouns in which emphasis and the lack of it are in free variation, e.g. *a-frux* or *!a-frux* 'boy', *t-i-frx-in* or *!t-i-frx-in* 'girls'.

words are emphatic, and so are all the other words built on the same kernels: *!wrrɣ-n* ‘they are yellow’, *!a-wrɣ* ‘yellow (ms adjective)’, *!t-i-wrɣi* ‘yellow color’, *!i-wriɣ* ‘vomit of gall’, *!s-awrɣ* ‘jaundice’. On the other hand the following words are nonemphatic, and so are all the other words built on the same kernels: *gzzul-n* ‘they are short’, *a-g^wzzal* ‘short (ms adjective)’, *a-gzzaylu* ‘short (ms adjective)’, *i-gzzuyla*, a plural form of the same.

Let us say that the words in each set share a common root, e.g. all the words in the first set are built on the root $\{!w-r-\gamma, \text{‘yellow’}\}$, and more generally let us use the term ‘root’ as an informal label for the set of phonological and semantic properties which are shared by all the words in a family of morphologically related words.³⁵ As a consequence of the generalizations at the beginning of the preceding paragraph, all the roots in Imdlawn Tashlhiyt fall into two classes, emphatic and nonemphatic.

All the emphatic roots without exception contain a coronal consonant. One can account for this fact by assuming, as is usually done by authors writing on Berber, that Imdlawn Tashlhiyt has a set of emphatic phonemes, all coronal. The reason there are no emphatic lexemes containing only vowels and/or noncoronal consonants is that Imdlawn Tashlhiyt does not have emphatic phonemes which are vocoids or noncoronal consonants.

Does one need to include in the phoneme inventory of Imdlawn Tashlhiyt an emphatic counterpart for each of the plain coronal phonemes? Our answer is Yes: for any one of the coronal consonants, one can find emphatic kernels in which the consonant in question is the only coronal, e.g. *!i-wtfa-n* ‘ants’ for $!/t/$, *!idgam* ‘yesterday’ for $!/d/$, *!uskay* ‘greyhound’ for $!/s/$, *!a-ggaz* ‘afternoon snack’ for $!/z/$, *!mušš* ‘cat’ for $!/š/$, *!bbiž* ‘knead!’ for $!/ž/$, *!t-mnnk* ‘she stayed away (from school)’ for $!/n/$, *!t-rmi* ‘she is tired’ for $!/r/$, *!yallah* ‘let us go’ for $!/l/$. Roots in which the only coronal is $!/š/$, $!/n/$ or $!/l/$ amount to just a handful.

In emphatic kernels which contain several coronals we do not know of any reason for preferring one coronal as the underlying source of emphasis, to the exclusion of the others. There is for instance no way to determine whether in *!i-smmid* ‘it is cool’ the underlying representation of the kernel is $/ṣmmid/$, $/smmid/$ or $/sṃmid/$. If at the phonetic level dorsopharyngealization were a matter of degree rather than a categorial property, one could expect segments closer to the underlying emphatic consonant to have a greater degree of emphasis than those further away. This does not seem to be the case. In an emphasis span the degree of emphasis does not vary in an audible manner. Consider *!t-i-bukad-in* ‘blind women’ and *!t-i-zukat-in* ‘juniper trees’. Under our assumption that in Imdlawn Tashlhiyt the emphatic phonemes are all coronals, the kernels of these words must

³⁵ We use the term ‘root’ merely as an expository convenience.

be /bukad/ and /zuka/ at the phonological level.³⁶ We fail to hear any difference between the initial *ti* sequences in these words, although one is adjacent to the underlying emphatic consonant while the other is located two syllables away.

Emphasis is an important stylistic cue; in more formal speech styles emphasis spreads over shorter spans. /t-a-!ddinga/ ‘wave’, which is normally pronounced *taddinga*, can also be pronounced *taddinga*, a pronunciation appropriate only in a speech style used in certain forms of public address by ambulant preachers and by minstrels (!rrways). To take another example, /i-kid/ ‘eye ailment’, which is normally pronounced *ikid*, can be pronounced *ikid* in that same elevated style.³⁷ As suggested by *taddinga* above, data about this speech style make it possible, at least in some cases, to pinpoint the underlying emphatic coronal(s) in emphatic kernels with several coronals. This will have to await further research. In the remainder of this discussion we limit ourselves to manners of speaking which do not have the distinctly highbrow flavor conveyed by pronunciations like *taddinga* and *ikid*.

Since affixes, clitics and prepositions are emphatic only when they belong to words or phrases which contain a lexical morpheme with an emphatic kernel, one must assume that they are all nonemphatic in their underlying representations.

3.6.2.2. At the phonetic level

Let us now turn to the distribution of emphasis at the phonetic level. Borrowing the expression ‘emphasis span’ from Heath (1987: 311) let us say that the emphatic span of an emphatic phoneme or morpheme in a terminal representation is the maximal emphatic string which contains the surface reflex of that phoneme or morpheme. To illustrate this definition, consider the following sentence:

³⁶ In !tizukatin the stem-final *t* is epenthetic, v. § 2.5, note 20. The corresponding ms noun is !a-zuka.

³⁷ In *ikid* the degree of emphasis seems to increase gradually during the time course of the second vowel, which sounds like emphatic [i] near the end. The vowel gives the impression of beginning as a plain *i*, an impression which may in part be due to the fact that the preceding consonant is palatalized ([kʲ]). While /k/ and /g/ regularly palatalize before /i/ and /a/ in nonemphatic contexts, their palatalized variants never occur inside an emphasis span. For the speakers’ categorial perception, the semi-emphatic *i* in *ikid* counts as a plain vowel, like the plain *i* in the last syllable in *i-zri=k=id* (3ms-overtake=do2ms=dir) ‘he overtook you (coming hither)’.

- (30) /ur y-umz u-zg^wg^war a-bukad/ uryumzuzg^wg^warabukad³⁸
 neg 3ms-cling b-jujube u-blind
 ‘the jujube did not cling to the blind man’

In the pronunciation represented in (30) the emphatic spans of /!z/ and /!d/ are the strings uryumzu and bukad. Mapping out the facts about emphasis spread in Imdlawn Tashlhiyt is not an easy task, owing to the existence of extensive free variation as well as to frequent uncertainties in acceptability judgements. Among the expressions which contain emphatic segments, short words pronounced in isolation must be emphatic from one end to the other, but longer expressions usually have more than one acceptable pronunciation, as far as emphasis is concerned. The following generalizations seem to be exceptionless:

- (31) a. The segments in a CV sequence must be both plain or both emphatic; this requirement must be met regardless of the morpho-syntactic relationship between C and V.
 b. All the coronals in an emphatic kernel must have the same emphatic span.

As an illustration of these generalizations, consider the sentence /iɣ i-!smmid asi=t/ (if 3ms-cool take:aor=do3ms) ‘if it has cooled down, take it’, which must be pronounced *iɣismmidasit*.³⁹ (31)b requires that the surface reflexes of *s* and *d* in /!smmid/ belong to the same uninterrupted string of emphatic segments and (31)a requires /a/ to be emphatic like the preceding *d*.

The above generalizations are valid for all styles of speech. The other factual observations one can make about emphasis spans must include qualifications about factors such as speed of delivery and the degree of formality. In (30) above /a-bukad/ can be pronounced *abukad*, but in isolation this word can only be pronounced *abukad*. In the isolation form of an emphatic word, emphasis always starts at the beginning of the word, but in some words it can stop before the end, e.g. one acceptable pronunciation of /t-i-zuka-in/ ‘juniper trees’ is *tizukatin*⁴⁰ (the other is *tizukatin*).

Concerning the maximal size of emphasis spans, the following generalization is only meant to convey the general flavor of the facts.

- (32) Let E be an emphatic unit (phoneme or morpheme) and let P be the smallest $X^{\max}$ containing E. The emphatic span of E does not include segments not contained in P.

³⁸ The sentence has another acceptable pronunciation, in which the second emphatic span is *rabukad*.

³⁹ Pronouncing *iɣismmidasit* is not altogether unacceptable, but feels far less natural.

⁴⁰ *t* before the suffix is epenthetic (v. note 36), which explains why it can be nonemphatic, in apparent contradiction with (31)b.

We illustrate this generalization with the following sentence:

- (33) i-!bda=yax⁴¹ ird-n n=t-!addžar-in=ad
 3ms-share=dat1p wheat-p gen=f-neighbor-fp=dem
 n-awi=tn
 1p-take:aor=do3mp
 ‘he shared among us the wheat of these neighbors (f) and we took it away’

Sentence (33) has four acceptable pronunciations; it contains two emphatic morphemes which each give rise to two emphatic spans in free variation. These are listed in (34):

- (34) ibda / ibdayax taddžari / taddžarina

Assuming that clitics belong to the same $X^{\max}$ as their host, we see that in (33) the span on the left remains within the bounds of the sentence’s initial $V^{\max}$ while the span on the right is confined within the limits of the prepositional phrase $n=!taddžarin=ad$, which is the smallest $X^{\max}$ containing /!addžar/, given the assumption we have just made about the clitics.

In the present state of our knowledge about emphasis spans, generalization (32) is obviously little more than a tool for finding out more about the facts. In the absence of a discussion of phrase structure in Imdlawn Tashlhiyt, it is in many cases unclear what is a genuine counter-example to (32).

All the uncontroversial counter-examples to (32) which we have encountered occur in expressions in which an onset-nucleus sequence straddles an $X^{\max}$ boundary. In /z#u/ in (30) and in /d#a/ in the example in the text immediately below (31) the nucleus in the onset-nucleus sequence is a vowel, and the violations of (32) may be due to the overriding necessity of meeting (31). But there are also analogous counter-examples in which the nucleus involved is a consonant, as is the case of /n/ in ummaz n=dadda=s (fist gen=elder:brother=3s) ‘his elder brother’s fist’. The acceptability judgements for Onset-Nucleus sequences straddling an $X^{\max}$ boundary are often fuzzy or inconsistent over time.

3.7. THE VOICED PHARYNGEAL CONSONANT

In this section we show that all the surface occurrences of tautomorphemic *aa* derive from /ʕ/.

/ʕ/ and tautomorphemic *aa* only occur in Arabic loans or in words derived

⁴¹ From more abstract /!bda=ax/, with a hiatus-breaking yod.

from such loans.⁴² Compared to that of the other consonants, the distribution of *ʕ* in the surface forms of Imdlawn Tashlhiyt is very limited. Let us begin with nongeminated *ʕ*.

All the occurrences of nongeminated *ʕ* which are found in surface forms occur next to a high vowel which belongs to the same word, e.g. *ʕum* ‘swim’, *ʕišš* ‘up yours! (interjection)’, *!arrbiʕ* ‘sugar box, aug’,⁴³ *ʕiša* ‘Aysha’, *labyuʕ* ‘sale, p’. We have furthermore found a few cases where nongeminated *ʕ* alternates with *aa*. Finally, the morphemes which contain an invariant *aa* throughout all their occurrences behave morphologically as though *aa* were the surface reflex of a consonant, not a vowel (examples will be given below). The following rule accounts for the distribution of tautomorphemic *aa* and for the alternations involving *ʕ*:

- (35) *ʕ*-TO-aa: *ʕ* → aa / except when adjacent to a high vowel

Here are alternations involving *ʕ*:

- | | | | |
|---------|----------------|--------------|--------------------------------------|
| (36) a. | /l-!snʕ-t/ | !s-snaa-t | ‘occupation, vocation’ ⁴⁴ |
| a’. | /a-!snayʕ-iy/ | !a-snayʕ-iy | ‘craftsman’ |
| b. | /l-slʕ-t/ | s-slaa-t | ‘wares’ |
| b’. | /a-slayʕ-iy/ | a-slayʕ-iy | ‘wholesaler’ |
| c. | /a-ʕzr-iy/ | aa-zr-iy | ‘bachelor’ |
| c’. | /t-i-ʕʕuzra/ | t-i-ʕʕuzra | ‘bachelorhood’ |
| d. | /dʕa-n/ | daa-n | ‘pray 3mp’ |
| d’. | /dʕu-n/ | dʕu-n | ‘pray aor 3mp’ |
| e. | /a-byyaʕ/ | a-biyaa | ‘informer’ (p i-biyaa-n) |
| e’. | /t-i-byyaʕ-in/ | t-i-biyaʕ-in | ‘informer fp’ |

The second item in each pair contains an occurrence of *ʕ* which is adjacent to a high vowel. If one posits the underlying forms given at the beginning of each line, the morphology in the examples above is perfectly regular. The nouns in (36)a’, (36)b’ and (36)c’ are templatic nouns of the ABNAKLIY type and of the TIRRUGZA type, in the terminology of DE (1992), where these templatic nouns are discussed at length. The verb in (36)d conjugates like any *CCa* verb, e.g. *bda* ‘begin’, aor *bdu* (v. DE 1991: 80–82). Item (36)e is an occupational noun with the shape /a-CC:aC/, a very productive type. As exemplified by (36)d,e sequences, /ʕa/ and /aʕ/ surface as *aa*, instead of *aaa* as rule (35) would lead one to expect. The sequence *aaa*, tautosyllabic or heterosyllabic, is never found in Imdlawn Tashlhiyt.

⁴² A possible exception is *a-raam* ‘camel’ (p i-raaman); this word has no close phonetic analogue in Arabic.

⁴³ The feminine form (non augmentative) is *!t-arrbiħ-t*, with /ʕ/ devoiced to *ħ* before /t/.

⁴⁴ *!lasnayʕ*, the plural of *!ssnaat*, is the only exception to rule (35) we have encountered.

Rule (35) also enables us to make sense of the morphological alternations involving morphemes with an invariant *aa*. The realization of /ʕ/ as *aa* results in the appearance of canonical forms not attested otherwise in Imdlawn Tashlhiyt, and the words with these canonical forms show various apparent irregularities in their morphology. Positing underlying representations with /ʕ/ enables one to ascribe the words in question to morphological types which are otherwise well-attested.

For instance nouns with singular forms ending in a short *a* never have identical kernels in both numbers, e.g. *a-saka* 'ford', p *i-sakat-n*, *a-ɣnža* 'ladle', p *i-ɣnžaw-n*; on the other hand, in nouns ending in *aa* which have Berber plural forms,⁴⁵ these forms always end in *aa-n*, as is expected if these nouns end in a consonant (/ʕ/) at the level of representation which is relevant for plural formation, e.g. *aždaa laždʕ* 'colt', p *aždaa-n*.

Or consider the verb /ʕab/ *laab* (impf *tt-laab* /tt-ʕab/) 'play (in sports)'. The corresponding ABNAKLIY noun is *a-laayb-iy* 'player', for which we posit /a-ʕayb-iy/, which has the form /a-CCayC-iy/, the normal shape of ABNAKLIY nouns derived from a kernel which contains three consonants (cf. (36)a' and (36)b' and v. DE (1992)). If *laab* were derived from /laab/ one would expect the corresponding ABNAKLIY noun to be **a-lwayb-iy*, i.e. it would have the shape /a-CwayC-iy/, like the other ABNAKLIY nouns derived from kernels which contain two consonants.

Positing /ʕ/ in the underlying form of every morpheme with a surface *aa* makes the underlying distribution of /ʕ/ more similar to that of the other consonants; it also explains why long *aa*, which cooccurs rather freely with the various consonants, cannot occur in the same morpheme as /h/. Short *a* is not subject to a similar restriction, v., e.g., *šħlassm* 'get away stealthily'. In Tashlhiyt as well as in Arabic, consonants which differ only with respect to voicing cannot cooccur within the same morpheme,⁴⁶ and the prohibition of tautomorphemic *aa* and /h/ is simply an instance of that restriction: morphemes which contain both /h/ and /ʕ/ are prohibited. Arabic, the language which is the source of almost all the lexical items in Imdlawn Tashlhiyt which contain *aa* or ʕ, is subject to the same cooccurrence restriction.

We have encountered only three lexical items where geminated ʕ occurs, *ʕʕad* 'yes (French *si*)', *sg^waʕʕi* (impf *sg^waʕʕay*) 'belch' and *t-i-ʕʕuzra* 'bachelorhood' ((36)c'). *ʕʕad* and the imperfective stem *sg^waʕʕay* suggest that rule (35) only applies to nongeminate /ʕ/.

Rule (35) is blocked by an adjacent high vocoid if it is a vowel but not

⁴⁵ On Berber and Arabic plurals, v. § 2.5.

⁴⁶ Violations of this restriction are extremely rare, e.g. *t-i-mtd-in* 'loin (cut of meat)'. Some exceptions are only apparent, e.g. *!ttd* 'coagulate', whose underlying representation can be assumed to be /!dd÷d/, on account of the fact that /!dd/ regularly surfaces as *!tt*. On '÷', v. § 6.4.1.

if it is a glide, for *aa* can occur next to a glide, v., e.g., *!a-maayud* (p *!i-maayad*) ‘lark’, *laawin* (p *laawayn*) ‘supplies’, *waar* (impf *tt-waar*) ‘be difficult’. There is a tendency for Imdlawn Tashlhiyt speakers of the younger generations to reinstate *ʕ*, e.g. whereas older speakers only say *aali* ‘Ali’ and *i-šbaa* ‘he has enough’, younger speakers also have the free variants *ʕli* and *išbʕa*.

3.8. /u/ FRONTING

The full vowel /u/ is fronted and lowered when it occurs between two consonants which both belong to the set [coronal OR pharyngeal OR glottal]. In that context the realizations of /u/ range between [ö] and [œ]. We use the symbol ‘ö’ to represent them. This rule is obligatory and exceptionless. In the examples below, /u/ is in the fronting context in the forms on the right but not in those on the left.

(37)	I	II	
a.	ttu	ttö=t	‘forget’
b.	sshu	sshö=t	‘hypnotize’
c.	i-flu	t-i-flö-t	‘door’
d.	a-ħanu	t-a-ħanö-t	‘shop’
e.	uyyl-n	y-öyyl	‘fly away’
f.	uħl-n	y-öħl	‘be stuck, cornered’

The forms in lines a–b are 2s imperatives, with a do3ms clitic pronoun added in column II. In lines c–d the forms in column II are feminine nouns and those in column I are the corresponding augmentatives. The forms in lines e–f are perfective verbs, 3mp in column I and 3ms in column II.

/u/ does not undergo fronting when it belongs to an emphatic span, e.g. whereas /u/ is fronted in /ššħu=t/ ‘minimize its weight!’, it has its back (dorsopharyngealized) realization in /!ssħu=t/ ‘strengthen it!’. The steady-state [u:] which is the realization of /ww/ does not undergo fronting.⁴⁷ Whereas /sus/ ‘Sous’ (a toponym) must be pronounced [sös], /šwwš/ ‘disturb!’ must be pronounced [šü:š], not [šö:š].

Fronting occurs even when the triggering consonants do not belong to the same word, e.g. the occurrence of /u/ indicated by angled brackets has the same fronted variant in all three expressions in (38):

(38) a.	i-tt-<u>t	ar alliy
	3ms-pass-rot	up:to bottom
	‘it is rotten to the core’	

⁴⁷ On geminate glides, see § 7.4.

- b. i-tt<u> t-a-qššab-t
 3ms-forget smock
 ‘he forgot the smock’
- c. t-a-funas-t <u>t-nt t-ħšmiy-in
 cow hit-3fp girls
 ‘the cow that the girls struck’

u fronting also occurs in some varieties of Moroccan Arabic, v. Al-Ghadi (1990: 15). For further discussion of this phenomenon, see Elmedlaoui (1995a: 222 ff). To avoid unnecessary clutter, the effects of *u* fronting are normally not represented in our phonetic transcriptions in this book, e.g. our phonetic transcriptions for the forms in column II in (37)a and (37)b would simply be *ttu=t* and *sshu=t*.

CHAPTER FOUR

TASHLHIYT SYLLABLES I

One of the remarkable features of the phonology of Imdlawn Tashlhiyt is its syllable structure, which allows any segment to be a syllable nucleus. This feature is not without precedent in the phonological literature, but it is sufficiently rare to require a detailed justification. Among the languages which have been claimed to have syllabic obstruents, those which have received most attention from a theoretical point of view are languages spoken on the Northwest Pacific coast of North America, e.g. Bella Coola, and certain Mon-Khmer languages spoken in Laos and the Malay peninsula, see Bagemihl (1991) and Shaw (1993) and references therein.¹ In this chapter and the next we determine the basic inventory of syllable types in Tashlhiyt and we discuss the role of sonority in assigning syllable structure to sequences of segments. Syllabic consonants will be the focus of Chapter 6.

The first section of the present chapter introduces two mutually independent claims around which our analysis revolves, the Sonority-Driven Syllabification thesis and the Licit Consonantal Nuclei thesis. The rest of this chapter is devoted to an inventory of the syllable types and to the Sonority-Driven Syllabification thesis, using text-to-tune alignment in singing as evidence.

4.1. SYLLABIC CONSONANTS

We have argued in our earlier work,² and we shall again argue in this book, that the only vocoids in the underlying representations of Imdlawn Tashlhiyt are /a/, /i/, /u/, /y/ and /w/, and that syllables which do not contain an occurrence of one of these segments have a consonant as their nucleus. Any consonant of Imdlawn Tashlhiyt may act as a syllable nucleus.³ Long strings entirely devoid of vocoids are commonplace at the underlying level because morphemes which lack underlying vocoids are numerous, especially among the grammatical morphemes. Most of the

¹ Closely related issues are raised by certain members of the Northwest Caucasian and Yuman families, see Anderson (1978).

² See Elmedlaoui (1985) and DE (1985, 1988, 1996a, b).

³ This claim has already been made about other dialects, see Applegate (1958: 13) on Ifni Tashlhiyt: 'all consonants in certain environments have syllabic allophones', and Mitchell (1957: 198) about the dialect spoken in Zuara (Libya): 'If the statement is at all meaningful at the phonetic level, any "consonant" may be syllabic in Berber'.

affixes lack vowels in their underlying representations, and so do a number of prepositions and clitic pronouns. Complex consonant clusters are a common occurrence at the phonetic level in Imdlawn Tashlhiyt. Indeed, it is not difficult to find utterances which do not contain a single vowel, or even a single stretch of speech with glottal vibration. Examples have already been given in § 3.6.1. Here are some more. (1) must be pronounced with an uninterrupted midsagittal closure from one end to the other. No voiced segment should be heard in (2) and (3).⁴

- (1) [tntlt:nt^h] tntltnt /t-ntl-t=tnt/
 2s-hide-2s=do3fp
 ‘you hid them (f)’
- (2) [k:st:š:t^h] kkstšštt /kks=t t-šš-t=t/
 remove:aor=do3ms 2s-eat:aor-2s=do3ms
 ‘remove it (m) and eat it (m)’
- (3) [tft:šts:k:xt^hk:stš:k^h] tfttštskkxtkkstšškk
 /t-fttš-t l-skk γ t-kks-t l-škk/
 2-examine-2s /l/-currency in 2-remove-2s /l/-doubt⁵
 ‘you examined the currency which you checked out’

In consonant sequences such as those in the preceding examples the broad phonetic transcriptions used in this book provide a faithful enough picture of what is actually heard when the forms in question are uttered. However there are also many sequences which cannot be pronounced without intervening short voiced vocoids that are systematically omitted in our transcription. For instance our broad phonetic transcription for /t-!btt/ ‘she put a lining’ is *!tbtt*, but one actually hears [!təbt:n]. These short vocoids were already mentioned in § 2.2, where they were dubbed VTVs (voiced transitional vocoids). In the following paragraphs we summarize our position concerning the VTVs. Further discussion will have to await Chapter 6.

Given that the VTVs’ location and vowel quality are entirely predictable from the phonetic environment and the location of certain morphological boundaries, one expects them to be epenthetic vowels, i.e. segments inserted by the phonology to act as syllable nuclei. However it is our contention that VTVs do not correspond to separate segments in the representations which are inputs to phonetic implementation.

Consider for instance /t-zgzaw/ ‘it (f) is green’, which sounds like [tzigzaw]. This word is disyllabic and according to the analysis to be pre-

⁴ For each example we give both the broad phonetic transcription used throughout this book and an IPA transcription.

⁵ The prefix /l-/ is the reflex of the definite article of Arabic, v. § 2.5.3.1.

sented below, its terminal representation is *tzg.zaw* (periods indicate syllable boundaries; underlyings indicate syllable nuclei). The first syllable has a simple onset (*t*), not a complex one (*tz*); its nucleus is a contoid (*z*), not a vocoid (*ɪ*). Transitional vocoids do not fall within the purview of the phonological component of Imdlawn Tashlhiyt. They can indeed be heard, and they may sound like certain vowels in other languages or even in other dialects of Berber, but they are not units manipulated by the phonology. When we give the narrow phonetic transcription of /*tzgzaw*/ as the seven symbol sequence ‘*tzɪgzaw*’ we only mean to convey what is heard when the word in question is uttered; we do not intend to make any claim about the phonological component of Imdlawn Tashlhiyt. As far as phonology is concerned, the representation of /*tzgzaw*/ does not comprise more than six segments at any stage of the derivations.

Our discussion of the surface syllabification of words and sequences of words in Imdlawn Tashlhiyt will revolve around the following two claims:

(4) Licit Consonantal Nuclei:

The only surface vowels are *a*, *i* and *u*; any consonant of Imdlawn Tashlhiyt can be a syllable nucleus.

(5) Sonority-Driven Syllabification:

- a) All the information relevant for predicting the syllable structure of an expression resides in the consonants and the full vowels contained in that expression.
- b) In the competition for the status of syllable nucleus, more sonorous segments are favored over their less sonorous neighbours.

Let us give examples illustrating these two claims. Justifications will be given later.

The Licit Consonantal Nuclei thesis (4) is illustrated in the mid column in (6) below. Each line in (6) contains, in this order, the underlying representation of an expression (a word or a sequence of words), the terminal representation of that expression under our analysis, and a narrow phonetic transcription indicating what one actually hears when the expression is uttered in isolation. In the terminal representations, syllable edges not adjacent to pauses are indicated by periods and syllable nuclei are underlined.⁶

⁶ Here is the meaning and the morphemic analysis for each expression in (6): (a) 3ms-collide ‘he collided’, (b) 3fs-stingy=even ‘she is even stingy’, (c) f-u-gazelle-fs ‘female gazelle’, (d) 2-surround-2mp ‘you (mp) surrounded’, (e) pick=do3ms 2s-eat:aor-2s=do3ms ‘pick it and eat it’.

(6)	underlying representation	terminal representation	narrow phonetic tr.
a.	/i-dl ^h /	i.dl ^h	[idl ^h]
b.	/t-bxl=akk ^w /	t.b ^x .lak ^w	[təb ^x lak:ɥ]
c.	/t-a-!znk ^w d-t/	t _a .z _n .k ^w tt	[!tazn ^u k ^u t: ^h]
d.	/t-ssutl-m/	t _s .s _ö .t _l m	[ts:öt _l əm]
e.	/kks=t t-šš-t=t/	k.kst.t _š .štt	[k:st:š:t: ^h]

According to the terminal representations in the mid column, the nucleus of the second syllable in (6)a is *l*, the nuclei in the first two syllables in (6)b are *t* and *x*, those of the last two syllables in (6)c are *n* and *t*, and so on.⁷ These, then, are instances illustrating the Licit Consonantal Nuclei thesis (4). In our analysis this thesis goes hand in hand with another claim: Imdlawn Tashlhiyt does not have any vowel epenthesis. As already stated above, the only nonconsonantal segments present in the terminal representations are the glides *y*, *w* and the vowels *a*, *i* and *u* or their contextual variants.⁸ Some of the vocoids recorded in the narrow phonetic transcriptions in (6) do not have any reflex in the terminal representations, because we claim that these sounds are not segments in their own right, but mere transitions between segments. Some of these transitional vocoids are voiceless, e.g. the short voiceless *u* which is heard in (6)c when the articulation moves from [k^w] to [t]; others are voiced, e.g. [ɛ] in (6)a. A consonant which is immediately followed by a transitional vocoid may occupy any position in syllable structure, i.e. it can be an onset, a coda or a nucleus. Instances of the latter situation are found for example in (6)a, where [ɛ] occurs between a nucleus (*l*) and the following coda (^h), and in (6)b, where [ə] occurs between a nucleus (*t*) and the onset of the following syllable (*b*). If these vocoids were manifestations of surface vowels, that is, of segments syllabified as nuclei in the terminal representations, the consonants occurring immediately before them would be expected to be onsets, contrary to the evidence which will be presented below about surface syllabification in Tashlhiyt. The transitional vocoids will be discussed in Chapter 6.

We now turn to examples illustrating the thesis of Sonority-Driven Syllabification (5). We repeat that thesis under (7):

(7) Sonority-Driven Syllabification:

- (a) All the information relevant for predicting the syllable structure of an expression resides in the consonants and the full vowels contained in that expression.

⁷ At the end of (6)c the underlying sequence /d-t/ surfaces as the geminate *tt*, in which the first skeletal position is a nucleus.

⁸ E.g. [ö] in (6)d, which is a fronted variant of /u/. On *u* fronting, v. § 3.8.

- (b) In the competition for the status of syllable nucleus, more sonorous segments are favored over their less sonorous neighbours.

Let us consider each branch of this thesis in turn. The treatment of Arabic loans in Imdlawn Tashlhiyt provides a simple demonstration of the import of branch (a). Moroccan Arabic (MA) has three full vowels *a*, *i*, *u*, like Imdlawn Tashlhiyt, but unlike Imdlawn Tashlhiyt it has in addition a vowel @, the location of which can be the sole distinguishing feature between words. For instance MA has a contrast between words of the shapes *CC@C* and *C@CC*. This contrast is illustrated below in columns I and II of (8). The forms in column I are 3ms perfective verbs ('he jailed', etc.) and those in column II are deverbal nouns corresponding to these verbs ('imprisonment', etc.). Columns I' and II' will be explained below.⁹

(8)	Moroccan Arabic		Imdlawn Tashlhiyt	
	I	II	I'	II'
	verb	noun	verb	noun
a.	ħb@s	ħ@bs	ħbs	l-ħbs ¹⁰
b.	!sx@t	!s@xt	!sxd	!s-sxd
c.	sb@t	s@bt	sbt	s-sbt
d.	!rx@s	!r@xs	!rxs	!r-rxs
e.	rz@q	r@zq	rzq	r-rzq
f.	žh@d	ž@hd	žhd	ž-žhd ¹¹

Contrasts such as that between columns I and II show that branch (a) of the thesis of Sonority-Driven Syllabification does not hold in MA. *ħb@s* and *ħ@bs* do not contain any full vowel and they share the consonant sequence /ħbs/. If there exist representations from which the different syllable structures of *ħb@s* and *ħ@bs* can be derived, these representations must contain more information than the mere sequence /ħbs/. We will see in Chapter 8 that the contrast between I and II is due to templates, i.e. to requirements on syllable structure which are associated with certain morphological categories or specified in the lexicon. Templates fall outside the bounds of (7)a.

The forms in columns I' and II' in (8) are bona fide words of Imdlawn

⁹ Here are the meanings of the verbs in column I: (a) 'jail', (b) 'curse', (c) 'keep the Sabbath', (d) 'become cheap', (e) 'grant' (the subject is usually God), (f) 'be strong'. The Imdlawn Tashlhiyt words on the right-hand side have meanings identical with those of their MA counterparts.

¹⁰ In lines a, c and e, the medial consonant of the Berber words optionally devoices, see § 6.4.2 on regressive devoicing in Imdlawn Tashlhiyt.

¹¹ In free variation with *lžhd*.

Tashlhiyt.¹² Our examples in (8) come from cases in which both a verb and its deverbal noun have been borrowed from MA. As is the rule for recent loanwords, the nouns in (8)-II' all begin with the prefix /l-/, which assimilates to a following coronal,¹³ but otherwise they are homophonous with the corresponding verbs. This homophony is an instance of branch (a) of the Sonority-Driven Syllabification thesis. The Imdlawn Tashlhiyt words *ħbs* 'jail!' and *l-ħbs* 'imprisonment' have as their kernel the same sequence /ħbs/. Since all the information necessary to predict the surface forms is contained in that sequence, the sequence has the same phonetic representation in both words. In Imdlawn Tashlhiyt, Arabic loans are completely oblivious of the vowel @ of MA. This obliviousness is also typical of the pronunciation of MA by the Ashlhiy speakers who speak it 'with an accent'.¹⁴

Some dialects of Berber spoken in Morocco are like MA in that branch (a) of the Sonority-Driven Syllabification thesis is not valid for them. Rifian Berber is one of them, and it will be seen in Chapter 6 that in Rifian, Arabic loans take into account the schwas of MA.

We now turn to branch (b) of the Sonority-Driven Syllabification thesis (5). We are assuming the following sonority scale, in order of decreasing sonority:

- (9) Sonority Scale: *a*, high vocoids, liquids, nasals, fricatives, stops

Each line in (10) below displays two words which contain similar consonants but are syllabified differently on account of their different sonority contours.¹⁵

(10)	one syllable	two syllables
a.	/krm/ k <u>rm</u>	a'. /g ^w mr/ g ^w .mr
b.	/smd/ s <u>md</u>	b'. /zdm/ z.d <u>m</u>
c.	/krz/ k <u>rz</u>	c'. /rks/ r.k <u>s</u>
d.	/xng/ x <u>ng</u>	d'. /!ngd/ n.g <u>d</u>

The forms on the left-hand side are each comprised of one heavy syllable, i.e. a syllable with a coda; those on the right-hand side are sequences of two light syllables, the first lacking an onset. In (10) all the segments which are local maxima of sonority are syllabified as nuclei, which is in accord

¹² The verbs are in the 2s pf imperative.

¹³ V. § 2.5.3.1.

¹⁴ The mishandling of schwas occurs prominently in the skits of Abdeljabbar Luzir and Ahmad Belqas, a comic duo well-known during the Sixties and the Seventies who had made a specialty of imitating the broken MA of Ashlhiy shopkeepers.

¹⁵ The words in (10) are 2s imperative verbs, i.e. bare aorist stems. Here are the meanings of the verbs in (10): (a) 'be dried out', (a') 'hunt', (b) 'add', (b') 'gather firewood', (c) 'plough', (c') 'hide', (d) 'choke', (d') 'drown'.

with the thesis of Sonority-Driven Syllabification (5). Segments which are local maxima of sonority are indicated by bold type in the underlying representations in (10). A segment is a local sonority maximum if it is higher on the sonority scale than the abutting segments. *r* is for instance a local maximum of sonority in *krm* ((10)a) because the adjacent segments *k* and *m* are lower on the sonority scale; *r* is also a local maximum of sonority in *g^wmr* ((10)a') because it occurs in final position and the preceding segment (*m*) is less sonorous. Whereas the Sonority-Driven Syllabification thesis (5) claims that segments which are local sonority maxima are nuclei, it does not make the converse claim; not all syllable nuclei are local sonority maxima, e.g. *g^w* is a nucleus in *g^wmr* ((10)a') although it is not a local maximum of sonority, and the same is true of *d* in *!ngd* ((10)c').

The Licit Consonantal Nuclei thesis (4) and the Sonority-Driven Syllabification thesis (5) are closely connected in our analysis, and yet in essence they are logically independent of one another. It is possible to deny that consonants can ever be syllable nuclei in Tashlhiyt while retaining the gist of Sonority-Driven Syllabification. One could for instance claim that in the vowelless syllables in our syllabic parses in (6) and (10) the consonants which we take to be syllable nuclei are in fact preceded by an epenthetic vowel which is obscured in various ways by phonetic implementation. In (11) below we give side by side our terminal representations in (6) and the corresponding ones in an alternative analysis developed along these lines ('e' stands for the epenthetic vowel):

(11)	terminal representations in (6)	alternative terminal representations
a.	<u>i</u> .d ^h h	<u>i</u> .de ^h h
b.	<u>i</u> .b ^x .lakk ^w	<u>et</u> .be ^x .lakk ^w
c.	<u>ta</u> .z ⁿ .k ^w tt	<u>ta</u> .ze ⁿ .k ^w ett
d.	<u>ts</u> .s ^ö .t ^l m	<u>tes</u> .s ^ö .te ^l m
e.	<u>k</u> .k st .t ^š .štt	<u>ek</u> .ke st .te ^š .šett

The location of syllable edges is the same under both analyses. The alternative analysis eschews syllabic consonants but it retains the basic idea behind Sonority-Driven Syllabification: more sonorous consonants are favored over less sonorous ones in determining the location of epenthesis sites.¹⁶ More precisely, every consonant which is a local maximum of sonority in the underlying form has an epenthetic vowel inserted before it. As noted earlier the converse is not true: considerations of sonority alone are not sufficient to determine the parses in (11); other factors come into play, such as hiatus avoidance, a prohibition against complex onsets, etc.

¹⁶ Armenian is a language in which vowel epenthesis is motivated by sonority-driven syllabification, see Vaux (1998).

This chapter deals with those aspects of the syllable structure of Imdlawn Tashlhiyt which are common to both analyses in (11), i.e. with all those aspects which are not tightly connected with the thesis of Licit Consonantal Nuclei. Although our main evidence in favor of the Licit Consonantal Nuclei thesis will only be presented in Chapter 6, the analysis which will be developed in the remainder of the present chapter already takes that thesis for granted. This is merely an expository convenience; the basic insights and regularities presented in the discussion below can be reformulated so as to be made compatible with alternative analyses such as that illustrated in the right-hand side of (11).

Our richest source of data about surface syllabification in Imdlawn Tashlhiyt consists in the native speakers' judgements about syllable count. These judgements are of two types. Some are answers to questions like 'How many syllables do you think there are in word (or word sequence) such and such, and where do you think the peak of each syllable is located?' Others are only implicit and can be inferred from judgements about what constitutes a well-formed line of verse. Our earlier work on syllable structure in Imdlawn Tashlhiyt drew most of its evidence from judgements of the first type, v. Elmedlaoui (1985) and DE (1985). In this book, on the other hand, we will forsake the direct questioning of speakers about syllable count and rely instead on well-formedness judgements about lines of verse. We feel that the data derived from judgements about well-formedness in versification lies on firmer methodological ground than data from answers to questions about syllable count. Tashlhiyt poetry is normally sung. Like French or English speakers, Tashlhiyt speakers have clearcut intuitions about which words can be fitted onto a given tune. One could say that singing provides the native speakers with a yardstick for assessing the well-formedness of verse. Like language, this yardstick is acquired in early childhood without any explicit instruction. Making acceptability judgements about text-to-tune alignment is a rather well-defined task for the speakers who are asked to perform it. It is debatable whether the same can be said of counting syllables and identifying syllable nuclei in nonpoetic language.¹⁷

Concentrating on poetic syllabification has another advantage: the syllabic parses which are relevant for the syllable-based regularities found in the morphology of Tashlhiyt are those required by poetry, as we shall see in the next chapter.¹⁸

Usually, in the phonological literature, syllabification in word sequences is only discussed after the syllable structure of isolated words has been considered. The nature of our evidence about surface syllabification in Tashlhiyt

¹⁷ Louali and Puech (1999) and Puech and Louali (1999) report on an experiment in which Tashlhiyt speakers were presented with pairs of Tashlhiyt words and asked to judge whether the words were rhythmically alike or different. The interpretation of their results is unclear.

¹⁸ This fact was already pointed out in DE (1988).

leads us to proceed differently. The stretches of linguistic material involved in judgements about text-to-tune alignment are not isolated words, but word sequences coterminous with lines of verse. In view of this we will discuss word sequences directly.

4.2. TASHLHIYT VERSE AND SINGING

Let us begin with a caveat. The relevance of poetic meter for our understanding of the phonology of Tashlhiyt in its colloquial uses is apt to be obscured by associations which terms such as ‘poetry’ and ‘verse’ carry in literate cultures with a written corpus of poetry which has accumulated over several centuries. In France, for instance, these terms bring to mind activities which involve conscious effort, rote learning and specialized skills acquired through formal teaching. However there are occasions when native speakers of French engage in activities which are closer, for the purposes of our discussion, to Tashlhiyt poetry: as children, many have had the experience of making up new words and singing them to the tune of a well-known jingle or nursery rhyme.

In Imdlawn, poetry is inseparable from music. Except in one situation,¹⁹ lines of verse are never heard unless sung to a musical tune. One cannot lay too much emphasis on the importance of the connection between poetry and singing in Ashlhiy culture. To be sure, the metrical structure of a line of verse is the same regardless of whether that line is sung or not. But singing brings the meter of verse in sharp focus, for the metrical structure of a sequence of words is a key element in the mental computations which enable the singer to keep the words in step with the tune.

In France virtually all singing involves pieces in which the words have been memorized. The people in Imdlawn have a repertory of such pieces, e.g. lullabies (*a-snuhnnu*) and songs sung while preparing the bride (*a-sallaw*), but in many occasions they engage in a singing of a different kind, in which a familiar tune is combined with newly coined words. This happens for instance in oratorical contests such as the one transcribed in Appendix III at the end of this book. It also happens in a genre called *t-iŕzza*, in which a group of people sing together to a fixed tune verse improvised on the spot by one of them.²⁰ Only certain people in Imdlawn are able to improvise verse worth listening to, but anyone there has the ability to sing to a tune words which they have never heard sung to that tune before. There is no explicit teaching of the conventions which regulate the struc-

¹⁹ During a conversation a well-known line may be quoted on account of its content, as one quotes proverbs.

²⁰ V. also the description of *a-ħwaš* in Basset (1952/1987: 87). On *aħwaš*, a rural party with dances, see Schuyler (1979: 49–52).

ture of verse or its relation to music. The children of Imdlawn simply acquire them through repeated listening, as French children do.

The conditions which ME has experienced in Imdlawn presumably hold throughout the Ashlhiy area, or at least they did until very recently. For discussions of poetry and music in Ashlhiy society, v. Galand-Pernet (1972) and Lortat-Jacob (1980). The relative linguistic homogeneity of the Ashlhiy area has allowed it to evolve a common poetic tradition. This tradition is embodied in the *!rrays*,²¹ a travelling singer and musician who makes a living by giving performances. Some *!rrways* are also poets who perform their own works. Nowadays cassette recordings and the radio contribute powerfully to the diffusion of these works, not only in Morocco, but also among the expatriates abroad.

During the last centuries tashlhiyt poems have occasionally been written down in Arabic script.²² Since the Thirties many recordings have been made of performances by *!rrways*. Some of these have been put down in writing and published in anthologies aimed at Ashlhiy people who are literate in Arabic, e.g. Amarir (1975).

In recent years some intellectuals have started a new trend of delivering their compositions without singing. The people in the audience are still able to spot ill-formed lines of verse, although there is no text-to-tune correspondence to help them in their judgements.

In what follows we will discuss certain basic properties of the structure of verse in Tashlhiyt poetry. Ultimately, the evidence we will make use of in our discussion is native speakers' judgements about the well-formedness of lines of verse. One way such judgements are manifested is through text-to-tune alignment in singing. Aligning a text with a tune is something that people do 'automatically', i.e. without deliberation. As already stated, all the speakers in Imdlawn can do it, and they do not have to be taught how to do it; they just pick it up during their early years. This suggests that while performing the mental operations which are needed to compute the metrical structure of lines of verse the Ashlhiys rely to a great extent on abilities which they possess anyway as speakers of their language, independently of their musical experience, e.g. they presumably break down the poetic text into phonological units which are more or less those used in processing nonpoetic language.

Let us first discuss briefly the relationship between words and music in singing.

²¹ From underlying /l-!rays/. The plural is *!rrways* and the feminine singular *!tarrayst*. On the *!rrways*, their music and the social and economic background of their activity, see Schuyler's (1979) outstanding work.

²² See Stroomer (1992) and Boogert (1997).

4.3. SINGING WORDS TO A TUNE

Among the facts about how Ashlhiys put words to music, those which are relevant to our discussion of syllabification are quite straightforward. Let us illustrate the kind of facts we have in mind with an example from French. The facts of French are analogous to those of Berber but the data may be more familiar to some readers.²³

Let us consider three lines in the first stanza of *Au clair de la lune*, a nursery rhyme widely known in the French-speaking world.²⁴

- (12) a. Au clair de la lune, mon ami Pierrot.
 b. Prête-moi ta plume pour écrire un mot.
 c. Ouvre-moi ta porte pour l'amour de Dieu.

Each of the lines in (12) is sung to the same eleven note tune; in that tune the duration of the fifth, sixth and eleventh notes is twice that of that of any of the others. Limiting ourselves to durations, the tune can be represented as in (13), where '*' and 'o' respectively represent an eighth note and a quarter note.

- | | | | | | | | | | | | |
|------|---|---|---|---|---|---|---|---|---|----|----|
| (13) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | * | * | * | * | o | o | * | * | * | * | o |

To be able to sing the song, it is not enough to know separately the text and the tune. One must furthermore know how to align them together. The mental computations involved in text-to-tune alignment presumably require that certain features in the text be taken as landmarks and be matched with landmarks in the tune. In French singing it is syllable nuclei which provide the relevant landmarks for the mapping of texts onto tunes. One can infer certain aspects of the syllable structure of a sequence of words from the way it can be sung to a tune. Let us imagine that the phonology of French had yet been little studied and that we were trying to discover more about it by doing fieldwork on singing. Let us pretend in particular that we knew next to nothing about syllabification in French. What kind of evidence could we gather from singing? We give below a broad phonetic transcription which represents the words in (12) as they are pronounced when sung in that particular song. The blanks at word boundaries are for the readers' convenience. Square brackets indicate vowels which do not occur when the text is delivered by a speaker of Standard French with a pronunciation appropriate in everyday conversation.

²³ See the appendices at the end of this book for musical scores of Ashlhiy tunes and words sung to these tunes.

²⁴ The music and words of the song can be found in Davenson (1955: 581).

- (14) a. o kler dæ la lün[œ] mōn ami pyero
 b. prɛt[œ] mwa ta plüm[œ] pur ekriɾ ẽ mo
 c. uvrœ mwa ta pœrtœ pur lamur dæ dyö

If we were to ask our informants to sing the song several times we would notice that the manner in which the speech sounds associate with the notes in the tune remains more or less the same in every repetition. In particular, certain vocoids always align with certain notes. The alignments one would observe are represented below. Each number in the top row stands for a note in (13).²⁵

- | | | | | | | | | | | | |
|------|--------|------|-----|------|------|-----|------|------|------|------|----|
| (15) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | | | | | | | | | |
| a. | o kl | ɛ rd | œ l | a l | ü n | œ m | õ n | a m | i py | ɛ r | o |
| b. | pr ɛ t | œ mw | a t | a pl | ü m | œ p | u r | e kr | i r | ẽ m | o |
| c. | u vr | œ mw | a t | a p | ɔ rt | œ p | u rl | a m | u rd | œ dy | ö |

Although these alignments remain constant from one performance to the next, they need not be memorized by the singers. We would come to realize this when we discovered that all our informants have the ability to use a tune they already know as a carrier for words which they have never heard before, e.g. they can use tune (13) to sing *j'ai perdu ma montre dans un autobus* 'I lost my watch in a bus':

- | | | | | | | | | | | | | |
|------|---|-----|------|-----|-----|------|-----|-----|-----|-----|-----|-----|
| (16) | <i>j'ai perdu ma montre dans un autobus</i> | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | |
| | | | | | | | | | | | | |
| | ʒ | e p | ɛ rd | ü m | a m | õ tr | œ d | ã z | ẽ n | ɔ t | ɔ b | ü s |

Most speakers can do this without rehearsal and with no apparent effort. The publishers of song anthologies assume that the readers have such an ability, witness the fact that in each song the text-to-tune alignment is indicated only for the first stanza.

The speakers can also determine whether a sequence of words and a tune fit together. Take *j'ai perdu ma montre dans un autobus* and replace *perdu* (two syllables: /pɛr.dü/) with *oublié* 'forgotten' (three syllables: /u.bli.ye/), and the resulting text does not fit anymore with tune (13). The speakers know this by trying to sing the text to the tune and seeing whether they can reach the end of the text without 'getting stuck'. One 'gets stuck' when one stops singing because one loses all hope of achieving a legitimate association between the words and the tune. The reason the sequence

²⁵ Actually this is a simplification. It would be more accurate to say that each number represents a point in time, i.e. the onset of a note (v. Cornulier 1995: 116–120, 280) or a musical beat (v. Hayes and Kaun 1996). Text-to-tune alignments are effected primarily by pairing up the metrical structure of the text with the rhythmical structure of the tune.

j'ai oublié ma montre dans un autobus cannot be sung to tune (13) is that that sequence has one syllable too many. A basic regularity which governs text-to-tune alignment in French – and in Berber – is that two successive syllables in the text cannot be associated with the same occurrence of one note in the tune.

Many speakers can also make judgments of a finer nature. They find certain fits between text and tune better than others. If *ma montre* is replaced with *mon stylo* (/mõ.sti.lo/ 'my fountainpen') in (16), the resulting text can still be sung on tune (13), but the speakers have the feeling that the fit between the text and the tune is not as good as in (16).²⁶

The phenomenon which is recorded in (15) is an alignment between certain vocoids and certain notes. But such an alignment is only an observable consequence of a more abstract alignment which involves phonological constituents (syllables), not individual segments.

By now it should be obvious how text-to-tune alignment in singing can be used as a source of data on the syllable structure of French. Consider *éblouira* 'will dazzle' and *débrouillera* 'will disentangle', which are pronounced [e.blu.i.ɣa] and [de.brui.ɣa] in Standard French. As indicated by our transcriptions the first word is comprised of four syllables, and the second of three. When the words are embedded in a sentence spoken at normal speed the difference between [i] and [y] may not be easy to grasp to an ear unattuned to French. But have French speakers try to sing the two words to a particular tune, and the difference will no longer be in doubt. If tune (13) is used as a carrier for the sentence *Au clair de la lune, Luc s'y débrouillera* ([. . . lüksidebruyra]), the words flow effortlessly, with one vowel aligned with each of the notes in the tune. With sentence *Au clair de la lune, Sara t'éblouira* ([. . . saratebluira]), on the other hand, speakers will report that the words do not fit very well. They may be able to patch things up, for instance by cramming the two syllables of *Sara* into position 7 in (13), but this amounts to singing to a different tune, a tune derived from (13) by changing the eighth note in position 7 into two sixteenth notes.

Text-to-tune alignments such as (15) provide direct evidence about the location of syllable nuclei. It may be the case that they could also give direct evidence about syllable boundaries. We have not looked into that question. In our work on Tashlhiyt, verse is used as a means of observing where syllable nuclei lie in a string. Our claims concerning syllable boundaries were arrived at indirectly, through inferences based on our observations about the location of nuclei.

French was brought in only as an expository device, and there is no point

²⁶ The implicit conventions which govern text-to-tune alignment in French nursery rhymes favor a 'feminine schwa' on the sixth note of tune (13). *montre* may be pronounced with such a vowel in its final syllable, whereas *stylo* cannot.

here in pursuing the question of exactly how much one can infer about the syllable structure of French from a systematic study of alignments such as those in (15). We now turn to the same question for Tashlhiyt.

4.4. PARSING TASHLHIYT VERSE: PRELIMINARIES

The starting point of our work on poetic scansion is Hassan Jouad's pioneering work on versification in Tashlhiyt and Tamazight, for recapitulations of which v. Jouad (1990, 1995). Jouad's corpus contains both Tashlhiyt and Tamazight poems and he does not distinguish between the two dialect groups in his discussion of the data. Since we want to be able to characterize exactly the relationship between phonological structure and poetic convention we have found it wise to begin by limiting ourselves to Tashlhiyt, for which we have detailed firsthand knowledge of the phonology. We have examined close to one thousand lines of Tashlhiyt verse. The pieces in our corpus fall in two classes.

A first class is comprised of poems taken down in Arabic script by Ashlhiy speakers and published in various books. ME retranscribed these pieces according to his own pronunciation. This is not always a straightforward matter because of some ambiguities in the Arabic transcriptions. To retranscribe a piece ME sang it line after line to the tune to which it was sung when first taken down; when he did not know the tune in question he used another to which he felt the lines sang naturally. Two pieces belonging to this first class can be found in Appendices II and III at the end of this book.

This part of our corpus contains the following pieces: two songs by !rrays El-hajj Belaïd, in Mestaoui (1996: 24, 38–39); one by !rrays Hmad Biyzmawn, one by !tarrayst Rqiya Tandmsirt and one by !rrays Mohmmad Andmsir, in Amarir (1975: 139–143, 147–150, 132–138); two improvised oratorical encounters between Asid and Lachgar, transcribed from tape in Asid and Lachgar (1996: 23–29, 83–86). The total number of lines in these pieces is 380.

The other part of our corpus is comprised of poems presented by Jouad and Bounfour in their studies of Berber versification. Either author gives each line in a broad phonetic transcription, together with a French translation and a parsing which is consonant with his particular views about Berber versification. In addition to the whole corpus of Bounfour (1984), i.e. 322 lines in Igliwa Tashlhiyt, we have examined 276 lines in various Tashlhiyt dialects published by Jouad, viz. 8 lines in poem II in (1990: 284) and the 268 lines transcribed in pp. 94–116 and 134–141 of his 1995 book; these lines are parsed in pp. 178–201 and 216–223 in that book.

In poetic scansion, a Berber text is broken into small successive chunks. Borrowing a term from Malone (1996), we shall call these chunks ortho-metric syllables, to distinguish them from the syllables of the colloquial

language.²⁷ For the sake of brevity, in what follows we shall refer to orthometric syllables as syllables *tout court* when there is no risk of ambiguity.

Jouad was the first to realize that Tashlhiyt and Tamazight versification distinguishes between heavy and light syllables and that the syllables in a poem can often be arrayed to form a table such as (19) below, where all the syllables in the same column have the same weight. Tahar (1975) had earlier made the same discovery for *melhun*, a verse genre in Arabic.²⁸

In all of Jouad's work orthometric syllables are set up for reasons which are independent of any particular views concerning the phonology of Berber. In DE (1988) we pointed out the connection between orthometric syllabification and syllabification outside of poetry.

The analysis we will present here is essentially the same as that in DE (1997a). It differs in some respects with our predecessors' views about poetic scansion, for which v. Bounfour (1984), Jouad (1983, 1986, 1987, 1990, 1995), Jouad and Lortat-Jacob (1982). A comparison of our analysis with theirs can be found in DE (1997a). Let us simply say here that the main difference between our analysis and theirs concerns the distribution of syllable nuclei. As we shall show below the location of syllable nuclei in a string is to a great extent predictable from the segments and their order in the string. Jouad in effect takes syllable nuclei as already given in the strings which are inputs to his parsing operations. Unlike Jouad, Bounfour attempts to predict the location of nuclei in consonant sequences. Unfortunately his whole approach is predicated on the assumption that the syllable structure of the Tashlhiyt dialect of his corpus (Igliwa Tashlhiyt) is the same as that of Ayt Ndhir Berber, a dialect of the Tamazight group whose syllable structure is discussed in Saïb (1978). This assumption, which we feel is wholly unwarranted, leads to serious problems, about which see DE (1997a).

4.5. PATTERN SATISFACTION

In Berber poetry it is common for all the lines of a piece to be sung to the same tune, e.g. the music of a piece of thirty lines is a sequence of thirty repetitions of the same tune. As a consequence of this, all the lines of the piece share the same meter. A meter is characterized, among other things, by what we shall call a metrical pattern. A metrical pattern is a certain sequencing of light (L) and heavy (H) syllables. In the lines given below, for instance, the metrical pattern is LLHLLHLLLLH, that is, a line must be comprised of twelve orthometric syllables, of which the third, the seventh and the twelfth must be heavy while the others must be light. Let us first

²⁷ Malone (1996: 124) uses the term 'orthometric' to 'denote the set of systematic euphonic patterns deployed by a given language-cum-tradition in the verbal arts.'

²⁸ On the versification of *melhun*, see Chapter 8.

give the phonological representation of these lines, where certain segments are highlighted for the sake of conspicuity.²⁹

- (17) a. i-lla=nn **l**-!rža n=u-!madun γ=imikk n=t-ammn-t
 b. ur=as i-!zdar **ad**=tnt=d i-kks ula **ad**=tnt lkm-n
 c. i-ddu dar bab n=t-addar-t **ad**=fll=as alla-n

The pronunciation used in singing differs little from that used elsewhere.³⁰ In /l-r/ in line a, /l/ assimilates to the following /r/, whence *rr* (v. § 2.5.3.1). In the three occurrences of /ad=/ in lines b and c the final /d/ assimilates with the initial consonant of the following clitic (v. § 3.2.1.3), hence the surface geminates *tt* (line b) and *ff* (line c); similarly /t=d/ yields *dd* in line b; in /ula ad/ in line b, finally, the sequence /a a/ would be pronounced as a long (tautosyllabic) vowel in normal speech. In singing two adjacent identical vocoids may be reduced to a single one. We give in (18) the strings of segments which result from these processes.

- (18) a. i-lla=nn **r**-!rža n=u-!madun γ=imikk n=t-ammn-t
 b. ur=as i-!zdar **at**=tnd=d i-kks ul **at**=tnt lkm-n
 c. i-ddu dar bab n=t-addar-t **af**=fll-as alla-n

Morphosyntactic boundaries do not play any role in orthometric syllabification. We give them only for the readers' convenience. Table (19) indicates how the material in (18) is parsed. The exclamation points indicating emphasis have been omitted to make the vertical alignments more perspicuous. Geminates which straddle successive syllables are indicated by a tilde. We will see that such geminates play a special role in the assignment of syllable weight.

(19)

	1	2	3	4	5	6	7	8	9	10	11	12
	L	L	H	L	L	L	H	L	L	L	L	H
a.	il~	lan~	nrr	ža	nu	ma	dun	γi	mik~	kn	tam~	mnt
b.	u	ra	siz	da	rat~	tnd~	dikk	su	lat~	tn	tl	kmn
c.	id~	du	dar	ba	bn	tad~	dar	taf~	fl~	la	sal~	lan

Table (19) displays at once two kinds of information which, although closely related, must carefully be kept apart. On the one hand it presents data as to how the material in (18) is sung. Each successive line in (18) is sung

²⁹ These are the first lines of a poem by Mohammad Andmsir in Amarir (1975: 132ff). 'A sick man needed a little honey / He could not gather any (from a hive) nor reach any / All in tears he went to see the owner of the hive'. Our translations do not seek elegance and they are sometimes rather approximative. We give them only to allow those who know Berber to identify morphemes and syntactic structures.

³⁰ V. below on the phonological differences between the forms of language used in speaking and in singing.

to the same tune, and each column in (19) corresponds to a particular point in that tune, so that two chunks of the text which belong to the same column are sung on the same portion of the tune.³¹ On the other hand, table (19) displays an analysis of the metrical structure of the material in (18). According to that analysis the material in question is parsed so as to satisfy the metrical pattern LLHLLLHLLLH. Analyses of this kind are the main topic of this section and those that follow.

In (19) certain syllables do not contain any vowel, e.g. a3, a10, a12. Syllables can even lack any voiced segment, as is the case for syllables a5, b5 and c9 in the following three lines, which have the same metrical pattern as those in (19).³²

(20)	1	2	3	4	5	6	7	8	9	10	11	12
	L	L	H	L	L	L	H	L	L	L	L	H
a.	i	ga	zun	dl	fq~	qi	hitt	fa	ru	ka	nl	ħaqq
b.	r	wa	ħag ^w	ma	st	ma	zir	tn	na	γak~	ka	wiy
c.	i	ga	sak ^w	fa	fn	ti	bin	sr	tt	lu	ħa	man

These voiceless orthometric syllables must be pronounced in singing in the same way as they are in speaking, viz. without any glottal vibrations. The occurrence of a voiceless syllable does not cause any perturbation in the alignment of the neighboring syllables with the tune. The note aligned with the voiceless syllable is simply skipped in singing.

Besides satisfying a metrical pattern such as LLHLLLHLLLH, there are other conditions which a stretch of text must meet if it is to count as a well-formed line of verse. These conditions restrict the distribution of consonant types in a line, v., e.g., Jouad (1990: 302ff). We will not take these restrictions into account in what follows. Also, there is more to the metrical organisation of a line than a mere sequencing of H and L syllables. Jouad (e.g. 1995: 237ff) has proposed that orthometric syllables are grouped into foot-like constituents, and as a consequence of this organisation H and L do not combine freely to form metrical patterns. We will not take into account constituent structure above the level of syllables either, because we feel we do not understand it well enough. We shall focus our discussion on the grouping of segments into orthometric syllables.

³¹ Actually this is a simplification. The music on which ME sang this particular piece in order to retranscribe it requires lines to be grouped in couplets. The tune for the first line of a couplet is different from that for the second line, but both tunes have the same rhythmical structure. Each column in (19) thus corresponds to a given point in that rhythmical structure. The score of the tune in question is given at the end of this book, see Tune 1 in Appendix IV.

³² These lines are respectively line 69 in the preceding piece and lines 33 and 46 in that of Appendix II. Here is the text of the first line: i-ga zund l-fqqih i-!ttfar ukan l-ħaqq 'like the man of learning, he is indeed entitled'.

Let us say that an analysis of a line into a succession of orthometric syllables is a (syllabic) parse of that line, e.g. (19)a is a syllabic parse of (18)a. One question one may ask is: What are the features in the phonological make up of a string such as (18)a, considered independently of its possible uses in poetry, which allow that string to be parsed as in (19)a?

Consider for instance the string /tntlkmn/, which is parsed as LLH (*tn.tl.kmn*) at the end of line b in (19). Could that string be parsed instead as HLL (*tnt.lk.mn*) or as LHL (*tn.tlk.mn*) to allow it to appear in lines of verse with metrical patterns requiring HLL or LHL? In order to be able to answer questions like these, we shall try to answer the question 'How does one parse a sequence of words into a succession of orthometric syllables?'³³ We tackled that question previously in our 1988 article, where we argued that orthometric syllabification is determined in part by the sonority relations between adjacent segments, as is syllabification outside of poetry. In DE (1997a) we supplemented our earlier idea about the role of sonority with a detailed account of the role of geminates in orthometric syllabification. In what follows we draw heavily on DE (1997a).

Our goal in the following discussion is to make it clear what we mean exactly when we say that a string satisfies a metrical pattern. This problem has two subparts: parsing a string, and determining whether the syllabic parse(s) match the metrical pattern. We assume that parsing a string into a sequence of orthometric syllables is something which can be done independently of any particular pre-determined metrical pattern. Here is how we propose to formulate the problem of metrical pattern satisfaction.

(21) PATTERN SATISFACTION

Let *S* be a string of segments in Tashlhiyt and *P* a metrical pattern. In order to determine whether string *S* satisfies metrical pattern *P* one goes through two stages:

- a. SYLLABIFICATION: one parses *S*, that is, one lists the set $SYL = \{\Sigma_1, \dots, \Sigma_n\}$ of all the (well-formed) syllabic parses of *S*; these parses are determined independently of *P*;
- b. EVALUATION: one searches *SYL* for a parse which satisfies *P*;

String *S* satisfies *P* if one member of *SYL* satisfies *P*.

³³ Nowhere does one find an answer to that question in Jouad's work. In his various publications, Jouad tries to answer the following questions, which are different: (i) Given a metrical pattern and a line of verse which matches that pattern, how does one parse the line into orthometric syllables? (ii) Given a sequence of lines which all match the same metrical pattern, how does one discover what that metrical pattern is? Answering our question also answers Jouad's, but the converse is not true.

Take any text which can be viewed by Ashlhiy speakers as a succession of well-formed lines with the same metrical pattern. In order to complete the program outlined in (21) we must devise a definition of the notion ‘well-formed parse’ which would enable us to parse such a text so that the resulting syllables can be arrayed in a table with a layout analogous to that of (19). The data we will examine are native speakers’ acceptability judgements. The set of pieces in our corpus can be considered as a repository of acceptability judgements made in the past by the people who composed those pieces and by those who performed them when they were taken down. We will supplement the acceptability judgements frozen in our corpus by others which ME has elicited from himself by trying out various text-to-tune alignments. Let us give an example.

At the beginning of (19)a the final *n* in *illann* is an onset to *rr*. Imagine instead that we make one syllable with the two skeletal slots in *nn*, leaving everything else unchanged. Instead of (19)a, line (18)a would have the following parse:

(22)	1	2	3	4	5	6	7	8	9	10	11	12	13
	il~	la	nn	rr	ža	nu	ma	dun	γi	mik~	kn	tam~	mnt

A native speaker who tries to sing line (18)a in accordance with this parse runs into several problems. Let us limit ourselves to the easiest one to state: the parse has thirteen syllables, one too many to fit the tune of the song. In order to sing line (18)a in accordance with the new parse, *rr* must move over to the fourth position in the tune as shown in (22), *ža* to the fifth, and so on, so that one runs out of notes when one has reached *tam~*. Two successive syllables in the text cannot be associated with the same point in the tune. If a tune is comprised of *n* successive notes, a text with more than *n* syllables cannot be sung to it.

As will become clear later, we do not have a complete solution to problem (21); but framing our discussion in terms of (21) will at least enable us to state precisely how much empirical ground we have been able to cover and what areas require further study.

4.6. GENERALIZATIONS ON ORTHOMETRIC SYLLABLES

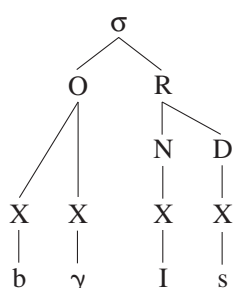
In this section we will present various generalizations on the form of orthometric syllables in Tashlhiyt. Let us first state our general assumptions about syllable structure.

The units which are grouped into syllables are prosodic positions, i.e. skeletal slots (‘X slots’). Strings must be exhaustively parsed, i.e. every X in a string must belong to a syllable.³⁴ Syllables may not overlap, in

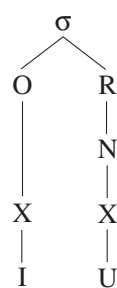
³⁴ See Selkirk (1981).

other words an X may not belong to more than one syllable. We take syllables to be arborescent structures analogous to those which represent constituent structure in syntax. Adopting well-known ideas and terminology (v. e.g. Harris (1983), Levin (1985)) we take a syllable (σ) to be composed of an onset (O) and a rime (R); the rime is composed of a nucleus (N) and a coda (D). Every syllable contains a rime, and every rime contains a nucleus. A syllabic segment is a skeletal slot which is dominated by N. Skeletal positions not dominated by a nucleus are called margins. (23) displays the first syllables in three French words, *briscard* [bʁiskɑʁ] ‘veteran’, *yougoslave* [jugoslav] and *ouvrage* [uvʁaʒ] ‘work’.

(23) a. *bʁis*



b. *yu*



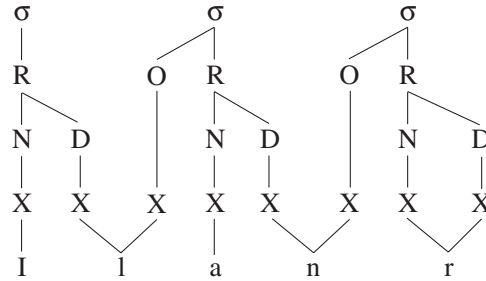
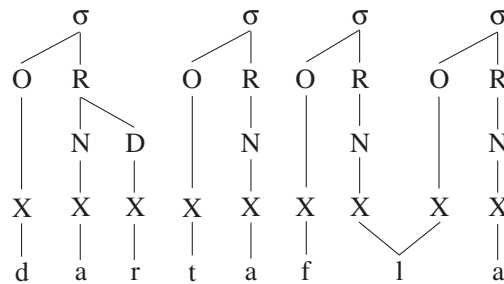
c. *u*



Following various authors,³⁵ we assume that glides have the same feature composition as the corresponding high vowels. The only difference between *i* and *y* is that *i* is syllabic while *y* is not, and similarly for *u* and *w*. Let us use 'U' and 'I' as stand-ins for the feature bundles of (*u*, *w*) and (*i*, *y*) respectively. The same feature bundle is a nucleus in (23)a and an onset in (23)b.

Constituents are said to be complex if they contain more than one skeletal slot. (23)a has a complex onset and a complex rime. A geminate is comprised of two skeletal slots; in Tashlhiyt these two slots may or may not belong to the same syllable, v. § 3.2.2. In (24) we represent syllables 1 to 3 in (19)a and syllables 7 to 10 in (19)c.

³⁵ See Kaye and Lowenstamm (1984). For more recent references see e.g. Harris and Kaisse (1999).

(24) a. *il~.lan~.nrr*b. *dar.ta.fl~.la*

At this point, let us pause briefly to comment on one aspect of the notation used to represent the inputs to orthometric syllabification. This notation is very close to the broad phonetic transcription used elsewhere in this book. This raises no question for most segments, since in general our transcription does not represent syllable structure, e.g. an *n* which is an onset and one which is a nucleus are both represented simply as ‘n’. The only segments whose syllabic status is recorded in our phonetic transcription are the high vocoids, e.g. that transcription uses ‘u’ to represent *U* when it is a nucleus, and ‘w’ to represent it when it is a margin, and one might think that the input to orthometric syllabification should not have a distinction between ‘u’ and ‘w’, since the distinction is the result of syllabifying that input. In fact, *U* and *I* are different from the other feature bundles of Tashlhiyt, in that their syllabicity cannot always be predicted from the environment. As we shall see later, Tashlhiyt has an underlying distinction between two kinds of high vocoids. Some high vocoids alternate between vowels and glides, while others are marked in the lexical representations so as to guarantee that they (nearly) always surface as margins. We use the expression ‘underlying glides’ to refer to the high vocoids of the latter type. This chapter and the next focus primarily on the syllabification of segments other than the underlying glides. The syllabification of the underlying glides raises special problems whose discussion must await a later chapter. In the meanwhile, in our notation of the inputs to orthometric

syllabification, we follow the convention introduced in § 2.2: every word in a line is transcribed as it is pronounced when it is neither preceded nor followed by a vowel, e.g. when it is uttered in isolation.

We now start with two basic observations about orthometric syllables in Tashlhiyt.

- (25) NoHiatus: a syllable which is not line-initial has an onset.
- (26) RimeSize: a rime contains at most three slots; in three-slot rimes the last two constitute a geminate.

These generalizations can be illustrated with the lines in (19) and (20). The only onsetless syllables are those at the beginning of lines. In all the other syllables the first segment is an onset. Syllables with a single slot can only occur at the beginning of a line since they are onsetless: the slot in question must be a nucleus (v. (23)c). After a syllable has been stripped of its initial segment, the remainder (the rime) never contains more than three slots, and all the three-slot rimes have codas consisting of a geminate, v. b7 in (19) and a7, 12 in (20).

Let us now turn to syllable weight. If one sets aside those rimes in which a geminate is involved, the situation is a simple one: one-slot rimes are light and the others are heavy. When the geminates are brought into the picture the generalization in the preceding sentence remains true in most circumstances: it is still the case that one-slot rimes are all light (v. c9 in (19)), and furthermore rimes which contain both slots of a geminate are all heavy, v. e.g. syllables *nrr* (a3 in (19)) and *dikk* (b7 in (19)). The added complexity comes from codas consisting of a single slot which is the first half of a geminate, as in *il~* (a1) (and all other two-slot rimes in (19) which are followed by a tilde). All such occurrences involve a heterosyllabic geminate with a first half which is not a nucleus, v. the representations of the first two syllables in (24)a. In cases of that kind we dub the first slot of the geminate a hinged coda. Syllables with hinged codas are extremely common in our corpus, and they occupy L positions in the overwhelming majority of cases; the examples in (19) are typical in that respect. Our corpus also contains occasional occurrences in which a syllable with a hinged coda occupies a H position, v. e.g. the third syllable in lines 8, 11 and 39 in Appendix II. Since the proportion of such occurrences is quite small it is very tempting to consider them as violations of the constraints on syllable weight in Tashlhiyt versification. However ME feels that the lines containing such occurrences flow as naturally as others whose well-formedness is not in doubt, which compels us to consider them well-formed. Here, then, are the generalizations one can formulate about syllable weight:

(27) Weight:

- a. rimes with one slot are light;
- b. rimes with a hinged coda may be either light or heavy;
- c. other rimes are heavy.

We have just seen that geminates have two special properties which set them apart from other XX sequences: they are the only complex codas allowed (v. (26)), and the only XX rimes which may occupy a L position are those with a hinged coda (v. (27)b).

The ambiguity of hinged codas (v. (27)b) is a phenomenon which concerns only the weight of syllables, not the apportionment of X slots between syllables. As used in (21) and in the discussion below, the expression ‘syllabic parse’ is meant to refer to the distribution of syllabic nuclei and syllabic margins in a string, not to the associated distribution of syllabic weights. Consider a hypothetical string /rtta/ occurring at the beginning of a line. /r.tta/, /rt~.ta/ and /rt~.ta/ are three different syllabic parses in the intended sense (the underlyings indicate syllable nuclei), but counting the first syllable in /rt~.ta/ as H or as L does not result in two different syllabic parses. Let us use the expression ‘weighed parse’ to refer to a parse with its associated syllable weights. It will emerge from our discussion that /rtta/ has only one licit syllabic parse in Tashlhiyt verse, viz /rt~.ta/, and that this parse allows two weighed parses, (/rt~.ta/, LL) and (/rt~.ta/, HL).

In DE (1988) we followed Jouad and Bounfour in assuming that in poetry geminates may in general count either as one segment or as two to suit the needs of the poets. We have shown in DE (1997a) that this assumption is incorrect; it allows many syllabic parses which are never found to occur. Note that in singing, long consonants are pronounced distinct from their short counterparts, as they are in the colloquial language. This is in particular true in the case of rimes with a hinged coda which occupy a L position in the metrical pattern. When singing (19)c one does not pronounce the words *taddart* and *allan* as though they were *tadart* and *alan*.

Certain grammatical morphemes which must be pronounced with a long consonant in the colloquial language have a poetic variant in which the long consonant is replaced by its short counterpart. The colloquial form also occurs in poetry. For instance *walaynni* ‘however’ can also be pronounced *walayni* in poetry (v. line 43 in Appendix III); as we shall see, the former variant has four syllables (*wa.la.yn~.ni*) whereas the latter has three (*wa.lay.ni*). Other items which can be degeminated in poetry are the initial /nn/ in certain possessive determiners (v. line 12 in Appendix II) and the geminate which results from totally assimilating the genitive preposition /n/ to a following high vocoid (v. line 25 in Appendix III). The morphemes involved are all grammatical morphemes, e.g. *a-snnan* ‘thorn’ cannot be pronounced *asnan*. Furthermore not all grammatical morphemes can undergo

the degemination in question; the directional clitic /nn/, for instance, cannot be pronounced short.

Like the weight ambiguity of the hinged codas, the degemination above provides poets with a wild card to help them meet the demands of the meter, but this should not obscure the differences between the two phenomena. Weight ambiguity provides a choice between two different weight assignments for the same segment sequence. Degemination, on the other hand, provides a choice between two different segment sequences as exponents of a particular morpheme.

Table (28) lists the syllable types allowed by generalization (26) together with their weights according to generalization (27).

(28)	types	N= [-cons]	N= [+cons]	weight
a.	(O) N	nu (a5)	kn (a10)	L (light)
b.	(O) N~	ri~ ³⁶	fl~ (c9)	
c.	(O) N D~	mik~ (a9)	tnd~ (b6)	L or H
d.	(O) N D	siz (b3)	kmn (b12)	H (heavy)
e.	(O) N~D	biy ³⁷	nrr (a3)	
f.	(O) N D~D	dikk (b7)	bndd ³⁸	

In the first column each occurrence of a capital letter represents a skeletal position. Those skeletal positions which are the first half of a geminate are indicated by a following tilde.³⁹ The parenthesized *O*s are a reminder that line-initial syllables may lack an onset. In the examples in the second column the nucleus is a vocoid, and in those in the third it is a contoid. Some examples occur in (19). Their location there is indicated by the parenthesized letters and numbers. The other examples occur in the pieces in Appendices II and III.

In the third column of the table the consonant which is a nucleus is a sonorant in all our examples. This is because we have tried as much as possible to draw the examples in the table from the three lines in (19), and all the nuclei in these lines happen to be sonorants. Although syllables with an obstruent as a nucleus are less common than those with a sonorant nucleus – why it is so will become clear in the next sections – they are every bit as well-formed and they divide likewise into the six categories a–f of table (28). Having gone over various pieces of poetry recorded by Jouad, Shaw (1996) pointed out that they did not contain closed syllables.

³⁶ Appendix III, syllable 4 in line 64.

³⁷ Appendix III, syllable 8 in line 78.

³⁸ Appendix II, syllable 7 in line 49.

³⁹ In the first columns of tables (28) and (47) all geminates are indicated by tildes. Elsewhere only heterosyllabic geminates are indicated by tildes.

bles with obstruent nuclei and she proposed that such syllables be excluded by Universal Grammar. However such syllables are not judged ill-formed, as the following examples will illustrate. The first example is a ditty about a bird, the hoopoe. Each line of the song's text is followed by its parse.

- (29) stu tutut s tu tu tut
 stu tutut s tu tu tut
 t-ɣla t-isn-t tɣ la ti snt
 t-šqqa t-aka-t⁴⁰ tšq~ qa ta kat

All four lines share the metrical pattern LLLH. The words in the first two lines are onomatopoeias imitating the hoopoe's song. The first syllable in the last line is a closed syllable with š as a nucleus.

Our other examples are lines composed by ME. The lines below are sung to the tune of the song by Hmad Biyzmawn recorded in Amarir (1975: 139–143). The tenth syllable in each line has a heavy rime with an obstruent nucleus.⁴¹

- (30) 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L L L L H L H
 a. i ɣa sur gu mnt~ tɸ ra wi na tzd mi ɣaln⁴²
 b. al~ la huk ba rd~ du ni ti nu tšt nu linw

Like Shaw we did not find any closed syllable with an obstruent nucleus in our corpus. This absence may have to do with preferences in the matching of texts with tunes: there seems to be a preference for aligning H positions in the meter with portions of the tune which are musically prominent, and obstruent nuclei are not ideal carriers of musical notes. Consider the following lines, which sound quite natural to ME despite the fact that the third or the seventh syllable has a complex rime with an obstruent nucleus.⁴³

- (31) 1 2 3 4 5 6 7 8 9 10 11 12
 a. i ɣu rir si lh na **tɸk** ta da ri lu tan
 b. i xa rinn ɣa ki ba **nss** fa ts~ su ta kal
 c. ta nq~ **qzb** rut~ ta da xas ts ɣa lal~ la tnɸ

⁴⁰ 'Stu tutut / Stu tutut / Salt is expensive / Making ends meet is difficult' (literally 'the hearth is difficult').

⁴¹ (a) iɣ=as ur gum-nt t-fraw-in=a t-zdm i-ɣal-n, 'if these twigs are not enough, let her chop armfuls'; (b) !allahukbar d-duni-t=inu t-!štn ul=inu, 'Allahoakbar! Life here below troubles my heart'.

⁴² This meter requires final syllables with 'compound rimes'. On syllables with compound rimes, see the end of this section.

⁴³ (a) iy ur i-!rsi l-hna t-fk-t a-!dar i=!lutan, 'if peace does not settle, begin your journey' (literally: 'give the foot to the lands'); (b) ixar inn ɣ=ak i-ban s-!sfa t-ssu-t a-kal, 'where serenity comes to you, there you should take the ground as your carpet'; (c) t-a-!nqqzbrud-t ad=ax=as t-sɣa lalla=tnɸ, 'it is a small poncho which our mistress has bought him'.

These lines have the same metrical pattern as those in (19) and in Appendix II. They can be sung without a hitch to certain tunes which are compatible with that metrical pattern, but not with all. In particular they do not fit with the tune of the song in Appendix II, a tune in which the notes associated with third syllable and the seventh are musically prominent.

Besides syllables with an obstruent nucleus, there is another syllable type which is implicit in table (28) and whose existence deserves explicit recognition: syllables in which the only X slot is the first half of a geminate, i.e. onsetless syllables of type (28)b. Such syllables appear at the beginning of the second and third line below. The first line is given to illustrate the metrical pattern shared by the other two.⁴⁴

- (32) a. a man a-drar ur nkki n-stara i-!zaɣar-n
 b. !ss-rmi-ɣ kullu t-!tlba n-ss-!rmi i-g^wrram-n
 c. kki-ɣ l-!bħur stara-ɣ i-gnwa-n d=i-kal-n

(33)

	1	2	3	4	5	6	7	8	9	10	11	12
	L	L	H	L	L	L	L	L	L	H	L	H
a.	a	ma	nad	ra	ru	rnk~	ki	ns	ta	ray	za	ɣarn
b.	s~	sr	miɣ	kul~	lut~	tl	ba	ns~	sr	miy	g ^w r~	ramn
c.	k~	ki	ɣlb	ħu	rs	ta	ra	ɣi	gn	wan	di	kaln

The initial *a* in the first line is a stop-gap vowel, a common device used by Ashlhiy poets to add an extra syllable at the beginning of a line.⁴⁵ Any geminate consonant can be a nucleus-onset sequence at the beginning of a line. We have chosen the above examples as further illustrations of our claim that even a voiceless consonant can play the role of a nucleus. Note in particular that the initial syllable in (33)c is completely silent.⁴⁶

In our 1997a article, which the present discussion follows closely, we allowed for orthometric syllables of a special kind which were dubbed ‘compound’ syllables. The strings we considered as compound syllables are found only at the end of lines. Certain meters allow or even demand a compound syllable at the end of the line, e.g. the meter of the song from which the lines in (33) are excerpted. In these lines the twelfth position is occupied by strings *ɣarn*, *ramn* and *kaln*, which cannot be parsed as single

⁴⁴ Lines 19, 20 and 69 of the poem by Hmad Biyzmawn in Amarir (1975: 139–143). (a) Ah! Which mountain did I not comb, which plains!; (b) I have badgered the scholars and the marabouts; (c) I’ve crossed the seas and I’ve been all over the skies and the lands.

⁴⁵ V. Galand-Pernet (1969).

⁴⁶ In lines 12 and 56 of the poem in Appendix III (but not in line 59) the first half of the initial geminate is ‘left out’ of the parse. ME finds such violations worse when the geminate involved is a sonorant than when it is an obstruent.

syllables which would fit into table (28).⁴⁷ In 1997 we considered each such string as a syllable resulting from the contraction of two light syllables into one: *ya.rn*, *ra.mn*, etc. We now believe that these strings are not syllables of a special sort. They must be analyzed instead as sequences of a heavy syllable followed by an onset, viz *yar.n-*, *ram.n-*. In the few pieces known to us in which lines end in such strings, the supernumerary segment at the end of each line is actually sung as an onset to a following vowel. In some pieces that vowel is a stopgap *i* or *a* which serves as a carrier to the final note(s) of the tune, while in others it is the first segment of a refrain which is repeated after each line.

4.7. THE ROLE OF SONORITY

There are many ways to parse a given sequence of segments into successive chunks which all belong to one of the categories listed in table (28). Consider for instance sequence /latntlkmn/, which is parsed as *lat-.tn.tl.kmn* at the end of (19)b. If orthometric syllabification only required that each syllable fit into table (28), *latt.nt.lk.mn* would also be a licit parse, contrary to fact.

In order to fulfill the general program outlined in (21) we should produce a device capable of enumerating all the well-formed parses of any string in Tashlhiyt. Because more empirical work is needed on the syllabification of certain types of consonant clusters (v. § 4.9) we cannot present such a device. What we will present instead is a set of conditions which any parse must meet if it is to be well-formed. These considerably narrow down the set of parses associated with any string; in many cases in fact they reduce it to a single parse.

Our analysis gives a central role to the sonority relationships between adjacent segments. As far as sonority is concerned, the empirical generalizations which our analysis must account for are those stated in Elmedlaoui (1985) and DE (1985): in a nutshell, syllable nuclei must have the highest degree of sonority compatible with other requirements such as the prohibition of hiatus. In our works of 1985 and 1988 we operated within a rule-and-constraint framework. Starting from representations devoid of any syllabic structure, syllabic trees were built in a stepwise fashion through the operation of sequentially-ordered rules; the rules failed to apply when their operation would have created adjacent nuclei (a hiatus).

The data in our articles of 1985 and 1988 have been used as a testing ground for various theoretical proposals.⁴⁸ In particular, Prince and Smolensky (1993) proposed an account of Tashlhiyt syllable structure within

⁴⁷ For other examples, see for instance the piece recorded in Jouad (1995: 193).

⁴⁸ Goldsmith and Larson (1992), Prince and Smolensky (1993), Scobbie (1993), Zec (1995), Shaw (1996), Clements (1997), Frampton (1999).

Optimality Theory (henceforth OT). Clements (1997) has raised various objections to that account and set forth his own analysis, also in the OT framework. The analysis we will present here revolves around SonPeak (39) and NoRR (42), two constraints on sonority sequencing which are borrowed from Clements.

Let us first recapitulate the generalizations we have seen thus far.

- (34) a. every skeletal slot belongs to one syllable and only one;
- b. NoHiatus (25);
- c. RimeSize (26);
- d. complex onsets are disallowed.⁴⁹

The propositions in (34) are descriptive statements which are true of all the licit parses. Let us construe them also as components of the grammar of Tashlhiyt, i.e. as well-formedness conditions on parses, and more specifically as constraints in the sense of OT. Except for the last, maybe, the items in (34) are not constraints in the strict sense but rather composites of several constraints. We will nonetheless treat them as unanalyzable wholes. We assume that (34)a–d are all undominated constraints, i.e. in case of conflict with other constraints those in (34)a–d always take precedence. In the discussion below, unless stated otherwise, we only take into consideration parses which abide by the constraints in (34)a–d.

We use the following sonority scale:⁵⁰

- (35) Sonority scale:
- (a) low vocoids: a
- (b) high vocoids: i, y, u, w
- (c) liquids: r, l
- (d) nasals: m, n
- (e) fricatives: s, š, x, x^w, z, ž, γ, γ^w, ħ, ʕ, h
- (f) stops: t, k, k^w, q, q^w, b, d, g, g^w

The objects ranked on this scale are melodic units, i.e. bundles of feature specifications dominated by a Root node, feature bundles for short. The higher a feature bundle is on the scale, the more sonorous it is said to be, or equivalently, the higher its degree of sonority. *i* is more sonorous than *n*, which is more sonorous than *d*, which is as sonorous as *t*.⁵¹ An assumption implicit in (35) is that the degree of sonority of a feature bundle is the same in all its occurrences; in particular is not affected by syllable structure. For the sake of explicitness the rung of the scale for high vocoids

⁴⁹ Implicit in table (28).

⁵⁰ On sonority and its role in syllabification, see Clements (1990) for a careful discussion and references.

⁵¹ On the differences between the sonority scale in (35) and that used in our earlier work, see below the end of § 4.9.1.

contains four symbols but it should contain only two since ‘i’ and ‘y’ are different labels for the same feature bundle, as are also ‘u’ and ‘w’.⁵²

Let us return to the question we asked at the beginning of this section about /latntlkmn/. We said that the licit parse is lat.tn.tl.kmn (unless indicated otherwise, underlinings indicate nuclei) and we asked what excludes latt.nt.lk.mn. According to Clements (1997) the answer is that latt.nt.lk.mn violates the constraint SonPeak whereas lat.tn.tl.kmn does not violate the constraint:

- (36) SonPeak (a first approximation):
Every segment which is more sonorous than its immediate neighbours must be a syllable nucleus.

We repeat below the parses under consideration, together with the input string, in which the segments which are more sonorous than their immediate neighbours are in bold type for the sake of conspicuity:

- (37) input l a t t n t l k m n
a. l a t.t n.t l.k m n
b. *l a t t.n t.l k.m n

Whereas the constraint does not incur any violation in parse (37)a, it is violated twice in (37)b: *n* and *l* are sonority peaks, i.e. they are more sonorous than their immediate neighbours, and yet they are not syllable nuclei in (37)b.

It is important to note the asymmetry in the constraint: while (36) requires sonority peaks to be nuclei, it does not require nuclei to be sonority peaks. Consider for instance the syllables 7 to 9 in (33)a, which are ki.ns.ta. The string *kinsta* only contains two sonority peaks, viz *i* and *a*, and yet there are three syllable nuclei in the licit parse ki.ns.ta. *s* is a nucleus, but it is not a sonority peak, since it is adjacent to *n*, which is more sonorous.⁵³

In the input string in (37), neither consonant in the final sequence *mn* is a sonority peak, since either is adjacent to a segment of equal sonority, but the sequence taken as a whole is more sonorous than its immediate surroundings, and it is useful to have a notion of sonority peak general enough to be applicable not only to single X-slots, but also to sequences of X-slots. In the sense of ‘sonority peak’ which is relevant for the constraint in its final formulation (see below in (39)), the final sequence *mn* in (37) is a sonority peak, and consequently that sequence must contain a syllable nucleus. Let us say what we mean exactly by a sonority peak.

Following Clements (1997), let us use the expression ‘sonority peak’ to refer

⁵² V. text under (23) in § 4.6.

⁵³ *n* is not a sonority peak either since it is adjacent to *i*. The fact that *i* does not belong to the same syllable as *n* is irrelevant, as will be explained below.

to any sequence of segments which is a local maximum of sonority. A local maximum of sonority is a sonority plateau which is higher than its immediate neighborhood, or more precisely,

(38) Sonority peak (definition):

A sequence *Q* is a sonority peak within sequence *R* iff the following conditions obtain:

- (i) *Q* is contained in *R*;
- (ii) for any two adjacent segments *q* and *r*, with *q* contained in *Q* and *r* not contained in *Q*, *q* has a higher degree of sonority than *r*;
- (iii) all the segments in *Q* are of equal sonority.

To take an example, consider the phrase *i=y-gnwa-n* ‘to the skies’, which is composed of the dative preposition *i* followed by the bound state noun *ignwan*. *iygnwan* contains two sonority peaks, *iy* and *a*. The one-segment sequences *i* and *y* are not sonority peaks because they do not meet condition (ii). *an* and *nwa* are not sonority peaks because they do not meet condition (iii).

We now give the definitive formulation of the constraint.

(39) SonPeak: A sequence which is a sonority peak within the syllabification domain contains a syllable nucleus.⁵⁴

In (39) the expression ‘syllabification domain’ refers to the unit which is coextensive with the strings taken as inputs to syllabification. In this chapter the syllabification domain is the Phonological Utterance, which is coterminous with the line in Tashlhiyt singing; in the next chapter the syllabification domain will be the inflectional stem.

Returning to the example in (37), the readers may check for themselves that the input *latntlkmn* contains four sonority peaks as defined in (38), viz *a*, *n*, *l* and *mn*, and that each sonority peak contains a nucleus in the licit parse *lat.tn.tl.kmn* ((37)a). In *latt.nt.lk.mn*, on the other hand (see (37)b), SonPeak is violated twice, for the sonority peaks *n* and *l* do not contain nuclei.

Now what about parse *latt.nt.lk.mn*, which has syllable boundaries located as in parse (37)b, but different nuclei in some syllables? This parse does not violate SonPeak, but it is excluded because syllables *nt* and *lk* violate NoHiatus (25): they are not line-initial and yet they lack an onset.

Since, as stated above, we will restrict our attention to parses which abide by NoHiatus and the other undominated constraints in (34), omitting from the parses the underlinings which indicate syllable nuclei will not result in any ambiguity except in line-initial position. For instance if sequence

⁵⁴ SonPeak is Clement’s Sonority Peak Principle (p. 303), slightly reworded.

tlkmn does not occur at the beginning of a line, the notation ‘*tl.kmn*’ can only stand for *tl.kmn*; parses *tl.kmn*, *tl.kmn* and *tl.kmn* would all violate NoHiatus, and the latter parse would furthermore violate the prohibition of complex onsets, as would the parse *tl.kmn*.

Let us now consider the four lines in (40) and their scansions in (41).⁵⁵

- (40) a. yan i-g^wmr-n ar !id iγ=d ur umz-n yat⁵⁶
 b. !udn-γ yaw w-!attan⁵⁷ i-!dbib-n žla-n=aγ
 c. alliγ=d n-wafaq-n f=l-maḡna nna-n
 d. a l-mskin !attan l=l-hubb⁵⁸ af=fllak⁵⁹
- (41)
- | | | | | | | | | | | |
|----|-----|------------------|------|------|----|-----|------|------|------|-------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | L | H | L | L | L | H | L | H | L | H |
| a. | ya | nig ^w | mr | na | ri | diγ | du | rum | zn | yat |
| b. | u | dnγ | yaw~ | wat~ | ta | nid | bi | bnž | la | naγ |
| c. | al~ | liγ | dn | wa | fa | qn | fl | maḡ | nan~ | nan ⁶⁰ |
| d. | a | lms | ki | nat~ | ta | nll | hub~ | baf~ | fl~ | lak |

The first line is given for the sole purpose of exemplifying the metrical pattern of the song. There is an interesting difference between sequence /udnγya/ in line b, which is parsed as u.dnγ.ya, and sequence /iγdnwa/ in line c, which is parsed as iγ.dn.wa. The form of both sequences is VCCCCV, in which the last C must be an onset to the following vowel (that vowel is a sonority peak). In u.dnγ.ya, it is SonPeak (39) which is responsible for the fact that /n/ is syllabic. If /udnγya/ were parsed as ud.nγ.ya, the sonority peak *n* would not contain a nucleus (it would contain an onset).⁶¹ In line c, on the other hand, if the VCCCCV sequence /iγdnwa/ were parsed in the same fashion as u.dnγ.ya, i.e. as V.CCC.CV, constraint SonPeak would not incur any violation in the resulting parse i.γdn.wa, because there is no sonority peak between /i/ and /a/ in /iγdnwa/. Yet this is the wrong result. Therefore we need to call upon another constraint. After Clements (1997:

⁵⁵ (40)a,b,c,d are respectively lines 1, 18, 20 and 21 in the song by El-hajj Belaïd in Mestaoui (1996: 38ss). Here are translations. ‘He who hunts till nightfall without catching anything / I am ill and physicians have lead me astray / Having agreed on the symptoms, they declare / Unfortunate! Your illness is that of love’.

⁵⁶ Every line in this song ends with a stop-gap vowel *i*, a common occurrence in Ashlhiy singing. The final *i* has been left out from our transcriptions.

⁵⁷ From /yan w-!attan/.

⁵⁸ From /n=l-hubba/. /a#a/ reduces to a short *a*, see the text below (17).

⁵⁹ From /ad=fllak/, see the text under (17).

⁶⁰ This line is ill-formed: its sixth syllable should be heavy.

⁶¹ The same situation obtains later on in the same line, when /ibnžla/ is parsed as *i.bnž.la* rather than as **ib.nž.la*.

303) we assume that parses such as *i.ɣɔ̃n.wa* are ruled out by the following constraint:⁶²

(42) NoRR (No Rising Rimes):

The coda does not have a higher sonority than the nucleus.

If */iɣɔ̃nwa/* were parsed as *i.ɣɔ̃n.wa*, coda *n* would exceed nucleus *d* in sonority.

Let us clear up a possible misunderstanding concerning (42) and its resemblance with SonPeak (39). The parse *i.ɣɔ̃n.wa* could seem to violate SonPeak: *n* is a sonority peak inside syllable *ɣɔ̃n*, and yet it does not contain any nucleus. However let us go back to the formulation of SonPeak in (39): ‘a sequence which is a sonority peak *within the syllabification domain* contains a syllable nucleus.’ *n* is not a sonority peak within sequence */iɣɔ̃nwa/*, since it is adjacent to *w*, which is more sonorous. An important difference between constraints NoRR (42) and SonPeak (39) is that the latter does not legislate over sonority relationships within the syllable. SonPeak does not rule against syllables in which the most sonorous segment is not the nucleus. It is not violated by syllables in which the most sonorous segment is the onset, which are a common occurrence in our corpus, see for instance *lms* in (41)d2 or *rs* in (33)c5.

NoRR excludes heavy syllables in sequences with a rising sonority. Consider the (invented) sequence */ksmrwa/*, in which each segment is more sonorous than the preceding one. Because of NoRR, this must be parsed as *ks.mr.wa*. Constraint NoRR is violated only by certain rimes in which *r* is the nucleus and *w* is the coda. These will be discussed in Chapter 7, and for the purposes of the present chapter we consider NoRR as an undominated constraint.

The constraints introduced up to this point make predictions which are compatible with those of the syllabification procedure CS proposed in our works of 1985 and 1988. Let us recapitulate these constraints here.

- (43) a. Every skeletal slot belongs to one syllable and only one
- b. Complex onsets are prohibited ((34)d)
- c. Condition (26) on well-formed rimes
- d. NoRR (No Rising Rimes) (42)
- e. NoHiatus (25)
- f. SonPeak (39)

Setting aside (43)a, which is a general condition on well-formed parses, the other constraints fall into two categories. The constraints (43)b,c,d are conditions on syllable shape which must be met in any context. The

⁶² In Dell and Tangi (1993) the same constraint is posited to prevent */r/* from being turned into *a* in certain contexts.

constraints (43)e,f further restrict the shape of syllables in certain environments.

4.8. GEMINATES IN COMPLEX CODAS

As far as we know, any string of segments of Imdlawn Tashlhiyt can be parsed exhaustively as a sequence of orthometric syllables, i.e. any such string has at least one licit parse.⁶³ Are there sequences which have more than one licit parse? We know of two classes of such sequences. In this section we deal with one case, which involves complex codas. The other case will be taken up in the next section.

Consider the following song, which Imdlawn people sing in unison while winnowing on the threshing floor. The song has only one line, which is repeated over and over again, always to the same tune.⁶⁴

(44) bab n=u-wwtif a⁶⁵ i-g !rbbi l-baraka γ=u-nnrar

What is the metrical pattern of this song? One cannot compare how successive lines align with the tune, since the song has only one line. The following parse is compatible with everything we have said up to this point.

(45)

1	2	3	4	5	6	7	8	9	10	11
H	H	L	H	L	H	L	L	L	H	H

bab nuww ti fay grb~ bil ba ra ka γunn rar

But is this indeed the parsing used in the winnowing song? Here is why we think it is not. ME has replaced the actual words in (44) by others and tried to sing the resulting sequence to the original tune.⁶⁶ His acceptability judgements provide us with independent evidence as to the metrical pattern of the song. If *u-wwtif* is replaced by *u-γaras*, *u-grtil* or *u-žddig* the resulting sequence still sings naturally to the tune. These words are trisyllabic; they begin with a LL sequence (*u.γa.ras*, *u.gr.til*, *u.žd.dig*), not with a H syllable, which is what is assumed about *uwwtif* in (45). There is yet other data which confirm that in the winnowing song *uwwtif* does not begin with a H syllable: the line becomes lame (i.e. one gets stuck when one tries to sing it) when *uwwtif* is replaced by *u-wtil* or by *u-rgaz*, which begin with a H syllable (*uw.til*, *ur.gaz*). Instead of the H syllable in second position in (45), there should be two L syllables:

⁶³ It is not obvious that it should be so. For instance if closed syllables with an obstruent nucleus were universally excluded, as proposed by Shaw (1996), and if SonPeak were inviolable, such a sequence as *nakzdma* could only be parsed with *d* left unsyllabified.

⁶⁴ 'Owner of the threshed grain, let God bless the threshing floor'.

⁶⁵ /ad/ underlyingly. On the consonant in /ad/ and /rad/ see DE (1989: 188–189).

⁶⁶ For observations on French songs which were made using the same method, see Dell (1989).

- (46)
- | | | | | | | | | | | | |
|-----|----|----|----|-----|------|-----|----|----|----|------|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| H | L | L | L | H | L | H | L | L | L | H | H |
| bab | nu | ww | ti | fay | grb~ | bil | ba | ra | ka | ɣunn | rar |

The line ends with the word *unnrar*, which has the same structure as *uwwtif*, but in (46) the two words syllabify differently: *u.ww.ti* . . . vs. *unn.ra* Could it be that in the winnowing song both words have parallel parses, and that the final word should be parsed as *u.nn.rar* rather than as *unn.rar*? No, as the following data show. Replacing *unnrar* by *u-wtil* or *u-rgaz* does not impair the text-to-tune alignment, while the line becomes lame when *unnrar* is replaced by *u-ɣaras*, *u-grtil* or *u-žddig*.

The preceding data suggest that the same sequence VC~CCV may have two licit parses, VC~C.CV (*unn.ra*) and V.C~C.CV (*u.ww.ti*). That this is indeed the case is conclusively shown by the fact that when one permutes *uwwtif* and *unnrar* in (44) the resulting sequence sings naturally to the same tune as (44): placed at another location in the line, *unnra* . . . can be syllabified as *u.nn.ra* . . . and *uwwti* . . . can be syllabified as *uww.ti*

In (44), sequence *uww* in *uwwtif* and sequence *unn* in *unnrar* are what we call ‘EF~G’ sequences. An EF~G sequence is a sequence of three X slots the last two of which are a geminate, and which furthermore has the following relationship with the surrounding string: (i) E belongs to a sonority peak within the syllabification domain, and (ii) G does not immediately precede a sonority peak. An EF~G sequence has two well-formed parses. It may form a rime with a complex coda (type (28)f) or it may straddle two open syllables whose nuclei are E and G. In the latter case the second syllable is comprised of the two skeletal slots of a geminate. Syllable (F~G) belongs to category (a) in table (28). Table (28) did not take into account the possibility that an onset and the following nucleus might belong to the same geminate. Assuming that that possibility can combine freely with those listed in table (28), one can derive from (28) a new table in which each line represents the particular case in which the onset and the nucleus belong to the same geminate, see below table (47). Examples b, c, d, e and f in (47) are invented. An underlining indicates a nucleus. Otherwise our conventions are the same as in table (28).

(47)	types	examples	weight
a.	O~ N	<u>nn</u>	L (light)
b.	O~ N~	<u>nn</u> ~	
c.	O~ N D~	<u>nn</u> k~	L or H
d.	O~ N D	<u>nn</u> k	H (heavy)
e.	O~ N~D	<u>nnn</u>	
f.	O~ N D~D	<u>nn</u> kk	

Syllables of type (47)b and (47)e are excluded because in Tashlhiyt the same melodic unit cannot be linked to three X slots in a row, v. § 3.2.1.1. As for the cases c,d and f of (47), we have not encountered any example in our corpus.⁶⁷ Let us add that in all the instances of type (47)a which we have encountered the syllable in question is the F~G part of an EF~G sequence. Unless it belongs to an EF~G sequence, the first skeletal slot in a geminate cannot be syllabified as an onset.

Let us posit the following constraint, which forbids the first half of a geminate to be an onset:⁶⁸

$$(48) \quad \text{NoOns~:} \quad \text{prohibit} \quad \begin{array}{c} \text{O} \\ | \\ \text{X} \quad \text{X} \\ \diagdown \quad \diagup \\ \text{Rt} \end{array} \quad \begin{array}{l} (\text{O} = \text{onset} \\ \text{Rt} = \text{Root node}) \end{array}$$

We now need to specify the way the constraints interact so as to guarantee that the only violations of (48) which can result in a licit parse are those occurring in EF~G sequences. We have not been able to solve this problem in a manner compatible with the spirit of OT. Let us nonetheless propose the following device, for the sake of explicitness.

Let us assume that whereas all the parses which are optimal with respect to the constraints are licit, there exist licit parses which are not optimal. These are derived from optimal parses through the operation of optional rules. Let us assume that constraint (48) is undominated; no optimal parse violates it. To derive licit parses of type (47)a, which violate (48), we posit a late optional rule which takes optimal parses as its inputs. The rule turns a complex coda into a syllable:

$$(49) \quad \text{DETACH:} \quad (\text{X X})_{\text{D}} \longrightarrow (\text{X X})_{\sigma} \\ (\text{OPT})$$

To illustrate the role played by DETACH, let us present an analysis of two examples. In our first example we will recapitulate how (44) gets to be parsed as (46). Let us go back to the general scheme outlined in (21).

We start from the input sequence (44) and the metrical pattern required by the tune of the winnowing song, which we repeat below in (50).

$$(50) \quad \text{H L L L H L H L L L H H}$$

⁶⁷ In Jouad (1995) one finds *mu.nnt* (line 4 p. 183 and line 4 p. 196) and *li.mmk* (line 8 p. 220). These parses do not contradict our assertion since in the sequences in question 'nn' et 'mm' are not geminates, see later in this section. On the first form v. DE (1985: 128 note 46).

⁶⁸ This constraint was already discussed in our 1985 work and in Dell and Tangi (1992: 132–133).

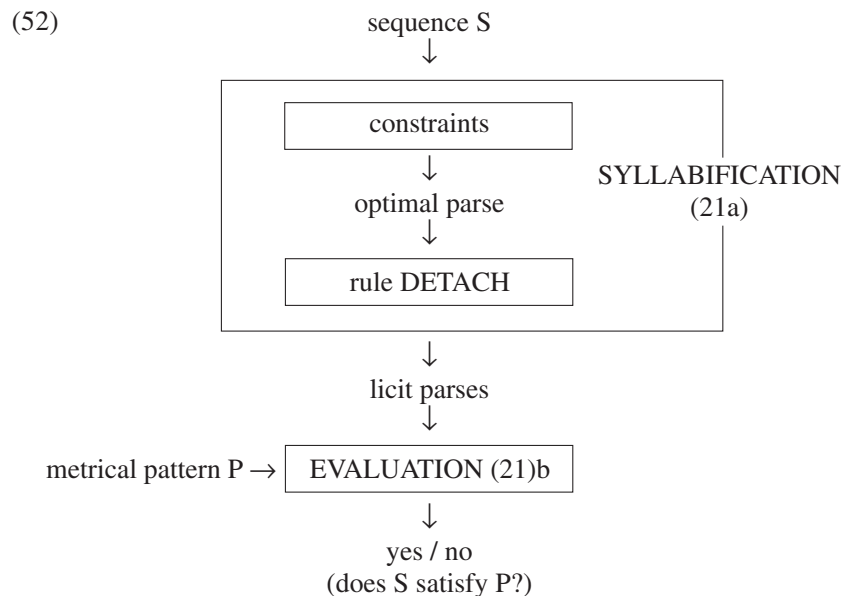
As prescribed in (21)a, one first enumerates the set of licit parses of sequence (44). (44) has four licit parses, which are listed in (51).

- (51) a. bab nuww ti fay grb~ bil ba ra ka γunn rar
 b. nu ww γunn
 c. nuww γu nn
 d. nu ww γu nn

Here is how the parses in (51) are arrived at. The licit parses of a sequence are obtained by applying rule DETACH (49) to each of the parses which are optimal with respect to the constraints. In the case of sequence (44), the various constraints discussed above define a single optimal parse, viz (51)a. Since rule DETACH is optional and its conditions are met in two places in (51)a, the operation of DETACH in (51)a yields four parses, i.e. (51)a–d, which constitute the set SYL mentioned in (21)a.

Let us now move to the second step in (21). Only at this stage does metrical pattern (50) come into play. The metrical pattern requires twelve syllables, which eliminates parse (51)a, which only has eleven, and parse (51)d, which has thirteen. Moreover the pattern requires that the penultimate syllable be heavy, which rules out (51)c. We are then left with (51)b, which satisfies pattern (50) on the condition that the sixth syllable (*grb~*) be construed as light, which is allowed by (27)b.

The various components of our analysis and the way they interact are pictured in diagram (52).



For our second example, consider the beginning of (18)a. As indicated in (19)a, sequence *illannrrž*a parses as shown below in (53)a, but other parses are conceivable. In particular, how is (53)b excluded?

- (53) a. il~ lan~ nrr ža
 b. il~ la nn rr ža
 c. il~ lann rr ža
 d. il~ la nnrr ža

Note first that (53)a is optimal. In particular it does not violate SonPeak (39) since the four sonority peaks in the sequence, viz *i*, *a*, *rr* and *a*, each contain a nucleus. NoOns~ (48) is not violated either in (53)a. On the other hand it incurs two violations in (53)b. On the analysis presented above, a violation of NoOns~ (48) can occur in a licit parse only if it can be traced to the application of rule DETACH in an optimal parse. For (53)b to result from the operation of DETACH, the input to the rule must have been (53)c or (53)d. But it is impossible for either representation to have undergone DETACH, since they are not optimal parses: in (53)c, *rr* violates NoOns~ and in (53)d both SonPeak (39) and NoRR (42) are violated in the third syllable.

Let us end this section with two remarks which will clarify the empirical import of constraint NoOns~ (48).

The first remark concerns the difference between geminates and sequences of identical consonants. Consider the following line (a) and its scansion (b):⁶⁹

- (54) a. is t-ttu-m r-ribab ula n-naqus dlħin
 1 2 3 4 5 6 7 8 9 10 11 12
 H L L L L L L H L H L H
 b. is tt~ tu mr~ ri ba bu lan~ na qus dl ħin

The second syllable in (54)b does not violate NoOns~. Both skeletal slots in that syllable are linked to a feature bundle *t*, but they are not linked to the same occurrence of *t*. The onset is the second person prefix /t-/ while the nucleus is the first half of the initial geminate of the kernel /ttu/ ‘forget’.

Our second remark concerns the fact that as formulated in (48), constraint NoOns~ prevents the first half of a geminate from being an onset. Why not instead prevent it from being syllable-initial? This alternative formulation would predict that a geminate cannot occur as an onsetless H syllable

⁶⁹ Line 151 in a song composed by ME, to appear. ‘Have you already forgotten the one-stringed violin and the tuning fork?’.

at the beginning of a line, an incorrect prediction, witness the second line in the following example.⁷⁰

- (55) a. fulki s-!sbr⁷¹ ma=γ ur i-g a-smun i=t-dalli-t
 b. s-!sbr d=l-yaqin a=f⁷² i-bna i-gmmi d=t-aka-t
- (56) a. ful ki ss br ma γu ri gas mu nit dal~ lit
 b. ss br dl ya qi na fib⁷³ nay gm~ mid ta kat

In order for parse (56)b to be optimal the initial geminate must be a nucleus-coda sequence, i.e. a syllable of type (28)d lacking an onset. If the geminate were an onset-nucleus sequence it would violate constraint NoOns~ and the parse would not be an optimal one, since there exists another one which does not violate the constraint.

Note that the word *!ssbr* also occurs in (55)a. This line has two licit parses. One is that of (56)a, which has a violation of NoOns~ resulting from the operation of rule DETACH. The other is optimal and is the input to DETACH. In that parse the sequence *kiss* is one heavy syllable.

4.9. ALTERNATIVE PARSES MEETING ALL THE CONSTRAINTS

This section deals with sequences for which there is more than one parse meeting all the requirements presented until now. These sequences have sonority contours which are even or have falling slopes.

Let us first list all the constraints which have been called upon in the preceding sections:

- (57) a. Every skeletal slot belongs to one syllable and only one
 b. Complex onsets are prohibited ((34)d)
 c. Condition (26) on well-formed rimes
 d. NoRR (No Rising Rimes) (42)
 e. NoHiatus (25)
 f. SonPeak (39)
 g. NoOns~ (48)

Let us assume that these constraints are all undominated. We say that a parse is '(57)-compliant' if it does not violate any of the constraints in

⁷⁰ Lines 217 and 218 in the song cited in the preceding note. 'Patience is a fine virtue as long as it does not go together with humility / Patience and faith are the foundations on which houses and hearths stand'.

⁷¹ Underlyingly /l-!sbr/. The total assimilation of /l-/ to the following coronal gives rise to a geminate, v. § 2.5.3.1.

⁷² /ad=f/ in the underlying representation.

⁷³ The metrical pattern required by the tune allows the seventh syllable of a line to be either L or H.

(57). Setting aside the violations of NoOns~ ((57)g) due to rule DETACH (49) (see last section), by and large all licit parses are (57)-compliant.⁷⁴

Certain segment sequences only have one (57)-compliant parse while others have several. Examples of sequences of the first type are (40)a,b,c, (44) and (55)a,b. For such sequences, if the (57)-compliant parse does not meet the conditions of rule DETACH, it is the unique licit parse; otherwise there are several licit parses, all derived through the application of DETACH to the (57)-compliant parse.

An example of a sequence which has several parses which are (57)-compliant is (40)d. We repeat it here with its parse in (41):

- (58) a l-mskin !attan l=l-hubb af=fllak
- (59)
- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| L | H | L | L | L | H | L | H | L | H |
- a lms ki nat~ ta nll ħub~ baf~ fl~ lak

The parse in (59) does not violate any constraint in (57), but (58) has yet another (57)-compliant parse, which only differs from (59) in that /almski/ is syllabified as *al.ms.ki* (HLL) instead of *a.lms.ki*.

When a sequence has several parses which are (57)-compliant, which among these are licit parses? More research is needed before we can answer this question. All we will do below is to point out two regularities which exclude certain (57)-compliant parses from the set of licit parses, and to show that in a sequence with several (57)-compliant parses, more than one may be a licit parse.

4.9.1. Sonority plateaux in complex obstruent rimes

Our first regularity has to do with complex rimes in which the nucleus is an obstruent, which we call ‘complex obstruent rimes’ for short. Examples of complex obstruent rimes were given in (30), (31) and (56)b. Let us give one more example. (60)a satisfies the same metrical pattern as (54) and (56), as shown in (60)b, where the rime in the eighth syllable is a geminate stop.

- (60) a. w-a=nna y-ugl-n a-žddig gggru-n=as=d i-zan⁷⁵
- b.
- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| H | L | L | L | L | L | L | H | L | H | L | H |
- wan~ na yu gl na žd~ di ggg ru nas di zan

⁷⁴ ‘By and large’: see Chapter 7 on the violations of SonPeak and NoRR which are due to underlying glides.

⁷⁵ ‘Whoever carries flowers and is followed by flies’. This line was coined by ME. From now, on lines for which no reference is given are lines invented by ME.

If a complex obstruent rime is to comply with NoRR, its coda must be an obstruent. The rimes in examples (30), (31), (56)b and (60) are either fricative-stop sequences or geminates, and this is no accident since these are the only complex obstruent rimes which are possible, as it turns out. A rime cannot contain two stops or two fricatives. Consider for instance the sequence in (61)a. The sequence /gdb/ after /u/ cannot form a syllable, witness the fact that it cannot be made to occupy a H position in the metrical pattern of (19). Parse (61)b is (57)-compliant and yet it is unacceptable:

- (61) a. i-!sug=d bda t-i-sita-n d=l-mal i-hmma-n⁷⁶
 b. 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L H L L L L H
 i su *gdb da ti si tan dl ma li hm~ man

Only the other (57)-compliant parse is well-formed, the one in which /ugdbda/ is syllabified as *ug.db.da*. Here is a well-formed line with a parse which is identical in all relevant respects (syllables 3 to 5).

- (62) a. aħħ i-zug=d !brahim i-rwl=d ar=ak^wk^w alla-n⁷⁷
 b. 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L H L L L L L
 aħ~ ħi zug db ra hi mir wl da rak^w~ k^wal~ lan

How are we to account for the limited range of permissible complex obstruent rimes? One could adopt Shaw (1996)'s claim that complex obstruent rimes are altogether prohibited by Universal Grammar and make it into a violable constraint, call it NCOR (No Complex Obstruent Rimes). That constraint could be ranked below NoOns~ and below SonPeak. Let us examine each ranking in turn.

The ranking of NoOns~ above NCOR would account for the well-formedness of complex rimes which are comprised of an obstruent geminate, as in (31)b and (60). Consider again sequence /banssfa/ in (31)b, which must be parsed as *ba.nss.fa*, in violation of NCOR. *ban.ss.fa* complies with NCOR, but it is excluded because it is not even (57)-compliant, since it violates NoOns~.

Ranking SonPeak above NCOR would allow fricative-stop rimes such as those in the syllables *tzd* and *tšt* in (30)a,b and in syllable *tʃk* in (31)a: in these lines the fricative nucleus is indeed a sonority peak. But this ranking would fail to account for the fact that a fricative-stop rime can be well-formed even if the fricative is not a sonority peak, as in the eighth syllable of the following line, which satisfies the same metrical pattern as (60):

⁷⁶ 'He has always led herds and great riches'.

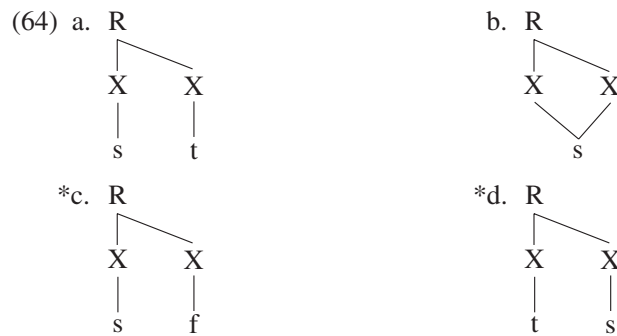
⁷⁷ 'Alas! Brahim has exiled himself here, he has fled here all in tears'. Note that in syllable 8 the glide *w* violates SonPeak. See Chapter 7 about such violations.

(63) a. w-ašš=nna t-srufa t-a-x^ws-t sar ur hnna-n⁷⁸

b. 1 2 3 4 5 6 7 8 9 10 11 12
 H L L L L L L H L H L H
 waš~ šn~ na ts ru fa ta x^wst sa rur hn~ nan

At present we are unable to devise an analysis which would make use of NCOR and at the same time allow parses such as (63)b. The appropriate empirical generalization is that an obstruent nucleus cannot be followed by a coda of equal sonority, unless both belong to the same geminate.

To see what this generalization implies, consider for instance the various possibilities when the nucleus is a fricative. These are displayed below in (64), where *s* and *f* can be replaced at will by any other fricatives, and *t* by any other stop.



Cases (64)a,b,c are all (57)-compliant but we must find a way to exclude (64)c, which is ill-formed, as implied by the above generalization. Case (64)d has been added for the sake of completeness; it is excluded by NoRR (42). The above generalization allows (64)b but not (64)c. Let us posit the constraint formulated below in (65) and assume that only NoOns~ is ranked above that constraint.

(65) NoPICOR:⁷⁹

An obstruent nucleus cannot be followed by a coda of equal sonority.

(63)b does not violate NoPICOR: the syllable *x^wst* does indeed contain adjacent obstruents of equal sonority, but these do not both occur inside the rime.

Whereas the constraints NoRR and SonPeak only take into account sonority differences between adjacent segments, NoPICOR furthermore makes reference to a specific rung of the sonority scale, the obstruents.

⁷⁸ 'The unfortunate whose tooth gives him a rough time will never find relief'.

⁷⁹ NoPICOR: No Plateaux In Complex Obstruent Rimes.

Introducing NoPICOR, which is justified by the need to exclude syllables such as **gdb* in (61), has allowed us to assume that voiced obstruents and their voiceless counterparts are of equal sonority. The sonority scale which we invoked in our earlier work was more differentiated than that given above in (35). Whereas the scale in (35) only divides the obstruents into two classes, the fricatives and the stops, our previous work divided them into four. These were, in an order of decreasing sonority: the voiced fricatives, the voiceless fricatives, the voiced stops and the voiceless stops.⁸⁰ Consider the word *t-xzn=as* ‘she hoarded for him’ (3fs-hoard=dat3s), which can only be parsed as *t.xz.nas* (LLH). In our earlier work, what made this parse preferable to *txz.nas* (HH), was the fact that voiced *z* was more sonorous than voiceless *x*; as a result of this our step-by-step syllabification procedure parsed *z* as a nucleus before its less sonorous neighbour *x* could be entertained as a candidate to nucleushood. In the analysis presented here, on the other hand, the sequence *xz* is a sonority plateau, and what makes *t.xz.nas* preferable to *txz.nas* is that NoPICOR incurs a violation in the latter parse but not in the former.

It is only at a late stage in the preparation of this book that we have come to consider seriously the possibility that positing NoPICOR might render superfluous our earlier sonority distinction between voiced and voiceless obstruents. The decision of invoking the less differentiated sonority scale in (35) has ramifications which have yet to be explored. The less differentiated the sonority scale, the more sequences are sonority plateaux, and constraints SonPeak and NoRR have nothing to say about sonority plateaux. Clearly, more work is needed on the syllabification of sequences containing only fricatives or only stops.

4.9.2. Sequences of high vowels

Our second regularity concerns certain sequences of high vocoids. It is illustrated by (66) below, which is the fourth line of the poem the beginning of which was parsed in (19). That line has two (57)-compliant parses, but only one of them is well-formed:

- (66) a mašš i-s-kufr=t !rbbi ur a=t=ak^wk^w i-tt-annay⁸¹
- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| L | L | H | L | L | L | H | L | L | L | L | H |
- a maš~ šis ku fr trb~ biw ra tak^w~ k^wit~ tan~ nay

In the scansion in (66) /trbbiu/ is syllabified as *trb~.biw*. Another (57)-compliant parse is *trbb.yu*, which is not acceptable. When two high vowels

⁸⁰ See Elmedlaoui (1985), DE (1985, 1988).

⁸¹ ‘But the owner was a callous man; he did not deign look at him.’

are separated by a word boundary and one of them glides to avoid hiatus, it must be the second.⁸² This regularity is valid for the colloquial language as well as for poetry, as will be seen in § 7.1.3.

4.9.3. *Alternative licit parses not due to DETACH*

Let us now turn to situations in which a sequence has two (57)-compliant parses, both of them licit. Sequence /yukrlka/ has two (57)-compliant parses, *yu.krl.ka* and *yuk.rl.ka*. These are both well-formed, witness the acceptability of the lines below, which can be sung to the tune of (19).⁸³

- (67)
- | | | | | | | | | | | | | |
|----|----|-----------|------------|-----------|-----------|------|-----|----|----|----|----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | L | L | H | L | L | L | H | L | L | L | L | H |
| a. | a | yu | krl | ka | sɣ | tuz~ | zum | tn | ma | ta | ħa | nut |
| b. | bi | hi | yuk | rl | ka | su | ras | gi | sn | ta | ya | fut |

In /yukrlkas/ SonPeak requires a syllable nucleus to be located on one of the two segments in the sonority peak /r/, but the other constraints do not prefer one location over the other.

On the basis of the limited data given in DE (1997a), Billerey (1999) conjectured that alternate licit parses exist only when the alternate nuclei have the same degree of sonority, as is the case in (67) above, where there is no sonority difference between /r/, which is a nucleus in (67)a, and /l/, which is a nucleus in (67)b. However, we have found strings which allow alternate parses although the alternate nuclei do not form a sonority plateau. Sequence /tax^wstsa/ in (63) is a case in point. It is parsed as *ta.x^wst.sa* in (63)b, and its other (57)-compliant parse, viz *tax^w.st.sa*, is also well-formed, see the syllables 8–10 in (68)b below: (68)a is acceptable as a line with the same metrical pattern as (63)b, and (68)b is the parse of (68)a which satisfies that pattern. Parses *ta.x^wst.sa* and *tax^w.st.sa* are both licit, despite the fact that /st/ is not a sonority plateau.

- (68) a. ayhayya w-a=nna t-nɣa t-a-x^ws-t sul huwl-n⁸⁴
- b.
- | | | | | | | | | | | | |
|----|------|----|------|----|----|----|------------------|----|-----|-----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| H | L | L | L | L | L | L | H | L | H | L | H |
| ay | hay~ | ya | wan~ | na | tn | ɣa | tax ^w | st | sul | hu~ | wln |

In /ax^wstsa/ the sonority peaks (the vowels) are separated by a sequence with falling sonority, about which constraints SonPeak and NoRR have nothing

⁸² See also syllable 10 in (33)b.

⁸³ (a) a y-ukr l-kas ɣ=t-!uzzum-t nm a t-a-ħanu-t, ‘he stole the glass from the back of the shop’; (b) bihi y-ukr l-kas ur=as=gisn t-a-yafu-t, ‘Bihi stole the glass; it is of no use to him’.

⁸⁴ ‘Ouch! the one whose tooth aches and who, on top of that, is in trouble’.

to say. Another example is sequence /almski/, which is parsed as *a.lms.ki* in (59). The parse *al.ms.ki* is also well-formed,⁸⁵ witness the acceptability of the following line, which can be sung to the tune of (19).⁸⁶

- (69) 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L H L L L L H
 a ym~ mal ms ki nu rak^wk^w yu fi ta gl~ lat

More empirical work is needed on syllabification in expressions which contain sonority plateaux and sequences with falling sonority ramps.

4.10. SUMMARY

We recapitulate the devices which have been called upon in this chapter.

- (70) a. Every skeletal slot belongs to one syllable and only one
 b. Complex onsets are prohibited ((34)d)
 c. Condition (26) on well-formed rimes
 d. NoRR (No Rising Rimes) (42)
 e. NoHiatus (25)
 f. SonPeak (39) 
 g. NoOns~ (48) 
 h. NoPICOR (65)
 i. DETACH (49)

The last item in (70) is a phonological rule and all the others are constraints. The rule, which is optional, operates on the output of the constraints, see the box diagram in (52). Except for NoPICOR, which is dominated by NoOns~, all the constraints are undominated.

⁸⁵ This corrects DE (1997a: 46), who stated incorrectly that *al.ms.ki* is unacceptable.

⁸⁶ a ymma l-mskin ur=ak^wk^w y-ufi t-a-glla-t 'Ah! while the poor man does not even find a turnip'.

TASHLHIYT SYLLABLES II

The last chapter dealt with syllabification in word sequences sung to a tune. In this chapter we discuss two morphologically-governed alternations which are evidence that our analysis of syllable structure in Tashlhiyt is also valid inside stems: imperfective gemination and length alternations in the causative prefix. Before we do this, however, let us consider briefly syllabification in word sequences outside of poetry.

5.1. THE SYLLABIFICATION OF WORD SEQUENCES OUTSIDE OF POETRY

In the preceding chapter all our evidence about syllabification in Tashlhiyt Berber was drawn from versification. The evidence on which we relied in Elmedlaoui (1985) and in DE (1985) was of a different kind: ME uttered various expressions (words or word sequences) as he would in normal speech, and for each expression we noted (A) how many syllables ME felt the expression contained and (B) where he felt the syllabic peaks were located. ME was for instance asked questions A and B about the expressions /rad t-kšm/ ‘she will enter’ and /i-!sbukd/ ‘he poked (someone) in the eye’, which are pronounced *ratkšm* and *!isbukd*. He answered that he felt that *ratkšm* was comprised of three syllables whose nuclei were *a*, *k* and *m*, and that *!isbukd* was comprised of two, whose nuclei were *i* and *u*. From these answers we inferred the parses *ra.tk.šm* and *is.bukd*.¹ Let us use the phrase ‘inferred from direct questioning’ (IFDQ) to distinguish parses like these from those involved in orthometric syllabification, i.e. syllabification in poetry.

As noted in DE (1988), orthometric syllabification and IFDQ syllabification differ in certain respects. One systematic difference involves obstruent nuclei, which never occur next to a pause in IFDQ syllabic parses. Whereas the already cited *!isbukd* is felt to contain three syllables in *!i-sbukd baba=s* ‘he poked his father’s eye out’ (*is.bu.kd.ba.bas*) it is felt to contain only two syllables when uttered in isolation (*is.bukd*). Another example is the initial consonant in the stem /skr/, which is felt to be a nucleus in *t-skr* ‘she did’ (IFDQ *tš.kr.*) but not in *skr* ‘do!’. The latter form is felt to contain only one syllable (IFDQ *.skr.*). The IFDQ parse and the orthometric parse are identical for *t-skr*, in which the stem-initial /s/ is not adjacent to a pause,

¹ See DE (1985: 120). We say that the parses were ‘inferred’, rather than simply recorded, because no questions were asked about the location of syllable boundaries.

while they are different for *skr*, which can count as two syllables at the beginning of a line in singing (s.kr).

The analysis proposed in our works of 1985 and 1988 proceeded in two stages. During the first stage syllable structure was built in a stepwise fashion over the input string by a simple procedure called Core Syllabification. Like the constraint-based analysis developed in the last chapter, Core Syllabification yielded parses which are those needed for versification. During the second stage the syllable structure built by Core Syllabification was readjusted in various ways to fit the IFDQ parses. Take again *skr* ‘do!’. Core Syllabification would first parse /skr/ as dissyllabic s.kr. In a later stage of the derivation, in case the form occurred immediately after a pause, it would be readjusted to monosyllabic skr, with a complex onset.

We do not make use of IFDQ syllabification in this book because we think singing is a more reliable source of data, as explained in § 4.1. What, then, about the syllable structure of Tashlhiyt Berber outside of poetry?

It is a common occurrence across cultures for singing to make use of pronunciations and of syllabic parses which are not acceptable in the spoken language. Take for instance the variety of French spoken in Paris. *étudiez* ‘study!’ can only have three syllables in the spoken language ([e.tü.dje]) while in singing it can have three or four ([e.tü.di.je]), depending on what the tune requires; *lune* ‘moon’ can only be pronounced with a final consonant in the spoken language ([lün]) while it can take a final vowel in singing ([lü.nœ]). For Imdlawn Tashlhiyt Berber, we have already mentioned the existence of variant pronunciations which are acceptable only in singing,² and one cannot rule out the possibility that certain syllabic parses could be available in singing but not in the spoken language, or the other way around.³ We must leave this question open for further research. Whatever the discrepancies between them, however, syllabification in singing and that in the spoken language cannot be very different. They are rooted in the same components of the native speakers’ grammars, or at least in components which overlap to a considerable extent. While native speakers of French sing the French word *trois* ‘three’ as one syllable, those of Tashlhiyt Berber sing it as two (*tr.wa*). Clearly, such divergences reflect differences between the sound patterns of the two languages, not just different conventions for setting text to music.

Up to this point we have only considered syllabification in word

² See § 4.6.

³ We have a hunch that only singing allows violations of constraint NoOns~, which forbids the first half of a geminate to be an onset. Such violations are never found in IFDQ parses. Jebbour (1999: 109ff) argues that NoOns~ is never violated in the syllabic parses which are relevant for the templatic morphology of Tashlhiyt.

sequences. We now turn to two phenomena which shed light on syllabification in units smaller than words, viz in stems.

5.2. IMPERFECTIVE GEMINATION: THE BASIC GENERALIZATION

Certain verbs of Tashlhiyt form their imperfective stem by geminating one consonant in their basic stem. Before we discuss the details of imperfective gemination, let us set the scene by explaining in broad outline how imperfective stems are formed.⁴ Some aspects of this outline will become relevant later in this chapter, when we discuss Jebbour's claims about syllable weight.

Details aside, three processes are resorted to in the formation of imperfective stems:

- (1) A i. the gemination of a consonant;
 ii. the prefixation of *tt-*;
 B. the insertion of a 'chameleon vowel'.

Which of these processes operate for a given verb is to a great extent determined by the phonological make-up of the basic stem, i.e. the perfective stem.⁵ These processes may operate jointly, except that gemination and the prefix *tt-* are incompatible, which is why in (1) they have been grouped to form the supercategory A. The examples in the table (2) below cover some common stem-types. In (2) the first two columns each correspond to one branch in (1). The plus and the minus signs indicate whether the processes just mentioned are involved in the formation of the imperfective stem.

(2)	A	B	pf	impf	
a.	+	–	lkm	lkkm	'reach'
b.	+	–	žla	žllu	'lose'
c.	+	–	lsa	lssa	'wear'
d.	+	–	ufa	tt-afa	'find'
e.	+	–	kkil	tt-kkil	'curdle'
f.	+	+	skkiws	tt-skkiwis	'sit'
g.	+	+	fruri	tt-fruruy	'crumble'
h.	+	+	dl	ddal	'cover'
i.	+	+	xm	tt-xm	'complete'
j.	+	+	fssr	tt-fssar	'explain'
k.	–	+	ssumm	ssumum	'suck'
l.	–	+	sni	snay	'sign'
m.	–	+	ss-lkm	ss-lkam	'cause to reach' (cf. a)

⁴ See DE (1991: 84–96) for a detailed survey of imperfective stem formation.

⁵ See below on the choice of the basic stem.

(2)f and all the verbs below it insert a chameleon vowel in the imperfective. The chameleon vowel is inserted before the last segment of the basic stem. It is a copy of the preceding vowel if there is one; otherwise it is *a*.

Our argument in this section is concerned with the verbs which simply geminate one consonant in the imperfective, see (2)a,b,c.⁶ In the examples below we give for each verb (I) its perfective stem, (II) its imperfective stem and (III) the syllabic parse of its perfective stem, which will become relevant below.⁷

(3)	I pf	II impf	III syll of pf	I pf	II impf	III syll of pf
	krz	kkrz	.krz.	rks	rkks	r.ks
	hľb	hľhľb	.hľb.	!lbž	!lbbž	l.bž.
	!zľm	!zzľm	.zľm.	γml	γmml	γ.ml
	mrz	mmrz	.mrz.	ršq	rššq	r.šq
	xng	xxng	.xng.	žbd	žbbd	ž.bd
	frn	ffrn	.frn.	xsi	xssi	x.sĩ

The verbs on the left-hand side of (3) geminate their first consonant in the imperfective while those on the right-hand side geminate their second consonant. The boldface letters in the perfective stems (I) will be explained later.

In all the verbs which form their imperfective stems simply by geminating one consonant in the basic stem, the following two conditions are met:⁸

- (4)
- (a) the basic stem contains three segments none of which is a geminate;
 - (b) if the basic stem contains a vowel, that vowel must be the last segment.

Let us refer to the verbs which have these properties as the ‘geminable verbs’. Not all geminable verbs resort to gemination in the imperfective, see e.g. *xťm* ((2)i) and *sňi* ((2)l), which meet the above conditions. Let us say that a geminable verb which does resort to imperfective gemination is a ‘geminating verb’. The distribution of the geminating verbs among the

⁶ The ablaut *au* in (2)b also occurs in verbs which do not use gemination in the imperfective (see DE (1991)). It is not directly relevant in this discussion, which is only concerned with alternations in which syllable structure is involved.

⁷ Except for *xsi*, which means ‘go out (fire)’, the meanings of all the verbs in (3) are given in Appendix V at the end of this book.

⁸ See DE (1991: 85).

geminable verbs seems to be a matter of lexical idiosyncrasy.⁹ On the other hand the segment which undergoes gemination is predictable. It is either the first or the second, never the third. One can state the following generalization:

- (5) The segment which is geminated in the imperfective stem is that segment which is an onset in the basic stem.

In the verbs on the left-hand side of (3) it is the first consonant which is an onset in the perfective stem, while in those on the right-hand side it is the second consonant. It is easy to see that the syllabic parses in (3) are indeed the only ones compatible with the constraints proposed in the preceding chapter. The sonority peaks in the perfective stems in (3) are in boldface. Syllabic parses with nuclei other than those in (3) would violate constraint SonPeak.

Generalization (5) reflects a property which is specific, at least in part, to the processes responsible for the formation of imperfective stems. It does not simply follow from general limitations on the distribution of geminate segments in all stems, witness the existence of basic stems such as *mmzr* 'scatter', *nnɣl* 'pour out', *sstl* 'weigh in one's hand', *frrd* 'give the change', *!znng* 'be congested', *drmm* 'trample underfoot'.

We have found only four exceptions to generalization (5) among all the geminating verbs of Imdlawn Tashlhiyt known to us.¹⁰ Commenting on DE (1988), the article in which generalization (5) was first proposed, Shaw (1996) notes that geminating verbs like those on the left in (3), which geminate their first consonant in the imperfective, all have a sonorant as their second segment. We have since found one with an obstruent in second position: *fsd* 'be spoiled'.¹¹ That we have not found more is not too surprising, for there are not many CCC verbs with only obstruents.

Imperfective gemination is strong evidence in favor of the thesis of Sonority-Driven Syllabification.¹² As is implied in the preceding discussion,

⁹ Appendix V at the end of this book lists all the geminating verbs ending in a consonant which we have found in Imdlawn Tashlhiyt.

¹⁰ They are *!ɣra* 'read', *ɣ^wma* 'coat', *ɣli* 'go up' and *bzg* 'swell', whose imperfective stems are not *!ɣrra*, *ɣ^wmma*, *ɣlli* and *bbzg*, as predicted by (5), but *!aqqra*, *aq^wma*, *aqqlay* and *azzg*. Besides being exceptions to (5), the first three forms have an idiosyncratic initial *a*. The third has a further irregularity: although gemination and vowel insertion are both regularly used to form imperfective stems, as a rule both processes do not cooccur in the same stem if it is trilateral, v. DE (1991: 84ff). Besides *bzg*, there are a number of other geminating verbs in which an initial labial is replaced by *a* in the imperfective.

¹¹ Like a number of other geminable verbs, *fsd* has a geminating form and a nongeminating one in free variation in the imperfective (*ffsd* / *tt-fsad*). *tt-CCaC* is arguably the unmarked case in the formation of imperfective stems for the CCC verbs. This case is exemplified in (2)i.

¹² On the thesis of Sonority-Driven Syllabification, see § 4.1.

the units whose syllabic structure is relevant for imperfective gemination are bare stems; inflectional affixes are irrelevant. /k/ is an onset in the bare perfective stem /rks/ 'hide', for instance (r.ks), while it is not in /rks-n/ 'they hid' (rk.sn), but the imperfective stem of /rks/ is /rkks/ regardless of the surrounding morphemes: *ar t-rkks* 'she is hiding', *ar rkks-n* 'they are hiding'. Imperfective gemination indicates that the same constraints which shape syllable structure in word sequences also operate in bare stems.

In view of recent attempts to characterize 'cyclic effects' in terms of relations between full words,¹³ one may ask whether the generalization (5) could be reformulated so as to capture a relation between actual word forms in the conjugational paradigm of Tashlhiyt, rather than between stems. Can the imperfective stem and the basic stem referred to in (5) stand on their own as words?

In the conjugation of Tashlhiyt verbs the only stems which can occur without any overt inflectional affixes are the imperfective stem and the aorist stem. These are used as imperative 2s forms. The bare imperfective stem is used in the imperfective imperative, while the bare aorist stem is used in the perfective imperative, see DE (1991: 178–179).

Can the 'basic stem' referred to in (4) and (5) be equated with the aorist stem? We are unable to give this question a definite answer, for such an answer would presuppose an overall analysis of the verbal morphology of Tashlhiyt, but we can at least give an idea of the kind of facts involved. Knowledge of these facts is in any case necessary in order to see the exact empirical import of generalization (5).

The table in (6) below exemplifies the various types of verbs which resort to gemination in the imperfective.¹⁴

(6)	pf	aor	impf	
a.	lkm	lkm	lkkm	'reach'
b.	žla	žlu	žllu	'lose'
c.	lsa	ls	lssa	'wear'
d.	mla	ml	mmal	'show'
e.	dl	dl	ddal	'cover'

Table (6) illustrates several regularities. First, the verbs with shapes *CCC* and *CCi* have homophonous stems in the perfective and in the aorist; either stem can be used as a starting point for deriving the imperfective stem (line a). Second, the vowel of most *CCa* verbs becomes *u* in the aorist and in the imperfective (line b), which would suggest that it is the aorist

¹³ See Kenstowicz (1996), Kiparsky (2000) and references therein.

¹⁴ The verbs in lines a, b and e also appear in (2)a,b,h.

stem which should be taken as basic, as is in fact done in most discussions of Berber verbs. Third, a sizeable minority of *CCa* verbs have *CC* aorist stems (lines c and d). For most of these the shape of the imperfective stem is *CC:a* (line c), while it is *C:aC* for the others (line d). Choosing the perfective stem as a starting point for deriving the imperfective stem allows us to include in our discussion the class of verbs exemplified in (6)c. If the aorist stem were used instead as the basic stem, various details would have to be changed in our formulations, but the changes would not impinge on the main point of this section: the generalization in (5) is evidence that the account of syllable structure which we set forth in the last chapter is also valid for stems.

The support which the facts of imperfective gemination lend to our analysis of syllable structure in Tashlhiyt, and in particular to the Sonority-Driven Syllabification thesis, is reinforced when Tashlhiyt is compared with other dialects of Berber. Consider for instance Ath Sidhar Rifian.¹⁵ In addition to the underlying vowels /a, i, u/, Ath Sidhar Rifian has an epenthetic vowel @ which is inserted to syllabify consonant clusters, and the sonority of consonants only plays a marginal role in syllabification in that dialect. /CCC/ verbs are also very common in the lexicon of Ath Sidhar Rifian. The appendix in Tangi (1991: 313–337) lists close to 600 verbs. One-fifth of these are /CCC/ verbs whose imperfective stem only differs from the perfective stem by the gemination of a consonant. In all such verbs it is the second consonant which geminates in the imperfective, regardless of the sonority contour of the underlying /CCC/ sequence. The imperfective stem of *šm@z* ‘scratch’ is *š@mm@z* and that of *!mš@ð* ‘comb’ is *!m@šš@ð*.¹⁶ When pronounced in isolation, e.g. as 2s imperative forms, all the /CCC/ stems are pronounced as *CC@C*, with the middle C acting as an onset. Generalization (5) is also valid in Ath Sidhar Rifian, then.

The same state of affairs prevails in the dialect of Figuig (Kossmann 1994, Saa 1995), in Kabyle (Basset and Picard 1948, Bendjaballah 1995) and in Tamazight (Abdel-Massih 1968, Penchoen 1973). All these dialects are on record with syllable structures resembling that of Ath Sidhar Rifian, and in all the middle consonant is the only one which can geminate to form imperfective stems for /CCC/ verbs.¹⁷

¹⁵ On Ath Sidhar Rifian, see § 6.5.

¹⁶ The cognate forms in Tashlhiyt are *k^wmz* (impf *k^wk^wmz*) and *!mšd* (impf *!mššd*).

¹⁷ According to Basset (1929: 155), among the Berber dialects for which data were available at the time, Tashlhiyt was the only one regularly to geminate the first consonant in the imperfective of certain categories of /CCC/ verbs. Basset’s text also implies that gemination of the first C in the imperfective of /CCC/ verbs also occurs, although less regularly, in the Ntifa dialect, in Central Morocco.

5.3. IMPERFECTIVE GEMINATION AND THE WEIGHT OF HOLLOW SYLLABLES

From now on we use the expression ‘hollow syllable’ to refer to any syllable whose nucleus is not *a*, *i* or *u*. *kz* and *krz* are hollow syllables, while *ka* and *kin* are not.

While the views of Jebbour (1999) about the syllable structure of Tashlhiyt are otherwise in accord with ours, this author disputes our conception of syllable weight in that language. Jebbour claims that hollow syllables are all light. According to him, *krz* is a light syllable, on a par with *kz* and *ka*.¹⁸

The author gives two arguments in favor of his position. One argument concerns imperfective gemination and the other, length alternations in the causative prefix. These arguments lose much of their appeal under close scrutiny, as we will now try to show.

We stated earlier that if a verb containing a vowel is to undergo imperfective gemination, the vowel must be its last segment, see (4)b. While some verbs with the shapes CCC and CCV undergo gemination in the imperfective, verbs with the shapes VCC, CVC and VCV never do. This state of affairs is summarized below in table (7), where the canonical forms just mentioned are all instantiated. The perfective stems with shape CCC are instantiated on two lines, one for monosyllabic CCC and one for disyllabic C.CC.

(7)		pf	impf	
a.	<u>CCC</u> .	krz	kkrz	‘plough’
a’.	<u>CVC</u> .	ħuz	*ħħuz (tt-ħuz)	‘corner’
b.	<u>CCC</u>	rks	rkks	‘hide’
b’.	<u>VCC</u>	udr	*uddr (tt-adr)	‘pin down’
c.	<u>CCV</u>	kla	klla	‘spend the day’
c’.	<u>VCV</u>	uli	*ulli (tt-ali)	‘cluster’

The column for imperfective stems displays the form which results from geminating the onset consonant in the perfective stem. When the geminated form is ungrammatical, the attested form is indicated in parentheses.

Jebbour seeks an analysis which would not only predict which consonant geminates in the imperfective in (7)a–c, but would also account for the fact that gemination is an option in lines a, b and c, but not in a’, b’ and c’. According to him, the reason why gemination is licit only with stems in lines a, b and c, is that the grammar of Tashlhiyt imposes a certain constraint on the shape of imperfective kernels, which geminated forms in lines a’, b’ and c’ fail to meet. He proposes that imperfective gemination is subject to the following restriction:

¹⁸ Jebbour’s article restates the central claim of Jebbour (1996).

- (8) Geminate the onset in the basic stem if the resulting form is LL (a sequence of two light syllables).

In (9) below we give again the content of the ‘pf’ and ‘impf’ columns in table (7). Each geminated form is syllabified and is followed by the syllable weight which Jebbour assigns in accordance with his claim that in Tashlhiyt all vowelless syllables are light.

(9)	pf	impf		
	a. krz	k.krz		L L
	a'. ħuz	ħ.ħuz	*	L H
	b. rks	rk.ks		L L
	b'. udr	ud.dr	*	H L
	c. kla	kl.la		L L
	c'. uli	ul.li	*	H L

The LL requirement on the output of gemination is met in lines a, b and c, but not in lines a', b' and c', and consequently gemination is possible in the former but not in the latter, as indicated by the asterisks. Note in particular the contrast between lines a and a', which is consistent with Jebbour's claim that CCC syllables are light.

At first one may take the LL requirement in (8) to be a constraint on imperfective kernels in general, and we believe that therein lies much of its attractiveness. In fact, what is the scope of the LL requirement? Due to chameleon insertion, among other things, imperfective stems ending in CVC syllables are commonplace in Tashlhiyt, see line f and all the others below it in (2). Consequently the LL requirement cannot be construed as a constraint on imperfective kernels in general.

It cannot even be construed as a constraint on the imperfective kernels in which gemination operates, for Tashlhiyt has imperfective stems such as *ddal*, from *dl* ((2)h). Until now the discussion has focussed on the three-segment verbs, but these are not the only ones which can use gemination to form their imperfective stems. Most of the two-segment verbs have imperfective stems of the form *C:aC*. Examples are given below in (10).

(10)	pf	impf	
	a. !dr	!ttar	‘fall’
	b. fl	ffal	‘leave behind’
	c. gn	ggan	‘sleep’
	d. γ ^w i	q ^w q ^w ay	‘seize’
	e. !di	!ttay	‘take out’

The upshot is that Jebbour's LL requirement is concerned only with the output of a specific process (gemination), and that its jurisdiction is limited to the three-segment verbs. The only property of the class of geminable

verbs which is explained by Jebbour's LL constraint is the fact stated earlier in (4)b: if a vowel occurs in a (three-segment) geminable verb, that vowel must be the last segment. The LL requirement is indeed an improvement over merely stating the fact in question as we did in (4)b, but this improvement is offset by the conundrum which we are then faced with: we cannot simply discount the fact that versification systematically treats hollow syllables with a coda as heavy. Further evidence is needed before we would feel compelled to accept that Tashlhiyt morphology and versification use different representations to compute syllable weight. However Jebbour's second argument is even less compelling than the first, as we will see now.¹⁹

5.4. LENGTH ALTERNATIONS IN THE CAUSATIVE PREFIX

To show that hollow syllables with codas are light, Jebbour (1999) also uses data pertaining to the length of the causative prefix. In this section we build on Jebbour's work and present our own characterization of length alternations in the causative prefix, which is preferable for conceptual reasons as well as for empirical ones. That characterization is compatible with our claim that in Tashlhiyt the weight of syllables does not depend on the feature content of their nuclei. The length alternations in the causative prefix are our second item of evidence which shows that the structure of syllables inside stems is the same as that in word sequences.

The morpheme /s-/ is prefixed to verbs to derive causative verbs. Here are some examples.²⁰

- | | | | | |
|---------|-------|---------------|---------|--------------------|
| (11) a. | rgigi | 'tremble' | s-rgigi | 'cause to tremble' |
| b. | nda | 'be churned' | ss-nda | 'churn' |
| c. | nza | 'be sold' | zz-nza | 'sell' |
| d. | ʕiʃ | 'survive' | ʃʃ-ʕiʃ | 'cause to survive' |
| e. | nʒm | 'be unharmed' | ʒʒ-nʒm | 'rescue' |

In what follows, we use the term 'base' to refer to the verb from which a causative verb is derived by prefixation of /s-/.

Causative /s-/ shows two types of alternations which are independent

¹⁹ A questionable aspect of Jebbour's proposal should be noted in passing, which has to do with the representation of geminates. Formulated within Hayes's (1989) version of moraic theory, which is the framework he adopts, Jebbour's basic claim is that syllables which have a consonant in their nucleus are all comprised of a single mora. It is difficult to see how this claim can be reconciled with the existence of tautosyllabic geminates in vowel-less syllables, e.g. /gzz/ 'crunch!' (gzz), /dl=tt/ 'cover her!' (dltt). /dl=tt/ and similar cases are especially worrisome. Since the author explicitly prohibits branching codas in vowel-less syllables (note 5 p. 98), sequences such as /dl=tt/ do not have any licit parse in his analysis.

²⁰ DE (1991: 96–99) present an overview of the causative verbs of Imdlawn Tashlhiyt and show how their conjugation relates to that of the other verbs.

of one another. On the one hand, it is subject to sibilant harmony, a cover term for two independent processes of assimilation-at-a-distance: when the base contains a fricative coronal the causative prefix must agree with it in voicing and in anteriority; compare for instance *ss-nda*, *zz-nza*, *šš-ŋiš* and *žž-nžm* in (11) above. Sibilant harmony has no lexical exceptions in Imdlawn Tashlhiyt.²¹

Besides harmonizing with a sibilant in the base, the causative prefix is also subject to quantity alternations. It is realized as a simplex consonant in some verbs and as a geminate in others, and these alternations are the subject of the present section.

5.4.1. *Monosyllabic bases beginning with an onset*

Setting aside various lexical idiosyncrasies, the length of the causative prefix is predictable from the canonical form of the base to which it is attached. The facts which are central in Jebbour's argument are those about causatives derived from monosyllabic bases in which the initial segment is an onset. The author's factual claims about such verbs are summarized in (12).

(12) Jebbour's generalizations about onset-initial monosyllabic bases

	base	px	example
a.	<u>CC</u>	long	!ss-dr 'cause to fall'
b.	CV	long	ss-ni 'cause to ride'
c.	<u>CCC</u>	long	ss-frs 'sharpen'
d.	CVC	short	s-mun 'gather'

According to (12), .CCC. bases call for the same variant of the causative prefix as CV and CC bases, which are light syllables; CVC bases call for a different variant of the causative prefix.²² Considering .CCC. syllables as unimoraic allows Jebbour to subsume all the facts of table (12) under a single generalization: the causative prefix is long before unimoraic bases, and short before multimoraic bases.

We wish to take issue with the factual basis of the generalizations summarized in (12). The table only covers part of the data. Except for the .CCC. bases, which always call for a geminate prefix, as claimed by table (12), the other bases are found both with a simplex prefix and with a geminate one. Pending a detailed study, our preliminary explorations suggest

²¹ See Elmedlaoui (1995a: 11–42) for a detailed discussion illustrated with abundant examples.

²² Since we are only taking into consideration base verbs which begin with an onset, the notations .CC. and .CCC. unambiguously refer to bases in which the second consonant is a nucleus. To avoid cluttering, we will often dispense with the underscores indicating nuclear consonants. Anyway, Tashlhiyt has no verb whose perfective stem is an onsetless hollow syllable, i.e. a syllable .CC. or a syllable .CCC. whose final CC is a geminate.

the following broad outline for the causative verbs derived from onset-initial monosyllabic bases.

Some such verbs allow both variants of the prefix in free variation, e.g. *(s)s-γal* ‘cause to imagine’, *!(s)s-ruħ* ‘cause to reach’, while others allow only one. For instance the verbs in (13) only allow the geminate variant:²³

- | | | | | |
|---------|---------|----------------------------|------|----------------|
| (13) a. | ss-lil | ‘rinse’ | lil | ‘be rinsed’ |
| b. | !zz-riz | ‘pollute’ | !riz | ‘be polluted’ |
| c. | ss-γab | ‘cause to disappear’ | γab | ‘disappear’ |
| d. | ss-tub | ‘demand repentance’ | tub | ‘repent’ |
| e. | ss-hul | ‘cause to worry’ | hul | ‘be worried’ |
| f. | ss-dux | ‘cause to lose one’s head’ | dux | ‘lose one’s h’ |

Note that the causative verbs in (13) are all counter-examples to generalization (12)d, according to which CVC bases call for a simplex prefix; that generalization is crucial for Jebbour’s claim that CVC and CCC syllables have different weights.

In the causative verbs with onset-initial monosyllabic bases and no free variation in the length of the prefix, the geminate variant is found as a rule in verbs whose syntactic and semantic relationship with the base is more regular, while the simplex variant tends to occur in verbs whose relationship with the base is more idiosyncratic. Some bases give rise to two different causative verbs, one with either variant. Here are examples.

- | | | | | |
|------|-----|--------------------|----------|---------------------------------|
| (14) | !dr | ‘fall’ | !ss-dr | ‘cause to fall’ |
| | | | !s-dr | ‘lay (egg)’ |
| | faw | ‘be clear’ | ss-faw | ‘light up’ |
| | | | s-faw | ‘be able to see’ |
| | gn | ‘sleep, go to bed’ | ss-gn | ‘put to sleep, to bed’ |
| | | | s-gn | ‘lay on its side (e.g. a tree)’ |
| | dus | ‘be tough’ | ss-dus | ‘make strong’ ²⁴ |
| | | | s-dus | ‘fortify (e.g. a town)’ |
| | ʕum | ‘swim’ | (s)s-ʕum | ‘make swim’ |
| | | | s-ʕum | ‘flood’ |

The existence of free variation in some verbs, which was mentioned above, together with doublets like those in (14), suggest that we are dealing with an area of the morphology which is at present in a state of flux, and that in the new order which is emerging all onset-initial monosyllabic bases behave alike, regardless of the content of their rime, and call for

²³ (13)e and (13)f are not to be confused with their free variants *s-huwl* and *s-duwx*, which have a short prefix, as is to be expected for reasons discussed later.

²⁴ As in *l-ħdid a y-ss-dus-n l-bni* ‘it is *the iron* which makes the building strong’ (l-iron AD prt-cau-tough-prt l-building).

the geminate variant of the prefix. This is the assumption which we will make below when we propose a single generalization covering all causative verbs, no matter the shape of their bases. We will assume that all causative verbs with a short prefix before an onset-initial monosyllabic base are lexical idiosyncrasies.

Among the onset-initial monosyllabic bases, the .CCC. bases are the only ones never to occur with a simplex prefix. This fact has no synchronic explanation, but its historical antecedents are easy to surmise: the change now in progress is instating the geminate as the regular variant of the prefix before base shapes which used to call for the simplex variant. If we assume that .CCC. bases already called for the geminate variant in earlier stages of Tashlhiyt, the ongoing change leaves unaffected the causative verbs with .CCC. bases.

5.4.2. *Other bases*

Let us now turn to the causative verbs in which the base is polysyllabic or does not begin with an onset. We will see that Jebbour's generalizations can be improved upon without adopting his views about the weight of hollow syllables with codas.

Bases whose first segment is a coronal fricative are excluded from the upcoming discussion. As a rule the causative prefix does not undergo gemination before sibilant-initial bases. Consider for instance the sibilant-initial bases with the shape CCV. CCV bases normally call for a geminate prefix, e.g. *ss-fta* 'cause to walk', *šš-rša* 'cause to decay', and yet the causative verbs derived from *sda* 'lean on' or *šwa* 'be good', for instance, are *s-sda* and *š-šwa*, not **ss-sda* and **šš-šwa*. When the causative prefix immediately precedes a sibilant, the process of sibilant harmony mentioned earlier partially merges its feature-geometric tree with that of the following sibilant. The phonological objects represented by 'sss' and 'ššš' at the beginning of the ill-formed *ss-sda* and *šš-šwa* would violate constraint NO-TREBLE, which prohibits melodic units associated with three X-positions in a row.²⁵ The interaction between sibilant harmony and NO-TREBLE in causative prefixes is discussed in detail in DE (1996a: 381–385).

In (15) below we give the complete array of generalizations set forth in Jebbour (1999) to cover all the causative verbs. These generalizations have been rearranged and rephrased slightly for the sake of this discussion, but they have the same empirical import as the original ones. Examples of the various cases in (15) can be found below, when we give data in support of our own characterization of the facts.

²⁵ NO-TREBLE was introduced in § 3.2.1.1.

- (15) i. if (a) the base contains a geminate or (b) if it is trisyllabic, the prefix is short;
 ii. otherwise, if the first segment of the base is not an onset, the prefix is long;
 iii. otherwise, if the base is (a) dissyllabic or (b) CVC, the prefix is short;
 iv. otherwise, the prefix is long.

Case iii-b of (15) is the same thing as the generalization stated earlier in (12)d; case iv of (15) is the same thing as the conjunction of a, b and c in (12).

One insight expressed in (15) is that the syllable count is relevant in determining the quantity of the prefix. This insight is correct, in our view, and we shall argue that if it is suitably formulated, the other contextual factors invoked in (15) become superfluous.

We submit that (16) below must be preferred to (15) as a characterization of the quantity alternations in the causative prefix. The idea is to choose the geminate variant only when a causative stem containing the short variant would contain less than three syllables:

(16) CausLength:

The length of the prefix only depends on the number of syllables in the causative stem taken as a whole:

- a. if prefixing the simplex variant to the base yields a string which contains less than three syllables, the prefix is geminate;
 b. otherwise, the prefix is simplex.

The causative prefix is a simplex consonant in the underlying representations, and geminates only under the circumstances described in (16)a. To illustrate: prefixing *s-* to *aywul* yields *say.wul*, which only contains two syllables; hence by (16)a, the causative of *aywul* ‘cause to be tall’ is *ss-aywul*. Similarly, since prefixing *s-* to *frs* yields *s.frs*, with only two syllables, the causative of *frs* ‘be sharp’ is *ss-frs*. On the other hand, prefixing *s-* to *ħada* results in a trisyllabic string (*s.ħa.da*); consequently, by (16)b, the causative of *ħada* ‘be next to’ is *s-ħada*. In case (16)a, prefixing the geminate variant achieves trisyllabicity in the causative stem in some instances, e.g. *s.say.wul*, but not in others, e.g. *ss.frs*.

The differences between (16) and (15) are conceptual as well as empirical, and (16) is superior on either count, as we shall now argue. Consider first the empirical differences.

Setting aside the onset-initial monosyllabic bases, which have already been dwelt upon, a careful comparison of the two proposals reveals that the only case for which they make different predictions is when the base contains a geminate. According to Jebbour’s proposal, all causative verbs with a geminate in the base should begin with a short prefix, see (15)i-a.

On our proposal, on the other hand, bases containing a geminate should not behave differently from the others in their selection of the prefix. Like the others, they should select the long prefix if selecting the short prefix does not yield a causative stem which is long enough. This prediction is borne out by the data. The examples in (17) below all have a long prefix and a geminate in the base, contrary to Jebbour's claim (15)i–a. In (17) the transcription of each attested stem (I) is followed by its syllabic parse (II) and by that of the ill-formed stem which would result from choosing the short variant of the prefix (III).

(17)	I	II parse of I	III parse with short pfx	
	ss-attuy	s.sat.tuy	sat.tuy	'cause to be high'
	ss-g ^w g ^w ra	s.sg ^w g ^w .ra	sg ^w g ^w .ra	'put last'
	!ss-nnra	s.snn.ra	snn.ra	'cause to win'
	ss-alla	s.sal.la	sal.la	'cause to weep'
	ss-xxi	s.sx.xi	sx.xi	'cause to defecate'
	ss-ttu	s.st.tu	st.tu	'cause to forget'
	ss-nna	s.sn.na	sn.na	'cause to say'
	ss-ukrr	s.su.krr	su.krr	'drag'
	ss-uff	s.suff	suff	'make angry'
	ss-iff	s.siff	siff	'sieve'

The strings parsed in III all contain less than three syllables.

By presenting the forms in (17) as counter-examples to Jebbour's generalization (15)i–a, we are implying that Jebbour's generalizations (15) and ours (16) are claims about the same object. However, alternations in the causative prefix is one area of Berber phonology where dialectal variation is rife, even within the confines of Tashlhiyt.²⁶ Could it not be the case that the differences between (15) and (16) simply reflect differences between the Tashlhiyt dialect spoken in Tiznit, from which Jebbour's data is drawn, and the Imdlawn dialect, which is that spoken by ME? The data in Jebbour's work is too limited to enable one to answer that question.²⁷

Even if subsequent research on Tizinit Tashlhiyt shows that the length alternations in that dialect differ in systematic ways from those described

²⁶ On alternations in the causative prefix in various Berber dialects of Morocco, see Saa (1995: 230–259) for a partial survey of the recent literature. This author presents in great detail the alternations in the causative prefix in Zenaga (Figuig), in Eastern Morocco.

²⁷ Guerssel (1992) compares the realizations of the causative, reciprocal and passive prefixes in two Tamazight dialects and a Taqbaylit dialect. Although the author intends to provide an overall account of the phonology of these prefixes in the Berber dialects of Morocco and Algeria, it is not clear how the general scheme he proposes can accommodate the Imdlawn Tashlhiyt data.

here, the differences must presumably be specific to length selection in the causative prefix, rather than following from a general difference in the way syllable weight is computed in the two dialects. For if syllable weight distinctions in Tiznit accorded with Jebbour's theses, the native speakers of the Tiznit dialect, who share the same singing tradition with the other Ashlhiys, would experience special difficulties in acquiring the H/L distinction employed in verse by that tradition. However, Tiznit speakers do not experience such difficulties.²⁸

We now turn to the conceptual differences between the two proposals. Our proposal is preferable to Jebbour's because of its parsimony. According to CausLength (16), syllable count is the only factor which has an influence on the quantity of the prefix. (15), on the other hand, lists three different factors, viz

- the length of the base, measured in syllables (cases i-b and iii-a), or in moras (cases iii-b and iv);
- the presence of a geminate in the base (case i-a);
- whether the base begins with an onset or a nucleus.

What makes the parsimony of CausLength possible is another conceptual difference between the two proposals; that difference has to do with the morphological unit whose phonological properties are taken into account to predict the quantity of the prefix. In Jebbour's proposal the unit in question is the base which is an input to the prefixation process, whereas in our proposal, it is the causative stem as a whole, i.e. the output of the prefixation process. Our generalization establishes a tight relationship between the phonological properties of the prefixal variants and those of the bases which select them: since the alternation aims at producing causative stems as long as possible up to three syllables, it is no wonder that short bases should select the long prefix, and longer bases, the short prefix. In Jebbour's proposal, on the other hand, there is no intrinsic connection between each context listed in (15) and the variant which is called for by that context. The generalization we are proposing, then, points to a formal account along the lines of templatic morphology.

Let us now give examples of the various cases covered by our generalization CausLength (16). Table (18) below illustrates case (16)a, in which the geminate prefix is required. The canonical form at the beginning of each line is that of the base considered in isolation. Otherwise the layout of the table is the same as in (17).²⁹

²⁸ According to Amarir (1975: 114, 151), *Lħažž blħid* and *Lħusayn !žanti*, two well-known !rways whose recordings are among the earliest still extant, came from the Tiznit area.

²⁹ The verbs in (18) have the following meanings: (a) bring closer, (b) bring down (fruit), (c) cause to be heavy, (d) remind, (e) keep awake, (f) cause to stand up, (g) cause to be delicious, (h) cause to be right, (i) drag, (j) cause to be lukewarm, (k) put last, (l) strain, (m) cause to be red.

(18)	I	II parse of I	III parse with short pfx
a. .VC.	!zz-az	z.zaz	.zaz.
b. .VCC.	ss-uss	s.suss	.suss.
c. V.CV	!zz-uzi	z.zu.zi	zu.zi
d. C.CV	ss-kti	s.sk.ti	sk.ti
e. V.CC	zz-iwz	z.zi.wz	zi.wz
f. C.CC	ss-nkr	s.sn.kr	sn.kr
g. V.CVC	ss-imim	s.si.mim	si.mim
h. C.CVC	!zz-γzan	z.zγ.zan	zγ.zan
i. V.CCC	ss-ukrr	s.su.krr	su.krr
j. VC.CV	ss-ulba	s.sul.ba	sul.ba
k. CC.CV	ss-g ^w g ^w ra	s.sg ^w g ^w .ra	sg ^w g ^w .ra
l. VC.CC	ss-uddm	s.sud.dm	sud.dm
m. VC.CVC	zz-iwziγ	z.ziw.ziγ	ziw.ziγ

When they are syllabified in isolation, the bases in table (18) all contain less than three syllables and they all begin with a nucleus. As can be seen in column III, adding the simplex variant of the prefix usually gives an onset to the initial syllable of the base, but it never creates an extra syllable. If the geminate variant is used, on the other hand, the causative stem begins with an onsetless syllable whose nucleus is the first half of the geminate prefix; that stem contains one more syllable than the base.

Consider next the onset-initial dissyllabic bases. Prefixing the short variant is enough to create a third syllable, and consequently the short variant is selected, in conformity with (16)b.

(19)	I	II	
a. CV.CV	s-gula	s.gu.la	‘cause to hurry’
b. CC.CV	s-frsi	s.fr.si	‘split’
c. CV.CC	s-nufl	s.nu.fl	‘cause to lose patience’
d. CC.CC	!s-brbr	s.br.br	‘boil’
e. CV.CCC	s-muylt	s.mu.ylt	‘cause to be nauseous’
f. CVC.CV	s-gusma	s.gus.ma	‘cause indigestion’
g. CVC.CC	š-nuššg	š.nuš.šg	‘cause to be agitated’

Finally, here are examples illustrating the fact that the bases which contain more than two syllables select the short variant of the prefix. To highlight the fact that the short prefix is chosen even when its adjunction does not increase the number of syllables, in all our examples but the first, the base begins with a nucleus when it is syllabified in isolation.

(20)		I	II	
a.	CC.CC.CV	s-brkssa	s.br.ks.sa	‘granulate’
b.	V.CC.CV	s-asstwa	sas.st.wa	‘level’
c.	C.CV.CV	s-fruri	sf.ru.ri	‘cause to crumble’
d.	C.CV.CC	!s-knawd	sk.na.wd	‘cause to roll about’
e.	C.CVC.CV	š-frušša	šf.ruš.ša	‘clear up (weather)’
f.	C.CVC.CC	s-ħlullf	sh.lul.lf	‘smooth’

We do not know of many counter-examples to CausLength among the causative stems in which the base is polysyllabic or does not begin with an onset. Most of these counter-examples have the short variant of the prefix, and there are independent reasons to believe that they are lexical exceptions. Consider for instance *xsi*, which means (a) ‘go out (fire)’ or (b) ‘be asphyxiated’. Two causative verbs are derived from this verb: *ss-xsi* and *s-xsi*. *ss-xsi* (*s.sx.si*), which conforms to CausLength, means (a) ‘extinguish’ or (b) ‘asphyxiate’. On the other hand *s-xsi* can only mean ‘extinguish’. This gap suggests that *ss-xsi* represents the productive case while *s-xsi* is listed in the lexicon.

CausLength (16) states that in a causative form, the unit whose properties play a role in determining the length of the causative prefix is the stem; inflectional affixes are irrelevant. Consider for instance the causative stem *ss-frs* ‘sharpen’. According to CausLength, the prefix is geminate because the adjunction of a simplex *s* to *frs* yields a dissyllabic string (*s.frs*). But consider now *ss-frs-n* ‘they sharpened’. Here it is crucial that CausLength take stems into consideration, rather than whole words: once the 3mp prefix *-n* is taken into consideration, the string which follows the causative prefix is dissyllabic (*fr.sn*), and CausLength would incorrectly select the short variant of the prefix.

Like that of the other verbs, the conjugation of the causative verbs involves four stems, viz perfective, negative, aorist and imperfective (see § 2.4). All the causative stems cited in our examples up to this point are perfective stems, but CausLength is meant to be valid for the other stems as well. Consider for instance the four stems of *!ss-udn* ‘cause to be ill’ (those of *!udn* ‘be ill’ are given underneath for the sake of comparison):

(21)	pf	neg	aor	impf
a.	!ss-udn	!ss-ud(i)n	!ss-adn	!ss-adan
b.	!udn	!ud(i)n	!adn	!tt-adn

In (21)a the quantity of the prefix in each stem is determined independently of that in the other three, and it only depends on the nature of the phonological string which follows the prefix in the stem in question, e.g. when CausLength applies in the perfective, the string whose syllable count matters is *su.dn*, and when CausLength applies in the imperfective, that string is *sa.dan*. Since both strings are dissyllabic, the long variant of the

prefix is independently called for in either case. What the preceding sentences imply is that when one wants to predict the quantity of the prefix of a causative verb for a given stem, there is no need to refer to the quantity of the prefix in one of the three other stems, or to any property of the verb from which the causative verb is derived.³⁰

At the beginning of this section we agreed to use the term ‘base’ to refer to ‘the verb from which a causative verb is derived’. We can now define that term more precisely. In (16), ‘base’ is intended to refer to the string which remains when a causative stem is stripped of its causative prefix. The base is *!udn* in the perfective *!ss-udn*, while it is *!adan* in the imperfective *!ss-adan*. The phonological differences between *!udn* and *!adan* follow from various regularities which are not specific to the conjugation of causative verbs, see DE (1991).

Shifting from one stem to the other in the conjugation of verbs sometimes impinges on syllable structure, e.g. *!udn* ends in a light syllable (*dn*), and *!adan* ends in a heavy syllable (*dan*). One may expect to find causative verbs in which the length of the prefix changes when one shifts from one stem to the other. Here is one such case. The imperfective stem of *!s-wrry* ‘cause to be yellow’ has two forms in free variation: *!ss-iwriy* and *!swrray*.³¹ The base *!iwriy* calls for the long variant of the prefix, like the other VCCVC bases, and the base *!wrray* calls for the short variant, like the other CC.CVC bases. Such instances are not numerous, however, because as a rule the various bases of a verb all fall under the same branch of CausLength (16); in (21)a, for instance, the bases *!udn*, *!udin*, *!adn* and *!adan* all fall under branch a of CausLength. Note in particular that the geminating verbs of section § 5.2 do not give rise to causative verbs with length alternations in their causative prefixes. Consider for instance *k̥ti*, a geminating verb meaning ‘remember’, and the causative *ss-k̥ti* ‘remind’. The perfective and imperfective stems of each are given below in (22)a,b:

(22)	perfective	imperfective
a.	<i>k̥ti</i>	<i>k̥tti</i>
b.	<i>ss-k̥ti</i> (s.sk.ti)	<i>ss-ktay</i> (s.sk.tay)
c.		* <i>s-k̥tti</i> (s.kt.ti)

If imperfective gemination operated in the causative, the resulting stem would be *s-k̥tti* ((22)c), with a short prefix in alternation with the long prefix

³⁰ Only the aorist stem and the imperfective stem can occur without any affixes (see above in § 5.2). Consequently, CausLength cannot in general be construed as capturing a relation between units which can stand on their own as words.

³¹ This verb is derived from *!wrry* ‘be yellow’, whose imperfective stem is *!tt-iwriy*.

in the perfective stem *ss-kti* ((22)b). *s-ktti* is ill-formed, however. This ill-formedness is the consequence of the following two claims:³²

- (i) The morphological structure of the imperfective stem of a causative verb derived from a verb Z is [impf[cau[Z]]], e.g. the structure of the imperfective stem *ss-ktay* ((22)b) is [impf[cau[kti]]]. Taking /kti/ as a starting point, one first derives the causative verb /s-kti/, which is then inflected for the imperfective.
- (ii) Imperfective gemination can only operate on inputs which are kernels.

As a result of (i), the input to the morphological processes which derive the imperfective stem of *ss-kti* contains a causative prefix, i.e. that input is not a kernel, and consequently imperfective gemination cannot apply to it.

5.5. CONCLUSION

In § 4.1, we introduced two mutually independent claims which are central to our account of Tashlhiyt syllable structure, the Sonority-Driven Syllabification thesis and the Licit Consonantal Nuclei thesis. While the two morphologically-governed alternations discussed in this chapter are evidence in favor of the Sonority-Driven Syllabification thesis, they are neutral with respect to the Licit Consonantal Nuclei thesis. Consider for instance imperfective gemination, taking as examples the verbs *krz* ‘plough’ and *rks* ‘hide’, whose imperfective stems are *kkrz* and *rkks* (v. (3)). In accordance with the Licit Consonantal Nuclei thesis, we are claiming that in the basic stems of these verbs, all syllable nuclei are consonants. Now suppose that we discard the Licit Consonantal Nuclei thesis and analyze the syllabic consonants of Tashlhiyt as phonetic realizations of *eC* sequences, where ‘e’ stands for an epenthetic vowel.³³ As a result of sonority-driven vowel epenthesis, the basic stems of *krz* and *rks* would now syllabify as *.kerz.* and *er.kes.* Under this alternative analysis, it is still the case that the segment which undergoes gemination in the imperfective is an onset in the basic stem, as stated in generalization (5). Since the facts of imperfective gemination are equally consistent with an analysis which does not incorporate the Licit Consonantal Nuclei thesis, they do not constitute evidence in its favor. Evidence for the Licit Consonantal Nuclei thesis will be presented in the next chapter.

³² Ample evidence for the validity of these claims can be found in DE (1991).

³³ Such an analysis was entertained briefly in § 4.1, v. (11) and the surrounding text.

VOWELLESS SYLLABLES

As explained in § 4.1, our analysis of the syllable structure of Imdlawn Tashlhiyt revolves around two theses, the Licit Consonantal Nuclei thesis and the Sonority-Driven Syllabification thesis. The evidence in favor of the Sonority-Driven Syllabification thesis was presented in the last two chapters. In this chapter we present our evidence in favor of the Licit Consonantal Nuclei thesis. According to this thesis, Imdlawn Tashlhiyt has no epenthetic vowels; if the nucleus in a syllable is not a full vowel it is a consonant.

We first discuss the distribution of the short voiced vocoids (sections 6.1 to 6.3). That distribution lends strong plausibility to our contention that the vocoids in question are not vowels, but mere transitions between consonants. We then present two phonological phenomena which are natural consequences of our claim that there are no epenthetic vowels in Imdlawn Tashlhiyt. One is a gap in consonant combinations inside morphemes (§ 6.4.1); the other involves regressive devoicing (§ 6.4.2). In the next section we contrast Imdlawn Tashlhiyt with Ath Sidhar Rifian, a Berber dialect in which some short vocoids are genuine epenthetic vowels. The last section is devoted to considerations about the short vocoids in other works on Tashlhiyt.

6.1. VOWELS VS. TRANSITIONAL VOCOIDS

Transitional vocoids and their distribution is a topic which clearly requires further research, but the knowledge we have already acquired about it is sufficient to dispel suspicions that transitional vocoids are short epenthetic vowels or surface reflexes of underlying segments.

Transitional vocoids were briefly introduced in § 2.2.¹ The reader may recall that in that section a vocoid was defined as any stretch of time, however short, not occupied by a glottal consonant or by an articulation which is consonantal in the sense of Chomsky and Halle (1968). A voiced transitional vocoid (VTV for short) was defined as any voiced vocoid which is not an occurrence of one of the uncontroversial segments *a*, *i*, *u*, *y*, *w*. By ‘uncontroversial segments’ we mean those segments which are already present in lexical representations or which are introduced by uncontroversial morphological or phonological processes. Compare for instance the

¹ See also § 4.1.

imperfective participle /i-tt-!bukud-n/ (prt-impf-blind:impf-prt) ‘who becomes blind’ !ittbukudn and its perfective counterpart /i-!bbukd-n/ (prt-blind-prt) !ibbukdn. One hears a voiced vocoid between *k* and *d* in the pronunciation of both forms, which sound respectively as [!it:^hbukudn] and [!ib:uk@dn]. The intervening vocoid in the first form is an instance of *u*, i.e. a copy of the preceding vowel which is regularly inserted to form certain imperfective stems (v. § 5.2). That in the second form is a transitional vocoid. As another example, compare the pronunciations of the free state noun /t-i-gni/ *tigni* ‘sewing’ and its bound state form /t-gni/ *tgni* when these words occur in /sala-n tigni/ (finish-3mp . . .) ‘they finished sewing’ and in /šala n=tgni/ (contest of= . . .) ‘sewing contest’. *t* and *g* are separated by a voiced vocoid in both forms. In *tigni* the intervening vocoid is the nominal prefix discussed in § 2.5, which drops in the bound state, while in *tgni* it is a transitional vocoid, a short [ɪ] glossed over by our broad transcription.

VTVs never occur adjacent to vowels. As already stated in § 4.1, we believe that the location and vowel quality of VTVs are entirely predictable on the basis of the neighbouring segments and of certain morphological boundaries.

We will use the cover symbol ‘@’ when we want to represent a VTV without specifying its exact vowel quality. Although the expression ‘transitional vocoid’ implies our commitment to a certain analysis, it should be clear that statements that a VTV occurs at a certain location in the pronunciation of a given sentence have empirical content. To falsify a statement of that kind one must inspect tokens of the sentence in question to determine whether a vocoid occurs at the said location. If one occurs one must check whether it is an ‘uncontroversial segment’ according to our analysis. Setting aside dialect differences, our ‘uncontroversial segments’ are pretty much in agreement with the full vowels and the semivowels in the transcriptions of other authors who have written on Tashlhiyt, v. e.g. those in Destaing (1920) or in Aspinion (1953).

We uniformly notate ‘@’ for all VTVs, but it must be kept in mind that some are more vowel-like than others; some sound like full-fledged vowels, albeit very short ones, e.g. the first @ in [!tn@g@d@] !tngd (/t-!ngd/) ‘she drowned’, whereas others sound like mere stop bursts combined with voicing, e.g. the last two in [!tn@g@d@]. Also, VTVs are rather elusive in many cases; now you hear them, now you don’t. For instance in !iznnkk ‘he made you become congested’, from /i-!znng=k/ (3ms-congest=do2ms) a VTV may be heard between *n* and *kk* in some tokens ([!izn:@k:^h]) but not in others ([!izn:k:^h]); and in yet other tokens, we are not sure. This is different from standard cases of free variation. In French, for instance, *pas de ski* ‘no ski’ can be pronounced either as [padœski] or as [patski], and the two variants are categorially distinct: in the mapping between the segments and the tones of the sentence tune, for

instance,² there are only two options, depending on whether the realization of *pas de ski* /paz də ski/ contains three vowels or only two.

In our previous articles on Imdlawn Tashlhiyt and in the present book the VTVs recorded between heterorganic consonants reflect the perceptions of one of us, FD, who does not speak the language. The other author, ME, is normally unaware of the existence of the VTVs in his speech, and when the presence of one is pointed out to him, he finds it quite difficult to perceive, if he perceives it at all.³ This is all the more striking since ME is to some extent able to introspect about other aspects of his pronunciation and consciously manipulate them, such as emphatic articulation and voicing in consonant clusters.

A fully explicit description of the phonology of Imdlawn Tashlhiyt should characterize the distribution of the VTVs and their phonetic properties in each environment. We are able to do this only in part because the data are very difficult to gather. If the difficulty simply resided in the fact that the combinations to check occur at sentence level and that there is extensive free variation in many contexts, our task would be similar to that involved in making sense of the behavior of schwa in Standard French. But, as we have said above, the VTVs of Imdlawn Tashlhiyt do not seem to be all-or-none entities akin to French schwa.⁴ A more apt comparison would be with the very short voiced vocoids that we seem to hear after the release of the first stop in sequences *dm*, *bd* and *gm* in some tokens of *admirer* [admiʁe], *abdiquer* [abdike] or *bourgmestre* [buʁgmɛstʁ] when we listen to Standard French with the same attention to detail as that required to make out the most elusive VTVs of Imdlawn Tashlhiyt. These short vocoids may indeed be there, but they do not count for the phonology of French, i.e. there is no known phonological process which takes their presence into account. We hold that the same is true of the VTVs of Imdlawn Tashlhiyt. Their distribution is to some extent language-specific, and a grammar of Imdlawn Tashlhiyt cannot be complete unless it describes that distribution. But if, as we claim, the other phonological processes of the language do not take the VTVs into account, an incomplete description of their distribution will be without consequences for the rest of the description of the phonology.

6.2. VTVS ARE RELEASES WITH VOICING

Before presenting in some detail the facts presently known about the VTVs of Imdlawn Tashlhiyt, let us first outline how we propose to account for them. In our view the transitional vocoids of Imdlawn Tashlhiyt are nothing

² For examples of that mapping, v. Dell (1984).

³ This assertion is valid only for those VTVs which occur between heterorganic consonants. Between homorganic consonants it is another matter, see below § 6.3.3.

⁴ Aspinion (1953: 120) likens the 'e brefs' of Aštukén Tashlhiyt to French schwa.

but consonantal releases. In this book 'release' means the same thing as 'removal of a radical obstruction in the midsagittal region of the oral cavity, followed by pulmonic egressive airstream'.⁵

Two conditions must be met for a voiced vocoid to occur at a given point in the pronunciation of an utterance: the vocal cords must vibrate and the articulators must assume a posture which allows the air to flow unimpeded through the vocal tract. Here is, in a nutshell, how we view a VTV occurring between two consonants A and B which are adjacent in the terminal representations: it corresponds to a lag between the offset of the closure of A and the onset of the closure of B, and its voicing is an extension of that of A or B.

Consider for instance the word /t-kla/ 'she spent the day'. For reasons to be explained below, the closure of *t* must be released before that of *k* is formed, and consequently the 'hold' phases of *t* and *k* must be separated by an interval of time during which the air can flow out unimpeded. *t* and *k* being both voiceless, the intervening vocoid is voiceless too; it sounds like a short voiceless *i*, and one hears [t^hkla], or more precisely, as Coleman (1996: 191) correctly points out for a related form, [t̚kla]. Consider now /t-gla/ 'it (f) soaks'. *t* and *g* must again be separated by a short vocoid, but in this case the glottal vibration required by *g* begins as soon as *t* is released. The transition between *t* and *g* sounds like a very short lax *i*, and one hears [t̚gla]. On the other hand in /t-bla/ 'she gave (a vice)' the transition between *t* and *b* sounds more like IPA [ə].

The distinction between released and unreleased stops is not known to play a distinctive role in the lexicon of any language. McCawley (1967), Anderson (1974), Selkirk (1982), Kim-Renaud (1986) and Steriade (1993a, b, 1994) have argued that it nonetheless plays a role in linguistically significant generalizations about individual languages. An assumption shared by all these authors is that release should be represented in the phonological component of a grammar. However Kim (1995) argues that in Korean, a language in which syllable-final stops must be pronounced unreleased in certain environments, release is not a phonological entity since its distribution can be accounted for by resorting to rules of phonetic implementation. Following a suggestion made to us by Nick Clements, we shall adopt the same position for Imdlawn Tashlhiyt. Whereas phonological rules map categorial representations onto other categorial representations, the rules of phonetic implementation generate representations in which feature values are translated into targets along continuous phonetic dimensions, see Pierrehumbert (1980, 1991), Liberman and Pierrehumbert (1984), Keating (1990), Cohn (1993), Huffman (1993), Clements and Hertz (1996) and references therein.

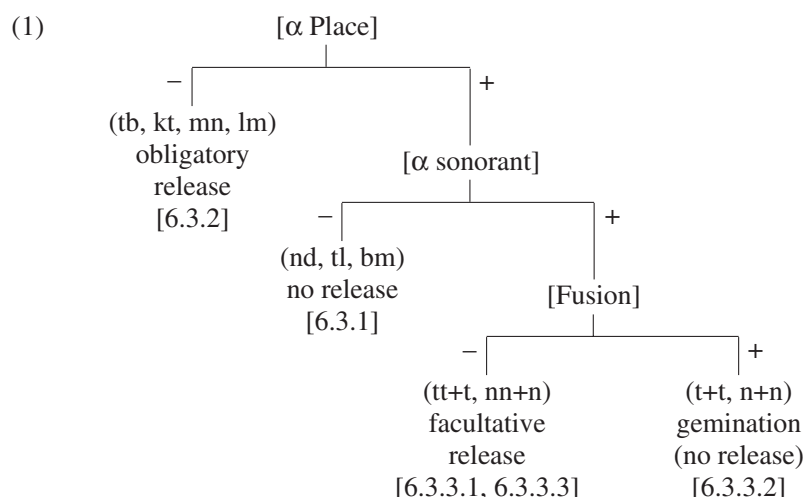
⁵ Mentioning the midsagittal region allows us to speak of the release of *l*, which we take to be a noncontinuant. On the relevance of pulmonic egressive airstream, v. Kim (1994).

The distribution of VTVs in Imdlawn Tashlhiyt results from the interplay between two kinds of phonetic implementation processes, those which determine the relative timing of the constrictions of adjacent segments and those which govern the timing of phonation. The processes of the first type are responsible for the duration of the vocoids which occur between the two first consonants in *t-bla*, *t-gla* and *t-kla*, and also for their vowel quality ([ə] in the first word and [ɪ] in the others); those of the second type are responsible for the fact that the vocoid is voiced in *t-bla* and *t-gla*, and voiceless in *t-kla*. In the next three sections we rely heavily on DE (1996a).

6.3. THE DISTRIBUTION OF VTVS

In this section we describe the possibilities of occurrence of the VTVs in various contexts. Let us first give a very rough outline of the results of the discussion to come.

The licitness of releasing the first consonant in a CC sequence depends primarily on whether the two consonants are homorganic and on whether they agree in sonorancy and in continuancy. If syllable structure plays any role at all, it is a minor one and is limited to heterorganic sequences. The diagram (1) below summarizes the situation when both consonants are noncontinuants. This is the case we have studied in the most systematic fashion, because in that case VTVs are easiest to discern by purely auditory means. In (1) sister branches represent answers ‘Yes’ (+) and ‘No’ (–) to a question which is represented by the mother node. The consonant sequences between parentheses are examples of the various cases, and the numbers between square brackets refer to the sections where those cases are discussed.



As indicated by (1), release is obligatory before a heterorganic noncontinuant (e.g. in *tb*) and it is excluded between two homorganic noncontinuants with different values for the feature [sonorant] (e.g. *tl*). When two homorganic noncontinuants agree in sonorancy, release is optional except in those cases in which the rule Fusion blends them into a geminate.

The preceding summary concerns only release. VTVs are releases accompanied by voicing. When voicing is absent, a transitional vocoid occurs but it is not a VTV. Voicing is excluded between voiceless consonants, e.g. in *kt*. In a sequence of two obstruents which do not agree in voicing, voicing in the second consonant is more prone to give rise to a VTV than voicing in the first, e.g. keeping other contextual factors constant, a VTV is more liable to occur in *kd* than in *gt*.

6.3.1. Two generalizations

The following two generalizations are exceptionless.

- (2) If an underlying sequence does not contain any voiced segment, its phonetic realization does not comprise any laryngeal vibrations.
- (3) The oral closure of a noncontinuant may not be released before a homorganic noncontinuant which differs in sonorancy.

Let us dwell on each generalization in turn. The first implies that in the pronunciation of an expression, voicing can only occur adjacent to a sonorant or a voiced obstruent. This generalization is true of all styles of elocution, even the most deliberate ones. VTVs cannot occur between a voiceless obstruent and a pause or another voiceless obstruent.⁶ Take for instance the phrase /*t-s-qssf-t=stt*/ ‘you shrank it’ (2-cau-narrow-2s=do3fs), which can stand on its own as a complete utterance. It contains only voiceless consonants in its underlying representation, and it must be pronounced voiceless from one end to the other: [tsqs:ftst:^h]. Voiced vocoids cannot be inserted in it at any point, even for the purpose of shouting or as carriers of intonation. It is altogether unsuitable for singing or for slogan chanting.

Let us now turn to the second generalization. When two adjacent homorganic noncontinuants differ in sonorancy, e.g. in *t+n* or in *n+t*, releasing the first is prohibited in all morpho-syntactic environments. In *is=t n-dl* (int=do3ms 1p-cover) ‘did we cover him?’ *t* must not have an oral release (i.e. it must be pronounced with nasal plosion) because it is followed by *n*, which is homorganic with *t* but is [+son]. Similarly, *d* must be pronounced

⁶ This is in sharp contrast with the @ vowel of Rifian and Moroccan Arabic, which can occur between two voiceless consonants (v. § 6.5, § 8.2.2), or with fast speech pronunciations such as *tkila* for *tequila* in English, where a vowel can occur between *t* and *k* in slower speech (Hammond 1997: 34).

with lateral plosion. In generalization (3) and elsewhere in this book the word 'homorganic' is meant to refer only to primary articulations; it does not require agreement with respect to secondary articulations such as rounding or emphasis. For instance, the sequence $g+g^w$ is homorganic in the intended sense. Similarly the sequence $[dn]$, where $[d]$ is emphatic while $[n]$ is not, must be pronounced with a continuous coronal closure, as is for instance the case for the cluster straddling the word boundary in $/t-!bbukd\ nanna=s/$ 'his elder sister became blind' (3fs-blind elder:sister=3s).

Like (2), prohibition (3) is enforced without taking anything into account except the phonetic properties of the segments and their adjacency. It can hold sway over sequences of any length, no matter what their morpho-syntactic make-up. For instance in the sentence $/dl-n=t\ ntl-n/$ 'they covered him and they hid themselves' (cover-3mp=do3ms screen-3mp) the eight consonants must be pronounced with a single uninterrupted closure in the midsagittal region.

Generalization (3) only concerns sequences of noncontinuants which differ in sonorancy. When the two homorganic stops agree in sonorancy, e.g. in $t+t$, $t+d$ or $g+k^w$, releasing the first stop is prohibited in some cases and optional in others: it is prohibited when an assimilation rule has applied or, in most morpho-syntactic contexts, when both stops are short; it is optional otherwise. Whereas the cases covered by (3) are purely a matter of phonetic implementation, those in which the stops agree in sonorancy result from the interplay between the phonological component and the phonetic component. They will be taken up later (v. § 6.3.3).

(3) suggests some kind of principle of phonetic inertia. Assume that in the phonetic implementation of a stop the action of the articulator effecting the closure in the oral cavity is characterized by a single target which corresponds to the 'hold' phase. In a sequence such as $t+n$, then, the tip of the tongue would be assigned two identical targets in a row, and the prohibition against releasing t is best seen as resulting from the requirement that an articulator must follow the shortest possible path when moving from one target to the next. We dub this requirement MINIMAL-PATH(place).

The facts presented earlier about voicing suggest that the phonetic implementation of laryngeal features is subject to a general requirement which is an analogue of MINIMAL-PATH(place), call this requirement MINIMAL-PATH(voice). According to MINIMAL-PATH(voice), a transitional vocoid must be voiceless between voiceless consonants, v. for instance the transitional vocoid between q and k in $i-šnnq=k$ 'he wrung your neck' (3ms-wring:neck=do2ms), which must be pronounced $[iʃn:@q^h k^h]$, and it must be voiced between voiced consonants, v. for instance the transition between g and bb in $!gbbs$ $[!g@b:s]$ 'plaster!'.

Only when adjacent consonants agree in voicing does MINIMAL-PATH(voice) make predictions about voicing in an intervening transitional vocoid. Preliminary observations on the clusters in which one consonant

is voiced and the other is voiceless suggest the following generalizations. If the second consonant is voiced, the vocoid is almost always voiced. For instance one hears an unmistakable [ʊ] between kk^w and d in *nna-n=akk^w !di=tt* (say-3mp=all take:out=do3fs) ‘they all said “take her out!”’. If the first consonant is voiced and the second is not, there are two cases to consider, depending on whether the first is a sonorant or an obstruent. If it is a sonorant the vocoid is always voiced, witness the voiced vocoid between l and k in */i-xtl=km/* ‘he conned you’ (3ms-con=do2fs), which is pronounced [ixtl@km].⁷ If on the other hand the first consonant is a voiced obstruent, the general tendency is for the transitional vocoid to be voiceless, e.g. in *ss-agg^w !titt* (cau-peep eye) ‘let one eye show’⁸ the glottal vibrations of gg^w do not seem to extend beyond the release of the dorsal closure. However there are particular environments in which the glottal vibrations of the first obstruent last until the onset of the constriction of the following obstruent. This often happens before a pause, e.g. between g and t in */t-xng-t/* ‘you strangled’ (2-strangle-2s), which is pronounced [txn(@)g@t].

6.3.2. Release in heterorganic clusters

One striking fact about the pronunciation of Imdlawn Tashlhiyt is that an obstruent stop is always released in an audible manner before another stop which is not homorganic with it. It is instructive to compare the pronunciation of kt in *i-kti* ‘he remembered’ and in the French word *acteur* (*aktœγ*). The velar stop must be pronounced with an audible release in *ikti*, which must sound like [ik^{ht}i], while the release is only optional in the French word, which can be pronounced either *a[k^{ht}]eur* or *a[k^ɿt]eur*. It is commonly said that k is released in [k^{ht}] and not in [k^ɿt], and we will follow this way of speaking, which is harmless as long as one keeps in mind that what is involved is a difference in the phasing between the closure of k with that of the following consonant. In [k^{ht}] the velar closure of k is removed before the coronal closure of t is formed. In [k^ɿt], on the other hand, the coronal closure is formed with the velar closure still in place, and the subsequent removal of the velar closure does not have any audible consequence. The facts we know at present are compatible with the generalization that in Imdlawn Tashlhiyt the oral closure of a consonant never overlaps in time with that of an adjacent heterorganic consonant.⁹ In other words the transition between two heterorganic consonants must always be an open

⁷ Homophonous with */ix t-lkm/* ‘if she reaches’ (if 3fs-reach).

⁸ Said, for instance, to a woman whose hair is hanging in front of her eyes.

⁹ Kinesthetic observations by ME suggest that sequences */fl, bl, ml/* may be counterexamples. We disregard these pending further research.

one.¹⁰ Let us assume that in Imdlawn Tashlhiyt phonetic implementation is subject to the following requirement:

(4) NO-OVERLAP:

Radical constrictions effected by different articulators in the oro-pharyngeal cavity may not overlap in time.¹¹

Requirement (4) concerns only 'radical' constrictions, i.e. it is not meant to govern the timing of the constrictions involved in secondary articulations such as labialisation and dorsopharyngealization. In *t-g^wna* 'she sewed', for instance, it could be the case that *t* is produced with a raised tongue dorsum and rounded lips, as suggested by the fact that the transition between *t* and *g^w* sounds like a short [ʊ].

Consider for instance *t-ss-ftq* [ts:ft^hq^h] 'it (f) bodes ill', where *t* must be released before the following *q*. Our proposal implies that the release of *t* does not have an associated phonetic target of its own. Release is simply an unavoidable consequence of NO-OVERLAP. Because of NO-OVERLAP, the 'hold' phase of *t* and that of *q* must be separated by an interval of time during which the air can flow out unimpeded. At least before a heterorganic segment, there is no need for stop releases to have a counterpart in the representations at any stage of the phonological derivations.

NO-OVERLAP (4) concerns all the heterorganic sequences, but all such sequences do not lend themselves equally well to the auditory detection of intervening vocoids. These are often difficult to make out between a fricative and another consonant. For instance *ak^wz* 'recognize, aor' sounds like *a[kuz]*, but we cannot be sure that *k^w* and *z* are actually separated by a vocoid in our sense. It could be that coronal friction begins as soon as the velar closure is released, and that what we hear as a vocoid is simply the beginning of the voiced fricative. Analogous remarks can be made about the VTV which is at times heard between *f* and *dd* in */t-!fdda/* 'it is over' (3fs-end) and between *x* and *z* in */t-xzn=ak/* 'she hoarded for you' (3fs-hoard=dat2ms). The observations which lead to NO-OVERLAP were made primarily on the release of noncontinuants before noncontinuants. If the vocal cords are vibrating at the time of release, the release of the oral closure of a non-continuant sounds like a short vowel with a clearly delineated onset; it sounds like a short burst of aspiration if they are not. The vocal cords are for instance vibrating when *k* and *d* are released in */i-!bbukd/* (3ms-blind) 'he became blind', and one hears *!ibbu[k@d@]*; they are not when *t* and *k* are released in *y-ut=k* (3ms-strike=do2ms) 'he struck you', and one hears *yu[t^hk^h]*.

Before a pause, obstruent stops are as a rule released in an audible manner, as illustrated by the final stops in the two last examples.

¹⁰ On 'open' and 'close' transitions, see Bloomfield (1933) and Catford (1977).

¹¹ On articulatory overlap, see for instance Browman and Goldstein (1989, 1990).

Among the heterorganic clusters of noncontinuants, those in which we find it easiest to determine by ear whether the stop is released, are those of two obstruents (v. examples above) and also those beginning with *m*, *n* or *l*, at least those in which the vocal cords are vibrating at the time the oral closure of the sonorant is released.¹² This happens for instance in /sstl-x=tt/ (weigh-1s=do3fs) ‘I weighed it in my hand’, which is pronounced [s:tl@xt:^h] and in /t-nfs/ (3fs-deflate) ‘it went flat’, which is pronounced [tn@fs].

Of all the heterorganic clusters, those in which we find it most difficult to ascertain the presence of an intervening vocoid are those in which the second consonant is a syllabic nasal or liquid. We are often unable to distinguish by ear between [CR] and [C@R] (R a nasal or a liquid), e.g. between [t^hknt:^h] and [t^hk@nt:^h] for *tkntt* (from /t-knd-t/) ‘you bamboozled’, or between *ti*[gm]*mi* and *ti*[g@m]*mi* for *t-i-gmmi* ‘house’.

Our discussion until now implies that the only contextual factors which are relevant for the occurrence of a VTV in a CC sequence are the phonetic properties of the two consonants. This is true for voiceless clusters and for homorganic ones, but other features of the environment come into play in the other clusters. It is often the case that a given CC sequence contains a VTV in some contexts but not in others.¹³ The preceding sentence makes this look like an all-or-nothing phenomenon, but in some cases at least it is rather a gradient one: the VTV is easier to discern in some contexts than in others. To carry out a systematic study of this phenomenon, sharper means of observation will be required than the unaided ear. Examples are given in (5).

(5) a.	ts.bɣ	[ts@bɣ]	t-sbɣ	‘she painted’
a’.	is.bɣ	[isbɣ]	i-sbɣ	‘he painted’
b.	ra.dl.bix	[radl@bix]	rad lbi-x	‘I will bite’
b’.	ml.ral.bix	[mralbix]	mra lbi-x	‘if I had bitten’
c.	i.žlx	[ižl@x]	i-žlx	‘he is dirty’
c’.	su.lx	[sulx]	sul-x	‘I survived’
d.	mk.knx	[m@k:nx]	mkkn-x	‘I tightened’
d’.	i.mk.kn	[imk:n]	i-mkkn	‘he tightened’

We have not been able to determine whether syllable structure is involved in variations such as those in (5). The only pattern which emerges clearly

¹² Sonorant consonants are as a rule fully voiced in Imdlawn Tashlhiyt. They may devoice when they are subject to prepausal annexation after a voiceless consonant (v. DE 1985), but even in that context the devoicing is only a partial one.

¹³ This was already pointed out in DE (1985: 117).

from our data is the following general trend: a CC sequence is more likely to contain a VTV when neither C is adjacent to a vowel.¹⁴

In (5)a and (5)b the CC sequence with an intervening VTV is heterosyllabic. More examples of this situation are given below in (6). From now on the raised 'h's indicating voiceless vocoids are omitted from our narrow phonetic transcriptions whenever convenient. Examples b,e,f,n,o,p are included for the sake of comparison.¹⁵

(6) a.	d _l .xas	[dl@xas]	/dl-x=as/	cover-1s=dat3s
b.	.d _l x.	[dl@x]	/dl-x/	cover-1s
c.	t _l .bt.tnt	[!t@bt:nt]	/t-!btt=t/	3fs-line=do3ms
d.	sn.γu.ba	[sn@γuba]	/s-nγuba/	cau-vanish
e.	in.γu.ba	[inγuba]	/i-nγuba/	3ms-vanish
f.	š _{nn} .nq	[šn:@q]	/šnnq/	wring:neck
g.	š _{nn} .qas	[šn:@qas]	/šnnq=as/	wring:neck=dat3s
h.	š _{nn} .qxt	[šn:@qxt]	/šnnq-x=t/	wring:neck-1s=do3ms
i.	tš.bh	[tš@bh]	/t-šbh/	3fs-whip
j.	t _l .ks.btt	[tksb@t:]	/t-ksb=tt/	3fs-own=do3fs
k.	tž.btt	[tž(@)bt:]	/t-žbd-t/	2-pull-2s
l.	tž.bt.tas	[tž@bt:as]	/t-žbd-t=as/	2-pull-2s=dat3s
m.	ts.sn.gtt	[!ts:n@g@t:]	/t-ss-!ngd-t/	2-cau-drown-2s
n.	i.xng	[ix@n@g]	/i-xng/	3ms-strangle
o.	t _l .xnkk	[tx@n@k:]	/t-xng=k/	3fs-strangle=do2ms
p.	t _l .kntt	[tknt:]	/t-knd=t/	3fs-bamboozle=do3ms
q.	tl.mtt	[tl@m@t:]	/t-lmd-t/	2s-learn-2s
r.	sn.fl	[sn@fl]	/snfl/	exchange
s.	l.bž	[!l@bž]	/!lbž/	knead

Let us summarize our presentation up to this point. VTVs never occur adjacent to a vowel. They always occur after a consonant. They always occur next to a voiced segment. When one examines the manner of transition between two noncontinuants there are three cases to consider. In the first two cases there is only one way of making the transition, regardless of the morpho-syntactic context: a noncontinuant is released before a heterorganic consonant, and it is unreleased before a homorganic consonant which differs in sonorancy. We have suggested that these two generalizations are reflections of two requirements on phonetic implementation in

¹⁴ Contextual factors other than the properties of the two consonants are also involved in determining the vowel quality of the intervening VTV. Coleman (2001) shows that the color of VTVs is influenced by neighboring vowels.

¹⁵ The expressions in (6) have the following meanings: (a) I covered for him; (b) I covered; (c) she lined it (clothing); (d) cause to vanish!; (e) he vanished; (f) wring the neck!; (g) wring (someone's neck) for him!; (h) I wrung his neck; (i) she whipped; (j) she owns it; (k) you pulled; (l) you pulled for him; (m) you drowned; (n) he strangled; (o) she strangled you; (p) she bamboozled him; (q) you learned; (r) exchange!; (s) knead!

Imdlawn Tashlhiyt: NO-OVERLAP, see (4), and MINIMAL-PATH(place), which dictates that an articulator should follow the shortest possible path when moving from one target to the next. We now turn to the third case, that of a sequence of homorganic noncontinuants which agree in sonorancy.

6.3.3. Release before a sibling consonant

6.3.3.1. SIBLING-RELEASE

Let us say that two segments are siblings when they have the same values for the features [sonorant] and [continuant], and the same primary articulation. For instance, in the underlying inventory of Imdlawn Tashlhiyt (see § 2.1), the siblings of /t/ are /t, !t, d, !d/; the siblings of /ʒ/ are /ʒ, !ʒ, ʃ, !ʃ/; the siblings of /k/ are /k, k^w, g, g^w/.¹⁶ To take a last example, /f/ has only one sibling in Imdlawn Tashlhiyt, /f/ itself.

When two sibling stops stand next to one another, the transition between them may take two forms. Their oral closures may blend into one long, uninterrupted, closure phase, or the oral closure of the first stop may be released before that of the following stop is formed. These options are in free variation in some contexts but not in others. Because Imdlawn Tashlhiyt allows these two options, the location of releases in sequences of sibling stops may be the only distinguishing feature between two contrasting expressions. Consider the following sentences.

- | | | | |
|--------|-----------------------------------|-------------------------|--------------------|
| (7) a. | /is t-ttu-t/
int 2s-forget-2s | [ist ² ttut] | ‘did you forget?’ |
| b. | /is=tt t-ut/
int=do3fs 3fs-hit | [istt ² tut] | ‘did she hit her?’ |

From now on the symbol ‘²’ represents any stop release, voiceless (^h) or voiced (@). In the above examples *t²tt* and *tt²t* respectively represent IPA [t^ht:] and [t:^ht]. (7)a may not be pronounced as [istt²tut], and (7)b may not be pronounced as [ist²ttut].

Both sentences have an alternative pronunciation in free variation: an acceptable pronunciation for both is [istttut], with an uninterrupted coronal closure which is unambiguously heard as a sequence of three consonants.¹⁷

The contrast in (7) involves a word sequence, but similar contrasts are found word-internally. /tt-tabaa=t/ ‘follow him!’ (impf-follow=do3ms) can be pronounced [tt²tabaat] but not [t²ttabaat], whereas /t-ttu/ ‘she forgot’ (3fs-forget) can be pronounced [t²ttu] but not [tt²tu]. Here is another example:

¹⁶ Note that /q/ is not included (see below).

¹⁷ The coronal closure in [istttut] is longer than that in the contrasting form [istttut] /is=t#t-ut/ ‘did she hit him?’ (int=do3ms 3fs-hit).

- (8) a. /i-γli d=ddir/ [id²ddi] 'he started climbing'
 3ms-climb prep=foot
 b. /t-bidd di-s/ [idd²di] 'she stopped with him'
 3fs-stop prep-3s

d²dd and *dd²d* respectively represent [d@d:] and [d:@d]. The examples in (8)a and (8)b each have an alternative pronunciation in free variation with no release ([ddd]).

That the homorganic sequences appearing in most of our examples are coronal sequences is only due to the greater availability of coronal consonants: in Imdlawn Tashlhiyt it is the coronals which have the most complete series of stops and they appear in numerous grammatical morphemes. The phenomena under discussion are not peculiar to the coronals. Here is for instance an example with velars which is parallel to (7).

- (9) a. /rad=ak kkis-n/ [radak²kkisn] 'they will dispossess you'
 fut=dat2ms dispossess-3mp
 b. /rad=k krf-n/ [rakk²krf-n] 'they will tie you up'
 fut=do2ms bind-3mp

In (9)b /d/ and /k/ obligatorily blend into /kk/ through a process of total assimilation on which see § 3.2.1.3. [kk²k] is not an acceptable pronunciation in (9)a, neither is [k²kk] in (9)b. Both sentences in (9) have an alternative realization in free variation where /kkk/ is realized as [kkk], i.e. with an uninterrupted velar closure which is unambiguously heard as a sequence of three consonants.

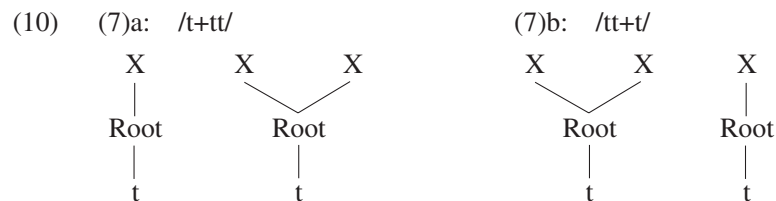
The phonetic contrasts in the preceding examples are all of the form *C²C*: vs. *C:²C*, i.e. they all involve sequences of three X slots. Analogous contrasts are possible for longer sequences. Sequences of five X slots, for instance, allow a three-way contrast. The sequences *t:²t:²t*, *t²t:²t*: and *t:²t²t*: occur respectively in /t-smun-t=t d=t-tbir-t/ (2s-put:together-2s=do3ms with=bf-dove-fs) 'you put it (m) together with the dove', in /ar=t tt-ttu-x/ (impf=do3ms impf-forget-1s) 'I forget him' and in /t-ut=t t-ttu=t/ (3fs-strike=do3ms 3fs-forget:aor=do3ms) 'she struck him and forgot him'.

As can be seen in our examples, a release can never intervene between the two 'halves' of a geminate. Let us call this geminate inseparability. Inseparability obtains for geminates resulting from assimilatory processes (e.g. in (9)b) as well as for those already present in lexical representations. The inseparability of geminates follows from the conception of geminates which we have adopted (see § 3.3): a geminate is a single feature bundle (a single Root node) associated with two prosodic positions.¹⁸

¹⁸ As already stated in § 3.1, we follow the proposals of Clements and Hume (1995) concerning the internal structure of segments.

It is natural to interpret the Root node of a stop as representing an uninterrupted oral closure. Since, like simple stops, geminate stops are comprised of a single Root node, the idea of a consonant with an intervening release between its two ‘halves’ does not make any more sense for geminate stops than it does for simple stops.

Once the source of geminate inseparability is recognized, the data in (7)–(9) is easily understood. Consider again (7), for instance. In both (7)a and (7)b, in the underlying representation, sequence /t+t/ is indeed comprised of three prosodic positions, but only of two Root nodes, as shown in (10), where the letter ‘t’ represents the feature tree which defines the segment *t*:



If a release is to occur inside the structures represented in (10), it can only occur ‘after’ the first Root node. The difference between [ist²ttut] and [istt²tut] simply follows from the fact that the first *t* is short in /is#t-ttu-t/ ((7)a) whereas it is long in /is=tt#t-ut/ ((7)b).

How is a grammar of Imdlawn Tashlhiyt to account for the fact that the underlying contrast between /t+tt/ and /tt+t/ gives rise to a phonetic contrast between [t²tt] and [tt²t]? Given MINIMAL-PATH(place), one would expect release always to be prohibited between homorganic stops, regardless of whether they agree in sonorancy. As a matter of fact, the prohibition only holds when the two stops differ in sonorancy, i.e. in those transitions which involve what Catford (1977: 219) terms an airpath change; otherwise its enforcement is merely optional, as we have just seen. This optionality is presumably the consequence of some other general requirement which is in conflict with MINIMAL-PATH(place). Finding out what this requirement may be is beyond the scope of this book. For the sake of explicitness, let us write the following rule, which encapsulates whatever combination of devices – rules, principles, and the like – is responsible for the fact that a stop is optionally released before a sibling stop.

- (11) SIBLING-RELEASE: [–cont] $\longrightarrow$ released / — sibling (optional)

We have already noted the existence of alternative pronunciations with no releases in sequences /ttt/, /ddd/ and /kkk/ sequences in (7), (8) and (9). In general, releases between sibling stops are not mandatory, that is, if an expression has one acceptable pronunciation which contains two sibling

stops separated by a release, then it has another where the two closures blend into a single uninterrupted one. Here is an example where the sibling consonants differ in voicedness. In /h̥ra#t-dl/ ‘she just covered herself’ (just 3fs-cover) /t-d/ may be realized as t^2d or as td , with a continuous oral closure.¹⁹ The variants of the same form with and without release are not felt to belong to different speech styles or tempos, but the longer a sequence of sibling consonants the stronger the preference for pronouncing the possible releases. For instance /ar#tt-ttu-x/ ‘I forget’ (impf impf-forget-1s) can be realized either as [artt²ttux] or as [arttttux], with a preference for the first realization. Similarly, in /ar=stt tt-ttu-n/ ‘they forget her’ (impf=do3fs impf-forget-3mp) the realization tt^2tt^2tt is strongly preferred.

We have come across a number of instances where release between sibling stops is mandatory, and we have yet to discover the phonological and morpho-syntactic properties which set these instances apart from the run-of-the-mill cases, where it is only optional. Here are two examples. /kk+g/ must be realized as kk^2g in /i-nna=yi kk=grat-sn/ ‘he told me to pass between them’ (3ms-say=dat1s pass:aor=between-3mp), and /t-tt/ must be realized as t^2tt in /t-ttu/ ‘she forgot’ when this word follows a pause.²⁰

There is no reason to ascribe SIBLING-RELEASE to the phonological component in the grammar of Imdlawn Tashlhiyt. We do not know of any phonological rule which should be ordered after SIBLING-RELEASE. The distribution of stop releases varies from one language to the next, but the range of possible variation is probably rather limited. SIBLING-RELEASE (11) is presumably one of a small set of options allowed by Universal Grammar. Our policy will be to keep the formulation of the rules of Imdlawn Tashlhiyt which directly involve release as free as possible from contextual restrictions. Specifically, we shall assume that SIBLING-RELEASE (11) uniformly operates across all morpho-syntactic environments. In those situations where release before a sibling stop is actually forbidden, we shall try to find independent mechanisms which exclude the first term of the alternative – release or no release – implied by the optional nature of SIBLING-RELEASE.

6.3.3.2. *The Fusion rule*

In Imdlawn Tashlhiyt release is in most cases forbidden between two short sibling consonants. Such is for instance the case in sequences which straddle a word boundary. In a sequence /A#B/ where A and B are short sibling consonants, releasing A is prohibited most of the time, unless /A#B/ is a subsequence in a longer sequence of siblings.²¹ Here are examples. Release

¹⁹ There exists yet another variant, viz. *dd*.

²⁰ But release is only optional in /mra t-ttu/ ‘if she had forgotten’.

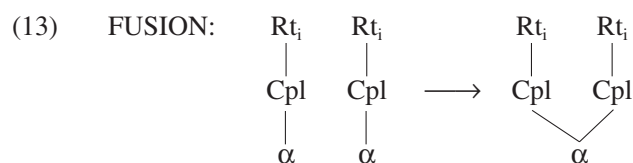
²¹ Instances of sequences of more than two siblings were given in the text under (9).

is forbidden between the two identical consonants in *t-trm ma=s* 'his mother went down' (3fs-go:down mother=3s), where /m#m/ must be realized as mm (**m²m*), and similarly /l#l/ must be realized as ll (**l²l*) in /i-fl luzin/ 'he gave up the factory' (3fs-give:up factory), /t#t/ must be realized as tt (**t²t*) in *y-ut t-ili* 'he struck the ewe', and /g#g/ must be realized as gg (**g²g*) in *i-frg gar i-frig* 'he put up a bad fence' (3ms-enclose bad u-enclosure).

Release is also forbidden between two nonidentical siblings, as in the following sentences:

- (12) a. /t-frd t-funas-t/ 'the cow grazed'
3fs-graze bf-cow-fs
b. /is=ak k^wra-n t-i-gmmi/ 'did they rent the house to you?'
int=dat2ms rent-3mp f-u-house

In (12)a /d#t/ can be pronounced *dt* but not *d²t*; in (12)b /k#k^w/ can be pronounced as *kk^w*, i.e. as a continuous dorsal closure with no concomitant rounding during its first half, but not as *k²k^w*.²² Given that SIBLING-RELEASE (11) optionally releases a stop before a sibling stop, how are we to prevent it from generating *d²t* and *k²k^w* as optional variants of *dt* and *kk^w*? Let us assume that the mechanism responsible for the prohibition of releases is the following phonological rule, which must operate before SIBLING-RELEASE (11):



Fusion is an obligatory rule. It operates in certain morpho-syntactic environments and not in others, as we shall see later. The rule merges two identical primary articulations if the Root nodes which dominate them are adjacent and if they are furthermore comprised of the same feature specifications.²³ We shall assume that release is universally prohibited between two Root nodes in representations containing the linked structure displayed

²² In (12)a /d#t/ can also be pronounced as *tt* (but not as *t²t*), and in (12)b /k#k^w/ can also be pronounced as a geminate *k^wk^w* (but not as *k^{w2}k^w*). These free variants are due to regressive assimilations in phonation type and in rounding to which we will return later. These assimilations are optional in sequences of short consonants straddling a word boundary. When regressive rounding assimilation occurs in /k#k^w/ in (12)b the preceding *a* is articulated further back. Only then does sentence (12)b become homophonous with the following: /is=ak^w k^wra-n tigmmi/ 'the fact is that they even want the house' (indeed=even want-3mp house).

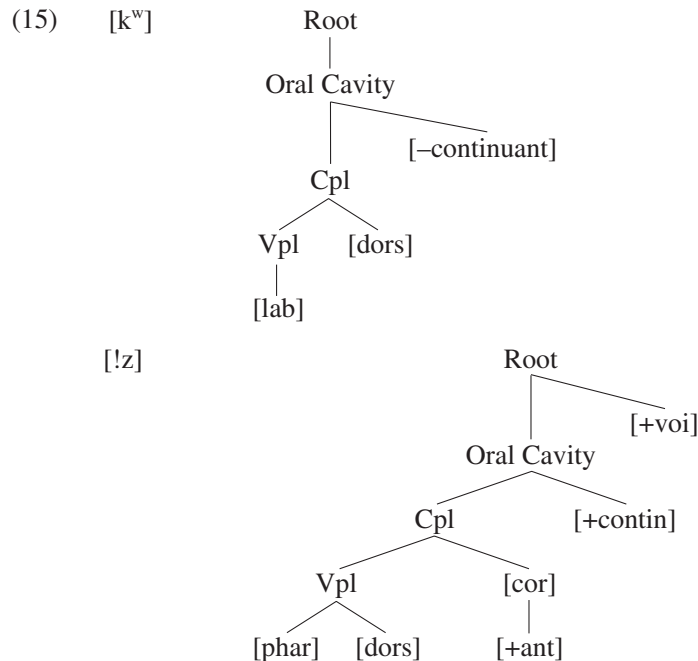
²³ That is, if they agree for the features [sonorant], [vocaloid] and [approximant]. Clements and Hume's [+vocaloid] is the equivalent of [−consonantal] in Chomsky and Halle (1968), and [−vocaloid] is the equivalent of [+consonantal]. Vocaloids and liquids are [+approximant] whereas the other sounds are [−approximant].

to the right of the arrow in (13), and, more generally, between two Root nodes which share a single primary articulation. Here is what we mean by a primary articulation.

(14) Primary articulation:

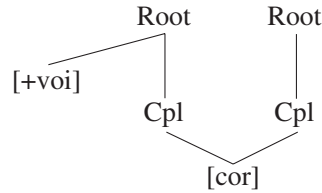
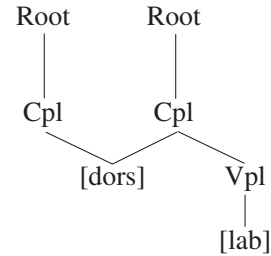
The node in the feature tree which specifies which articulator implements the feature [continuant], together with any nodes which that node may dominate.

This definition is in the spirit of Sagey (1986) and Halle (1992, 1995). In [k^w], for instance, the articulator which implements [-cont] is the dorsum, and consequently the primary articulation is the node [dorsal]. In [!z] the articulator which implements [+cont] is the front of the tongue, and the primary articulation is the node [coronal] together with the specification [+anterior] which it dominates. The diagrams in (15) show how the relevant aspects of these segments are represented in the version of feature geometry advocated in Clements and Hume (1995).²⁴



The representations in (16) result from the operation of Fusion in /d+t/ and in /k+k^w/ in the examples in (12).

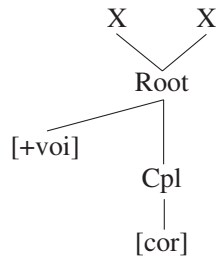
²⁴ The diagrams in this section represent only those aspects of the structure of segments which are relevant.

(16) a. *dt* (from /d+t/)b. *kk^w* (from /k+k^w/)

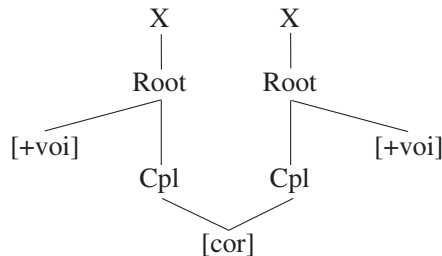
Universal Grammar bars the rules of phonetic implementation – more specifically: SIBLING-RELEASE (11) – from releasing the first stop in linked structures such as these. In (16)a, for instance, there is a single primary coronal articulation. Consequently, in the phonetic component the tongue blade is assigned a single target, i.e. *dt* in (16)a must have a single ‘hold’ phase.

Sequences of identical consonants subject to Fusion are homophonous with the corresponding geminates, e.g. *amud d=u-dis* ‘the seed and the stomach’ (seed and=b-stomach) is homophonous with *a-muddu di-s* ‘the trip with him’ (u-trip with-3s). The relevant aspects of the structure of a lexical geminate /dd/ are represented below in (17)a; (17)b represents the linked structure which results from the operation of Fusion in /d+d/.

(17) a. /dd/



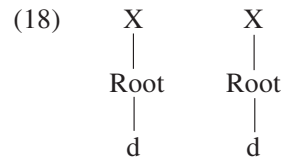
b. /d+d/ after Fusion



The reason why release is impossible in either structure is that both contain a single primary articulation. Let us use ‘long primary articulation’ to refer to a primary articulation which is shared by two skeletal slots, as is the case with [cor] in (17)a and (17)b.

Given our analysis of release, an uninterrupted long closure is ambiguous: it may be the realization either of a long primary articulation, as in (17), or of identical stops in which the optional rule SIBLING-RELEASE (11) has elected not to apply. Consider for instance what we transcribe as *dd*, i.e. *d* with a closure spanning two timing slots, in contrast with *d²d*. The terminal phonological representation which corresponds to *d²d* can only be (18) below, for the closure before the release and that after it must be

manifestations of different occurrences of the same phonetic target, either occurrence corresponding to a [cor] node of its own in the terminal phonological representation.



dd too can be the phonetic implementation of representation (18), as when /d#dd/ is realized as *ddd* in (8)a. In that instance the first and the second occurrences of the letter 'd' in *ddd* represent time slices which correspond to successive Root nodes. In other instances, *dd* is the phonetic implementation of a long primary articulation as in (17), e.g. in the previous example /amud#d=u-dis/, where the sequence /d#d/ is subject to Fusion and surfaces as (17)b. What makes us believe that in that case /d#d/ yields (17)b rather than (18) as its terminal phonological representation? It is the fact that in *amud d=u-dis* the only acceptable realization of /d#d/ is *dd*. If in that example /d#d/ could surface as (18), SIBLING-RELEASE (11) would give rise to a free variant *d²d*, contrary to fact. More generally, what allows us to tell apart those long closures [C:] which materialize a sequence of identical stops from those which materialize a long primary articulation, is the fact that the former, but not the latter, have a free variant [C²C].

The plausibility of the Fusion rule is enhanced by the facts of some other Berber dialects. In the dialect of Figuig as spoken in the Zenaga village, for instance, the geminate counterpart of /d/ is phonetically voiceless, i.e. /dd/ is always realized as [t:]. Heteromorphemic /d+d/ sequences are also always realized as [t:], regardless of morpho-syntactic structure.²⁵ The latter fact shows that that dialect has a rule similar to Fusion (13). Ath Sidhar Rifian Berber has analogous facts which involve continuancy differences between short obstruents and their geminate counterparts.²⁶

Fusion (13) does not treat the uvular stops /q, q^w/ as homorganic with the velar stops /k, k^w, g, g^w/, e.g. the stem-final /q/ must be released in /i-s-qllq=k/ 'he made you angry' (3ms-cau-angry=do2ms), whereas the stem-final /k/ must not be in /i-sllk=k/ 'he saved you' (3ms-save=do2ms). Uvulars must consequently differ from velars in their primary articulations. In Imdlawn Tashlhiyt a velar stop optionally assimilates to a following uvular stop, but not vice-versa. /k+q/ can be pronounced *k²q* or *qq*

²⁵ See Saa (1995).

²⁶ See Dell and Tangi (1992: 158–159).

in /is=ak !qrra-n/ ‘did they make a confession to you?’ (int=dat2ms confess-3mp), but /q=k/ cannot be pronounced *kk* in /i-s-qllq=k/ ‘he made you angry’. On the structure of velars and uvulars, see Trigo (1991) and Elmedlaoui (1995a: 32ff).

Before we move on to examine various restrictions on the operation of Fusion, let us briefly explain why the rule is formulated to merge primary articulations rather than other nodes higher up in the feature tree.

Imagine that Fusion were to merge C-place nodes whenever they dominate identical primary articulations and when the other conditions in (13) are met. Assume that when two nodes are subject to merger the resulting node is their Boolean union. If one of the C-place nodes involved were to contain a secondary articulation, then, the result of the merger should contain it too. This prediction is not borne out by the data. Consider the sentence /i-!bbukd#dadda-s/ ‘his elder brother became blind’ (3ms-blind elder:brother-3s), where two stops on either side of the word boundary must be pronounced as a single long stop. The fact that the following *a* is not pronounced emphatic shows that in the long stop in question, the second half is not emphatic, since both segments in a CV sequence must agree with respect to emphasis at the phonetic level (see § 3.6.2.2).

The evidence is unclear in the case of secondary rounding. In /assarg^w=ka ad γi=nn/ ‘only the stone anvil is there’ (stone:anvil=only AD dem=dir), for instance, it is not clear whether /g^w+k/ can only be realized as *k^wk* or whether it also can be realized as *k^wk^w*. In this example and others like it the relevant acceptability judgements are fuzzy or not consistent over time. Judgements are clear, however, on the following point. The absence of secondary rounding cannot spread, e.g. in the example above /g^w+k/ cannot be realized as *kk*, an outcome which would be predicted if Fusion were a rule spreading to the left the C-place node of the second consonant in (13), or any node dominating C-place.

6.3.3.3. *Restrictions on fusion*

If Fusion were to apply in any string meeting the conditions in (13), SIBLING-RELEASE (11) would never have an opportunity to apply and releases would always be prohibited between sibling stops. Let us now turn to the restrictions on the operation of Fusion which make release between sibling stops possible in Imdlawn Tashlhiyt. These restrictions are of two types. Some involve length, while others have to do with morpho-syntactic structure. Let us review these in turn.

In sequences of sibling stops the long oral closures created by Fusion never span more than two timing units, as we shall now see.

First, Fusion never affects adjacent sibling stops one of which is a geminate. Our reason for believing this to be the case is that release is always²⁷ possible in such sequences, i.e. the realization with an uninter-

rupted closure is in free variation with another in which the first consonant is released. This fact has already been illustrated in our examples in (7)–(9). In these examples the two consonants are identical except for length; here are some in which the two sibling stops differ in phonation type. In /is=ak ggr-n/ ‘did they touch you?’ (int=dat2ms touch-3mp) the medial cluster can be pronounced k^2gg or kgg ; in /ar tt-dus-n/ ‘they are becoming sturdy’ (impf impf-sturdy-3mp) the medial cluster can be pronounced tt^2d or ttd .²⁸

Second, in sequences of three short sibling stops, Fusion never merges three successive primary articulations into one. Like those discussed in the preceding paragraph, these sequences may be realized with unbroken closures, but they always have alternative realizations with releases. In /yat#t-tri-t/ ‘one star’ (one:f bf-star-fs), /t#t-t/ may be pronounced either as tt^2t or as ttt . In /a-gllid#d=d#i-mun/ ‘the king with whom he came’,²⁹ /d#d=d/ may be pronounced as d^2dd , dd^2d or ddd .

As was already pointed out in Chapter 3, Imdlawn Tashlhiyt has two assimilation rules which are blocked if their operation would create a triply-linked Root node. In that chapter we introduced a constraint NO-TREBLE which forbade Root nodes linked to three adjacent X slots. The nodes merged by Fusion are primary articulations rather than Root nodes, and the formulation of NO-TREBLE should be made more general:

(19) NO-TREBLE:

A primary articulation may not be associated with three prosodic positions which are adjacent.³⁰

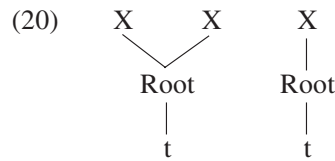
(19) is valid over any string bounded by pauses. Note that what this restriction prohibits is a superlong primary articulation, not a superlong closure. Consider again /is=tt#t-ut/ (see (7)b), where /tt#t/ may be pronounced tt^2t or ttt . For the sake of convenience we reproduce here as (20) the structure of the underlying sequence already displayed in (10)b.

²⁷ . . . unless there has been an assimilation in phonation type or in secondary labiality. Release is incompatible with assimilation between sibling stops, see DE (1996a: 385–388).

²⁸ Contrary to the generalization stated at the beginning of this paragraph, there are a few contexts in which Fusion merges a geminate with a simplex sibling. For instance, in 2nd person imperfective forms, the prefix sequence /t-tt-/ must be realized simply as *tt*. Similarly, /dd-t/ must be realized as *tt* in /t-bidd-t/ ‘you stood up’ (*tbitt*). In all such cases, however, Fusion involves the loss of a skeletal slot, and its outcome abides by NO-TREBLE (see below).

²⁹ u-king with=dir 3ms-come.

³⁰ As formulated in (19), NO-TREBLE is too restrictive, for it excludes languages in which a nasal borrows its primary articulation from a geminate, for example /n+bb/ > *mbb*. A more adequate formulation is given in DE (1996a: 383).



In view of (19) Fusion cannot operate in (20), which surfaces unchanged at the end of the phonological component. Since SIBLING-RELEASE (11) is optional, it may apply, hence tt^2t , or it may not, hence ttt , i.e. a continuous closure spanning three timing slots. When $/tt\#t/$ is realized as ttt , then, what one observes from a phonetic point of view is one continuous closure, but that single *closure* is the manifestation of two successive *primary articulations*, as that notion was defined in (14). NO-TREBLE (19) is not a constraint on the output of phonetic implementation, but on that of the phonological component.³¹

When three underlying short sibling stops stand in a sequence which is not a subsequence of a longer string of siblings, the first stop and the second cannot be released at the same time, e.g. we have not been able to find any instance in which $/t+t+t/$ could be pronounced as t^2t^2t .

If Fusion applied in all environments and if NO-TREBLE (19) was the only restriction on its operation, release between sibling stops would only be found adjacent to a closure spanning two timing slots, as when $/t\#t-t/$ is realized as tt^2t in $/yat\#t-tri-t/$ ‘one star’ (see supra). This prediction comes close enough to the mark. At the phonetic level, release between short sibling closures is disallowed in most environments, and we have yet to determine the exact range of environments which allow it. One can nonetheless already state one important generalization: *releases between sibling stops which are both underlyingly short are disallowed anywhere within a ‘stretch’*. What we call a stretch is a string made up of a lexical morpheme and its dependent suffixes and enclitics, in other words a stretch is a Pword minus its prefixes. The generalization just stated can be broken down into three subcases, which we now quickly review.

Releases between sibling stops which are both underlyingly short are disallowed, (i) between a suffix and a preceding morpheme, and (ii) between

³¹ We account for the optionality of release in sequences such as $/tt\#t/$ by assuming that Fusion (13), which is an obligatory rule, is blocked by NO-TREBLE (19), and that SIBLING-RELEASE (11) is optional. A reviewer has pointed out an alternative: Fusion would be optional in sequences such as $/tt\#t/$, and SIBLING-RELEASE would be obligatory in all contexts. We do not retain this alternative because it would force us to give up restriction (19), which enables us to link up the distribution of releases with the blockage of rules of complete assimilation (see Chapter 3) and with certain facts about the lexical distribution of adjacent identical consonants, on which v. below in § 6.4.1. Yet other evidence in support of (19) is provided by the behavior of the causative prefix before sibilant-initial kernels, v. DE (1996a: 381–385).

an enclitic and a preceding morpheme, and (iii) inside morphemes. Case (i): the clusters at the end of the words below must be pronounced as geminates no matter in what environment: /i-kzin-n/ ($nn / *n^2n$) ‘puppies’, /t-flt-t/ ($tt / *t^2t$) ‘you escaped’, /ar t-slum-m/³² ($mm / *m^2m$) ‘you (p) are eating (something powdery)’, /t-!srd-t/ ($tt / *d^2t$) ‘you sued’. Case (ii): the same holds for the sibling clusters in /i-šrk=k/ ($kk / *k^2k$) ‘he shares you’ (3ms-share=do2ms), /i-!γrd=d/ ($dd / *d^2d$) ‘he lay down’ (3ms-lie=dir), /i-!krd=tn/ ($tt / *d^2t$) ‘he scratched them’ (3ms-scratch=do3mp), /t-!umz-t=d/ ($dd / *t^2d$) ‘you seized’ (2s-seize-2s=dir), /i-balak=k^wn/ ($k^wk^w / *k^2k^w$) ‘he evacuated you’ (3ms-evacuate=do2mp).

Notice that in all the examples above in which the abutting siblings are nonidentical, they are subject to regressive assimilations of phonation type and rounding. These assimilations are mandatory between short sibling consonants which belong to the same stretch.

Case (iii) of the generalization under scrutiny, which concerns tauto-morphemic sequences, only has one exception, the plural noun /t-i-mtd-in/ ‘loin (cut of meat)’, which can be pronounced *timt²din* or *timtdin*. In all the other morphemes with adjacent sibling consonants we have been able to find, one of the sibling consonants is long, e.g. *!tt²d* ‘coagulate’.³³

Fusion always applies within stretches, but not between a prefix and the following morpheme. Release between stops which are both underlyingly short is acceptable in certain cases in that context, e.g. in /t-uška=d t-tbir-t/ ‘the dove came’ (tt^2t) (3fs-come=dir bf-dove-fs), in /t-ut=t t-tbir-t/ (tt^2t^2t)³⁴ ‘the dove struck him’ (3fs-strike=do3ms bf-dove-fs), and in /n-nkr/ (n^2n) ‘we got up’ and /t-!dalb/ (t^2d) ‘she prayed’ when these words occur immediately after a pause.

Since there are instances where Fusion does not apply between a prefix and the following morpheme, it is somewhat surprising to discover that it applies most of the time at the boundaries between words, e.g. in (12).

6.4. THE ONLY SURFACE VOWELS ARE *a*, *i* AND *u*, TWO PHONOLOGICAL ARGUMENTS

Some languages of Morocco have a fourth vowel (@) in their phonetic representations, in addition to the full vowels *a*, *i* and *u*. This is for instance the case in Rifian Berber and in Moroccan Arabic. We submit that Imdlawn Tashlhiyt is different in that its only vowels are the full vowels. In the surface representations of Imdlawn Tashlhiyt, consonants not separated by a consonant or a full vowel are adjacent. In this section we discuss two phenomena which are consistent with our analysis of Imdlawn Tashlhiyt

³² Impf 2-eat:impf-2mp.

³³ On the others, see § 6.4.1.

³⁴ Other possible realizations are *ttt²t* and *tt²tt*.

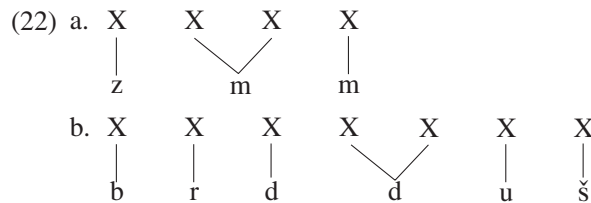
and would be problematic for an analysis in which consonants adjacent in the underlying representations would in some cases be separated by an epenthetic vowel in the surface forms.

6.4.1. Morphemes with adjacent identical consonants

Positing a rule of fusion which is obligatory inside ‘stretches’ enables us to explain certain facts about the distribution of adjacent identical consonants inside morphemes. Imdlawn Tashlhiyt has a few morphemes whose lexical representations contain adjacent consonants which are identical. Below we list all those that we have been able to find.

- (21) a. zmm^2m ‘write down’, xmm^2m ‘think’, fnm^2n ‘discern’, $ħqq^2q$ ‘stare at (while trying to identify)’, $šll^2l$ ‘rinse’, $ħll^2l$ ‘treat with caution’, $!ħrr^2r$ ‘liberate’;³⁵
 b. $brd^2dduš$ ‘marjoram’, $!bbnt^2ttr$ ‘struggle’, $bbrt^2ttš$ ‘sprawl’, $!frr^2ttu$ ‘bat’.

In zmm^2m ‘write down!’, and in $zmm^2m=at$ ‘write down! mp’ (=at imperative 2mp), the verb can be pronounced zmm^2m or $zmmm$ in free variation,³⁶ but not zm^2mm nor zm^2m^2m nor zmm . If the lexical representation of this verb contains a geminate *m* followed by a simple *m* (see (22)a) the location of the release is accounted for by SIBLING-RELEASE (11). Similarly, $brd^2dduš$ may be pronounced $brd^2dduš$ or $brddduš$, not $brdd^2duš$ nor $brd^2d^2duš$ nor $brdduš$, and we posit the underlying representation in (22)b.



All the morphemes listed in (21) contain two identical consonants in a row, one of which is a geminate.³⁷ On the other hand the lexicon of Imdlawn

³⁵ The items in (21)a are all borrowings from Arabic. They all have a free variant with *i* after the second consonant, e.g. $zmmim$, $xmmim$, $fnmin$, etc. The free variation between *i* and zero is also found in native verbs, viz. in the biconsonantal verbs where both consonants are obstruents, e.g. $b(i)dd$ ‘stand up’, $bb(i)z$ ‘pound’, $kk(i)s$ ‘remove’. In all such verbs one of the consonants is a geminate.

³⁶ The uninterrupted triple *m* in $zmmm$ sounds longer than the uninterrupted double *m* in $illmm$ ‘you (mp) spun’ (from /t-llm-m/).

³⁷ In our 1985 article we stated that a simple consonant cannot immediately precede its geminate counterpart in a lexical entry, see (48)b p. 124. The existence of the items in (21)b shows that that assertion is false.

Tashlhiyt does not allow a contrast between geminates and sequences of two identical short consonants, e.g. a contrast between /dd/ and /d÷d/, where the symbol '÷' is a shorthand to indicate the presence of two distinct Root nodes. In languages where it occurs such a gap is usually seen as a consequence of a general prohibition against adjacent identical segments.³⁸ Such a prohibition cannot be invoked in the present case, however, in view of the fact that it is violated in (21). But our Fusion rule provides an explanation. Imagine that at some point in time the grammar of some speakers contained a lexical entry with adjacent identical short consonants, e.g. /d÷d/. Since the application of Fusion is obligatory inside 'stretches', Fusion (13) would make all the occurrences of /d÷d/ homophonous with /dd/ (geminate *d*), and the original /d÷d/ would be irretrievably lost, i.e. language learners in the next generation would have no reason to posit anything else but a geminate in the lexical entry of the morpheme in question. Ath Sidhar Rifian Berber affords us an interesting comparison on this point.

Unlike the lexicon of Imdlawn Tashlhiyt, that of Ath-Sidhar Rifian Berber allows a contrast between geminates and sequences of two identical short consonants, see Dell and Tangi (1992, 158–160). Consider for instance the following forms in Ath-Sidhar: (i) /i-zemm/ 'he wrung', from /y-!zmm/; (ii) /ye-smem/ 'it (dough) rose', from /y-sm÷m/; (iii) /semm-en/ 'they rose', from /sm÷m-n/. Like Imdlawn Tashlhiyt, the Ath-Sidhar dialect has a Fusion rule, as a result of which a sequence of two identical short consonants is homophonous with the corresponding geminate, see /m÷m/ in (iii). Fusion cannot operate in (ii) because in that form the /m÷m/ sequence is broken up by the epenthesis of *e*, a process which occurs in the syllabification of consonant clusters in Ath-Sidhar Rifian.³⁹ In (i) that same process inserts *e* before the geminate /mm/.

The fact that sequences of identical short consonants are allowed in the lexicon of one dialect but not in that of the other has nothing to do with constraints on the underlying forms of morphemes, then. Rather, the difference follows from the different syllable structures of the two dialects. Unlike Ath-Sidhar Rifian, Imdlawn Tashlhiyt has no phonological process of vowel insertion which can break up underlying sequences of consonants and consequently, if the lexicon of Imdlawn Tashlhiyt contained tautomorphemic sequences of identical short consonants, these would all be wiped out by Fusion.

In all the morphemes in (21) the identical consonants are noncontinuant. We do not have any explanation for this fact. What about the fact that there does not exist any morpheme containing a sequence of identical geminates? This is probably a consequence of a quasi-gap which has

³⁸ On the Obligatory Contour Principle see McCarthy (1986), Odden (1988) and references therein.

³⁹ On syllabification and epenthesis in Ath Sidhar Rifian Berber, v. below in § 6.5.

nothing to do with constraints on sameness in adjacent consonants: morphemes which contain adjacent geminates are very rare in Imdlawn Tashlhiyt.

6.4.2. Regressive devoicing

Like some other Tashlhiyt dialects in the High Atlas, that spoken in Imdlawn has a process of regressive devoicing in obstruent clusters. Devoicing is mandatory in some cases and optional in others. We give examples below in (23). The consonants subject to the assimilation are enclosed between brackets for the sake of conspicuousness. Symbols separated by a slash indicate that devoicing is only optional. The forms in parentheses are morphologically related words in which the voiced obstruents surface intact.⁴⁰

- | | | | | |
|---------|-----------------------|------------------------|---------------|-------------|
| (23) a. | /s-uzf/ ⁴¹ | zzu[s]f | ‘discover!’ | (zzuzuf) |
| b. | /rgs/ | r[k]s | ‘hide!’ | (tirggas) |
| c. | /a-!zdda/ | !a[s]tta ⁴² | ‘loom’ | (!zd) |
| d. | /a-sds/ | as[d/t]s | ‘trough’ | (isdas) |
| e. | /l-rzq/ | rr[z/s]q | ‘divine gift’ | (larzaq) |
| f. | /l-fndqq/ | lfn[d/t]qq | ‘caravansary’ | (lafnadiqq) |

Regressive devoicing operates across word boundaries as well as inside words. The present discussion is limited to the sequences in which both consonants belong to the same kernel, the only ones for which our data is sufficient to allow us to make generalizations with confidence. We will use the expression ‘vcd-vls sequence’ to refer to such sequences. Devoicing is mandatory in some kernels and optional in others, but for the purpose of our argument the important fact is that it operates in all vcd-vls sequences.⁴³ Assuming that regressive devoicing cannot operate across a vowel, this fact shows that the obstruents in a vcd-vls sequence are always adjacent at the surface level, no matter the context in which the sequence occurs. This would be difficult to explain if the surface representations of Imdlawn Tashlhiyt contained a fourth vowel *e* in addition to the full vowels *a*, *i* and *u*.

⁴⁰ Here are the glosses for the parenthesized forms: (a) id impf; (b) ‘hiding’ (deverbal noun, pluralia tantum); (c) ‘weave!’; (d–f) id p.

⁴¹ On the realization of causative /s-/, v. § 5.4.

⁴² In Tashlhiyt as in other Berber dialects, /dd/ is generally realized as *tt* in emphatic morphemes.

⁴³ An exception must be made for vcd-vls sequences beginning with /b/, a consonant which is in some instances immune to devoicing in Imdlawn Tashlhiyt. In Imdlawn the extent to which regressive devoicing operates varies with the speakers’ age. It is more pervasive in the language of older speakers such as ME’s father. Even in ME’s less conservative dialect, the vcd-vls sequences in which regressive devoicing is only optional all belong to kernels which have transparent cognates in the local variety of Moroccan Arabic.

Consider the perfective stem *zzusf* and the corresponding imperfective *zzuzuf* in (23)a. In /s-uzf/ the adjacency of /z/ and /f/ makes regressive devoicing possible, hence *zzusf*. The imperfective *zzuzuf* is derived from /s-uzf/ in a regular fashion, i.e. a copy of the vowel is inserted in the final cluster,⁴⁴ thus making /z/ and /f/ nonadjacent, and regressive devoicing impossible. *zzusf* is trisyllabic (z.zu.sf) and our analysis implies that the nucleus of its final syllable is *f*. Suppose for a moment that in *zzusf* the last two consonants are actually separated by a vowel *e* which is somehow obscured by phonetic implementation, i.e. the perfective stem is actually *zzusef*. One would then have to explain why full vowels block regressive devoicing while *e* does not. This problem does not arise in our analysis, in which *e* does not exist in Imdlawn Tashlhiyt. The comparison with Ath Sidhar Rifian is instructive: as we shall see below, that dialect has a schwa vowel, and schwa blocks regressive devoicing.

On the left in (24) below, we list words of Imdlawn Tashlhiyt in which the voiceless consonant resulting from regressive devoicing has been lexicalized. The original voiced consonant can only be recovered by comparing Imdlawn Tashlhiyt with dialects in which it has been preserved. The forms on the right-hand side of (24) were culled from Dallet's (1982) dictionary of At Mangellat Kabyle.

(24) Imdlawn		At Mangellat	
a.	i-[x]ss 'bone'	i-γess 'id'	
b.	t-a-[k]šrar-t 'kneecap'	t-a-g ^w ešrir-t 'id'	
c.	t-a-[k]ššul-t 'churn'	a-geššul 'bellows'	
d.	i-[t]qqi 'clay'	i-deqqi 'id'	
e.	t-a-[t]kmi-t 'palmfull'	t-a-dak ^w em-t 'id'	
f.	bi[k]s 'gird!'	ebges 'id'	
g.	!t-a-[x ^w]smar-t 'chin'	!t-a-γ ^w esmar-t 'id'	
h.	a-[s]kka 'tomorrow'	a-zekka 'id'	
i.	a-[tx ^w]s 'colostrum'	a-dγes 'id'	
j.	a-[t]fl 'snow'	a-dfel 'id'	
k.	!t-a[t]sa 'laughter'	!t-a-dsa 'id'	⁴⁵

The lexicalization of devoiced consonants has all but wiped out the vcd-vls sequences from the Berber stratum in the lexicon of Imdlawn Tashlhiyt. Items like (23)a–c, which belong to that stratum, only amount to a handful.⁴⁶

⁴⁴ On vowel insertion in the imperfective, see § 5.2.

⁴⁵ While the initial vowel belongs to the stem in Imdlawn, it is an augment in At Mangellat.

⁴⁶ The Berber stratum also contains vestigial pairs which do not fit anymore into productive alternation patterns, e.g. *a-bggas* 'belt' / *biks* 'gird!' (see (24)f). The imperfective stem of *biks* is *tt-bikis*, not *tt-bigis*, which shows that in *biks* the velar consonant is lexically voiceless in present-day Imdlawn Tashlhiyt.

Although regressive devoicing operates in all vcd-vls sequences, in the examples in (23) and (24) we have chosen mainly forms in which the consonant subject to devoicing is followed by a word-final consonant or by CCV. Here is our reason for doing so. In those works on Tashlhiyt which have schwas in their transcriptions, consonants which occur in these environments are as a rule followed by a schwa, as they are in the literature which deals with Tamazight, Rifian or Kabylie Berber.⁴⁷ For someone claiming that Imdlawn Tashlhiyt actually has a fourth vowel *e*, the consonants subject to devoicing in our examples in (23) and (24) are the most likely to be separated from the following consonant by a schwa, and yet the fact that they devoice shows that they are not.

In (23) and (24), the consonant which triggers devoicing is a nucleus except in (24)j,k, where it is an onset. We give the syllabic parses of these forms below in (25). The forms on the left are those in (23) and those on the right are those in (24). The vcd-vls sequences are in boldface for the sake of conspicuousness.

(25)	Imdlawn (23)	Imdlawn (24)
a.	z.zu. sf	i. xss
b.	r. ks	ta. kš .ra.rt
c.	a. st.ta	ta. kš .š <u>u</u> .lt
d.	as. ts	i. tq.qi
e.	rr. sq	ta. tk .mit
f.	l.fn. tqq	bi. ks
g.		ta. x^ws .ma.rt
h.		a. sk.ka
i.		at. x^ws
j.		at. fl
k.		tat. sa

Regressive devoicing is similarly heedless of syllable structure in Haha (*ħaħa*) Tashlhiyt, a dialect in which simple noncoronal stops spirantize.⁴⁸ When preceding a voiceless consonant, /b/ is realized as *f* and /g/ as *x* (a velar) in all environments, for instance the noun meaning ‘vagina’, which is *i-bšši* in Imdlawn, is *i-fšši* in the Haha area. It is not reckless to assume that syllable structure is identical in the two dialects, in view of their great similarity. Since the syllabic parse of /i-bšši/ is *i.bš.ši*, we see that in the second syllable of Haha *i.fš.ši* the labial onset has devoiced under the influence of a following nucleus. The first column in (26) contains other similar Haha words provided to us by R. Ridouane, who is a native speaker

⁴⁷ See e.g. Aspinion (1953).

⁴⁸ On Haha Tashlhiyt, v. Ouakrim (1993) and Ridouane (1999). The latter discusses Haha spirantization in some detail.

of Haha Tashlhiyt. The words in the second column are their counterparts in Imdlawn.

(26)	Haha	Imdlawn	
	t-a-[x]ššul-t	t-a-[k]ššul-t	‘churn’
	a-[f]hri	a-[b]hriy	‘sailor’
	t-a-[f]qqal-t	t-a-[b]qqal-t	‘grocery’
	i-[f]qqa	i-[b]qqa	‘he stayed’
	i-[f]šši	i-[b]šši	‘vagina’

6.5. EPENTHETIC VOWELS IN RIFIAN BERBER

In accord with our main goal in this chapter, which is to show that the short voiced vocoids which one hears in Imdlawn Tashlhiyt are not vowels (i.e. syllable nuclei), we now contrast Imdlawn Tashlhiyt with Ath Sidhar Rifian, a dialect which does have epenthetic vowels. We shall see that in Ath Sidhar Rifian some occurrences of @ are genuine vowels, while others are transitions, like the VTVs of Imdlawn Tashlhiyt.

As far as can be ascertained from the literature, the syllable structure of Rifian is rather similar to that of Tamazight and to that of Kabylie Berber, which are also reported to have bona fide epenthetic vowels. The following discussion will allow us to highlight certain features by which Tashlhiyt differs from these other dialects. It will provide evidence that Berber dialects with very similar morphologies may differ significantly in their syllable structures when the domain of syllabification is the stem or some larger unit. This evidence should dispel any suspicion that syllable structure is basically the same in all the dialects of Berber, an impression that could be suggested by a casual reading of the literature, where the distribution of the unstable vowel is more or less the same in the transcriptions of Tashlhiyt and in those of other dialects of Berber.⁴⁹

The variety of Rifian Berber described here is that spoken in the village of Bag^wg^war, in the Ath Sidhar area, about 20 kilometers to the north-west of the city of Nador, in north-eastern Morocco.⁵⁰ All our data on Ath Sidhar Rifian were gathered during joint work by one of us (FD) and Oufae Tangi, a native speaker. Oufae Tangi has written her Doctoral dissertation on the phonology of her native tongue (Tangi 1991) and she has

⁴⁹ Compare for instance Basset and Picard (1948) for Kabyle, Penchoen (1973) for Tamazight, and Aspinion (1953) and Destaing (1920) for Tashlhiyt.

⁵⁰ For discussions of nearby dialects with rather similar phonological systems, see Chami (1979), Cadi (1981) and Chtatou (1982).

subsequently co-authored two articles on its phonology, Dell and Tangi (1992, 1993), henceforth cited as DT (1992) and DT (1993).⁵¹

Note well: all our claims about Ath Sidhar Rifian, in particular those about underlying representations, are based on analyses in which Ath Sidhar Rifian is considered on its own terms, independently of its similarities with other Berber dialects.

6.5.1. *The basic pattern for vowel epenthesis*

Like Imdlawn Tashlhiyt, Ath Sidhar Rifian has two underlying glides /y, w/ and three underlying vowels /a, i, u/. The latter will be referred to as ‘full vowels’. Besides glides and full vowels, the surface forms of Ath Sidhar Rifian also contain short voiced vocoids whose distribution is predictable and which sound very much like the VTVs of Imdlawn Tashlhiyt. But whereas the VTVs which are heard in Imdlawn Tashlhiyt are not segments, some of the short voiced vocoids of Ath Sidhar Rifian are epenthetic vowels, as we shall see below. Like the VTVs of Imdlawn Tashlhiyt, the short voiced vocoids of Ath Sidhar Rifian vary in vowel quality depending on the nature of the neighboring sounds. We will abstract away from these contextual variations and uniformly note the short voiced vocoids as ‘@’. From now on let ‘SVV’ stand for ‘short voiced vocoid’.

The SVVs of Ath Sidhar Rifian fall into two categories. The bulk of them are vowels inserted in order to syllabify sequences of consonants; the remainder are nonsegments like the VTVs of Imdlawn Tashlhiyt. Let us first give examples of the VTVs which are vowels, i.e. syllable nuclei.

Unlike in Imdlawn Tashlhiyt, in Ath Sidhar Rifian the location of a VTV may be the sole feature which distinguishes two expressions (i.e. words or sequences of words). Ath Sidhar Rifian has for instance a contrast between [C@C] and [CC] before a pause. This contrast is illustrated in (27).

- | | | | | |
|---------|------|-----------------|--------|-------------------|
| (27) a. | žh@ð | ‘be strong’ | ž-ž@hð | ‘strength’ |
| b. | bħ@θ | ‘investigate’ | r-b@ħθ | ‘investigation’ |
| c. | xr@q | ‘be born’ | s-s@rk | ‘wire’ |
| d. | nq@s | ‘diminish’ | n-n@fs | ‘breath’ |
| e. | nħ@š | ‘bite greedily’ | r-m@sk | ‘musk’ |
| f. | xn@s | ‘dodge’ | ss-@ns | ‘spend the night’ |

The words on the left-hand side of (27) all have underlying representations of the form /CCC/.⁵² It is argued in DT (1992, 1993) that in Ath Sidhar

⁵¹ Oufae Tangi’s father and mother are from the Ath Sidhar area and Berber was her first language. She uses Berber with her parents and with other members of her family of their generation, some of whom are monolingual. She uses Arabic with her sisters and the people outside her family.

⁵² They are bare aorist stems. As in Tashlhiyt, such stems are used as 2s imperative forms.

Rifian schwas are inserted into consonant clusters to supply syllable nuclei; if the underlying string does not contain enough vowels, some are supplied by epenthesis. Let us use ‘e’ to represent the epenthetic vowel without committing ourselves as to its featural make-up. It will be seen below that depending on context *e* is realized as @, as a voiceless counterpart of one of the voiced vocoids for which ‘@’ is a cover symbol, or as the syllabicity of an adjacent sonorant.

Note well the difference between ‘@’ and ‘e’. As elsewhere in this book, ‘@’ stands for a voiced vocoid, i.e. an object whose presence in an expression can be ascertained by inspecting tokens of that expression. On the other hand, ‘e’ represents a vowel (a nonconsonantal syllable nucleus) which is posited to explain the distribution of [@] and other phonological regularities to be discussed below. Our transcriptions of Ath Sidhar Rifian which employ the letter ‘e’ are broad phonetic transcriptions akin to the phonemic transcriptions of structuralist phonology.

Provided certain word-final consonants are marked as extrametrical (see below), the following procedure makes predictions which are basically correct:⁵³

(28) RIGHT-TO-LEFT SCAN:

Scanning the Pword from right to left, rewrite as *CeC* any *CC* string which is not immediately followed by a vowel. Each step in the scan must take as its input the output of the previous step.

For the stem meaning ‘be strong’ in (27)a, for instance, RIGHT-TO-LEFT SCAN rewrites /žhð/ as *žheð* in a single iteration. In /θ-xns-m/ ‘you (mp) dodged’ the procedure has to apply twice. It first changes /θxns-m/ into /θxnsem/; it then takes /θxnsem/ as its input and changes it into /θxensem/.

The role of epenthesis is to allow strings of consonants to be fitted into syllables which are maximally *CVC*;⁵⁴ and consequently the epenthesis of Ath Sidhar Rifian is reminiscent of that in Yawelmani (Archangeli 1991) or in Palestinian Arabic (Abu-Salim 1980, 1982). The distribution of *e* in our transcriptions of Ath Sidhar Rifian resembles that of ‘unstable vowels’ in various works on other dialects of Berber, and also in some dealing with Moroccan Arabic.⁵⁵

Schwa is never inserted between the two Cs of a geminate. When the formulation in (28) would lead to such an insertion, RIGHT-TO-LEFT SCAN disregards the last C in the geminate and moves leftward by one

⁵³ RIGHT-TO-LEFT SCAN is almost identical with the epenthesis rule proposed in Saib (1976: 127) for the Ayt Ndhir variety of Tamazight. On that rule, see Hyman (1985: 68).

⁵⁴ On how initial clusters fit in with this general scheme, see DT (1992).

⁵⁵ See the references in note 49 for the works on Berber. For those on Moroccan Arabic, the references will be found in Chapter 8.

segment; /ššubbš-n/ ‘they had a fight’ is pronounced ššubbšen, not *ššubebšen. A form like *ssnen* ‘they know’ (/ssn-n/ know-3mp) illustrates the different behaviours of geminates and sequences of identical consonants: epenthesis breaks up the sequence /n-n/ but not the geminate /ss/ (**sesnen*).

In our discussion of transitional vocoids in Imdlawn Tashlhiyt we stated that in that dialect a short voiced vocoid can never be heard (i) between voiceless consonants or (ii) between homorganic noncontinuants which differ in sonorancy (v. (1)–(2) in § 6.3.1). Because of epenthesis, Ath Sidhar Rifian has SVVs which occur in these contexts. SVVs occurring between voiceless consonants are found in *bħ@θ*, *nq@s* and *nħ@s* in (27)b,d,e. As for case (ii), consider for instance the following pair:

- | | | | | |
|---------|-------------------|---------------------------------|--|--------------------------------|
| (29) a. | <i>Imdlawn</i> | ssn=tt
know=do3fs | [s:nt: ^h]
[s:nt: ^h] | /ssn=tt/
‘know her!’ |
| b. | <i>Ath Sidhar</i> | ssn-et=t
know-imper:2p=do3fs | [s:n@t: ^h]
[s:n@t: ^h] | /ssn-θ=<t>/
‘know (p) her!’ |

In Ath Sidhar Rifian the imperative 2nd person plural suffix /-θ/ and the 3rd person singular object pronoun /=<t>/ merge into a geminate /tt/.⁵⁶ When articulation moves from *n* to *tt* in the Imdlawn Tashlhiyt form in (29)a the coronal occlusion must be kept in place; pronunciations with a voiced vocoid between *n* and *tt* are rejected outright. An intervening SVV is clearly heard in the Rifian form (29)b, on the other hand.

Ath Sidhar Rifian has words which do not contain any vowel, or even any voiced sound. The imperative 2s of ‘eat’, for instance, is /šš/. In a normal pronunciation this word can only be realized as šš (i.e. [š:]). It can stand on its own as a complete utterance. Ath Sidhar Rifian has other similar words: /kk/ *kk* ‘pass!’, /žž/ *žž* ‘let!’, /gg/ *gg* ‘do!’, /g^wg^w/ *g^wg^w* ‘knead!’. The absence of any vowel in the /C:/ words is predicted by (28).

6.5.2. *e* devoicing and *e* absorption

Our broad transcriptions of Ath Sidhar Rifian do not portray the terminal representations of the phonological component, although they are not far removed. These transcriptions adequately reflect the distribution of syllable nuclei in the dialect, but they do not mirror faithfully what one actually hears. If they did, one would expect every instance of the letter ‘e’ in them to represent a voiced vocoid in the pronunciation, but this is not so. *e* is devoiced or deleted in certain contexts and it is absorbed into a neighboring sonorant in others. We now turn to these two phenomena.

⁵⁶ The angled brackets around the do3ms clitic indicate that it is extrametrical; in view of this it is disregarded by RIGHT-TO-LEFT SCAN, see below.

e devoices or deletes between voiceless consonants. This devoicing or deletion is optional in the last syllable of a word and obligatory elsewhere. For instance in isolation /θ-kašf/ 'she guessed' may be pronounced either [θkaš@f] or [θkašf]. In what FD hears as [θkašf] we do not know whether [š] and [f] are adjacent or whether they are separated by a vocoid which is the voiceless counterpart of @. Let us use capital 'E' to represent the occurrences of *e* which are subject to devoicing/deletion between two voiceless consonants. Further research will be necessary to determine whether 'E' is actually a voiceless vocoid or the absence of any segment. From now on we use the expression '*e* devoicing' without committing ourselves on that point. Two other examples of *e* devoicing are given below in (30). The facts about each example are laid out on three lines. The output of RIGHT-TO-LEFT SCAN and the underlying representation are given on the first line. The other two lines show alternative pronunciations of the form under consideration. No other pronunciations are acceptable.⁵⁷

- | | | | |
|------|--|--------------|------------------------|
| (30) | ttetteθ | /tt-tt-θ/ | impf-eat:impf-imper2p |
| | a. [t: ^h t:t:θ], | i.e. ttEtt@θ | |
| | a'. [t: ^h t:t:θ], | i.e. ttEttEθ | |
| | fekket | /fkk-θ=<θ>/ | release-imper:2p=do3ms |
| | b. [fk:it: ^h], | i.e. fEkk@tt | |
| | b'. [fk: ^h t: ^h], | i.e. fEkkEtt | |

Each form contains two occurrences of *e*. The occurrence in the last syllable is devoiced in one variant but not in the other: devoicing is optional in word-final syllables. Devoicing is obligatory elsewhere, and consequently the occurrence of *e* in the first syllable is devoiced in both variants. The second variant in each pair in (30), which is voiceless throughout, can stand on its own as an acceptable utterance. Such variants are commonplace among the spontaneous pronunciations which we have recorded. In word-final syllables, where the devoicing of *e* is optional, the choice between the two variants is not random. In prepausal words it seems that the voiced variant only occurs when the intonation requires a high pitch on the syllable in question, or when the speaker wants to place special emphasis on the word.⁵⁸

The devoicing of unstable vowels between voiceless consonants has been

⁵⁷ The meanings of the two examples are 'eat! p' and 'release him! p'.

⁵⁸ In Moroccan Arabic, according to Heath (1987: 184), schwa deletion in word-final syllables is blocked by 'list intonation', and in Japanese high vowel devoicing is blocked 'when a final syllable in the devoicing environment must carry a rising intonation' (Vance 1987: 51).

ascribed to other Berber dialects⁵⁹ and to Moroccan Arabic.⁶⁰ There is an obvious resemblance between the facts discussed here under the heading ‘*e* devoicing’ and those presented in Chapters 8 and 9, which will lead us to formulate for Moroccan Arabic a rule of schwa epenthesis which only operates at the end of Intonational Phrases. More empirical work is needed before one can characterize precisely the similarities between the two languages in that area of their phonology.

Should subsequent research on Ath Sidhar Rifian show that ‘*e* devoicing’ is actually a deletion process, we would not abandon our syllabification-cum-epenthesis analysis or restrict epenthesis to word-final CC clusters, for there is independent evidence that *e* occurs at some intermediate level of representation to allow the syllabification of voiceless CC sequences which are not word-final. This evidence is provided by fusion, a process which is sensitive to the presence of *e*.

A sequence of two identical simplex consonants is homophonous with the corresponding geminate. Whereas in *ne-nbeš* (/n-nbš/) ‘we teased’ one must pronounce [n@n], i.e. two short *n* sounds separated by a short vocoid, in *nnebšiθ* ‘we teased him’ (/n-nbš=iθ/ 1p-tease=do3ms) one must pronounce a long *n* homophonous with the realization of a geminate *n*. When the adjacent consonants both belong to the set /θ ð t d/, their fusion yields *tt* or *dd* depending on the voicing of the second consonant in the cluster,⁶¹ e.g. /θ-ð/ yields *dd* in *ddarrast* (/θ-ðrraz-<θ>/), which is the bound form of *θ-a-ðarras-t* ‘weaver, f’.⁶² Fusion is blocked by an intervening *e*, e.g. it cannot occur in /θ-ðbib-<θ>/ *θeðbift*, the bound form of the feminine form of *a-ðbib* ‘physician’. Similarly, fusion occurs in *tteɫeð* (/θ-tɫɛ-ð/) ‘you disappeared from home’ whereas it is blocked in /θ-tɫɛ/ *θetleɫ* ‘she disappeared from home’. Since it is voiceless and is furthermore preceded by a voiceless fricative, the vocoid which occurs between *θ* and *t* in *θetleɫ* cannot be perceived directly, at least by FD, to whose ears the word sounds like [θtɫeɫ], but its blocking effect on fusion is evidence that it is present at the level of representation which is relevant for the fusion process.

Devoicing is not the only phenomenon which obscures the surface distribution of epenthetic *e*. Another such phenomenon is the absorption

⁵⁹ See Basset and Picard (1948: 9), Mitchell (1957: 197–198), Penchoen (1973: 10, 94). Extensive data elicited from Fouad Saa show that a situation similar to that just described also prevails in the Figuig dialect, on which see Kossmann (1994) and Saa (1995).

⁶⁰ E.g. Harrell (1962a), Mitchell (1993: 62, 64), Shoul (1995: 208).

⁶¹ *θ* and *ð* do not have a geminate counterpart. Historically they derive from simplex *t* and *d* and still alternate with them, but they must be considered independent phonemes. One of the reasons for this state of affairs is a massive influx of Arabic loans with unspirantized *t* and *d*.

⁶² The corresponding masculine noun is *a-ðarraz* /a-ðrraz/. As a rule /rɾ/ surfaces as *arr*. /r/ is realized as *r*, *ar* or *a* depending on the context. See DT (1993) for a detailed discussion of how these alternations link up with syllabification.

of *e* by a neighboring sonorant. The previously cited *ttelʃeð* (/θ-tlʃ-ð/) is actually pronounced [t:ʃʃeð]; going from the articulation of *tt* to that of *l* is done through lateral plosion and the phonetic reflex of *el* is a syllabic *l*. The absorbing sonorant follows *e* in some cases, as in the previous example, and it precedes *e* in others, as in the highlighted sequence in the following example:

- (31) mayemmi=**t nedh**-en /maymmi=t ndh-n/ why=do3fs lead-3mp
 ‘why did they lead her?’

In (31) the sequence *t#ned* is realized as [tnd], that is, with an uninterrupted coronal closure which begins with *t* and ends with the release of *d*. The two examples of absorption just given might lead one to conjecture that *e* is absorbed by a sonorant (*R*) whenever the sequence *eR* or *Re* is adjacent on both sides to noncontinuants which are homorganic with the sonorant. But absorption does not always occur in such circumstances, witness the fact that in *sbeddent* ‘they made her stand up’ (/s-bdd-n=<t>/cau-stand-3mp=do3fs) the sequence *ddent* can only be pronounced [d:@nt]; it is incorrect to pronounce [d:nt], with nasal plosion in *dd* and a syllabic *n*. Absorption requires further study.⁶³

The devoicing of *e* between voiceless segments and its absorption by a neighboring sonorant result in pronunciations which lack a SVV in places where RIGHT-TO-LEFT SCAN predicts the occurrence of *e*. Ath Sidhar Rifian also has words in which a SVV can be heard inside clusters in which RIGHT-TO-LEFT SCAN does not insert *e*. These supernumerary SVVs always occur next to a voiced consonant and we assume that they are like the VTVs of Imdlawn Tashlhiyt: they are not separate segments, but mere transitions between consonants. Two examples are given below in (32). Each line shows (I) the underlying representation, (II) our broad transcription, and (III) what is actually heard.

- | | | | | |
|------|-----------|---------|-----------|---------------------|
| (32) | I | II | III | |
| a. | /y-fqð-n/ | ifeqðen | [ifq@ð@n] | ‘be concerned, prt’ |
| b. | /y-hrš-/ | yehreš | [y@h@r@š] | ‘he fell sick’ |

In (32)a one hears a SVV between *q* and *ð*, which are adjacent in the output of RIGHT-TO-LEFT SCAN; similarly, in (32)b a SVV is heard between *h* and *r*. Note that the realizations of the prefix /y-/ are predictable in terms of the output of RIGHT-TO-LEFT SCAN, rather than of the vocoids which one actually hears. As a rule, that prefix is realized as *i-* before CV and as *y@-* before CC.⁶⁴ In [ifq@ð@n] ((32)a), because of *e* devoicing,

⁶³ Absorption of an unstable vowel by a neighbouring sonorant has been ascribed to other Berber dialects, see Mitchell (1957: 194) and Penchoen (1973: 10, 94), and to Moroccan Arabic, see Mitchell (1993: 63, 72) and Heath (1987: 249–253).

⁶⁴ The glides of Ath Sidhar Rifian are discussed in detail in DT (1992).

no vocoid is heard between *f* and *q*. And yet the realization *i*- of the prefix indicates that *f* is indeed an onset. In the same line of thought the realization [y@-] of /y-/ in [y@h@r@š] (32)b shows that although the following kernel sounds as though it began with CV, it actually begins with CC.

FD cannot hear any difference between those SVVs which are realizations of *e* and those which are transitional vocoids. But it is noteworthy that Oufae Tangi's transcriptions of her language consistently record the former and ignore the latter, and that she has great difficulty in perceiving the latter. The distinction between the two kinds of SVVs is the same as that made by Harrell (1962a) between 'major transitions' and 'minor transitions' in his seminal paper on Moroccan Arabic.⁶⁵ More data on transitional vocoids in Ath Sidhar Rifian can be found in DT (1992).

6.5.3. Final CC clusters

Returning to the examples in (27), let us now consider the words in the right-hand side column. Except for *ss@ns* in the last line, they are nouns borrowed from Arabic.⁶⁶ The source nouns in Moroccan Arabic also have a *C@CC* shape. In § 4.1 we pointed out that when Imdlawn Tashlhiyt borrows from MA it neutralizes the MA distinction between *CC@C* and *C@CC* words. There is for instance no contrast in Imdlawn between the reflex of the MA verb *žh@d* 'be strong' and that of the MA noun *žh@d* 'strength', witness the homophony of the two Imdlawn Tashlhiyt forms in (33):

- (33) ižžd /i-s-žhd/ 'he strengthened' (3ms-cau-be:strong)⁶⁷
 ižžd /i=l-žhd/ 'to the strength' (to=l-strength)

The pairs in (27) show that unlike Tashlhiyt, Ath Sidhar Rifian has the phonological means for doing justice to the distinction between *CC@C* and *C@CC* in MA.

If RIGHT-TO-LEFT SCAN (28) is responsible for the vowel in the *C@CC* kernels in the right column of (27) as well as in the *CC@C* kernels in the left column, the two kinds of kernels must be distinguished in some way in the lexicon. Let us assume that the lexical representation of each one of the morphemes on the right-hand side of (27) contains a special mark which forces RIGHT-TO-LEFT SCAN to 'skip' its final consonant when

⁶⁵ V. also Levin's (1987) distinction between epenthesis and excrescence. The facts of Ath Sidhar Rifian suggest that when epenthetic vowels and excrescent vocoids coexist in the same language, they need not have different vowel qualities.

⁶⁶ As in Tashlhiyt, such nouns begin with a prefix /l-/, see § 2.5.3.1. The prefix assimilates to a following coronal; otherwise it surfaces as *r*, as do most occurrences of simplex /l/ in Ath Sidhar Rifian. On /r/ and /l/ in Ath Sidhar Rifian see DT (1993).

⁶⁷ The causative prefix assimilates to a following sibilant, v. § 5.4.

that consonant is word-final. We shall use angled brackets to indicate those segments which are lexically marked as 'extrametrical'.⁶⁸ In (27)a, for instance, the underlying representations of $\check{zh}@\check{\delta}$ is simply $/\check{zh}\check{\delta}/$ whereas that of the kernel in $\check{z}-\check{z}@\check{h}\check{\delta}$ is $/\check{zh}<\check{\delta}>/$. Only obstruents can be extrametrical in Ath Sidhar Rifian.⁶⁹ Verbal kernels marked for extrametricality are only a handful, whereas nouns so marked are numerous. They are all recent loans from Moroccan Arabic.

In Chapter 8, when we discuss the contrast between $CC@C$ and $C@CC$ kernels and other similar contrasts in MA, we will not resort to extrametrical consonants. Our aim in the present section is not to present an analysis of Ath Sidhar Rifian which could be compared with our analyses of Imdlawn Tashlhiyt and MA, but to present facts which suggest that the syllable structure of Tashlhiyt differs in important ways from that of other Berber dialects such as Rifian. RIGHT-TO-LEFT SCAN and extrametricality are but convenient expository devices which allow us to give a compact presentation of the facts of Ath Sidhar Rifian. A point-by-point comparison of syllabification in Berber and in MA within a unified framework will have to await further research. Our goal here is to lay some of the empirical groundwork for such a comparison.

Ath Sidhar Rifian has other contrasts between $[C@C]$ and $[CC]$ besides the type illustrated in (27). We now present two of these.

In Ath Sidhar Rifian, feminine singular nouns fall into two categories, $/\theta-Z-<\theta>/$ and $/l-Z-\theta/$, where Z stands for the kernel.⁷⁰ Examples of the first type are $\theta\text{-azzu-}\theta$ 'search' and $\theta\text{-a-teffaḥ-t}$ ($/\theta\text{-a-tffaḥ-<\theta>/}$) 'apple'; an example of the second type is $\text{arriḥe}\theta$ ($/l\text{-riḥ-}\theta/$) 'odour'.⁷¹ No SVV may occur before the suffix in nouns of the first type. The suffix shows up as *t* when the kernel ends in a consonant, and furthermore the consonant interacts in various ways with the suffix, e.g. */m/* becomes a coronal and obstruents devoice, v. the diminutive of *asrem* ($/a\text{-slm-}/$) 'fish', which is *ṯasrent* ($/\theta\text{-a-slm-<\theta>/}$), and *ṯiggest* ($/\theta\text{iggz-<\theta>/}$) 'tattoo' (plural *ṯiggaz*). In *arriḥeθ* ($/l\text{-riḥ-}\theta/$), our example of the $/l-Z-\theta/$ nouns, the epenthetic *e* can be heard as a SVV when the *e* devoicing, which is optional in word-final syllables, does not occur. The presence of *e* prevents any interaction between the suffix and the final consonant of the kernel, e.g. */m/* does not become a coronal in *nniṯmeθ* ($/l\text{-niṯm-}\theta/$) 'food', and $/\theta/$ does not become

⁶⁸ On extrametricality, see e.g. Hayes (1995) and references therein.

⁶⁹ Basing themselves on the limited data in Tangi (1991), DT (1992: 134) stated incorrectly that only coronal obstruents can be extrametrical. Subsequent work with Oufae Tangi has turned up nativized loans like *s-s@rk* ((27)c) and *r-m@sk* ((27)e), which end with non-coronals.

⁷⁰ Almost all $/l-Z-\theta/$ nouns are Arabic loans, but Arabic loans are also found among the $/\theta-Z-<\theta>/$ nouns. *ṯa-teffaḥ-t* in the text below is a case in point.

⁷¹ The initial $/l-/$ assimilates to the following coronal, hence $/rr/$, which is realized as *arr*.

t.⁷² Imdlawn Tashlhiyt also has two classes of feminine singular nouns, /t-Z-t/ and /l-Z-t/, most of the latter borrowed from Arabic. But the fs suffix /-t/ of Imdlawn Tashlhiyt nouns has the same phonological behaviour in both types of nouns. For instance voiced obstruents optionally devoice when they immediately precede a voiceless coronal obstruent, and suffixal /-t/ triggers devoicing in both classes of nouns, e.g. /t-a-mzdaγ-t/ ‘inhabitant (f)’ can be realized as *tamzdaγt* or *tamzdaxt* – we shall write *tamzda[γ/x]t* for short. Similarly /t-a-sbbaγ-t/, the feminine form of *a-sbbaγ* ‘dyer’, is pronounced *tasbba[γ/x]t*, and /l-sbaγ-t/ ‘paint’⁷³ is pronounced *ssba[γ/x]t*.

Another source of minimal pairs distinguished by the presence of @ in Ath Sidhar Rifian is the contrast between suffixes and clitics after the verb. Of the four suffixal PNGs which are obstruents, three are not extrametrical: /-γ/ ‘1s’, /-ð/ ‘2s’ and /-θ/ ‘imper2p’.⁷⁴ On the other hand, the four clitics which are obstruents are all extrametrical: /θ/ do3ms, /t/ do3fs, /d/ dir and /š/ do2ms. The difference between the imperative 2p PNG /-θ/ and the direct object 3ms pronoun /=<θ>/ gives rise to contrasts such as the following.

- (34) a. siyeθ /siγ-θ/ light-imper2p ‘light! p’
 b. Φšixθ /wšix-γ=<θ>/ give-1s=do3ms ‘I gave it’

As indicated by our transcriptions, it is acceptable to pronounce a SVV before the final consonant in (34)a but not in (34)b. Moreover the 1s PNG /-γ/ can devoice in (34)b, as is the case whenever an obstruent immediately precedes a voiceless coronal obstruent, whereas it must be voiced in (34)a.

Imdlawn Tashlhiyt lacks a similar contrast. There is no evidence that it has extrasyllabic consonants. For instance /t/ is both the suffixal part of the 2s PNG and the direct object 3ms pronoun, and the two following words are homophonous: /t-ut-t/ (2-strike-2s) ‘you struck’ and /t-ut=t/ (3fs-strike=do3ms) ‘she struck him’. Both words are pronounced *tutt*. Or again consider the following pair in Ath Sidhar Rifian.

- (35) a. θžebðeð /θ-žbð-ð/ 2-pull-2s ‘you pulled’
 b. θežbedd /θ-žbð=<d>/ 3fs-pull=dir ‘she pulled hither’

In Imdlawn Tashlhiyt the corresponding forms are /t-žbd-t/, whence *tž.btt* through fusion and voicing assimilation, and /t-žbd=d/, whence *tž.bdd* through fusion.

More generally, the examples in the present section illustrate a basic

⁷² Kossmann (1995: 80) presents similar facts concerning Ait Said Rifian.

⁷³ Plural *ssbayγ*. The MA source noun is *!sbaγ-a* (p *!sbaγγ*).

⁷⁴ The fourth is extrametrical. It is the final /-θ/ which marks the feminine in /θ- . . . -m-<θ>/ ‘2fp’ and in /-n(<θ>)/ ‘3fp’.

difference between Ath Sidhar Rifian and Imdlawn Tashlhiyt in the way consonants which are adjacent in the underlying representations interact. How such consonants interact in Ath Sidhar Rifian depends on whether syllabification has inserted *e* between them. Because of the left-right asymmetry of syllabification in Ath Sidhar Rifian, how two consonants which are contiguous at the underlying level interact depends on the phonological make-up of the string to their right within the Pword. In /y-zð÷ð/ 'he grew thinner', where /ð÷ð/ represents two adjacent occurrences of /ð/, syllabification inserts *e* between them, which prevents them from merging into *dd*, and they remain continuants in the surface form *yezðeð*. On the other hand, in /zð÷ð-n/ 'they grew thinner' syllabification yields *zeð÷ð-en*, with the two occurrences of /ð/ still adjacent, hence the pronunciation *zedden*, with a geminated stop resulting from fusion.

In Imdlawn Tashlhiyt, on the other hand, syllabification does not result in vowel epenthesis. Setting aside a few special cases which are irrelevant to the present discussion,⁷⁵ in Imdlawn Tashlhiyt, *consonants which are adjacent in the underlying representations are also adjacent at the surface level*. As a first approximation⁷⁶ one can say that in Imdlawn Tashlhiyt, consonants which are adjacent at the underlying level behave in the same manner with respect to voice assimilation and fusion, regardless of morpho-syntactic context.

6.5.4. An outstanding issue: syllabification in kernels

One general implication of the preceding discussion is not new, but is worth emphasizing: two dialects of the same language may have rather similar morphologies, as is the case for Tashlhiyt and Rifian, and at the same time they may differ significantly in their surface syllable structures.

The differences between the nonconcatenative processes which shape kernels in Tashlhiyt and in Rifian are only minor ones. Given that the syllable structure of a language is always a central ingredient of its non-concatenative morphology, there is no escape from the conclusion that in both dialects there are several levels of representations where syllable struc-

⁷⁵ V. the *i*-epenthesis mentioned in note 35, as well as that presented in DE (1989: 191–193). Both are optional and morphologically-governed.

⁷⁶ The facts which make this statement only a first approximation fall into three categories: (1) the special behaviour of prefix boundaries with respect to Fusion (v. § 6.3.3.3), (2) the erasure of one X slot in certain Pword-internal XXX sequences in which all three X slots are linked to sibling segments (for instance the prefix sequence /t-tt-/ must be realized as *tt* when /t-/ is one of the PNG prefixes and /tt-/ is the imperfective prefix, v. DE (1989: 193), and (3) the operation of Fusion in sequences of three or more simplex consonants which are siblings, v. the examples illustrating the three-way contrast between *t:²t:²t*, *t²t:²t* and *t:²t²t* in the text below (9) in § 6.3.3.1.

ture is defined.⁷⁷ The most abstract level is that of kernels, where the syllable structures of Tashlhiyt and Rifian are presumably identical. The main sources of evidence about syllable structure at the level of kernels would be (i) phonotactic regularities in kernels, and (ii) alternations in the inflection of nouns for number, in that of verbs for tense/aspect, and in the derivational morphology. Let us briefly summarize what is presently known about evidence of either kind.

Regarding the first, Dell and Jebbour (1991) tabulated the canonical forms of kernels in over 1300 singular nouns in Tiznit Tashlhiyt. They found that a kernel may contain at most three syllables and at most two vowels, and that in three-syllable kernels which contain two vowels, one of these must be in the last syllable.⁷⁸ Like the one presented in this book for Imdlawn Tashlhiyt, the syllabification scheme adopted in the work on kernels in Tiznit Tashlhiyt allowed any consonant to be a syllable nucleus. However, in that scheme, sonority relationships between adjacent consonants did not play any role: a right-to-left scan was used instead. At the end of the article, the authors speculated that the distributional restrictions in noun kernels in Tashlhiyt may reflect an earlier historical stage still in existence in Tarifit and in Kabyle, in which the syllabification of consonant clusters is not sonority-driven even at the sentence level.

As for morphological alternations in kernels, a great wealth of data have already been collected.⁷⁹ Since in Tashlhiyt all consonants can be syllabic, one could expect to find morphological processes which would treat syllabic consonants on a par with vowels, but this expectation is not borne out. As far as morphology-governed alternations in kernels are concerned, the relevant distinction is not that between syllabic segments and non-syllabic ones, but that between vowels and consonants. Consonants all behave alike, regardless of their syllabicity in the terminal representations. We illustrate this point with an example from derivational morphology.

The TIRRUGZA derivatives are templatic nouns which denote a state or property, e.g. *tirrugza* 'manhood', from *argaz* 'man', *tirruksa* 'clandestinity', from *rks* 'hide'.⁸⁰ TIRRUGZA nouns all have a /u . . . a/ vocalic melody and end in a light syllable. Their penultimate syllable is heavy and its onset belongs to a geminate. Although in our examples the bases

⁷⁷ See Clements (1997) for some discussion of multistratal syllabification in Imdlawn Tashlhiyt.

⁷⁸ The authors of this book have since carried out a systematic survey of nominal and verbal kernels in Imdlawn Tashlhiyt and found that verbal kernels are subject to maximal size requirements akin to those which constrain nominal kernels.

⁷⁹ See for instance Jebbour (1988) for number inflection in nouns (Tiznit Tashlhiyt), DE (1991) for verbal stem formation and DE (1992) for derivational morphology (Imdlawn Tashlhiyt).

⁸⁰ The TIRRUGZA derivatives are pluralia tantum nouns in the feminine. See DE (1992) for a list of forms and a discussion of the templatic mapping.

and their derivatives are given as complete words, the inflectional material is not involved in the correspondence between bases and derivatives. For example, in the derivation of *t-i-rrugza* from *a-rgaz*, the templatic correspondence only involves *-rgaz* and *-rrugza*. In (36) below, the words in column I have the TIRRUGZA derivatives given in column II. The items in column III are the strings which are inputs to the templatic mapping. In these strings, the segments which are not preserved in the derived nouns are marked by a slash.⁸¹

(36)	I	II	III
a.	a-rgaz	t-i-rrugza	rgǎz
b.	a-maziγ	t-i-mmuzγa	mǎzɿγ
c.	i-nbgi	t-i-nnubga	nbɣɿ
d.	!a-nttayfu	!t-i-nttuyfa	!nttǎyfu
e.	a-n-lmad	t-i-nllumda	nlmǎd
f.	a-n-flus	t-i-nffulsa	nflus

The TIRRUGZA derivatives respect ‘consonantal invariance’, a general property of nonconcatenative morphology in Tashlhiyt which was already mentioned in § 3.3.1. Very roughly: *vowels* are the main targets of morphological processes; except for length, these processes leave consonants intact. The syllabic status of contoids does not impinge on their behaviour in morphology-governed alternations.⁸² Consider for instance the consonant /l/ in examples (36)e,f. It is a nucleus in the base *-nlmad* (nl.mad), whereas it is an onset in the base *-nflus* (nf.lus), but this difference does not have any bearing on its fate in the derivation: it is retained in the derivative in both cases.

We leave kernel-level syllabification as an outstanding issue. This issue is inextricably interwoven with the analysis of the underlying glides, which are the subject of the next chapter.

6.6. SHORT VOCOIDS IN OTHER WORKS ON TASHLHIYT

The data involved in our presentation of syllabification in Imdlawn Tashlhiyt are mainly drawn from two areas, versification and morphologically-governed length alternations on the one hand, and the distribution of short vocoids on the other hand. The two kinds of data play different roles in our discussion. Let us first pause briefly to see where the difference lies.

It is versification and the morphologically-governed length alternations which provide the crucial evidence as to how strings of segments are parsed into syllables; in particular, these data show that short vocoids are not

⁸¹ The base nouns in (36)-I have the following meanings: (a) man, (b) free person, (c) guest, (d) dummy in a card game, (e) apprentice, (f) wealthy person.

⁸² Imperfective gemination is an exception to this generalization.

taken into account in syllabification. Call this the syllabic irrelevance of short vocoids in Tashlhiyt. It has been stated that Berber @ is a syllable nucleus.⁸³ This is not the case in Tashlhiyt, but it is in other dialects of Berber, e.g. Rifian.

The role of our considerations about short vocoids in Imdlawn Tashlhiyt (this chapter) is to propose an explanation for their syllabic irrelevance: the reason why syllabification does not take them into account is that they are not segments. Our knowledge of their distribution and of their phonetic properties is rather incomplete, as we have seen, but what little we know fits with the hypothesis that they are mere transitions between segments.

The syllabic irrelevance of short vocoids is a property of Tashlhiyt at large, because the poetic conventions discussed in Chapter 4 are not specific to people living in the Imdlawn valley. They are common to a much larger group of Berber-speaking people living in Western Morocco. On the other hand, our generalizations on the distribution of short voiced vocoids were arrived at solely on the basis of data from the Imdlawn dialect.

How much variation involving short vocoids is there among Tashlhiyt speakers? We do not know. The extant literature on Tashlhiyt cannot be relied upon to provide information on this point. Half a century ago, Basset and Galand were complaining that the transcriptions used by Berberists only gave minimal information about pronunciation,⁸⁴ and the situation has hardly improved since. Short vocoids are present in the transcriptions of various dialects of Tashlhiyt, see e.g. Destaing (1920) and Aspinion (1953), but it is unclear to what extent they mirror the actual pronunciation.⁸⁵ The distribution of short vowels in these works differs markedly from that which we reported above for the VTVs in Imdlawn Tashlhiyt. It is reminiscent of that of short vowels in works on Berber dialects outside of the Tashlhiyt group, e.g. in Ait Iraten Kabyle (Basset and Picard 1948) or in Ayt Ndhir Tamazight (Penchoen 1973). But the latter authors did not intend every occurrence of *e* in their transcriptions to represent a voiced vocoid actually occurring in the pronunciation,⁸⁶ and the same is probably true of the transcriptions of Tashlhiyt by Aspinion and the other authors cited above.

As far as schwa and syllabic consonants are concerned, the literature

⁸³ Basset (1952: 8).

⁸⁴ Basset (1952: 5) and Galand (1953).

⁸⁵ Some of the inconsistencies in these transcriptions probably come from variations in transcriptional practice, rather than from variation in the data. See Galand (1953: 230) for examples of inconsistencies in the transcriptions in Destaing (1920).

⁸⁶ According to Basset and Picard (1948: 9) *ə* is 'a vocalic element [. . .] which ranges, depending in particular on tempo, from a well-marked vowel to nothing at all. All vowels are voiced; it may be the case, however, that *ə* could devoice, leaving a mere suspension as its only residue'. Penchoen (1973: 10) writes that what he transcribes uniformly as *ə* 'may be – phonetically – an [ə], the syllabicity of a consonant such as a nasal, lateral or /r/, or even a simple consonant release voiced or not'.

on Tashlhiyt is no less confusing than that on the other Berber dialect groups: when two descriptions disagree, it is often very difficult to sort out from the rest those divergences which reflect actual differences in the data. Mohamed Guerssel's work on his native Tamazight dialect is an example of this general state of affairs.

In Guerssel's transcriptions of surface forms in his earlier work, the distribution of schwa followed a pattern rather similar to that found in other works on Berber, with underlying /CCC/ clusters regularly surfacing as *C@CC*.⁸⁷ Then, in 1985, the author published an article in which most of the @*C* sequences occurring in the surface forms in his earlier work were in effect reinterpreted as syllabic consonants. He gave surface forms such as *s̥f.d̥x.t̥n* 'I wiped them' (from /sfd-x=tn/), which he would have transcribed as *s@fd@xt@n* in his earlier work. According to the 1985 analysis of Ait Seghrouchen Tamazight, all the consonants but the stops can be syllable nuclei, and nuclear status is preferentially assigned to consonants with greater sonority. The author does not make it clear whether the switch from *s@fd@xt@n* to *s̥f.d̥x.t̥n* is only a matter of phonological interpretation, or whether he has also changed his views about what the phonetic facts are. In Guerssel (1992), the author gives up all syllabic consonants and reverts to Ait Seghrouchen surface forms in which /CCC/ is generally realized as *C@CC*. Apart from such surface forms, Guerssel's articles provide little information about the pronunciation of his dialect.

Durand (1995/96) notes that neutral vowels become more and more elusive as one moves westward in North Africa. He makes this observation both for Arabic and for Berber. Durand shows that in many instances, commonly accepted transcriptions of Moroccan Arabic write a short vowel where none is heard in the pronunciation. He suggests that as far as neutral vowels are concerned, the transcriptions of Moroccan Arabic have been unduly influenced by those devised for recording the varieties of Arabic spoken in Algeria, and he seems to suggest that a similar phenomenon may have occurred for Berber, where prior knowledge of dialects like Kabyle, which have more clearly audible neutral vowels, may have influenced the notation of dialects more to the West.⁸⁸ Some transcriptions of Tashlhiyt could contain occurrences of *e* which are audible as vowels only in other dialects.⁸⁹ We must bear in mind that the transcriptions in question are in many ways more like conventional spelling systems than like phonetic transcriptions, in that they are primarily for the use of people who already

⁸⁷ See for instance the rule of schwa epenthesis in Guerssel (1977: 271). As we have seen in § 6.5.1, Rifian Berber follows essentially the same pattern.

⁸⁸ Galand (1953: 230) even hints that some transcriptions of Berber may have been influenced by assumptions about syllabification in Arabic.

⁸⁹ See also Galand (1988: 213): '... most often, the numerous occurrences of [ə] found in works by Berberists reflect habits which are alien to Tashlhiyt.'

have a first hand experience with the dialect which they record, or with one resembling it. The people who devised them seem to have tried not to depart too far from the spelling conventions of French, since these transcriptions were used in teaching: some native speakers of French and Arabic were taught Berber before being sent as administrators to Berber-speaking areas.⁹⁰ Take for instance /tt-kks/ 'remove! impf', which can only be pronounced as *ttkks* (i.e. [t:^hk:s]) in Imdlawn Tashlhiyt. Destaing (1920: 110, 206) and Aspinion (1953: 271) both write *ttekkes*. No matter how the word was actually pronounced in the dialects these authors were describing, 'ttekkes' is easier than 'ttkks' to identify and to memorize for a speaker of French (or Spanish, or German).

Louali and Puech have recently presented evidence which suggests that some varieties of Tashlhiyt have voiced vocoids which cannot be interpreted as mere transitions between segments. Louali and Puech (2000) report that they have made a short list of words which contain only voiceless consonants, e.g. /kf=t/ 'give it!', and they have examined audio recordings of nine repetitions of each word by four speakers from various locations in the Tashlhiyt-speaking region. In the case of one speaker they report the same finding as Coleman (1999) observed in his audio recordings of ME's speech: no voicing ever occurs, as MINIMAL-PATH(voice) would lead one to expect (v. § 6.3.1); but they found voiced vocoids in some of the repetitions produced by the other speakers.

Louali and Puech do not give any indication about the location of the epenthesis sites in the various tokens they examined. In the absence of such information one cannot determine the relationship between the voiced vocoids which they have observed and the syllable structure which we have posited on the basis of the evidence presented in Chapters 4 and 5. When we know more about Louali and Puech's data, it may turn out that the distribution of the short vocoids is closely related to syllable structure, but this cannot be taken for granted a priori.

To conclude this section we discuss an article in which John Coleman challenges our views on the status of short vocoids in the syllable structure of Tashlhiyt.

Coleman (1996, 1999, 2001) disputes our phonological interpretation of the syllabic consonants of Tashlhiyt. Let us concentrate on Coleman (2001), which repeats or summarizes the main facts contained in the earlier papers and presents the author's current position. To anticipate our conclusions: most of the data marshalled by the author is irrelevant for choosing between his position and ours, and the little that is relevant is not compelling.

Let us first sort out what the points of contention are and what kinds of data would be decisive for choosing between our position and Coleman's.

⁹⁰ See Galand (1957) on the school founded in Rabat by General Lyautey in 1912.

Once this is done, we will review the various kinds of evidence presented by Coleman.

Coleman agrees that Imdlawn Tashlhiyt has syllables which do not contain any discernible vocoid, but he disputes our interpretation of this fact. While we hold that the nucleus of such syllables is a consonant, his view is that it is a vowel which is phonetically overlapped by adjacent consonants. Consider for instance the first syllable of *t-sti* ‘she selected’, which is pronounced [ts]. While we hold that that syllable only contains two segments *t* and *s*, Coleman’s view is that it is actually *t@s*, in which the vowel is subject to a process of reduction akin to those which give rise to English casual-speech pronunciations such as [t^h]*night* (*tonight*), [s]*ppose* (*suppose*).

Let us use the acronym ‘RIPI’ to refer to the Representations which are Inputs to Phonetic Implementation.⁹¹ Coleman proposes what he calls ‘the coproduction analysis of syllabic consonants’, which implies that only vocoids may occur as nuclei. The coproduction analysis of syllabic consonants is in contradiction with the Licit Consonantal Nuclei thesis introduced in § 4.1. According to the Licit Consonantal Nuclei thesis, any consonant can be a nucleus in the RIPIs. The two contending positions are illustrated below in (37) with *t-sti* ‘she selected’.

(37)	underlying representation	pronunciation	Coleman’s RIPI	our RIPI
	/t-sti/	[tsti]	[t@s.ti]	[ts.ti]

We enclose the RIPIs between vertical lines to distinguish them from the narrow phonetic transcriptions, which are indicated by square brackets. The latter transcriptions are only meant as means of conveying what can be observed by inspecting the phonetic record, without any commitment as to the content of the corresponding RIPIs. To represent the vowel subject to reduction in the coproduction analysis, Coleman uses the notation ‘/ə/’. To remain in agreement with our conventions elsewhere in this book, we replace ‘/ə/’ by ‘|@|’.

According to Coleman (2001), all the occurrences of |@| are epenthetic; they are introduced by syllabification (recall that under the coproduction analysis, only vocoids may occur as syllable nuclei in the RIPIs). |@| is an empty nucleus and it is phonetic implementation that specifies its vowel quality, which depends on the surrounding segments, and its duration. This duration may be too short for the vocoid to be discerned as a distinct segmentation of time in the phonetic record. In [tsti], for instance, the syllabicity of [s] is simply due to the fact that the realization of the nucleus |@| is completely overlapped by that of the following [s].

⁹¹ In our view the RIPIs are terminal representations of the phonological component.

There are no disagreements between Coleman (2001) and us on the representations which are inputs to syllabification. Whereas in our account the burden of accounting for the distribution of [ə] is placed entirely on phonetic implementation, in Coleman's account the work is done jointly by the phonological component, which inserts [ə], and by phonetic implementation, which eclipses it in certain instances.

When one tries to match the [ə]s which occur in the RIPIs posited by Coleman with the [ə]s observed in pronunciation, one encounters disparities of two kinds. Compare for instance the RIPI and the pronunciation of *t-sbɣ-t* 'you painted'.

(38)	underlying representation	pronunciation	Coleman's RIPI	our RIPI
	/t-sbɣ-t/	[ts@bɣt]	[t@sb.ɣ@t]	[tɓ.bɣt]

First, in [t@sb.ɣ@t], which is the RIPI under Coleman's analysis, the two occurrences of [ə] do not have reflexes in the pronunciation. A proponent of the coproduction analysis may simply claim that [ə] is eclipsed by the surrounding consonants in both syllables of (38).

Second, a short vocoid is pronounced between [s] and [b], but these segments are not separated by [ə] in the RIPI. In our view the short vocoid which is heard between [s] and [b] in the pronunciation of *t-sbɣ-t* is not the realization of a distinct segment in the RIPI, but a transition between [s] and [b]. Coleman too recognizes that certain vocoids are not the realization of a vowel, but he acknowledges their existence only in a very limited range of contexts. The only examples that he mentions occur next to /r/ or between the individual taps of its trilled realizations. Although he is not explicit on this point, throughout his discussion he seems to assume the following:

(39) All Schwas Are Nuclei:

Except in the immediate neighborhood of /r/, any [ə] found in the phonetic record is the reflex of a syllable nucleus in the RIPIs.

'All Schwas Are Nuclei' is but a convenient mnemonic for (39), and we beg the reader to bear in mind that henceforth any statement implying the absence of transitional vocoids from Coleman's account must be understood with the proviso 'except in the immediate vicinity of /r/'.

Coleman's account and ours are both incomplete, in that there are certain environments in which each fails to make definite predictions about the occurrence of [ə] in a CC sequence. Furthermore, the two accounts are incomplete in similar ways: each account circumscribes a certain range of environments in which it predicts that [ə] may not occur in a CC sequence, call these the 'no-schwa environments'; outside of these environments

[@] is allowed to occur in a CC sequence, but here neither Coleman's account nor ours makes definite claims as to whether the occurrence of [@] is obligatory or merely optional. When the two accounts are compared for empirical adequacy, then, the crucial data come from environments which are no-schwa environments.

In our account, the no-schwa environments are those singled out by generalizations (2) and (3) at the beginning of § 6.3.1, viz voiceless sequences (e.g. *kt*) and sequences of homorganic noncontinuants which differ in sonorancy (e.g. *dl*), and also those in which the Fusion rule creates geminates (v. § 6.3.3.2). Outside of these environments, a short vocoid is heard in some cases but not in others, but the regularities have yet to be worked out, e.g. our discussion in § 6.3.2 has nothing to say about the fact that the pronunciation of [ts.byɾ] contains [@] between [s] and [b], but not between [b] and [ɾ].

In Coleman's account, the no-schwa environments are all those in which syllabification does not insert |@|, e.g. [sb] in [t@sb.ɣ@t] (see (38)), but that account does not say anything about the extent to which |@| is phonetically overlapped in various environments, e.g. it does not capture the fact that |@| must be totally eclipsed in [t@s.ti] (37), but not in /i-xng/ [ixn@g] 'he strangled', a form whose RIPI is [ix.n@g] in Coleman's account.

To sum up, either account is incomplete in its characterization of phonetic implementation. Our account only makes definite factual claims about the CC sequences involved in generalizations (2) and (3) and sequences of sibling consonants. Coleman's account only does so for the CC sequences which are *not* broken up by |@| in the RIPIs.

In Coleman's account, the syllables of Tashlhiyt all have the form (C)V(C(C)), where V stands for *a*, *i*, *u* or the epenthetic vowel @. Unlike ours, that account allows VCC rimes in which CC is not a geminate, e.g. in Coleman's account /t-a-frux-t/ 'girl' is parsed as two syllables, [taf.ruxt], with a final rime *uxt*, but on our analysis it must be parsed as three syllables: [taf.ru.xt]. In CC codas the second C may not be more sonorous than the first, but otherwise the sonority of consonants does not play any role in syllabification in Coleman's account.

We will not go any further into the details of syllabification in Coleman's analysis, but the reader may get some sense of how it differs from syllabification in our account by examining the examples in table (40) below.⁹² In the last column the nuclear consonants are all underlined for the sake of conspicuity. In the second column, letters in boldface indicate schwas which are problematic for Coleman's account because they are in contra-

⁹² The meanings of the examples in (40) are the following: (a) it went numb; (b) she even hoarded; (c) she even behaved as a miser; (d) what will happen of you?; (e) for the cockroaches; (f) you drowned; (g) you painted; (h) I locked; (i) he strangled; (j) he strangled him; (k) broken branch; (l) he wrung (someone's neck) for him; (m) take care of his mother!.

diction with the All Schwas Are Nuclei assumption (39): they do not correspond to epenthetic |@|s in Coleman's RIPIs. In (40)b, for instance, |x| and |z| are not separated by |@| in the RIPI posited by Coleman, and yet a short vocoid can sometimes be heard between the two consonants.

(40)	underlying representation	pronunciation	Coleman's RIPI	our RIPI
a.	/i-slm/	[isl@m]	is.l@m	i.s_lm
b.	/t-xzn=akk ^w /	[tx(@)znak ^w :]	t@x.z@.nakk ^w	t.xz.nakk ^w
c.	/t-bxl=akk ^w /	[t@bxlak ^w :]	t@b.x@.lakk ^w	t.bx.lakk ^w
d.	/ma rad t-g-t/	[marat@gt]	ma.rat.g@t	ma.rat.gt ⁹³
e.	/i=t-!bdr-in/	[!it@b(@)drin]	it.b@d.rin	it.bd_rin
f.	/t-!ngd-t/	[!tn(@)g@t:]	t@ng.t@t	tn.gt ⁹⁴
g.	/t-sbγ-t/	[ts(@)bγt]	t@sb.γ@t	ts.bγt
h.	/rgl-x/	[rgl@x]	r@g.l@x	r.glx
i.	/i-xng/	[ixn@g]	ix.n@g	i.xng
j.	/i-xng=t/	[ixn@g@t]	ix.n@gt	i.xn.gt
k.	/!iškd/	[!išk@d]	iš.k@d	iš.kd
l.	/i-šnnq=as/	[išn:@qas]	iš.n@n.qas	i.šnn.qas
m.	/nawl ma=s/	[nawlmas]	nawl.mas	na.w_l.mas

Table (40) gives us the occasion to pause briefly to comment on the nature of the difference between the syllabic parses discussed in our works of 1985 and 1988 and those discussed in this book. This difference complicates the comparison between Coleman's position and that expounded in this book, but it is irrelevant for assessing the value of all but one of the arguments presented in Coleman (2001).

In (40) the pronunciations in the second column are reproduced from our 1985 article, but the syllabic parses in the last column are not. As explained in § 5.1, our 1985 article dealt with syllabic parses inferred from direct questioning (IFDQ syllabifications for short). On the other hand this book only deals with orthometric syllabification, and consequently the forms at the end of each line in (40) are orthometric syllabifications.⁹⁵ Unless the readers constantly keep this point in mind, they are apt to find the comparison between Coleman's work and ours very confusing. Table (41) below contains all the examples from (40) whose orthometric syllabification differs from the IFDQ syllabification recorded in our 1985 article (the line numbering of (40) has been retained to make the comparison easier).

⁹³ On the deletion of /d/ at the end of the future preverb /rad/, see DE (1989: 188).

⁹⁴ As a result of voice assimilation and Fusion, /dt/ surfaces as geminate /tt/, see § 6.3.3.2.

⁹⁵ On the reasons why we now prefer to work with orthometric syllabification, v. § 4.1.

(41)	orthometric (40)	IFDQ (DE 1985)
b.	t.xz.nak ^w k ^w	txz.nak ^w k ^w
c.	t.bx.lak ^w k ^w	tbx.lak ^w k ^w
d.	ma.rat.gt	ma.ra.tgt
f.	tn.gtt	tn(.)gtt ⁹⁶
j.	i.xn.gt	i.xngt
k.	iš.kd	išk.d

As we already noted in 1988, one important difference between orthometric syllabification and IFDQ syllabification is that the latter does not allow obstruent nuclei adjacent to a pause; it allows complex onsets and complex codas instead, see the forms in (41)b,c, which have a complex onset in their IFDQ parse, and those in (41)j,k, in which the complex coda is not a geminate.⁹⁷ In our works of 1985 and 1988 the focus was on IFDQ syllabification. However the analysis in these works also generated syllabic parses which were in essence identical to the orthometric parses. The parses in question were a significant step in the sequential derivations which led from the underlying forms to the IFDQ syllabifications, for they were the output of our ‘Core Syllabification’ procedure. In the derivation of the IFDQ parse of (41)b, for instance, Core Syllabification would generate the parse on the left-hand side in (41)b, which would subsequently be readjusted to yield the IFDQ parse on the right-hand side.

The constraint-based analysis of orthometric syllabification expounded in the present book was first presented at length in DE (1997a). Coleman (2001) only makes passing references to that article. His arguments are all aimed at our earlier papers.

Returning now to table (40), the highlighted schwas in the pronunciations in the second column point to what is in our opinion the main weakness in Coleman’s position, viz the All Schwas Are Nuclei assumption. Consider for instance *i-šnnq=as* [išn:@qas] ((40)l). The sequence /nq/, which is broken up by [@] in [išn:@qas], is heterosyllabic in Coleman’s RIPI as well as in ours. This form exemplifies one of the environments in which transitional vocoids are most systematically heard in Imdlawn Tashlhiyt: between a sonorant and a following uvular. Note that the sonorants of Tashlhiyt are all articulated in the front part of the mouth. In Coleman’s account, differences between the points of articulation of adjacent consonants do not play any role, and consequently there is no explanation for why

⁹⁶ ME was unsure whether the form contained one syllable or two.

⁹⁷ The IFDQ syllabification of form (41)d violates constraint NoPICOR, which disfavors rimes in which an obstruent nucleus is followed by a coda with the same degree of sonority, see § 4.9.1.

a short vocoid can occur in *nq* even when the sequence is heterosyllabic, while none may occur in *nt* regardless of syllable structure.

Coleman's reluctance to accept that at least some occurrences of [ə] are not epenthetic vowels is understandable: if some occurrences of [ə] were epenthetic vowels while others were mere transitions between consonants, the coproduction analysis would have to be supplemented with hypotheses about transitions between consonants, and one would have to examine if these hypotheses do not render the overlapping mechanisms superfluous, at least as parts of an account for schwas and syllabic consonants in Tashlhiyt.⁹⁸

We are now ready to examine Coleman's arguments. Coleman (2001) is in essence a later version of Coleman (1996). Coleman (2001) takes into account some of our reactions to Coleman (1996) in our rejoinder to that article (DE 1996b); it also incorporates the acoustic data presented in Coleman (1999). These data were gathered by the author in the hope of substantiating his 1996 position, which he has now abandoned in part: not only did Coleman (1996) claim that in Tashlhiyt all syllabic consonants arose from the phonetic overlap of a vowel; he claimed furthermore that in some cases at least the overlapped vowel was [a], [i] or [u]. Coleman (2001) implicitly acknowledges that his acoustic data do not support this latter claim and he retreats to the weaker position that the vowels subject to phonetic overlap are all epenthetic schwas. This retreat renders irrelevant much of the evidence repeated by Coleman (2001) from his 1996 and 1999 articles, for that evidence was gathered in support of a position which he no longer holds. Coleman (2001) adduces four kinds of data in support of the analysis exemplified in (37), (38) and (40): (i) acoustic measurements, (ii) IFDQ syllabifications, (iii) free variation phenomena, and (iv) data from Berber dialects other than Tashlhiyt. We will discuss each kind of evidence in turn.

Coleman's acoustic measurements are based on audio recordings of ME's speech made in the phonetics laboratory in Oxford in the summer of 1995. These recordings included all the words which occur in DE (1985). For the purpose of this discussion, Coleman's data from acoustic measurements fall into two categories: (a) data about the occurrence of [ə] and (b) data about the duration and formant frequencies of [ə] in various contexts. The latter data were gathered by the author in search of evidence for his earlier position that the vowels subject to phonetic overlap were in some cases underlying vowels. However the author has now retreated to the claim that the eclipsed vowels are all epenthetic schwas. The data about the acoustic properties of schwa may be of interest for the study of those aspects of phonetic implementation responsible for the duration and the vowel quality of short voiced vocoids in various contexts, but they

⁹⁸ See DE (1996b: 232) for the discussion of a case in point.

are irrelevant for choosing between our account and Coleman's current account.

As data about the distribution of schwa, the author only presents statistics which he uses to assess the overall goodness of fit of our account and of his.⁹⁹ The author's finding is that his account's overall performance is 'marginally better' than ours in predicting the occurrences of [ə]. This can hardly be taken as compelling evidence of the superiority of the coproduction analysis. We think that global statistics of the kind performed by the author are a poor substitute for data about specific forms instantiating crucial cases in which the two accounts make different predictions. As explained above, the crucial cases involve contexts which are no-schwa environments in one account but not the other.

We turn next to the second kind of evidence presented by Coleman, which is native speakers' judgements about syllable structure. The author used his (C)V(C(C)) grammar to parse close to six hundred Tashlhiyt words. The resulting parses were presented to a Tashlhiyt speaker from the city of Agadir. The informant checked the parses against his own intuitive judgements and declared them correct in 98 percent of the cases. One would like to know how the same informant would have rated the parses assigned to the same words by DE's 1985 analysis. The question is of particular interest, since Coleman (1996: 187, 206) writes that the informant, a graduate student with extensive education in phonological theory who has written a Master's thesis on the phonology of Tashlhiyt, was an advocate of our approach to syllabification. Presumably he would not have advocated it if there had been important differences between his own judgements and the IFDQ syllabifications recorded in our works of 1985 and 1988. Again, an overall success rate cannot substitute for examination of the individual IFDQ parses which are incompatible with one or the other of the competing analyses.

The third type of evidence presented by Coleman is cases of free variation between *C^w* and *Cu*. The forms in (42) are in free variation in Imdlawn Tashlhiyt:

- | | | | |
|---------|-------------|--|----------------|
| (42) a. | managu | manag ^w | 'when' |
| b. | !a-xurbiš | !a-x ^w rbiš | 'small mosque' |
| c. | a-ggurdi | a-g ^w g ^w rdi | 'flea' |
| d. | !t-i-kkurda | !t-i-k ^w k ^w rda | 'theft' |

In Coleman's paper examples such as those in (42) are given without comment, but the context makes the author's intent clear. The examples in question are given just after a discussion of the variations in the pronunciation of forms such as *!kdu* 'smell!'. [ə] occurs between *k* and *d* in

⁹⁹ Here 'our account' refers to our characterization of voiced transitional vocoids in DE (1996a), which is the same as that presented in the earlier sections of this chapter.

the recordings of some tokens of the word but not in others, and Coleman interprets this variation as evidence that the RIPI of *!kdu* is *!k@du*. It is clear that he means to suggest that in the free variation in (42), *C^w* is just a realization of *Cu* when the vowel is eclipsed by phonetic implementation. Strictly speaking, viewing *manag^w* as resulting from the phonetic eclipse of the final vowel in *|managu|* is in contradiction with Coleman (2001)'s position that eclipse only affects epenthetic schwas. We nonetheless briefly take up free variations like those in (42) because we suspect that they will turn up again in future discussions of syllable structure in Tashlhiyt.

Coleman's presentation suggests that *[manag^w]* is a 'reduced' variant of *|managu|* in the same manner as *!kdu* is, in his view, a reduced variant of *!k@du*. This parallel is untenable. The difference between *!kdu* and *!k@du* is a subphonemic one, and after a pause the 'free variation' between *[kd]* and *[k@d]* occurs in all the words beginning with 'kd' in our transcriptions. The status of that variation in the grammar is comparable to the variation in the degree of aspiration of voiceless stops after a pause in English. On the other hand, the distinction between *Cu* and *C^w* is a phonemic one, witness contrasting pairs like those in (43) below, which can be multiplied at will:

- | | | | | |
|---------|-------------|--------------|-------------------------------------|----------------------------|
| (43) a. | aggu | 'smoke' | ag ^w g ^w | 'peek!' |
| b. | t-a-guri | 'word' | ag ^w ri | 'cause' |
| c. | t-guni | 'lying down' | t-g ^w ni | 3fs-sew:neg ¹⁰⁰ |
| d. | t-a-skkur-t | 'partridge' | a-sg ^w g ^w rd | 'mortar' |
| e. | a-mrgul | 'tureen' | a-srg ^w l | 'cover' |
| f. | akuz | 'weevil' | ak ^w z | 'recognize!' |
| g. | i-gulla-n | 'cheeks' | t-a-g ^w lla | 'porridge' |

Pronouncing *C^w* instead of *Cu* in the forms on the left-hand side yields ill-formed pronunciations, and the same is true if *Cu* is substituted for *C^w* in the pronunciation of the forms on the right-hand side. The status of the free variation in (42) is comparable to the vacillation between *[i]* and *[ɛ]* in the first syllable of the English word *economics*. Last but not least, whereas 'free variations' such as that between *!kdu* and *!k@du* do not affect syllable structure, those between *Cu* and *C^w* do, e.g. in singing, the alternation between *managu* (ma.na.gu) and *manag^w* (ma.nag^w) provides a choice between trisyllabic LLL and disyllabic LH.

The last kind of evidence presented by Coleman is sets of cognate words from Tashlhiyt, Tamazight and Kabyle Berber. In most sets the Tamazight and Kabyle forms have a vowel where Tashlhiyt has *[@]* or a syllabic consonant, and in the others the situation is reversed: Tamazight and Kabyle have *[@]* where Tashlhiyt has *a* or *i*. Coleman does not explain

¹⁰⁰ *t-guni* is the bound state form of *t-a-guni*. The affirmative form corresponding to *t-g^wni* is *t-g^wna*.

how these cognate sets are relevant to his argument. He probably means to suggest that his account implies a more uniform syllable structure across Berber dialects than ours does. This is merely begging the point, however. As we have seen in our discussion of Rifian Berber, there are indeed differences between the syllable structure of Tashlhiyt and that of some other Berber dialects, and the exact extent of these differences is an empirical question. Cognate forms drawn from different dialects can contribute little to that question if they are not embedded in a comparison, however sketchy, of the grammars of the dialects under consideration, i.e. of their phonologies.

To sum up, Coleman (2001) fails to provide compelling evidence for his claim that the syllabic consonants of Tashlhiyt result from the phonetic overlap of an epenthetic vowel by the neighboring consonants. However, in his search for evidence supporting an earlier version of his claim, he has gathered acoustic data which may prove valuable for the future study of phonetic implementation in Tashlhiyt.

This review of the treatment of short vocoids in the literature on Tashlhiyt concludes our argumentation in favor of the Licit Consonantal Nuclei thesis, which is one main component in our account of syllable structure in Imdlawn Tashlhiyt. In our presentation of that account, we have devoted special attention to the syllabification of contoids when they are adjacent to other contoids, because this aspect of Tashlhiyt phonology is of special interest for linguistic theory, but the constraints put forth in Chapter 4 also make definite predictions about the syllabification of contoids adjacent to vocoids. As we shall see, these latter predictions are not always borne out, due to certain peculiarities in the behaviour of underlying glides, a topic which will be the center of attention in the next chapter.

THE SYLLABIFICATION OF VOCOIDS

Like the other Berber dialects, Tashlhiyt has an underlying distinction between the high vowels /i, u/ and the semivowels /y, w/. In § 7.1 we examine in detail how hiatus is avoided in vocoid sequences which do not contain underlying semivowels. The rest of the chapter deals with the phonology of the underlying semivowels. In § 7.2 we show the need for an underlying distinction between glides and vowels. In § 7.3 we discuss the behaviour of glides when they occur as sonority peaks in the underlying representations. In some cases (§ 7.3.1, § 7.3.3) they surface as glides, in violation of some of the constraints discussed in Chapter 4, whereas in others (§ 7.3.2) they undergo lengthening and surface as vowel-plus-glide sequences. Finally, § 7.4 is devoted to a discussion of geminate glides and we end with a brief conclusion in § 7.5.

7.1. VOCOID SEQUENCES NOT CONTAINING UNDERLYING GLIDES

This section deals with the prohibition of vowel sequences and how this prohibition is enforced in Imdlawn Tashlhiyt.

Like other dialects of Berber, Imdlawn Tashlhiyt does not tolerate adjacent vowels in any morphosyntactic environment.¹ As we will see, Imdlawn Tashlhiyt can do the following things to prevent an underlying sequence of vocoids from being realized as a sequence of vowels. The vocoid sequence may be realized as a long vowel, it may be broken up by an epenthetic yod, or one of the vocoids may show up as a glide. In all these cases, either underlying vocoid shows up as a separate skeletal position on the surface. Setting aside the idiosyncratic behavior of certain grammatical morphemes, elision, i.e. the complete deletion of one vocoid, is only used in fast speech and in poetry.

In what follows we survey the various cases in which a sequence of vocoids could be expected to give rise to a vowel sequence, were it not for the abovementioned prohibition. Our survey will deal with sequences

¹ We have come across a few cases in which hiatus may not altogether be excluded. In all of these, ME's judgements are not clearcut, or when they are, they are not consistent over time. These instances all involve adjacent vowels belonging to words located on either side of a major syntactic break. Such cases warrant further research. An example is found in the following sentence, an interrogative cleft: *i-kru a mmi ra !t-γrs-t* (kid AD dat RAD 2-cut:throat:aor-2s) 'is it *the kid* whose throat you will slit?' It may be possible to put the sentence's pitch maximum on *u* in *ikru*, the clefted noun, in which case the sentence contains a sequence of vowels (*ua*).

of vocoids which are brought about by concatenative mechanisms in morphology or in syntax. Nonconcatenative morphology also avoids vowel sequences.

The lexical representations of Imdlawn Tashlhiyt must distinguish between two kinds of high vocoids depending on whether they are allowed to surface as vowels. /y/ and /w/ are underlying segments which must always surface as glides,² whereas /i/ and /u/ surface as vowels in some contexts and as glides in others. The difference between the two types of high vocoids will be dealt with in detail in the following sections. Let us use the term ‘underlying glide’ to refer to /y/ or /w/, and the term ‘potential high vowel’ (‘potential hv’ for short) to refer to /i/ or /u/.

The underlying glides do not belong to the subject matter of the present section. As for the potential hvs, only those located at the ends of morphemes will be considered, for Imdlawn Tashlhiyt does not possess processes which would have the capacity of bringing together a potential hv which is morpheme-internal and another segment located at one end of a morpheme.³ Our examples will often be given in sets to show contextual variants of the morphemes involved.

In our presentation of the facts we will gloss over various idiosyncracies involving individual morphemes or morpheme sequences, e.g. /imma ur/ ‘while not’, which is normally pronounced *immawr*, can also be pronounced *immuwr* or *immur* in fast speech. As far as we know, only in this particular morpheme sequence can /a+u/ be realized as *uw* or *u*, e.g. /imma uššn/ ‘while the jackal . . .’ can only be pronounced as *imma wššn*.

The terminology and the abbreviations used below were introduced in § 2.2. As indicated there, ‘H’ represents a high vocoid, ‘G’ represents a glide and ‘+’ represents any morpho-syntactic boundary (–, = or #).

7.1.1. Sequences *a+H*

When *a* is followed by a high vocoid, the high vocoid is realized as a glide no matter in what environment. In *iγ i-šša y-su* (if 3ms-eat 3ms-drink:aor) ‘if he has eaten, let him drink’ the 3ms PNG must be syllabic in the first verb but may not be in the second. Compare also *ut-n* ‘they struck’ and *t-a=da wt-n* (f-s=det strike-3mp) ‘the one (f) which they struck’.⁴ The initial segment of the enclitic is syllabic in *las=iγi* (shear:aor=do1s)

² Except in quite exceptional circumstances, on which v. the end of § 7.2.

³ This statement could seem to be falsified by the insertion of the chameleon vowel in the formation of imperfective stems, as in the imperfective of *gnugi* ‘tumble down’, which is *tt-gnuguy*. Chameleon insertion is better viewed as a nonconcatenative process, however. On the chameleon vowel, v. § 5.2.

⁴ Homophonous, up to the second *t*, with *t-adaw-t=nn-s* (f-hump-fs=gen-3s) ‘its hump (camel)’.

‘crop my hair!’ and *i-las=iyt* (3ms-shear:aor=IYT) ‘let him shear’ but not in *žara=yi* (seek=dols) ‘look for me!’ nor in *i-žara=yyt* (3ms-seek:aor=IYT) ‘let him search’.⁵

For vocoid sequences other than those of the form *a+H*, the surface outcome varies depending on whether + represents a morpheme boundary, a clitic boundary or a Pword boundary. Let us examine each case in turn, starting with *H+a* sequences.

7.1.2. Sequences *H+a*

Sequences *H+a* can be realized as *G+a* in all environments. *G+a* is the only acceptable realization in some environments whereas others allow free variation with another pronunciation. Inside words only *G+a* is an acceptable pronunciation. When the sequence straddles a clitic boundary, *u+a* (but not *i+a*) can in some cases be broken up by the insertion of yod. When it straddles a Pword boundary, *G+a* is in some contexts in free variation with a long monophthong. For word-internal sequences, here are examples involving the 3ms PNG and the bound state prefix: *i-skr* ‘he did’ vs. *y-attuy* ‘it (m) is high’; *d=u-rgaz* ‘and the man’ vs. *d=w-aman* ‘and the water’. For sequences straddling a clitic boundary, here are examples involving imperative plural *at*, dat3s *as* and demonstrative *ad* ‘this’: *ldi* ‘pull!’ vs. *ldy=at* ‘pull! p’; *gnu* ‘sew!’ vs. *gnw=at* or *gnu=yat* ‘sew! p’; *mdi* ‘set a trap!’ vs. *mdy=as* ‘set a trap for him!’; *hdu* ‘give away!’ vs. *hdw=as* or *hdu=yas* ‘give away to him’; *i-ldi* ‘sling’ vs. *ildy=ad* ‘this sling’; *a-gru* ‘frog’ vs. *agrw=ad* or *agru=yad* ‘this frog’. When the potential hv and the following *a* belong to different words, *G+a*, which is always a possible realization, is often in free variation with a long vowel: *aa* for *ya* and *ɒɒ* for *wa*, e.g. *ldi* ‘pull!’ vs. *ldy#a-sk^wti* or *lda#a-sk^wti* ‘pull the mill crank!’.

In the preceding transcription the Pword boundary should not be taken to imply the presence of a syllable boundary. The two ‘halves’ of the long vowel are tautosyllabic, as in all long vowels in Imdlawn Tashlhiyt. In this book, two identical vowel symbols in a row always represent a (tautosyllabic) long vowel, regardless of intervening boundary symbols.

Here are other examples in which /i+a/ has a free variant *aa*. /w-a=lli=ak^wk^w=gi-sn i-!ħrš-n/ (m-s=det=all=loc-3mp prt-clever-prt) ‘the most intelligent among them’, /a-ydi=as fki-x/ (u-dog=dat3ms give-1s) ‘the dog I gave him’. Here is now an example in which *wa* is in free variation with *ɒɒ*: /ss-ħmu atay/ (cau-warm tea) ‘warm up the tea!’.

The realization of *i+a* and *u+a* as *aa* and *ɒɒ* is only possible across Pword boundaries, but all *i+a* and *u+a* sequences with an intervening

⁵ The clitics *iyi/yyi* and *iyt/yyt* may be analyzed as beginning with geminate glides in their lexical representations (/yyi/ and /yyt/). On geminate glides, v. § 7.4.

word boundary cannot be realized as *aa* and *ɒɒ*. At present we do not know what contexts allow the free variants *aa* and *ɒɒ*.

7.1.3. Sequences of potential hvs

Let us now turn to sequences of two potential hvs. Inside words they are realized as *GV*;⁶ elsewhere they are realized as *VG*.⁷ Here are word-internal sequences involving the 3ms PNG and the bound state prefix: *i-nna* ‘he said’ vs. *y-ut* ‘he struck’, *y-itti* ‘he moved away’; *d=u-ɣaras* ‘and the path’ vs. *d=w-uday* ‘and the Jew’, *d=y-izm* ‘and the lion’. The following examples involve sequences which straddle a clitic boundary: *sufu* ‘illuminate!’, *las=iyi* ‘crop my hair!’, *sufu=yiyi* ‘make light for me!’, *t-las=iyt* ‘let her shear’, *t-sufu=yyt* ‘let her illuminate’. Here are now instances involving a preposition: *i=ysti* (dat=daughter:p:my) ‘to my daughters’, *ddu=yžža* ‘under Ižža (a woman’s first name)’;⁸ *d=u-frux* (and=b-boy) ‘and the boy’ vs. *iws-x i=w-frux* (help-1s dat=b-boy) ‘I helped the boy’.

Finally, in the following examples the adjacent potential hvs do not belong to the same Pword. *uhu* ‘no’, *ini whu* ‘say no!’, *izm* ‘lion’ vs. *hdu yzm* ‘give the lion away!’, *ut-x=tt* (strike-1s=do3fs) ‘I struck her’, *ašku wtxtt* ‘because I struck her’, *immi* ‘Mom’ vs. *ur !t-zri ymmi* (neg 3fs-see:neg Mom) ‘she did not see Mom’.

In most contexts the glides of Imdlawn Tashlhiyt do not give the impression of being produced with a narrower constriction than the high vowels. There are instances where our only basis for choosing between ‘y’ and ‘i’ or between ‘w’ and ‘u’ in our phonetic transcriptions are ME’s judgments about syllable count and the location of syllabic peaks. In so doing we do not operate differently from phonologists who write [žɔlio] and [žɔlyo] when they are asked for phonetic transcriptions recording the Parisian pronunciations of *joli haut* ‘pretty top’ and *Joliot*, a family name: their main cue, or at least the overriding one, is the native speakers’ judge-

⁶ One must bear in mind that this statement only pertains to sequences of potential hvs which are brought about by concatenative morphology. The *VG* sequences created in some imperfective stems by the ‘insertion’ of a chameleon vowel (v. note 3) are due to nonconcatenative morphology, as is also sequence *uw* in plural nouns such as *i-šuwaš* ‘pitchforks’, which is related to the singular *a-šawš* as *i-mudal* ‘mountainsides’ is related to the corresponding singular *a-madl*.

⁷ In fast speech the final *i* of certain grammatical morphemes contracts with a following *u*, yielding *uw*, e.g. in /w-a=lli ufi-x/ (m-s=det find-1s) ‘the one which I found’, /lli#u/, which is normally pronounced *lliw*, can also be pronounced *lluw* in fast speech. We only know of one case in which /u+i/ may be realized as *iy*, that of the phrases headed by the empty nouns *bu* and *mmu*, e.g. /bu i-zrga-n/ (ms:with bp-mill-p) ‘the one with the mills’ can be pronounced either as *bu yzrgan* or as *bi yzrgan*, v. § 2.5.3.2.

⁸ Although they begin with vowels, *isti* and *ižža* can occur without a prefix in the bound state, v. § 2.5.1, note 22.

ment that there are three syllables in *joli haut* and only two in *Joliot*.⁹ In other instances, syllabicity differences correlate with others which even a nonnative speaker can hear easily. Here is one such difference. Like the sequences at the beginning of the English words *yeast* and *woo*, the sequences *yi* and *wu* of Imdlawn Tashlhiyt are produced with a narrower constriction at the beginning of their time course, which is not the case in *iy* and *uw*, compare for instance *tyi* and *tiy* in *y-ut y-ils* (3ms-hit b-tongue) 'the tongue struck' vs. *y-uti yls* (3ms-let:out tongue) 'he has his tongue hanging out', and compare *dwu* with *duw* in *y-anf=d w-udad* (3ms-take:cover:aor=dir b-ibex) '... and the ibex took cover' vs. *ra n-fdu wdad* (RAD 1p-redeem:aor ibex) 'we shall redeem the ibex'.

7.1.4. Sequences *a+a*

Let us now examine the behaviour of */a+a/*. This sequence can always surface as *aa* (tautosyllabic), which is in free variation with *aya* in particular contexts. We have already mentioned the fact that Imdlawn Tashlhiyt morphemes display a contrast between *a* and *aa*, e.g. *t-zba* 'she took hastily' vs. *t-šbaa* 'she ate her full', *bqqa-n* 'they stayed' vs. *fqqaa-n* 'they became angry', *t-iram* 'meals' (s *t-irm-t*) vs. *!a-raam* 'camel', *zayd* 'add!' vs. *laayd* 'festival'. The surface contrast between *a* and *aa* does not reflect an underlying contrast between simple and geminate */aa/*, because all occurrences of tautomorphemic *aa* can be derived from */ʕ/*, */ʕa/* or */aʕ/*, as we have argued in § 3.7.

The occurrences of *aa* which arise from */a+a/* are homophonous with morpheme-internal ones, witness the homophony of *!rqqa=ax* (*!rqqa=ax/* warm:impf=dat1p) 'let us two warm up' with *!rqqa=x* (*!rqqa=x/* mend-1s) 'I mended'. Another example is provided by the following pair, in which emphasis is the only distinguishing feature at the phonetic level: *i-ra aman* (3ms-want water) 'he wants water', *!i-raama-n* */i-!rʕma-n/* 'camels'.

In Imdlawn Tashlhiyt the concatenation of morphemes inside words never creates */a+a/* sequences,¹⁰ so we turn directly to those */a+a/* sequences which arise through word concatenation. As we have already said, all */a+a/* sequences can be realized as *aa*. Except those involving the preverbs */ad/* and */ar/*, on which v. below, all */a=a/* sequences have a free variant *aya*. Here are some examples. *a-swik=ann* 'that walnut (tree)', *t-a-rga* 'channel',

⁹ We do not mean to imply that there are no phonetic differences which correlate with the syllable count difference. We simply mean that it is not necessary to know what these differences are to be able to choose appropriately between the symbols 'i' and 'y' when transcribing French sentences.

¹⁰ There are no verbal affixes beginning or ending with */a/*, and in nouns the only uncontroversial instance of such an affix is the free state augment */a-/*, which can only occur before a consonant-initial morpheme. As for the putative masculine plural suffix *-an* which appears in certain nouns, it is never suffixed to nouns whose singular forms end in *a*.

targaann or *targayann* ‘that channel’; the notation *targa(y)ann* conveniently sums up the two variants; *krz=at* ‘plough! p’, *štta* ‘eat!’, *štta=(y)at* ‘eat! p’; *a-ydi=da=(y)ax i-bbi-n* (u-dog=det=do1p prt-bite-prt) ‘the dog that bit us’; *ħra=(y)ak^wk^w mmut-n* (just=all die-3mp) ‘they all just died’; *mra=(y)as nni-x* (if=dat3s say-1s) ‘if I had told him’;¹¹ *bla=(y)aga* (without¹²=bucket) ‘without a bucket’.

A special mention must be made of *a=a* sequences in which the first *a* belongs to the preverbs /ar/ or (R)AD. These sequences come about when the preverb drops its final consonant and an *a*-initial clitic follows. Such sequences cannot be broken up by an epenthetic yod; they can only be realized as *aa*. The complementizer /ad/ and the future preverb /rad/, which we lump together under the label (R)AD, display the same set of idiosyncratic alternations, on which v. DE (1989: 188–190). In particular they optionally lose their consonant before a vocoid-initial clitic. This happens for instance in *man a-fullus a(d)=ak y-ukr* (WH u-chicken AD=dat2ms 3ms-steal) ‘which chicken did he steal from you?’. As implied by our transcription, /ad=ak/ may be pronounced as *adak* or *aak*, not as *ayak*.

How are we to interpret this fact? It looks as though what is preventing the appearance of a hiatus-breaking yod is the final consonant in (R)AD. Working with ordered rules, one would posit two optional rules, one inserting yod to break up an *a=a* sequence, and the other deleting /r)ad/’s final consonant before a clitic beginning with a vocoid, and one would order the yod-insertion rule before the truncation rule (counterfeeding order).

The imperfective preverb AR (/ar/) obligatorily loses its final consonant when it is preceded by another preverb which belongs to the same clause (v. DE (1989: 180ss) for details). This happens regardless of the phonological make-up of the next word, and consequently the vowel of /ar/ may be brought together with that of a following clitic, as is the case in *is a=(*)yas akka-n at*¹³ *t-šš* (int AR=dat3s give:impf-3mp AD 3fs-eat:aor) ‘do they give her something to eat?’, where the interrogative *is* is itself a preverb.¹⁴ Since (R)AD and /ar/ are the only preverbs with a final consonant subject to deletion, it is tempting to try for /ar/ an analysis along the same lines as that we have proposed for (R)AD. We could posit an obligatory *r*-deletion rule specific to the imperfective preverb and order it after the yod-insertion rule. But note that the contextual features to which the

¹¹ When the second /a/ in an /a=a/ sequence belongs to a clitic pronoun, the sequence can also be pronounced *ay*, e.g. in *waxxa=as bbi-x a-gayyu* (even:if=dat3s cut-1s u-head) ‘even if I cut his head off’, the first Pword can be pronounced *waxxaas*, *waxxayas* or *waxxays*.

¹² Preposition *bla* requires the following noun to be in the free state.

¹³ From AD (/ad/), whose final consonant assimilates to the following consonant.

¹⁴ Another idiosyncrasy of /ar/ is that *γ* is obligatorily inserted between it and a preceding word ending in *a*, provided the two words belong to the same clause (v. DE 1989: 187–8), e.g. *mra [γ]a n-aqgra* (if AR 1p-read:impf) ‘if we read’.

r-deletion rule is sensitive are of a purely syntactic nature, whereas the yod-insertion rule is concerned with syllabic structure.

In general sequences /a#a/ can only be realized as *aa*, e.g. /i-šša adan/ (3ms-eat gut) 'he ate the gut' can only be pronounced *iššaadan*. However we have come across a number of cases in which *aya* is also an acceptable pronunciation. Here are two examples: *ha=tt* (here:be=do3fs) 'here she is', *ha (y)a-grtil* (here:be u-mat) 'here is the mat'; *manza=t* (where:be=do3ms) 'where is he?', *manza (y)a-rgaz* (where:be u-man) 'where is the man?'. More work is needed to discover what factors set these cases apart from the general case. Our present hunch is that in those instances in which *aya* is acceptable, the first *a* belongs to a closed class of grammatical words which must always bear a tight syntactic relationship to the word which immediately follows them in the sentence.

In fast speech, *aa* sequences which are surface reflexes of /a+a/ can in some instances be shortened to *a*, e.g. *nttayran* is an acceptable fast speech pronunciation alongside *nttaayran* for /ntta ad i-ra-n/ (3ms AD prt-want-prt) 'it is he who wants'. Some of the *aa* sequences derived from /i+a/ can also be reduced to *a* in fast speech, e.g. /ldi ask^wti/ (see above in § 7.1.2), which can be realized as *ldaask^wti*, can also be pronounced *ldask^wti* in fast speech. The contextual conditions under which these shortenings are acceptable are yet to be worked out.

7.1.5. Sequences involving *aa*

Let us end this survey of vocoid sequences by looking at sequences in which one of the abutting vocoids is *aa*. As mentioned earlier, tautomorphic *aa* can derive from /ʕ/, /ʕa/ or /aʕ/, but in a vocoid sequence the behaviour of *aa* is the same regardless of its underlying source. When discussing cases such as the present one, where the source of *aa* at the most abstract level of representation is irrelevant, we will include occurrences of /aa/ in the underlying representations of some of our examples, even though according to our analysis geminate *a* does not occur in the lexical representations of Imdlawn Tashlhiyt.

Like those adjacent to *a*, potential hvs adjacent to *aa* can always be realized as glides, e.g. *zri* 'overtake!' vs. *zry aali* 'overtake Ali!', *azu* 'skin!' vs. *azw aalluš* 'skin the calf!'. Gliding after *aa* gives rise to sequences of three or even four vocoidal positions, as in the following examples: *i-mmnaa w-zal* (3ms-difficult b-daylight) 'it is difficult to do it during the day',¹⁵

¹⁵ Literally 'the daylight is difficult'.

i-mmnaa w-wzal (3ms-difficult b-name) ‘Awzal is a tough fellow’.¹⁶ Note that such sequences do not always straddle a Pword boundary, witness forms such as *laayb* ‘defect’, *!i-saayyd* ‘he shouted’, *i-šbaa=yyt* ‘let him eat his full (I don’t mind)’, *i-šbaa=yyt=t* (/≠t/, do3ms) ‘let him eat his full of it (I don’t mind)’.

The behaviour of sequences /aa+a/, /a+aa/ and /aa+aa/ parallels that of the /a+a/ sequences which occur in analogous morpho-syntactic environments. Yod is inserted optionally to break up /aa=a/ sequences, e.g. /bužmaa=ad/ (name=dem) ‘this Boujmaa’ can be pronounced *bužmaayad* or *bužmaad*. Except when /aa=a/ is broken up by yod insertion, sequences /aa+a/, /a+aa/ and /aa+aa/ are pronounced as a long *a* which is homophonous with tautomorphemic *aa*. In /i-s-šbaa=ak a-!kuray/ (3ms-cau-satiate=dat2ms u-stick) ‘he gave you a beating with a stick’ the verb can be pronounced *iššbaayak* or *iššbaak*. The latter form is homophonous with /i-s-šbaa=k/ (3ms-cau-satiate=do2ms) ‘he made you eat your full’. /i-šbaa aali/ ‘Ali ate his full’ can only be pronounced *išbaali*.

7.2. THE NEED FOR UNDERLYING GLIDES

Let us first give again two constraints which played a central role in our discussion of sentence syllabification in Chapter 4.

- (1) NoHiatus: A syllable which is not at the beginning of a syllabification domain has an onset.
- (2) SonPeak: A sequence which is a sonority peak within the syllabification domain contains a syllable nucleus.

We now show that Imdlawn Tashlhiyt has an underlying distinction between high vowels and glides, i.e. between /u/ and /w/, and between /i/ and /y/. The reason such a distinction must be made is that the syllabification of high vocoids is not always predictable.

There are two contexts where the syllabification of high vocoids is always predictable on the surface: high vocoids always show up as vowels when they occur after a contoid and before a pause, and they always show up as glides when they are adjacent to an occurrence of *a*. An example of the first context is given in (3)a; examples of the second context are given in (3)b,c,e.

¹⁶ *u-wzal*, bound state form of *a-wzal*, a proper name. The contrast between *a* and *aa* is not neutralized before a geminate glide, v., e.g. the following quasi-minimal pair: *i-šqqa w-wzal* ‘Awzal is a tough fellow’ (same meaning as the last example in the main text) vs. *i-fqqaa w-wzal* ‘Awzal got upset’.

- (3) a. n-kti 'we remembered'
 b. n-tt-mm-ktay¹⁷ 'we remember one another'
 c. n-ky a-rgaz 'we remembered the man'
 d. urs-n 'they swept' (v. next line)
 e. ur ta wrs-n 'they have not swept yet'

The high vocoid in (3)a is a sonority peak occurring at the end of a syllabification domain. In Imdlawn Tashlhiyt glides do not occur in the context C_|| ('||' stands for a pause).

As a rule they are also excluded from the context ||_C. The only known exceptions to the preceding sentence are postpausal occurrences of the verbs in (15) below.¹⁸ The high vocoids in (3)b,c,e are nonsyllabic so as to avoid being in hiatus with *a*. Let us now review those cases where at the surface level the syllabification of high vocoids is not predictable from the environment.

First, sequences of a high vowel and a glide contrast with sequences of a glide and a high vowel:

- | (4) | vowel-glide | | glide-vowel |
|-----|-------------|-----------------------|-----------------------------------|
| a. | t-suy | 'she let pass' | t-zwi 'she beat down' |
| b. | i-liwš | 'sheep hide (carpet)' | a-yyul 'mule' |
| c. | tt-gnuguy | 'tumble impf' | zuzwi 'be cool neg' ¹⁹ |

As already stated in § 4.6, we adopt the commonly-held position that glides have the same feature content as the corresponding high vowels, and that the difference between them only has to do with their different positions within syllable structure. Consider for instance [u] and [w]. We are assuming that they are occurrences of the same feature bundle {[–cons], [dorsal], [labial] . . .}, call it *U*. [u] is an occurrence of *U* which occurs as a syllable nucleus, and [w] is an occurrence of *U* which occurs as a syllable margin. Similarly, the feature bundle *I* is notated as [i] when it is syllabic, and it is notated as [y] when it is not. Given the assumptions we have just made, here are the surface representations of *t-suy* and *t-zwi* in (4)a:²⁰

¹⁷ In *tt-mm-ktay*, the imperfective stem of *mm-kti*, *a* is the chameleon vowel, on which see § 5.2. The conjugation of reciprocal verbs is presented in DE (1991: 100–102).

¹⁸ In Rifian, on the other hand, postpausal glides preceding a consonant are commonplace, see Dell and Tangi (1992: 144).

¹⁹ From *gnugi*, *zuzwa*.

²⁰ The syllabic parses in (5) are those which obtain when the forms in question occur at the beginning of a line of verse and are immediately followed by a CV sequence. The same is true of all the syllabic parses given in this chapter.



Setting aside the difference in voicedness in the initial consonant, which is irrelevant, the lexical representations of *suy* and *zwi* must differ in some way so as to account for the fact that it is /U/ which is syllabified as a nucleus in *suy*, whereas in *zwi* it is /I/. But before we can determine what the difference in question is, let us survey the other contexts in which glides and high vowels contrast.

The examples in (4) involve adjacent high vocoids which differ in backness. Analogous cases exist in which the abutting high vocoids agree in backness:²¹

(6)	vowel-glide	glide-vowel
a.	i-lkkuwsa 'pruning hook p'	i-mzwura 'first p' ²²
b.	!suwr 'paint'	zwur 'precede'
c.	t-huwt 'wander 3fs'	t-hwu-t 'go down aor 2s'
d.	ruwn 'fit'	!rwu-n 'be good aor 3mp'
e.	xuwx 'hollow out'	xwu-x 'be empty aor 1s'
f.	t-ḥiyd 'move away 3fs'	t-ḥyi-t 'keep alive 2s'
g.	sniriy 'mimic impf' ²³	n-ḥyi 'keep alive neg 1p'
h.	d=u-wtil 'and the hare'	d=w-uday 'and the Jew'

As implied by our transcriptions, the sequences *wu* and *yi* in the right-hand side column sound like those at the beginning of the English words *woo* and *yeast*. The constriction of the vocal tract is presumably narrower in the glide than in the following vowel.

The forms in (4) and (6) abide by SonPeak (2). In *t-suy* (4)a for instance, the sonority peak *uy* contains *u*, which is a syllable nucleus. Imdlawn Tashlhiyt also has words which violate SonPeak. In all such words a high vocoid occurs between two contoids, or word-initially before a contoid, and yet it is not a syllable nucleus. Compare for instance *lur* 'give back', where the high vocoid is a nucleus, as is to be expected on account of the fact that it is a sonority peak, and *lwr* 'flee',²⁴ where *w* is an onset and the following *r* is syllabic. *lwr* sounds like [lwər]; the short vocoid which

²¹ In the right-hand column in (6), the verbs in lines c–g have the following perfective stems: (c) *hwa*, (d) *!rwa*, (e) *xwa* and (f, g) *ḥya*.

²² The corresponding singular forms are *a-lkkawsu* and *a-mzwaru*.

²³ Perfective *sniri*.

²⁴ *lwr* (impf *lg^wg^wr*) 'flee' is a rather formal word; it has a variant *rwl* (impf *rg^wg^wl*) which is used in more colloquial styles of speech.

is heard between *w* and *r* is, in our view, a mere transition between the two segments. It is not an independent segment at any level of representation, hence not a sonority peak. The syllabification of words such as *lwr* in verse accords with their pronunciation, witness the scansion of line (7) below, which is the 33rd line in the poem the beginning of which was parsed in (19) in § 4.5. (7) is parsed in (8).

(7) ar iγ=as t-!rzm-t i-bbi š-škal-at rwl-n=ak²⁵

(8) 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L H L L L L H
 a ri γas tr zm tib~ bišš ka la tr wl nak

SonPeak (2) is violated in the last word, *rwl-n=ak*, for *w*, which is a sonority peak in (7), is not a syllable nucleus in (8). If it were a nucleus the parse would be *lat.rul.nak* (HHH) instead of *la.tr.wl.nak* (LLLH).²⁶ The only circumstances in which SonPeak ever incurs a violation in a well-formed line of verse are similar to those in the example above: a high vocoid is a sonority peak and yet it is parsed as a margin.

It is unclear how underlying glides are to be represented in the lexical representations.²⁷ For the time being let us assume that in the representations which are inputs to syllabification the underlying glides are distinguished in some way from the other high vocoids, and that SonPeak is dominated by the following constraint:

(9) GlideFaith: underlying glides do not become nuclei.

GlideFaith overrides SonPeak, but it is itself overridden by NoHiatus (1) and the other constraints in (70) in § 4.10. For instance the kernel *zwi*, which has already appeared in (4)a, is realized as *zuy* when the next morpheme begins with a vowel:

(10) a. zuy=as /zwI=as/ 'beat down for him!'
 b. zuy a baba /zwI a baba/ 'beat down, O father!'

Consider for instance /zwI=as/. /a/ must be syllabified as a nucleus. If the preceding /I/ were also a nucleus, as it is in *t-zwi* in (4)a, NoHiatus would be violated. As a matter of fact, NoHiatus can never be violated in Imdlawn Tashlhiyt, and /I/ must be an onset to /a/. One might suggest that one way to syllabify /I/ as an onset while at the same time having the preceding /w/ abide by (9), would be for /zw/ to be syllabified as an onsetless syllable,

²⁵ 'As soon as you release him, he breaks his fetters and escapes you'.

²⁶ For other such instances, see e.g. Jouad (1995), line 6 on p. 102 and lines 1 and 12 on p. 106.

²⁷ Guerssel (1986) has proposed an answer to this question for Ait Seghrouchen Tamazight, but his proposal does not carry over to Tashlhiyt, due to differences between the two dialects.

with /z/ a nucleus and /w/ a coda (.zw.yas.). This is impossible because the first syllable violates the following constraint, which was one of the cornerstones in our discussion of syllabification in Chapter 4:

- (11) NoRR: the coda does not have a higher sonority than the nucleus.

Except in quite special circumstances on which see § 7.3.3 below, NoRR is never violated in Imdlawn Tashlhiyt. GlideFaith must yield to NoRR, hence the outcome *zuy=as* (.zU.las.).

One must distinguish between two kinds of high vocoids in the underlying representations of Imdlawn Tashlhiyt. There are on the one hand those high vocoids which we called ‘potential hvs’ in § 7.1 and which we will simply call underlying vowels. These vocoids surface as vowels unless they are adjacent to a vowel, in which case they surface as glides to avoid hiatus. It is underlying vowels which are involved in the alternations in (3). Underlying vowels are never involved in violations of SonPeak or of NoRR. The second kind of high vocoids are those which we call underlying glides. Underlying glides only surface as vowels in the highly restricted set of environments exemplified in the preceding paragraph. They may occur in strings which violate SonPeak or even NoRR, as we will see below.

Here is how the contrast between underlying glides and underlying vowels is indicated in the letter sequences enclosed by slashes which symbolize underlying representations in our running text. The underlying glides are always noted ‘w’ and ‘y’. Although we should use the symbols which stand for bare feature bundles, viz. ‘U’ and ‘I’, to represent the underlying vowels, we usually note these simply as ‘u’ and ‘i’ to avoid proliferating symbols.

There is no audible difference between the surface glides which are realizations of underlying glides and those which are realizations of underlying vowels. Consider for instance /wrz/, a nominal kernel meaning ‘hinge’, and /urs/, the perfective stem of a verb meaning ‘sweep’. The contrast between /w/ and /u/, which is exemplified below in (12), is neutralized after a vowel: setting aside dorsopharyngealization and differences in the consonants, utterances *a’* and *b’* in (12) below sound alike.²⁸

(12)

- | | | | |
|-----|--------------------|-----------------------------------|-----------------------------------|
| a. | t-wrs-t | (t.wr.st) | ‘hinge dim b’ (v. (18)b below) |
| b. | t-urs-t | (tur.st) | ‘you swept’ (v. (3)d) |
| a’. | ur d a-wrz !n=tamu | (w _r .z _n) | ‘it is not Tamu’s hinge’ |
| b’. | ur ta wrs-nt anu | (w _r .s _n) | ‘they haven’t yet swept the well’ |

²⁸ For reasons of convenience, the syllabic parse that we give between parentheses in an example may represent only a portion of the complete parse of the expression under consideration. In such cases the enclosing parentheses always correspond to syllable edges in the complete parse.

On the other hand, the surface vowels which are realizations of underlying vowels are in some cases distinct from those which are realizations of underlying glides. This happens in those contexts in which /u/ is realized as [ö] as a result of *u* fronting,²⁹ e.g. between two coronal consonants in a nonemphatic environment. Vocalized *w* is immune to *u* fronting. Consider for instance the contrast between /suy/ and /swi/, which is exemplified in (13)a and (13)b. When a vowel immediately follows /swi/, /i/ surfaces as a glide, and /w/ as a vowel, but the realization of /swi/ is nonetheless distinct from that of /suy/, as /u/ undergoes *u* fronting, whereas vocalized *w* does not, witness the minimal pair (13)a',b':

- (13) a. ur=tt i-suy ([söy]) 'he did not wipe with it (f)'
 b. ur=tt i-swi 'it (m) is not as good as it (f)',³⁰
 a'. ur i-s[ö]y a-žɣaɣ 'he did not wipe with the rag (aug)'
 b'. ur i-s[u]y a-žɣaɣ 'it is not as good as the rag (aug)'

Outside of the contexts in which *u* is fronted, there is no audible difference between the vowel *u* and the vocalized *w*. Consider for instance emphatic environments, in which *u* fronting does not occur. Clauses (14)a and (14)b below are homophonous. The underlying representations of the kernels involved are /!udn/ and /!iwd/, as shown by (14)a',b', which give the postpausal pronunciations of the forms in question, followed by the corresponding imperfective forms.

- (14) a. mra !y-udn 'if he were in pain'
 b. mra !yud-n 'if they had folded'
 a'. !y-udn 'he is in pain' (!i-tt-adn id. impf)
 b'. !iwd-n 'they folded' (!tt-awd-n id. impf)

Similarly, ME does not hear any difference between the vowel in *k[u]yan* 'each one, m' and that which is a realization of /w/ in /ur i-xwi anu/ (neg 3ms-empty:neg³¹ well) 'he did not empty the well' *ur ix[u]y anu*.

Our broad phonetic transcription does not record the effects of *u* fronting. We shall keep it that way, with the added convention that we shall indicate with a circumflex all the occurrences of *u* (i.e. vocalized /w/) which are not subject to fronting although they occur in a fronting context. Following this convention, we write *suy* in (13)a,a', *sûy* in (13)b', *xuy* in the example at the end of the preceding paragraph, and *zûy* in (10)a,b.

²⁹ On *u* fronting, see § 3.8.

³⁰ *swi* is the negative stem of *swa*. The verbs in the sentences in (13) have two arguments, a subject and a direct object. The direct object is the do3fs pronoun *it* in (13)a,b; it is the noun *ažɣaɣ* in (13)a',b'.

³¹ Perfective *xwa*.

7.3. GLIDES WHICH ARE SONORITY PEAKS IN THE UNDERLYING REPRESENTATIONS

In the present section we review all the words in which, as in /rwl/, a glide occurs as a sonority peak in the underlying representation. Given the sonority-driven account of syllabification developed earlier in this book, we expect the glide in question to be realized as a syllable nucleus. This often does not happen, however. In some cases constraints NoRR and/or SonPeak are violated and the glide is also a sonority peak at the surface level, while in other cases the glide avoids such violations by becoming a geminate. Let us first deal with some of the former cases.

7.3.1. Surface glides (onsets) which are sonority peaks

The total number of morphemes in which an underlying glide gives rise to violations of the constraints NoRR and/or SonPeak is rather small. When such violations occur, the glide is in some cases an onset, as in tr.wlt (/t-rwl-t/) ‘you ran away’, while in other cases it is a coda, as in s.srw.sn. (/s-rws-n/) ‘they gave the impression’.³² In some morphemes the glide is parsed as an onset regardless of the environment, while in others it is parsed as a coda at least in some environments.

We begin with the morphemes in which the offending glide is always parsed as an onset, i.e. it violates the constraint SonPeak. As we shall now see, the violations in question form a narrowly-circumscribed class of cases; in all these cases the onset glide is *w* and the following nucleus is a coronal sonorant or fricative. The glide is the leftmost segment in all of the morphemes in question. Words containing these morphemes fall into two sets. The first set is comprised of all the inflected forms of the following four verbal kernels:

- | | | | |
|---------|-------|---------------------------|-------------|
| (15) a. | !wrrγ | (w <u>r</u> .r <u>γ</u>) | ‘be yellow’ |
| b. | !wrrk | (w <u>r</u> .r <u>k</u>) | ‘show off’ |
| c. | wžžl | (w <u>ž</u> . <u>ž</u> l) | ‘postpone’ |
| d. | wžžb | (w <u>ž</u> . <u>ž</u> b) | ‘show up’ |

w is in free variation with *u* in (15)c,d; *užžl* and *užžb* are also acceptable pronunciations. (15)a,b have no free variants. In these verbs the initial vocoid must always surface as a glide, e.g. !i.wr.rγ ‘he is yellow’, !wrr.γn ‘they are yellow’, !t.wrr.kt ‘you showed off’.

The second type of onset glides occur in bound state forms of feminine nouns in which *w* is kernel-initial and is followed by a CC sequence. Before we discuss these forms, let us remind the readers of their morphological relation with the rest of the inflectional paradigm of nouns with conso-

³² On the gemination of causative /s-/, v. § 5.4.

nant-initial stems, and show how they contrast with the analogous forms in nouns in which the stem begins with a vowel.³³ The forms in (16) below are all singular forms. They are the free state and bound state forms of a masculine noun and of the feminine diminutive derived from it. In the forms on the left-hand side the kernel begins with /wCC/, whereas in those on the right-hand side it begins with /uCC/.

(16)	/wrz/ 'hinge'			/urti/ 'garden'	
	mu	a-wrz	(a.wrz)	urti	(ur.ti)
	mb	u-wrz	(u.wrz)	w-urti	(wur.ti)
	fu	t-a-wrs-t	(ta.wr.st)	t-urti-t	(tur.tit)
	fb	t-wrs-t	(t.wr.st)	t-urti-t	(tur.tit)

In (16) the forms on the left are the analogues of those in lines a and c of the paradigm displayed in (36) in § 2.5.1; the forms on the right correspond to those in lines a and c of (35) in the same section. The noun on the left-hand-side displays the morphology which is normal for nouns with consonant-initial stems. The augment *a-* which occurs in the free state forms drops in the bound state.³⁴ Like all other nouns whose stem begins with a vowel, the noun on the right-hand side does not have an augment. Both forms in the second line of the table begin with the bound state prefix.

The forms which are of interest in the present discussion are the feminine bound state forms like *twrst* in (16)fb. Other examples are given below in column I in (17). Column II contains words where a syllabic *u* occurs in similar contexts, in conformity with SonPeak.

(17)	I	II
a.	t-wrta-t 'ko feline'	t-urti-t 'garden dim'
b.	t-wšk-in 'pendants', ³⁵	!t-ušrih-t 'slit olives'
c.	t-wznawas-t ³⁶ 'glow-worm'	!t-uzlim-t 'husk ³⁷ dim'

The word-initial *t-wCC* sequences occur as a result of dropping the initial vowel to form the bound state form. For instance the bound state form *twrtat* ((17)I-a) is formed by dropping the prefix /-a-/ in the free state form

³³ On the morphology of vowel-initial nouns, see § 2.5.1 and § 2.5.2.

³⁴ Since a noun in the bound state is always preceded by the word which governs it, it is impossible to elicit the pronunciation of bound state nouns after a pause. When we cite a bound state form out of context, the pronunciation we give is that occurring after a contoid, e.g. after the preposition *d* 'and'.

³⁵ (Jewelry). Besides *twznawast* and *twškin* the only other similar bound state noun with a syllabic fricative is *!twždatt*, a place name (u *!tawždatt*).

³⁶ From /t-wznawaz-t/, cf. *tiwznawazin*, 'id, pu'.

³⁷ Of argan nut.

/t-a-wrta-t/. Here are further examples. In the list below the first form is the free state, and the second the bound state.³⁸

- | | | | |
|---------|---------------|-----------|------------|
| (18) a. | t-i-wrtat-in | twrtatin | (t.wr) |
| b. | t-a-wrs-t | twrst | (t.wr.st) |
| c. | !t-a-wrda | !twrda | (t.wr) |
| d. | t-a-wryu-t | twryut | (t.wr.yut) |
| e. | t-a-wlk-t | twlkt | (t.wl.kt) |
| f. | t-a-wlzi-t | twlzit | (t.wl) |
| g. | t-a-wnza | twnza | (t.wn) |
| h. | t-a-wntllis-t | twntllist | (t.wn.tl) |

Example (18)a, a plural form (v. (17)a for the corresponding singular), is included to illustrate the fact that in nouns with a kernel-initial glide, that glide has the same realization in both numbers. In the forms in (15), (17) and (18) one hears a short vocoid between *w* and the following consonant. The timbre of this vocoid ranges between [ʊ] and [ə].

The syllables *wr* and *wš* in the bound state forms *t.wr.tat*, *t.wš.kin* ((17)a,b) are not remarkable in themselves. As we have seen in Chapter 4, syllables of the form GC (G a glide) are commonplace in Tashlhiyt as long as they immediately follow a vowel, as in the case of the corresponding free state forms *ta.wr.tat*, *ti.wš.kin*. What is noteworthy about the bound state forms is that the glide violates SonPeak. Whereas any combination of a glide and a consonant may constitute a well-formed syllable as long as SonPeak is not violated (see e.g. *wt* in *i-wtlan* ‘hare, p’,³⁹ *yf* in *mra y-fsi* ‘if it had melted’), the syllables in which an onset glide violates SonPeak are tightly constrained. They all fall under the following generalization.

- (19) WC-SYLL: In a syllable in which the onset violates SonPeak,
- the onset is *w*;
 - the nucleus is a coronal sonorant or fricative.

7.3.2. Glide gemination

In *t-wrta-t* (t.wr.tat) and other similar forms presented in the previous section, SonPeak is violated and the violation gives rise to a syllable which falls under the parameters of WC-SYLL (19). We now turn to the other cases where a morpheme-initial glide is a sonority peak in the underlying

³⁸ The nouns in (18) have the following meanings: (a) ko feline, p; (b) hinge, dim; (c) hollow in which to put sauce; (d) bridle (horse); (e) ko leather bag, dim; (f) ankle; (g) fringe of hair; (h) scroll.

³⁹ Singular *a-wtil*.

representations. We shall see that in these cases the glide is realized as a geminate, and consequently SonPeak can be met. The cases in question fall into two morphological categories, feminine bound state forms and verbs.

7.3.2.1. Feminine bound state forms

Consider the feminine noun *t-a-wtil-t* ‘hare, f’ and the corresponding bound form, which is derived thereof by dropping the prefix */-a-/*. In the same way as */zwi=as/* is realized as *zuyas* (see (10)a), one might expect */t-wtil-t/* to yield *tutilt*. However the correct form is *tuwtilt*, where the homorganic sequence *uw* is the realization of a geminate glide, as we suggest later. As we did in the previous section, let us first set the scene by showing how the forms under consideration contrast with analogous forms in which the stem begins with a vowel. The table (20) below is exactly parallel with table (16).⁴⁰

(20)	<i>/wtil/</i> ‘hare’		<i>/uday/</i> ‘Jew’	
	mu	a-wtil (aw.til)	uday	(u.day)
	mb	u-wtil (uw.til)	w-uday	(wu.day)
	fu	t-a-wtil-t (taw.ti.lt)	t-uday-t	(tu.da.yt)
	fb	t-uwtil-t (tuw.ti.lt)	t-uday-t	(tu.da.yt)

The bound state forms which are presently of interest are those in the feminine, see (20)fb. The masculine bound state forms ((20)mb) will be taken up later.

Here is a list of all the feminine bound state forms known to us in which an underlying glide is realized as the homorganic vowel-glide sequence. The first form in each line is the free state, and the second the bound state.⁴¹

(21) a.	t-a-wtil-t	tuwtilt	(tuw)
b.	t-a-wrir-t	tuwrit	(tuw)
c.	!t-a-wraγ-t	!tuwrayt	(tuw) ⁴²
d.	t-a-wsrγin-t	tuwsrγint	(tuw.sr)
e.	t-a-ysγl-t	tiysγlt	(ti.ys.γlt)
f.	t-a-ynnri-t	tiynnrit	(ti.ynn) ⁴³

⁴⁰ The meanings of the feminine forms are ‘female hare’ and ‘Jewish woman’.

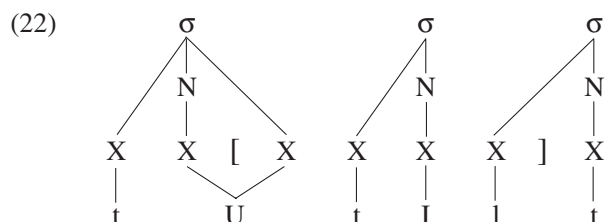
⁴¹ The nouns in (21) have the following meanings: (a) hare, f; (b) hill; (c) yellow, f; (d) ko medicinal plant; (e) foul-brood; (f) ko medicinal plant, indiv; (g) goatskin (container), dim; (h) shepherd (the occupation); (i) dog, f; (j) ear of cereal; (k) amulet; (l) worm; (m) old one, f.

⁴² Cf. (15)a.

⁴³ Cf. (31)a.

g.	t-a-yddit-t	tiydditt	(ti.yd.ditt) ⁴⁴
h.	t-a-yssa	tiyssa	(ti.ys.sa)
i.	t-a-ydi-t	tiydit	(tiy.dit)
j.	t-a-ydr-t	tiydr	(tiy.drt)
k.	t-a-wmmis-t	tuwmmist	(tu.wm.mi.st)
l.	t-a-wkka	tuwkka	(tu.wk.ka)
m.	t-a-wssar-t	tuwssart	(tu.ws.sa.rt)

Consider first the examples in (21)a–d. We give in (22) the surface representation of *tuwtilt*.



We have indicated the kernel by enclosing it between square brackets. It will be shown later that sequences *uw* and *iy* are in some cases realizations of the geminates /ww/ and /yy/. We assume that in the realization of /t-wtil-t/ as *tuwtilt* (*tuw.ti.lt*) the initial glide in the kernel is geminated. The representation in (22) conforms to GlideFaith (9): in (22) the initial X slot in the kernel is a margin. Conformity with GlideFaith is achieved at the cost of violating FAITH(SHORT):

- (23) FAITH(SHORT): Every segment which is short in the input should be short in the output.

As a result of its gemination, the glide can comply with GlideFaith without violating SonPeak (2): in *tuwtilt* in (22) the sonority peak *uw* does contain a nucleus.⁴⁵

The gemination whereby /w/ surfaces as *uw* in *tuwtilt* involves creating an additional skeleton slot. The name ‘FAITH(SHORT)’ was adopted for the sake of convenience, but it should not conceal the fact that the constraint is actually a member of the DEP family, a family of constraints prohibiting epentheses of various kinds.⁴⁶ Note that what needs to be inserted is merely a skeleton slot and its association with /w/. That the epenthetic slot is parsed as a syllable nucleus follows from the constraints invoked in Chapter Four, notably NoOns~.

⁴⁴ From m *a-yddid*.

⁴⁵ Tautosyllabic *uw* and *iy* are realized as [u:] and [i:].

⁴⁶ On DEP, see McCarthy and Prince (1995).

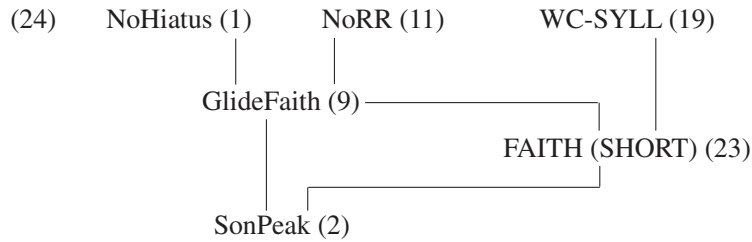
In (21)a–d the gemination of the initial glide is motivated by the need to avoid a violation of GlideFaith. But no such violation would occur if the glide were not lengthened in the other forms in (21). Form (21)e, for instance, would surface as *tysɣlt* (*t.ys.ɣlt*), which is parallel to *twškin* (*t.wš.kin*) in (17)b. The kernel-initial glide occurs as a sonority peak in both forms, but only the second is well-formed. The difference between the two forms is that *twškin* falls under branch a of generalization WC-SYLL (19) whereas *tysɣlt* does not. As a matter of fact, *y* can never violate SonPeak. Similarly, if gemination did not take place, */t-wmmis-t/* ((21)k) would surface as *twmmist* (*t.wm.mi.st*), in which the nucleus of syllable *wm* fails to fall under case b of WC-SYLL (19), which requires a coronal.

Let us pause briefly to recapitulate what we have seen so far.

An underlying glide surfaces as a vowel only in environments in which GlideFaith is in conflict with undominated constraints such as NoHiatus, e.g. in */zwi=as/ zûyas* ((10)a). A glide which is a sonority peak in the input representation is syllabified as an onset, in violation of SonPeak, only if the resulting syllable meets condition WC-SYLL (19), see e.g. *t.wr.tat* in (17)a. Otherwise the glide is geminated, which allows it to surface as a margin without violating SonPeak, see e.g. *tuw.ti.lt* in (21)a, where it surfaces as a coda, and *tu.wm.mi.st* in (21)k, where it surfaces as an onset.

Note the special role played by condition WC-SYLL (19) in the preceding account: WC-SYLL defines what the permissible violations of SonPeak are. WC-SYLL is admittedly nothing more than a restatement of the facts. It combines the effects of two prohibitions which involve independent phonetic dimensions: one prohibition favors nuclei with a place of articulation different from that of the preceding onset (*w* is both dorsal and labial, while coronal consonants are neither); the other prohibition disfavors syllables in which the onset is a vocoid and the nucleus a stop. The sonority curve of such syllables deviates maximally from that of those syllables which are presumably the most favored cross-linguistically, those with a stop as an onset and with a vocoid as a nucleus. We shall not try to formulate these prohibitions. Let us simply take WC-SYLL as an unanalyzed whole and add it to our account as an undominated constraint. Once generalization WC-SYLL is used as a constraint, one aspect of it which one may find particularly worrisome is the fact that it refers to another constraint, viz. SonPeak. One can reformulate WC-SYLL to avoid reference to SonPeak. One can state it as a condition on syllables with a consonantal nucleus and with a nonconsonantal onset which does not immediately follow a vocoid. However this does not change the fact that WC-SYLL is the description of a regularity rather than an account for that regularity.

Since the beginning of this chapter we have encountered evidence for the constraint rankings which are represented below. In (24) a line between two constraints indicates that they are crucially ranked, the one on top being ranked higher.



(25) gives a form which provides crucial evidence for each of the rankings in (24):

(25)

NoHiatus » GlideFaith	/zwi=as/	zû.yas	*z.wi.as	(10)
NoRR » GlideFaith	/zwi=as/	zû.yas	*zw.yas	(10)
GlideFaith » SonPeak	/t-wrta-t/	t.wr	*.tur.	(17)a
GlideFaith » FAITH(SHORT)	/t-wtil-t/	.tuw.	*.tu.	(21)a
WC-SYLL » FAITH(SHORT)	/t-wmmis-t/	tu.wm	*t.wm	(21)k
FAITH(SHORT) » SonPeak	/t-wrta-t/	t.wr	*tu.wr	(17)a

The rankings in (24) imply that an underlying glide should violate SonPeak whenever the resulting syllable meets WC-SYLL (19). They make an incorrect prediction for one form: they predict that the bound state form of *t-a-wssar-t* ((21)m) should be *twssart* (t.ws) rather than *tuwssart* (tu.ws). We leave this form unaccounted for.

7.3.2.2. Verbs and masculine bound state forms

Imdlawn Tashlhiyt has verbs whose kernel begins in *uw*. Here is a sample of those verbs. For each we give the perfective stem and the imperfective stem:

(26) a.	uwzn	(uw.zn)	tt-uwzan	‘weigh’
b.	uwda	(uw.da)	tt-uwdu	‘be sufficient’
c.	uwžad	(uw.žad)	tt-uwžad	‘prepare’
d.	uwkkl	(u.wk.kl)	tt-uwkkal	‘delegate’
e.	uwdda	(u.wd.da)	tt-uwdda	‘repay’

We hold that in all these verbs the underlying form of the kernel begins with a nongeminate /w/, i.e. the underlying forms in (26) are /wzn/, /wda/, /wžad/, etc., and the initial glide is subject to gemination. Our justification for this claim is the following. The items in (26) represent all the different canonical forms which are found in the *uw*-initial verbs. Under the proposed analysis these canonical forms are the following: (a) CCC, (b) CCV, (c) CCVC, (d) CC:C, (e) CC:V. All these canonical forms are attested outside of the *uw*-initial verbs, with the same conjugational paradigms. For instance

uwzn conjugates like *bxs* ‘cause to become awful’, whose imperfective is *tt-bxas*, *uwda* conjugates like *sda* ‘lean against’, whose imperfective is *tt-sdu*, and so on.⁴⁷ The alternatives to this analysis are unappealing. In (26), if *uw* were derived from /uw/ or /ww/, most of the verb types in (26) would not have parallels outside the *uw*-initial class.

The kernel of a *uw*-initial verb begins with *uw* no matter what the other morphemes in the same word are, e.g. *y-uwzn* ‘he weighed’, *n-uwzn=as* ‘we weighted for him’.

Our analysis of gemination in *t-uwtil-t* and the like (v. (21)) carries over to the verbs in (26)a–c,⁴⁸ but more must be said of cases (26)d,e. We list in (27) and (28) all the verbs of types (26)d,e which we have been able to find.

- | | | | |
|---------|---------------|------------|-----------------------------------|
| (27) a. | <i>uwmm</i> | (u.wm.ml) | ‘intend’ |
| b. | <i>uwmmn</i> | (u.wm.mn) | ‘promise to spare’ |
| c. | <i>!uwxxr</i> | (u.wx.xr) | ‘move back’ |
| d. | <i>uwdda</i> | (u.wd.da) | ‘repay’ |
| e. | <i>uwddn</i> | (u.wd.dn) | ‘call to prayer’ |
| f. | <i>!uwddr</i> | (u.wd.dr) | ‘squander’ |
| g. | <i>uwttq</i> | (u.wt.tq) | ‘register’ |
| h. | <i>uwkkd</i> | (u.wk.kd) | ‘insist’ |
| i. | <i>uwkkl</i> | (u.wk.kl) | ‘delegate’ |
| j. | <i>!uwggd</i> | (u.wg.gd) | ‘alert’ |
| k. | <i>!uwqqr</i> | (u.wq.qr) | ‘spare’ |
| (28) a. | <i>uwlla</i> | (u.wl.la) | ‘appoint to a post’ |
| b. | <i>uwrr</i> | (u.wr.ri) | ‘come back’ |
| c. | <i>!uwssa</i> | (u.ws.sa) | ‘leave instructions’ |
| d. | <i>uwssaa</i> | (u.ws.saa) | ‘let pass’ |
| e. | <i>uwssr</i> | (u.ws.sr) | ‘grow old (animal)’ ⁴⁹ |

In the verbs in (27) the consonant which follows the glide is not a coronal sonorant or fricative. If their initial segment were realized as a simplex glide, e.g. if /wmm/ (27)a were realized as *wm.ml* in violation of SonPeak, the initial syllable would not meet condition WC-SYLL (19). The glide in the verbs of (27) must geminate, then, for the same reason as that in the bound state form *tuwmmist* (/t-wmmis-t/, (21)k).

The verbs in (28) are another matter. They would meet condition WC-SYLL (19) if their initial glide were not geminated, and the parallel with the verbs in (15) incorrectly leads one to expect *wlla* instead of *uwlla*,

⁴⁷ An exception must be made for *uwrr* (impf *tt-uwrury*) ‘come back’. The only other /CC:/ verb we know of is *nqqi* ‘be clean’, whose impf stem is *tt-nqqi*, not **tt-nqqy*.

⁴⁸ Besides the three verbs listed in (26)a–c, the only other verb of this type we have encountered is *uwfa* ‘be in excess’.

⁴⁹ Cf. (21)m.

wrrri instead of *uwrrri* and so on. The items in (15) form quasi-minimal pairs with those in (28), compare for instance *uwrrri* /wrrri/ (28)b, where the initial glide geminates, with *!wrrɣ* /!wrrɣ/ (15)a, where it does not. *twrtat* and the other bound state forms in (17) and (18) illustrated the fact that in nouns, initial glides which are sonority peaks in the underlying representations *must* violate SonPeak whenever WC-SYLL (19) allows it. In verbs with a similar make-up, on the other hand, SonPeak is violated in some items, e.g. in *!wrrɣ*, but not in others, e.g. in *uwlla*.

An assumption in our discussion of the /w/-initial verbs in (15) and in the present subsection is that their initial glide is a sonority peak in the underlying representation, which is indeed true in the forms listed in (15), (27) and (28), which are stems, and remains true in strings in which these stems immediately follow a pause or a contoid. But what of the cases in which they follow a morpheme ending in a vocoid? The answer is that the *uw*-initial verbs begin with a geminate no matter what. After a word-final vowel, the initial geminate is realized as *ww* to avoid hiatus, compare for instance *uwzn-ɣ* (*uw.znɣ*) ‘I weighed’ (cf. (26)a), and *ur ta wwznɣ* (*taww.znɣ*) ‘I have not weighed yet’, from */ur ta wzn-ɣ/*. After the 3ms prefix /i-/, on the other hand, the initial geminate is realized as *uw*, as it is after all the other prefixes, e.g. *y-uwzn* (*yuw.zn*) ‘he weighed’. Let us consider the two cases in turn.

The fact that the initial glide of the *uw*-initial verbs geminates even after a word-final vowel is one of our reasons for assuming that syllabification operates in successive stages. Consider again the string */ur ta wzn-ɣ/*. If syllabification operated from the start at sentence level there would be no reason for the initial segment of */wzn/* to geminate. /w/ is no more a sonority peak in the string under consideration than it is in */a-wtil/* ‘hare’, and consequently it should surface as a simplex glide, as it does in *awtil*.

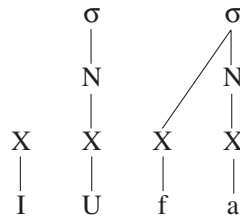
Let us recall our earlier assumption that in a sentence each stem is parsed as an independent syllabification domain before the concatenation of the resulting parses is subjected to sentence-level syllabification. This assumption was crucial in our discussion of imperfective gemination and in that of length alternations in the causative prefix, see Chapter 5. In the word */wzn-ɣ/* ‘I weighed’, stem-level syllabification parses the stem as *uw.zn*. In the input to sentence-level syllabification the representation of sentence */ur ta wzn-ɣ/* ‘I have not weighed yet’ is *<urta>.uw.zn.<ɣ>*, where unsyllabified sequences are enclosed between angled brackets. Sentence-level syllabification turns that representation into *ur.taww.znɣ*.

Let us now turn to the forms with the /i-/ 3ms prefix, e.g. *y-uwzn* /i-wzn/. Why not instead *i-wzn*, which would meet GlideFaith and SonPeak as well as *yuwzn*, and spare a violation of FAITH(SHORT)? Before we deal with this case we must present the basic facts about the syllabification of the 3ms prefix and explain how we propose to account for them.

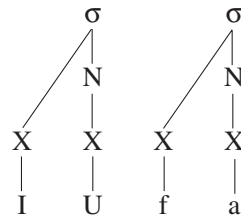
Setting aside the cases under discussion, the syllabification of the 3ms

prefix in words pronounced in isolation is pretty straightforward. It surfaces as a glide when the stem begins with a vowel, and as a vowel otherwise, witness the following examples: *y-ufa* ‘he found’ (cf. 3mp *ufa-n*), *y-itti* ‘he moved away’ (cf. 3mp *itti-n*), *i-wažb* ‘he answered’, *i-rgl* ‘he locked’.⁵⁰ Most of this distribution is accounted for by our constraints, notably NoHiatus and SonPeak. What these constraints leave unaccounted for, however, is the fact that when the initial vowel of the kernel is high, it is the prefix, rather than the following vowel, which surfaces as a glide to avoid a hiatus: /i-ufa/ yields *yufa*, not *iwfa*.⁵¹ Let us assume that at the stage of the derivations when the prefix and the verb are first syllabified together, the high vocoid at the beginning of *ufa* is already a nucleus, while the prefix is yet a skeletal slot unaffiliated with any syllabic constituent. The input representation /i-ufa/ and the two competing outputs *yufa* and *iwfa* are given below in (29).

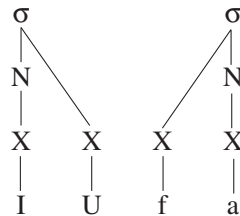
(29) a. /i-ufa/



b. *yufa*



c. *iwfa*



We assume that when syllabification operates, its output must satisfy the constraints in such a way as to differ as little as possible from the input representation. *yufa* and *iwfa* are both optimal with respect to the constraints presented earlier, but *yufa* departs less from the input representation.

At what stratum of the grammar does syllabification operate when it changes (29)a into (29)b? One could suppose that the domain of syllabi-

⁵⁰ After a vowel the prefix in the last two forms is realized as a glide: *ašku y-wažb* ‘because he answered’, *w-a=lli y-wažb-n* ‘the one (ms) who answered’, *ašku y-rgl* ‘because he locked’, *t-i=lli y-rgl-n* ‘those (fp) who locked’.

⁵¹ Words beginning with *iw* are otherwise attested, e.g. *iws-n* ‘they helped’.

cation is the word, but let us try not to multiply strata beyond necessity. Let us assume only two levels of syllabification; at one level it is stems which are taken as domains of syllabification and at the other it is whole sentences. It is sentence syllabification which changes (29)a into (29)b; there is no word-level syllabification. Recall that it is syllabification in the stem stratum which is responsible for the fact that /wzn/ and the other verbs in (26) begin with a geminate vocoid in all their occurrences. /wzn/ becomes /uw.zn/ in the stem stratum and the 3ms prefix surfaces as a glide in *y-uwzn* for the same reason as it does in *y-ufa*.

As is implicit in the paragraph immediately under (29), all the constraints in diagram (24) take precedence over the requirement that the output of syllabification differ as little as possible from its input. This requirement only makes a difference in situations in which more than one candidate parse is optimal with respect to the constraints in (24). This is the case with /i-ufa/, but it would not be with /i-rgl/ ‘he locked’, for instance, which is pronounced *irgl*. The stem /rgl/ is syllabified as *r.gl* at the output of the stem stratum, which is parallel to *u.fa*. However, whereas the outputs *yu.fa* and *iw.fa* fared equally well with the constraints in (24), this is not so for *yr.gl* and *ir.gl*: the former violates SonPeak while the latter does not. Consequently *ir.gl* is selected as the grammatical output. Resyllabifying the nucleus *r* as a coda is the price to pay to avoid unnecessary violations of the constraints in (24).

7.3.2.3. Other stem-initial glides

Our assumption that syllabification operates on stems before it operates on whole sentences enables us to account for the discrepancy between the pronunciation of the *uw*-initial verbs and their morphology. At the same time this assumption creates problems for the analysis of nouns with a stem-initial glide. The only forms of such nouns we have discussed so far are feminine bound state forms. Let us now deal with masculine nouns and free state forms in either gender. Although the initial glide of the stem in these words is not a sonority peak, here is the convenient place to deal with them, since presumably all the relevant facts are still fresh in the readers’ minds. We will give only one example for each case, but the regularities these examples illustrate are exceptionless.

Consider again /a-wtil/ *awtil* ‘hare’. If the stem /-wtil/ were first syllabified in isolation, it would yield /-uwtil/, whence **awwtil* after the initial prefix is taken into consideration by sentence level syllabification.⁵² The plural form in both states is *i-wtlan*, not **iwwtlan* nor **yuwtlan*, and similarly the plural of *t-a-wrir-t* ‘hill’ is *t-i-wrar*, not **tiwwrar* nor **tyuwrar*.

⁵² Homosyllabic *aww* is attested in Imdlawn Tashlhiyt, witness *a-wwtif* ‘heap of threshed cereal’.

Masculine bound state forms raise a similar problem. The bound state of *awtil* is *u-wtil*, not **w-uwtil*. Let us recall the facts about the syllabification of the bound state prefix /u-/ and that of its fronted variant /i-/ before *i*-initial nouns.⁵³ These facts are similar in all respects with those presented earlier about the 3ms prefix of verbs. The bound state prefix is realized as a glide before vowels and as vowel before consonants. Here are free state nouns with their corresponding bound state forms: *udad*, *w-udad* 'ibex', *ilf*, *y-ilf* 'wild boar', *a-rgaz*, *u-rgaz* 'man', *i-kzin*, *i-kzin*⁵⁴ 'puppy'.⁵⁵ The pair *a-wtil* / *u-wtil* patterns just like any noun with a consonant at the beginning of its stem (*a-rgaz*, *u-rgaz*), provided we find a way to prevent its initial glide from geminating.

Before we deal with nouns like *a-wtil* / *u-wtil*, in which the stem begins with an underlying glide, let us review how our analysis handles nouns like *udad* / *w-udad* and *ilf* / *y-ilf*, in which the stem begins with a vowel. The gliding of the bound state prefix in *w-udad* and *y-ilf* is accounted for in the same manner as that of the 3ms prefix in *y-ufa* in the preceding subsection. Consider for instance *w-udad*. /U-udad/, the input to syllabification at sentence level, is a representation analogous to (29)a, which results like (29)a from stem-level syllabification. In that representation the prefix /U/ is unsyllabified while the vocoid at the beginning of the stem is already a nucleus. By making the prefix into an onset, sentence syllabification avoids hiatus and at the same time it leaves unchanged the syllable structure present in the input.

We now return to *a-wtil* / *u-wtil* and the like. If stem-level gemination operates on the string /wtil/ taken in isolation, how can we prevent it from geminating the stem-initial glide? Nouns like *a-wtil* have the same morphological properties as the vowel-initial nouns in which the stem begins with a consonant, e.g. *a-rgaz* / *u-rgaz*. The augment (*a-*) and the bound state prefix (*u-*) are inflectional affixes, and consequently they do not belong to the stem. Let us assume, however, that in nouns whose stem begins with a glide (*a-wtil*) or with a consonant (*a-rgaz*), the augment and the bound state prefix are included in the string which is subjected to stem-level syllabification. Under this assumption, the initial glide of /wtil/ is not anymore a sonority peak in the strings which are inputs to stem-level syllabification and there will be no need for it to geminate.

We have just divided verbs and nouns into two categories, as far stem-level syllabification is concerned. In the items of one category, the strings

⁵³ On this variant, see § 2.5.2.

⁵⁴ In this pair the initial vowel in the first form is the nominal augment, whereas that in the second form is the fronted variant of the bound state prefix, see § 2.5.2.

⁵⁵ After a vowel the prefix is pronounced as a glide (v. § 7.1.3): *i-kti w-rgaz* 'the man remembered', *ddu=w-rgaz* 'under the man', *ikti y-kzin* 'the puppy remembered', *ddu=y-kzin* 'under the puppy'.

which are syllabified in the stem stratum correspond exactly to the notion ‘stem’ employed throughout this book: a stem is what remains after a word has been stripped of all its inflectional affixes. All the verbs belong to this first category (e.g. *gn* ‘sleep’, *uwzn* /*wzn*/), and also all those nouns in which the stem begins with a vowel (e.g. *aylal* ‘bird’, *udad* ‘ibex’). In the items of the other category, the strings subjected to stem-level syllabification must include, in addition to the stem proper, the affix which immediately precedes it when that affix is the augment or the bound state prefix. This second category is comprised of all the nouns whose stem (in the strict sense) does not begin with a vowel, e.g. *a-rgaz* ‘man’, *a-wtil* ‘hare’. The above difference between the two categories, which has to do with the delimitation of syllabification domains, may be related to a difference in their morphological structure. The stem may be word-initial in the first category but not in the second category, e.g. the stem occurs at the beginning of the word in *gn-n* ‘they slept’ and in the singular free-state form *aylal* ‘bird’, but the paradigm of *a-rgaz* ‘man’ does not contain any word beginning with *rgaz*. Another fact which may be relevant here is the following:

- (30) In nouns with an augment, if the initial segment of the kernel is a vocoid, it must be an underlying glide.

If (30) were not true, the following situation would obtain. Alongside *t-a-wtil-t* and *t-a-wrta-t*, in which the first segment of the kernel complies with GlideFaith when the augment drops in the bound state (cf. *t-uwtıl-t* (21)a and *t-wrta-t* (17)a), there would exist nouns in the bound state form of which that first segment simply surfaces as a vowel, in compliance with SonPeak, e.g. nouns *t-a-wsil-t* and *t-a-wrsa-t* whose bound state forms would be *t-usıl-t* and *t-ursa-t*. That such a contrast does not exist is a remarkable fact which is crying out for an explanation.

Let us finally discuss the masculine bound state forms in which the bound state prefix immediately precedes a kernel which begins with an underlying /y/. The only forms we have been able to find are those listed below (the corresponding free state forms are given in parentheses).

- | | | | |
|---------|-----------------|--------------------|--------------------------|
| (31) a. | <i>u-ynnri</i> | (<i>a-ynnri</i>) | ‘ko medicinal plant col’ |
| b. | <i>w-iydi</i> | (<i>a-ydi</i>) | ‘dog’ |
| c. | <i>w-iyda</i> | (<i>a-yda</i>) | ‘patrimony’ |
| d. | <i>w-iyddid</i> | (<i>a-yddid</i>) | ‘waterskin’ |

The first noun is the only one to behave in accordance with our analysis. *u-ynnri* behaves like *u-wtil*. On the other hand, the bound forms in the other nouns look as though they have undergone syllabification in the stem stratum, e.g. /*u-ydi*/ *w-iydi* (31)b is analogous to /*i-wzn*/ *y-uwzn* ‘he weighed’. But if these nouns were marked in the lexicon as exceptions undergoing syllabification at the level of stems, we would also expect

their glides to geminate in the free state, contrary to fact (**a-yydi*). We do not have a solution to the problem posed by (31)b,c,d.⁵⁶

7.3.3. Surface glides (codas) which are sonority peaks

Constraint NoRR (11) is not violated in any of the data presented thus far. However Imdlawn Tashlhiyt has rimes which violate NoRR. All such rimes have a liquid as their nucleus and *w* as their coda. NoRR is for instance violated in /t-s-rws=ak/ (3fs-cau-resemble=dat2ms) ‘she gave you the impression (that . . .)’.⁵⁷ Whereas the analysis recapitulated in (24) predicts *tssrûsak* (*tss.rû.sak*), the correct form is *t̥s.srw.sak*. Here is for instance a well-formed line of verse in which the sequence /srw/ is parsed as a heavy syllable.⁵⁸

- (32)
- | | | | | | | | | | | | |
|---|-----|-----|----|----|----|-----|------|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| L | L | H | L | L | L | H | L | L | L | L | H |
| a | ys~ | srw | sa | kl | ħa | lis | dil~ | la | sl | ma | kan |

We compare below the pronunciation of /t-s-rws=ak/ with those of forms in which the rimes *u* and *uw* occur after an onset which is a sonorant.

- (33)
- | | | |
|------------------------------|------------|------------------|
| a. /t-s-rws=ak/ | ts.srw.sak | [ts:(ə)ru(w)sæk] |
| b. /srus=as/ ⁵⁹ | s.ru.sas | [srösæs] |
| c. /s-nwws=as/ ⁶⁰ | s.nuw.sas | [snu:sæs] |

r gives the impression of being longer or more prominent in (33)a than in (33)b. The parentheses around [ə] in (33)a do not indicate an alternation between two free variants, but our inability to distinguish consistently by ear between [CR] and [C@R] (R a nasal or a liquid) when R is syllabic.⁶¹ The whole nonconsonantal section between [r] and the kernel-final [s]

⁵⁶ In *w-iydi* the bound state prefix does not assimilate to the following *i*, as it does e.g. in *y-ilf* /u-ilf/ ‘wild boar, b’. There are various ways of accounting for this fact. One way would be to order the fronting rule (rule WI/YI in § 2.5.2) before the pass of syllabification which is responsible for the gemination of yod in /w-ydi/. Another is to formulate rule WI/YI so that it can only apply if the front vowel triggering fronting belongs to the kernel. As illustrated in (22), the extra slot added to the glide by gemination does not belong to the kernel.

⁵⁷ In Imdlawn Tashlhiyt the verb /rws/ exists only in the causative. The closest item built on a monomorphemic stem is *rwas* (impf *tt-rwas*) ‘resemble, seem’, but the morphological relationship between *ss-rws* and *rwas* in a synchronic description of Imdlawn Tashlhiyt is not a regular one. On the gemination of the causative prefix, v. § 5.4.

⁵⁸ a *i-ss-rws=ak* l-ħal is=d i-l-las l-makan ‘Ah! you have the impression (lit. ‘the situation gives you the impression’) that the world is darkening’. The metrical pattern of this line is the same as that of the piece in Appendix II.

⁵⁹ ‘Lay down for him! impf’.

⁶⁰ ‘Entertain for him!’ (cau-amuse=dat3s).

⁶¹ V. § 6.3.2.

may sound somewhat longer in (33)a than *u* in (33)b, but definitely not as long as *uw* in (33)c. Since it occurs between two coronals, /*u*/ is fronted in (33)b,⁶² while the vocoid in (33)a shows no more signs of fronting than that in (33)c. Finally, whereas the vocoids in (33)b,c are steady-state, that in (33)a gives at times the impression of a closing diphthong.

Consider now the verb *rwł* (r.wł) ‘flee’, which is the colloquial variant of the more formal *lwr* cited in the text under (6). This verb allows us to examine syllabifications of /*rw*/ in a richer array of morphologically related forms than /*s-rws*/ does. /*i-rwł*/ ‘he fled’ is parsed as *i.r.wł* and sounds like [irwəl] whereas /*i-rwł=ak*/ (3ms-flee=dat2ms) ‘he escaped from you’ is parsed as *i.rû.lak* and pronounced accordingly (with an unfronted *û*), and these pronunciations are as predicted by the analysis summarized in (24). That analysis leads one to expect *t.rû.lak* for /*t-rwł=ak*/ ‘she escaped from you’, but the correct form is *trw.lak*, with *r* as the nucleus of the first syllable.⁶³ The examples below recapitulate all the relevant data.

(34) a.	<i>tr.wł</i>	/t-rwł/	3fs
	<i>tr.włt</i>	/t-rwł-t/	2s
a’.	<i>r.wł</i>	/rwł/	imper
	<i>r.włγ</i>	/rwł-γ/	1s
b.	<i>trw.lak</i>	/t-rwł=ak/	3fs + dat2ms
b’.	<i>rw.lat</i>	/rwł=at/	imper=2p
c.	<i>ir.wł</i>	/i-rwł/	3ms
d.	<i>i.rû.lak</i>	/i-rwł=ak/	3ms + dat2ms
	<i>in.na.rû.lat</i>	/i-nna rwł=at/	‘he said “flee!”’

In all these examples the onset-nucleus sequence *wł* sounds like [wəl] and the rime *rw* sounds like that in (33)a (see text immediately under (33)). For instance *tr.wł* in (34)a is pronounced [t(ə)rwəl] and *trw.lak* in (34)b is pronounced [t(ə)ru(w)læk]. The cases which are problematic for the analysis summarized in (24) occur in the forms in lines b–b’, where /*w*/ is not preceded by a vocoid and is not followed by a segment which can be parsed as a nucleus, as is also the case in /*t-s-rws=ak*/ in (33)a. These forms show that GlideFaith dominates NoRR, contrary to what has been assumed until now. All the cases which show the effects of this ranking fall under the following generalization.

(35) RW-RIME: In a rime in which the coda violates NoRR,

- a. the nucleus is a sonorant;
- b. the coda is *w*.

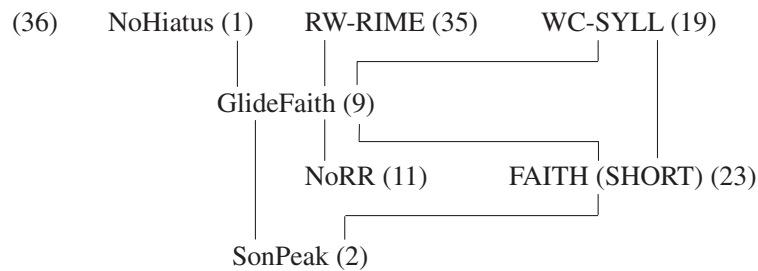
⁶² On *u* fronting, see § 3.8.

⁶³ ME does not consider *trûlak* as absolutely unacceptable, but he finds it very sloppy. Acceptability judgements are made more difficult by the existence of Tashlhiyt dialects in which the normal pronunciation of this form is *trulak*.

In all the data given so far to illustrate RW-RIME the consonant which precedes *w* is *r*. Here are examples of *Cw* rimes in which the nucleus is another sonorant: /ur t-lwi aqqay-n/⁶⁴ *ur.tlw.yaq.qa.yn* ‘she did not pick dates’; /ur t-s-nwi aman/⁶⁵ *ur.ts.snw.ya.man* ‘she did not boil water’. The morphemes which can be used to provide the relevant strings are very few and we have not found any which would enable us to check the facts for *mw*. The following pair illustrates the fact that sonorants can be nuclei in *Cw* rimes, but obstruents cannot. /i-s-nwi=ad/⁶⁶ ‘this cooking’ can only be pronounced *i.snw.yad* (not **is.nu.yad*), whereas /i-!gzwi=ad/ ‘this brook’ can only be pronounced *!ig.zu.yad* (not **i.gzw.yad*).⁶⁷

Violations of NoRR are not very common in the languages of the world. Two such violations are found in the varieties of English and of German where in codas /r/ is realized as a nonsyllabic nonhigh vocoid, e.g. Eng. *here* [hiɹ̥], Germ. *Uhr* [u:ʀ]. For a case in Ath Sidhar Rifian, which involves rimes consisting of a syllabic /r/ followed by a glide, see DT (1993: 43–46).

Let us modify our analysis by re-ranking NoRR below GlideFaith and by adding (35) as an undominated constraint. (24) is replaced by (36):



Forms such as /zwi=as/ *zûyas* in the second line in table (25) now become crucial evidence that RW-RIME (35) is ranked above GlideFaith: if /zwi=as/ were parsed as *zw.yas*, with *z* the nucleus in the first syllable, RW-RIME would be violated. It is GlideFaith which is violated instead, hence the correct form *zû.yas*. If, as in (36), RW(RIME and GlideFaith are the only constraints which dominate NoRR, the implication is that in Imdlawn Tashlhiyt all the well-formed representations which violate NoRR fall under generalization (35), which is in fact true.

Diagram (36) indicates that WC-SYLL must be ranked higher than GlideFaith, which diagram (24) did not, because the data examined earlier did not provide evidence on this point. The new evidence is the fact that /i-rwl=ak/ in (34)d yields *i.rû.lak*, with a violation of GlideFaith, rather than

⁶⁴ *lwi*, negative of *lwa* ‘pick unripe fruit’.

⁶⁵ *ss-nwi*, negative stem of *ss-nwa* ‘(cause to) cook’, from *nwa* ‘cook, ripen’.

⁶⁶ *isnwi*, an action noun derived from *nwa* ‘cook’.

⁶⁷ The same state of affairs obtains in Lmnabha Moroccan Arabic, v. § 9.3.3.2.

y_rw.lak, which complies with RW-RIME and GlideFaith but violates WC-SYLL.

Given the constraints in (36), /i-rwl=ak/ should be realized as *i.ruw.lak*, which achieves compliance with both GlideFaith and SonPeak at the cost of a violation of FAITH(SHORT) (23), as is the cases in *t-uwtil-t* /t-wtil-t/ (21)a. (36) must be supplemented with an undominated Contiguity constraint which prohibits the ‘insertion’ of skeletal slots inside morphemes.⁶⁸

7.4. GEMINATE GLIDES

As already noted by Basset (1946), vowels do not have an underlying length contrast. On the other hand glides do, like the other consonants. The examples below illustrate the contrast between simple and geminate glides after a vowel.

- | | | | | |
|---------|------------|------------------|-------------|--------------------------|
| (37) a. | t-aqqay-in | ‘Adam’s apple p’ | t-aqqayy-in | ‘walnut p’ ⁶⁹ |
| b. | i-muyag | ‘adze p’ | i-guyya | ‘head p’ ⁷⁰ |
| c. | iwi-n | ‘take away 3mp’ | iwwi | ‘my son’ |
| d. | a-wtil | ‘hare’ | a-wwtif | ‘threshed wheat’ |
| e. | t-a-ydr-t | ‘ear (cereal)’ | t-a-yydar-t | ‘woman’s name’ |
| f. | zuyd-n | ‘be born 3mp’ | t-uyyl-t | ‘fly 2s’ |
| g. | ssiwd-n | ‘be afraid 3mp’ | !swiwwd-n | ‘burn (pain) 3mp’ |
| h. | t-aqqay-t | ‘walnut’ | i-žara=yyt | ‘let him search’ |
| i. | t-duy-t | ‘you woke up’ | i-žlu=yyt | ‘let him lose’ |

Apart from the fact that they have greater duration, postvocalic geminate glides occupy more extreme locations in the vowel space than their simplex counterparts. When compared in such pairs as *t-ayyu-t* ‘camel’s hump’ vs. *ur ta y-ut* (neg yet 3ms-strike) ‘he has not struck yet’, and *!w-ayyad* ‘other m’ vs. *!a-bayad* ‘wasteland’, *yy* is closer to cardinal vowel [i] than *y*, which one is tempted to note [ɛ̃]. Similarly the rounding and/or protrusion of the lips is greater in the glide in *i-žawwa-n* ‘strong wind p’⁷¹ than in *a-zawar* ‘nagging’.

After a consonant, the first half of a geminate glide is realized as the corresponding high vowel, as we shall see below. The examples in (38) illustrate the contrast between simple and geminate glides in that context. In (38)a, for instance, the underlying representations are /a-fyaš/ and /a-fyyaš/.

⁶⁸ On that constraint, see Kenstowicz (1994b) and McCarthy and Prince (1995).

⁶⁹ Both nouns have identical singular forms: *taqqayt*.

⁷⁰ From *a-mayg* and *a-gayyu*.

⁷¹ Singular *a-žawwu*.

- (38) a. a-fyaš 'unpeeled argan nut' a-fiyaš 'braggard'
 b. nwa 'cook' nuwa 'intend'
 c. ħya 'resurrect' hiya 'be magnificent'
 d. t-a-ryal-t 'ko basket' !t-a-riyas-t 'direction'⁷²
 e. t-a-rway-t 'barley porridge' t-a-ruway-t 'disorder'⁷³

As implied by our transcriptions in the right-hand side column in (38), after a consonant a geminate glide is homophonous with a high vowel followed by the homorganic glide, for instance /ww/ is homophonous with /u+w/. Since the existence of this homophony or its systematic nature can easily be overlooked, let us illustrate it with minimal pairs involving three different morpho-syntactic contexts.

The kernel in /tt-šwwaš/ 'make lots of noise impf'⁷⁴ is phonetically undistinguishable from that in /i-šūwaš/ 'two-pronged pitchfork p';⁷⁵ both are pronounced *šūwaš*. Similarly, the sequences /a-nwwaš/ and /anu#w-ašš/ at the beginning of the sentences in the following pair are homophonous except for the final consonant.

- (39) /a-nwwaš⁷⁶ a i-ga γ=u-!dwwar/ *anuwašayga!yuduwar*
 u-informer AD 3ms-be in=b-village
 'a rat (an informer), that's what he is in this village'
- (40) /anu w-ašš a i-ga f=u-!dwwar/ *anuwaššayga!fuduwar*
 well m-bad:omen AD 3ms-be on=b-village
 'the well, it is bad luck that it brought to the village'

Our next pair illustrates an analogous homophony before CCV:

- (41) /fwwt⁷⁷-x=as/ *fuwtxas*
 spend-1s=dat3s
 'I spent for him'
- (42) /ašku ut-x=as/ *aškuwtxas*
 because strike-1s=dat3s
 'because I struck for him'

In our last example the geminate high vocoid in the first sentence results from the total assimilation of the genitive preposition /n/ to the initial

⁷² *!riys* 'lead (performers), be in charge'; *!r-rays* 'director, skipper, travelling musician'.

⁷³ A deverbal noun of shape /a-CC:aC/ derived from *rwi* 'stir'.

⁷⁴ The corresponding perfective is /šwwš/ *šuwš* ([šū:š]).

⁷⁵ The corresponding singular is *a-šawš*. *a-šawš* forms its plural like *a-madl* 'mountainside', p *i-mudal*.

⁷⁶ Cf. (48)g below.

⁷⁷ This verb is conjugated below in (45)a.

sonorant of the following noun.⁷⁸ When the optional assimilation rule applies the two sentences are homophonous.

- (43) /i-!rza ħmad ixf n=u-γγul/ !irzaħmadixfuwγγul
 3ms-break ħmad head of=b-donkey
 ‘Ahmed broke the donkey’s skull’
- (44) /i-!rza ħmad i-xfu u-γγul/
 3ms-break ħmad 3ms-vanish:aor b-donkey
 ‘Ahmed broke a limb and the donkey vanished’

It is only for reasons of convenience that the three pairs above all involve back vocoids. Lack of space prevents us from citing similar pairs to illustrate the homophony of /Cyy/ and /Ciy/. The homophony under discussion follows from two facts: (i) when a geminate immediately follows a segment of lower sonority, the first half of the geminate is syllabified as a syllable nucleus, and (ii) when an underlying glide is syllabified as a nucleus, the resulting surface vowel is homophonous with an analogous underlying vowel.⁷⁹ By (i), postconsonantal /ww/ is syllabified as /ww/, and by (ii), /u/ and nuclear /w/ have identical surface manifestations. Fact (i) is exemplified by the syllable structures of such forms as /i-ħlls-n/ ‘saddle prt’ and /i-tt-ħllas-n/ ‘saddle, impf prt’, which are *i.ħll.sn* and *itt.ħl.la.sn*. This fact is accounted for by the analysis in Chapter 4, notably by constraint NoOns~, which forbids the first half of a geminate to be an onset. Fact (ii) was presented earlier in this chapter (§ 7.2).

Given the homophony of /ww/ and /uw/ and that of /yy/ and /iy/ after a consonant, it is considerations about distributional restrictions or about the morphological make-up of words which enable us to tell apart those surface sequences which derive from a geminate glide and those which derive from a vowel followed by a glide. Let V_iG_i stand for a surface sequence *uw* or *iy*. Let us review a few cases in which the available evidence clearly points in one direction or the other.

If a V_iG_i sequence is heteromorphemic and if furthermore there is no reason to suppose that it has undergone assimilation, then that sequence cannot be the realization of a geminate (on geminates v. chapter 3). A few such cases have appeared earlier in our discussion. In *d#u-wtil* ‘with the hare’ (v. (6)h), *u* is the bound state prefix while the following *w* belongs to the kernel. In *sniri* ‘mimic impf’ (v. (6)g), *y* is the last segment in the root,⁸⁰ while the preceding *i* is a vowel which is inserted to form the imperfective stem (cf. the imperfective *tt-gnuguy*, in (4)c, and its perfective *gnugi*). In *i-lkkuwsa* ‘pruning hook p’ (v. (6)a) *w*, which also appears in the singular

⁷⁸ See § 3.2.1.2 on this assimilation.

⁷⁹ Except in the case of back high vocoids in *u*-fronting environments, see (13).

⁸⁰ That same segment is realized as a vowel in the perfective stem *sniri*.

a-lkkawsu, belongs to the root, while *u* belongs to the /ua/ melody which serves as a plural marker in certain nouns (cf. *a-gayyu* ‘head’, p *i-guyya*). In *!t-i-mššuwra* ‘state of being a counsellor’, a plural noun derived from *!a-mšawr-iy* ‘counsellor’ (v. DE 1992), *w* belongs to the root while *u* belongs to the plural melody /ua/.

What of the homomorphemic sequences? Let us first discuss two instances where there are reasons to believe that they are the reflexes of geminate glides.

First, consider the verbs whose perfective stem has the surface shape CV_iG_iC.⁸¹ A priori, their underlying forms could be either /CG:C/ or /CVGC/. We give a few CV_iG_iC verbs in table (45) below, and for the sake of comparison we add examples of CVCC and CC:C verbs. Three stems are given for each verb: perfective, negative and imperfective.

(45)	pf	neg	impf	
a.	fuwt	fuw(i)t	tt-fuwat	‘spend’
b.	huwl	huw(i)l	tt-huwal	‘worry’
c.	qiyd	qiy(i)d	tt-qiyad	‘record’
d.	!ziyr	!ziy(i)r	!tt-ziyar	‘tighten’
e.	!rufz	!ruf(i)z	!tt-rufuz	‘be reluctant’
f.	biks	bik(i)s	tt-bikis	‘gird’
g.	hawt	haw(i)t	tt-hawat	‘negociate’
h.	sxxn	sxx(i)n	tt-sxxan	‘dip (in sauce)’
i.	bddl	bdd(i)l	tt-bddal	‘exchange’

The CVCC verbs and the CC:C verbs insert a vowel before their last consonant to form their imperfective stem; in the CVCC verbs the inserted vowel is a copy of V (v. (45)e–g) while in CC:C verbs it is *a* (v. (45)h,i).⁸² As illustrated in (45)a–d the CV_iG_iC verbs pattern with the CC:C verbs: they insert *a* in the imperfective. This fact is our first reason for assuming that in the CV_iG_iC verbs the V_iG_i sequence is a geminate glide, e.g. the underlying form of *fuwt* (v. (45)a) is /fwwt/ and not /fuwt/. One cannot attribute the ill-formedness of **tt-fuwut* and **tt-qiyid* (from *qiyd*, v. (45)c) to a constraint against sequences *uwu* and *iyi*, for such sequences occur elsewhere in Imdlawn Tashlhiyt. *uwu* occurs in *nuwu* and *quwu*, which are the aorist stems of *nuwa* ‘intend’ and *quwa* ‘be strong’, and *iyi* occurs in the negative stems of the CV_iG_iC verbs, e.g. in *qiyid* and *!ziyir* ((45)c,d); *iyi* also occurs in *hiyi*, the negative stem of *hiya* ‘be magnificent’, and in its 1s and 2s forms in the perfective, *hiyi-x*, *t-hiyi-t*.

Our second reason for assuming that in CV_iG_iC verbs the V_iG_i sequence derives from a geminate glide, is the existence of verbs of the form *aaG:C*,

⁸¹ Such verbs were already given in the left-hand side column in (6)b,e.

⁸² On imperfective stems, see § 5.2.

e.g. *aayyb* ‘criticize’. As has been shown in § 3.7, in Imdlawn Tashlhiyt all occurrences of tautomorphemic *aa* can be derived from /ʕ/ by the following obligatory rule, which has very few exceptions:

- (46) ʕ-TO-aa: ʕ → aa / except when adjacent to a high vowel

For instance /ʕssis/ ‘mount guard’ is realized as *aassis*, /i-dʕa/ ‘pray for someone, 3ms’ is realized as *idaa*,⁸³ while the corresponding aor form /i-dʕu/ is realized as *idʕu*. As implied by rule (46), ʕ is adjacent to a high vowel in all the surface forms in which it occurs, e.g. *ʕiʃ* ‘survive’, *ʕum* ‘swim’, *lbiʕ* ‘sale’, *labyuʕ* ‘sale p’.

Consider the three *aaG:C* verbs which are given in (47)a–c below. These verbs conjugate like /CC:C/ verbs (v. (45)h–i); the /ʕC:C/ verbs in (47)d–f are given for the sake of comparison:

(47)	pf	neg	impf	
a. /ʕyyb/	aayyb	aayy(i)b	tt-aayyab	‘criticize’
b. /ʕyyd/	aayyd	aayy(i)d	tt-aayyad	‘spend time’ ⁸⁴
c. /ʕwwl/	aawwl	aaww(i)l	tt-aawwal	‘count on’
d. /ʕrrʃ/	aarrʃ	aarr(i)ʃ	tt-aarraʃ	‘stand in full view’
e. /ʕllm/	aallm	aall(i)m	tt-aallam	‘put a mark on’
f. /ʕmmr/	!aammr	!aamm(i)r	!tt-aammar	‘fill’

The underlying forms of the verbs in (47)a–c can only be /ʕG:C/, e.g. *aayyb* can only derive from /ʕyyb/. Deriving *aayyb* from /ʕiyb/ would require allowing /ʕ/ to be turned into *aa* in front of a high vowel, something which otherwise never happens. What the existence of the *aaG:C* verbs shows, then, is that the lexicon of Imdlawn Tashlhiyt must contain some /CG:C/ verbs. A distribution which would only allow /ʕ/ as an initial consonant in the underlying form of the /CG:C/ verbs would be oddly skewed. Analyzing all the *CV_iG_iC* verbs as /CG:C/ would avoid this problem.

Our third reason for assuming that in the *CV_iG_iC* verbs the *V_iG_i* sequence is a geminate glide has to do with the memberships of the three classes of verbs exemplified in table (45). The CC:C verbs are numerous, and so are the *CV_iG_iC* verbs, while there are not so many CVCC verbs. If we take the *CV_iG_iC* verbs to be /CC:C/ verbs of a particular kind, then the fact that there are many *CV_iG_iC* verbs is simply a special case of the fact that there are many /CC:C/ verbs. On the other hand, if we took the *CV_iG_iC* verbs to be /CVCC/ verbs, then we would have a rather peculiar distribution among the /CVCC/ verbs, most of them containing a high vowel followed by a homorganic glide.

⁸³ Unless ʕ is adjacent to a high vowel, sequences /ʕa/ and /aʕ/ surface as *aa*.

⁸⁴ During a religious festival.

The second instance where we have evidence that a V_iG_i sequence is the surface reflex of a geminate glide is that of the $a-CV_iG_i aC$ nouns, which in many cases are clearly instances of the templatic $a-CC:aC$ nouns. These are illustrated below in (48):

(48) a.	a-sbbay	'dyer'	sby	'dye'
b.	!a-nddam	'poet'	!ndm	'compose poetry'
c.	a-žmmal	'wholesaler'	žmml	'buy wholesale'
d.	t-a-qiyat-t	'lqayd status'	l-qayd	'ko judge'
e.	!a-siyad	'fisherman'	!siyd	'go fishing'
f.	a-fiyaš	'braggard'	fiyš	'show off'
g.	a-nuwaš	'informer'	nuwš	'malign'
h.	a-quwad	'pimp'	quwd	'mediate'
i.	!a-suwag	'cattle hand'	!sug	'drive (herd)'

The $a-CC:aC$ nouns are occupational nouns. Since Imdlawn Tashlhiyt does not have analogous nouns built on a template $a-CVCaC$,⁸⁵ the V_iG_i sequence in the $aV_iG_i aC$ nouns in (48)d–h must be the reflex of a geminate glide. *a-fiyaš* (48)f represents an underlying /a-fyyaš/.

A class of kernels with a V_iG_i sequence which cannot be traced back to a geminate glide in the underlying representations is that of the nouns ending in *iy* whose plurals end in *ay*, e.g. *!a-frdiy* / *!i-frday* 'tree', *!t-a-zrbiy-t* / *!t-i-zrbay* 'ko carpet'. In most of these the kernel has the shape $CCCiy$. If *iy* were a reflex of /yy/ the canonical form of these kernels would be /CCCC:/, and these would be the only existing nouns with an initial vowel and a /CCCC:/ kernel. On the other hand, if we assume these nouns to have a /CCCiy/ kernels, they fall together with other nouns of the well-attested /CCCVC/ type, e.g. *!a-g^wnrid* / *!i-g^wnrad*, 'quail' *a-ħnbub* / *i-ħnbab* 'pipe'.

We devote the end of this section to a review of the cases in which a geminate glide is not realized as a vocoid, as has always been the case thus far. These cases all share the following two properties: (i) the glide involved is /ww/, which surfaces as $g^w g^w$ (*gg* in delabializing contexts); (ii) /w/ is the medial glide in a three-segment root and its gemination is due to nonconcatenative morphology. The words involved fall into four classes A to D. Below we give for each class a complete list of the words we have encountered. Class A is comprised of the three-segment verbs

⁸⁵ This is a simplification. Imdlawn Tashlhiyt actually has a few nouns built on a template $a-CVCaC$, but they all have to do with physical defects. Here is a list of all those which we have come across, with their source verb between parentheses when there is one. *!a-bukad* 'blind' (*!b(b)ukd* 'be blind'), *a-kušam* 'paralyzed' (*kušm* 'be paralysed'), *!a-bidar* 'lame' (*!b(b)idr* 'limp'), *a-šiban* 'old' (*šib* 'grow old'), *a-titaw* 'stutterer', *a-ziwal* 'cross-eyed'.

with a medial *w*. *w* becomes *g^wg^w* in all those which form their imperfective stem by geminating their second consonant, e.g. the impf stem of *rwl* ‘flee’ is *rg^wg^wl*.⁸⁶ Class B contains two *a-CC:aC* action nouns, *a-rg^wg^way* (*rwi* ‘stir’) and *a-zg^wg^way* (*zwi* ‘beat down’).⁸⁷ Class C contains the perfective stems of two ‘quality verbs’, *zg^wg^waγ* (aor *izwiγ*) ‘be red’ and *lg^wg^waγ* (aor *ilwiγ*) ‘be soft’, and the corresponding nouns *a-zg^wg^waγ* ‘red’ and *a-lg^wg^waγ* ‘soft’.⁸⁸ Finally, class D contains two singular nouns, *!a-dg^wg^wal* ‘member of the family of one’s spouse’ (p *!i-dula-n*) and *a-zg^wg^war* (p *i-zûra-n*) ‘jujube tree’. If we assume that in the singular the underlying kernels of these nouns are *!dwwal/* and */zwwar/*, the alternations between singular and plural are exactly parallel to those in other nouns such as *a-sllab / i-slba-n* ‘whip’, *a-skkif / i-skfa-n* ‘soup’.⁸⁹ In the plural kernels *!dwla/* and */zwra/* the glide can only be syllabified as a nucleus, see the preceding sections. */w/* is also syllabic in the deverbal nouns *t-a-rûla* ‘flight’ (*rwl* ‘flee’, class A above), *t-a-zuγi* ‘redness’ (*zg^wg^waγ* ‘be red’, class C) and *t-a-luγi* ‘softness’ (*lg^wg^waγ* ‘be soft’, class C).

7.5. CONCLUSION

Imdlawn Tashlhiyt has an underlying contrast between high vowels and semivowels. The contrast is neutralized next to a vowel, where underlying vowels surface as glides to avoid hiatus. In other environments, the contrast is in most cases maintained in surface forms, and the underlying glides have three manners of realization, depending on context. In some contexts they surface as high vowels, in compliance with the requirements of sonority-driven syllabification. In other contexts they surface as glides, in violation of those requirements. In yet a third class of cases, the underlying glides geminate and surface as homorganic vowel-plus-glide sequences.

As it involves epenthesis of a skeletal slot, glide gemination is analogous to the schwa epenthesis found in other dialects of Berber such as Ath Sidhar Rifian, but whereas schwa epenthesis can occur next to any consonant, in Imdlawn Tashlhiyt an empty skeletal slot can be inserted only before an underlying glide. If, as is conceivable, Tashlhiyt had in earlier times an across-the-board schwa epenthesis process analogous to that of Ath Sidhar Rifian, glide gemination is its last remaining vestige within the

⁸⁶ The other verbs in class A are *lwr* (*lg^wg^wr*), a formal variant of *rwl*, *nwa* (*ng^wg^wa*) ‘be cooked’, *rwi* (*rg^wg^wi*) ‘stir (a liquid, e.g.)’, *zwa* (*zggu*) ‘become dry’, *zwi* (*zg^wg^wi*) ‘beat down’, *!zwi* (*!zg^wg^wi*) ‘ladle’, and *zwur* or *zwar* (*zggur*) ‘be first’. The latter verb is exceptional in that it is the only CCVC verb which geminates a consonant in the imperfective.

⁸⁷ Compare with *a-bzzag* ‘swelling’ (*bzg* ‘swell’), *a-ftak* ‘sprain’ (*ftk* ‘sprain one’s X’).

⁸⁸ Compare with *!mqqur* (aor *!imγur*) ‘grow’. The nouns *a-zg^wg^waγ* ‘red’ and *a-lg^wg^waγ* ‘soft’ have regular plural forms: *i-zg^wg^waγ-n* and *i-lg^wg^waγ-n*.

⁸⁹ But */ww/* does not surface as a stop in *!a-duwar* ‘village’ (*!dwwar/*; p *!i-dura-n*).

phonological component, but this is irrelevant from the point of view of language typology: whatever the situation in other dialects or in earlier stages of Tashlhiyt, the facts of present-day Imdlawn Tashlhiyt show that there are languages in which any segment can be a syllable nucleus.

The discussion of the high vocoids ends our analysis of the syllable structure of Tashlhiyt. We have argued that in Tashlhiyt any expression (any word or sequence of words) may be exhaustively parsed into syllables meeting the following conditions, among others:

- (A) A syllable is of the form (O)N(D). The onset (O) is comprised of a single skeletal slot. The coda (D) may be comprised of two skeletal slots if these belong to the same geminate.
- (B) The nucleus (N) is comprised of a single skeletal slot. It may be associated with any segment (feature bundle).

Let us briefly recapitulate the evidence for (A) and (B). Part of the evidence in support of (A) comes from poetry (text-to-tune alignment, with its distinction between light and heavy syllables); the remaining evidence is provided by two morphologically-governed alternations (imperfective gemination, causative prefix lengthening).

Proposition (B) goes hand in hand with our contention that none of the short vocoids which one hears in Imdlawn Tashlhiyt is a vowel (a syllabic vocoid). In fact, we claim that these vocoids are not even segments, i.e. they do not have a skeletal slot of their own.

Our evidence in favor of that claim is twofold. On the one hand, there are phonological processes which operate only on adjacent segments (fusion, regressive devoicing). In Imdlawn Tashlhiyt these processes are only blocked when the two consonants are separated by a full vowel, whereas in Ath Sidhar Rifian, a Berber dialect with genuine epenthetic vowels, consonant sequences which are broken up by vowel epenthesis are rendered immune to fusion and to regressive devoicing.

On the other hand, although the regularities that govern the distribution of short vocoids have not been fully worked out, those which are known only make reference to the feature content of the abutting consonants. Moreover, they do so in a manner which is more suggestive of the effects of phonetic implementation than of those of phonological epenthesis. Finally, even in Berber dialects with genuine epenthetic vowels, vowel epenthesis cannot account for all the short vocoids which are heard: in addition to *bona fide* epenthetic vowels, Ath Sidhar Rifian has transitional vocoids like those of Imdlawn Tashlhiyt.

Tashlhiyt is in close contact with Moroccan Arabic. The Moghrebian dialects of Arabic have undergone massive vowel deletions, a phenomenon attributed by many to the influence of Berber. The phonology of Moroccan Arabic is usually examined against the backdrop of the varieties of Arabic spoken further East, which have better retained the vowels

of Classical Arabic. However, our discussion of Imdlawn Tashlhiyt and Ath Sidhar Rifian has shown that two languages with very similar morphologies may nonetheless differ markedly in their syllable structures. In the next chapters we examine Moroccan Arabic in the light of what we know about its neighbour Tashlhiyt, a language which allows vowelless syllables.

CHAPTER EIGHT

SYLLABLE STRUCTURE IN MOROCCAN ARABIC

8.1. INTRODUCTION

The varieties of Berber and of Arabic spoken in Morocco have rather similar surface phonologies, e.g. their segment inventories do not differ much. Reading the literature on Moroccan Arabic (henceforth MA) might give the impression that Tashlhiyt and MA have almost identical syllable structures, at least at those levels of representation which are near the terminal representations of the phonological component. One of our aims in the forthcoming discussion is to show that such an impression would be mistaken. Our outline of the syllable structure of MA in surface representations will be detailed enough to allow us to point out the basic differences with Tashlhiyt. It is also meant as an original contribution, both factual and analytic, to the study of MA phonology.

The facts which could lead one to suspect virtually identical syllable structures in MA and in Tashlhiyt come from two areas, transcriptional practice and versification.

As already noted in Chapter 6, the transcriptions commonly used for MA and those used in works on various Moroccan dialects of Berber show very similar restrictions on consonant clusters and on the occurrences of the unstable vowel. In some of these works, furthermore, these transcriptions are accompanied by phonetic facts analogous with those we have adduced as evidence in favor of our analysis of syllabification in Imdlawn Tashlhiyt. For instance Harrell (1962a) notes that MA allows relatively long voiceless stretches of speech. He illustrates his point with ‘an utterance of seven syllables of which the first six are voiceless in ordinary conversational delivery’, which he transcribes /xəṣṣək tɛttəʃ fəssəttə/.¹ On the basis of similar facts, Durand (1995/96) claims that short voiced vocoids, when they are present at all, are but phonetic manifestations of the syllabicity of an adjacent consonant. In his view, the word meaning ‘he wrote’, which is pronounced [kt@b], is a monosyllable /ktb/ in which the nucleus is /b/.

The second area in which the facts of Tashlhiyt and those of MA may at first sight look very similar, if not identical, is versification. In DE (1988: 10) the authors pointed out the close resemblance of syllabification in MA songs to that in Tashlhiyt. The evidence adduced was the scansion of a four line stanza from a MA song. At the end of a book devoted to versi-

¹ !xəss=ek t-fetteʃ fe=s=sett-a, in the transcription adopted here (see *infra*). The sentence means ‘you have to inspect at six o’clock’.

fication in some Moroccan dialects of Berber, Jouad (1995: 304–314) presents syllabic scansions of material drawn from several MA songs. Jouad’s transcription and his discussion give no inkling of the differences between orthometric syllabification in MA and in Tashlhiyt.

Unlike in Berber, root-and-pattern morphology of the most unmistakable sort is all-pervasive in MA, which makes it easier to discern the respective contributions of word-formation and of phonology proper in the sound pattern of the language. In particular, it provides compelling evidence for the difference between those short voiced vocoids which are associated with syllable nuclei and those which are not. Also, MA is rather uniform, in contrast with the dialectal fragmentation of Berber, which means that linguistic variation is less of an obstacle to studies based on evidence gathered from different consultants.²

Consider the form in (1) below, which means ‘you (p) were manhandled’. In (1) we give (a) a standard transcription for that form (v. below about standard transcriptions), (b) its underlying representation, (c) its actual pronunciation at a normal speech rate in the variety of MA spoken in Oujda, and (d) the syllabic parse of (c), with dots to indicate syllable edges (this syllabification will be justified later):

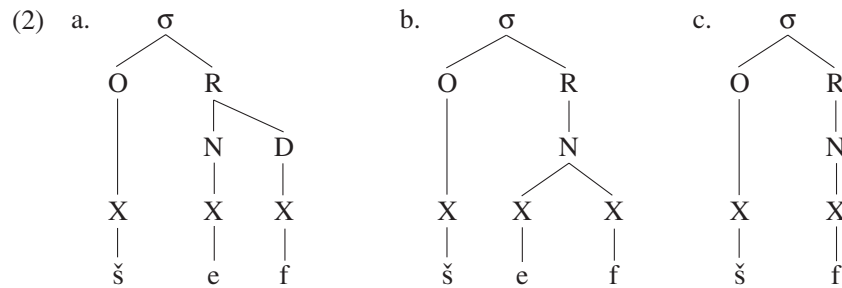
(1)	a	b	c	d
	tekšeftu	/tt-kšf-tu/	ttkš@ftu	.t.tk.š@f.tu.

We must provide an analysis which relates the underlying representation (1)b and the pronunciation (1)c. Our analysis must in particular account for the fact that the unstable vowel appears between *š* and *f* rather than between *k* and *š* or between *f* and *t*. This will be done by reference to syllable structure.

Rather than immediately present our analysis in its final form, we will go through the three stages depicted below in (2). This manner of exposition makes it easier to show exactly how each new item of data we present along the way contributes to shaping our final analysis.

In the first stage, evidence from versification will lead us to analyse the form as containing four syllables (see (1)d). We will first develop an analysis in which the third syllable, *.š@f.*, which has a voiced vocoid, represents the normal case. We will assume an intermediate representation *et.tek.šef.tu* in which every syllable contains a vowel and we will attribute the lack of any vocoid in syllables *.t.* and *.tk.* to superficial phenomena such as deletion in word-initial position or devoicing between voiceless consonants. At this point of our discussion, in syllable *šef* the rime *ef* will contain a nucleus *e* and a coda *f*, as represented in (2)a below.

² For an overview of the history and dialects of Arabic in Morocco, see Colin (1985).



However, joint consideration of phonotactics and syllable weight in versification will lead us to the conclusion that *f* actually belongs to the nucleus of *šef*. At the end of the second stage of our analysis, schwa forms a complex nucleus with the consonant which follows it, as shown in (2)b.³ Relying on this assumption, we will develop a set of constraints which go some way towards assigning syllable structure to any expression in the language. The constraints will also allow us to pinpoint some of the differences between the syllable structure of MA and that of Tashlhiyt.

In the third stage of our analysis we will reconsider the internal structure of syllables such as *šef* and suggest that their nucleus is not a complex one, after all. We will argue that the analysis with a vowel is needed only in special contexts and that in the other contexts *šef* only contains two segments, the onset *š* and the nucleus *f*, see (2)c. Except under special circumstances, the short voiced vocoids which occur immediately after onset consonants are not segments; they are mere transitions between the onset and the nucleus. We will show that this final analysis ties up in a simple way various loose ends of our second analysis.

This chapter is devoted to the stages of our discussion which are represented in (2)a and (2)b; (2)c will be the subject of Chapter 9.

This chapter is organized as follows. § 8.2 is devoted to preliminary remarks on the present state of our knowledge about the pronunciation of MA and on the nature of the data. In § 8.3 we set up an inventory of the syllable types of MA, drawing our evidence from syllabification in chanting and singing as well as from the phonotactics of words. § 8.4 shows that MA allows violations of the constraint SonPeak which cause ill-formedness in Tashlhiyt. § 8.5 provides the groundwork for a constraint-based account of word-level syllabification in MA which is consistent with the syllable inventory drawn up in § 8.3.

³ On the syllabification of postpausal consonant clusters, see § 8.3.1.

8.2. STANDARD TRANSCRIPTIONS

For MA as for Berber, in the present state of research on the phonology of the language, one important difficulty resides in the problematic nature of part of the data. In this section we attempt to draw the border between those areas of the data for which the transcriptions of MA found in various works (including the present one) are a rather direct reflection of what one can actually hear in MA speech, and those areas in which implicit assumptions about the phonology and the morphology of the language play an important role in shaping the transcriptions. Unless stated otherwise our data is drawn from the dialect spoken by ME, which is in essence that of Lmnabha, in Western Morocco, where he spent his childhood (see § 1.6).

8.2.1. *The distribution of ‘e’ in standard transcriptions*

In our discussion of MA, ‘word’ is as a rule an abbreviation for ‘Pword’.⁴ When we want to refer to syntactic words we will use the expression ‘syntactic word’ in full. For the rest, unless stated otherwise, in our discussion of MA we use the symbols for boundaries and speech sounds and the various abbreviatory conventions in the same manner as in our discussion of Berber. Besides using ‘=’ to mark the left edge of enclitics (direct object pronouns and possessive determiners) we will also use this symbol to mark the right edge of the definite article /l=/, that of prepositions whose underlying form is comprised of a single consonant, e.g. /b=/ ‘with’, and that of *u/w* ‘and’.

Like that of Ath Sidhar Rifian, the vowel inventory of MA consists of four vowels, the three full vowels /a, i, u/ and an unstable vowel *e*, whose realization depends to some extent on the nature of the surrounding segments.⁵ In the following discussion we use the letter ‘e’ with two values, depending on the context. It may be part of a ‘standard transcription’ (see below) or it may represent a vowel in a representation which we posit in the phonological component. It is commonplace for an occurrence of ‘e’ not to have a corresponding vocoid in the pronunciation. On the other hand, in this chapter as everywhere else in this book, the symbol ‘@’ always stands for an audible object, namely a short voiced vocoid.

MA has a systematic distinction between simplex consonants and their geminate counterparts, but vowels do not have an analogous length

⁴ As defined in § 2.2, a Pword is a sequence which comprises a word together with all the clitics attached to it.

⁵ Some authors posit two contrasting unstable vowels *e* and *o*. We interpret the rounded unstable vowel as a variant of *e* due to a neighboring labialized consonant, e.g. we posit *k^well* and *x^webz* where Harrell (1962b) writes *koll* (‘all’) and *xobz* (‘bread’). On this analysis, see Heath (1987: 254–263).

contrast.⁶ The reflexes of *e* in most contexts sound shorter than the full vowels. Although the full vowels are systematically recorded as long vowels by some authors,⁷ they do not give the impression of having an especially long duration. Furthermore, it will be seen later (v. § 8.3.2) that in versification, syllables ending with a full vowel always count as light, while they should count as heavy if full vowels were geminates.

As is the case in Imdlawn Tashlhiyt and in Ath Sidhar Rifian, a stop is as a rule pronounced with an audible release when it precedes a pause or a non-homorganic stop.

We will often need to set apart the unstable vowel from all the other segments. Following the terminology of Heath (1987), by a full segment we mean a full vowel or a consonant. Whereas the lexicon and morphology play a central part in determining the nature and sequential ordering of full segments in words, they play only a marginal role in determining the distribution of the unstable vowel, which is to a large extent governed by phonotactic regularities valid for all words, regardless of their morphological structure. Consider for instance the ms active participle *kateb* 'writing' and its mp counterpart *katb-in*. The lexical entry of the verb *kteb* 'write' and the morphology jointly produce the sequence /katb/ as the stem of the active participle. In the mp form /#katb-in#/ the vowel of the mp suffix /-in/ allows /tb/ to surface as a licit intervocalic cluster, hence the output *katbin*. On the other hand, in the ms form, which is the naked stem /#katb#/, *e* appears in order to avoid a word-final cluster preceded by a full vowel, an ill-formed sequence in MA, hence the surface form *kateb*.

Let us use the expression 'standard transcriptions' as a cover term for the transcription in Harrell (1962b) and similar transcriptions used in Harris (1942), Harrell and Sobelman (1966), Abdel-Massih (1973), Keegan (1986) and Youssi (1992), which do not differ much from one another as far as the distribution of the unstable vowel is concerned. According to the standard transcriptions the distribution of the unstable vowel and the consonant clusters of MA are not very different from those we have found in Rifian Berber.

⁶ By 'an analogous contrast' we mean an underlying contrast between vowels linked to one and two skeletal positions. MA actually has a surface contrast between short vowels and long ones. Sequence *iy* is realized as a long *i* when it is tautosyllabic, and so is the sequence customarily transcribed as *eyy*. Such sequences occur in *žmiyl=u* 'his little camel' and in *meyyl=u* 'he put him aside'. The two words are homophonous from *m* onwards; they both end in [mi:lu]. Similarly the following two expressions, the first a sentence and the second a noun phrase, are homophonous from *s* onwards: *ma sewwl-u=ni* 'they did not interrogate me' (v. *sewwel* 'he interrogated') and *lun kas=u w=lun=i* 'the color of his glass and my color' (color glass=3ms and=color=1s). Both expressions end in [su:luni].

⁷ For claims that the full vowels of MA are underlyingly long or geminate, see e.g. Cantineau (1950), Lowenstamm (1991), and also Kouloughli (1978) for an Arabic dialect of Eastern Algeria with facts similar to a certain extent.

As far as the full segments are concerned, standard transcriptions pose no special problem: they can be taken as ‘broad’ phonetic transcriptions, and adequate ones on the whole. Matters are different as far as the letter ‘e’ is concerned. It would be greatly mistaken to interpret the occurrences of ‘e’ in the standard transcriptions as we do those of ‘a’ or ‘i’, i.e. as consistently representing a voiced vocoid in the pronounced forms. Our position about ‘e’ is stated in (3) for later reference:

- (3) The letter ‘e’ in standard transcriptions merely indicates that the *preceding consonant* is a syllable *onset*.

In many instances the following nucleus is not (must not be) realized with a voiced vocoid; ample evidence for (3) will be provided in the next section when we examine versification. Consider again the syllabic parse *t.tk.š@f.tu* in (2)d and the corresponding standard transcription *ttekšeftu* in (2)a. The form in question contains three syllables without full vowels. The standard transcription contains no ‘e’ for the initial syllable *.t.* because it lacks an onset (*t* is a nucleus). In the two other syllables the onsets are *t* and *š*, as indicated by the location of the occurrences of ‘e’; the first ‘e’ has no corresponding voiced vocoid in the pronunciation. Rather than a stand-in for a class of speech sounds, we propose to view ‘e’ in standard transcriptions as a device for encoding constituent structure. ‘e’ is comparable to the dots used to indicate syllable edges. The analogy is not immediately apparent because as a rule the symbols used by linguists to mark constituent boundaries have the following two properties: (i) they are not letters of the alphabet, and (ii) they are located outside the strings which they delimit, e.g. the dot marking the beginning of a syllable is located before the onset, whereas ‘e’ occurs after the onset. As far as the unstable vowel is concerned, then, the standard transcription of an expression reflects more directly the syllable structure of that expression than its pronunciation. Once this is understood, discussing the distribution of *e* in the standard transcriptions is a convenient means of getting acquainted with the basic facts of syllabification in MA.

The following generalizations can be stated about the distribution of *e* in words in the standard transcriptions: (i) *e* immediately follows a consonant, and (ii) *e* is immediately followed by a CC sequence or by a word-final C; in short, *e* only occurs in closed syllables. Generalization (i) is exceptionless; generalization (ii) has a few exceptions, on which see next chapter (§ 9.5). Here are forms which illustrate the distribution of *e*.

- | | | |
|-----|-----------------------|--------------------------|
| (4) | I | II |
| a. | qerd ‘monkey’ | qerd-a ‘id, f’ |
| b. | suret ‘he locked’ | surt-u ‘they locked’ |
| c. | qeddem ‘he presented’ | qeddm-u ‘they presented’ |
| d. | dheb ‘gold’ | dehb-i ‘golden’ |

e.	!zeɣret	'he ululated'	!zɣert-u	'they ululated' ⁸
f.	tte-xleɕ	'he got scared'	tt-xelɕ-et	'she got scared'
g.	s=sder	'the jujube, col'	s=sedr-a	'the jujube, indiv'
h.	šekk	'he doubted'	šekk-u	'they doubted'

In each line in (4) the second word is formed by adding a vowel-initial suffix to the first word, in which the rightmost vowel is *e*. Except in the first and last lines, adding a vowel-initial suffix changes the distribution of *e* in the preceding stem. Some occurrences of *e* disappear, and the 'deletions' may affect other occurrences besides the rightmost, see for instance lines e and f. Furthermore the suffixed forms contain occurrences of *e* in locations where the corresponding unsuffixed form has a consonant cluster, see lines d to g.

The alternations in (4) are driven by the need to comply with certain limitations on well-formed consonant clusters. As a provisional characterization of what these limitations are, admittedly a crude one, let us accept for the moment that all occurrences of *e* present in the standard transcriptions result from the operation of the following procedure:⁹

(5) RIGHT-TO-LEFT SCAN:

Scanning the Pword from right to left, rewrite as *CeC* any *CC* string which is not immediately followed by a full vowel or by *e*. Each step in the scan must take as its input the output of the previous step.

The procedure rewrites for instance /!zɣrt/ as !zeɣret and /!zɣrt-u/ as !zɣertu ((4)e). We assume that *e* has a skeletal position of its own. The universal inseparability of geminates prevents *e* from occurring between the two halves of a geminate, and when (5) predicts that this should happen, the site of insertion is shifted before the geminate. If RIGHT-TO-LEFT SCAN operated without taking the universal inseparability of geminates into account, in (4)c-II, for instance, one would expect /qddm-u/ to yield *qdedmu*, but this is an impossible outcome because in the input /dd/ is a geminate, and we get *qeddmu* instead. As in Berber, not all the geminates are underlying. In (4)g-I, for instance, geminate inseparability causes /s=sdr/ to become *ssder*, not *sesder*. /s=sdr/ comes from a more abstract /l=sdr/, where /l=/ is the definite article, and the initial geminate results from the total

⁸ An exclamation point prefixed to a form indicates that the form contains dorsopharyngealized segments. Like Berber, MA has dorsopharyngealized coronals in the lexical representations and dorsopharyngealization spreads to the neighboring segments at the phonetic level.

⁹ This procedure was invoked in § 6.5 for Rifian Berber.

assimilation of /l=/ to the following coronal.¹⁰ The geminate *ss* is heteromorphemic, i.e. it is a single bundle of distinctive features linked to two heteromorphemic skeletal slots.¹¹

RIGHT-TO-LEFT SCAN excludes all word-final CC sequences except geminates (e.g. *šekk* in (4)h-I) and it excludes all medial and initial CCC sequences except those beginning with a geminate (e.g. *qeddmu* in (4)c-II and *ttxelʃet* in (4)f-II). The statements (6) and (7) below are logically equivalent reformulations of these predictions.

- (6) At the end of words
 - a. consonant sequences contain at most two skeletal positions;
 - b. two-position sequences are geminates.
- (7) Elsewhere than at the end of words
 - a. consonant sequences contain at most three skeletal positions;
 - b. in three-position consonant sequences, the first two positions make up a geminate.

Statements (6)a, (7)a and (7)b are factually accurate, disregarding a few cases which are either isolated or unclear.¹² On the other hand, (6)b is only a first approximation to the facts, e.g. it does not square with *qerd* 'monkey', cited in (4)a-I. This statement will be replaced by a more accurate one later on, but let us stay with (6) and (7) for the time being.

¹⁰ As a rule the definite article /l=/ completely assimilates to a following coronal contoid.

¹¹ In our transcription 's=sder' in (4)g-I a boundary symbol occurs between the two halves of a geminate. As in all other transcriptions in this book, the boundary symbols only provide information about morphemic affiliation at the skeletal tier; they do not imply anything about the organisation of the distinctive features associated with the skeletal positions. The symbol sequence 's=s' implies that we are dealing with two heteromorphemic *skeletal positions* but it does not indicate whether each skeletal position has its own associated feature bundle or whether the two positions share a single feature bundle, in other words it does not say whether we are dealing with two occurrences of simplex /s/ or with a geminate /s/. A consequence of what precedes is that when a symbol '=' or '-' is sandwiched between two occurrences of the same simplex consonant, it does not imply anything about the release of the first consonant. In fact, in all the examples below, two occurrences of the same letter with an intervening '=' or '-' represent a geminate or a sequence homophonous with a geminate. Qualifications will be added when we discuss consonant releases in the next chapter (§ 9.4).

¹² (6)a does not take into account the negative enclitic /=š/, which has no phonological effect on what precedes it (Heath 1987: 243). (7)a disregards certain prefixes which give rise to initial CCCC sequences in Harrell (1962b), as in n-tt-xelʃ-u 'for us to be scared' (p. 49), see also pp. 34, 46 and 57 for other instances. Empirical work has yet to be done on the pronunciation of such clusters as well as on their behaviour in versification, to determine their status with respect to syllable structure. The cases mentioned in this footnote will be ignored in the following discussion. Some of the counter-examples to (7)b are initial clusters analogous with those just mentioned, e.g. n-dfen 'he was buried' (Harrell 1962b: 34, see also pp. 46 and 57).

Let us assume that in MA a C is always tautosyllabic with a following V, and that intervocalic CC sequences are all heterosyllabic. Under these assumptions, RIGHT-TO-LEFT SCAN predicts that all occurrences of *e* should occur in rimes whose codas are either single skeletal slots or geminates, see, e.g., the initial syllables in *deh.bi* ((4)d-II) and in *qedd.mu* ((4)c-II).

8.2.2. *Uncontroversial schwas vs. putative ones*

We will use a standard transcription when we discuss syllabification in MA versification later in this chapter, but before we turn to versification let us explain why, as far as the unstable vowel is concerned, the standard transcriptions must not be construed as representations, however ‘broad’, of the phonetic facts. Two points must be made: (i) ‘e’ does not always have a corresponding voiced vocoid in the pronunciation, and (ii) one hears short voiced vocoids in places where no ‘e’ occurs in the standard transcriptions.

In what follows we will be in constant need to distinguish between two kinds of sequences inside words, which we will call W-final and W-internal. Here is how we define them:

(8) W-final, W-internal:

A sequence is W-final if it is contained in the last syllable of a word; it is W-internal otherwise.

Consider *n-ketb=u* ‘I write it’, in which the last syllable is *bu*. Following our definition, sequences *b* and *bu* are W-final while sequences *tb*, *ket* and *nk* are W-internal. Note that since a single segment is a sequence of length 1, we can say that the *e* in *Žaweb* ‘he answered’ is W-final, in the special sense of ‘W-final’ we have just defined. This cannot lead to any confusion with the normal sense of ‘word-final’ because *e* cannot be the last segment of a word in MA.

We can now turn to point (i), i.e. ‘e’ does not always have a corresponding voiced vocoid in the pronunciation. Let us first dwell on W-final sequences, which are the only environment in which the presence or absence of ‘e’ in the standard transcriptions is always a faithful reflection of the phonetic facts.¹³ MA has a contrast between W-final [C@C] and [CC], as in the following pairs:

¹³ Cf. Heath (1987: 243).

- | | | | | |
|--------|----------|----------------------------|---------|---------------------------|
| (9) a. | !šhet | ‘he slashed’ | !šeht | ‘slash (n)’ |
| b. | !nqes | ‘he diminished’ | !neqs | ‘shortage’ |
| c. | !zlet | ‘he ruined’ | !zelt | ‘ruin (n)’ |
| d. | !qnet | ‘he felt bored’ | !qent | ‘boredom’ |
| e. | kašf-et | ‘she guessed’ | kašef-t | ‘I guessed’ ¹⁴ |
| f. | nbet | ‘he pushed’ | neb-t | ‘I acted as a proxy’ |
| g. | !besl=ek | ‘your onion’ ¹⁵ | b=selk | ‘with a wire’ |

A voiced vocoid must be pronounced immediately before the final consonant in the forms on the left, whereas no voiced vocoid may separate the last two consonants in the forms on the right. Except in the last two pairs, we have chosen examples in which the last two consonants are homorganic or both voiceless. There are two reasons for our choice. First, voiced vocoids, even very short ones, are particularly easy to hear when they break up such clusters. Second, preliminary observations on the pronunciation of the varieties of MA spoken in Oujda and in Lmnabha suggest that these clusters never give rise to voiced transitional vocoids, i.e. to voiced vocoids which are not segments in their own right, but rather mere transitions between segments (see below).

The phonetic difference between *CCeC* and *CeCC* is often not as straightforward as in the examples in (9). Consider for instance *dleḥ* ‘he wandered’ and *šelḥ* ‘Ashlhiy’. The release of *l* is accompanied by glottal vibrations in both words. In *dleḥ* the release is the beginning of a vocoid which is auditorily more salient than *l*. In *šelḥ*, on the other hand, the voiced vocoid between *l* and *ḥ* gives the impression of having a shorter duration than the preceding sonorant, which carries the main part of the pitch contour on the word. The short vocoid which one hears between *l* and *ḥ* in *šelḥ* is merely a transition from one consonant to the next.

Examples (9)a–d illustrate the well-known contrast between *CCeC* forms and *CeCC* forms. The *CCeC* forms comprise the citation forms of all the triconsonantal ‘strong’ verbs and some nouns.¹⁶ On the other hand the *CeCC* forms are mostly nouns, some of them derived from *CCeC* verbs, as in (9)a–d.¹⁷ (9)e exemplifies the contrast between the 3fs perfective suffix, which must be pronounced with a schwa in most environments, and its 1s counterpart, which may not. The last pair in (9) illustrates the fact that the 2s clitic must be pronounced with a schwa in most environments. The

¹⁴ Cf. *kašef* ‘he guessed’.

¹⁵ Cf. *!bsel* ‘onion’.

¹⁶ The citation forms of verbs are their perfective 3ms forms, which are naked stems.

¹⁷ Contrary to what the examples in (9) might suggest, *CeCC* nouns do not all contain an emphatic consonant, nor do they all end in a voiceless coronal obstruent, e.g. *qelb* ‘heart’, *šelḥ* ‘Ashlhiy’, *kehḥ* ‘cave’, *šenq* ‘hanging’, *mesk* ‘musk’. On the contrast between *CCeC* and *CeCC* in MA nouns, see Amimi and Bohas (1996) and Zeroual (2000).

contrast between [CC] and [C@C] at the end of a word exists in all varieties of Arabic spoken in Morocco.

We turn next to sequences which are not W-final. It may be that the standard transcriptions adequately represent syllable structure at an abstract level, but elsewhere than at the end of words they are not to be taken as accurate depictions of the sequencing of vocoids and contoids at the phonetic level. This has already been pointed out by some authors.

Mitchell (1993: 60ff) begins his discussion of consonant clusters in MA with remarks on the problems one runs into when one tries to identify consonant clusters in the first place. According to Mitchell one difference between MA and varieties of Arabic spoken further east is that in MA the phonetic differences between *CC* clusters and *C@C* sequences are rather elusive in many contexts, a difference that he ascribes to the influence of Berber. Take for instance the MA expressions meaning 'the shoulder' and 'his shoulder', pronounced in isolation at normal tempo. Most authors writing about MA would respectively transcribe them as *le=ktef* and *ketf=u*. Mitchell notes that the different occurrences of *e* in these transcriptions have quite different phonetic correlates. While a voiced vocoid is clearly audible between *t* and *f* in *lektef*, none occurs between *k* and *t* in *ketfu*. In *ketfu* the unstable vowel is only manifested by a 'voiceless, very rapid, barely audible transition' (p. 62), which is nonetheless different, according to Mitchell, from 'the closer, inaudible passage from /k/ to /t/ in *lektef*' (p. 62). Mitchell does not voice any objection against postulating a phonological vowel after the first consonant in *ketfu* and *lektef*, as long as it is clear that 'from a phonetic point of view, these [forms] are typically pronounced with [initial] three-consonant clusters' (p. 62).

In a similar vein, Heath (1987: 266) writes that in the form meaning 'they wrote', which other authors would represent as *ketb-u*, with a vowel between *k* and *t*, his judgement is that in the variety of MA spoken in the Fes/Meknes region 'the transition [between *k* and *t*] does not constitute a true surface segment; rather, it is simply the minimally necessary articulatory transition between segments'. He goes on to remark that no transition at all can be heard in analogous forms involving fricatives, e.g. he cannot hear any difference between the beginning of the form meaning 'they got drunk', which other authors would transcribe as *sekr-u*, and that of Eng. *screw*.¹⁸ To give an example of our own, we cannot hear any difference between the sequence noted *ket* in *ma ketr-u=š* 'they have not been numerous' and *kt* in those Parisian pronunciations of the French word *actrice* [aktʁis] 'actress' in which the closure of *k* is released before that of *t* begins. Some authors have ascribed instances like these to the devoicing of the unstable vowel between voiceless consonants, see for example Harrell (1962a).

¹⁸ Durand (1994, 1995/96) also insists that many schwas in the transcriptions do not correspond to any vocoid.

Other instances of surface clusters have been seen as resulting from the absorption of the unstable vowel by a neighboring sonorant which becomes a syllable nucleus, see e.g. Harris (1942), Harrell (1962a), Heath (1987). *!tenz* 'haste' may for instance be pronounced [!t@nz] or [!tnz]. In the latter realization the oral closure is maintained throughout the articulation of [tn] and [t] is pronounced with nasal plosion. We chose an example which involves a sequence of homorganic stops because auditory and/or kinesthetic detection of an intervening vocoid is easiest in such sequences. As already stated in § 6.3.2, we often find it difficult to ascertain the presence of an intervening vocoid in other CR sequences (R represents a nasal or a liquid), e.g. between [q] and [n] in *!qent* 'boredom' or between [z] and [m] in *zemt* 'choking'. It would be cumbersome constantly to remind the readers of this uncertainty in our narrow phonetic transcriptions. We will adopt a special convention about the narrow transcription of CR sequences in which the two consonants are not homorganic noncontinuants. When such a sequence occurs before a consonant or a pause we uniformly represent its pronunciation as [CR] without thereby implying the absence of a short voiced vocoid between the two consonants. We will for instance represent the pronunciations of *!qent* and *zemt* as [!qnt] and [zmt]. The transcription '[!qnt]' makes no commitment as to the presence of a voiced vocoid between [q] and [n], because it falls in the purview of our convention. In '[!tnz]', on the other hand, the adjacency of 't' and 'n' implies that there is no intervening vocoid, for that transcription is not concerned by our convention.

The problem with the standard transcriptions is not that they do not faithfully record consonant clustering at the phonetic level. It is that their relation to the phonetic facts is not known, because at present the phonetic facts themselves are to a great extent a *terra incognita*, at least those pertaining to consonant clustering in W-internal sequences. How little we actually know at present about the surface distribution of short vocoids in MA is concealed by the fact that most authors writing on MA take the standard transcriptions for granted.¹⁹

Dialectal variation is one important factor in the confused state of our present knowledge.²⁰ In Morocco as in other parts of the Arab world, the language used in teaching and in most formal aspects of public life is Classical Arabic, a language which has no native speakers. In the colloquial language dialectal variation is found primarily in the lexicon and in minor aspects of the phonology. Unlike in Berber, linguistic variation in MA is never an obstacle to intercomprehension. As far as phonology is concerned, there is as yet nothing which could be called Common Moroccan

¹⁹ In dubious cases, the facts are sometimes inferred from other cases, rather than ascertained by direct observation, see note 4 in Kaye (1987: 158) for an example.

²⁰ On the language situation in Morocco, see Boukous (1995).

Arabic, although such a dialect may be gradually emerging now in Casablanca and Rabat. The discrepancy between W-internal occurrences of 'e' in the standard transcriptions and short vocoids in the actual pronunciation varies across dialects. It is greater in the cities of Casablanca and Rabat and in Southern MA (the area comprising Marrakesh and Taroudant), and lesser in North-Eastern MA and in the so-called Aroubi dialects spoken in the countryside around Casablanca and Rabat.

Dialectal differences involving the unstable vowels are not merely a matter of phonetic implementation, as shown by certain systematic differences we have observed between the dialect of Oujda, in North-Eastern Morocco, and the Beduin dialect of Lmnabha, to the East of Taroudant. There is a wider gamut of surface contrasts between *CCeC* and *CeCC* in Oujda than in Lmnabha.²¹ Let 'O' stand for an obstruent and 'R' stand for a liquid or a nasal. Let us compare the possibilities of contrast between /CCeO/ and /CeCO/ sequences in the two dialects, depending on whether the medial C is a sonorant or an obstruent. In the two minimal pairs below, which exist in both dialects, the first item is a verb and the second is an action noun derived from that verb:

- (10) a. !dreb 'he struck' !derb 'striking'
 b. !sxet 'he cursed' !sxt 'cursing'

Consider now the related forms with the suffix *-u* (3p) and the possessive clitic *=u* (3ms). In both dialects the contrast is neutralized regardless of the nature of the medial consonant. Here are the forms in the Oujda dialect. The necessity of avoiding occurrences of schwa in open syllables is what seems to motivate the apparent metathesis in the verbal forms.

- (11) a. !derb-u 'they struck' !derb=u 'his striking'
 b. !sxt-u 'they cursed' !sxt=u 'his cursing'

Whereas the Lmnabha pronunciations of the forms in (11)a do not differ audibly from their pronunciations in Oujda, the forms in (11)b are not pronounced alike in the two dialects. Whereas glottal vibrations may occur between the first two consonants in the Oujda pronunciation, none may occur in Lmnabha and one hears [!sxtu].

Consider next analogous forms with the suffix *-na* (1p) and the possessive clitic *=na* (1p). In Oujda the contrast is maintained in both pairs:

- (12) a. !dreb-na 'we struck' !derb=na 'our striking'
 b. !sxet-na 'we cursed' !sxt=na 'our cursing'

The Lmnabha dialect, on the other hand, has contrast (12)a but not contrast (12)b. In Lmnabha the two forms in (12)b are homophonous. They are

²¹ We thank Chakir Zeroual for answering our questions about the Oujda dialect.

pronounced as [!sxtna], with no glottal vibrations before the onset of the nasal consonant.

To sum up: Lmnabha allows a narrower range of surface contrasts than Oujda in W-internal sequences. Immediately before CV, sequences *CReO* and *CeRO* contrast in both dialects, whereas a contrast between *COeO* and *CeOO* exists in Oujda but not in Lmnabha.

We now dwell briefly on the second type of discrepancy between standard transcriptions of MA and the distribution of voiced vocoids at the phonetic level: certain short voiced vocoids are systematically glossed over in the standard transcriptions, even though they do not seem to be phonetically different from others which are instances of the unstable vowel. Two examples will suffice, which are valid both in Oujda and in Lmnabha. The expression /f=l=dbiz/ 'in futility' would standardly be transcribed as *feddbiz*, and yet *dd* and *b* are separated by a short voiced vocoid which is no less audible than that between *f* and *dd*. As our second example, consider the forms meaning 'he diminished' and 'we diminished', respectively *!nqes* and *!nqes-na* in the standard transcriptions. It is plain that a voiced vocoid separates the oral release of *n* from the closure of *q*. One hears [!n@q@s] and [!n@q@sna].

The reasons why the standard transcriptions are selective in the short vocoids they note are usually not made explicit, but they are not hard to find. The standard transcriptions are to a certain extent embodiments of analyses which relate the phonetic facts to certain morphological regularities. The notation '*!nqes*' rather than '*!neqes*' for 'he diminished' is based on the recognition that the form in question is parallel to the 3ms perfective forms of other triliteral strong verbs, e.g. *kreb* 'he wrote' or *!šhet* 'he slashed', and on the assumption that the occurrence of a short vocoid between the first two consonants in *!nqes* is a superficial phenomenon tied to the particular consonants involved.²² A similar case can presumably be made for the short vocoid which occurs between *dd* and *b* in *feddbiz*, our other example. *ddbiz* (/l=dbiz/) is the definite form of a CCiC action noun derived from *dbez* 'fool around'. Whether a short voiced vocoid occurs between the first two consonants in analogous forms derived from other verbs depends on the nature of these consonants. No such vocoid can for instance be heard between *šš* and *t* in *!šštiḥ* (/l=!štiḥ/), from *!šteḥ* 'dance', or between *nn* and *t* in *nntif* (/l=ntif/), from *ntef* 'pluck (feathers)'.

Our preliminary observations on the varieties of MA spoken in Lmnabha and in Oujda suggest that the short voiced vocoids not recorded by the standard transcriptions occur in the same types of clusters as give rise to

²² V. Heath (1987: 251, 263–265) for passages where such assumptions are made explicit. V. also Mitchell, who writes (1993: 68): '[-ə- may be less of a phonetic segment in a given case than a phonological fiction recognized [. . .] with a view of facilitating the formulation of general structural patterns'.

transitional vocoids in Imdlawn Tashlhiyt, e.g. they regularly occur in sequences of two heterorganic stops the second of which is voiced.²³ Pending systematic research, one may speculate that MA could be like Ath Sidhar Rifian in that it would possess short voiced vocoids of two kinds: some would be vowels, i.e. syllable nuclei, while others would not be segments in their own right; they would be mere transitions between segments.

Let us assume that at some level of representation not too far removed from the surface all syllable nuclei in MA are vowels. Depending on how much is known at present about them, one can distinguish between two types of vowels in MA, which we shall henceforth refer to as the 'uncontroversial' vowels and the 'putative' ones. The uncontroversial vowels comprise all the full vowels, all the W-final schwas as well as some W-internal ones such as those in (12)a. We call these vowels uncontroversial because the evidence as to their location in strings is clearcut. The uncontroversial schwas give rise to surface contrasts like those in (9), (10) and (12). The other syllable nuclei are what we call the 'putative' vowels. Given what is presently known about the pronunciation of MA and about syllable structure in other languages, the claim that W-internal occurrences of 'e' in standard transcriptions mirror exactly the distribution of the unstable vowel in (near-) surface representations is only a plausible surmise, and empirical evidence is needed before this surmise can be turned into an established fact. The required evidence will be presented in the next section.

8.3. THE STRUCTURE OF SYLLABLES IN MA

In this section we propose an analysis of the internal structure of syllables in MA. Our evidence is drawn primarily from chanting and singing. The data of orthometric syllabification allow us to substantiate the claim we made in (3) about the proper interpretation of 'e' in standard transcriptions, a claim which may be formulated more precisely as follows: the letter 'e' occurs if and only if the preceding consonant is an onset in a syllable which does not contain a full vowel. Orthometric syllabification shows that in word-initial clusters all the consonants but the last one belong to a rime. Syllable weight distinctions in versification lead us to the conclusion that some consonants belong to a syllable nucleus. Finally, orthometric syllabification agrees by and large with the syllable structures which can independently be inferred from the distribution of vowels and consonants in the standard transcriptions.

²³ See Chapter 6.

8.3.1. *Hinge syllables; syllable-final schwas*

Versification provides us with a rich source of evidence about the syllable structure of MA at a surface level. The MA material examined below will be presented using the standard transcriptions, but only the consonants and the uncontroversial vowels will play a crucial role in our aligning the linguistic material with the metrical patterns imposed by versification. In this subsection we first show that putative ‘e’s in the transcriptions only occur in locations where verse structure requires syllable nuclei. This fact is strong evidence that the surmise in the last paragraph of the preceding section is basically correct.²⁴

Although the unstable vowel always occurs in closed syllables when words are considered in isolation, it sometimes occurs in an open syllable as a result of resyllabification across a word boundary. In the latter part of this subsection we make use of this phenomenon to highlight the difference between MA, which has an unstable vowel, and Tashlhiyt, which does not.

We give below the text of a nursery rhyme which is well-known in the Marrakesh-Taroudant area and in Oujda. We first give the text and its translation.

- (13)
1. !bid-a !bid-a lillah
 2. b=aš n-zewweq luḥ-t=i
 3. u=luḥ-t=i ʕend !taleb²⁵
 4. !we²⁶=t=taleb fe=ž=ženn-a²⁷
 5. we=ž=ženn-a me-ḥlul-a
 6. ḥellel=ha mula=na
 7. mula=na mula=na
 8. la !te-qteʕ !rža=na
 9. fi sabil m^wḥammed²⁸
 10. muḥammed !we=sḥab=u
 11. fe=ž=ženn-a !ye-nsab-u

²⁴ In our special use of ‘uncontroversial’ and ‘putative’, these adjectives are predicated of vowels, i.e. of phonological objects, but for the sake of convenience we will allow ourselves to predicate them also of letters in transcriptions, e.g. we shall say that, of the two occurrences of ‘e’ in !besl=ek ‘your onion’ ((9)g), the first is putative and the second is uncontroversial.

²⁵ !taleb, caretaker of a mosque; often acts as a schoolteacher.

²⁶ u ‘and’ has a free variant w before a consonant cluster.

²⁷ The initial geminates in !t=taleb and ž=ženna result from the assimilation of the definite article /l=/ to the following coronal: /l=!taleb/, /l=ženna/. Henceforth in all surface sequences of the form #K=K or =K=K in which the two ‘K’s represent the same coronal, the first ‘K’ represents the assimilated variant of the definite article. ‘K=K’ represents a heteromorphemic geminate, i.e. two heteromorphemic skeletal positions linked with the same bundle of distinctive features.

²⁸ Variant of muḥammed, see following line.

- (14)
1. Egg, egg, for God's sake
 2. With what could I decorate my writing tablet?
 3. And my writing tablet is with a teacher
 4. And the teacher is in Paradise
 5. And Paradise is open
 6. Our Lord made it accessible
 7. Our Lord, our Lord
 8. Do not shatter our hope
 9. In Muhammad's way
 10. Muhammad and his companions
 11. In Paradise they are dwelling

When the nursery rhyme is performed, it is chanted in such a way as to make the syllables coincide with beats in a rhythmic pattern. All lines are chanted to the same pattern, which is represented in (15), with the text of the first line aligned underneath.²⁹

- (15)
- | | | | | | | | |
|----|----|----|----|-----|---|-----|---------------|
| * | | * | | * | | * | |
| * | * | * | * | * | * | * | * |
| bi | da | bi | da | lil | | lah | ³⁰ |

In (15) the stars in the bottom line represent points in time separated by equal durations; items which are vertically aligned are simultaneous. Columns with two stars represent strong beats. Every line in the nursery rhyme is six syllable long. The first five syllables are evenly spaced in time, and so are the first, third, fifth and sixth syllables, which occur on strong beats.³¹ The last syllable of one line and the first syllable in the following line are aligned with successive strong beats.

The alignment of each line of the text in (13) with the rhythmic pattern in (15) is given below.

- (16)
- | | | | | | | | |
|----|-----|-----|-----|------|-----|---|-----|
| | * | | * | | * | | * |
| | * | * | * | * | * | * | * |
| 1. | bi | da | bi | da | lil | | lah |
| 2. | ba | š#n | zew | weq | luħ | | ti |
| 3. | u | luħ | ti | ʕend | ta | | leb |
| 4. | wet | ta | leb | fež | žen | | na |

²⁹ On the use of 'metrical grids' such as (15) to represent musical rhythm, v. Lerdahl and Jackendoff (1983).

³⁰ Here and below we omit from the syllabic parses the exclamation points representing emphasis.

³¹ The rhythmic pattern of the chant is the same as that of the first line of the well-known French song 'Au clair de la lune' (v. § 4.3). Here is that line, with the strong beats indicated by capitals: *AU clair DE la LU-NE*.

5.	wež	žen	na	meħ	lu	la
6.	ħel	lel	ha	mu	la	na
7.	mu	la	na	mu	la	na
8.	la	teq	te	ʕ#r	ža	na
9.	fi	sa	bi	l#m^w	ħam	med
10.	mu	ħam	med	wes	ħa	bu
11.	fež	žen	na	yen	sa	bu

For the sake of conspicuity we have highlighted every putative vowel together with the consonant which immediately precedes it. The information displayed in (16) is a mixture of observed facts and of inferences based on the examination of a larger corpus of MA verse. The empirical observations concern the rhythmic alignment of onset consonants and that of uncontroversial vowels, while the inferences concern the coda consonants. Let us first dwell on the empirical observations embodied in (16).

What the rhythmic delivery of the nursery rhyme allows us to observe is that every line is divided up into six successive chunks and that every chunk contains an uncontroversial vowel together with the consonant which immediately precedes it, or it contains a consonant which immediately precedes a putative vowel. (16) contains two kinds of putative vowels, some represented by a highlighted ‘e’, others by a ‘#’ sign. Let us look at these in turn.

For every occurrence of a highlighted ‘e’ in the transcription in (16) there is a corresponding syllable nucleus in the phonological string. If, as proposed at the end of the preceding section, we assume that all syllable nuclei in MA are vowels, (16) is one piece of evidence suggesting that like the W-final occurrences of ‘e’, the W-internal occurrences all correspond to vowels in the phonological string.

Let us now turn to the nuclei represented by ‘#’. When a word ending in a consonant is immediately followed by another beginning with a consonant cluster, a syllable straddling the two words is formed. In line 2, for instance, *b=aš#n-zewweq* is parsed as *ba.š#n.zew.weq*, with the second syllable straddling the two words. We call ‘hinge syllables’ the syllables which straddle two words and we say that a syllable is ‘hollow’ when it does not contain a full vowel. *š#n* is a hollow hinge syllable. Let us assume that like those of Tashlhiyt, the syllables of MA do not allow complex onsets.³² Forming hollow hinge syllables such as *š#n* is a way to avoid complex onsets while leaving no segment unsyllabified. Under our assump-

³² Cantineau (1960: 118–119) suggests that there are no complex onsets inside words in the modern dialects of Arabic. In his detailed and insightful discussion of the phonology of a Bedouin dialect of Eastern Algeria, Kouloughli (1978: 104ff., 256ff.) gives several arguments leading to the same conclusion. Some of his evidence is drawn from versification in songs.

tion that all syllable nuclei in MA are vowels, every # in (16) actually stands for a vowel. The phonetic manifestations of # nuclei are at present as murky as those of other putative vowels. It would be consistent to use the letter 'e' to represent the nuclei of hinge syllables in our parses of MA poetry, but for the sake of conspicuity we will continue to note these nuclei as #.

Hinge syllables occur as well in nonpoetic speech styles, witness the following pairs of homophonous expressions:

- | | |
|--------------------|--|
| (17) a. qlib argan | 'overturning of the argan trees' ³³ |
| a'. qli b=argan | 'fry with argan oil!' |
| b. mat !ħmar | 'a donkey is dead' |
| b'. ma !te-ħmar | 'you will not blush' ³⁴ |
| c. žab džāž-a | 'he brought a hen' |
| c'. ža be=džāž-a | 'he came with a hen' |
| d. žab džāž-a | 'he brought a hen' (v. item c above) |
| d'. žabed žāž-a | 'pulling a window pane' |
| e. !šerm !l=gansa | 'a rip in the gizzard' ³⁵ |
| e'. !šermel !gansa | 'he put dressing on a gizzard' |

In each pair we are comparing two pronunciations of a certain sequence of segments, e.g. /ba/ in pair (17)a–a'. The sequence in question straddles a word boundary in the first member of each pair but not in the second. In the first pair the nucleus of the hinge syllable is a full vowel. The hinge syllables involved in the other pairs are hollow ones. Pairs b–b' and c–c' illustrate the fact that *C#CCV* is homophonous with *#CeCCV*. Pairs d–d' and e–e' illustrate the fact that in certain contexts, at a normal speech rate, *C#CCV* is homophonous with *CeC#CV*.³⁶

These remarks on hinge syllables conclude what we have to say about those aspects of table (16) which are observed facts. We now turn to the information in (16) which is not derived from direct observation. This information concerns the consonants which do not immediately precede a vowel, e.g. *ħ* in *luħti* in line 3. We have not tried to observe how chanting apportions these consonants between successive chunks. Our decision to group them with the preceding vowel rather than with the following consonant is in accordance with our assumption that complex onsets are not allowed.

We have stated at the outset that *e* does not occur in open syllables. It is not surprising, then, that in (16) every *e* but one is followed by a

³³ *qlib* is a noun derived from *qleb* 'overturn'.

³⁴ As, e.g., in *ma !te-ħmar ma te-sfar* 'you will neither blush nor turn pale'.

³⁵ *!šerm* is a noun derived from the verb *!šrem* 'tear, rip'.

³⁶ In very deliberate speech, or if the speaker intends to put special emphasis on the first word, the homophony disappears in example d', see next chapter (§ 9.2).

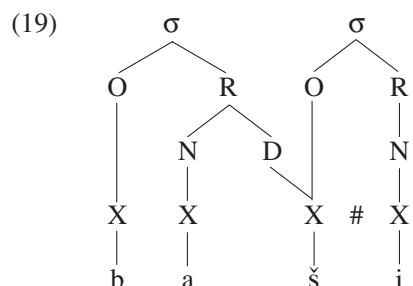
tautosyllabic consonant. The one occurrence of *e* which is in an open syllable is the W-final *e* in *!teqteʕ*, in the third syllable in line 8.

The sequence *teʕ#rža* gives rise to a hinge syllable; W-final *ʕ* becomes the onset of a syllable which has word-initial *r* as its coda. Let us assume that in MA, syllabification operates in successive stages defined by more inclusive domains, two such domains being the word and the line. */ʕ/* is syllabified as a coda at the word level (*.teq.teʕ.*) and it is later resyllabified as an onset when the successive words in a line form a single syllabification domain: *teq.te.ʕ#r.ža.na*. This example is but one instance of a general fact of MA poetry: at the line level, W-final schwas can occur in an open syllable as a result of resyllabification, and in this they behave just like the full vowels, see e.g. *a* in *ba.š#n*, in line 2. In the present case (*teʕ#rža*) the hinge syllable resulting from resyllabification happens to be a hollow syllable, but the consonant in a word-final *eC* sequence can become an onset to a full vowel as well, e.g. when *!rža=na* is replaced with *amal=i* ‘my hope’ in line 8, the resulting line ends in *te.ʕa.ma.li*, which is still perfectly suited to the rhythmic pattern (15).

When a word-final consonant is parsed as an onset, we assume that this is a result of resyllabification rather than ambisyllabicity. To see what we mean by this, let us use as an example the sequence which results when in line 2 of (13) the 1s imperfective verb *n-zewweq* is replaced by its 3ms counterpart *i-zewweq*. The resulting sequence, which is a well-formed line, is shown in (18)a below and its scansion is shown in (18)b:

- (18) a. b=aš i-zewweq luḥ-t=i
b. ba.ši.zew.weq.luḥ.ti

Consider *š* in *ba.ši* in (18)b. The skeletal position of *š* is first made a coda to the preceding vowel by word-level syllabification; line-level syllabification subsequently deletes the grouping of *š* with the preceding *a* and turns *š* into an onset to the following *i*. Alternatively one could assume that *š* is ambisyllabic, i.e. that there exists a level of representation at which *š* is both a coda in one syllable and an onset in the following syllable. The skeletal position of *š* would be contained in two overlapping syllables, as represented in (19):



This view is inconsistent with the framework adopted until now, in which syllables do not overlap, and it would lead to an incorrect prediction about syllable weight in the syllabification of CVC#C sequences in versification. We shall see later that in poetry, when V is a full vowel, CV syllables count as light whereas CVC syllables count as heavy. If a word-final C retained its status as a coda when it is resyllabified as an onset, as diagrammed in (19), word-final CVC strings in which V is a full vowel would always count as heavy syllables no matter what follows. In fact, in the parse of /CVC#V/ as CV.CV in verse, the first syllable always counts as light.³⁷

Let us revert to sequences like *te.ʕ#r* in line 8 of (16). *e* is indeed in a closed syllable when we consider syllabification at the word level (*.teʕ*), but we know of no evidence which would suggest that in such sequences *e* is still in a closed syllable when we consider syllabification at the line-level. Indeed, such syllables always count as light in poetic scansion.³⁸

Parse *te.ʕ#r* and the like are dramatic illustrations of the difference between MA, which has an unstable vowel, and Imdlawn Tashlhiyt, which does not have any. The difference can be brought home in an even more striking manner by devising similar sequences of segments in MA and in Tashlhiyt and looking at how they align to the same rhythmic pattern. Tashlhiyt happens to have a ‘trick or treat’ nursery rhyme which is chanted to the same rhythmic pattern as the MA nursery rhyme in (13). Let us first give the text of the nursery rhyme and its translation.

- (20) a. a-k^wndrris a-šwiḥ
 b. yan=ax=t=id ur i-fki-n
 c. ar !i-tt-zzig t-a-ydi-t
 d. ar i-ss-ndu γ=u-ḥlas
- (21) a. Meatballs,³⁹ rag
 b. He who does not give us any
 c. Let him milk a bitch
 d. And churn the milk in a packsaddle⁴⁰

Here is how the nursery rhyme must be chanted:

- (22)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| * | | * | | * | | * | |
| * | * | * | * | * | * | * | * |
- | | | | | | | |
|----|----|------------------|----|-----|-----|-----|
| a. | a | k ^w n | dr | ri | saš | wiḥ |
| b. | ya | nax | ti | du | rif | kin |
| c. | a | rit | tz | zig | tay | dit |
| d. | a | ris | sn | du | γuḥ | las |

³⁷ See for instance the second syllable in lines 2a and 3a in (30) below.

³⁸ See for instance the second syllable in line 11b in (31) below.

³⁹ More precisely, balls made with dried tripe.

⁴⁰ With the hollow facing up.

We want to compare line 8 of the MA nursery rhyme in (13) with a similar sequence in Imdlawn Tashlhiyt. The crucial word in that line is *!teqteʕ*, where the final consonant happens to be *ʕ*, a consonant with a very limited distribution in Imdlawn Tashlhiyt. To compare strings which are as similar as possible, let us replace *qteʕ* in line 8 by another verb, e.g. by *nsef* ‘undermine’. The resulting sequence is also a well-formed line:

(23) la te-nsef !rža=na⁴¹

We will compare the scansion of (23) in MA with that of the following Tashlhiyt sequence:

(24) ra y-nšf rbu-n=t=id⁴²

Let us align the syllabic parse of (23) in MA with that of (24) in Tashlhiyt:

(25) a.	(23)	MA	la	ten	se	f#r	ža	na
b.	(24)	Tash	ra	ynš		fr	bun	tid
c.	*(24)		ra	yn	š_	fr	bun	tid

As can be seen in (25)b, the Tashlhiyt sequence in (24) only has five syllables and cannot be chanted to the rhythm of (15) and (22). (25)c aligns the segments in (24) with those in the MA line in (23) so as to highlight the crucial difference between the two sequences. The underscore in (25)c indicates the segment whose absence makes (24) shorter by one syllable than (23): the last two consonants in the MA verb *te-nsef* in (23) are separated by a vowel, whereas the last two consonants in the Tashlhiyt verb *y-nšf* in (24) are not. In (23) a voiced vocoid must be pronounced between *s* and *f* in *te-nsef* even if the sentence is uttered in a style of diction appropriate in everyday conversation.

Finally, consider the following Tashlhiyt sequence:

(26) ra y=nsr fl-n=as=t=id⁴³

(26) has one more syllable than the Tashlhiyt sequence (24) because the presence of *r* between *s* and *f* in (26) yields one more sonority peak. This is made clear in (27), where (26) is aligned with (23) and (24).

(27) a.	(23)	MA	la	ten	se	f#r	ža	na
b.	(24)	Tash	ra	ynš		fr	bun	tid
c.	(26)	Tash	ra	yn	sr	fl	nas	tid

⁴¹ neg 3fs:impf-undermine hope=1p.

⁴² fut 3ms-graze carry:aor-3mp=do3ms=dir, ‘he will graze (his skin) and they will carry him on their backs’. In the underlying representation the line begins with /rad i-nšf/. The alternations involving the final consonant of the future marker /rad/ are described in DE (1989: 188–190).

⁴³ fut 3ms-graze leave:aor-3mp=dat3s=do3ms=dir, ‘he will graze (his skin) and they will leave it (m) with him’. *nsr* is synonymous with *nšf* in (24).

Let us sum up our discussion of the two nursery rhymes. Our comparison illustrates the following difference between the two languages: In MA, but not in Tashlhiyt, a hollow syllable occurring inside a word sequence may contain a single consonant, see e.g. .s@. in (27)a. Such syllables are made possible in MA by the fact that MA has a fourth vowel in addition to the full vowels /a, i, u/. In Tashlhiyt, on the other hand, there is no vowel schwa and consequently hollow syllables which are not postpausal must contain at least two consonants.

8.3.2. *Inventory of syllable types*

In this subsection we draw up an inventory of the syllable types occurring in orthometric syllabification. This inventory coincides with that which can independently be inferred from the distribution of vowels and consonants in standard transcriptions.

Like Tashlhiyt, MA distinguishes between light and heavy syllables. We now turn to a song which makes systematic use of this distinction, unlike the nursery rhyme in (16). The song belongs to a genre of singing called *melhun*, which is widely known throughout Morocco and in Algeria.⁴⁴ The *melhun* tunes have their own distinctive musical style.⁴⁵ The language of the lyrics comprises many lexical items used only in singing.⁴⁶ Apart from occasional occurrences of the glottal stop, its phonology does not differ from that of everyday MA. The meters used in *melhun* are different from those of poetry composed in Classical Arabic (henceforth CA). Even today many composers and performers – the same person can be both – are illiterate, not to speak of the experienced listeners. Some practitioners of *melhun* are professionals, others are amateurs from all walks of life. The length of a *!qsid-a*, a *melhun* song, ranges between twenty lines and several hundred. The transmission of *melhun* songs is mostly oral, but occasionally some are recorded using the Arabic script. The *melhun* is only one among several MA poetic genres in widespread use in Morocco today.

The *melhun* is a pan-MA genre. As far as we know, speakers from different parts of Morocco only need to make minor alterations in the lyrics when they sing a given *!qsida* in their own dialect of MA. This fact suggests that syllable structure changes little when one moves from one dialect of MA to another.

Tahar (1975) was the first to state the basic principles which govern

⁴⁴ For general presentations of *melhun*, see Al-Jirari (1970), Tahar (1975), Pellat (1987), Al-Malhuni (1990b) and Jouad (1995). Al-Fassi (1997) contains a representative sample of songs.

⁴⁵ On the music of *melhun*, see Aydoun (1994) for a quick overview and for references to more detailed work.

⁴⁶ See De Prémare and Alaoui (1989).

versification in the melhun. The following discussion is based on our examination of the songs collected in pp. 253–364 in Al-Malhuni (1990a) and in Al-Fassi (1997).⁴⁷ Some melhun pieces are organized in stanzas with several different meters combined in a stanza. Other pieces have all their lines built on the same meter. Most of our examples are drawn from pieces with two-line stanzas.

We give below the text of the first twelve couplets in ‘the !qsida of Fatma’, a song by Muḥammed Lehmer Lermyaq (Al-Fassi 1997: 15–18). An English translation follows.

- (28)
- 1a. mir !le=γ^wrem xil=u !fe=l=ħerb !zadm-a
 - 1b. dakk l=hedd-a fuq šelw-i me-lzum
 - 2a. !we=l=γ^wram i-šeyyeb we=d=dat saqm-a
 - 2b. ħett l=γiwan ma !y-weqker me-γrum
 - 3a. hakda=k !žra l=i !qess-a !w=teržm-a
 - 3b. w=anaya ma dri-t !fe=l=ħerb qyum
 - 4a. ha sbab hwa=ya !x^wennar xadm-a
 - 4b. γab-et ħenn=i w=ħad qelb=i me-hmum
 - 5a. fi knan=i !γess-et !γ^wess-at samm-a
 - 5b. kif n=nišan dar xebl-a fe=l=qum
 - 6a. γab-et ħli=ya we=l=m^wehž-at haym-a
 - 6b. q^wel-t a ħežb=i !d=dedd fe=bn-at l=yum
 - 7a. !tal-et l=γib-a ya le=γ^wzal !fatm-a
 - 7b. ħib !l=hežr-an ya sbiγ-et le=nyum
 - 8a. kan-et mlaḥ=i fe=l=ħeššaq ħakm-a
 - 8b. we=l=yum sqa-t=ni mħayen we=hmum
 - 9a. ħ^webb=ha xella l=i dat=i m-faqm-a
 - 9b. we=l=ħ^webb !sħib qal-et dha-t l=qum
 - 10a. sal qis l=me-žnun ħla l=ħakm-a
 - 10b. lil-a hiya sbab qelb=u me-ħdum
 - 11a. sal siḥ l=yazan ħla z=zaħm-a
 - 11b. msex ula γ^wrab !wadeħ me-ħkum
 - 12a. sewwel ħla !ħenter we=l=qum zaħm-a
 - 12b. le=γ^wram i-luħ le=ħšiq l=le=hmum

⁴⁷ Jouad (1995: 304–314) presents ninety odd lines of melhun with their syllabic parses and French translations. DE (1988: 10) is an earlier instance of syllabic scansion of MA verse.

- (29)
- 1a. Love, the great prince, launches his cavalry into battle
 - 1b. Pounding my side under his impressive bearing
 - 2a. Love has made my hair white and my body weak
 - 2b. Amorous yearning does not spare any lover
 - 3a. Here is what happened to me, here is the story, here is the chronicle
 - 3b. I, who am inept in the arts of warfare
 - 4a. The object of my passion is a hard-headed beauty
 - 4b. She has left me, and my heart is troubled
 - 5a. At the bottom of my heart, deep and mortal regrets
 - 5b. Like arrows which lay waste to the fighters' ranks
 - 6a. She left me and my soul is distraught
 - 6b. How obstinate, I realize, girls are nowadays
 - 7a. Absence has lasted too long, O Fatma, my gazelle
 - 7b. Your being away is no good, O you with khol-painted eyes
 - 8a. She was my tame one, she used to bewitch lovers
 - 8b. Now she showers me with adversity and worries
 - 9a. My love for her has unsettled my body
 - 9b. Love is hard, as people with experience say
 - 10a. Ask Qays the madman about the woman who bewitched him⁴⁸
 - 10b. Layla, who bruised his heart
 - 11a. Ask Al-Yazan about his daring one
 - 11b. Better a transfixing curse than a pure and bewitching love
 - 12a. Ask Antar (on how he feels) when armies rush forward
 - 12b. Love plunges the lover into worry

The text in (28) is parsed below. The two lines in each couplet have different meters. The couplets' first lines are parsed in (30); the second lines are parsed in (31). H and L respectively stand for 'heavy' and 'light'.

⁴⁸ Qays, Al-Yazan (line 11a) and Antar (line 12a) are well-known characters from the literature.

(30)	1	2	3	4	5	6	7	8	9
	H	L	L	L	L	L	H	H	L
1a.	mir	le ^{γw}	rem	xi	lu	fel	herb	zat	ma
2a.	wel ^{γw}	ra	mi	šey~	yeb	wed~	dat	saq	ma
3a.	hak	da	k#ž	ra	li	qes~	saw	terž	ma
4a.	has	ba	b#h	wa	ya	x ^w en~	nar	xat	ma
5a.	fik	na	ni	γes~	set	γ ^w es~	sat	sam~	ma
6a.	γab	t#f	li	ya	wel	m ^w eh	žat	hay	ma
7a.	tal	t#l	γi	ba	ya	le ^{γw}	zal	fat	ma
8a.	kan	t#m	la	fi	fel	f ^w eš	šaq	hak	ma
9a.	h ^w ebb	ha	xel~	la	li	da	tim	faq	ma
10a.	sal	qi	s#l	mež	nu	n#f	lal	hak	ma
11a.	sal	si	f#l	ya	za	n#f	laz~	za ^f	ma
12a.	seww	l#f	la	f ^w en	ter	wel	qum	za ^f	ma

(31)	1	2	3	4	5	6	7	8	9
	L	L	L	H	H	L	L	L	H
1b.	dak~	k#l	hed~	*da	fuq	šel	wi	mel	zum
2b.	het~	t#l	γi	wan	may	weq~	qer	me ^γ	rum
3b.	wa	na	ya	mad	rit	fel	her	b#q	yum
4b.	γa	bet	f ^w en~	niw	f ^w ad	qel	bi	meh	mum
5b.	ki	f#n~	ni	šan	dar	xeb	la	fel	qum
6b.	q ^w el	ta	f ^w ež	bid~	dedd	feb	na	t#l	yum
7b.	f ^w i	b#l	hež	ran	yas	bi	γet	len	yum
8b.	wel	yu	m#s	qat	nim	ha	yen	weh	mum
9b.	wel	h ^w eb~	b#s	f ^w ib	qal	t#d	ha	t#l	qum
10b.	li	la	hi	yas	bab	qel	bu	me ^f	dum
11b.	#m	se	xu	la ^{γw}	rab	wa	deh	me ^h	kum
12b.	le ^{γw}	ra	mi	lu ^h	le ^f	ši	q#l~	leh	mum

There are no complex onsets. Onsetless syllables are allowed only at the beginning of a line (see line 11b for an example); in particular, hiatus is prohibited. The syllable types which occur in melhun are listed below in the first column in table (32), where we follow the same conventions as in table (28) in § 4.6.⁴⁹

⁴⁹ N and D respectively stand for Nucleus and Coda. Z~ indicates that Z is linked with the first skeletal position in a geminate.

(32)	rime	N = full V	N = e
a.	N	xi (1a:4)	se (11b:2)
b.	N D~	dak~ (1b:1)	ħet~ (2b:1)
c.	N D	mir (1a:1)	yeb (2a:5)
d.	N D~D	ħubb	dedd (6b:5)
e.	N D D	*ħarb	ħerb (1a:7)

Each syllable type is exemplified with two instantiations drawn from the couplets cited above.⁵⁰ The parenthesized numbers which follow the examples indicate the examples' coordinates in (30) and (31); a colon separates the line number from the position of the syllable in the line. The table does not include onsetless syllables, which will be dealt with separately. Since all the syllables within the purview of the table have an onset, the relevant differences between them all have to do with their rimes.

In table (32) codas comprise at most two skeletal positions; after a full vowel the only complex codas allowed are geminates, as indicated by the starred form in the bottom line of (32). The evidence summarized in (32) pertains to syllabification in poetry. Not surprisingly, an examination of the phonotactics of MA words leads to the same inventory of syllable types. We have made a preliminary survey of the canonical forms of MA words noted in the standard transcriptions. It turns out that once word-initial syllables are set aside, all and only the syllable types listed in (32) are necessary to parse the isolation forms of MA words. This observation is illustrated below in (33). The ten lines in (33) correspond to the ten syllable types in (32). The syllables which are instantiations of the various syllable types are highlighted. Each word is followed by information about its morphological make up. The syllabification of initial clusters in the examples in (33) will be justified later.

- (33) a. **ša**.fu 'they saw'; *šaf-u*
 a'. s.**ke**.ku 'his plowshares'; *skek=u; skek* 'plowshares'⁵¹
 b. tt.**haz**.zu 'they lifted one another'; *tt-hazz-u*
 b'. **šek**.ku 'they doubted'; *šekk-u*
 c. **kaš**.fu 'they guessed'; *kašf-u; kašef* 'he guessed'
 c'. **der**.bu 'they struck'; *!derb-u; !dreb* 'he struck'

⁵⁰ The syllable type instantiated as *ħubb* in the table happens not to occur in the song cited above, but is attested in others, e.g. *ħubb* occurs in the first line of the first stanza in a ballad recorded on tape by Toulali which will be cited in § 8.5.6. See exact reference there.

⁵¹ The singular form is *sekk-a*. On the special status of *e* in *skek* and other similar plural nouns, see § 9.5.

- | | | |
|-----|-------------------|--|
| d. | m.qidd.š a | ‘mischievous girl’; <i>m-qiddš-a</i> ⁵² |
| d’. | t.nešš.ri | ‘spread impf 2fs’; <i>t-neššr-i</i> ⁵³ |
| e | terž .ma | ‘life story’; <i>teržm-a</i> |
| e’. | *tarž .ma | (ill-formed) |

Whenever possible we have used syntactic words rather than Pwords in the examples in (33). The only syllable type which does not occur in isolated syntactic words is that with a hollow open rime, see (33)a’, the only case in which we were forced to use an example containing a clitic. Apart from case (33)a’, the set of syllable types necessary to parse Pwords is the same as that necessary to parse syntactic words. Since complex onsets are disallowed, all word-internal clusters comprised of three skeletal positions begin with a complex coda.

Anticipating the conclusions of our discussion of line-initial syllables (see below), we are faced with the fact that two different routes lead us to the same set of syllable types. One line of investigation is concerned with the orthometric syllables in songs, while the other deals with the phonotactics of words. We take this convergence as evidence that there is no difference between the syllable structure of MA in its everyday usage and that in singing. From now on we consider the two structures as one and the same thing and we assume that as far as syllabification is concerned, lines of verse are treated as instances of a higher-level phonological constituent which we call the Phonological Utterance. We define a Phonological Utterance as a minimal stretch bounded by pauses. A Phonological Utterance can contain several sentences in a row, or it can be comprised of no more than a single word, as when a word is pronounced in isolation.

Let us now turn to line-initial orthometric syllables. Since line-initial syllables may lack an onset, the syllable types one would expect to find at the beginning of lines are all those in table (32) plus their onsetless counterparts. In fact the hollow rimes in the last column in (32) only exist in syllables with an onset, i.e. schwa is never line-initial. On the other hand, at the beginning of lines, and only there, there occur syllables which are made of a single consonant, e.g. the initial syllable of line 11b in (31) consists of a mere *m*. Let us suppose that such syllables are actually onsetless syllables in which the nucleus is *e*, and that syllable-initial occurrences of *e* are never realized as vocoids. This analysis enables us to account for the peculiarities of line-initial syllables while preserving our assumption that in MA all syllables contain a vowel. It allows us to reconcile the existence of word-initial consonant clusters with our assumption that MA disallows complex onsets: word-initial clusters are not syllable-initial clusters; their first part is actually the coda of a hollow onsetless syllable,

⁵² The masculine form is *mqiddeš*.

⁵³ *neššer* is the intensive stem derived from *nšer* ‘spread’.

e.g. the surface syllable structure of *skeku* 'his plowshares' (v. (33)a') is /*es.ke.ku*/.⁵⁴ In MA a short voiced vocoid is never heard at the beginning of a word pronounced in isolation.

Viewed in terms of syllable structure, the observations above can be summarized in the statement below, which we number for later reference.

- (34) Only after an onset can *e* be realized as a vocoid.

Clearly, (34) is not a principle of grammar, but a fact which must be accounted for. We will propose an explanation for it in Chapter 9. Till then, we will treat (34) as a primitive in our analysis. In a word such as (33)a', which is pronounced [sk@ku] but is syllabified as *.es.ke.ku*., we will not attempt to explain exactly how after a pause the syllabicity of *e* is transferred to the following *s*, for the question will not arise anymore in our final analysis.

Judging from the songs we have examined, lines beginning with an onsetless syllable seem to be far less common in MA than in Tashlhiyt. A detailed inventory of the various possibilities allowed in line-initial syllables would require a larger corpus. Let us simply give two more examples. They are the first lines in couplets #6 and #22 in 'the !qsida of Muni', a song recorded in Al-Fassi (1997: 5–6), see below (36)c,d. Before these lines we give the first line of the song as an instance of a line beginning with an onset ((36)a), and the first line of couplet #26 to exemplify the case of vowel-initial lines ((36)b). We first give the text of these lines, then their syllabic parses:⁵⁵

- (35) a. qelb=i be=l=ħ^webb !sar me-fni
 b. u=!n-usef qedd=ha s=sani
 c. !llah ħsib men γwa=ha
 d. sqa=ni kas men !mrar-a

- (36) L L L H H L L
 a. qel bi bel ħ^webb sar mef ni
 b. u nu sef qedd has~ sa ni
 c. l~ la h#ħ sib menγ wa ha
 d. s qa ni kas menm ra ra

Given a sequence of morphemes or words in MA, what is the proce-

⁵⁴ For an analysis of word-initial consonant clusters in Ath Sidhar Rifian along the same lines, see DT (1992). Hyman (1985: 68) already proposes that in Ayt Ndhir Tamazight Berber, in which the distribution of schwa is similar to that discussed here, words with initial consonant clusters begin with syllabic consonants.

⁵⁵ Here are the translations of the four lines: (a) my heart is wrecked by love; (b) and I describe her radiant silhouette; (c) God will judge those who diverted her; (d) he has handed me a cup of bitterness.

ture which parses it into a sequence of syllables? We cannot provide a complete answer to this question, but we can at least answer it inasmuch as is relevant to our main aim in this discussion, which is to highlight the main differences between the surface syllable structure of MA and that of Tashlhiyt.

One can view syllabification in MA poetry as operating in successive stages, the last two of which are word-level syllabification and line-level syllabification. After syllabification has operated at the level of words, i.e. once each word in a line has been syllabified as a separate unit, syllabification operates again, taking the whole line as its domain. Constraints on well-formed syllables are the same at the two levels, and what line-level syllabification does is to reshuffle syllable structure at junctures between words. What motivates all the reshufflings is the need to avoid contiguous rimes. Here are the most common ways this result is achieved. First, certain word-final codas are turned into onsets. In line 2a of (28), for instance, the final consonant of *le*= γ^w *ram*, a coda in its word, becomes an onset to the initial vowel of *i*-šeyyeb, and in line 1b the second skeletal position of *kk* becomes an onset in a hollow hinge syllable *k#l* whose coda is the initial consonant in *l*=hedda. Second, certain vowel sequences are broken up by the insertion of a glide, as when /šra#atay/ ‘he bought tea’ is pronounced šrayatay. Third, a nucleus loses its syllabicity next to another. If that nucleus is a high vowel it becomes a glide, as in the realization of *itim* ‘orphan’ in *lga ytim* ‘he found an orphan’. If the nucleus in question is *e*, it disappears altogether, as happens at the beginning of line 4a in (28): in the representations which are the output of word-level syllabification the line begins as /.ha.es.ba . . ./, where the second syllable lacks an onset. Line-level syllabification changes /.ha.es./ into /.has./.

Our reason for viewing line-syllabification as operating on already syllabified words is that schwas in a given word occur much in the same places regardless of whether the word is uttered in isolation or strung with other words in a line. Let us call this ‘the stability of word-level nuclei’:

- (37) Stability of word-level nuclei:
 Line-level syllabification preserves the syllable nuclei resulting from word-level syllabification to the extent that their preservation is compatible with the avoidance of contiguous rimes (i.e. of line-internal onsetless syllables).

We view (37) as a fact which a grammar of MA must account for and not as one component in the machinery comprised in the grammar of MA. Going back to the three cases of resyllabification reviewed in the text above (37), we see that in the first two cases, line-level syllable structure preserves all the word-level nuclei. As for /.ha.es./ in the third case, apart from inserting a consonant between the two nuclei, an option which is not available in MA when one of them is *e*, the deletion of *e* is the most economical

way of getting rid of the adjacent rimes.⁵⁶ The view that *e* is deleted after a vowel is only a provisional one adopted here for the sake of explicitness. In our final analysis we will suggest a more parsimonious account in which there is no difference between the phenomenon which we interpret here as schwa deletion, and turning a high vowel into the corresponding glide, see the next chapter.

8.3.3. Complex nuclei; evidence from syllable weight

Like that of Berber, the versification of MA makes a distinction between heavy (H) and light (L) syllables. In a nutshell, syllables ending with a vowel and hollow syllables ending with a single C are light, while all the others are heavy. According to Pellat (1987) the distinction was first proposed by Tahar (1975), whose book deals with Algerian *melhun*.⁵⁷

The table below indicates the weight associated with each of the syllable types listed in table (32). As in table (32), the strings in the middle columns are instantiations of the syllable types listed in the first column.

(38)	rime	I N = full V	II N = e	
a. N		xi	se	L
b. N D~		dak~	ħet~	L or H
c. N D		mir	yeb	
d. N D~D		ħubb	dedd	H
e. N D D		*ħarb	ħerb	

As in Tashlhiyt, certain syllable types are alternately H or L depending on what the meter requires. The rimes which are ambiguous in this manner are (i) those which end in the first half of a geminate (line b) and (ii) the hollow rimes which only have one skeletal position after *e* (box c-II). We have already encountered weight ambiguity of type (i) in Tashlhiyt versification, see § 4.6, where rimes of type (i) were dubbed rimes with hinged codas. As an example of the two-valuedness of rimes with hinged codas, compare *dak~*, the first syllable of line 1b in (31), which counts as L, and *sam~*, the eighth syllable in line 5a in (30), which counts as H. Hollow rimes with only one skeletal position after *e* count as light in the overwhelming majority of cases, but the lines in which such syllables occupy H posi-

⁵⁶ *e* is also deleted elsewhere than after a vowel, e.g. in the first word in lines 6a, 7a and 8a. These cases will receive a different interpretation in § 9.1.

⁵⁷ In support of his distinction, Tahar (pp. 73–74) cites Cantineau (1960: 119), who states that in Maghrebian dialects H syllables are ‘a little longer’ than other syllables.

tions are not judged awkward by the experienced listener. The only example of such a line in the twelve couplets in (28) is line 12b in (31), with *leʃ* counting as a H syllable.⁵⁸ Let us use the expression '*eC* rime' to refer to a rime which has only one skeletal position after *e*.

In what follows we will have nothing to say about weight ambivalence in rimes with hinged codas. As for that in *eC* rimes, it is tempting to see a connection between their rather infrequent occurrence in H positions and the rather infrequent occurrence of *e* in open syllables at the word level. Syllables like *.se.*, whose rimes do not contain consonants, and H syllables with *eC* rimes, are special in that they are the only ones in which schwa is equivalent to a full vowel, as far as syllable weight is concerned. In the other cases a full vowel contributes as much to syllable weight as *e* together with the following C. Let us first discuss the weight equivalence between full vowels and tautosyllabic *eC* sequences.

Let us tabulate again the rime types in (38), leaving aside the rimes with hinged codas (line b) and those ending with tautosyllabic geminates (line d). In the table below the sequences used to instantiate the rime types have been selected for expository convenience. Onsets, which are not relevant, have been left out. To make comparison easier, the lowercase letters at the beginning of lines match with those in table (38). Line c of table (38) has been split to separate the cases in which *eC* counts as L from those in which *eC* counts as H.

(39)	rime	I N = full V	II N = e	
a. N		a	(e)	L
c. N D		*am	em	
c'. N D		am	(em)	H
e. N D D		*ams	ems	

Three kinds of rimes appear in table (39), some marked with an asterisk, others with parentheses and others yet without any marking. An asterisk indicates ill-formedness, absolute as in line e (a full vowel cannot be followed by two consonants), or in combination with the weight indicated to the right of the table, e.g. *am*, which is well-formed, cannot count as L (line c). Parentheses indicate rime types which we call 'secondary': rimes lacking any full segment and *eC* rimes counting as H. The remaining four rime types are those we call primary. Let us first focus on these.

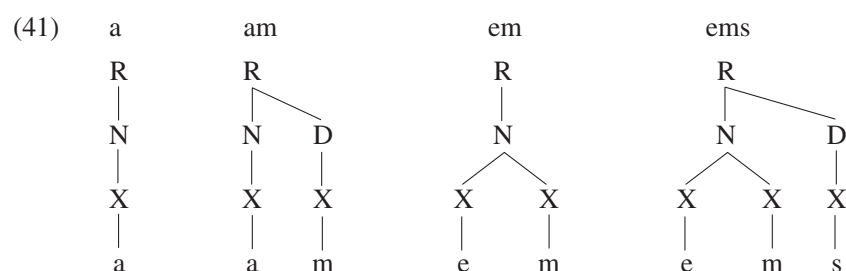
In primary rime types, syllable weight seems to depend only on the full

⁵⁸ Contrast that syllable with the eighth syllable (*meʃ*) in line 10b in (31), which counts as L.

segments, as can be seen by inspecting the table below, in which we have re-tabulated the primary rimes of (39).

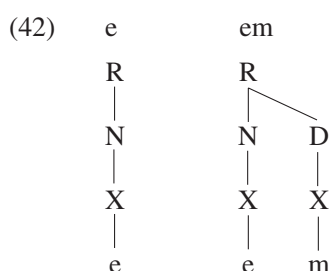
(40)	I N = full V		II N = e	
a, c	a		em	L
c', e	am		ems	H

In (40) the rimes with one full segment are L and those with more are H. Furthermore, a full vowel can only be followed by one tautosyllabic segment, whereas *e* can be followed by two. This suggests that full vowels and *eC* sequences play analogous roles in syllable structure. Until now we have assumed implicitly that in a rime all consonants belong to the coda. Let us abandon this assumption and suppose that in the hollow rimes in (40) *e* shares its nucleus node with the segment which immediately follows it. We propose the structures below for the rimes of table (40):



In the analysis which we are proposing here, only *e* can be associated with the first position of a complex nucleus, and only a consonant can be associated with the second position. Under that analysis, syllable weight does not depend on the number of skeletal positions in the rime, but on the existence of a coda. Rimes *am* and *em* both contain two skeletal positions; *am*, which contains a coda, is H, while *em*, which does not, is L.

Let us now go back to the secondary rimes, i.e. those parenthesized in table (39). Their structure is that represented below.



The distinguishing property of the secondary rimes is that *e* does not share its nucleus node with another segment. Compare the rime *em* in (41) with the rime *em* in (42). The former is L (it is coda-less) whereas the latter is H (it has a coda). The relative rarity of heavy *eC* rimes in versification suggests that in *eC* rimes the final consonant normally belongs to the nucleus and that it is construed as a coda only to satisfy the needs of versification.

The introduction of complex nuclei forces us to rearrange the contents of table (32), in which the syllable types of MA were all listed and arranged according to the structure of their rimes. Table (32) was devised under the assumption that any consonant belonging to a rime is a coda. We give below the old version of (32) and the rearranged one. Table (43) is (32) with two modifications which do not change its import. First, since the difference between lines b and c in (32) will not be relevant later, they have been collapsed, but the lowercase letters at the beginning of lines in (43) match with those in (32). Second, in (32) the strings used as instantiations of the syllable types all actually occur in lines of melhun examined by us. In (43) these have been replaced by invented ones chosen to facilitate the discussion of later versions of the table.

(43)	rime	N = full V	N = e
a.	N	xi	se
b, c	N D	mib	wet
d.	N D~D	ħuzz	ħezz
e.	N D D	*ħast	ħezb

Table (44) below is the result of rearranging (43) in a manner consistent with our new conception of the internal structure of rimes; while the nucleus is *e* in the last column in (43) it is *eC* in (44). Parentheses indicate syllables with secondary rimes.

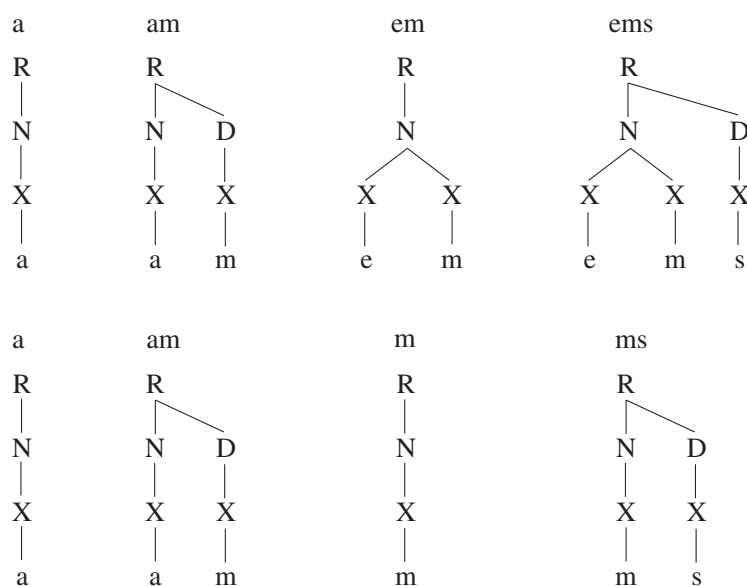
(44)	rime	N = V	N = eC
a.	N	xi (se)	wet
b, c	N D	mib (wet)	ħezb, ħezz
d.	N D~D	ħuzz	?benšš
e.	*N D D	*ħast	*benst

The rime types in lines a–e are the same in (44) as in (43), but some strings have migrated from one box to another, e.g. *ħezb* has a complex coda in (43)e whereas it has a simple one in (44)b,c. The only complex codas allowed under the new analysis are those in which the two skeletal positions in the coda form a geminate (see line d), and line e, which now lacks any well-formed rimes, has been kept only to draw attention to this fact. In line d the interrogation mark indicates a problematic case not men-

tioned before, that of hollow syllables in which the coda would be a geminate. Certain facts about versification suggest that such syllables are well-formed, but the evidence would take us too far afield and we will leave the issue pending.

Finally, the display below brings together the primary rimes of MA, which are reproduced in the top row, with their analogues in Tashlhiyt (bottom row).

(45) MA rimes (top) and their analogues in Tashlhiyt (bottom)



8.4. VIOLATIONS OF SONPEAK IN MA

In this section we propose an extended version of constraint SonPeak which allows us to compare the role of sonority in the syllable structures of MA and Tashlhiyt. To do this, we must devise means of abstracting away from the fact that Tashlhiyt allows syllabic consonants while MA does not, and that MA allows complex nuclei while Tashlhiyt does not. Extending SonPeak is not merely a matter of devising a yardstick with which to compare the role played by sonority in the syllable structure of MA and in that of Tashlhiyt. The extended version of SonPeak will also play a role in our account of word syllabification in MA when the language is considered on its own terms in the following sections.

Let us state two differences between MA and Tashlhiyt:⁵⁹

⁵⁹ Similar differences were found between Tashlhiyt and Ath Sidhar Rifian, see § 6.5.

(46) Nature of nuclei:

- a. MA: Every nucleus contains a vocoid;⁶⁰ there is an unstable vowel (*e*).
- b. Tashlhiyt: Any contoid can be a nucleus all by itself; there are no vowels besides the full vowels.

(47) Location of nuclei other than full vowels:

- a. MA: Determined by RIGHT-TO-LEFT SCAN (5); sonority is irrelevant to locating epenthesis sites.⁶¹
- b. Tashlhiyt: Determined by sonority relationships, v. SonPeak, NORR and other constraints in Chapter 4.

As already noted in § 4.1, (46) and (47) are logically independent. To see this, note that there is no contradiction involved in the idea of a language which would combine MA's strictures on the class of nuclei with Tashlhiyt's sonority-driven distribution of syllabicity. Imagine for instance a language which resorts to vowel epenthesis to break up consonant clusters, with the site of insertion always located immediately to the left of a sonority peak of the input string. In such a language /smtl/ would surface as *sem.tel* and /smɫ/ would surface as *smelt*. Nor is there anything contradictory in the idea of a language which would be like Tashlhiyt in allowing any consonant to be a nucleus, but in which sonority would not have any influence in the syllabification of consonant sequences. Imagine for instance a language with a procedure which is like RIGHT-TO-LEFT-SCAN (5), except that it turns consonants into nuclei instead of inserting *e*. The procedure in question scans words starting from the end and syllabifies as .CC. any CC string which is not immediately followed by a vowel or by a C which has been made a nucleus in a previous iteration.⁶² In such a language sequences /smtl/ and /smɫ/ would be syllabified respectively as sm.tɫ and sm.ɫt.

MA and Tashlhiyt both have hollow syllables. In MA the nuclei of hollow syllables are occurrences of *e* or *eC* sequences while in Tashlhiyt they are consonants. In spite of this difference the hollow syllables occupy similar positions in the overall syllable structure of either language. When one compares the syllable types of MA with those of Tashlhiyt, the two inventories show obvious analogies. Among the hollow syllables, in particular, the two languages show parallel weight contrasts. These are represented, details set aside, in the table below.

⁶⁰ We are abstracting away from those cases in which the vocoid is absorbed by an adjacent sonorant (see above in § 8.2.2).

⁶¹ As mentioned earlier, RIGHT-TO-LEFT SCAN is only a temporary device adopted for expository convenience.

⁶² Here and below, underlinings indicate nuclei.

(48)		Tashlhiyt	MA
	Light	<u>CC</u>	Ce <u>C</u>
	Heavy	<u>CCC</u>	Ce <u>CC</u>

What we intend to do is compare the distribution of the nuclear Cs in the two languages. We will see that those of MA are much less under the influence of restrictions on sonority than those in Tashlhiyt.

The reader may recall that a key factor in the distribution of sonority in the syllables of Tashlhiyt is the constraint SonPeak. Let us reproduce here our formulation of the constraint in § 4.7.

- (49) SonPeak: A sequence which is a sonority peak within the syllabification domain contains a syllable nucleus.⁶³

SonPeak was formulated under the implicit assumption that nuclei always consist of a single skeletal position, an assumption which we abandoned when we posited complex nuclei in MA. We modify slightly our formulation of SonPeak to adapt it to representations which contain complex nuclei.

- (50) SonPeak: a sequence which is a sonority peak within the syllabification domain contains a *skeletal position which belongs to* a syllable nucleus.

For the reader's convenience we have italicized the words which were added to (49) to yield (50). Even with this new formulation, SonPeak cannot help us much in bringing out the differences between syllabification in MA and in Tashlhiyt, and it is not difficult to see why. We have assumed (i) that in MA every nucleus contains a vocoid, and (ii) that vocoids have a higher degree of sonority than contoids. Taken together, these assumptions do not leave much room for violations of SonPeak in MA. As far as SonPeak is concerned, MA is as different from Tashlhiyt as, say, French is.

And yet it makes sense to want to be able to use SonPeak in order to compare the distribution of sonority in hollow syllables in the two languages. Take for instance the sequence /zrb/. Let us compare forms of either language which can be minimal embodiments of this sequence, i.e. surface forms which contain as few distinctive feature specifications as possible in addition to those already present in /zrb/. In MA the forms in question are *zerb* and *zreb*, which are both well-formed: *zreb* 'he was in a hurry' vs. *zerb* 'hurriedness'. In Tashlhiyt /zrb/ can only give rise to *zrb*, a verb

⁶³ A sonority peak is any sequence which is a local maximum of sonority, see § 4.7. We are assuming that MA has the same sonority scale as that proposed for Tashlhiyt in § 4.7. This assumption will be modified later, see § 8.5.3.

with the same meaning as MA *zreb*.⁶⁴ The respective syllabic parses of MA *zerb* and *zreb* are *.zerb.* and *ez.reb*; that of Tashlhiyt *zrb* is *.zrb.*. In Tashlhiyt, dissyllabic *z.r**b***, in which *z* and *b* are nuclei, is an impossible surface form in the language. Its ill-formedness is due to a violation of SonPeak: *r* is a sonority peak and yet it is not a nucleus. We would like to be able to consider parallels like the following:

- | | | |
|------|----------------------|-----------------------------|
| (51) | Tashlhiyt | MA |
| a. | <i>.zrb.</i> | <i>.zerb.</i> |
| b. | <i>*.zrb.</i> | <i>.ez.reb.</i> |

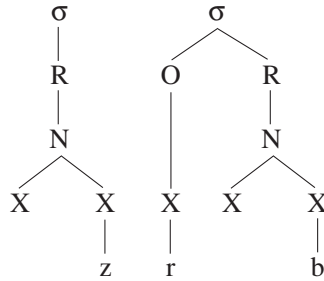
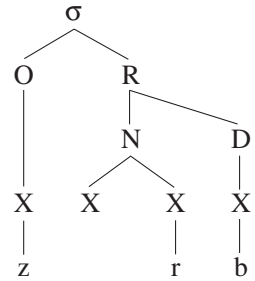
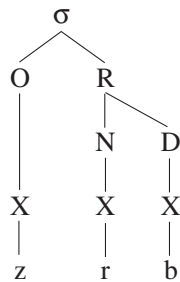
In a given line in (51) the apportionment of the consonants between onsets and rimes is the same in both forms, e.g. *r* belongs to a rime in both forms in (51)a whereas it is an onset in both forms in (51)b. (51) is but one particular illustration of the fact that MA is more liberal than Tashlhiyt in the range of such apportionments it allows. This fact is an empirical one; it remains unaltered if one claims, contrary to the analysis we are advocating, that in Tashlhiyt all hollow syllables have complex nuclei of the form *eC*.

Strictly speaking, neither of the MA forms in (51) violates SonPeak, for the sonority peak is *e* in both. In order to compare MA with Tashlhiyt, we want to introduce an extended version of SonPeak which would enable us to say that *.z.reb.* is a violation in that extended sense, while *.zerb.* is not. Since MA has a vowel *e* and Tashlhiyt does not, we want to leave out the occurrences of *e* in our computations of sonority contours in MA. For the purpose of comparing MA and Tashlhiyt we want sequences *zreb* and *zerb* to have the same sonority contour; we furthermore want this sonority contour to be the same as in the schwa-less sequence *zrb*. This can be achieved in the following way.

Let us suppose that in the phonological derivations of MA there is an intermediate level of representation in which the unstable vowel is an empty skeletal position, i.e. a skeletal position which does not have any feature bundle attached to it.⁶⁵ We give below the representations at the level in question for the verb *zreb* 'be in a hurry' and its deverbal noun *zerb* 'hurriedness', and we add for the sake of comparison the surface representation of the Tashlhiyt verb *zrb*, which also means 'be in a hurry'.

⁶⁴ In Tashlhiyt the deverbal noun of *zrb* is *zzrb* (/l-zrb/).

⁶⁵ Harrell (1962a) already proposed that MA schwa does not have any supra-laryngeal features of its own.

(52) a. *zreb*b. *zerb*c. *zrb*

Since the three phonological objects in (52) contain the same sequence of melodic units, they have the same sonority contour. In (52), MA *zerb* complies with SonPeak, as Tashlhiyt *zrb* does.⁶⁶

There is admittedly something paradoxical about disregarding the feature content of schwas when evaluating MA forms for violations of SonPeak. The *raison d'être* of schwa epenthesis is presumably to enable the nuclei of all the syllables of MA to be above a certain sonority threshold, and we have just proposed that the feature specifications introduced as a result of schwa epenthesis be ignored in the computation of sonority contours. We will see in § 9.1 that the paradox is only apparent.

To give the reader a feeling for the empirical import of SonPeak (50), let us review a few instances in which SonPeak is met or violated. Consider line 1a in (28), which we reproduce again here with its syllabic parse:

(53) a. *mir !le=γ^wrem xil=u !fe=l=ħerb !zatm-a*b. *mir leγ^w rem xi lu fel ħerb zat ma*

H	L	L	L	L	L	H	H	L
1	2	3	4	5	6	7	8	9

⁶⁶ MA *zerb* and Tashlhiyt *zrb* are homophonous. On such homophonies, v. § 9.3.

The occurrences of *r* in *!γ^wrem* and *!ħerb* are sonority peaks. The latter occurrence complies with SonPeak, since it belongs to a nucleus (see syllable #7), but the former does not, since it is an onset (see syllable #3). As another example, consider line 12b in (28), which we give again here:

- (54) a. le=γ^wram i-luħ le=ŋšiq l=le=hmum
 b. leγ^w ra mi luħ leŋ ši q#l~ leh mum
- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L | L | L | H | H | L | L | L | H |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

The first position in the sonority peak *ll* straddling syllables #7 and #8 belongs to a nucleus, while the occurrences of *l* in syllables #1 and #5, which are also sonority peaks, are onsets and consequently violate SonPeak. Here are a few other examples which the readers may check for themselves in (30) and (31): *l* meets SonPeak in 7a:2 and 10a:3. Sonority peaks violating SonPeak are *f* in 6b:6 and *m* in 11b:8.

As illustrated by the above sample, MA allows violations of SonPeak which cause ill-formedness in Tashlhiyt. We will show later that these violations have two sources. One is that syllabification is influenced by morpho-syntactic structure to a much greater extent in MA than in Tashlhiyt. The other resides in the sonority scale of MA, which is less differentiated than that of Tashlhiyt.

Glides are a very common source of SonPeak violations in MA, as they are in Tashlhiyt, e.g. at the beginning of line 2a in (28) the sequence /w=l=γ^wra/ surfaces as .welγ^w.ra. (HL), with a violation of SonPeak in the first syllable: /w/ is a sonority peak (it is more sonorous than /l/) and yet it does not belong to a nucleus. We will deal later with certain aspects of the syllabification of high vocoids in MA. We simply note at this point that the high vocoids of MA raise basically the same problem as those in Tashlhiyt.⁶⁷ The representations which are inputs to word-level syllabification must distinguish high vocoids of a special kind, which we call underlying glides. As far as morphology is concerned the underlying glides behave like consonants. Whereas a run-of-the-mill high vocoid may be syllabified as a vowel in some environments and as a glide in others, underlying glides as a rule surface as glides in all environments. As in Tashlhiyt, in MA some of the underlying glides have their source in templatic morphology, others in lexical representations. Reverting now to our example, an idiosyncrasy of the word meaning ‘and’ is that its lexical entry contains two allomorphs, /u=/ and /w=/ which are in free variation in some contexts.⁶⁸ It is the latter which occurs at the beginning of line

⁶⁷ See Chapter 7.

⁶⁸ See Heath (1987: 288).

2a in (28). Using the former allomorph instead would have resulted in a line beginning with *u.leɣ^w.ra* (LLL), which does not accord with the meter required by the song.

8.5. THE SYLLABLE STRUCTURE OF WORDS

The widespread violation of SonPeak in MA should come as no surprise, given the way word-level syllabification operates in that language.

All violations of SonPeak which occur at the line level are due to word-level syllabification. Here is why. SonPeak violations can only occur in places where there occurs a sonority peak. A moment's thought shows that concatenating two strings cannot add new sonority peaks to those already present in each string considered separately.⁶⁹ Consequently stringing words together to make lines does not create new opportunities for SonPeak violations to occur.

In the following discussion we will take preliminary steps towards an overall characterization of syllabification at the word level in MA, focussing on those aspects which are most revealing for our comparison of the syllable structures of MA and Tashlhiyt.

In the kind of characterization of syllabification we have in mind for MA, the central component is a procedure which takes any string of MA and parses it into successive syllables all meeting certain conditions on syllable well-formedness. Since the distribution of *e* is to a great extent predictable, we would like the predictable occurrences of *e* to be inserted as a result of applying syllabification.⁷⁰ The only schwas whose location would be indicated in the input strings would be the unpredictable ones. To see what we have in mind, consider the following pair.

(55)	(a)	(b)	(c)	
	!tenžra	.tenž.ra.	/tnžr-a/	'billy-can'
	!tnezna	.et.nez.na.	/tnz-na/	'we made fun of'

Each line gives (a) the pronunciation of a word recorded in a standard transcription, (b) the corresponding syllabic parse and (c) the string which we are assuming is the input to syllabification. A complete account of syllabification in MA must indicate how one gets from (c) to (b). In MA syllabification, aside from glide epenthesis, which was mentioned briefly near the end of § 8.3.2, the only changes employed to make strings syllabifiable are schwa epenthesis and schwa deletion. Syllabification does not

⁶⁹ More precisely, for any two strings A, B and their concatenation AB, every segment which belongs to a sonority peak in AB also belongs to one in A or B. Let A and B be the strings *qfxbns* and *mtiw*. The sonority peaks in A are *fx* and *n*, those in B are *m* and *iw*, and those in AB are *fx*, *nm* and *iw*.

⁷⁰ This was already the general spirit of Keegan's (1986) pioneering article.

insert, metathesize, (de)geminate or delete full segments, nor does it modify their feature content.⁷¹ Let us assume that the grammar of MA contains various constraints which jointly define the set of strings which are well-formed syllables. Let us temporarily lump all these constraints together under the label SWF (Syllable Well-Formedness). SWF has the same function as the syllable templates used by various authors.⁷² A complete characterization of the syllable structure of MA requires more than a characterization of SWF; SWF must be supplemented with what one might call a syntax of syllables. The syntax of syllables is a set of conditions limiting the privileges of occurrence of the various syllable types within words. Here are two reasons why such conditions are needed. First, concatenating two well-formed syllables does not always give rise to a well-formed structure. To take a trivial example, *it* and *ak* are well-formed syllables of MA, but *it.ak* is not well-formed, because in a MA word only the first syllable may lack an onset. A second reason is that an input string may have several syllabic parses which are compatible with SWF, and SWF has nothing to say about the fact that some are well-formed and others are not. According to SWF, for instance, syllables with rimes *eC* and *eCC* are both well-formed. Consequently, in the first line of (55), where the grammatical form *tenž.ra* contains a syllable with a *eCC* rime, one must explain why the alternative parse *et.než.ra* is ill-formed although it is also compatible with SWF.

Our distinction between SWF and syllable syntax does not imply the existence of two distinct components in that part of the grammar of MA which deals with syllable structure; it is intended merely as a typology of constraints which we find useful in explaining how the following discussion fits into a complete account of syllabification in MA. We will see that restrictions on sonority are involved both in SWF and in syllable syntax.

In the following discussion we sketch the basics of word-level syllabification in MA, devoting special attention to those aspects which are relevant in a comparison with Tashlhiyt.

⁷¹ The following fact may look like a counter-example to some readers. In perfective verbs with stems ending in *aC* the vowel becomes *e* when the suffix begins with a consonant: *šaf* 'he saw', *šef-na* 'we saw' (*-na* is the 1p desinence). But note that **šaf-na* would be well-formed, as far as syllable structure is concerned, cf. *šaf=na* 'he saw us' (*=na* is the do1p clitic). One of our basic assumptions is that the phonotactics of any language is due in part to constraints on the form of words which are blind to morphological structure, and it is constraints of that nature which are at the center of our attention in this chapter. The alternation under consideration here is indeed sensitive to morphological structure: First, suffixes trigger it whereas clitics do not, and yet the difference between suffixes and clitics is otherwise irrelevant to syllabification in MA. Second, the alternation is limited to verbs, e.g. *!far-t=i/* 'my female rat', the 1s possessivized form of *!far-a* 'female rat', is pronounced *!farti*, not **!ferti*.

⁷² See e.g. Selkirk (1982). For MA, see Keegan (1986).

8.5.1. *A constraint-based analogue of right-to-left scan*

Until now we have used RIGHT-TO-LEFT SCAN (5) as a convenient expository device encapsulating a first approximation of the basic facts about the predictable occurrences of *e*. We reproduce RIGHT-TO-LEFT SCAN below:

(56) RIGHT-TO-LEFT SCAN:

Scanning the Pword from right to left, rewrite as *CeC* any *CC* string which is not immediately followed by a vowel. Each step in the scan must take as its input the output of the previous step.

In (55) RIGHT-TO-LEFT SCAN correctly predicts the occurrence of *e* in *!tnezna*, not that in *!tenžra*; that form contains a CCC cluster which RIGHT-TO-LEFT SCAN should have broken up, as it has the /nzn/ sequence in *!tnz-na/*. Basing our description of MA on an iterative procedure like RIGHT-TO-LEFT SCAN would not make it easy to compare MA and Tashlhiyt, for our analysis of Tashlhiyt syllabification was couched in terms of constraints. So as to compare MA and Tashlhiyt on equal terms, let us discard RIGHT-TO-LEFT SCAN and replace it with constraints which do the same work. We will first posit various constraints which will be designed in such a way that their simultaneous enforcement will require the occurrence of *e* precisely in the locations in which RIGHT-TO-LEFT SCAN inserts *e*. These constraints fall into several categories.

First, certain conditions jointly circumscribe the set of syllable types represented in (44). We reproduce here (44) as (57) to make comparison easier.⁷³

(57)		I N = V	II N = eC
	rime		
a.	N	xi (se)	wet
b, c	N D	mib (wet)	hez b, hezz
d.	N D~D	ħuzz	?benšš

Let us recall the most important conditions which contribute to confine licit syllables to the types listed in (57) and assign them structures like those displayed in (41) and (42). There are no complex onsets. In complex nuclei the first segment must be *e* and the second must be a consonant. The only complex codas are geminates following a full vowel. We will not state these conditions formally. We simply assume that this can be done and lump them together under the cover term SYLL. For the sake of explicitness we also include in SYLL two conditions of a very general nature.

⁷³ Line *e* in (44), which is now irrelevant, has been left out.

- (58) SYLL: In a structure which satisfies SYLL the following conditions are all met:
- every syllable belongs to one of the syllable types listed in (57);
 - every skeletal position belongs to a syllable and there are no overlapping syllables;⁷⁴
 - geminate inseparability is respected.

The reader may recall that each of the syllable types in (57) can be instantiated with an onset or without, but that onsetless syllables can only occur at the beginning of words in isolation or at the beginning of lines. Let us supplement SYLL with the following requirement, which is already familiar from our discussion of Tashlhiyt.

- (59) NoHiatus: A syllable which is not located at the beginning of a syllabification domain has an onset.

As already stated in § 8.3.2,⁷⁵ we are assuming that the units which are domains of syllabification in MA are the word and the Phonological Utterance. As far as syllabification is concerned, the line in poetry plays the same role as the Phonological Utterance in other speech styles.

From this point on, unless stated otherwise the only structures which we will take into consideration as candidates, i.e. as possible grammatical outputs, are those which meet SYLL (58) and NoHiatus (59). Let us call these structures viable candidates. Given any input string there exist many viable candidates which are compatible with that string, and our task is to devise means for selecting one of these (or several, in cases of free variation) as the grammatical output(s). Here are for instance the viable candidates which are compatible with the input string /ktb/ for *kteb* ‘he wrote’: *.ke.te.be.*, *.ek.te.be.*, *.ekt.be.*, *.ket.be.*, *.ke.teb.*, *.ketb.*, *.ek.teb.*. Note that RIGHT-TO-LEFT SCAN correctly rules them all out except the last.

For the purpose of mimicking RIGHT-TO-LEFT SCAN, SYLL is too liberal in a number of ways. First, it allows occurrences of *e* not followed by a tautosyllabic consonant (see box a-I in (57)); such occurrences are only found in special circumstances. Second, SYLL allows occurrences of *e* followed by two tautosyllabic consonants (b, c-II). The following conditions are designed to outlaw such occurrences.

- (60) NoLoneSchwa: *e* occurs in a complex nucleus.

- (61) NoCoda: avoid codas.

NoLoneSchwa rules out syllables like *se* (a-I in (57)) and NoCoda rules out syllables like *ħezb* (b, c-II); on how these syllables nonetheless end

⁷⁴ On overlapping syllables, see (19) in § 8.3.1.

⁷⁵ See the text below (33).

up in well-formed outputs, see below. Let us now see how the various conditions work together. Consider the following paradigm:

- (62) a. qleb 'he overturned'
 b. qleb-na 'we overturned'
 c. qelb-u 'they overturned'

Here is how *qleb* 'he overturned' derives from the input /qlb/. All the viable candidates are listed below:

- (63) .qe.le.be. .qe.leb. .eq.le.be. .qel.be. .eq.be.
 .qelb. .eq.leb.

All the items in the first line violate NoLoneSchwa. In the second line the first item violates NoCoda while the second violates neither constraint (on how it is so, see below). Consequently *.eq.leb.* is the winning contestant.

Strictly speaking, the linear transcription *.eq.leb.* can represent two phonological objects which differ only in the syllabic affiliation of *b*. In the first object, *b* is a sibling of *e* under the nucleus node; in the second, *b* is a coda. The two structures are displayed below.



Since the second structure violates both NoLoneSchwa and NoCoda it will always be disfavored and from now on it will simply not be taken into consideration when we list the various candidates.

Going back to paradigm (62), it is easy to see that the derivation of the items in line b proceeds in the same manner as that of *qleb*. Let us turn to line c. We list below all the viable candidates:

- (65) .qe.le.bu. .eq.le.bu. .eq.l.bu. .qel.bu.

The first three candidates lose against the fourth, the only one which does not violate NoLoneSchwa nor NoCoda.

In the same way as our analysis associates outputs of the form *.eC.CeC.* to inputs of the form /CCC/ (see above our discussion of *.eq.leb.* 'he overturned'), it correctly accounts for the fact that all naked stems of /CCCC/ verbs are pronounced as *CeCCeC*, e.g. *!bežyet* (!bžyt) 'he babbled'. Consider the following paradigm:

- (66) a. !bežγet 'he babbled'
 b. !bežγet-na 'we babbled'
 c. !bžēγt-u 'they babbled'

All the viable candidates for /!bžγt/ ((66)a) are listed below:

- (67) a. .be.žē.γe.te. a'. .eb.žē.γe.te. a''. .bež.γe.te.
 b. .be.žēγ.te. b'. .eb.žēγ.te. b''. .be.žēγt.
 c. .ebž.γe.te. c'. .bežγ.te. c''. .eb.žēγt.
 d. .ebž.γet. d'. .bež.γet.

Violations of NoLoneSchwa occur in all items in the first three lines except in c''; violations of NoCoda occur in b'', in all the items in the third line and in d. Item d' is the only one not to contain a violation of either constraint and is therefore the winner. Here are now all the viable candidates for /!bžγt-u/ ((66-c)):

- (68) a. .be.žē.γe.tu. a'. .eb.žē.γe.tu. a''. .bež.γe.tu.
 b. .be.žēγ.tu. b'. .ebž.γe.tu. b''. .bežγ.tu.
 c. .eb.žēγ.tu.

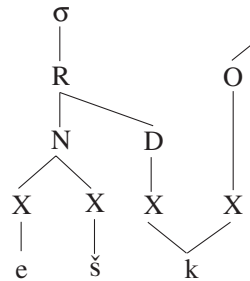
Violations of NoLoneSchwa occur everywhere in the first line, as well as in the first two candidates in the second line; items b' and b'' violate NoCoda. Candidate c is preferred for it is the only one which violates neither constraint.

Violations of SYLL or NoHiatus are never found to occur in licit forms. When NoLoneSchwa and NoCoda conflict, NoCoda gives way, as shown for instance by the fact that /kašf-u/ 'they guessed' yields *kaš.fu*, not *ka.šē.fu*. Geminate are another source of violations of NoCoda. Consider for instance the derivation of *šekk* 'he doubted' from /škk/. There are only three viable candidates for /škk/. We list them below besides the representation of the input /škk/.

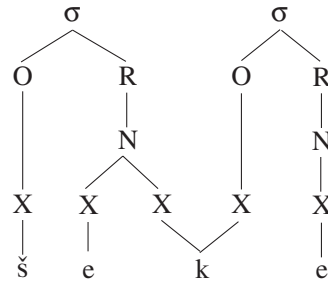
- (69) X X X a. .ešk.ke. b. .šek.ke. c. .šekk.
 | / \
 š k

.eš.kek. and other candidates which violate geminate inseparability are not listed in (69) because they are not viable candidates: viable candidates must by definition comply with SYLL, which implies that they must respect geminate inseparability, see condition c in the definition of SYLL in (58). The three candidates in (69) are represented in (70):

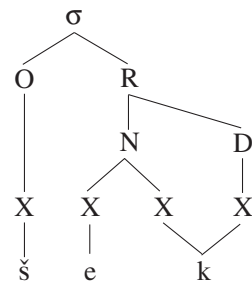
(70) a. .ešk.ke.



b. .šek.ke.



c. .šekk.



The first candidate violates NoLoneSchwa and NoCoda at the same time; the second only violates NoLoneSchwa, while the last only violates NoCoda. That the last candidate is one which corresponds to the correct output shows again that NoLoneSchwa dominates NoCoda.

Verbs like *fertet* 'pick off' and *!henzez* 'stare' do not violate geminate inseparability. We assume that MA is like Ath Sidhar Rifian in that the representations which are inputs to syllabification allow a contrast between a geminate, as in *!hett* 'lay down' and *hezz* 'take', and adjacent occurrences of the same segment, as in *fertet* and *!henzez*. Here are for instance the representations of *!hett* and *fertet* in the input to syllabification:



8.5.2. Kernels ending in *eCC*; *FinH*

Geminate inseparability accounts for the *eCC*] sequence in *šek*, but not all *eCC*] sequences can be explained in that manner. We already gave in (9)a–d minimal pairs *CCeC* vs. *CeCC* in which the only distinguishing factor

is the location of *e*. These were verb-noun pairs. Here are pairs in which both members are nouns.⁷⁶

- | | | | | |
|---------|-------|---------------|-------|----------------------|
| (72) a. | !treš | ‘deaf person’ | !terš | ‘slap (in the face)’ |
| b. | !ŋreq | ‘sweat’ | ŋerq | ‘vein’ |
| c. | !freŋ | ‘defloration’ | !ferŋ | ‘branch’ |
| d. | ŋneb | ‘grapes’ | denb | ‘peach’ |

These examples show that the position of schwa is not always predictable in three-consonant kernels, even if one only considers nouns. In the pairs above the middle consonant is a liquid or a nasal, but schwa is also unpredictable with other middle consonants, as suggested by the following pairs:

- | | | | | |
|---------|------|-----------|-------|--------------|
| (73) a. | qfez | ‘cage’ | !gebs | ‘gypsum’ |
| b. | ŋdes | ‘lentils’ | žehš | ‘ass’s foal’ |
| c. | dheb | ‘gold’ | sehb | ‘tributary’ |
| d. | sqef | ‘ceiling’ | kehf | ‘cave’ |

Before going any further, let us remind the readers of what we mean by ‘kernel’, a notion which will play an important role below. We use the term ‘kernel’ with the same meaning as in our discussion of Berber. The kernel of a word is what remains when the word has been stripped of its clitics and of all its prefixes and suffixes, derivational as well as inflectional. In *me-ħlul-in*, the mp passive participle of *ħell* ‘open’, the kernel is *ħlul*. In the affixless word *šekkek* ‘he caused to suspect’ the kernel is *šekkek*. These two examples were chosen to make it clear that kernels may be morphologically complex, e.g. *šekkek* is a causative verb derived from *šekk* ‘to suspect’, but this fact is irrelevant, as far as the notion ‘kernel’ is concerned.

An important observation about MA is that all the unpredictable schwas occur inside kernels.⁷⁷ Furthermore, unpredictable schwas are only found in kernels which do not contain any full vowel. The location of full vowels in kernels is in many cases dictated by templatic morphology. We will assume that it is also templatic morphology which is responsible for the contrast between *CCeC* and *CeCC* in nouns. We assume that the distinguishing feature of the *CeCC* nouns is FinH, a morphological template which requires a H syllable at the right edge of the kernel.

- (74) FinH: The right edge of the kernel must coincide with the right edge of a heavy syllable.

FinH is an alignment constraint in the spirit of McCarthy and Prince (1993), but we will sometimes call it a template, as a reminder of its role in our analysis. Recall that a H syllable is a syllable with a coda. In the input to

⁷⁶ Some of these pairs were pointed out by Amimi and Bohas (1996).

⁷⁷ The only exceptions are the 3fs suffix *-et* and the 2s clitic *=ek* (see infra).

syllabification, the representation of *qelb* ‘heart’ is the pair (/qlb/, FinH) whereas that of *qleb* ‘he overturned’ is simply /qlb/.⁷⁸ The set of all the viable candidates for *qelb* is the same as that in (63), which gave rise to *qleb* ‘he knocked over’:

- (75) .qe.le.be. .qe.leb. .eq.le.be. .qel.be. .eq.l.be.
 .qelb. .eq.leb.

The need to satisfy the template FinH takes precedence over NoCoda. The winning candidate is in consequence *.qelb.*

The paradigms below illustrate the fact that the contrast between *CCeC* and *CeCC* is preserved before the affixes and clitics which begin with a consonant, while it is neutralized before those which begin with a vowel:

- (76) a. *qleb* ‘he knocked over’ *qelb* ‘heart’
 b. *qleb=na* ‘he knocked us over’ *qelb=na* ‘our heart’
 c. *qelb=u* ‘he knocked him over’ *qelb=u* ‘his heart’

The preservation of the contrast follows from our analysis. Let us review the derivations of all the forms in (76). Those of the paradigm on the left have already been discussed, see the text around (63) and (65). In the paradigm on the right, in which the kernel is lexically associated with FinH (74), the derivation of *qelb=na* is the same as that of *qelb*, modulo the clitic. Finally, consider *qelb=u* ‘his heart’. The set of viable candidates is the same as that given in (65) for *qelb-u* ‘they knocked over’. We give it again in (77):

- (77) .qe.le.bu. .eq.le.bu. .eq.l.bu. .qel.bu.

qel.bu is again the preferred candidate, as it was in (65), for it is the only one not to violate NoLoneSchwa nor NoCoda. An important point to note is that all four candidates in (77) violate FinH. Given the input /qlb=u/, with /qlb/ lexically marked as subject to FinH, an output cannot simultaneously satisfy NoHiatus and the template FinH. Forms like *qelb=u* ‘his heart’ show how the enforcement of constraints on syllable structure can result in violations of a morphological template.⁷⁹

The template FinH is also needed to distinguish two classes of /CCCC/ nouns. All /CCCC/ verbs have naked kernels of the form *CeCCeC*, as already stated in our discussion of *!bežyet* ‘babble’ (see (66)). Among monomorphemic nouns, on the other hand, some have naked kernels of the form *CeCCeC*, while in others the naked kernels are of the form *CCeCC*; for instance:

⁷⁸ Our assumption about the underlying representations of the *CCeC* words will be modified later, see § 8.5.5.

⁷⁹ The interaction between FinH on the one hand, and SYLL and NoHiatus on the other hand, is doing the same work as the cyclic derivations proposed by Keegan (1986).

(78) !ʔegreb ‘scorpion’ frenk ‘franc’ šfenž ‘doughnut’

While the lexical entry of the first noun in (78) is a mere sequence of four consonants, those of the two others must furthermore indicate that the nouns in question are subject to template FinH, e.g. the lexical entry of *frenk* is (/frnk/, FinH).⁸⁰

We are now ready to turn to the role of sonority. Let us first recapitulate the constraints posited so far.

(79)	SYLL (58)	[undominated]
	NoHiatus (59)	[undominated]
	NoLoneSchwa (60)	
	FinH (74)	
	NoCoda (61)	

The machinery in (79) does not impose any constraint on sonority, aside from the requirement that every nucleus contain a vocoid, a requirement which is part of SYLL. As a matter of fact SYLL should be made more restrictive, to account for certain limitations on complex rimes, as we shall now see.

8.5.3. Sonority in rimes; NoRR

Whereas the freedom of occurrence of consonants in *CCeC* kernels is limited only by cooccurrence restrictions on consonants in roots, a review of the *CeCC* kernels in which CC is not a geminate leads to the following generalization.

(80) In word-final consonant clusters occurring in surface forms, if the final C is a sonorant contoid, it must have a lesser degree of sonority than the preceding C.⁸¹

(80) is stated as a generalization about clusters at the end of words, rather than at the end of *CeCC* kernels, because, as it turns out, it is valid for MA words in general, no matter what their morphological structure. We are assuming here the following sonority scale:

(81)	vocoids	
	liquids	(L)
	nasals	(N)
	other contoids	(O)

⁸⁰ *frenk* came into the language as a borrowing but its origin is not anymore traceable in present-day MA. *franc* has lost its final velar in modern French. FaithAdapt is irrelevant here. On FaithAdapt see below in § 8.5.3.

⁸¹ (80) extends to all words an observation of Heath (1987: 265) about the shape of *CeCC* words.

Since the scale in (81) lumps together all the contoids which are not liquids and nasals, it is less differentiated than the one we employed in our discussion of Tashlhiyt (see § 4.7).⁸² Consequently the constraints SonPeak (50) and NoRR (see (83) below) impose weaker limitations on syllabic parses in MA than in Tashlhiyt. Consider for instance the underlying sequence /ddfb/ in line 6b in (28). Because fricatives are more sonorous than stops in the Tashlhiyt sonority scale, /f/ is a sonority peak in /ddfb/ according to that scale, and syllabifying it as an onset would result in a violation of SonPeak. According to scale (81), on the other hand, /f/ is not a sonority peak, and no violation of SonPeak occurs in line 6b in (31), where it is syllabified as an onset.

As a particular consequence of the generalization in (80), MA forbids *CeCC* words with the three types of final clusters listed below in (82).⁸³ Each line in (82) corresponds to a class of forbidden clusters. It first gives examples of excluded sequences; these are followed by *CCeC* words which show that the final sequences in question are not excluded when they are broken up by *e*. ‘O’, ‘N’ and ‘L’ respectively stand for ‘obstruent’, ‘nasal’ and ‘liquid’.

- | | | | |
|---------|-----|----------------|--|
| (82) a. | *ON | bn, fn, dm, ħm | tben, kfen, gdem, šhem ⁸⁴ |
| b. | *OL | bl, kl, žr, hr | žbel, škel, !šžer, !šher ⁸⁵ |
| c. | *NL | mr, ml | !ŋmer, žmel ⁸⁶ |

Consider *qebl*, an ill-formed word. Since in that word the final consonant is a sonority peak, it would seem that the ill-formedness of *qebl* has its source in the violation of constraint SonPeak (50). Note however that the liquid also violates SonPeak in *qleb* ‘he overturned’, which is well-formed nonetheless. We submit that the constraint which is violated in a crucial way here is NoRR, which played an important part in our discussion of Tashlhiyt syllabification in Chapter 4. NoRR is repeated below:

- (83) NoRR (No Rising Rimes):
the coda does not have a higher sonority than the nucleus.

The monosyllable *qebl* is ill-formed because it violates NoRR. Note that in monosyllabic words like *x^webz* ‘bread’ the final cluster does not violate NoRR, because stops and fricatives belong to the same rung of scale (81).

Being a constraint on codas, NoRR predicts that generalization (80),

⁸² Zeroual (2000) advocates a more differentiated scale, with *h* between the liquids and the nasals, and *ŋ* between the nasals and the obstruents. His conclusions are based on a detailed survey of the CC clusters in *CeCC* nouns. Unfortunately, this work became available too late for us to take it into account.

⁸³ Counterexamples will be taken up later.

⁸⁴ tben ‘straw’, kfen ‘shroud’, gdem ‘heel’, šhem ‘grease’.

⁸⁵ žbel ‘mountain’, škel ‘shape’, !šžer ‘trees, col’, !šher ‘month’.

⁸⁶ !ŋmer ‘length of life’, žmel ‘camel’.

which was stated for word-final clusters, is also valid for preconsonantal CC clusters. The prediction is borne out by the facts. We have not found any counter-example in Harrell and Sobelman's dictionary. Here is a sample of the words with internal *eCC* rimes.

(84)	fermli	'nurse'	berdʕ-a	'pack saddle'
	!xenfr-a	'nose'	genbri	'banjo'
	ʕenkbut	'spider web'	zerdb-a	'ko feline, f'
	festq-a	'pistachio'	!ʕeskr-i	'soldier'
	!q ^w estl-i	'chestnut (color)'	žeb-t=hum	'I brought them'

In the list above, the CCC sequences are all tautomorphemic except that in the last item, *žeb-t=hum*, where the *eCC* rime coincides with the end of a syntactic word. Since the consonant of the 1s suffix /-t/ is an obstruent, it cannot give rise to *eCC* rimes violating NoRR, no matter what consonant occurs at the end of the preceding stem.⁸⁷

We have not found any words in which an internal CCC sequence has a steadily rising sonority profile, i.e. words such as *fetmli* or *seblyun*.⁸⁸ This is additional evidence that the constraint responsible for generalization (80) is NoRR, rather than SonPeak. If there existed a word *fetmli*, its syllabic parse would have to be *fetm.li*. This parse does not violate SonPeak, for *m* is not a sonority peak within the domain of syllabification, that is, within the word (see the formulation of SonPeak in (50)). *fetm.li* violates NoRR, on the other hand.⁸⁹

We now turn to forms which fly in the face of generalization (80). All of them are *CeCC* nouns. Examples are given below.

(85)	I	II	
a.	!setr ⁹⁰	saʔr	'line'
b.	!feqr	faqr	'poverty'
c.	ʕedl	ʕadl	'justice'
d.	resm	rasm	'drawing'
e.	fehm	fahm	'understanding'
f.	wezn	wazn	'weight'

Column I contains counterexamples to generalization (80). Column II contains their counterparts in CA; the relevance of the latter will be explained below. The last four items in (85) are the only exceptions to generalization (80) which we have found in the lists in Amimi and Bohas

⁸⁷ On the 1s suffix /-t/ see § 8.5.5.

⁸⁸ Cf. the noun meaning 'the Spanish, col', which is *!sbelyun*, not *!seblyun*.

⁸⁹ For other languages with a prohibition against syllable-final clusters with a rising sonority contour, v. e.g. Cantineau (1960: 114–115, 118–119), Kenstowicz (1986), Kouloughli (1978), Hayward (1988) and Bohas (1999).

⁹⁰ This word is distinct from its everyday *synonym* !ster, see below.

(1996). In the remainder of this subsection we show that the existence of the words in column I does not invalidate our claim that NoRR is crucially involved in shaping well-formed codas in MA.

Before we go any further, let us make sure that the items in the first column of (85) are indeed monosyllables with complex rimes rather than dissyllables, i.e. that the word *!setr* in (85)a, for instance, is *.setr* and not *se.ter*.

That the words under consideration are monosyllabic is shown by their prosodic silhouette and by the fact that their schwa must be pronounced with glottal vibrations no matter what the surrounding consonants. Let us take up these points in turn.

In *!setr*, for instance, *e* is auditorily more salient than *r*. The word sounds rather like the English word *sucker*, *mutatis mutandis*. When it is uttered under a sentence-final rising intonation the main pitch event is located on *e*. We now turn to the voicedness of schwa. If the correct syllabic parse of the words in (85)I were *Ce.CeC*, one would expect the first schwa to devoice when the adjacent consonants are both voiceless, see (85)a,b. In fact schwa must be pronounced voiced in such cases. Compare for instance *!setr*, in which the voicing of schwa is mandatory, with *!setter* 'he drew a line', in which the first schwa must devoice (one hears [*!st:r*]). As elsewhere in this book, the indications just given pertain to isolation forms, i.e. prepausal ones. When a suffix or clitic follows *!feqr*, schwa devoices in the expected fashion, e.g. it must be voiced in a prepausal occurrence of *!feqr* 'poverty' but it is voiceless in *!feqr=u* 'his poverty'.

There is no denying that the items in the first column of (85) belong to MA. Indeed, the list of such items can be extended *ad libitum*, as will become clear shortly. However it must be noted that they all belong to a special speech register, a crucial feature which is not indicated in Harrell and Sobelman's dictionary or in the lists in Amimi and Bohas (1996), where they are listed indiscriminately alongside other MA words.

All the forms under consideration belong to classicized MA. Classicized MA is a formal speech style intermediate between everyday MA and CA. It is commonly used by educated speakers in certain kinds of face-to-face interaction involving some degree of formality, e.g. by professors and students in university lecture halls or by participants in political caucuses.⁹¹ Very roughly, to use classicized MA is to speak MA with borrowings from the CA lexicon. In the process the borrowed CA words are moroccanized, that is, they are adapted to the phonology of MA. Except for a few differences, the syntax and inflectional morphology of classicized MA are those of everyday MA, and so is the phonology. One phonological difference is the addition of the glottal stop to the set of underlying consonants. Another is the use of *CeCC* words such as *!feqr*, which violate NoRR. While they

⁹¹ For some discussion of classicized MA, see Heath (1989) and Youssi (1992).

are speaking in the classicized register, the speakers are directly tapping their knowledge of CA. Virtually any lexical item of CA that they happen to know is eligible for use, once they have adapted it to the phonology of MA. It is quite common for speakers to borrow from CA a word which they have never heard used as a classicism before. In such cases the CA word is moroccanized off the cuff.

In classicized MA, CA words of the form *CVCC* are uniformly adapted as *CeCC*, as exemplified in (86):

(86)	MA	CA	
	a. beħt	baħθ	'research, monograph'
	b. neħt	naħt	'sculpture'
	c. nehž	nahž	'method'

This pattern of adaptation is mimicking the regular correspondences which relate the everyday words of MA with their cognates in CA. In particular, when a CA word is of the form *CVCC* its reflex in (vernacular) MA is almost always a *CeCC* word, as exemplified below:

(87)	MA	CA	
	a. x ^w ebz	xubz	'bread'
	b. kelb	kalb	'dog'
	c. sebt	sabt	'Saturday'
	d. teħt	taħt	'under'
	e. beʕd	baʕd	'after'

The regularity illustrated in (87) breaks down, however, when we consider the *CVCC* words of CA in which the final cluster has a rising sonority contour. The shape of their reflexes in colloquial MA is not *CeCC*, which would violate NoRR; it is *CCeC* instead:

(88)	MA	CA	
	a. !ʕdem	ʕaðm	'bone'
	b. ħbel	ħabl	'rope'
	c. !bħer	baħr	'sea'
	d. !q ^w ten	quṭn	'cotton'
	e. !šher	šahr	'month'

The upshot is that NoRR is always unviolated in MA except in one class of words: classicisms of the form *CeCC*, in which, presumably, NoRR is overridden by a constraint which requires adapted forms to mirror as faithfully as possible the canonical shapes of their CA sources. To the ears of the MA speakers, the final rising sonority contour of *!feqr* 'poverty' is a telltale sign that it is a classicism. Classicisms which become established words in the common language have a tendency to become regularized to meet NoRR. The classicism *!setr* 'line' (see (85)a) has

spawned the regularized form *!ster*, which is nowadays in everyday use along its older synonym *!xett*.

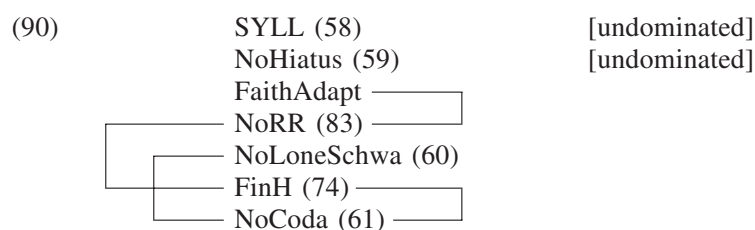
In conclusion, NoRR does indeed play a role in restricting the privileges of occurrences of consonants in present-day MA, and the existence of classicisms which violate NoRR does not disprove this claim.⁹²

In the lexical entries of nouns such as *kelb* ‘dog’, *teħt* ‘lower part’, the template FinH is an idiosyncratic property on a par with the consonant sequences /klb/ and /tħt/. FinH is also used to derive nouns from triconsonantal verbs, e.g. *ħret* ‘he plowed’ *ħert* ‘plowing’ (see (9) for other examples). What would happen if template FinH were used to derive a noun from a C*CeC* verb like *ster* ‘cover’, in which the final consonant is a sonorant contoid with a higher degree of sonority than the medial consonant? If we assume that NoRR is ordered above FinH, the result would be a C*CeC* noun. To see this, consider the set of all viable candidates for the input (/str/, FinH):

- (89) .se.te.re. .se.ter. .es.te.re. .set.re. .est.re.
 .setr. .es.ter.

The only candidates not violating NoLoneSchwa are those of the second line, viz. *.setr.* and *.es.ter.*. The former conforms to the template but violates NoRR, while the latter abides by NoRR, but does not conform to the template. If the grammar of MA ranks NoRR more highly than FinH, the result of mapping /str/ to template FinH is *ster*. Our grammar accounts for the inexistence of deverbal nouns of the form C*eCC* which violate NoRR. The template FinH, which normally gives rise to C*eCC* nouns, is overridden by the prohibition of rising rimes. Let us recapitulate the constraints proposed so far:

⁹² In his account of forms like those in (85), Kaye (1987) relies on two debatable assumptions. One assumption implies that all forms which are counterexamples to generalization (80) are nominalized verbs (‘masdars’). This assumption is incorrect, as implied by our presentation of classicized MA. Here are words which contradict (80) and are not masdars: *!setr* (85)a, *!feqr* (85)b, *nežm* ‘star, famous performer’ (cf. CA *nažm*), *!fesr* ‘era’ (cf. CA *fašr*). The author also assumes implicitly that in MA all nominalized verbs are built on (what amounts to) a C*eCC* template. Actually, the nominalizations of many C*CeC* verbs are of the form C*CuC* or C*CiC* (e.g. *dxul* ‘entering’, from *dxel* ‘enter’, *šrit* ‘plowing’, from *šret* ‘plow’). As for nouns lacking a full vowel which are related to C*CeC* verbs, many of them are of the shape C*CeC*, e.g. *fqes* ‘disembowelment’ (cf. *fqes* ‘disembowel’, *šteš* ‘thirst’ (cf. *šteš* ‘be thirsty’).



In the hierarchy in (90), FaithAdapt is a cover term for whatever constraints are at work to guarantee that when words from other languages are adapted into MA, the moroccanized forms bear some resemblance to the original words.⁹³ Consider the following nouns, both of the form *CeCC*: *žeħš* ‘ass’s foal’, an everyday word, and *!ferd* ‘formal talk, presentation’, a classicism derived from CA *šarḡ*. In our analysis the *CeCC* shape has a different origin in the two words. Whereas the *CeCC* form of *žeħš* ‘ass’s foal’ is due to the template FinH, that of *!ferd* ‘presentation’ has its source in FaithAdapt. The fact that the everyday word *žeħš* is the historical reflex of CA *žaħš* ‘ass’s foal’ is irrelevant for the characterization of that form in a synchronic account of MA. Neither has this fact anything to do with FaithAdapt, a component in the mental machinery which enables speakers to moroccanize words from other languages, CA among them.

NoRR is higher than FinH in the constraint hierarchy, while it is lower than FaithAdapt. In other words, syllable well-formedness overrides a template of the language, but it yields to some of the likeness constraints which shape moroccanized words. The latter situation is not unusual. Many languages loosen their phonotactics to accomodate loanwords. In Parisian French, for instance, a glide cannot be followed by a tautosyllabic consonant, but this prohibition is not enforced in recent loans, e.g. *design* [dizayn], *Nike* (a commercial brand) [nayk].

8.5.4. Favoring sonority peaks as nuclei; SonPeak

We have used SonPeak (50) in § 8.4 as a means of pointing out systematic differences between the syllable structures of Tashlhiyt and MA, but SonPeak does not play any role in the analysis of MA syllabification which we have started to develop in the present section. This analysis implies that the basic pattern for syllabifying /CCCCV/ is *eC.CeC.CV* rather than

⁹³ On phonological adaptations, see e.g. Yip (1993), Paradis and LaCharité (1997) and references therein. In the case of MA, see Heath (1989). Some of the constraints which are needed specifically to account for moroccanizations do not belong to FaithAdapt. An example of a phenomenon which falls outside the purview of FaithAdapt is the fact that the short vowels of CA are represented by *e* or zero in MA classicisms, e.g. CA *šadl* ‘justice’ is moroccanized as *šedl*, not *šadel*, despite the fact that *šadel* is a well-formed MA kernel, cf. *!batel* ‘calumny’ and *šabel* ‘shad’.

CeCC.CV, i.e. light syllables are preferred, except when certain overriding factors come into play. One such factor, as we have just seen, is the template *FinH*. The ranking of *FinH* above *NoCoda* is what makes *CeCC* nouns possible. We now wish to suggest that *SonPeak* is another factor responsible for the occurrence of heavy hollow syllables. We will present two facts in favor of this claim. One, which concerns syllabification in certain nouns, will be discussed presently. The other, a free variation which occurs in versification and in colloquial speech, will be presented in § 8.5.6.

The only hollow *H* syllables for which the analysis recapitulated in (90) makes allowances are those whose right edge coincides with the right edge of a kernel, e.g. those in *qelb* ‘heart’ and *qelb=na* ‘our heart’. Not all violations of *NoCoda* can be attributed to *FinH*, however. One area in which they crop up is the nouns of the form /CCCCV/ in which /CCCC/ is monomorphemic. Consider the following pair:

- (91) a. *mžebna* /mžbn-a/ .em.žeb.na. ‘large intestine’
 b. *!xenfra* /!xnfr-a/ .xenf.ra. ‘nose’

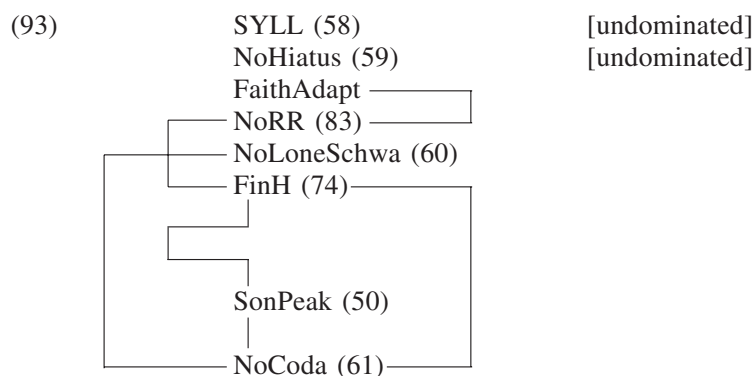
The syllabification in (91)a is that predicted by our analysis in its present state. /mžbn-a/ yields *mžebna* for the same reasons as /!bžyt-u/ ‘they babbled’ yields *!bžeγtu* (on the derivation of that form, see (68) and the surrounding text). We submit that in (91)b the realization of /!xnfr-a/ as *!xenfra* rather than *!xnefra* is due to *SonPeak*: parsing /xnfra/ as *xenf.ra* has the effect of including /n/, which is a sonority peak, into a nucleus. We have culled Harrell and Sobelman’s dictionary for all the nouns in which a full vowel is preceded by four consonants; they comply with *SonPeak* in their overwhelming majority. In these nouns, /CCCCV/ sequences in which the second consonant is a sonority peak surface as *CeCCCV*. Nouns of this type have already been given in the first three lines in (84). Here are other examples.

- (92) *!merstan* ‘asylum’ šertl-a ‘set of gold bracelets’
sensl-a ‘chain’ šendgur-a ‘germander’

!xenfra and forms like those in (92) suggest that *SonPeak* is ranked higher than *NoCoda*: in the correct parse *xenf.ra* the sonority peak /n/ is contained in a nucleus, as required by *SonPeak* (50), and the price to pay for compliance with *SonPeak* is a violation of *NoCoda*. *SonPeak* must also be ranked below the template *FinH*, as shown by the fact that there exist *CeCC* nouns in which the initial consonant is a sonority peak, e.g. *left* ‘turnip’, *mesk* ‘musk’, *neħs* ‘bad luck’, *weld* ‘boy’. According to our analysis the lexical entry of *left* ‘turnip’ is (/lft/, *FinH*). That *FinH* is ranked higher than *SonPeak* is shown by the fact that *left*, which violates *SonPeak* but complies with *FinH*, is preferred to **lfet* (.el.fet.), which complies with *SonPeak* but violates *FinH*. There also exist longer nouns lexically associated with *FinH* which compel us to adopt the same ranking,

e.g. *frenk* ‘franc’ (v. (78)) and *!šetrenž* ‘chess’. If SonPeak took precedence over FinH these words would be pronounced **fernek* and **!šternež*.

With these additional rankings, our analysis is now that shown in (93).



The analysis predicts that /CCCCV/ sequences in which the first consonant is a sonority peak surface as *CCeCCV* (i.e. *.eC.CeC.CV*), and the prediction is borne out by the nouns in Harrell and Sobelman’s dictionary. We have already encountered such a noun, i.e. *mžebna* in (91)a. Here are others.

- (94)
- | | | | |
|----------------|--------------|-----------------|------------|
| <i>mxezn-i</i> | ‘ko herald’ | <i>!rbeštaš</i> | ‘fourteen’ |
| <i>mheqb-a</i> | ‘flower pot’ | <i>!msetr-a</i> | ‘ruler’ |

We have examined the facts about /CCCCV/ sequences in which the first or the second C is a sonority peak. Those in which the third C is a sonority peak all surface as *CCeCCV*, e.g. *bdenžal* ‘eggplant’, *sberdil-a* ‘pair of sneakers’, but this fact is not additional evidence in favor of the role of SonPeak. If the sequences in question surfaced as *CeCCCV*, e.g. if the noun meaning ‘eggplant’ were **bednžal*, not only would these sequences violate SonPeak, they would also run afoul of NoRR, which is dominated only by FaithAdapt in the constraint hierarchy of MA.

8.5.5. Kernels ending in eC; FinL

The analysis summarized in (93) now runs into the following problem. Since SonPeak is ranked higher than NoCoda, how come the influence of SonPeak does not override that of NoCoda in verbs? If this were the case, /qlb/ ‘he overturned’, which is pronounced *qleb* (see the paradigm in (62)), would be pronounced *qelb* instead, and *!žxlt* ‘he mixed’, which is pronounced *!žexlet*, would be pronounced *!žxelt*, and similarly for all the verbs with kernels of the form /CCC/ or /CCCC/ in which the penultimate C is a sonority peak. Recall that we assumed earlier that /CCC/ and /CCCC/ verbs have no associated morphological template and that the consonant

sequence contained in their lexical entry is all that is needed to predict their syllable structure. This assumption now turns out to be mistaken.

Suppose that /CCC/ and /CCCC/ verbs are all lexically associated with a template, call it FinL, which requires their kernels to end with light syllables; suppose furthermore that FinL is ranked above SonPeak. The lexical entries of *kṭeb* ‘write’ and *!beḏḡet* ‘babble’, for instance, are now (/kṭb/, FinL) and (/!bḏḡt/, FinL). Let us assume furthermore that FinL and SonPeak are both ranked below NoLoneSchwa.⁹⁴ In this modified analysis /qlb/ ‘he overturned’ and /qlb-u/ ‘they overturned’ still surface as *qleb* and *qelbu*, and similarly /!ḡxlt/ ‘he mixed’ and /!ḡxlt-u/ ‘they mixed’ still yield the observed forms *!ḡexlet* and *!ḡxeltu*.⁹⁵ The template FinL is also needed to account for the CCEC and CeCCEC nouns in which the penultimate C is a sonority peak, e.g. *!treš* ‘deaf person’ (v. (72)a) and *!ḡeqreb* ‘scorpion’, for which we would otherwise expect the correct pronunciations to be **!terš* and **!ḡqerb*, if SonPeak had its way.

Since the only syllables concerned by FinL are those at the end of kernels, our analysis still predicts that codas should arise whenever required by SonPeak, in syllables whose right edge does not coincide with the right edge of a kernel. As an example of this prediction, consider *!šentrež* ‘chess’.⁹⁶ Under our assumptions the lexical representation of this noun is (/!šntrž/, FinL). For the sake of brevity, the set of candidate parses considered below in (95) does not comprise all the viable candidates, but only those viable candidates which meet NoLoneSchwa (60) and NoRR (83), two constraints which are ranked high in the constraint hierarchy displayed in (93).

(95)	(/!šntrž/, FinL)	FinL	SonPeak
a.	.šen.terž.	*!	ok
b. —→	.šent.rež	ok	*
c.	.eš.net.rež.	ok	* *!

The ranking of FinL above SonPeak prevents the occurrence of a coda in the kernel-final syllable (line a), but not in the first syllable; minimizing SonPeak violations is what makes (95)b a better candidate than (95)c.

We have just seen how FinL guarantees that /CCC/ verbs are all of the

⁹⁴ The ranking of NoLoneSchwa above SonPeak is needed in order to account for the CCEC words in which the medial C is a sonority peak, e.g. *!šreb* ‘he drank’. Candidates *.šer.be.* and *.eš.reb.* both meet FinL. *.eš.reb.*, which violates SonPeak, is preferred to *.šer.be.*, which satisfies SonPeak but violates NoLoneSchwa, because NoLoneSchwa is ranked higher than SonPeak.

⁹⁵ The reader is referred to our previous discussion of *qleb* and *qelb-u*, whose viable candidate sets were given in (63) and (65), and to that of *!beḏḡet* and *!bḏḡet-u*, for which see (67) and (68).

⁹⁶ This is the word given for ‘chess’ in Harrell and Sobelman (1966: 156). It is unknown to ME, who only knows the variant *!šetrenž*.

form *CCeC*, SonPeak notwithstanding. The introduction of FinL also brings us closer to the solution of another problem. MA has two verbal desinences which are distinguished only by schwa: /-t/ and /-et/, which respectively mark the 1st person singular and the 3rd person feminine singular.⁹⁷ Here are examples.

(96)	3ms	1s	3fs	
	bžey	bžey-t	bežγ-et	‘crush’
	!bežγet	!bežγet-t	!bžeyt-et	‘babble’
	kellem	kellem-t	kellm-et	‘speak to’
	bukeš	bukeš-t	bukš-et	‘brim’

Let us assume that a schwa is already present in the underlying form of the 3fs desinence /-et/.⁹⁸ The problematic forms are those in the 1st person singular, in which schwa must be prevented from appearing before the /t/ of the desinence. The forms to compare here are *bžey-t* ‘I crushed’ and *!bežγet* ‘he babbled’. The same reasons which make our present analysis derive the correct output *!bežγet* for (*!bžγt*, FinL) ‘he babbled’, make it predict the incorrect form *bežγ-et* for ‘I crushed’: NoCoda favors a final L syllable in both cases. Let us examine the viable candidates for the input */bžγ]_L t/* (‘I crushed’), where the bracket labelled L indicates the right edge of a kernel which has an associated template FinL. We consider only those viable candidates which satisfy NoLoneSchwa.

(97)	.b e ž.γ] _L e t.	.e b ž.γ] _L e t.	.e b.ž e γ] _L t.
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The correct pronunciation is actually that which corresponds to the third candidate, but our analysis elects the first candidate, for the two others violate NoCoda. FinL is of no help here because all three candidates violate it: in none of them does the right edge of the kernel coincide with the right edge of a syllable. Note however that whereas the last segment of the kernel is an onset in the first two candidates, in the third it occurs at the end of a nucleus. The third candidate would be the preferred one if the prosodic constituent involved in FinL were a nucleus rather than a light syllable:

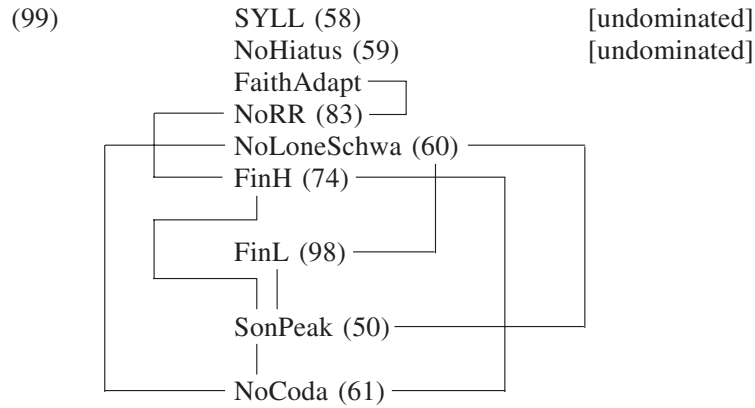
(98)	FinL: The right edge of the kernel must coincide with the right edge of a nucleus.
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This slight reformulation of FinL does not impinge on the other predictions made by our analysis. For FinL (98) to favor *bžeyt* over *bežγet* in (97), FinL must be ranked above NoCoda, a ranking which is consistent with the fact that FinL dominates SonPeak (see (95)) and SonPeak domi-

⁹⁷ On these two desinences see e.g. Heath (1987: 233).

⁹⁸ The other morpheme of MA which must possess a schwa in its underlying form is the 2s clitic /=ek/, see e.g. *bežγ=ek* ‘he crushed you’ (**bžey=k*).

nates NoCoda (see (93)). We end up with the following hierarchy of constraints:



Further development of the analysis summarized in (99) will require additional empirical work. We have not examined the pronunciation of the suffixed forms of four-consonant verbs, for instance, and it remains to be seen whether these forms are impervious to the demands of SonPeak, as the standard transcriptions imply. When we had to cite an instance of a four-consonant verb, in (66), we selected *!bežyet*, which has no sonority peak in terms of the sonority scale which we have adopted for MA (see (81)).

Before we leave (99), let us point out an empirical inadequacy which we will leave as a problem for further research. The problem has to do with those nouns containing /CCCCV/ sequences in which the first two consonants both belong to a sonority peak. Our analysis incorrectly predicts that the grammatical output should be *CCeCCV*. Consider for instance nouns like *menzl-a* 'flu' and *mendb-a* 'a lot', in which the first two consonants make up a sonority peak. Our analysis incorrectly predicts **mnezla* and **mnedba*. Here is for instance the set of viable candidates for /mnzl-a/:

- (100) .me.ne.ze.la. .me.nez.la. .men.ze.la. .emn.ze.la.
 .em.ne.ze.la. .em.nez.la. .menz.la.

All the candidates but the last two are fatally marred by violations of NoLoneSchwa. The penultimate candidate is preferred by our analysis, because it does not violate any of the constraints in (99), while the last candidate, which is the actually occurring form, violates NoCoda. The same problem arises with words such as *festq-a* 'pistachio' and similar ones in (84), in which the consonant cluster does not contain a sonority peak.

The problem which motivated our discussion of FinL was that of accounting for the fact that verbs such as *qleb* withstand the pressure of SonPeak. We now come to data which show that template FinL sometimes yields to that pressure.

8.5.6. *Free variants in which SonPeak overrides FinL*

In the paragraph below we use ‘CReC’ to refer to any *CCeC* sequence in which the middle C is a sonorant and has a higher degree of sonority than the surrounding consonants. In MA some *CReC* sequences have an alternative realization which complies with SonPeak, viz *CeRC*.⁹⁹ This phenomenon occurs both in everyday speech and in singing. In Lmnabha MA W-internal *CReC* sequences regularly have a free variant *CeRC*, e.g. *gleb-na* ‘we overturned’ can also be pronounced *gelb-na*.¹⁰⁰ The free variation can also occur in W-final sequences, but in that environment it is subject to restrictions which have yet to be worked out. The option of pronouncing *CeRC* instead of *CReC* also exists in some other dialects, but with limitations different from those which obtain in Lmnabha.¹⁰¹ Although the author does not explicitly say so, the data presented in El Mejjad (1984: 103–104; 141–144) suggest that in Marrakesh any W-final *CReC* sequence may also be pronounced as *CeRC*. In the variety of MA described in Heath (1987), whose main consultants were from ‘the Fes/Meknes region’ (p. 2), *CReC* and *CeRC* sequences remain distinct unless the medial consonant is *r*, in which case they are homophonous in all contexts (pp. 249–253).

Melhun lines in which *CReC* must be pronounced *CeRC* are quite common, and we now present a few examples to illustrate this phenomenon.

To begin, let us consider the first line in the 22nd couplet of the ‘ballad of Fatma’, the beginning of which was cited earlier in (28). We give the text of the line in (101) and its parse in (102) (see (30) for other lines with the same meter).

(101) !tleq-t=ek be=fʃal=ek te-mši !m-qasm-a¹⁰²

(102) 1 2 3 4 5 6 7 8 9
 H L L L L L H H L
 tleq tek bef ʃa lek tem šim qas ma

This line is well-formed. Its first word is *!tleq-t=ek* ‘I released you’ (release-1s=do2s), a word which begins with *CCeC*, as all analogous verbal forms

⁹⁹ A similar phenomenon is attested in Berber. In the Tamazight dialect of Ait Seghrouchen, according to Guerssel (1977: 274–275), *CCeC* is obligatorily changed into *CeCC* whenever the middle C is a sonorant.

¹⁰⁰ *CeRC* sequences in which R is a sonority peak may not be pronounced *CReC*, e.g. *kelb=na* ‘our dog’ does not have a free variant *klebna*.

¹⁰¹ Certain nouns have undergone lexical change, e.g. the words meaning ‘muslim’ and ‘earthen dish’ are *mselm* and *mterd* in Lmnabha, while they are recorded as *meslem* and *metred* in Harrell and Sobelman (1966), who state (p. ix) that their dictionary is based on the speech of educated speakers from Fes, Rabat and Casablanca.

¹⁰² ‘I let you go, crushed under the weight of your deeds’.

(cf. *kteb-t* 'I wrote'). The expected pronunciation is *!tleq-t*, but here it must be pronounced *!telq-t* instead.

Let us give two more examples of the same phenomenon. One is taken from 'the seizure of Oujda', a song by Hašem Sšhdani to be found in Al-Malḥuni (1990a: 253–255). The relevant line is the second in the 16th couplet. In that song, both lines in each couplet have the same meter. We first give the first line of the couplet for the sake of comparison.

- (103) a. žar !we=t-žebber we=bleγ mentha fžur=u
 b. la bqa l=u illa kesra i-xlef kesra¹⁰³
- (104)
- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| H | L | L | L | L | L | H | H | L | L |
- a. žar wet žeb ber web leγ ment haf žu ru
 b. lab qa lu yel la kes ray xelf kes ra

The relevant form in this example is *i-xlef* 'he replaced', near the end of line b, in which the kernel must be pronounced *xelf* if line (104)b is to be well-formed.

Our last example is taken from our own transcription of a song in a tape by L'Haj L'Houcine Toulali (*l=ħažž l=ħusin t=tulal-i*).¹⁰⁴ It is the sixth line in the fourth stanza. This song has a rather complex stanza structure. For the sake of comparison we first give the sixth line of the preceding stanza, which has the same meter.

- (105) a. waš ntiya l-yum semʕ=ek !sami
 b. fi west l-qelb zned !nar !dram=i¹⁰⁵
- (106)
- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| L | L | L | H | H | L | L | L | L |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
- a. wa š#n ti yal yum sem ʕek sa mi
 b. fi wes t#l qelb zend na r#d ra mi

For line b to be well-formed, *zned* 'he lit up' must be pronounced *zend*, and this is indeed the singer's pronunciation in the recording.

¹⁰³ (a) 'He became unfair and tyrannical, and reached the depths of sin'; (b) 'It only remained for him to name himself Kisraa so as to replace Kisraa' (CA *kisraa* = Caesar).

¹⁰⁴ Side One of tape TCK684 (no date or place indicated on the cassette's packaging). The title of the song is 'Fatma', like that of the song to which line (102) belongs; it was composed by Dris Ben-Ali Elmalki.

¹⁰⁵ (a) 'Have you now become deaf?'; (b) 'At the bottom of the heart he lit up the fire of passion'.

8.6. SUMMARY

In this chapter we first presented the basic properties of syllable structure in MA, drawing our evidence from versification and from phonotactics. In addition to the full vowels *a*, *i*, *u*, the surface representations of MA contain a vowel schwa. Abstracting away from differences in the nuclei of hollow syllables, the inventory of syllable types of MA is similar with that of Tashlhiyt. There are no complex onsets, and only geminate consonants can give rise to complex codas. Hiatus is prohibited.

In the second half of the chapter we laid the groundwork for a constraint-based account of word-level syllabification. In MA, surface syllabification is sensitive to morphological structure to a much greater extent than in Tashlhiyt. The syllabification of words results from the interplay of two kinds of constraints, the alignment constraints and the phonotactic constraints. The alignment constraints in our analysis play the same role as templates in classic analyses of CA. Some of these are imposed by morphology while others are lexically specified. The two alignment constraints which we propose restrict syllable structure at the end of kernels. The phonotactic constraints operate regardless of morphological structure. Many of them, most notably NoHiatus, override the alignment constraints.

Sonority plays a role in the syllable structure of MA. This role is less conspicuous than in Tashlhiyt because the influence of constraint SonPeak is sometimes masked by that of the alignment constraints. The sonority scale needed for MA has fewer sonority classes; all the consonants less sonorous than the nasals are lumped together into a single sonority class.

The evidence from versification and from phonotactics led us to the conclusion that in most instances hollow syllables have a consonant in their nucleus. By positing complex nuclei of the form *eC*, we were able to accept that conclusion while maintaining the assumption that in MA every syllable contains a vowel. This assumption will be reexamined in the next chapter.

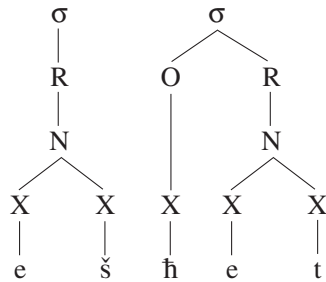
VOWELLESS SYLLABLES IN MOROCCAN ARABIC

In this chapter we explore a modified version of our analysis of syllable structure in MA. In this new version, syllables with a schwa would all be reanalyzed as vowelless. In the end we settle on a mixed account, in which hollow syllables are vowelless, except in special circumstances, in which they contain schwas.

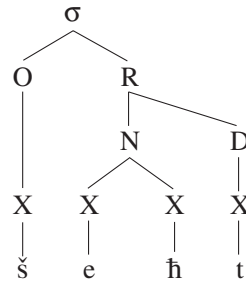
According to the analysis of MA developed in the preceding chapter, all hollow syllables have complex nuclei consisting of two segments, schwa and a consonant. In this chapter we ask to what extent *e* can be dispensed with, i.e. whether MA is not after all a language which, like Tashlhiyt, allows syllable nuclei which have consonants as their sole content. The idea is not new. It was suggested in DE (1988) on the basis of versification. Durand (1994, 1995/96) advocates phonemic transcriptions with no schwas: in his transcriptions, some occurrences of ‘e’ in the standard transcriptions are replaced by a syllabicity mark under the following consonant while others are omitted altogether.

Consider the verb *!šhet* ‘he slashed’ and the noun *!šeht* ‘slash’. The surface representations of these words in our present analysis are displayed below in (1); the modified representations which we will be exploring are displayed in (2):

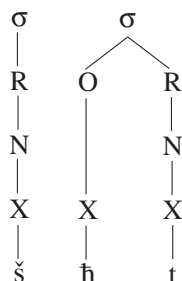
(1) a. *!šhet* [*!šh@t*]



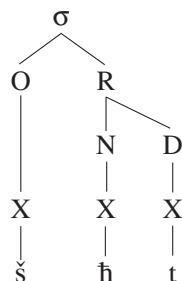
b. *!šeht* [*!š@ht*]



- (2) a. !šhet [!šh@t]



- b. !šeht [!š@ht]



The affiliation of the consonants to syllabic constituents is the same in both analyses, which only differ in how they account for schwa. As indicated by the transcriptions [ʃh̥@t] and [ʃh̥t], the most salient auditory difference between the two forms is the location of @. In (1) this difference is represented directly in the surface representations. The letter 'e' represents a certain bundle of feature specifications which is realized as [@]. This feature bundle is linked to a skeletal position which immediately follows the syllable onset and belongs to the nucleus, like the following consonant. In (2), on the other hand, the skeletal position of the onset and that of the nuclear consonant are adjacent, and so are the feature bundles linked to these positions. We will explore the claim that the voiced vocoid which is heard between the onset and the nuclear consonant is not the phonetic manifestation of a segment (of a bundle of distinctive features), but merely *a transition from the onset consonant into the nuclear consonant*.

As we shall see, this claim cannot be maintained to the end in this radical formulation. Our strategy will be to drive this extreme version as hard as we can and mitigate it only as a last resort. Our argumentation in favor of the new analysis implied by (2) will be twofold. First, the new analysis is simpler. Second, it allows a more insightful characterization of the differences between the syllable structures of MA and Tashlhiyt; it also permits a more straightforward account for their phonetic resemblances.

In what follows, we will often need to refer to examples and to constraints given in the preceding chapter. To avoid constant repetition, let us agree that while numbers between parentheses refer to items occurring in the present chapter, numbers between angled brackets refer to items contained in Chapter 8.

9.1. THE NEW ANALYSIS IS SIMPLER

The function of some components in our previous analysis was to account for the fact that *e* is always preceded by an onset, while that of others was to account for the fact that *e* is in most cases followed by a nuclear

segment. These parts of the machinery can altogether be dispensed with in the new analysis, in which *e* stands for a transition between an onset and the following nucleus.

In (1) *!šhet*, which is pronounced [*!šh@t*], is syllabified as *eš.het*, with an initial *e* to which no voiced vocoid corresponds in the pronunciation. This is but a particular instance of our general observation that only after an onset can *e* be realized as a vocoid, see (34) in § 8.3.2, where the observation was left unaccounted for. Under our new proposal, the problem disappears: what we took to be the segment *e* is actually the transition from an onset to the following segment, and since in the dissyllabic word *!šhet* the first syllable lacks an onset, there is no reason for us to expect it to be pronounced with an initial vocoid.

If there is no such thing as a postpausal occurrence of *e*, there is also no reason to worry about postvocalic schwa deletion, a question mentioned near the end of § 8.3.2. Consider the sequence *iwa !šhet* ‘then he slashed’, whose syllable structure is *i.waš.het*. If the first syllable of *!šhet* is *.š* rather than *.eš*, no deletion is involved in the derivation of the hinge syllable *.waš* by utterance-level syllabification. All that is involved is the resyllabification of a nucleus as a coda, in a manner exactly parallel to the gliding of the initial vowel of *itim* ‘orphan’, which becomes a glide in *lga ytim* ‘he found an orphan’.

Another phenomenon which ceases to be seen as a case of ‘schwa deletion’ is the alternation between @ and zero in words ending in *VCeC*. ‘Schwa deletion’ occurs in particular when the following word begins with an onsetless syllable, as in the sequence *γabet fliya* in line 6a in (28). Under our new analysis, word-level syllabification parses *γabet* as *.γa.bt.* and *fliya* as *.f.li.ya*. To avoid hiatus between the nuclei *t* and *f*, the sequence is reparsed as *fab.tf.li.ya* by line-level syllabification.¹ On the alternation between *VC@C#* and *VCC#* in other contexts, see below in § 9.2.

In our discussion of SonPeak in § 8.4 we agreed that the sonority contour of the surface forms of MA was to be computed without taking into consideration the occurrences of schwa and we commented on the paradoxical nature of that convention. We now see that there was nothing paradoxical, after all. We are proposing now that the surface representations of MA do not contain any vowel schwa, i.e. that the only feature bundles characterizing syllabic vocoids are those which characterize *a*, *i* and *u*. Feature specifications not present in a representation cannot contribute to the sonority contour of that representation.

A pause is in order to clarify our use of the symbol ‘@’ in what follows. Let us first recall the meaning of ‘e’. We use the symbol ‘e’ with two values, depending on the context. In some cases ‘e’ represents a phonological object, namely a certain feature bundle belonging to a syllable nucleus. In other

¹ For other similar instances in (28), see lines 7a, 8a, 9b and 12a.

cases ‘e’ is a letter in the standard transcriptions of MA; that letter indicates that the preceding consonant is a syllable onset, see ⟨3⟩. Turning now to ‘@’, the reader may recall that it has been used until now to represent any voiced vocoid which is not a ‘full segment’, i.e. which is neither a full vowel nor a consonant. When the symbol ‘@’ was first introduced in this book (v. § 2.2), it was indicated that the timber of @ varies depending on the surrounding segments. In § 8.2 we explained that two kinds of short voiced vocoids occur in MA. Some are manifestations of the presence of a syllable nucleus whereas others are not. To cite an earlier example, the pronunciation of *!nqes* ‘he diminished’ is [*!nʌqʌs*], which normally we note simply as [*!n@q@s*]. Until the beginning of the present section, our analysis was that the @ between *n* and *q* was a transitional vocoid, whereas the @ between *q* and *s* was the realization of the segment *e*, and our analysis was only meant to account for the second occurrence of @.

We are now entertaining the hypothesis that both kinds of @ are transitional vocoids. Let us use the expression ‘post-onset @’ and others like it to refer to a short voiced vocoid which immediately follows an onset. Our new analysis will be like the analysis which it replaces, in that it will only account for post-onset occurrences of @, e.g. it will have nothing to say about the first @ in the pronunciation [*!n@q@s*].

We are now ready to examine how our new proposal impinges on the formulation of the constraints. In a nutshell: the only constraints in ⟨99⟩ which are affected are SYLL, which must be modified slightly, and NoLoneSchwa, which vanishes.

Consider constraint SYLL, which requires, among other things, that every syllable belong to the syllable types listed in table ⟨57⟩, see the formulation in ⟨58⟩a. We give in (3) the modified version of table ⟨57⟩ which results from replacing the *eC* nuclei by the corresponding simple *C* nuclei in hollow rimes:

(3)	rime	N = [–cons]	N = [+cons]
a.	N	xi (se)	w _t
b, c	N D	mib (wet)	h _z b, h _z z
d.	N D~D	huzz	?b _n šš

The underscores indicate nuclear consonants. Like Tashlhiyt, MA now allows any segment to be a nucleus. For the time being we set aside the syllables with secondary rimes, which are indicated by parentheses.² The discussion will first proceed as though such syllables did not occur in MA. They will be dwelt upon in § 9.5.

A central fixture in our previous analysis was the constraint NoLoneSchwa ⟨60⟩, which required *e* to occur in a complex nucleus. Our

² On secondary rimes, see ⟨42⟩ and the surrounding text.

new proposal does not contain any constraint which would be the counterpart of NoLoneSchwa. Recall the facts which NoLoneSchwa was meant to account for: *eC* rimes count in most instances as light in versification, and post-onset @ does not occur word-finally or before CV. These facts now simply follow from our new conception of post-onset @. Post-onset @ is a vocoid which is produced when the articulation moves from the implementation of a feature bundle in an onset to that of a feature bundle in a nucleus. Post-onset @ cannot occur anywhere else than 'before' a nucleus, then. If constraint NoLoneSchwa disappears from the analysis, so must its rankings with the other constraints. We have given evidence for three such rankings: with FinL, SonPeak and NoCoda, and NoLoneSchwa was the higher-ranking constraint in all three cases, see ⟨99⟩. Our previous grammar contained one independent stipulation for each of these rankings. In our new account the separate facts which previously justified the three rankings are but manifestations of the same fact: the distribution of transitional vocoids is governed by the machinery of phonetic implementation, and phonetic implementation operates later than constraints FinL, SonPeak and NoCoda, which belong to the phonological component.

Note that discarding the segment *e* greatly reduces the size of the set of viable candidates for any input. Take for instance the derivation of *qleb* 'he overturned', which was first discussed in § 8.5.1 and was discussed again at the beginning of section § 8.5.5. The underlying representation of this form is (/qlb/, FinL). We reproduce again in (4) the set of viable candidates given earlier in ⟨63⟩.

- (4) .qe.le.be. .qe.leb. .eq.le.be. .qel.be. .eql.be.
 .qelb. .eq.leb.

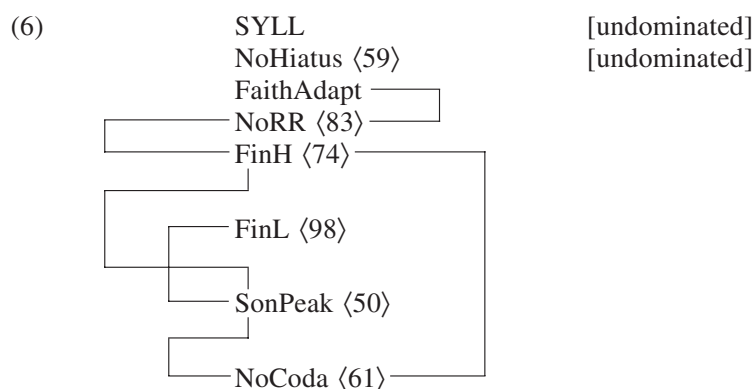
As pointed out in our discussion of ⟨63⟩, all the candidates in the first line violated NoLoneSchwa. None of these candidates has a counterpart in the new analysis. To see this, take for instance the first candidate, *.qe.le.be.*. Since in the new analysis there is no segment *e*, the counterpart of *.qe.le.be.* in this analysis would be *.q.l.b.*, a sequence of three syllables each comprised only of an onset. Such a structure clearly violates SYLL, i.e. it is not a viable candidate. The only members of (4) to have counterparts in the new analysis are the two items in the second line. The candidate set in (4) becomes that in (5):

- (5) .qlb. .q.lb.

.q.lb. is preferred over *.qlb.* for the same reason that *.eq.leb.* was preferred over *.qelb.* in the old analysis. The highest-ranked constraint relevant here is FinL, and *.q.lb.* complies with FinL whereas *.qlb.* violates it. To conclude: under the new analysis exemplified in (2), in the terminal representations of the phonological component the grammatical output for (/qlb/, FinL) would be *q.l̥b*, to be phonetically implemented as [ql@b].

The fact that sets of viable candidates are much smaller does not constitute an argument in favor of the new analysis. The point of discussing the derivation of *qleb* ‘he overturned’ was rather to illustrate that the one-to-one correspondence between the derivations under the old analysis and those under the new analysis is straightforward.

(6) below is the constraint hierarchy which results from removing NoLoneSchwa from ⟨99⟩ and reformulating SYLL ⟨58⟩ so that the well-formed syllable types become those listed in (3).³



9.2. EXPANDED HOLLOW SYLLABLES

Consider again (2)a, the representation which our new analysis assigns to *!šhet* ‘he slashed’. When uttered in isolation, this word must be pronounced [*!šh@t*], with a voiced vocoid between *h* and *t*. How can one maintain that this voiced vocoid is only a transition between *h* and *t*, while both consonants are voiceless? According to our preliminary observations on MA, both in the Oujda dialect and in the Lmnabha dialect, a short voiceless vocoid cannot occur between two voiceless consonants unless the first consonant is a syllable onset. If the post-onset schwas occurring between voiceless consonants were all manifestations of a vowel, one could claim that phonetic implementation in MA must meet the same requirement MINIMAL-PATH(voice) as in Imdlawn Tashlhiyt.⁴

Similarly, how can one maintain that the voiced vocoid which must occur in the isolation form of *hnet* ‘perjury’ is only a transition between *n* and *t*? Again, preliminary observations on the Lmnabha dialect suggest that a short voiced vocoid cannot occur between two homorganic stops differing in sonorancy unless the first stop is an onset. If post-onset schwas occurring in such sequences were all realizations of a vowel, one could claim that

³ On geminate inseparability in the new analysis, see below in § 9.4.3.

⁴ On MINIMAL-PATH(voice), see § 6.3.1.

phonetic implementation in Lmnabha MA must meet the same requirement MINIMAL-PATH(place) as Imdlawn Tashlhiyt.⁵

In the face of these objections we will weaken our claim rather than abandon it altogether. We now claim that in the general case the nucleus of a hollow syllable is a single skeletal position linked with a consonant, but that there are particular contexts in which that nucleus takes on an expanded form, with a vocoid preceding the nuclear consonant. This alternation is akin to phrase-final lengthening in other languages.⁶

Consider the following sentence.

- (7) ma fateħ bab=u 'he is not opening his door'

In (7) the participle *fateħ* 'opening' can be pronounced with a voiced vocoid between *t* and *ħ* or without. When *fateħ* is pronounced [fat@ħ] the sentence can only have the meaning indicated in (7). When *fateħ* is pronounced [fatħ], on the other hand, sentence (7) is homophonous with sentence (8) below; it is ambiguous between meanings (7) and (8):

- (8) ma fat ħbab=u 'he has not abandoned his close relations'

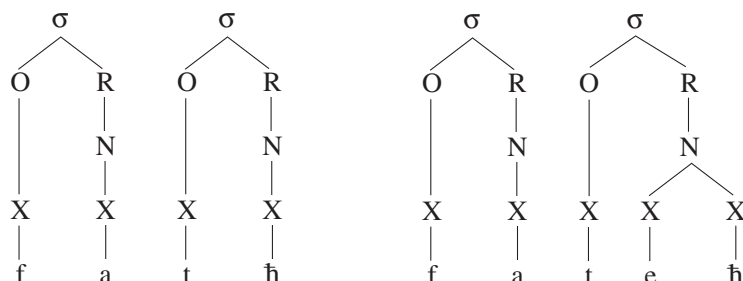
Sentence (8) has only one pronunciation; a voiced vocoid may not occur between the final *t* of *fat* and the initial *ħ* of *ħbab=u*.

The alternative pronunciations of *fateħ* in (7) are an example of what Heath (1987: 248–249) calls Forward Syncope, a free variation which affects word-final light syllables when the preceding syllable contains a full vowel.⁷ The comparison between (7) and (8) shows that Forward Syncope does not impinge on the syllable count. Both variants of sentence (7) have five syllables: *ma.fɑ.t(e)ħ.ba.bu*. In one variant the syllable *.teħ* is pronounced with an 'uncontroversial' schwa, while in the other it is voiceless throughout and homophonous with the hinge syllable *.t#ħ* in (8). We propose that the alternation between the two pronunciations of *fateħ* is one between a simple nucleus and a complex one in the last syllable, as represented below in (9).

⁵ On MINIMAL-PATH(place), see § 6.3.1.

⁶ On final lengthening, see e.g. Beckman and Edwards (1990).

⁷ See also Harrell (1962b: 17).

(9) a. [fat^h]b. [fat@^h]

In (9)b the letter 'e' stands for a tree-geometric Root node dominating the specifications [–cons] and [+voice]. These specifications guarantee that the segment occurring after *t* will be a voiced vocoid.

Let us say that a hollow syllable is basic when it has a simple nucleus, and that it is expanded when it has a complex nucleus. (9)a ends in a basic hollow syllable while (9)b ends in an expanded one. We take the basic hollow syllables to be the normal case, with the expanded hollow syllables occurring only under special circumstances. At present we are unable to spell out the exact distribution of the basic/expanded distinction; we can only make a few suggestions.

ME feels that the difference between the two pronunciations of (7) is primarily a matter of tempo: only in relatively slow pronunciations does it feel natural to pronounce a voiced vocoid in the final syllable in *fate^h* in (7). Let us speculate that the difference between the two variants of (7) is one of intonational phrasing: whereas the sentence comprises only one Intonational Phrase (henceforth: IP) at a normal rate of delivery, it is broken down into two IPs when uttered at a slower rate:⁸

- (10) a. [ma fate^h bab=u]_{IP} (normal rate, v. (9)a)
 b. [ma fate^h]_{IP} [bab=u]_{IP} (slower rate, v. (9)b)

We are assuming here that only when it is at the end of an IP can the last syllable of *fate^h* be pronounced with a complex nucleus. Here is another example, which suggests in a more direct manner that intonational phrasing is indeed involved in the alternation between basic and expanded hollow syllables. Consider the pair of sentences in (11), where the brackets indicate the edges of a subordinate clause:

⁸ In (10) below the labelled brackets indicate the edges of Intonational Phrases. On the phonological constituent 'Intonational Phrase', see Selkirk (1978) and work in its wake, e.g. Nespor and Vogel (1982), Rice (1987), Selkirk (1984).

- (11) a. [ila ma sket] fi saʕ-a te-sxef
 ‘if he does not shut up, she will faint right away’
 b. [ila ma sket fi saʕ-a] te-sxef
 ‘if he does not shut up right away, she will faint’

The two sentences differ only in the syntactic affiliation of the phrase *fi saʕa* ‘immediately’. The phrase belongs to the main clause in (11)a whereas it belongs to the conditional in (11)b. In (11)a *sket* ‘he fell silent’ must be pronounced with a voiced vocoid between *k* and *t*, a pronunciation which is only optional in (11)b. This difference is to be expected, if in (11)a the occurrence of the right edge of the subordinate clause calls for that of an IP.

Why should hollow syllables take complex nuclei when they occur at the end of an IP? Recall that complex nuclei contain voiced vocoids. The possession of a voiced vocoid is presumably a useful feature for a syllable to have, if that syllable is to be the locus of suprasegmental phenomena associated with the end of an IP. That this conjecture is on the right track is suggested by two facts.

The first fact has to do with pitch before a pause. For the last syllable of *ZVCeC* words like *fateħ* to take on their expanded form, occurrence at the end of an IP is a necessary condition but not a sufficient one, witness the fact that before a pause these words can appear either as [ZVC@C] or as [ZVCC]. However, as Heath (1987: 184) has pointed out, only [ZVC@C] is allowed when the intonation requires a pitch rise on the last syllable.

The second fact has to do with the nature of the nuclear consonant. Not all *ZVCeC* words show an alternation between [ZVC@C] and [ZVCC]. Those ending in an obstruent do, while those ending in a sonorant do not, e.g. *!damen* ‘guarantor’, *saken* ‘inhabitant’, *qawel* ‘he promised’, *bayen* ‘apparent’ only have one acceptable pronunciation before a pause, with prominence on the last syllable no matter what the intonation.⁹ Such words do not show variations dependent on tempo analogous to those exemplified in (7). Consider for instance the following pair of sentences:

- (12) a. kan ʕamel farina mʕa š=šʕir
 aux do:prt wheat with def=barley
 ‘he grew wheat with barley’
 b. kan ʕam l=farina mʕa š=šʕir
 aux year def=wheat with def=barley
 ‘(that year) was a year with wheat and barley’

⁹ This generalization simplifies slightly. Words of the form *ZVL@N* (L a liquid, N a nasal) allow the alternation between [ZVL@N] and [ZVLN], e.g. *salem* ‘unharméd’, *!dalem* ‘unjust’. The alternation in these forms is left unaccounted for by the analysis proposed below.

The structural difference between (12)a and (12)b is parallel with that between (7) and (8), and yet the facts about pronunciation are different. Whereas (7) has two contrasting pronunciations, one of which cannot be a pronunciation of (8), (12)a can only be pronounced in one way; it is homophonous with (12)b unless the ambiguity is avoided by artificial means such as the insertion of pauses, i.e. the momentary cessation of articulation.

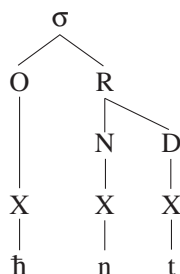
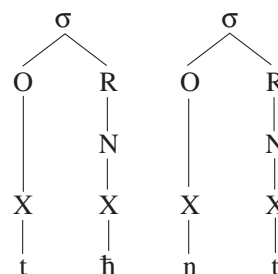
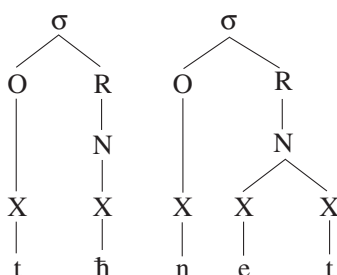
Whereas the final syllable in *fateħ* has the two variants depicted in (9), the final syllable in *ſamel* has only one. Which variant does it lack? Since *.mel.* is homophonous with the hinge syllable *.m#l.* in (12)b and since syllables of the form *.C#C.* have simple nuclei, we are led to the conclusion that the final syllable of *ſamel* does not have an expanded variant. We conjecture that it does not have one because it does not need one: the sonorant consonant in its nucleus provides enough elbow room for the deployment of suprasegmental features. We have reached the following generalization: hollow syllables have simple (vowelless) nuclei, except when they are IP-final and their nuclear consonant is an obstruent, in which case their nucleus is complex, with schwa occupying the first skeletal position.

It should be possible to modify the constraints recapitulated in (6) so as to make them select well-formed representations meeting the above generalization, but we will not attempt such a reformulation, because we feel that little genuine insight would be gained thereby. Instead, as a makeshift device for the sake of explicitness, we posit the following rule, which operates on the syllable structures generated by the constraints in (6):

(13) IP-Final Epenthesis:

In the last syllable of an Intonational Phrase, if the nucleus does not contain a sonorant, make it complex by inserting *e* before the nuclear consonant.

Take for instance *ħent* ‘perjury’ and *te-ħnet* ‘you perjured yourself’. The underlying forms of these words are respectively (*/ħnt/*, FinH) and (*/t-ħnt/*, FinL). The syllable structures assigned to these inputs by the constraints are displayed below in (14)a and (14)b.

(14) a. *ħent* (all env)b. *te-ħnet* (not IP-final)c. *te-ħnet* (IP-final)

Since in (14)a the nucleus is a sonorant, the epenthesis rule does not apply and (14)a is the representation of *ħent* in all contexts. In (14)b, on the other hand, there are two syllables neither of which has a sonorant in its nucleus. When (14)b occurs at the end of an IP the rule turns (14)b into (14)c, but elsewhere (14)b remains unchanged. Since the rule operates only on IP-final syllables, it leaves the first syllable of (14)b unaffected no matter in what context. In our analysis there is no process of schwa devoicing.

IP-Final Epenthesis guarantees that at least one sonorant must occur in an Intonational Phrase. This generalisation seems more accurate than Mitchell's (1993: 61), according to whom words spoken in isolation and utterances must all contain at least one voiced vocoid. Mitchell's statement is not true of the varieties of MA spoken in Lmnabha and Oujda, where even in isolation a word like *ftel-t* 'I rolled' may very well be pronounced [ftlt], with /tlt/ realized with an uninterrupted period of coronal closure.

A question which comes up naturally at this point is that of stress in MA. Authors who are otherwise mindful of phonetic detail deny the existence of any clear pattern of word accentuation in MA.¹⁰ We greatly doubt that

¹⁰ See Heath (1987: 266), Mitchell (1993: 144) and Durand (1995/96). El Mejjad (1985: 158 ff.) reports a predictable difference between final stress and penultimate stress in Marrakesh MA. Benhallam (1990) and Durand (1995/96) contain partial surveys of the meagre literature on stress in MA.

Lmnabha MA possesses anything that one could call word stress. The little evidence that we have managed to gather suggests that the stress of Lmnabha MA is rather similar to that of Parisian French, where stress is a property of phonological constituents larger than the word, presumably IPs, and where the main stress of an IP occurs on the last syllable or on the penultimate.¹¹ Prominent syllables in Lmnabha MA seem to have even less auditory salience than in Parisian French, witness the fact that in Lmnabha MA it is even more difficult than in Parisian French to devise pairs of sentences with patterns of prominence which are in clear contrast. We give one such pair in (15).

- (15) a. ža ħemmu, la tub ħrir mʕa=h
 come:3ms Hemmu (proper name), not cloth silk with=3ms
 ‘Hemmu came (and) he had no silk cloth with him’
- b. zaħem mula tub ħrir
 jostle:3ms the:one:with cloth silk
 ‘he jostled the one with silk cloth’

If the third syllable in (15)b (*mu*) is pronounced with the degree of prominence required on that in (15)a, the resulting pronunciation of (15)b is ill-formed. Note that in order to secure a clearcut contrast in (15), we had to make use of a break between clauses, as we did in (11).

In the alternative pronunciations of *fateħ* in (7) and in those of *sket* in (11)b an uncontroversial schwa alternates with a putative one. When we made the distinction between uncontroversial schwas and putative ones at the end of § 8.2, our discussion implied that the phonological constituent relevant for describing their distribution was the word. We have just seen that the constituent involved is larger than the word. The reason the difference between W-final and W-internal contexts seemed relevant then (see <8>) is simply that at the time we only considered words pronounced in isolation, i.e. words which are prepausal and postpausal at the same time. Facts about the edges of a word pronounced in isolation are actually facts about the edges of a Phonological Utterance coextensive with that word.

IP-final syllables with nuclear obstruents are not the only hollow syllables in which positing a vowel seems unavoidable in Lmnabha MA. A vowel schwa must also be posited in [@w] diphthongs and in one class of templatic plural nouns. Discussion of these is deferred to § 9.3.3. and § 9.5 for reasons of expository convenience.

As noted in section § 8.2.2, MA shows dialectal variation as to which hollow syllables may/must be realized with a voiced vocoid between the onset and the nuclear consonant. Consider example <1> /tt-kšf-tu/ ‘you (p)

¹¹ See Dell (1984).

were manhandled', whose syllabic parse is *t.tk.ʃf.tu*. That form may be pronounced [t:kš@ftu] in Oujda, but not in Lmnabha, where only [t:kšftu] is acceptable. In terms of the analysis set forth in this chapter, the penultimate syllable in *t.tk.ʃf.tu* may have a complex nucleus in Oujda but not in Lmnabha. Impressionistic observations by ME suggest that Southern MA, which includes the dialect spoken in Lmnabha, stands at one end of the spectrum of variation, with complex nuclei occurring only in a very limited range of contexts. The dialects which stand at the other end of the spectrum are certain varieties of MA spoken in the 'Oriental' (Morocco's eastern province) and also the Aroubi (i.e. bedouin) dialects in use in the countryside around Casablanca and Rabat.

Let us go back to [t:kš@ftu] and [t:kšftu]. Both are acceptable pronunciations of /tt-kšf-tu/ in Oujda whereas only the latter is in Lmnabha. According to our analysis, what is involved in the free variation in Oujda as well as in the dialectal variation between Oujda and Lmnabha is the difference between a complex nucleus (*ef*) and a simple one (*f*). It is important to note that the representations involved in this claim are those extant at the most superficial level of the phonological component. Our analysis of the alternations between post-onset schwa and zero has no obvious bearing on the question whether post-onset schwas are epenthetic, as we claim they are, or are instead derived from underlying vowels.¹²

9.3. COMPARING TASHLHIYT AND MA

In our new analysis all the hollow syllables except certain IP-final ones are vowelless. As a consequence of this, only minor differences now separate the internal structure of syllables in MA from that in Tashlhiyt. In this section we discuss two consequences of this state of affairs for characterizing the differences between MA and Tashlhiyt. First, the main difference between syllabification in the two languages now resides in the fact that constraint SonPeak is more strictly enforced in Tashlhiyt than in MA. Second, the reason why certain sequences in MA are homophonous with certain sequences in Tashlhiyt is straightforward: these sequences have identical representations at the output of the phonological component in both languages. We now take these points in turn.

9.3.1. *Well-formed sequences of syllables in MA and in Tashlhiyt*

When one compares the surface phonologies of Imdlawn Tashlhiyt (ITB) and Lmnabha MA, one conspicuous difference is that the occurrence of short voiced vocoids is required by certain contexts of MA, while it is forbidden

¹² A good example of the latter view is Kouloughli's (1978) analysis of an Algerian dialect.

in those same contexts in Imdlawn Tashlhiyt. Consider the following pair.

- (16) a. (ITB) sɣ=t [sxt] /sɣ=t/ ‘buy it (m)’¹³
 b. (MA) !sɛt [!s@xt] /sxt/, FinH ‘cursing’¹⁴

Both forms are heavy monosyllables with [x] in the nucleus (.sxt.) but neither is an acceptable isolation form in the other language. MINIMAL-PATH(voice) forbids the occurrence of a voiced transitional vocoid between *s* and *x* in the Imdlawn Tashlhiyt form in (16)a, while IP-Final Epenthesis requires the occurrence of a vowel between *s* and *x* in the MA form in (16)b.

This difference between the two languages is a striking one, especially when one concentrates on words pronounced in isolation, a context in which the effects of IP-Final Epenthesis are most readily observed. However the difference should not obscure a more central one, which has to do with syllabification itself, rather than with the distribution of short voiced vocoids. Very roughly: the *syllable types* available in both languages are the same, but one language imposes stricter limitations than the other on *syllable sequences*. If the analysis proposed above is adopted, a crude characterization of the difference between the syllable structures of Tashlhiyt and MA would run like this: setting aside special cases such as IP-final hollow syllables with nuclear obstruents (see § 9.2) and *CCeC* plural forms (see § 9.5), there is little difference between the internal structure of syllables in Tashlhiyt and in MA;¹⁵ the differences between the two languages reside rather in the range of possible syllabic parses which each language allows for a given string. In Tashlhiyt the only information present in the input strings which is relevant for syllabification is the feature content of the segments and their linear ordering. Except in special cases,¹⁶ a given string of segments can only be syllabified in one way. In MA, on the other hand, in addition to distinctive features, syllabification must also take into account morpho-syntactic structure. MA often allows the same string of segments to be parsed in several different ways depending on the location of word boundaries and on the internal structure of words.

Consider the expressions in (17), the first two from MA and the last from Tashlhiyt.

¹³ buy:aor=do3s. Underlying /ɣ/ devoices before the following /t/.

¹⁴ Cf. !sxet ‘he cursed’.

¹⁵ Compare table (3) above with the inventory of syllable types given for Tashlhiyt in table (28) in § 4.6.

¹⁶ See § 4.9.

- (17) a. (MA) l=ʕadel ħnet ‘the notary committed perjury’
 b. (MA) had l=ħent ‘this perjury’¹⁷
 c. (ITB) dlħ-n=t ‘they smashed into him’¹⁸

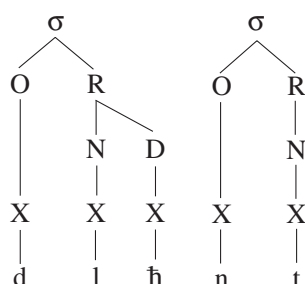
ME cannot detect any difference between his pronunciation of the string /dlħnt/ in the MA expression in (17)b and his pronunciation of the Tashlhiyt expression in (17)c. He furthermore reports that a characteristic feature of the pronunciation of MA by native speakers of Tashlhiyt is the faulty pronunciation of *CCeC* forms like the verb *ħnet* at the end of (17)a.

The expressions in (17) are reproduced below side by side with their syllabic parses:

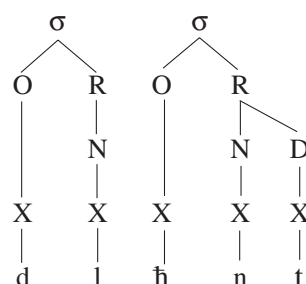
- (18) a. (MA) l=ʕadel ħnet .l.ʕa.dlħ.nt.
 b. (MA) had l=ħent .ha.dl.ħnt.
 c. (ITB) dlħ-n=t .dl.ħnt.

The parses of the MA expressions in lines a and b are those consistent with our new analysis, before IP-Final Epenthesis changes *t*, the last nucleus in (18)a, into *et*. That of the Tashlhiyt expression in line c is consistent with the analysis of Tashlhiyt syllabification propounded in Chapter 4. The representations of the last two syllables in the expressions in (18) are given below in (19).

- (19) i. .dlħ.nt. (MA)



- ii. .dl.ħnt. (MA and ITB)



In the terminal representations of the phonological component, the string /dlħnt/ in the MA expression in (18)b and that in the Tashlhiyt expression in (18)c have the same representation, viz (19)ii, a fact which is consistent with their being pronounced alike. As for dlħ.n̩t̩ (see (19)i), that representation is ill-formed in Tashlhiyt because *n* violates SonPeak. According to our analysis, the reason the *CCeC* words of MA which violate SonPeak are difficult to pronounce for Tashlhiyt speakers, is that the phonological component of Tashlhiyt cannot generate the appropriate syllable

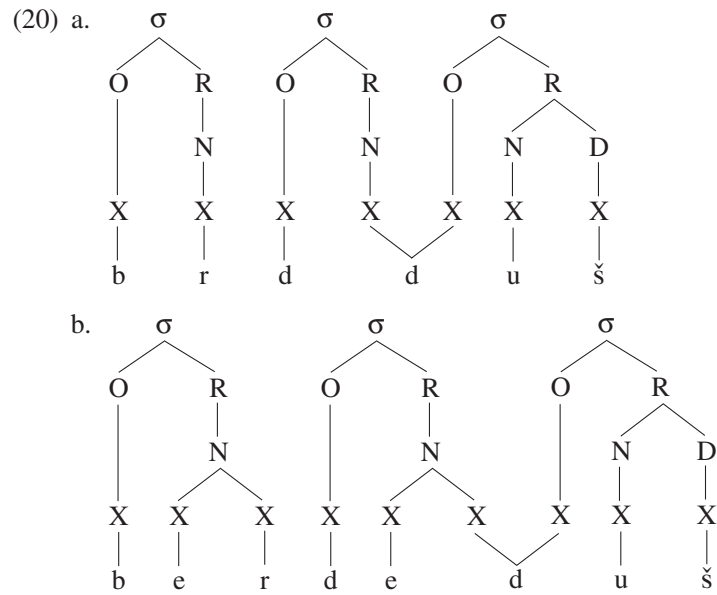
¹⁷ *ħent* is a noun derived from *ħnet* ‘to perjure oneself’.

¹⁸ percuss-3mp=do3ms.

structure for these forms. Tashlhiyt speakers learning MA are already endowed by their mother tongue with all the machinery necessary for a correct pronunciation of MA *dl.ħnt*. To pronounce correctly *dl.ħnt*, on the other hand, these speakers have to learn to compute syllable structures with SonPeak violations disallowed by their native grammars. We have explained earlier how SonPeak violations which would be lethal in Tashlhiyt come about in well-formed MA utterances: word-level syllabification creates SonPeak violations (FinL is ranked higher than SonPeak), and these violations are not mended by utterance-level syllabification. Another source of such violations is the fact that the sonority scale of MA is less differentiated than that of Tashlhiyt.

9.3.2. Strings pronounced alike in MA and in Tashlhiyt

With the old analysis, in which every hollow syllable of MA contains a vowel, we face an awkward situation when we compare sequences which sound alike in MA and in Tashlhiyt: the same voiced vocoid is the realization of a vowel in MA, while in Tashlhiyt it is only a transition between consonants. Consider for instance the noun meaning ‘marjoram’, which has identical pronunciations in MA and in Tashlhiyt: [brd@d:uš].¹⁹ The surface representation of the MA form, according to our present analysis, is that displayed below in (20)a; (20)b will become relevant later.



¹⁹ The Tashlhiyt form was discussed briefly in § 6.4.1. The MA noun has a variant *merdedduš*, the only one given in Harrel and Sobelman (1966).

(20)a is also the terminal representation of the Tashlhiyt form according to the analysis expounded earlier in this book. Under the present analysis of MA, then, the reason why the MA word and the Tashlhiyt word sound exactly alike is simply that they have identical terminal representations.

Under our previous analysis of MA, on the other hand, the terminal representation of the MA word is (20)b, and we are left with the problem of explaining how the phonetic implementation components in the grammars of Tashlhiyt and MA associate homophonous pronunciations with (20)a and (20)b.

For the same terminal representation (20)a to give rise to homophonous pronunciations in Tashlhiyt and in MA, phonetic implementation must operate on (20)a in the same way in both languages. The little relevant data which we have gathered suggests that there is indeed a close similarity between the phonetic implementation components of the two grammars.

To give just one example, let us take the verb /žbd/ 'pull', which exists both in Lmnabha MA and in Imdlawn Tashlhiyt, and let us compare the pronunciations of similar forms of the MA and the Tashlhiyt verbs. We will compare them first in isolation, a context in which they are pronounced differently, and then embedded in a sentence in which they sound alike.

- | | | | |
|--------------|---------------|----------|---------|
| (21) a. (MA) | /t-žbd/, FinL | .tž.bed. | [tžb@d] |
| b. (ITB) | /t-žbd/ | .tž.bd. | [tžb@d] |

(21)a is the 3fs imperfective form, which the standard transcriptions of MA note *težbed*; (21)b is the 3fs perfective form in Tashlhiyt, *tžbd* in the transcription used elsewhere in this book. The syllabic parse given above for the MA form is that which obtains in isolation, a context in which IP-Final Epenthesis operates. We give [tžb@d] as the narrow phonetic transcription of the isolation forms of both words, but that transcription leaves unexpressed clear differences between the two pronunciations.

In the isolation form of MA *te-žbed*, [@] sounds like a full-blown vowel and the second syllable is more prominent than the first, e.g. it carries the main pitch event in the word. In the isolation form of Tashlhiyt *t-žbd*, on the other hand, [@] sounds much shorter and the main pitch movement is on [ž]. According to our analysis, these differences are due to the operation of IP-Final Epenthesis (13). @ is the realization of a vowel in the MA form whereas it is a mere transition from *b* to *d* in the Tashlhiyt form.

While they must be pronounced differently in isolation, the two forms can be homophonous in nonprepausal environments. Consider the following pair of (incomplete) sentences:

- (22) a. (MA) baš te-žbed bezzaff
 ‘for her to pull hard’
 b. (ITB) a wr t-žbd bzzaff²⁰
 ‘that she did not pull hard’

When (22)a is pronounced at a normal speed, ME finds it homophonous, from *t* onwards, with (22)b. At a normal speed (22)a presumably constitutes a single Intonational Phrase, and consequently IP-Final Epenthesis does not operate in the last syllable of *tž.bd*. According to our analysis, in the output of the phonological component (22)a and (22)b have representations which are identical from *t* onwards: *tž.bd.bz.zaff*. If the relevant aspects of phonetic implementation are identical in the two languages, one expects the pronunciations of (22)a and (22)b to be identical from *t* onwards, as indeed they are.²¹

9.3.3. *Glides which are sonority peaks*

In this book we are assuming that glides have the same feature content as the corresponding high vowels.²² Under this assumption, syllabifying a glide as a syllable nucleus turns it into a high vowel. According to the analysis of MA proposed at the beginning of this chapter, a consonant may be the sole content of a nucleus in certain environments; when glides occur in those environments, then, the analysis predicts that they should surface as high vowels. As we shall see below, there exists one class of cases in Lmnabha MA where the prediction is incorrect. Before we turn to these cases, let us present our background assumptions about high vocoids in the underlying representations of MA and illustrate them by examining cases which are not problematic for our analysis.

We assume that in the representations which are inputs to syllabification the difference between high vowels and glides is that the former, but not the latter, are already associated with a nucleus node.²³ Let ‘U’ stand for the feature bundle [–cons, +high, labial . . .]. In the input to syllabification, ‘u’ represents U associated with a N node, whereas ‘w’ represents U without any associated syllable structure:

²⁰ *a wr*, AD neg (/ad ur/).

²¹ (22)a allows an alternative pronunciation for which (22)b has no counterpart. That pronunciation, which is slower, differs from the first in that the vocoid between *b* and *d* at the end of the verb is auditorily more salient. We assume that that longer vocoid is the realization of the vowel inserted by IP=Final Epenthesis when (22)a contains two IPs: [baš te-žbed] [bezzaff].

²² See Chapter 7. For some interesting discussion of the syllabification of high vocoids in MA, see Keegan (1986) and Heath (1987).

²³ In his discussion of the high vocoids in the Ait Seghrouchen variety of Tamazight Berber, Guerssel (1986) proposed that high vowels have a preassociated rime node.



Similarly, if 'I' stands for the feature bundle [-cons, +high, coronal . . .], 'i' in the input to syllabification represents I with an attached N node and 'y' stands for a bare I.

9.3.3.1. Vocalized glides

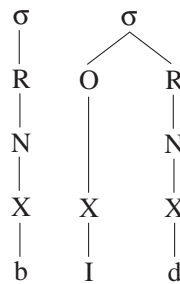
In the input to syllabification, then, glides do not differ from the other consonants, which are also without associated syllable structure, and one expects glides and contoids to behave alike in syllabification. This expectation is fulfilled to a point.

Consider the *CCeC* adjective *!byed* 'white' and its fs form *!bid-a*. The underlying form of *!byed* is (*!byd/*, FinL), which is syllabified as *.b.yd.*, whence *.b.y@d.* by IP-Final Epenthesis (13). In (24) below are displayed (a) the representation of *!byed* prior to syllabification, (b) the well-formed output *!byed*, (c) for the sake of comparison, the surface form *!bid*, which is not a possible pronunciation of *!byed*, and (d) the surface representation of *!bid-a*.

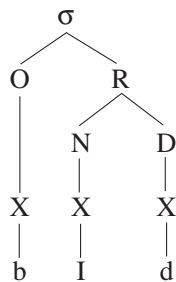
(24) a. *!byd/*

*!bId]*_L

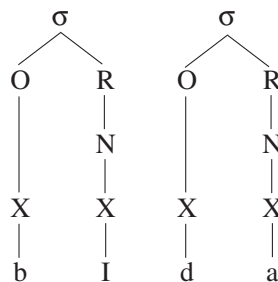
b. *!byed*



c. **!bid*



d. *!bida*

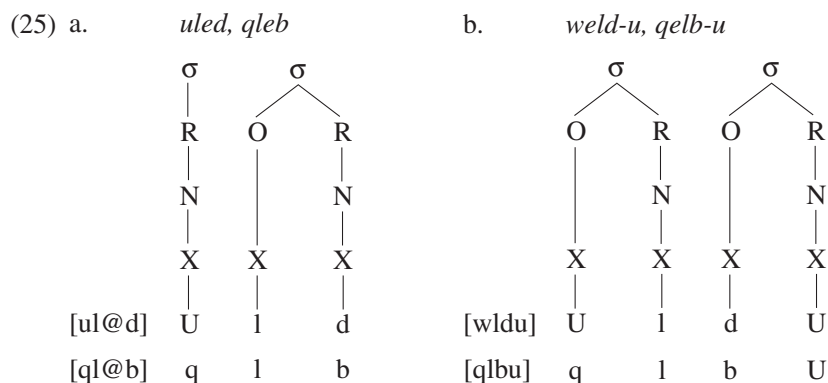


The bracket labelled L in (24)a represents the template FinL. Note that the representation displayed in (24)b is not the final output *.b.y@d.*, but rather *.b.yd.*, which obtains before epenthesis applies. Since IP-Final Epenthesis is irrelevant to the present discussion, we abstract away from it whenever convenient.

.b.yd. is a better candidate than *.bid.* for the same reason as (/qlb/, FinL) ‘he overturned’ yields *.q.lb.* rather than *.qlb.* (*qleb* rather than *qelb*, in standard transcriptions): unlike *.qlb.*, *.q.lb.* violates SonPeak, but this violation is the cost to pay in order to avoid violating template FinL, which is ranked higher than SonPeak (see § 8.5.5).

Consider next *!bid-a* (/!byd-a/), the fs form of *!byed*, which is represented above in (24)d. The medial /l/ in the kernel is syllabified as a nucleus in /!byd-a/ for the same reason as /l/ is syllabified as a nucleus in /qlb-u/ ‘they overturned’, which is realized as *ql.bu*.²⁴

Another example of underlying glides which surface as high vowels as predicted by our analysis is found at the beginning of *CCeC* verbs whose first C is a glide, e.g. (/wld/, FinL) ‘give birth’. The pronunciation of /wld/ ‘he gave birth’ is [ul@d] or [ʔul@d] and that of /wld-u/ ‘they gave birth’ is [w(@)ldu], where the parentheses around ‘@’ are a reminder of our general inability to distinguish auditorily between [CR] and [C@R] when R, a consonantal sonorant, is syllabic.²⁵ These surface forms, *uled* and *weld-u* in standard transcriptions, are represented below in (25). The syllabic parses of *qleb* ‘he overturned’ and *qelb-u* ‘they overturned’ are added underneath to illustrate the parallelism with run-of-the-mill *CCeC* verbs.



MA is much more liberal than Tashlhiyt in the range of violations of SonPeak which are allowed to syllable onsets. The reader may recall that

²⁴ On the derivation of this form, v. § 8.5.1.

²⁵ On this inability, see § 6.3.2. and § 8.2.2. Parenthesized ‘@’ will be omitted from such sequences in the forms cited below.

in Imdlawn Tashlhiyt the only onsets which are found to violate SonPeak are occurrences of *w* preceding a nucleus which is a coronal consonant or fricative,²⁶ e.g. in the medial syllable in *t.wn.za*, the bound form of *t-a-wnza* ‘fringe of hair’. In MA, on the other hand, both *y* and *w* can be onsets in violation of SonPeak, and there are no restrictions on the consonants which may be nuclei after such onsets, see e.g. the nuclear *d* which follows onset *y* in *!byed* ((24)b). MA’s greater tolerance of onset glides violating SonPeak is merely a particular instance of its greater tolerance of SonPeak violations, which is due, as has been explained earlier, to the ranking of SonPeak below FinH and FinL.

As in Tashlhiyt, hollow syllables with a glide in onset position give the impression of beginning with an opening diphthong. Consider for instance */wdn-in/* ‘ears’, for which our analysis predicts the terminal representation *wd.nin*, with *d* as the nucleus in the first syllable. This word sounds like [wɔdnin]. Its first syllable does not meet the conditions of IP-Final Epenthesis (13). According to our analysis, the vocoid which is heard in *.wd* when the articulators move from *w* to *d* is not the manifestation of a segment, but a mere transition. Later we will encounter short vocoids adjacent to glides which cannot be construed in this fashion, but before we turn to such cases, let us review a few more in which the glides behave as our analysis leads one to expect.

When a geminate glide follows a consonant its first half is realized as the corresponding high vowel.²⁷ On each line in the examples below, the form on the right contains a medial geminate:

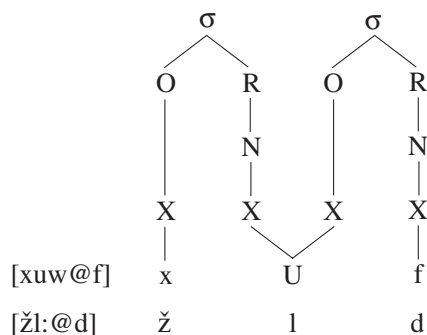
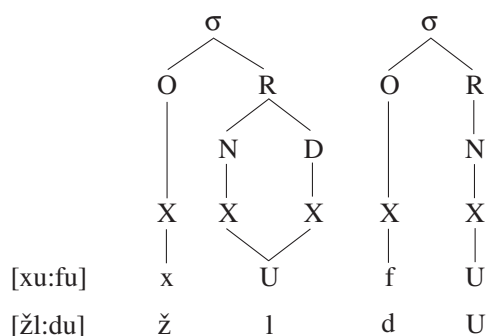
- | | | | | |
|---------|------|----------|--------|---------------------|
| (26) a. | ħerz | ‘amulet’ | ħerrez | ‘make amulets’ |
| b. | želd | ‘skin’ | želled | ‘cover with a skin’ |
| c. | xuf | ‘fear’ | xuwef | ‘frighten’ |
| d. | gid | ‘fetter’ | giy@d | ‘put fetters on’ |

We give below in (27) the representations of */xwwf/* *xuwef* ‘he frightened’ and */xwwf-u/* *xuwf-u* ‘they frightened’, prior to the operation of IP-Final Epenthesis. To illustrate the parallelism with the other *CeC:eC* verbs, we add underneath the surface forms of */žlld/* *želled* ‘he covered with a skin’ and */žlld-u/* *želld-u* ‘they covered with a skin’.

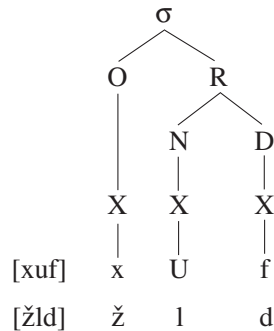
²⁶ See § 7.3.1.

²⁷ For similar facts in Imdlawn Tashlhiyt, see § 7.4. As in Tashlhiyt, a crucial factor in the syllabification of geminates is the constraint NoOns~, which forbids the first half of a geminate to be an onset. On the role of NoOns~ in Tashlhiyt, v. § 4.8. The role of this constraint in MA will be taken up later, see the text below (46) in § 9.4.3.

(27)

xuwef, želled*xuwf-u, želld-u*

As a last case in which our analysis does not require any additional machinery to accord with the data, consider the *CeCC* forms with medial glides. We saw earlier that /CCC/ kernels surface as *CCeC* when they are associated with template FinL, and as *CeCC* when they are associated with template FinH. When the medial consonant is a glide, (/CCC/, FinL) still surfaces as *CCeC*, as illustrated by *!byed* in (24)b. As for (/CCC/, FinH) forms, our analysis predicts that they should be phonetically indistinguishable from forms derived from /CVC/ with a medial high vowel, e.g. (/xwf/, FinH) ‘fear’ surfaces as *xuf*, ((26)c) for the same reason as (/žld/, FinH) surfaces as *želd* ((26)b). The surface forms of *xuf* and *želd* are displayed below in (28).

(28) *xuf, želd*

Like Tashlhiyt, MA has a process of *u* fronting which affects *u* but not *w* and operates in similar contexts.²⁸ This process regularly applies to the occurrences of *u* which are surface reflexes of /w/, e.g. those in /ksw-t=u/ *ksutu* ‘his suit’ and /šhw-t=u/ *šhutu* ‘his appetite’.²⁹ The actual pronunciations of these forms are [ksötu] and [šhötu].

9.3.3.2. @w diphthongs; NoRR violations

Our analysis predicts that glides which are syllabified as nuclei should be realized as high vowels. In Lmnabha MA the prediction is borne out in most cases, as illustrated in the above discussion, but not in all. Nuclear /w/ is in some contexts realized as the diphthong @w. Consider for instance /wsws-u/ ‘they mislead’.³⁰ This form can be pronounced either *us@ws-u* or *usus-u*, the latter variant characteristic of a faster tempo. *usus-u* is homophonous with *u#sus-u* ‘and let them shake down!’.³¹ In either expression the second syllable contains an occurrence of the full vowel *u*. In *us@ws-u*, on the other hand, the second syllable contains a closing diphthong. That diphthong cannot be construed as an instance of *uw*: *us@ws-u* is not homophonous with /u#swws-u/ *u#suwsu* ‘and they are worm-eaten’, an expression in which the second syllable contains a steady-state long *u* ([usu:su]).³² We give other examples below. The forms on the right are derived from those on the left by adding the fs suffix /-a/ or the 3ms possessive clitic /=u/ (‘cross-eyed, f’, ‘his time-table’, etc.):

²⁸ On *u* fronting in Tashlhiyt, v. § 3.8. On that process in MA, see Elmedlaoui (1995a: 222–227). *u* fronting also applies in the Moroccan pronunciation of Classical Arabic.

²⁹ The uncliticized forms are *kesw-a* and *šehw-a*. The suffix /-a/ becomes /-t/ before a possessive clitic.

³⁰ Cf. /wsws/ [usw@s] ‘he mislead’.

³¹ Cf. *sas* ‘he shook down’, *sus* ‘shake down!’.

³² Cf. /swws/ [suw@s] ‘it is worm-eaten’.

(29)

a. /ħwl/	ħwel	‘cross-eyed’	/ħwl-a/	ħ@w.la / ħula
b. /ŷwž/	ŷwež	‘twisted’	/ŷwž-a/	ŷ@w.ža / ŷuža
c. /!ŷwr/	!ŷwer	‘one-eyed’	!/ŷwr-a/	!ŷ@w.ra / !ŷura
d. /ždwl/	žedwel	‘time-table’	/ždwl=u/	ž.d@w.lu
e. /mzwd/	mezwed	‘ko bag’	/mzwd=u/	m.z@w.du

In some forms, e.g. in (29)a–c, nuclear /w/ can be realized either as @w or as *u* depending on speech rate, but there are others in which it can only be realized as @w, v. examples (29)d,e. We cannot go into the details about the contexts which allow a nuclear glide to surface as a diphthong. Suffice it to say that in Lmnabha MA this can only happen with /w/, and that the diphthong @w cannot occur at the beginning or at the end of a word.

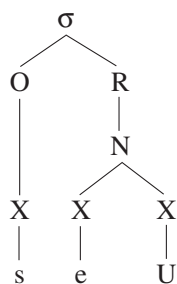
Once it is assumed that [u] and [w] are but two manifestations of the same bundle of distinctive features, one is forced to construe the schwa in @w diphthongs as a segment in its own right, and not as a mere transition between segments.

The nuclear diphthongs of Lmnabha MA are the same thing as the ‘syllabic semivowels’ which Heath (1987) has reported in Fes/Meknes MA. In that dialect, according to Heath, underlying glides which occur as syllable nuclei have two types of realizations depending on context. Some undergo vocalization and become phonetically indistinguishable from full vowels, whereas others surface as segments which he calls ‘syllabic semivowels’ (v. pp. 238, 269, 288). According to the author the syllabic semivowels do not show the same allophonic variations as the full vowels (e.g. in ‘emphatic’ contexts), and the transition between them and the preceding consonant ‘may resemble a faint schwa’ (p. 269). As we have just seen, Heath’s transition is actually a segment.

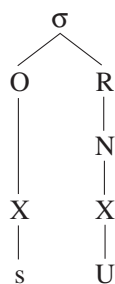
The representations of the medial syllables in the free variants *us@ws-u* and *usus-u* are displayed below in (30)a,a’.

(30)

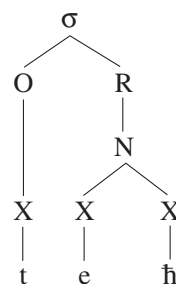
a. [s@w]



a'. [su]



b. [t@h]



b'. [th]



The displays on the right-hand side are given for the sake of comparison. They represent the variant pronunciations of the last syllable in *fateħ* in (10); they are reproduced from (9).

The pairs in (30) represent the only two classes of cases so far in which Lmnabha MA has a surface contrast which requires positing a *segment* schwa.³³ The two categories of contrast differ in their context of occurrence and in the feature content of the nuclear segment. The displays on the right-hand side illustrate a contrast which only occurs in word-final syllables whose nuclear consonant is an obstruent. (30)b and (30)b' are contextual variants; the choice between them depends on phrasing, as explained in § 9.2. The displays on the left-hand side in (30) illustrate a contrast which only occurs in nonfinal syllables with *U* in their nucleus. Not all words in which @w occurs have an alternative variant with *u*.

The distinction between simple and complex nuclei illustrated on the right-hand side of (30) is needed for heavy syllables as well as for light ones. On the other hand the distinction between @w and *u* seems to be limited to light syllables; [CuC] syllables are easy to come by, but we have not encountered any syllable of the shape [C@wC]. In view of this gap, one might wonder whether [C@w] syllables are indeed light, as implied by the representation in (30)a. That they are is shown by their behaviour in singing. We give below one line of poetry coined by ME on the meter of (30). In that line the second syllable of the word *m.z@w.du* (v. (29)e) occupies a L position and the line is well-formed. For the sake of comparison we give another line in which the same L position is occupied by the first syllable in /mzwd/ *mezwed* (v. (29)e), whose status as a light syllable is not in doubt:

- (31) H L L L L L H H L
 a. gim t#m **z@w** du ya leħ bab bay na
 b. gim t#l **mez** wed ya leħ bab bay na

The text of these lines is given in (32) and their meaning in (33):

- (32) a. gim-t mzewd=u, ya le=ħbab, bayn-a
 b. gim-t l=mezwed, ya le=ħbab, bayn-a
 (33) a. the value of his bag, O (my) friends, is obvious
 b. the value of the bag, O (my) friends, is obvious

Before leaving the glides we must dwell briefly on violations of constraint NoRR, which disallows rimes in which the coda has a higher sonority than the nucleus, v. § 8.5.3. We saw in § 7.3.3 that Imdlawn Tashlhiyt allows hollow rimes with a [+son, +cons] segment in the nucleus and *w* in the coda.

³³ A third case will be discussed in section § 9.5.

MA has similar violations of constraint NoRR, in which the offending coda glide can be *y* as well as *w*.

Consider for instance the participle /m-drws/ *mderwes* ‘feeling dizzy’ and its fs form /m-drws-a/. In view of what precedes one might expect the pronunciation of /m-drws-a/ to be *med.ru.sa* or *med.r@w.sa*. This form must actually be realized as *m.drw.sa*, with *r* as the nucleus of its second syllable. The facts about the pronunciation of syllables such as .*drw*. are the same as in Tashlhiyt, see § 7.3.3. The vocoid which follows *r* differs from realizations of /u/ and /ww/ in the same environment. The form *m.drw.sa* contrasts with /m-drus-a/ *med.ru.sa*, the fs participle of *dres* ‘thresh’, whose kernel has the underlying shape /CCuC/, as in the case of any other /CCC/ verb. The vocoid which follows *r* in *m.drw.sa* is furthermore different from that in /t-rwwn-u/ *t.ruw.nu* ‘that you (p) mess up’. We give below other examples with .CCw. syllables in Lmnabha MA. In these examples the forms on the right are derived from those on the left by adding the 3p desinence /-u/ or the 3ms possessive clitic /=u/ (‘they dried suddenly’, ‘his make-up pencil’, etc.).³⁴

(34)

a. /šlwħ/	šelweħ	‘he dried suddenly’	/šlwħ-u/	.šlw.ħu.
b. /mrwd/	merwed	‘make-up pencil’	/mrwd=u/	.mrw.du.
c. /!fryt/	!feryet	‘he scrapped’	/!fryt-u/	.fry.tu.
d. /knw-a/	kenwa	‘nickname’	/knw-t=u/	.knw.tu.
e. /qlw-a/	qelwa	‘testicle’	/qlw-t=u/	.qlw.tu.

Standard transcriptions of the forms on the right-hand side would be *šelwħu*, *merwdu* and so on.

In Lmnabha MA, then, glides are licit codas in hollow syllables, provided the preceding consonant is a sonorant. When /w/ occurs in forms analogous to those in the right-hand side of (34), but with an obstruent preceding it, it must belong to a nucleus. This nucleus is @w in some cases, *u* in others, and @w in free variation with *u* yet in others. The complementary distribution between coda *w* and @w is for instance found in most /CCwC/ kernels, compare (34)a,b, in which /w/ follows a sonorant, with (29)d,e, in which /w/ follows an obstruent. As for that between coda *w* and *u*, it occurs for instance in the possessed forms of the /CCw-a/ nouns: *w* is a coda in *knw.tu* ‘his nickname’ and other similar forms in which it is preceded by a sonorant (v. (34)d,e), whereas it surfaces as a full vowel when the preceding consonant is an obstruent, as in /škw-t=u/ *škutu* ‘his goatskin bottle’ or /nšw-t=u/ *nšutu* ‘his addiction’.³⁵ Finally, for a case in which coda *w* is in complementary distribution with *u* and @w in free variation, compare

³⁴ The fs suffix /-a/ becomes /-t/ before a possessive clitic.

³⁵ The uncliticized forms are *šekw-a*, *nešw-a*.

(34)a,b with the already cited /wsws-u/ 'they mislead', which can be pronounced either *usus-u* or *us@ws-u*.

MA shows much dialectal variation in the pronunciation of syllable nuclei which contain an underlying glide. The facts presented above are those of the variety of Southern MA spoken in Lmnabha. As explained earlier, Southern MA requires complex nuclei to occur in a narrower range of contexts than other dialects. The dialect of Oujda lies near the other end of the spectrum of variation, as far as complex nuclei are concerned. In that dialect all the forms on the right-hand side of (29) must be pronounced with a diphthong in their penultimate syllable, e.g. in (29)a /ħwl-a/ must be realized as *ħ@wla*, and the same is true of many forms such as /ksw-t=u/ 'his suit', in which /w/ is realized as *u* in Lmnabha. The bedouin dialects spoken around Oujda allow an even wider distribution of complex nuclei. Whereas the diphthong @y does not exist in the dialect of most people living in the city proper, it does in its periphery, where /!byd-a/ 'white, fs', can be pronounced *!b@yda* (cf. (24)d). Speakers living in the outskirts of Oujda and the surrounding countryside also pronounce a diphthong for the first half of a geminate glide which occurs after a consonant, e.g. they pronounce /swwl/ 'he interrogated' and /žyyr/ 'he whitewashed' as *s@ww@l* and *ž@yy@r*, whereas in the city itself these words are pronounced *suw@l* and *žiy@r*, as they are in Lmnabha.

9.4. RELEASES IN SEQUENCES OF SIBLING CONSONANTS

In § 6.3.3.1 we agreed to say that two segments are siblings when they have the same primary articulation and the same values for the features [sonorant] and [continuant]. Examples of sibling sequences are *t+d* and *t+t*. In MA some underlying sequences of siblings give rise to surface geminates while others do not, hence surface contrasts in which the distinguishing feature is the release of an oral closure. A consonant release is apt to be mis-analyzed as a vestigial vowel, especially when it occurs before a sibling consonant. Consider for instance the sequence *t+t* in a word in which the first *t* may be pronounced with an oral release. At the end of the 'hold' period of the first *t* the tongue is already in place for the closure of the following consonant. Why should the tongue not simply maintain a fixed posture throughout the articulation of the whole sequence? Could the release not be due to the presence of an intervening phonetic target specifying a vocoid? This line of thought is particularly tempting when the released consonant is an onset: the following vocoid would then be a nucleus.

We shall see, however, that syllable structure only impinges in a rather indirect way on the distribution of releases in sibling sequences.

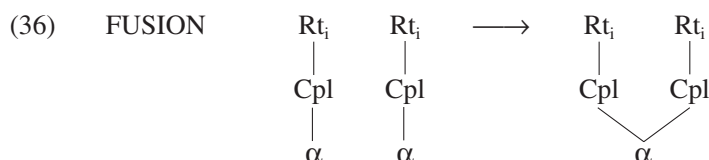
9.4.1. *Fusion and NO-TREBLE*

In § 6.3.3 we showed that Tashlhiyt has a process of fusion whereby two adjacent sibling consonants merge their primary articulations. A preliminary survey of consonant sequences suggests that MA also possesses a fusion process. This surmise is based on the following observation: except in special cases to be described later, when two short sibling consonants occur in a sequence the first must not be released and the sequence is homophonous with the corresponding geminate. Here are examples with such sequences (the forms in the second column are given for the sake of comparison).

(35) a.	fert tt -u	'they picked off'	fertet	'he picked off'
b.	mqet- ti	'you (f) loathed'	mqet	'he loathed'
c.	smen= na	'our butter'	smen	'butter'
d.	sel k=k um	'your (p) wire'	selk	'wire'
e.	ka t -tebɿ-u	'you (p) follow'	tbeɿ	'he followed'
f.	ka ! d -dekr-u	'you (p) mention'	!dk ^w er	'he mentioned'
g.	berret- t =u	'I cooled it (m)'	berred	'he cooled'

The highlighted sequences in the forms in the first column must all be pronounced as though they were geminates. The sequences /t-d/ and /d-t/ in lines f and g, which must respectively be pronounced as [d:] and [t:], exemplify regressive voicing assimilation between sibling stops. We do not know whether the domain of fusion in MA is the word or some larger unit, for we have not investigated analogous sequences straddling a word boundary.

Let us assume that MA has a fusion process identical with that which we have posited in Tashlhiyt. We reproduce below the rule which we gave in § 6.3.3.2.



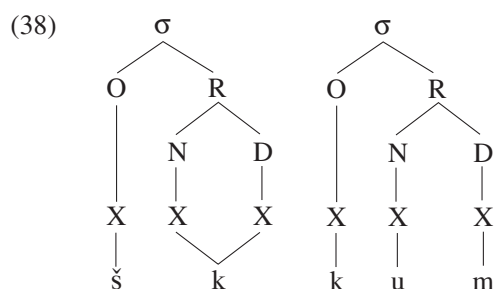
(36) does two things at once. It states that the configuration to the left of the arrow must be avoided, and it specifies how that configuration is to be modified to give rise to a well-formed output. If (36) is to be integrated into our account of MA, which is constraint-based, it must be replaced by a whole complex of constraints designed to prohibit the configuration to the left of the arrow in (36) and to guarantee that infringements are avoided by merging the offending adjacent primary articulations. Let us simply assume that this can be done and use the term Fusion to refer to the constraint complex in question.

As in Tashlhiyt, in MA three skeletal positions in a row cannot share the same primary articulation. When sibling consonants are linked with three successive skeletal slots, their 'hold' periods need not merge, i.e. one sibling consonant can be released before the constriction of the next is effected. Here are examples in which this phenomenon is observed. As in Chapter 6, '²' indicates that the oral constriction of the preceding consonant is released, i.e. it notes a voiceless burst ([^h]) between voiceless stops and a short voiced vocoid ([@]) between voiced ones.³⁶ The parenthesized form at the end of each line is the bare kernel of the preceding word, i.e. a singular noun or a 3ms perfective verb.

- (37) a. šekk²=kum 'your (p) doubt' (šekk)
 a'. šekk²k-u 'they caused to doubt' (šekkek)
 b. !denn²=na 'our idea' (!denn)
 b'. ženn²n-u 'they annoyed' (žennen)
 c. ħell²=l=u 'he opened for him' (ħell)
 c'. ħell²l=u 'he made it (m) licit' (ħellel)
 d. gett²-t=u 'his stack' (gett-a)
 d'. gett²t=u 'he stacked it (m)' (gettet)

As in analogous cases in Tashlhiyt, each example has an alternative pronunciation in which the two closures blend into a single uninterrupted one. In (37)a,a', for instance, the sequence noted kk^2k may be pronounced either as [k:^hk] or as [k::], where the doubling of the length mark indicates an extralong 'hold' period distinct from the long 'hold' period of a geminate. Unless stated otherwise, release is also optional in all the examples to come which contain an occurrence of the symbol '²'.

As we did for analogous sequences in Tashlhiyt, we assume that both pronunciations are realizations of a single terminal representation. That of šekk=kum ((37)a) is given in (38) below.



³⁶ Except for the replacement of some occurrences of *e* by the release symbol ², the transcriptions in (37) and others below are standard transcriptions.

In (38) the realization of /kk=k/ as kk^2k ([k:^hk]) is but a particular instance of the fact that in MA as in Tashlhiyt, the closure of a stop is released before that of a following stop is formed. The alternative realisation kkk ([k::]) is presumably due to a principle akin to MINIMAL-PATH(place), whereby an articulator must follow the shortest possible path when moving from one phonetic target to the next.³⁷

As in Tashlhiyt, Fusion is overridden by NO-TREBLE, an undominated constraint which prevents a primary articulation from being shared by more than two adjacent skeletal positions.³⁸ Fusion and NO-TREBLE jointly make the prediction that a consonant can be released before a sibling only if one of the consonants is a geminate. This prediction allows for instance the surface sequences t^2tt , tt^2t and tt^2tt , but not t^2t , in which both stops are short. The prediction is borne out by the data, with important qualifications to be discussed later.

9.4.2. Earlier views on releases in sibling sequences

Releases between sibling consonants have not been satisfactorily dealt with in the previous literature on MA. It is worthy of notice that our analysis makes it possible to clarify the confusion surrounding them. In a nutshell, there is no difference between releases in sibling sequences and other releases. The seemingly special status of releases in sibling sequences is only an artifact of alphabetic transcriptions in which gemination is indicated by letter doubling.

Unlike releases between nonsiblings, releases between siblings cannot be omitted from an adequate transcription of MA, however ‘broad’, because they give rise to surface contrasts of a particular kind. Consider the following pair.

- | | | | |
|---------|--------------------------------------|--------------------------------------|-----------------------|
| (39) a. | fert ^h t-t=u | [fɾt ^h t:u] | ‘I picked it (m) off’ |
| b. | šett ^h t ^h t=u | [ʃt: ^h t ^h tu] | ‘he scattered it (m)’ |

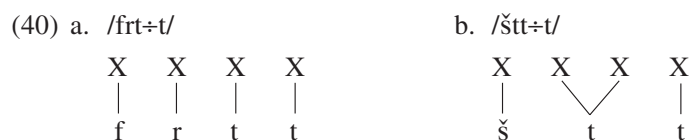
In (39)a an underlying sequence of three occurrences of /t/ is realized as a short *t* followed by a long one. In (39)b an underlying sequence of a geminate /tt/ and a simple /t/ is realized as a long *t* followed by a short one. The feature which distinguishes [t^ht:] from [t:^ht] is the timing of the medial release. Clearly, it would not do simply to transcribe both sequences as ‘ttt’. Whereas some previous analyses interpret the release in (39)a as a regular occurrence of schwa, they must introduce additional stipulations to characterize the release in (39)b.

Our own account of the contrast in (39) is implicit in the discussion in

³⁷ On MINIMAL-PATH(place), § 6.3.1.

³⁸ See § 6.3.3.

the preceding sections. The lexical representations of the two verbs in (39) are given in (40) below.



In the line at the top of (40) the sequences between slashes are no more than typographically convenient stand-ins for the plurilinear objects underneath, which are the lexical representations in question. In transcriptions noting underlying representations we follow the convention introduced in § 6.4.1 when we discussed analogous structures in Tashlhiyt: Inside a morpheme, adjacent occurrences of the same symbol indicate a geminate; an intervening '÷' between two occurrences of the same symbol indicates that each occurrence represents a distinct feature bundle.

The verb *fertet* in (40)a was already mentioned at the end of section § 8.5.1, see <71>. Its lexical representation ends with two occurrences of the feature bundle characterizing *t*. *ʃettet* in (40)b is a four-consonant verb with a medial geminate in which the last two consonants are identical.³⁹ The surface representations of the two forms in (39) are given below in (41)-I. The material below line I in (41) will become relevant later. In (41) the skeletal positions linked with *t* have been represented as digits to make reference easier. In (41) and below, the right edge of the kernel is indicated by a right bracket when it is relevant in the discussion.

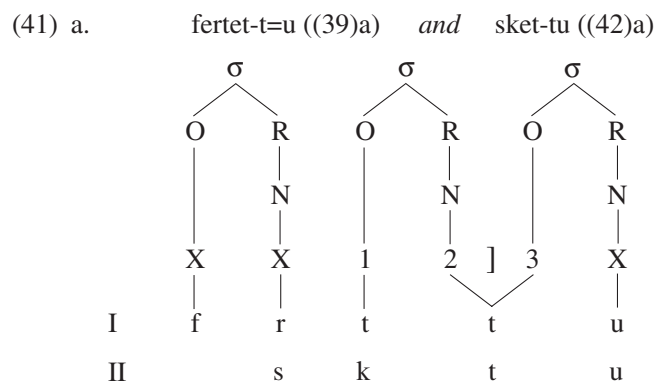
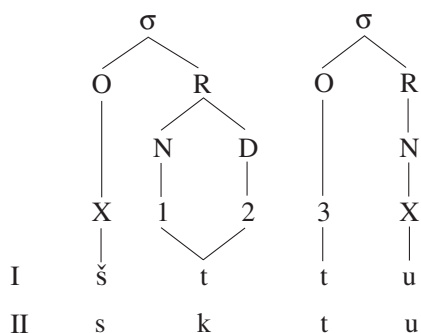


Figure (41) continued overleaf

³⁹ Other such verbs are *šekkek*, *žennen*, *ħellal* and *gettet* in (37). See Harrell (1962b: 31) for others.

(41) b. šett²t=u ((39)b) and sekkt=u ((42)b)



Release can only occur at the end of a ‘hold’ period. Each occurrence of *t* in (41) has an associated ‘hold’ period. Limiting our attention to the transition between positions 1 and 2 and to that between positions 2 and 3, we see that in (41)a, release can only occur between 1 and 2, while in (41)b it can only occur between 2 and 3.⁴⁰

The pair in (39) is in all relevant respects the exact parallel of that in (42) below, which does not contain sibling consonants:

- (42) a. sket-tu [sk^ht:u] ‘you (p) fell silent’
 b. sekkt=u [sk:^htu] ‘he shut him up’⁴¹

The surface representations of the two forms in (42) are those resulting from the association of the feature bundles in line II in (41) with the tree structures displayed there above line I. Whatever devices in the phonetic implementation component of the grammar of MA are sufficient to account for the occurrence of releases in the consonant sequences in (42), are also sufficient to account for those in (39). What makes pair (39) seem special is that unlike (42) it poses a problem for alphabetic transcriptions, which must represent phonological structure as a unilinear sequence. Let us briefly go over the views of Harrell (1962b) and Heath (1987) about releases between siblings.

Harrell (1962b) kept to a strictly unilinear conception of phonological structure which was commonly held at the time of his writing, and he managed to do so without resorting to a special symbol for consonant releases, but this was at the price of misconstruing syllable structure in some instances.

⁴⁰ In (41)a Fusion has merged the stem-final /t/ with the following /-t/ suffix. Merger of the stem-final /t/ with the preceding /t/ would have created a violation of constraint NoOns~, see below (47) and (48).

⁴¹ *sekket* ‘cause to fall silent’ is a causative derived from *sket* ‘fall silent’.

The consonant which is released in (41)a is an onset, as indicated by the following 'e' in the standard transcriptions, and previous analyses in the literature, e.g. Keegan (1986), would interpret the release as a realization of schwa. In (41)b, on the other hand, the released consonant is a coda, and yet Harrell interprets the releases in such cases as occurrences of e. On p. 18, where he discusses alternations between *e* and zero, e.g. *!sifet* 'he sent' vs. *!sift=u* 'he sent him', he presents these alternations as motivated by the need to prevent schwas from occurring in open syllables. He then notes the existence of forms such as (39)b and states that they represent the only cases in which the unstable vowel may occur in an open syllable. Harrell's example is /smm÷m-u/ 'they poisoned', cf. *semmem* [sm:@m] 'he poisoned'. According to our analysis /smm÷m-u/ has a surface representation *.smm.mu.* analogous to (41)b. *.smm.mu.* may be realized either as *smm²mu* [sm:@mu] or as *smmmu* [sm::u], which Harrell transcribes respectively as 'semmemu' and 'semmmu'.

In the sequence 'mmem' in Harrell's first transcription, 'e' notes the oral release of a consonant. Harrell mistakenly interpreted that release as the manifestation of a vowel. Indeed, noncontinuants must be released before a vowel, but they are also released in other contexts, e.g. before a heterorganic consonant, as *mm* is before *n* in *hemm=na* [hm:@na] 'our worry'. /hmm=na/ and /smm÷m-u/ have identical syllable structures: *.hmm.na.*, *.smm.mu.* The reason why Harrell's transcription records *mm*'s release in *.smm.mu.* but not in *.hmm.na.* is that in *.hmm.na.* this release is predictable on the sole basis of the graphic sequence 'mmn', whereas in *.smm.mu.* the graphic sequence 'mmm' is ambiguous; it can correspond to either of the surface structures displayed in (43).



In (43)a a release can occur after the first skeletal position but not after the second, whereas in (43)b it can occur after the second position but not after the first.

Heath (1987) devotes special attention to releases in sequences of sibling consonants. In the surface representations of MA, according to Heath, some CC sequences are tightly-knit while others are not (p. 219). What Heath calls secondary gemination, i.e. Fusion in our terms, is a special case of tight clustering. The distinction between tight CC clusters and loose ones is neutralized when the two consonants are not siblings (p. 281). In loose sequences of siblings, the two consonants 'retain separate articulations and releases' (p. 231). Heath calls this phenomenon 'hiatus' and uses a special symbol (^) to record it in his transcriptions of surface forms. Heath's hiatus marker ^ corresponds to our symbol '²'. In Heath's view hiatus is sometimes the trace of a syncopated schwa (pp. 219, 232). Although Heath

plainly sees that there is a close similarity between hiatus and schwa, he never explicates the exact connection between them. The reason for this, we believe, is that in Heath's analysis schwa is a segment while hiatus is not; hiatus is merely a phonetic cue for the edge of a tight CC cluster.

To repeat our own position, hiatus is just a special name given to consonant release when it occurs between siblings. The releases in sibling sequences are subject to the same restrictions as other releases, with the additional restrictions imposed by Fusion and NO-TREBLE: whereas a short stop must be released before a short heterorganic stop, the joint enforcement of Fusion and NO-TREBLE guarantees that in most cases a sequence of two short siblings surfaces as a geminate, and consequently the first sibling cannot be released.

In our view, release before a sibling consonant is no more represented in terminal representations than release before a nonsibling, compare for instance the terminal representations of *šett²t=u* 'he scattered it (m)' and *sekkt=u* 'he shut him up', which are both displayed in (41)b. The main reason why release before a sibling has received more attention than other releases, is that it poses a special problem to alphabetic transcriptions in which geminates are represented with doubled letters.⁴²

9.4.3. Releases between short sibling stops

Until now syllable structure has not played any role in our discussion of releases in sibling sequences. We have given full syllabic representations for some of our examples, see (38) and (41), but in these representations all the information relevant for locating possible releases is contained in the two lines at the bottom, which depict the mapping between the feature bundles and the skeletal positions. The rule of thumb for 'reading off' consonant releases from the lower part of these diagrams is a very simple one: a release can occur 'after' a skeletal position whenever the feature bundle associated with that skeletal position is not also associated with a following skeletal position.

In some of our examples in section § 9.4.2 the consonant released before

⁴² The machinery which Heath sets up to deal with hiatus is also put to use in his account of the length alternation in the passive prefix (p. 280 ff.). Lack of space prevents us from going into the details of Heath's discussion. We simply suggest an alternative account based on syllable structure.

In the dialect described by Heath the passive prefix is a simplex *t* in some forms and a geminate *tt* in others. It is for instance long in *tte-qtel* 'he was killed' and short in *t-qetl-u* 'they were killed'. In terms of our own account of the syllable structure of MA, it seems that the surface form of the passive prefix must meet the following requirement: a skeletal position belonging to the prefix must be included in a rime. The prefix takes on its long form only if its short form cannot meet this requirement. The forms cited above meet the requirement in question. The syllabic parse of *t-qetl-u* is *.t.qt.lu.* and that of *tte-qtel* is *.t.tq.tl.*

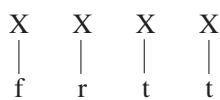
a sibling is an onset, see (41)a, but in others it is a coda, see (38) and (41)b. The latter fact must be faced by anyone toying with the idea that in MA the release of a consonant before a sibling is the realization of a vowel.

As already stated before, Fusion and NO-TREBLE jointly make the prediction that in a sibling sequence where release occurs, one of the consonants must be a geminate. There are however sequences in which both consonants are short, witness the following example.

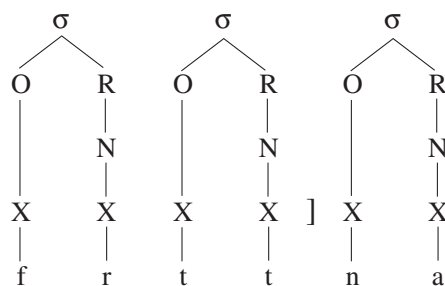
- (44) fertet-na [frt^htna] 'we picked off'

The lexical representation of *fertet* 'pluck', which was given in (40)a, is reproduced below in (45)a. The terminal representation of *fertet-na* is displayed in (45)b.

- (45) a. /frt÷t/



- b. fertetna

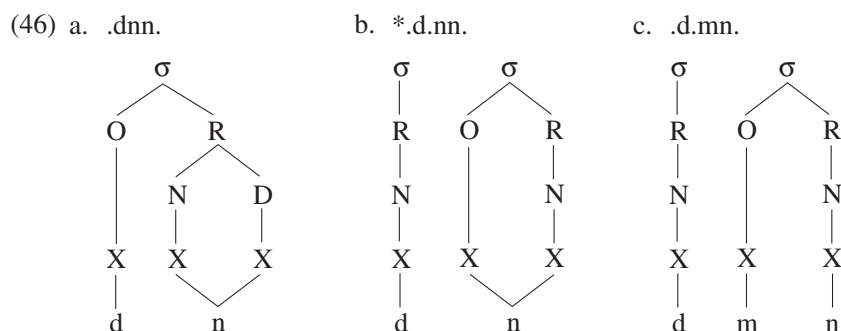


The medial syllable in (45)b contains two occurrences of the feature bundle characteristic of *t*. The closure corresponding to the first *t* can be released before the closure corresponding to the second *t* is effected. Why has Fusion not merged the two occurrences of /t/ in the lexical representation (45)a into a geminate /tt/?

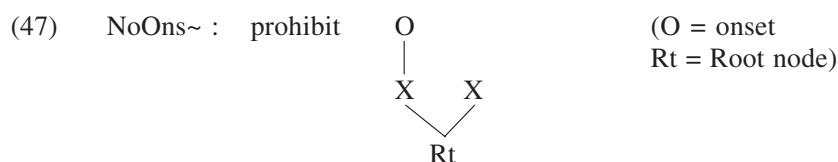
Before we can answer this question we must pause briefly to examine the role of geminate inseparability in an analysis with vowelless syllables.

In our earlier account, the special behaviour of geminates with respect to syllabification was due to geminate inseparability, which forbids inserting material between the two halves of a geminate, see the text around (69) in section § 8.5.1. Once we adopt an analysis in which syllables can be vowelless, geminate inseparability leaves certain properties of the MA geminates unexplained. Consider *!denn* 'he thought', whose underlying representation is *!dnn/*. This form must be pronounced [*!d(@)n:*]. Geminate inseparability may be the reason why [*!dn@n*] is not a well-formed realization of *!dnn/*, but it does not explain why [*!d(@)n:*] must count as a heavy syllable (*.dnn.*) and not as a sequence of two light ones instead (*.dn.nn*). The two syllabic parses are represented in (46)a,b below. For the sake of comparison we have added the terminal representation of *!dmen* 'he guar-

anted', a three-consonant verb whose last two skeletal position are not occupied by a geminate.



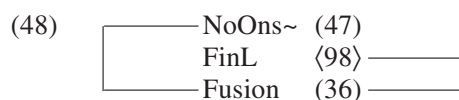
The device which excludes (46)b is the constraint NoOns~, which forbids the first half of a geminate to be an onset. This constraint was already invoked for Tashlhiyt, see § 4.8. It is given again below.



The role played by NoOns~ in our new account is analogous to that played by geminate inseparability in our earlier analysis. We assume that NoOns~ is undominated and that it is encapsulated in the analogue of SYLL in our new analysis, see condition c in SYLL ⟨58⟩.

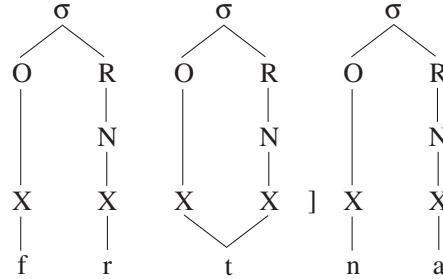
We can now go back to the derivation of *fertet-na* ((44)), which is well-formed, in spite of the fact that it violates Fusion (36), see the surface representation of *fertet-na* in (45)b.

We submit that the violation of Fusion in (45)b is a lesser evil: the other viable candidates violate constraints which are more highly ranked than Fusion. We propose the rankings displayed in (48):

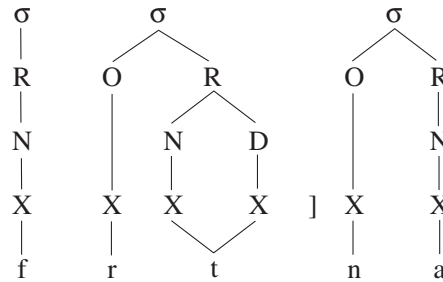


Recall that four-consonant verbs are associated with template FinL (see § 8.5.5). Except for (45)b, the viable candidates for the input (/fɾt+t-na/, FinL) all violate NoOns~ or FinL, see (49) below.

(49) a. *ferttna



b. *frettna



(49)a violates NoOns~ and (49)b violates FinL, which are more highly ranked than Fusion, while (45)b does not violate either constraint and is in consequence the grammatical output.

Fusion is violated only if the violation allows the output to comply with FinL, witness the pronunciation of /fɾt÷t-u/ ‘they plucked’, in which the first /t/ may not be released (see (35)a). All viable candidates for /fɾt÷t-u/ must violate finL, because the stem-final /t/ must be an onset before the following vowel.

We summarize this discussion with the two tableaux in (50).

(50)	/fɾt÷t]_L na/	NoOns~	FinL	Fusion
→	.fr.tt].na. (49)a	*!		
	.f.rtt].na. (49)b		*!	
→	.fr.t ² t].na. (45)b			*
	/fɾt÷t]_L u/			
→	.fɾt.t]u. (35)a		*	
	.fɾt ² .t]u.		*	*!

We have encountered two classes of words in which a short consonant may be released before a short sibling. All the words in one class are verbal forms like *fertet* and *fertet-na*, i.e. the kernel is word-final or followed

by a suffix or clitic which begins with a consonant, and it ends with two identical short consonants.⁴³ In the other class of words, release occurs between a prefix and the stem. Here are examples, all borrowed from Heath (1987: 283 ff.):

- | | | | |
|---------|----------------------------|-----------------------------|-----------|
| (51) a. | t ² -dwaz | 'letting pass' | (dewwez) |
| b. | !t ² -twal | 'lengthening' | (!tewwel) |
| c. | st ² -tna | 'he excluded' ⁴⁴ | |
| d. | ma !t ² -dreb=š | 'do not hit!' | (!dreb) |

We do not have an account for the cases in this second class. The data is complicated by the fact that some of the cases allow free variation, e.g. (51)d has another variant in which Fusion has occurred (*ma !ddrebš*), whereas Fusion is excluded in the other examples in (51). The following fact suggests that syllable structure is also at play in this second class of words with release between short siblings: in all of these words the second sibling immediately precedes an onset, and consequently the first sibling is in the appropriate environment for being syllabified as an onset. As for the fact that Fusion is enforced less severely at the juncture between prefix and stem than at other locations in the word, the reader is referred to § 6.3.3.3, where we noted that a similar situation prevailed in Tashlhiyt.

9.5. STABLE SCHWAS

In § 9.2 the pronunciation of certain IP-final syllables forced us to retain *e* as a segment, albeit with a limited distribution. As we shall now see, certain plural nouns of the form *CCeC* pose an even more serious challenge to a schwa-less analysis of MA, for they contain syllables in which schwa is the sole content of the nucleus of an open syllable. Ironically enough, these plural nouns also turn out to raise a serious problem for an analysis in which all hollow syllables would contain schwas.

Certain feminine nouns of the form *CCC-a* have plural forms with the shape *CCeC*. Here are examples.

- | | | | |
|------|----------|--------|----------------------|
| (52) | singular | plural | |
| a. | gerb-a | greb | 'goatskin for water' |
| b. | sekk-a | skek | 'plowshare' |
| c. | šebk-a | šbek | 'net' |
| d. | sell-a | slel | 'basket' |
| e. | kff-a | kfef | 'pan (of scales)' |

⁴³ Other such verbs are *!gertet* 'cut off', *feɣnen* 'hum', *hernen* 'grumble'.

⁴⁴ A classicism derived from CA *sta-θnaa*.

When a clitic is appended to a *CCeC* form which is the plural of a *CCC-a* noun, the schwa in that form does not behave as that of other *CCeC* forms. Recall that when a clitic beginning with a vowel is appended to a *CCeC* word, the word is realized as *CeCC*, i.e. its second consonant becomes nuclear, e.g. *!ʕreg* ‘sweat’ yields *!ʕerg=u* ‘his sweat’, with a nuclear *r*. This does not happen with the *CCeC* plurals of *CCC-a* nouns. *greb* ‘goatskins’ ((52)a) yields *greb=u* ‘his goatskins’ (**gerbu*), *skek* ‘plowshares’ yields *skek=u* ‘his plowshares’ (**sekku*).

In the Lmnabha dialect, most of the *CCC-a* feminine nouns with *CCeC* plurals which we have been able to find are like forms (52)b,d,e: the last two consonantal positions form a geminate which is split by *e* in the plural form. Plurals like *greb* ((52)a) and *šbek* ((52)c) are important in that they show that the special behaviour of schwa in *skek* and the like has nothing to do with the fact that schwa is sandwiched between identical consonants.⁴⁵

To present the other property of schwa which is special to these plural forms, let us temporarily revert to the parlance of the old analysis, in which every hollow syllable contains an occurrence of *e*. When it occurs in plural forms like those in (52), schwa cannot devoice between voiceless consonants, nor can it be absorbed by an adjacent sonorant.⁴⁶ For devoicing, let us compare cliticized forms of *skek* ‘plowshares’ and analogous forms of *šekkek* ‘cause to doubt’, which represent the normal case. In *šekkek=na* ‘he caused us to doubt’, schwa must be voiceless, and one hears [š^hk:^hkna]. When =*u* is cliticized to *šekkek* the resulting form is *šek^hk²k=u*, where ‘²’ represents the release of the preceding consonant, and one hears [š^hk:^hku].⁴⁷ In *skek=na* ‘our plowshares’ and *skek=u* ‘his plowshares’, on the other hand, the two occurrences of *k* must be separated by a voiced vocoid: [sk@kna], [sk@ku]. Pronunciations such as [sk^hkna], [sk^hku] or [sk:na], [sk:u] are unacceptable.

Turning now to absorption by an adjacent sonorant, let us compare cliticized forms of *sləl* ‘baskets’ ((52)d) and of *šlél* ‘rinse’, which represents the normal case. Consider *šlél=ha* ‘he rinsed her’. (53) gives (a) the syllabic parse in the new analysis, (b) the same in the old analysis, which some readers may find easier to relate to the standard transcriptions, and (c)–(d) the two possible pronunciations of *šlél=ha*.

(53)	a	b	c	d
	.šl.l.l.ha.	.šel.lél.ha.	[šl:@lha]	[šl::ha]

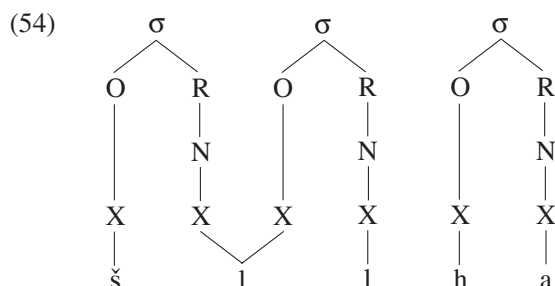
In the notation used in § 9.4.1 (see (37)), (53)c and (53)d would respec-

⁴⁵ See McCarthy (1986) on antigemination effects.

⁴⁶ On devoicing and absorption, see our discussion of W-internal sequences in § 8.2.2.

⁴⁷ The terminal representation of *šek^hk²k=u* is identical with that displayed in (38), except for the last consonant.

tively be transcribed as *šl²lha* and *šlllha*. (54) displays the phonological object represented as *.šl.ll.ha.* in (53)a.



Pronunciations (53)c and (53)d are both realizations of the structure depicted in (54). The two pronunciations differ in the manner of transition between the onset and the nucleus in the second syllable. We take this difference to be a matter of phonetic implementation, as explained when we discussed analogous examples in § 9.4.1. In (53)c the constriction of the geminate *ll* is relaxed before a similar constriction is effected for the articulation of the following simple *l*. In (53)d, on the other hand, the ‘hold’ period of *ll* blends with that of the following *l* and the result is an uninterrupted, extralong, *l*.⁴⁸ Under the older analysis, one would say that in (53)d the schwa in the second syllable has been absorbed by the following *l*/, with which it shared its nucleus node.

‘Absorption’ is not possible in *slel=ha* ‘her baskets’, which can only be pronounced [sl@lha]. [sl:ha] is well-formed, but only as a realization of *sell=ha* ‘he extracted her’ (v. *sell* ‘he extracted’).

Why do the *CCeC* words which are plural forms of *CCC-a* nouns not behave like the other *CCeC* words? Recall that the other *CCeC* words result from the syllabification of inputs of the form (/CCC/, FinL). We propose that *CCeC* plurals like those in (52) are different in that their vowel comes from a template akin to those which give rise to kernels with a full vowel. In the same way as the morphology of MA has a template *CCaC* responsible for the derivation of *klab* ‘dogs’ and *šmam* ‘paternal uncles’ from the singular forms *kelb* and *šem*, or a template *CCuC* underlying *žlud* ‘skins’ and *xdud* ‘cheeks’, which are derived from the singular forms *želd* and *xedd*, we propose that it has a template *CCeC* for the plurals in (52). One reason to think that in the *CCeC* plurals of *CCC-a* nouns the input to syllabification is not simply (/CCC/, FinL), is that only in these plurals does MA allow kernels like *skek*, *slel*, in which a geminate is split by an occurrence of schwa. In particular MA does not have any *CCeC* verb or

⁴⁸ These extra-long consonants contrast with the geminates, as already pointed out in Harrell (1962a).

singular noun with the shape CC_eC_i (' $C_i \dots C_i$ ' stand for identical consonants).⁴⁹ As is well-known, phonological epenthesis cannot split geminates, whereas templatic morphology can.⁵⁰

In the CC_eC template which we posit for the CC_eC plurals of CCC -a nouns, the vowel e is the same feature bundle as that which appears in expanded hollow syllables such as the final syllables in (9)b and in (14)c, which is why plural forms like those in (52) cannot be distinguished on a purely auditory basis from other CC_eC forms, e.g. setting aside the difference in the first consonant, *greb* 'goatskins' does not sound different from *zreb* 'he hurried', and *šbek* 'nets' is homophonous with *šbek* 'he tied (e.g. strings) into a net'.

(55)a below is the representation which results from mapping the singular noun *kelb* 'dog' onto template $CCaC$ to form the plural *klab*; similarly, (55)b is the representation which results from mapping the singular noun *gerb*-a 'goatskin' onto template CC_eC to form the plural *greb*.

(55) a. /klab/

X	X	X	X
k	l	a	b

b. /greb/

X	X	X	X
g	r	e	b

Consider the words *greb=ha* 'her goatskins' and *greb=u* 'his goatskins'. In the input to syllabification the representations for these words both contain (55)b. In *greb=ha*, /e/ and /b/ will be syllabified as a complex nucleus, in compliance with whatever mechanisms are responsible for the shape of expanded hollow syllables. In *greb=u*, on the other hand, /b/ will be syllabified as an onset to /u/, and /r/ as one to /e/, and the resulting parse will be *g.re.bu*, in which the sole content of the nucleus of the medial syllable is e .

greb and other plurals like it give us a further reason to prefer our new analysis to that summarized in <99>, in which all hollow syllables contain an occurrence of e . Under the new analysis, a plural form like *greb* only has one special property: r remains an onset regardless whether the morpheme following *greb* begins with a vowel or a consonant, a property which we claim originates in the CC_eC template. Under the analysis summarized in <99>, the plurals in question have yet another peculiarity: their schwa cannot devoice or be absorbed by a sonorant. It is not clear how that analysis would explain the concomitance of the two peculiarities. Under the present analysis there are no such processes as the devoicing of schwa or its absorption by a sonorant. Consequently there is no concomitance to explain.

⁴⁹ Ath Sidhar Rifian has CC_eC_i verbs, on the other hand, as we have seen in § 6.5.3.

⁵⁰ See e.g. Benhallam (1980: 141ff), Hyman (1985: 126, note 22).

The rime in the medial syllable of *greb=u* ‘his goatskins’ (*g.re.bu*) is what we called earlier a secondary rime, i.e. one in which schwa is the sole content of the nucleus.⁵¹ The secondary rimes in cliticized plurals like *greb=u* are W-internal. Secondary rimes also occur in W-final position, as a result of resyllabification across word boundaries. An example is the second syllable in *tq.te.ŕr.ža*, which is the syllabic parse of /t-qtʃ#!rža/ in line 8 in <16>. Accounting for W-final secondary rimes can only be done within a reasonably detailed account of utterance-level syllabification. We leave this problem for further research.

9.6. SUMMARY OF CHAPTER 9 AND ISSUES FOR FURTHER RESEARCH

Abandoning our earlier assumption that in MA every syllable contains a vowel, we have argued that some post-onset schwas are transitional vocoids analogous to those of Tashlhiyt. The hollow syllables of MA divide into three types depending on the content of the rime, call these A, B and B’. In type A the nucleus is schwa and there is no coda, as in the second syllable of *s.ke.ku*, the terminal representation of *skek=u* ‘his plowshares’. Syllables of type A only occur in certain templatic kernels and as a result of resyllabification across a word boundary. In types B and B’ the nucleus contains a consonant. The run-of-the-mill hollow syllables are those of type B, in which the nucleus is a bare consonant, as e.g. in the first two syllables of *bž.γt.na*, the terminal representation of *!bežγet-na*, ‘we babbled’. As in Tashlhiyt, any consonant may be a nucleus. When a type B syllable in which the nucleus is an obstruent occurs at the end of an Intonational Phrase, it takes on a special form with a complex nucleus in which the obstruent is preceded by schwa, as e.g. in the last syllable in *bž.γet*, the terminal representation of *!bežγet* ‘he babbled’. Such syllables constitute class B’. In addition to these, class B’ also contains syllables whose nucleus is the diphthong *ew*.

Our modified account of syllable structure in MA involves surface representations which are closer to the actual pronunciations than those in the preceding chapter. This account offers a better starting point for comparing the phonologies of MA and Tashlhiyt: in certain cases where a bilingual speaker feels that the pronunciation of a MA word is indistinguishable from that of a Tashlhiyt word, our new analysis assigns these words identical terminal representations.

In conclusion, let us take a brief look at the ground we have covered and raise some still-unresolved questions.

When we started writing this book, our central goal was to present the evidence relevant to Tashlhiyt’s peculiar syllable structure and embed it in an overall picture of Tashlhiyt phonology and morphology. We wanted

⁵¹ See the text under <39> at the end of § 8.3.3.

to do this in a way that would help readers to see how our work fit into the larger landscape of the variegated linguistic literature on Berber dialects. Finding one's bearings in that literature is not an easy task for non-Berberists. It is often difficult to sort out genuine linguistic differences among dialects from apparent differences which result from the divergent theoretical outlooks and expository styles of different authors. In particular, we needed to puncture the illusion that as far as syllabification and vowel epenthesis are concerned, the differences between the various Berber dialects are only of a marginal nature. Our foray into the phonology of Ath Sidhar Rifian has enabled us to point out some important differences between Rifian, which has genuine epenthetic vowels, and Tashlhiyt, which only has transitional vocoids.

Moving on further to MA was a natural thing to do. After many centuries of contact, the pronunciations of Tashlhiyt and MA have much in common. In cases where Tashlhiyt has a certain word containing only vowelless syllables, and MA has a word which is homophonous with it, we might be tempted to conclude that MA also has vowelless syllables. But clearly, the mere homophony of two forms could not take us very far unless both are considered against the backdrop of the overall sound patterns which give rise to them. We were thus led to study MA on its own terms.

Our work leaves many unanswered questions, having to do with phonology as well as with phonetics. Several important phonological issues were pointed out along the way. We now mention two phonetic questions of immediate concern.

If we are correct in our contention that the short vocoids of Tashlhiyt are all transitions between segments, a detailed study of these vocoids would be of considerable general interest for understanding how phonetic implementation works and for determining to what extent it can vary across languages. Our knowledge about the distribution of short vocoids in Tashlhiyt is still very patchy, and making that knowledge more systematic will require tools of observation more accurate than the unaided ear. Instrumental studies must of necessity concentrate on a few points of special interest which have been previously identified as a result of broader surveys of the terrain carried out with more primitive means. We hope that our work in this book can serve as such a preliminary survey.

Whereas in Tashlhiyt all short vocoids are transitional, in Ath Sidhar Rifian and in MA some are transitional while others are genuine vowels. An intriguing question is what the phonetic differences are between the two kinds of short vocoids, apart from differences in voicing in voiceless environments.⁵² Our discussion in this book leaves the answer to this

⁵² The occurrence of glottal vibrations between two voiceless consonants is a sure symptom of the presence of an intervening vowel, see e.g. § 9.2.

question completely open. Since the only feature specifications we have assumed for the epenthetic vowel in MA are [-cons] and [+voice],⁵³ it may very well be the case that the mechanisms of phonetic implementation which account for the quality of transitional vocoids are also responsible for the quality of epenthetic vowels. Between voiced consonants, then, the only difference between transitional vocoids and epenthetic vowels would be that the latter, but not the former, have associated skeletal positions. Whether this difference translates into systematic differences in duration is a question worth investigating.

⁵³ See the text immediately under (9).

PRELIMINARIES TO APPENDICES II AND III

In this appendix we give background information about the data to be presented in the next two sections. Our aim is not simply to help the readers understand the content of these appendices, but also to give them some sense of the process of elaboration which leads from the raw data in our sources to the sequences of Tashlhiyt words which are our starting point in our discussions of syllabification in singing in various places in this book.

The Tashlhiyt poems presented in Appendices II and III were composed by !rrways, viz professional Ashlhiy musicians. The music and poetry of the !rrways borrow widely from those performed by village aficionados during evening parties called aḥwaš. Being themselves actively involved in aḥwaš singing and dancing, villagers are a knowledgeable audience for the productions of the !rrways (Schuyler 1979: 49–52, 237 ff.). As Schuyler has already observed (p. 271), traditional singing is in sharp decline among the urbanized Ashlhiys. aḥwaš evenings are difficult to organize in an urban environment and the musical tastes of the young city-bred Ashlhiys tend to be the same as those of their Arab peers. As the older generations disappear and as the ties with the mountain villages slacken, experienced listeners become less numerous among city-dwelling Ashlhiys.

Our main reason for drawing our data from songs composed by !rrways is that ME is knowledgeable about the !rrways' production and is proficient in their singing style. It would be a worthy task to examine text-to-tune alignment in recent Ashlhiy songs whose style departs from the traditional canons. We leave it to younger Ashlhiy researchers with an ear attuned to these canons.

Appendices II and III present two songs drawn respectively from Amarir (1975: 147 ff.) and from Asid and Lachgar (1996: 23 ff.), two collections of Tashlhiyt songs written down using the Arabic script. The authors of the two volumes are Ashlhiys. They worked from recordings on tape. Going from their Arabic transcription to the one we give below cannot be done in a mechanical fashion; some amount of interpretation is unavoidable.¹

Let us explain briefly how the Arabic script is put to use to notate Tashlhiyt. The reader may recall that in the Arab world the only variety of Arabic normally used in writing is Classical Arabic (CA). As they learn to read and write, children also learn CA. While CA is quite different from the local Arabic dialect the children speak, the correspondences

¹ Recordings of Tashlhiyt songs are easily available, but for practical reasons, using written sources was the only option open to us at the time we did our work on versification.

between them are systematic enough to be readily apparent to the literate speakers, who generally view the variety of Arabic they speak as a corrupted version of CA.

In what follows, forms written in the Arabic script are represented by sequences of roman letters enclosed between angled brackets. Thus ⟨s⟩ represents the Arabic letter *siin*, which notates the sound *s*, and ⟨ktb⟩ stands for a sequence of three Arabic letters, those representing the sounds *k*, *t* and *b*. As is well known, conventional Arabic spelling only represents consonants. Short vowels are not represented at all. The word *taḥduθ* is written ⟨tḥdθ⟩, also the spelling of the words *tuḥdaθ*, *tuḥdiθ*, *taḥaddaθ* and *tuḥaddiθ* (consonant gemination is not represented either). Long vowels are represented by consonant letters: *uu* by ⟨w⟩, *ii* by ⟨y⟩ and *aa* by the letter aleph, which we represent here by ⟨A⟩. While *katab* is written ⟨ktb⟩, *kaatab* is written ⟨kAtb⟩ and *katabaa* is written ⟨ktbA⟩; while *wuzin* is written ⟨wzn⟩, *wuzinuu* is written ⟨wznw⟩ and *wuuzinuu* is written ⟨wwznw⟩.

Since the 8th century the Arabs have devised diacritics to represent short vowels and consonant gemination. Aside from its systematic use in the Koran, the spelling which comprises these diacritics, ‘vocalized (*maṣkuul*) spelling’, as it is called, is mainly used for pedagogical purposes. Vocalized spelling is also resorted to in order to notate MA or Tashlhiyt in those rare instances where these languages are committed to writing.

In the Arabic script the diacritics are written above or below the letters, but we will represent them as superscripts immediately after the letters to which they are attached. In a vocalized text, geminates are indicated by a special diacritic which we represent by ⟨²⟩, and each occurrence of a vowel is represented by a diacritic sign attached to the letter corresponding to the consonant which precedes that vowel. /a/, /i/ and /u/, the three vowels of CA, each have their own diacritic, which we represent here by ⟨^a⟩, ⟨ⁱ⟩ and ⟨^u⟩. The vocalized spelling of *tuḥaddiθ*, a word normally written simply as ⟨tḥdθ⟩, is ⟨t^u ḥ^a d^{2,i} θ^o⟩, with two diacritics attached to ⟨d⟩, one to indicate gemination and the other to represent the fact that *dd* is immediately followed by *i*. The raised zero at the end of the above spelling stands for the *sukuun* diacritic, a sign which indicates that the consonant to which it is attached is not followed by any vowel. Other illustrations of the use of the *sukuun* are found in such vocalized spellings as ⟨t^u ḥ^o d^a θ^o⟩ for *tuḥdaθ* (standard spelling ⟨tḥdθ⟩), ⟨k^a A t^a b^o⟩ for *kaatab* (standard spelling ⟨kAtb⟩) and ⟨m^a ṣ^o k^u w l^o⟩ for *maṣkuul* (standard spelling ⟨mṣkwl⟩). The last two examples illustrate the notation of long vowels in the vocalized spelling.

Before we see how the vocalized spelling is put to use to notate Tashlhiyt and MA, a caveat is in order. Although the Arabic script has sporadically been used for many centuries to record poems in Tashlhiyt,² this practice

² See, e.g., Boogert (1997, 1998) and Stroomer (1992).

has not evolved its own system of conventions.³ At present there is no way of writing down Tashlhiyt which is deemed the only correct one. The problems faced by the authors of the Arabic transcriptions are of the same nature as those faced by the authors of phrase books for travellers, in which sentences in one language are notated using the spelling of another. Different authors may use different letter combinations to represent the same sound, and alternative renditions or even inconsistencies can be found within the same phrase book.

The Arabic transcriptions of Tashlhiyt poems published during this century present variations in the delimitation of words and in the notation of full vowels, but they are consistent on the following point: As far as vocoids are concerned, these transcriptions represent all the occurrences of the glides and full vowels present in the Tashlhiyt material, and only those. If a consonant is not immediately followed by a full vowel in the Tashlhiyt material, its written counterpart in the Arabic transcription has a sukuun diacritic or no diacritic. We illustrate this generalization with three lines from a Tashlhiyt poem by A. Hafidi which the author himself has notated with Arabic letters.⁴

- (1) a. bayn-n i-tra-n x=t-agut-t mas=sul⁵ n-ss-ntal
 b. l-!yamar-t nm a t-i-ddukkla n-ssn=tnt=ak^wk^w
 c. ss-ifif-γ=it kra=d i-s-lulli w-a-fus⁶ nx

We give below the author's rendition of these lines in the Arabic script.

- (2) a. b^a A y n^{2, ∅} ?ⁱ t[∅] r^a A n x t^a A g^u w t^{2, ∅} m^a A
 s^{2, u} w l n[∅] s^{2, ∅} n[∅] t A l[∅]
 b. l[∅] y^a A m^a A r t[∅] n m ?^a tⁱ y d^{2, u} w k[∅] l A
 n[∅] s^{2, ∅} n[∅] t[∅] n[∅] t ?^a k^{2, ∅}
 c. s^{2, i} y fⁱ y f[∅] γⁱ y t k[∅] r^a A d[∅]
 ?ⁱ s[∅] l^u w l^{2, i} y w^a A f^u w s[∅] n[∅] x[∅]

The metrical pattern of the poem requires each line to have 12 syllables, with a H rime in the 3rd, 7th and 12th syllable:

³ Such conventions have recently been proposed, see Chafik (1990, 1991) and Elmedlaoui (1999) and references therein.

⁴ The lines below are lines 7, 10 and 14 in the poem in Hafidi (1996: 33–34). Here are the meanings of these lines: (a) The stars appeared through the clouds; there is not anymore anything to hide. (b) The signs of friendship, this I know very well. (c) Let me then sift all that my arm would have grinded.

⁵ From /mad=sul/.

⁶ Bound state form of *a-fus* 'arm', in which the initial vowel fails to drop in order to meet the needs of the meter. In Imdlawn, only *u-fus* is acceptable in nonpoetic speech.

(3)

	1	2	3	4	5	6	7	8	9	10	11	12
	L	L	H	L	L	L	H	L	L	L	L	H
a.	ba	yn~	nit	ra	nx	ta	gutt	mas~	su	lns~	sn	tal
b.	l	ya	mar	tn	ma	tid~	dukk	la	ns~	sn	tn	tak ^w k ^w
c.	s~	si	fif	γi	tk	ra	dis	lul~	li	wa	fu	snx

Besides illustrating our observation about the notation of full vowels of Tashlhiyt and that of their absence, the lines in (2) are also typical of various problematic aspects of Arabic transcriptions. The labialization of /k^wk^w/ at the end of line (3)b is simply glossed over in the Arabic transcription. Unlike Tashlhiyt and MA, CA does not possess any labialized consonants in its phonemic inventory and the Arabic script does not have letters representing labialized consonants. Note also the variation in the representation of the full vowels. CA has an underlying contrast in vowel length, which Tashlhiyt does not. The full vowels of Tashlhiyt are spelled as long in some instances and as short in others, e.g. the rightmost *a* in line (a) and the two occurrences of *a* in *!l-yamar-t* in line (b) are spelled as long, whereas the rightmost occurrence of *a* in line (b) is spelled as short. These variations do not reflect any phonological distinction in Tashlhiyt. Finally there are typographical uncertainties. There is actually a sukuun diacritic in the second word of line (3)b, but the typographical layout in our source makes it unclear whether it belongs to ⟨n⟩ or to ⟨m⟩. Ditto for another sukuun, near the end of the first word in the next line, where it is unclear whether the intended spelling is ⟨y^ot⟩ or ⟨yt^o⟩.

While the authors' Arabic transcriptions enable a speaker of Tashlhiyt to retrieve without ambiguity the words in the original recordings, they do not always enable one to make the appropriate choice between alternative pronunciations of the same word. The authors have a tendency to transcribe the words as they are pronounced in isolation. ME has sung each line before re-transcribing it. When a sequence of words transcribed in Arabic letters could be pronounced in several ways, he chose the pronunciation which he felt sang most naturally to the tune. Here is an example to give an idea of the kind of decisions ME had to make. The words in (4) below are those of line 31 in the song whose first lines were parsed in (19) in § 4.5:

(4) is a=ka i-siggil ag=giwn afi-n l-mγafl-t⁷

The sequence of words in (4) can be pronounced in two ways depending on whether the final segment in *afi-n* is assimilated to the following lateral.

⁷ 'He is merely seeking distractions from you'. The phonological representation *a=ka* is /ar=ka/ and that of *ag=giwn* is /ad=giwn/.

One can pronounce /n/ without assimilation to the following /l/, hence the sequence of segments represented in (5)a below, which can only be parsed as (5)b in view of our discussion of syllabification in Chapter 4:⁸

- (5) a. is aka isiggil aggiwn afil lmyaflt
 b. i sa kay sig~ gi lag~ giw na fi nlm ya flt
 1 2 3 4 5 6 7 8 9 10 11 12

On the other hand, if the optional assimilation takes effect, (4) is realized as the segment sequence in (6)a, whose orthometric parse is given in (6)b:

- (6) a. is aka isiggil aggiwn afil lmyaflt
 b. i sa kay sig~ gi lag~ giw na fil~ lm ya flt
 1 2 3 4 5 6 7 8 9 10 11 12

While syllable #10 is H in (5), it is L in (6). (6) sings without a hitch, which is not the case for (5); this accords with the fact that the meter of the song requires a L syllable in the tenth syllable. In this particular line, then, the optional assimilation should apply, and ME chooses pronunciation (6)a.

In re-transcribing the songs ME has merely chosen between variant pronunciations compatible with the Arabic transcriptions; he has not straightened the lines out. Some lines in the songs are ill-formed. Such lines are marked with an asterisk whose location indicates the point where the meter is violated. Some of the violations may be due to transcription errors in our sources.

One kind of violation is worth mentioning here although it does not occur in the two songs presented below. In Ashlhiy singing it is not unfrequent for a line to have one syllable less than the number required by the meter. In singing, the gap created by the missing syllable is patched by stretching a neighboring syllable. Here is for instance line 32 in the song by Hmad Biyzmawn already cited in (33) in § 4.6:

- (7) a yan u-tbir i-bbi flla !laxbar nns⁹

We give the scansion of this line below in (8)b, together with that of line (33)a in § 4.6, which is reproduced as (8)a for the sake of comparison:

- (8) 1 2 3 4 5 6 7 8 9 10 11 12
 L L H L L L L L L H L H
 a. a ma nad ra ru rnk~ ki ns ta ray za yarn
 b. a ya nut bi rib~ bi fl~ la lax ba rnns

⁸ In (5)a the spaces between words are given only for the readers' convenience.

⁹ Ah! the loved one (lit 'a dove'), he stops sending news.

In the singing of line (8)b the syllable *bi* is used as a carrier of the portion of the tune which is carried by *ra* and *ru* in (8)a. In some instances of this kind the stretching of a syllable over two positions sounds so natural to ME that he may not notice the metrical violation immediately. This, however, should not make us lose sight of the following point: although lines like (8)b lack one syllable, they also give us data about syllabification when their alignment with a tune is examined.

In Tashlhiyt as in French, all the pronunciations acceptable in non-poetic speech are also acceptable in singing, but the converse is not true. In our transcriptions of the songs the pronunciation is always that in use in Imdlawn, except for the realizations of /ʕ/. In Imdlawn this phoneme is realized as a long *a* in some contexts (v. § 3.7) but in some other Tashlhiyt dialects it is always realized as a consonant. The people of Imdlawn are used to hearing that pronunciation from other Ashlhiys and they can use it themselves in singing. Setting /ʕ/ aside, those pronunciations notated in our transcriptions which are not acceptable in everyday language in Imdlawn are all pointed out in footnotes.¹⁰

Our transcription is the same as that used elsewhere in this book, with the following modifications. The exclamation point indicating emphasis (dorsopharyngealization) is prefixed to the morpheme which contains emphasis in the underlying representations. Parentheses around a vowel indicate an underlying vowel which is elided (the contraction of two occurrences of the same vowel into a single short vowel does not occur outside of the poetic language). We have notated with a capital 'A' the vocative particle *a* and the vowel *a* often used as a stopgap syllable at the beginning of lines, to distinguish them from other words pronounced *a*, which are realizations of /ad/ with its consonant deleted. 'y' between square brackets represents the hiatus-breaking glide.

In the texts of Appendices II and III, two successive occurrences of the same letter not separated by a space always represent a geminate, regardless whether they belong to the same morpheme. Let us review three kinds of heteromorphemic geminates which are a common occurrence in the songs cited below.

First, Berber nouns which are loanwords from Arabic begin with the prefix /l-/, which assimilates to a following coronal (v. § 2.5.3.1). In the texts below, all the words which begin with two identical letters separated by a hyphen are nouns with an underlying shape /l-Z/, see e.g. II:3 (third line of the song in Appendix II).

¹⁰ Some of these are in use in everyday language in other Tashlhiyt dialects, but this is irrelevant for our purposes in this book. We will not dwell on syntactic irregularities. In II:51, for instance, the pronoun *flas* should immediately follow the verb *i-!dr*, and in III:62 the noun *t-i-!rzi*, which is governed by a preposition, should be in the bound state. On the distinctive characteristics of the syntax of poetic language, see the works of Galand-Pernet, Jouad and Bounfour.

Second, the consonant of the grammatical morpheme /ad/ often assimilates to the next consonant. In the texts below, all the occurrences of *aC* in which *C* is identical to the consonant at the beginning of the next word, are realizations of /ad/, see e.g. II:12, 50, 51.

Third, in certain contexts word-final /n/ optionally assimilates to a following sonorant. In the texts below, all the occurrences of a word with the shape *R=*, where *R* represents a sonorant identical to that which follows the = boundary, are realizations of the genitive preposition *n*, see e.g. II:25,39 and III:1,49.

APPENDIX TWO

SONG

This poem is a song by Rqiya Tandmsirt, a professional singer (*!tarrayst*). ME knew the original tune of this song, and he sang every line to that tune in order to transcribe it.¹ Every line ends with the vowel *i*, which is omitted below.

1. A [y] a-marg ur=ak nzi-γ ula sllm-γ=ak
2. A kiyin d=l-ħubb(a) ad=anγ² i-kkis-n t-iram
3. ula s-!saħ-t inu t-mda flla laħħ l-lun
4. nkki n-niy-t inu a=yy(i) i-hlk-n lli=ka !šmmr-γ
5. n-ga=nn r-!rža γ=bnadm fki-n=aγ i=t-illas
6. i-sgg^was-n a [y] ad !udr-γ l-iyam ur n-ssin
7. is i-lla γk-a=d lli gi-γ γassa γ=l-ħayat
8. nkka kullu t-i-mizar yat³ t-!trf n=yat
9. kullu man=d n-kka s=u-!dar n-kka=tn s=l-!frħ
10. A zud l-hna n=u-gadir ur i-li t-taman
11. walayinni⁴ t-a-mazir-t mra y-ufi yan
12. ag=gis i-skr t-a-mazir-t n-s⁵ aru-n arraw
13. i-ga sus zud l-ħižž iγ y-ufa yan l-mal
14. as=srs i-sγ l-mlk i-g=nn kullu t-i-!mitaš
15. ukan i-γz l-šin i-g=nn fllas l-mutur
16. i-g=nn !rrža nn-s γ=!rbb(i) a=ys⁶ i-kmml s=l-!xir
17. !ullah amradd ur l-hmm nn-un a wi-nnay
18. A tt-ini !zdar-aγ ad ut-γ ukan a-!γaras
19. a mmi=d uški-γ a mmi=d ut-γ ukan a-!γaras
20. a n-issan ma mmi=k=id n-fl a winu γ=u-fus
21. A winu waħqq !rbbi ini sisn t-amn-t
22. A t-asa nu tt-ini gis yan amr kiyin
23. ar ggan-γ ar=i⁷=k=id i-s-mala yan l-mlk

¹ V. Tune 1 in Appendix IV.

² Variant of the 1p object pronoun *ax*. This variant is only used in poetry.

³ Even in singing the release of this consonant is only optional, v. § 6.3.3.

⁴ This pronunciation is acceptable only in poetry. The normal pronunciation is *walaynni*.

⁵ From /nn-s/ 'of him/her'. In poetry, the initial morpheme in certain possessive determiners, which is normally pronounced *nn*, can be pronounced with a simplex consonant.

⁶ Underlyingly /ad=as/.

⁷ The 1s pronoun /iyi/, which is realized as *yyi* or as *iyi* depending on the context, has a variant /iy/, which is realized as *yy* or *iy* depending on the context. In poetry the latter realization can be shortened to *i*.

24. ar=i⁸=d i-s-mala t-iddi nn-k ul(a) awal nn-un
25. A !sbħan wallillah a kra u=w-awal nn-un
26. i-ga zun d r-ribab iγ=tn y-ut u-!snnaŋ
27. i-ga zun d l-luz iγ i-sli y-ili t-ammn-t
28. A zun i-tt-yara γ=iggi n=t-asa nu s=l-qlm
29. ur a=yi=k^wn i-ssirid u-!nzar ul(a) a-!smmid
30. !rwaħ a n-mun nkki dik yan i-ra-n i-mun
31. !rwaħ a n-mun i=t-udr-t n-mun i=s-siwal
32. n-mun i=s-!sirat inn γ ur t-uki-t n-ss-ak^wi=k
33. !rwaħ a g^wma s=t-mazir-t nn-aγ ak=k awi-γ
34. ad=ak n-bnu t-a-gadir-t ammas n=w-aman
35. A !brra nn-s ad=as n-g r-ryal i-la-n a-fus
36. a-g^wns nn-s ad=as n-g l-ħrir n=t-ukay-in
37. awi=yi s=darun iγ ur t-!rdi-t ak=k awi-γ
38. ad=ak n-g t-a-wayya γ=u-nwal i=ma t-uru-t
39. ad=ak n-tt-asi mad=dark i-lla-n u=w-arraw
40. ad=ukan t-nni-t mbarka s nni-γ nŋam
41. A t-anna ur n-!suwib n-šš=fllas a-!kuray
42. !imrbba s=yan i-tt-azzal-n l-firaq nn-aγ
43. at=tn gi-n d u-safu gi-n w-aman a-safar
44. amar i-bna-n a-gadir s=i-!mšd n=t-ammn-t
45. i-g=as=nn t-i-gžda d=u-!sγar n-k⁹ a r-!riħan
46. i-g=as a-k^wfaf n=t-i-!binsr-t t-luħ aman
47. t-i-flw-in ti n=ž-žaž l-qfl wi n=n-!nqqr-t
48. t-a-saru-t n=d-dahab i-fili win l-mlf
49. ukan i-fk=ak a bab n=d-!draf-t t-a-saru-t
50. !imrbba s=t-asa y-ugi-n t-!ayyad at t-!iγar¹⁰
51. ak=kullu t-g l-!barud i-!dr u-safu fllas

	H						H						H
	1	2	3	4	5	6	7	8	9	10	11	12	
1.	a	ya	mar	gu	ra	kn	*zi	ɣu	la	sl~	lm	ɣak	
2.	a	ki	yin	dl	ħub~	ba	dan	ɣik~	ki	sn	ti	ram	
3.	u	las~	saħ	ti	nu	tm	*da	fl~	la	laħ~	ħl~	lun	
4.	nk~	kin~	niy	*tin	way~	yi	hlk	nl~	li	ka	ŋm~	mrɣ	
5.	n	gan~	nrr	ža	ɣb	na	dmf	ki	na	ɣi	til~	las	
6.	i	sg ^w ~	g ^w as	na	ya	du	drɣ	li	ya	mu	rns~	sin	
7.	i	sil~	laɣ	ka	dl~	li	giɣ	ɣas~	sa	ɣl	ħa	yat	
8.	nk~	ka	kul~	lu	ti	mi	zar	ya	tt~	tr	fn	yat	

⁸ See note 7.

⁹ From /nn-k/; v. note 5.

¹⁰ From /ad t-!iγar/.

9.	kul~	lu	man	dnk~	ka	su	*da	rnk~	ka	tn	sl	frh
10.	a	zu	dlh	na	nu	ga	*di	ru	ri	lit~	ta	man
11.	wa	la	yin~	ni	ta	ma	zir	tm	ra	yu	fi	yan
12.	ag~	gi	sis	kr	ta	ma	zir	tn	sa	ru	nar~	raw
13.	i	ga	sus	zu	dl	hiž~	Žiγ	yu	fa	ya	nl	mal
14.	as~	sr	sis	γl	ml	ki	gnn	kul~	lu	ti	mi	taš
15.	u	ka	niγ	zl	fi	ni	gnn	fl~	la	sl	mu	tur
16.	i	gn~	nrr	žan~	ns	γrb~	bay	si	km~	ml	sl	xir
17.	ul~	la	ham	rad~	du	rl	*hm~	mn~	nu	na	win~	nay
18.	at~	ti	niz	da	ra	γa	dut	γu	ka	na	γa	ras
19.	am~	mi	duš	ki	γam~	mi	dut	γu	ka	na	γa	ras
20.	a	nis~	san	mam~	mi	ki	dnf	la	wi	nu	γu	fus
21.	a	wi	*nu	wa	hq~	qrb~	biy	ni	si	sn	ta	mnt
22.	a	ta	*sa	nut~	ti	ni	gis	ya	na	mr	ki	yin
23.	a	rg~	gan	γa	ri	ki	dis	ma	la	ya	nl	mlk
24.	a	ri	dis	ma	la	tid~	dinn	ku	la	wa	ln~	nun
25.	a	sb	han	wal~	lil~	la	hak	raw~	wa	wa	ln~	nun
26.	i	ga	zun	dr~	ri	ba	biγ	tn	yu	tu	sn~	naʃ
27.	i	ga	zun	dl~	lu	zi	γis	li	yi	li	tam~	mnt
28.	a	zu	nitt	ya	ra	γig~	gin	ta	sa	nu	sl	qlm
29.	u	ray~	yik ^w	nis~	si	ri	dun	za	ru	la	sm~	mid
30.	r	wa	han	mun~	nk~	ki	dik	ya	ni	ra	ni	mun
31.	r	wa	han	mu	ni	tu	*dr	tn	mu	nis~	si	wal
32.	n	mu	nis~	si	ra	*tinn	γur	tu	ki	tns~	sa	k ^w ik
33.	r	wa	hag ^w	ma	st	ma	zir	tn~	na	γak~	ka	wiγ
34.	a	da	knb	nu	ta	ga	dir	tam~	ma	sn	wa	man
35.	a	br~	rann	sa	da	sn	grr	ya	li	la	na	fus
36.	a	g ^w n	snn	sa	da	sn	glh	ri	rn	tu	ka	yin
37.	a	wiy~	yis	da	ru	ni	γur	tr	di	tak~	ka	wiγ
38.	a	da	kng	ta	way~	ya	γun	wa	li	ma	tu	rut
39.	a	da	knt~	ta	si	mad~	dar	kil~	la	nu~	war~	raw
40.	a	du	kan	tn~	ni	tm	bar	ka	sn~	ni	γn	ʃam
41.	a	tan~	naw	rn	su~	wi	bnšš	fl~	la	sa	ku	ray
42.	i	mr~	bas	ya	nit~	taz~	zal	nl	fi	ra	qn~	nay
43.	at~	tn	gin	du	sa	fu	gin	wa	ma	na	sa	far
44.	a	ma	rib	na	na	ga	dir	si	mš	dn	tam~	mnt
45.	i	ga	snn	ti	gž	da	dus	γa	rn	kar~	ri	han
46.	i	ga	sak ^w	fa	fn	ti	bin	sr	tt	lu	ha	man
47.	ti	fl	win	ti	nž~	ža	žlq	fl	wi	nn~	nq~	qrt
48.	ta	sa	ru	tnd~	da	ha	*bi	fi	li	wi	nl	mlf
49.	u	ka	nif	ka	ka	ba	bndd	ra	ft~	ta	sa	rut
50.	i	mr~	bas	ta	sa	yu	gin	tay~	ya	dat~	ti	γar
51.	ak~	kul~	lut	gl	ba	ru	did	ru	sa	fu	fl~	las

1. Passion for music, I will never forgive you;
2. Because of you and of love I have lost taste for food;
3. My health is ruined, my energy is gone.
4. Me, it is the good will I display which has doomed me.
5. I had invested my hope in human beings, and I am plunged into darkness.
6. I have been stirring the days for years without ever suspecting
7. That life may lead one to a situation such as mine.
8. I have visited country after country;
9. Everywhere I set foot I did so in joy,
10. But the tranquility of Agadir is something money can't buy.
11. Ah what a country! If only one could
12. Have it as one's own and have children there!
13. The Sous is like the Holy Places if one can afford
14. To buy a plot of land and grow tomatoes,
15. To dig a well and set up a pump,
16. And if one can trust that God will grant one's wishes.
17. Were I not worried for you, O mine, I swear
18. That I could never travel all the way to here.
19. What made me go all the way
20. Was to know to whose hands I am trusting you, O mine!
21. O mine! I swear by God -glorify Him and believe in Him-
22. That the thought of no one but you obsesses me.
23. In my sleep a ghost shines your image to me;
24. He conjures up your figure as well as your voice.
25. God be praised! What a voice, your voice!
26. It is like the one-stringed fiddle under the virtuoso's fingers,
27. Like almonds roasted and soaked in honey;
28. It is as though a stylus had engraved it on my heart;
29. Wind nor rain can erase it.
30. Come! Let us be together, you and I, no matter what the others do.
31. Come! Let us share life and purgatory.
32. Together, let us cross the Sirat isthmus, and where you falter, I will support you.
33. Come along, brother, I will take you to my land.
34. There I will build for you a home in the midst of the water.
35. On the outside it will be decorated with silver reals;
36. The inside will be lined with *tukayin*¹¹ silk.
37. Take me to your place, if you would be humiliated by my taking you to our place.
38. And there I will be a servant to your children.

¹¹ Word unknown to ME.

39. I will rock the babies which you will beget.
40. It will be enough for you to call out 'Mbarka!', and I will answer 'Yes'.
41. Let me be punished for whatever I fail in.
42. Whoever works at separating us,
43. Let them become a firebrand and let water be their remedy!
44. Let them build Agadir with honeycombs;
45. Let them fit it with myrtle joists,
46. With slanted roofs to let water flow down,
47. With glass doors with silver locks,
48. With golden keys on silk key-holders,
49. And in the end offer you the keys, O loved one!
50. Let the heart which hates become dry,
51. Let it be turned into gunpowder and be touched with a firebrand.

ORATORICAL ENCOUNTER

The lines presented below were improvised during an oratorical contest. Later on the authors themselves (Asid and Lachgar) wrote them down using the Arabic script. Since he has not heard a recording of the encounter, ME does not know to which tune(s) the lines were sung, and consequently he does not know whether they were sung with an additional vowel at the end, like those in Appendix II. However, ME knows several tunes which fit the meter of these lines. He chose one such tune and sung each line to it before transcribing it.¹

Even if it is not obvious from our translation, to an Ashlhiy audience the stanzas below form a coherent succession of retorts. On covert meaning in Ashlhiy tales and poetry, v. Galand-Pernet (1972) et Jouad (1989).

Lachgar:

1. A t-a-bra-t i-ss-!rsa u-fus l=l-ʕalim
2. i-ga=ysnt l-ḥaq a-mḥas i=u-g^wmmay
3. at=tnt y-azn yan i=l-xlq i-s-hmma-n
4. wa-lli i-ra-n ak^w=k^wnt !aqqra-n i-fhm=k^wnt

Asid:

5. l-ʕaql a i-ss-!rsaw-n arra bla s-smx
6. kullu kra i-bna s-!saḥ-t a=f a=t bnnu-n
7. ar aqqa-m² mddn x=l-msayl zri-nin
8. awi-n=d l-!xabar i=xiti-ll(i) ur !zrra-n

Lachgar:

9. l-aman-t ur i-žž-nžam yan a-yd usi-x
10. i-qqan=d a n-mmaγ a ur=i³ t-!rz γ=ufus
11. imm(a) ur sul i-lli yan=gis i-!tthlla-n

Asid:

12. d-din i-!dfur-n bab nn-s i-qqan=d ukan
13. y-uf=asn at=tn y-addu i-srs i=l-hmm n-s⁴
14. at=t ur i-tt-nʕat !udad is γušša-n

¹ V. Tune 2 in Appendix IV.

² From /aqqra-n/ through assimilation.

³ V. note 7 in Appendix II. The unreduced variant is found below in line 64.

⁴ V. note 5 in Appendix II.

Lachgar:

15. A t-a-nsa n=i-bnkal-n i-ffaγ l-aman
16. t-lli-t x=u-!γaras ur=gis i-zſm yan
17. i-ra u-!dar at=t n-ss-anf i=t-awdiw-in

Asid:

18. i-ga l-ſaqql t-ifaw-t ur i-tt-!γrra-n
19. kada n=yan ad=d i-!di x=gr=t-imday-in
20. kada n=yan i-fl=t ar=t i-tt-!amz l-xuf

Lachgar:

21. i-ga u-!γaras a-sawn i-γlb kuyan
22. labudd a i-ss-!rmuy wa-nna=d y-iwn-n
23. iγ i-!zr(a) a-mdlu dl-n kullu i-gnw-an
24. ur a=d y-akk(a) aman is=tn=k(a) i-gli r-riħ

Asid:

25. wa-nna i-la-n a-fud i=t-wada w=!γaras⁵
26. ur ar⁶=t i-ss-iwid u-drar i-!dſa=[y]as
27. ur ar=gis i-tt-!rza l-himma bla yat
28. iγ i-llas l-ħal urta=nn i-zri man
29. ula i-!ruħ x=t-ifaw-t ar i-tt-!brram

Lachgar:

30. i-ra u-zrg i-mndi i-ra y-igr aman
31. i-ra bnadm l-!usiy-t at=tn !dfur-nt
32. i-ra l-muhndiz l-lsas ad g-n yan
33. ad i-bnu f=l-ħaqq a ur i-!ttar dlħin

Asid:

34. hati z-zman-ad a=x ur=sul i-!dhr yat
35. yak l-lsas ur i-dus-n a=f i-bna s-!sur
36. imikk sul at=t i-q^wq^way-n !imma i-!dr nit
37. wa-nna i-ra-n a-malu nn-s i-lla γ=l-uhl-t

Lachgar:

38. i-ga l-bnya wil⁷ l-uqqt ak=k(a) i-!sbr yan
39. wa-lli x ħawl-n i-fass-n ar=ax=d i-!ttar
40. i-ggut ma=mm(i) i-tt-af l-!γrur a i-bn s-sas
41. γinn a=x !zrra-n mddl⁸ l-himma drus-nt

⁵ From /wada n=u-!γaras/. /n/ assimilates to the following sonorant, whence a geminate high vocoid. In Imdlawn the degemination of the high vocoid is acceptable only in poetry.

⁶ In this line and in the next, the preverb /ar/ retains its final consonant despite the fact that it is preceded by another preverb. Outside of poetry, the final /r/ obligatorily drops in such an environment, see DE (1989: 180).

⁷ From /win/.

⁸ From /mddn/.

Asid:

42. l-ḥaqq a=s a y-!atta l-ṣin i=l-γll-at
43. walayni⁹ t-!rza=[y]ax t-rga t-!γrr=ax
44. i-lli i-rufa-n is i-!qqur ur=d i-xlf
45. i-lli i-ra-n imikk ur=gis i-!dhr yat

Lachgar:

46. t-addar-t a-!ztta nn-un wr¹⁰ rad !ṣmmr-n
47. usi-n=d i-fass-n t-i-zlaf-in d=l-muss
48. gabl-n t-a-wala s-sll-t ag=gis g^wmmr-n
49. ur=ak^wk^w=sul skr-n uss-an l=l-!ṣnsr-t

Asid:

50. A t-!adfi wa-lli=tt i=myar-n t-huwl=t
51. i-qqan=d ab=bdda y-asi aggu d=w-aman
52. awi-n=d a-faruz nn-s ak^wi-n !ṣmmr-n
53. !mqqar gis l-ḥaqq nn-k ur=ak=d i-ffuγ
54. i-lli x=t=inn t-fl-t a=x=sul ur γama-n

Lachgar:

55. hann a g^wma t-a-mazir-t-lli x=d n-lul
56. !llah abla bzziz a=s=tnd¹¹=d i-ffγ l-xlq
57. n-!ḥrm=sul a-!γaras x=is i-zri yan
58. yan a i-!di !rubas i-xlu=t=id w-asif

Asid:

59. s-siṣr ix i-lla x=ixf ur a s-hnna-n
60. maxx is t-ufi-t a l-!asl ak=k i-žlu yan
61. !mqqar=gis ur i-dawm i-bidd fllas
62. !mqqar=nit ur i-ssugr i=t-i-!rzi yat

Lachgar:

63. n-!zuzd ab=bdda=gis n-ili tthnna-γ
64. walayn(i) ur=iyi=gis ma=f n-tt-!ṣmmar
65. mani=x n-ufa l-!mdars i=mayd uru-x
66. ul(a) a-!dbib ur=i¹²=gis ma=yy(i) i-tt-dawa-n

⁹ Another poetic variant of walaynni, v. note 4 in Appendix II.

¹⁰ Even outside of poetry the negation *ur* has free variant *wr*/ when it immediately precedes */rad/* (future).

¹¹ From */tnt/*.

¹² V. note 7 in Appendix II.

Asid:

67. arraw-da n=t-mazir-t a=f i-bna s-!slh
68. ntt(a) a i-ra-n at=tnd=d i-bnu nix hlkn
69. i-nna xwa-i¹³ id-bab nn-s i-ga i-!γrm-an
70. ur ra=nn=gis i-ttrs, a l-lsas, u-!zru nn-un

Lachgar:

71. hann a-drar ur ugr-n l-!uda d=w-asif
72. mllix t-lli-t a d-!duw x=imi y¹⁴=!dura-n
73. blhaqq bagnziz i-!ktr γ=u-glif n-x¹⁵
74. i-šša kra i-!zda sul t-nkr t-γuyyi-t

Asid:

75. A t-izzw(a) aggu n=ilamm-n i-!zza=d=giwnt
76. i-!zzu=d w-!adu wala f=ti-da i-g^wmmr-n
77. kuyat=ka d=i-frg-an x=as i-tt-γ^wi r-riš
78. t-lkm t-γuyyi-t n-snt¹⁶ bab i¹⁷=i-gnw-an

Lachgar:

79. t-affa=nn y-aggug-n f=u-!nzar n-hml=k^wnt
80. walayni l-mnazil=ka x n-!dfr š-šur
81. ar ix n-ufa wadd i-!zlay-n d-dmn-t n-x¹⁸

Asid:

82. issn-t ma=x=ann i-ffal bu-s-!sab-t !mnass
83. ass-an x i-suq i-zznz=d ur !umz-n yat
84. gar alwa t-i-!mudan=k(a) as=sul=d i-ffal
85. ix ur xlf-n l-!užur ti-lli zri-nin

¹³ From /xwa-n/. The optional assimilation of /n/ to the following sonorant gives rise to a geminate vocoid, which constraint NoOns~ (§ 4.8) prevents from syllabifying as *yi. xwayyd* is also a possible pronunciation outside of poetry.

¹⁴ From /imi n=i-!dura-n/. Preposition /n/ optionally assimilates to /i/ and the resulting rime *iyy* is shortened to *iy*. This pronunciation is also acceptable outside of poetry.

¹⁵ From /nn-x/; v. note 5 in Appendix II.

¹⁶ From /nn-snt/; v. note 5 in Appendix II.

¹⁷ From /n=i-gnwa-n/ through the assimilation of the preposition /n/.

¹⁸ From /nn-x/; v. note 5 in Appendix II.

		H				H		H		H
	1	2	3	4	5	6	7	8	9	10
1.	a	tab	ra	tis~	sr	saw	fu	sll	ʕa	lim
2.	i	gay	sn	tl	ħa	qam	ħa	siw	g ^w m~	may
3.	at~	tnt	ya	zn	ya	nil	xl	qis	hm~	man
4.	wal~	liy	ra	nak ^w ~	k ^w n	taqq	ra	nif	hm	k ^w nt
5.	l	ʕaq	la	ys~	sr	saw	nar~	rab	las~	smx
6.	kul~	luk	ra	yb	nas~	saħ	ta	fat	bn~	nun
7.	a	raqq	ram~	md~	dn	xlm	sa	ylz	ri	nin
8.	a	win	dl	xa	ba	rix	til~	lur	zr~	ran
9.	la	man	tu	riž~	žn	žam	ya	nay	du	six
10.	iq~	qan	da	nm~	ma	ɣaw	ri	trz	ɣu	fus
11.	im~	mur	su	lil~	li	yan	gi	sitt	hl~	lan
12.	*d~	di	nid	fu	rn	ba	bnn	siq~	qan	du
13.	yu	fas	nat~	tn	yad~	duy	sr	sil	hm~	mns
14.	at~	tu	rit~	tn	ʕa	tu	da	dis	ɣuš~	šan
15.	a	tan	sa	ni	bn	kal	nif~	faɣ	la	man
16.	tl~	lit	xu	ɣa	ra	sur	gi	siz	ʕm	yan
17.	i	raw	da	rat~	tns~	san	fi	taw	di	win
18.	i	gal	ʕaq~	ql	ti	faw	tu	ritt	ɣr~	ran
19.	ka	dan	ya	nad~	di	dix	gr	tim	da	yin
20.	ka	dan	ya	ni	fl	tar	tit~	tam	zl	xuf
21.	i	gaw	ɣa	ra	sa	saw	ni	ɣlb	ku	yan
22.	la	bud~	da	ys~	sr	muy	wan~	nad	yi	wnn
23.	i	ɣiz	ra	md	lu	dln	kul~	luy	gn	wan
24.	u	rad	yak~	ka	ma	nis	tn	kig	lir~	riħ
25.	wan~	nay	la	na	fu	dit	wa	daw	ɣa	ras
26.	u	rar	tis~	si	wi	dud	ra	rid	ʕa	yas
27.	u	rar	gi	sit~	tr	zal	him~	mab	la	yat
28.	i	ɣil~	la	sl	ħa	lur	tan~	niz	ri	man
29.	u	lay	ru	ħx	ti	faw	ta	ritt	br~	ram
30.	i	raw	zr	gi	mn	diy	ra	yig	ra	man
31.	i	rab	na	dm	lu	siy	tat~	tnd	fu	rnt
32.	i	ral	mu	hn	di	zll	sa	sad	gn	yan
33.	a	dib	nu	fl	ʕaq~	qaw	rit~	tar	dl	ħin
34.	ha	tizz	ma	na	da	xur	su	lid	hr	yat
35.	ya	kll	sa	su	ri	dus	na	fib	nas~	sur
36.	i	mikk	su	lat~	tiq ^w ~	q ^w ay	nim~	may	dr	nit
37.	wan~	nay	ra	na	ma	lunn	sil~	lay	lu	ħlt

38.	i	gal	bn	ya	wil~	luqq	tak~	kis	br	yan
39.	wal~	lix	ħa	wl	ni	fass	na	rax	dit~	tar
40.	ig~	gut	mam~	mit~	ta	flγ	ru	ray	bns~	sas
41.	γin~	nax	zr~	ra	nmd~	dll	him~	mad	ru	snt
42.	l	ħaq~	qa	sa	yat~	tal	fi	nil	γl~	lat
43.	wa	lay	ni	tr	za	yax	tr	gat	γr~	rax
44.	il~	liy	ru	fa	ni	siq~	qu	rur	di	xlf
45.	il~	liy	ra	ni	mik~	kur	gi	sid	hr	yat
46.	tad~	dar	ta	zt~	tan~	nun	wr	rad	fm~	mrn
47.	u	sin	di	fas~	sn	tiz	la	fin	dl	muss
48.	ga	bln	ta	wa	las~	sll	tag~	gis	g ^w m~	mrn
49.	u	rak ^w k ^w su	ls	kr	nus~	sa	nll	fn	srt	
50.	a	tad	fi	wal~	lit~	tim	ya	rnt	hu~	wlt
51.	iq~	qan	dab~	bd~	da	yas	yag~	gud	wa	man
52.	a	win	da	fa	ru	znn	sa	k ^w in	fm~	mrn
53.	mq~	qar	gi	sl	ħaq~	qnn	ku	rak	dif~	fuy
54.	il~	lix	tin~	nt	fl	tax	su	lur	γa	man
55.	han~	nag ^w	ma	ta	ma	zir	tl~	lix	dn	lul
56. *1~	la	hab	la	bz~	zi	zas	tnd~	diff	γl	xlq
57.	n	ħrm	su	la	γa	ras	xi	siz	ri	yan
58.	ya	nay	di	ru	ba	six	lu	tid	wa	sif
59.	s~	siʃ	ri	xil~	la	xix	fu	ras	hn~	nan
60.	max~	xis	tu	fi	ta	las	lak~	kiž	lu	yan
61.	mq~	qar	gi	su	ri	daw	mi	bidd	fl~	las
62.	mq~	qar	ni	tu	ris~	sug	ri	tir	zi	yat
63.	n	zuz	dab~	bd~	da	gis	ni	litt	hn~	naγ
64.	wa	lay	nu	ri~	yi	gis	ma	fntt	fm~	mar
65.	ma	nix	nu	fa	lm	dar	si	may	du	ruX
66.	u	lad	bi	bu	ri	gis	may~	yitt	da	wan
67.	ar~	raw	da	nt	ma	zir	ta	fib	nas~	slh
68.	nt~	tay	ra	nat~	tnd~	dib	nu	nix	hl	knt
69.	in~	nax	way~	yd	ba	bnn	si	gay	γr	man
70.	ur~	rann	gi	sit~	tr	sall	sa	suz	run~	nun
71.	han~	nad	ra	ru	ru	grn	lu	dad	wa	sif
72.	ml~	lix	tl~	li	tad~	duw	xi	miy	du	ran
73.	bl	ħaqq	ba	gn	zi	zik	tr	γug	li	fnx
74.	iš~	šak	ra	yz	da	sul	tn	krt	γuy~	yit
75.	a	tizz	wag~	gu	ni	lamm	niz~	zad	gi	wnt
76.	iz~	zud	wa	du	wa	laf	ti	day	g ^w m~	mrn
77.	ku	yat	ka	di	fr	gan	xa	sitt	γ ^w ir~	riš
78.	tl	kmt	γuy~	yi	tn	snt	ba	biy	gn	wan

79.	taf~	fann	yag~	gu	gn	fun	za	rnh	ml	k ^w nt
80.	wa	lay	ni	lm	na	zil	ka	xnd	frš~	šur
81.	a	rix	nu	fa	wad~	diz	la	yndd	mn	tnx
82.	is~	snt	ma	xan~	nif~	fal	bus~	sab	tm	nass
83.	as~	san	xi	su	qiz~	znz	du	rum	zn	yat
84.	ga	ral	wa	ti	mu	dan	kas~	sul	dif~	fal
85.	i	xur	xl	fn	lu	žur	til~	liz	ri	nin

1. The message which the scholar's hand has written in a perfect manner,
2. God the Just supplements it with vowel signs, for its reading aloud,
3. So that it can be sent to the conscious man,
4. To him who is able to read it and understand it.
5. Reason makes writings perfect without using ink.
6. Everything that Reason builds, it builds it on solid bases.
7. Men meditate on events of the past
8. In order to know something about events which they have never witnessed.
9. I have embarked on a delicate mission;
10. It is up to me to do my utmost to prevent its shattering in my hands,
11. For there remains nobody else to take care of it.
12. A debt befalling one cannot be avoided.
13. The debtor would do well to repay and relieve himself
14. To avoid continually being pointed at as unreliable.
15. O hole of perfidious snakes,
16. You are at the side of the path; no one dares tread there;
17. My foot beseeches me to keep it away from nasty surprises.
18. Reason is a light that never misleads.
19. Many are those it has saved in the swell.
20. Many others it has abandoned, and they were left the prey of fear.
21. The path is steep; it challenges everyone.
22. It cannot but tire whoever goes upward
23. When he sees the clouds that cover the sky,
24. Rainless, smothered by the winds.
25. He who has strength to set forth,
26. Does not let himself be awed by the heights; they obey him.
27. Only one thing stops him:
28. It is when night falls before he reaches the stopping place,
29. And, not having arrived by daylight, he goes in circles.
30. The mill wants grains, and the field wants water;

31. People need edifying words that they can carry along.
32. The architect needs foundations which form a coherent whole,
33. So as to build correctly and avoid premature destruction.
34. In the present times the prospects are not encouraging.
35. Was the wall built on flimsy foundations?
36. It hardly stays up; it is ready to fall down.
37. He is taking chances, who hopes to take cover in its shade.
38. Those are works of nowadays; one has to make do.
39. All those in which too many hands are involved collapse.
40. Many people prefer precariousness to consolidation work;
41. That is where poor morality shows.
42. Springs obey Equity in pouring out water for crops,
43. But our crack-ridden aqueducts bias the apportionment.
44. Places lacking water have become dry and barren.
45. Half-dry places do not breed hope.
46. O beehive, your honeycombs haven't got a chance to fill up.
47. So many hands are carrying containers and knives
48. And are in line to harvest in the basket (to empty it).
49. They no longer even respect the *lansart* (?)¹⁹ season.
50. He who has grown fond of delights lives in anxiety.
51. He is condemned continually to carry around a water pipe and water
52. To fill its china vessel.
53. Even if you are entitled to your share, it will not be spared;
54. It will not remain where you left it.
55. About the land where we were born, I swear, O brother,
56. That we left it against our will.
57. There is still no path to get there;
58. The path which Robas had built, a flood ruined it.
59. There is no serenity in a mind inhabited by passion.
60. Can one ever forget one's place of origin,
61. Even if one does not live there,
62. Even if there is nothing to be done against ill luck?
63. I had a deep desire to settle there and live in peace,
64. But I don't find there a base for my undertakings.
65. Where is a school to be found for my children?
66. A doctor to look after me, I don't find one there either.

¹⁹ This word is unknown to ME, and so are those followed by an interrogation mark in lines 73 and 84.

67. It is on the child of the land that prosperity rests.
68. He will rehabilitate it, or we are done for.
69. A place abandoned by its owners is all ruin and desolation.
70. There, foundation stones do not stand fast.
71. Mountains are no different from plains and valleys,
72. Provided electric power reaches the village entrance.
73. But the beehive is full of *bagnziz* (?)
74. Which have eaten up what the bees made; furthermore crys can be heard.
75. Bees, the smoke of burned bran pursues you.
76. Those of you who go out on their quest are caught out by the winds;
77. Their wings get caught in the hedges.
78. Their cries have reached the Master of the sky.
79. I avoid slopes too remote for rain to reach them.
80. I scrutinize the seasons, in wait for the opportunity
81. When I find someone to redeem my patrimony.
82. Do you know on what occasion the farmer loses half of his harvest?
83. This happens on the day he goes to the market and the takings of his sale are small.
84. A bad *alwa* (?) only brings ills
85. If divine reward does not compensate for earlier losses.

APPENDIX FOUR

FIVE ASHLHIY TUNES

The Ashlhiy tunes given below are appropriate for singing the lines used as examples in Chapter 4 and the whole pieces presented in Appendices II and III.

Tune 1 is that of the song by !Rqiya Tandmsirt transcribed in Appendix II. It can also be used to sing the lines in examples (19) and (20) in § 4.5.

Tune 2 was composed by Lħažž Błfid. It can be used for singing the lines in Appendix III.

Tune 3 can be used for singing the lines in examples (30) and (33) in § 4.6.

Tune 4 can be used to sing the lines in example (41) in § 4.7.

Tune 5 is the tune to which the Imdlawn sing the winnowing song (46) in § 4.8.

Except for the last, these tunes are appropriate carriers of two-line stanzas. They are made of two halves, one for each line in a stanza. The two halves are rhythmically parallel.

The numbers under the notes in the scores indicate the text-to-tune alignment, e.g. '4' under a note indicates that that note must carry the fourth syllable in a line sung to the tune under consideration; in singing the song in Appendix II, for instance, the fourth note in Tune 1 must be associated with *gu* in line 1, with *dl* in line 2, and so on.

When there is no number associated with a note, that note must carry the same syllable as the preceding note, e.g. in singing the song in Appendix II, the third syllable in line 1, (*mar*) must bear the last two notes in the first bar of Tune 1, and similarly the seventh syllable (*zi*) must bear the first two notes in the third bar.

The bracketted 'i' represents a line-final stopgap [i] vowel which must be sung to the corresponding note. That vowel is omitted from our transcription. Some tunes require a line-final stopgap vowel while others do not.

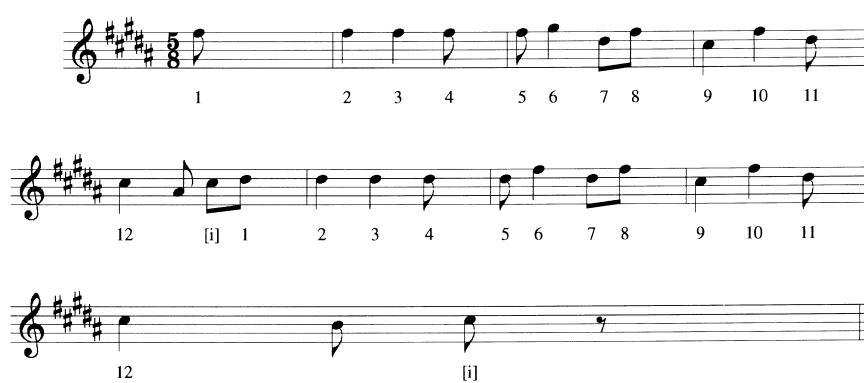
Tune 1



Tune 2



Tune 3



Tune 4



Tune 5



LIST OF VERBS WITH
IMPERFECTIVE GEMINATION

We list below all the triconsonantal verbs we have been able to find in Imdlawn Tashlhiyt which resort to gemination in the imperfective (see § 5.2). The forms listed are perfective stems. As a rule imperfective stems only differ from their perfective counterparts by the gemination of one consonant. When there are additional differences, the imperfective is given between parentheses. Such additional differences are only found in two situations: (i) the initial consonant becomes *a* in the imperfective, and (ii) the geminated consonant is one of those which regularly undergo strengthening when they are subject to morphologically-governed gemination: $w > g^w g^w$, $\gamma > qq$, $\gamma^w > q^w q^w$, $!d > !tt$.

The verbs are classified according to the sonority contours of their perfective stems. Each sonority contour is characterized by a two-letter sequence in which ‘R’, ‘E’ and ‘F’ respectively mean ‘rising’, ‘even’ and ‘falling’. A letter characterizes the sonority slope between two adjacent consonants. For instance the sonority contour of the sequence *xtl* is FR, as the sequence *xt* has a falling sonority contour (*x* is more sonorous than *t*) and the sequence *tl* has a rising contour (*t* is less sonorous than *l*).

1. Verbs which geminate the second segment in the imperfective

(RR)

!xmr		‘ferment’
g ^w mr		‘hunt’
bžr	(ažžr)	‘pluck (feathers)’
!dhr		‘appear’
gzr		‘slaughter (animal)’
γml		‘mould’
ħml		‘enjoy (someone’s company)’
bxl		‘be stingy’
kšm		‘enter’
gzm		‘slice off’

(ER)

!γfr		‘forgive’
fsr	(assr)	‘spread’
!xsr		‘be damaged’
zhr		‘blaze up’
!ħsr		‘stop’

bdr	(addr)	‘mention’
xzn		‘hoard’
(FF)		
!mšd		‘comb’
!mħd		‘poison’
nɣd	(nqqd)	‘refine’
!nšd		‘be happy’
ršq		‘be happy’
(FE)		
!rxs		‘be cheap’
msx		‘metamorphose’
mħs		‘vocalize (in writing Arabic)’
!nšh		‘advise’
nžh		‘succeed’
nšf		‘scrape (skin)’
!ngd		‘drown’
ftk		‘sprain’
žbd		‘pull’
(FR)		
lgr		‘lock’
lwr	(lg ^w g ^w r)	‘flee’
mgr		‘harvest’
ndr		‘moan’
!ndr	(!nttr)	‘jump’
nfr		‘blow one’s nose’
nkr		‘get up’
nsr		‘graze (skin)’
!str		‘protect’
!zbr		‘prune’
zgr		‘go across’
!hgr		‘underestimate’
ždr		‘burn’
rwl	(rg ^w g ^w l)	‘flee’
!rdl	(!rttl)	‘borrow’
rgl		‘lock’
!rħl		‘move (house)’
!mdl	(!attl)	‘bury’
msl	(assl)	‘plug’
nzl		‘spur’
ntl		‘take shelter’

xtl		'feint'
!rzm		'open'
!ršm		'mark'
!ržm		'stone'
!rhm		'be merciful'
rkm		'rot'
rgm		'insult'
lkm		'reach'
lhm		'solder'
ndm		'regret'
!ndm	(!nttm)	'compose (poem)'
nžm		'remain unharmed'
zdm		'gather firewood'
hkm		'have within one's reach'
!štn		'bother'
γ ^w bn		'lash'
rks		'hide'
sty		'split'
zdy		'inhabit'
!lbž		'squash'

2. Verbs which geminate the first consonant in the imperfective

(RF)

!hrm		'be forbidden by religion'
krm		'be dried out'
trm		'shimmy down'
frn		'sift'
krf		'tie up'
!yrf	(!qqrf)	'flatten (dough)'
frs		'be sharp'
!yrs	(!qqrs)	'slit the throat'
mrz		'wound in the head'
krz		'plough'
!qrs		'reopen (wound)'
frš		'deceive'
hrš		'feel slightly ill'
!hrš		'be smart'
!hrž		'be angry'
!srb		'have diarrhoea'
!krd		'scrape'
!srd		'sue'
frd		'graze (animal)'
!frd		'clear a field'

!γrd	(!qqrd)	'lie down'
frk		'guess'
šrk		'own with others'
frg		'fence in'
srg		'have a miscarriage'
!ħrg		'burn'
!zlm		'peel'
zlf		'singe'
žlx		'be dirty'
kls		'slash (meat)'
qlb		'knock out'
ħlb		'eat (liquid food)'
!xld		'mix'
k ^w ms		'tie into a neat bundle'
k ^w mz		'scratch'
šmt		'dupe'
smd		'add'
ħmd		'thank (God)'
k ^w md		'wither prematurely'
!γns	(!qqns)	'lose a bad habit'
knd		'dupe'
!qnd		'be bored'
xng		'choke'
(EF)		
fsd		'be spoiled'

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