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QUANTITATIVE TRANSFER IN THE NONCONCATENATIVE
MORPHOLOGY OF IMDLAWN TASHLHIYT BERBER

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ABSTRACT According to a general condition on nonconcatenative mappings proposed in McCarthy and Prince (1986, 1987), when a form is mapped onto a template the mapping preserves as much of the phonological structure of the form as is compatible with the template. We argue that not all aspects of the structure of a form are equal when they compete for mapping onto a template and that transferring as many melodic units as possible takes precedence over transferring their respective quantities. Our evidence is drawn from the derivational morphology of the dialect of Tashlhiyt Berber spoken in Imdlawn, Morocco. That evidence is twofold. There are on the one hand mappings such as those onto template uCCiC: krs ~ ukris, kk°m ~ ukkim, g°mm ~ ugmim, qssf ~ uqsif. In the first three mappings all melodic units are transferred, as well as their quantity. In the last mapping on the other hand, transferring to the derived word all three melodic units /q, s, f/ of the derivational base takes precedence over transferring the gemination of /s/, which would yield *uqsis or *ussif.

1. INTRODUCTION

This article¹ is intended as a contribution to the ongoing discussions concerning the mechanisms of nonconcatenative morphology. According to a general condition on nonconcatenative mappings proposed in McCarthy and Prince (1986, 1987), when a form is mapped onto a template the mapping preserves as much of the phonological structure of the form as is compatible with the template. We shall argue that not all aspects of the structure of a form are equal when they compete for mapping onto a template. Specifically, we shall propose that transferring as many segments (i.e. melodic units) as possible takes precedence over transferring their respective quantities. For instance, mapping the derivational base *lmmus* onto template uCCiC

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yields *ulmis*, not **ulmim* nor **ummis*. That is, transferring to the derived word all three consonants of the derivational base takes precedence over transferring the gemination of *m*.

This work also has a descriptive aim. The nonconcatenative aspects of Berber morphology still await a systematic description. We report here results of our first explorations in the nonconcatenative areas of the morphology of Imdlawn Tashlhiyt Berber (henceforth ITB).² In ITB the entities which are mapped onto templates are not abstract consonantal "roots", as is the case in the morphology of verbs in Arabic. Instead, these entities are "radicals" which contain both vowels and consonants (plain or geminate), and which may themselves be morphologically complex. For example, mapping the verb *ldrrf* 'be on the edge' onto the template CCCaCCu yields the noun *lnttarfu* 'extremist', which may in turn be mapped onto the template (C)CCuCCa, whence *lntturfa* 'extremism' (for / see hereunder).

For each of the word-formation processes of ITB discussed below we give an exhaustive list of all the relevant derivatives known to us, and the various mapping mechanisms presented below are meant to account for all the forms listed, unless indicated otherwise.

Before we discuss the mapping of bases onto templates in ITB we must present background knowledge on geminates and on nouns in ITB. This will be done in the next section.

2. GEMINATES IN ITB.

2.1. PRELIMINARIES. The consonants of ITB are: *b, m, f, t, d, n, s, z, ʃ, ʒ, k, k°, g, g°, x, x°, ʔ, ʔ°, q, q°, ʕ, h, ʕ, l, r, ɾ*; *x* and *ʔ* represent uvular fricatives, *h* and *ʕ* mark pharyngeal fricatives, *h* stands for a "voiced *h*"; ° indicates that the segment represented by the preceding symbol is labiovelar, and an exclamation point / indicates that at the phonetic level all the segments in the following unit (morpheme or word) have emphatic articulation.³ Otherwise we follow the conventions of the IPA. Besides *i, u* and *a*, which correspond to underlying segments, there occur on the surface ultra-short epenthetic vowels which are found only next to voiced consonants in certain environments (cf. Dell and Elmedlaoui (1985)). They are not indicated in our transcription. In this article the term "vocoid" denotes the class *a, i, u, y, w*. All the other segments of ITB will be called contoids. By vowel (V) we mean a syllabic vocoid (i.e. *a, i* or *u*), and by consonant (C), a glide or a contoid.

Following the work done by J. McCarthy (1979, 1981) and others⁴ on nonconcatenative morphology, we assume that phonological representations are organized

2. This is the Tashlhiyt dialect of Berber spoken in the Imdlawn valley, seventy kilometers northeast of the city of Taroudant, in the Western Higher Atlas. One of us (ME) is a native speaker of that dialect.

3. In the phonological representations of ITB there is a contrast between emphatic coronal consonants and plain coronal consonants, cf. Elmedlaoui (1985).

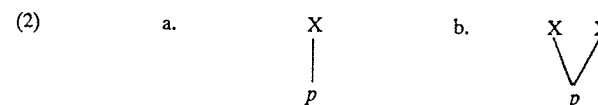
4. Cf. Halle and Vergnaud (1980), McCarthy (1982a, 1984), Marantz (1982), Yip (1982), Steriade (1982), Archangeli (1983), Levin (1983, 1985), Carrier-Duncan (1984), Clements (1985b), McCarthy and Prince (1986, 1987).

around a string of phonetically empty positions or slots, the skeleton. The phonemic material is represented independently of the skeleton, and associated with it according to the principles of autosegmental phonology. Here is for instance, according to McCarthy (1981), the representation for the verbal stem *kuttib* in Classical Arabic:



The relationship between the skeleton slots and the segments associated with them is analogous to that between tone-bearing units and tones in tone languages, and feature bundles such as /u/ and /k/ are often referred to as melodic units.

It has become a commonly accepted view that the distinction between short and long segments is not one between the two values of a feature such as [long], but rather that it is a reflection of the number of skeleton slots to which melodic units may be linked. Here is for instance the representation of a short *p* versus that of a long one:⁵



We shall adopt this conception of quantity in this article.

ITB has a contrast between long and short segments. Here are some minimal pairs.

(3)

a.	<i>i-mi</i>	'mouth'	<i>i-mmi</i>	'mother'
b.	<i>t-amda</i>	'pond'	<i>t-amdda</i>	'brown buzzard'
c.	<i>i-gʷa</i>	'he picked up'	<i>i-ggʷa</i>	'he is last'
d.	<i>y-ukr</i>	'he stole'	<i>y-ukrr</i>	'he dragged'

In the examples on the right the consonants represented by a sequence of two identical letters sound longer and give the impression of being pronounced with greater energy than their counterparts in the forms in the left column. Since the status of long segments is a matter of debate in the literature dealing with Berber,⁶ and since the conception of quantity portrayed in (2) is central to our discussion of mapping onto templates in ITB, let us first present our reasons for upholding such a conception in the case of ITB, apart from the facts of derivational morphology which will be examined below. This will give us the occasion to present various facts which are a necessary background for the discussion to come.

So as not to prejudge the issue, let us for the moment call "heavy" those segments which we transcribe with a sequence of two identical letters, and let us call

5. On this conception of quantity, cf. Leben (1980), Prince (1984), Clements (1985a), Hayes (1986), Schein and Steriade (1986), and references therein.

6. For references, cf. Saib (1977, 301 note 4) and Elmedlaoui (1985, 152-3 notes 9 and 9').

"light" the others. Let us call the representation in (2)b a geminate, and let us extend the terms "geminate" and "gemination" to all modes of representation which make it possible to treat heavy segments as being in some sense equivalent to a sequence of two light ones.

The geminate consonant represented in (2)b is comprised of two units (the two X slots) on the skeletal plane, but of only one unit (the distinctive feature bundle for which *p* stands as a shorthand) on the melodic plane. Such a representation leads one to expect that the consonant in question will behave as a sequence of two units in some respects, and as a single unit in other respects.

The heavy segments of ITB do indeed exhibit this kind of dual behaviour. Their behaviour as single units will be amply illustrated later on when we examine how they are mapped onto morphological templates. Let us now review those regularities which suggest that the heavy segments of ITB behave as sequences of two units. Arguments similar to those in section 2.2. and to the one concerning the imperfective radicals in (5) were already given for other dialects of Berber in Saib (1977).

2.2. HEAVY SEGMENTS AS SEQUENCES OF TWO UNITS. When morpheme or word concatenation happens to put side by side two occurrences of the same light segment the resulting sequence is in general homophonous with the corresponding heavy one. This fact would automatically be accounted for in a framework where heavy segments count as a sequence of two light ones. For instance there is no difference between the pronunciation of *t-zri-t* 'you overtook him' and that of *t-zri tt* 'she overtook her'.⁷ A similar argument can be drawn from certain circumstances where an underlying sequence of two nonidentical light consonants is realized as a heavy consonant. Such for instance is the case when the complementizer *ad* is followed by a word beginning with a consonant in certain morpho-syntactic contexts.⁸ This is exemplified in (4)b, c. (4)a is given for the sake of comparison; it exemplifies those cases where the morpho-syntactic environment allows the final /d/ of the complementizer to surface unmodified.

- (4)
- | | | | |
|----|----------------|-------------------------|--------------------------------------|
| a. | <i>nttat</i> | <i>ad sala-x</i> | 'it is her that I am taking care of' |
| b. | <i>lmad</i> | <i>as sr-k i-sawl-n</i> | 'it is Ahmed who spoke to you' |
| c. | <i>i-lxssa</i> | <i>ah lra i-ttrs</i> | 'it should have just been laid down' |

In a framework where heavy segments are represented as geminates, all one needs to say is that the consonant in *ad* completely assimilates to the initial consonant of the following word. If, on the other hand, the contrast between heavy and light segments were represented as one between, say, [+tense] and [-tense], then there would be no reason why the segment which results from blending two adjacent segments into one should be [+tense] rather than [-tense].

Evidence in favor of interpreting heavy segments as geminates can also be found in at least two areas of the verbal morphology: the formation of imperfective stems, and quantity alternations in the reciprocal and causative augments.

7. *t*...*t* and *t*- are respectively the affixes for 2s and 3fs; *t* and *tt* are object pronouns, respectively 3ms and 3fs.

8. Cf. Dell and Elmedlaoui (to appear) for a characterization of those contexts.

The imperfective radical of certain verbs ending in a CC sequence is formed by inserting a vowel between the two consonants. Verbs ending in a VC sequence never resort to vowel insertion to form their imperfective radical. Verbs ending in a heavy consonant form their imperfective as though they ended in a sequence of two identical light consonants. For details, cf. Elmedlaoui and Dell (to appear). This is illustrated below in examples *a'*, *b'* and *c'*:

- (5)
- | | | | | | |
|-------------------|-------------------|-------------|-----------|--------------|----------------|
| pf. | impf. | | pf. | impf. | |
| a. <i>sikkiws</i> | <i>tt-skkiwis</i> | 'sit' | <i>a'</i> | <i>ssiff</i> | <i>ssiff</i> |
| b. <i>mmuylt</i> | <i>tt-muylut</i> | 'feel sick' | <i>b'</i> | <i>summ</i> | <i>ssumum</i> |
| c. <i>bddl</i> | <i>tt-bddal</i> | 'change' | <i>c'</i> | <i>bdd</i> | <i>tt-bdad</i> |
| | | | | | 'winnow' |
| | | | | | 'suck' |
| | | | | | 'stand' |

Reciprocal stems are formed by prefixing to the radical an augment which is realized as a heavy consonant or as a light one depending on the phonological make-up of the base. We do not fully understand the mechanisms responsible for the alternation, but the regularities are clear. The forms below illustrate the fact that the reciprocal augment is realized as a heavy consonant when the radical begins with a CCV or a C:V sequence, and that it is realized as a light consonant when the radical begins with a sequence of the form CV, CCCV or CC:V:

- (6)
- | | | | | | |
|----|-----|---------------|------------|------------------|--------|
| a. | CCV | <i>mm-kti</i> | 'remember' | <i>mm-lra</i> | 'call' |
| b. | C:V | <i>mm-ttu</i> | 'forget' | <i>mm-l33ukr</i> | 'drag' |
- (7)
- | | | | | | |
|----|------|----------------|------------|----------------|--------------|
| a. | CV | <i>m-lzara</i> | 'see' | <i>m-hussa</i> | 'chase away' |
| b. | CCCV | <i>m-sbi</i> | 'set free' | <i>m-s-kti</i> | 'remind' |
| c. | CC:V | <i>m-slla</i> | 'listen' | <i>m-ldra</i> | 'harm' |

If a heavy consonant is in some sense equivalent to a sequence of two light ones, then it is to be expected that the mechanisms responsible for the quantity alternations in the reciprocal augment should treat the radicals beginning with C:V on a par with those beginning with CCV, rather than treating them on a par with those beginning with CV. The same can be said of the fact that the radicals beginning with CC:V are treated as similar to those beginning with CCCV rather than to those beginning with CCV. A similar point can be made about the causative augment, which is realized either as /ss/ or as /s/ depending on the phonological make-up of the radical.

Last, but not least, syllabification in ITB also provides evidence that heavy segments behave as sequences of two light ones. On syllabification in ITB, cf. Elmedlaoui (1985) and Dell and Elmedlaoui (1985, 1988).

From now on we shall assume that the heavy segments of ITB are geminates, and, more specifically, that they should be represented as in (2)b.⁹ Before leaving this

9. Hassan Jouad, who speaks the variety of Tashlhiyt spoken in the upper Tassaout valley, is proficient in a secret language where each word is altered by suffixing *ukan* to it and permutating the *k* in *ukan* with one of the consonants in the word's radical (the same secret language is also used in Arabic, cf. Youssi (1977)). For instance *ayulid* 'cliff', *t-usi-t* 'you took', *allas* 'snack' and *i-nna* 'he said' respectively yield *akulid-ukan*, *t-uki-t-ukan*, *akkas-ulan* and *i-kka-wnan*. The implications of the latter forms, where the radical of the source word contains a heavy consonant, should be clear for the analysis of heavy consonants in the dialect in question. If, in the phonological representations, heavy segments are distinguished from light ones by some feature specification, say [+long], one may wonder why the permutation moves around all the feature specifications except those of the feature [long] (notice that in going from *allas-ukan* to *akkas-ulan*, not only does *k* seem to have become heavy, but also *l* seems to have become light). And if geminates are simply represented as sequences of two identical segments, as they would be in a framework such as that of Chomsky and Halle (1968), where phonological representations are unilinear, one may wonder why *allas* cannot yield *aklas-ulan* or *alkas-ulan*. But if, in the representation of *allas*, *ll* is a single feature bundle /l/ linked to two successive slots, then all that needs to be said is that in the secret language in question the permutation operates on melodies, not on skeleta, cf. also Clements (1985a), Vago (1985), McCarthy

section let us note that although the distribution of geminates is not completely unrestricted, their location within morphemes is an idiosyncratic property of individual morphemes and must be recorded in the lexicon. However liberal one may be in making allowance for exceptions and minor rules, it does not seem possible to us to derive the distribution of geminates in the morphemes of ITB through the operation of a skeleton/melody association procedure of the kind envisioned in McCarthy (1981, 382) for Classical Arabic. The following quasi-minimal pairs are given as a sample of the data on which our belief is grounded:¹⁰

(8)	I	II	I	II	I	II
a.	<i>a-brrkāl</i>	<i>i-frkki</i>	d.	<i>ggʒ</i>	g.	<i>skubbr</i>
b.	<i>a-ḥṭram</i>	<i>t-a-frmṭ-t</i>	e.	<i>lkkd</i>	h.	<i>ggʾa</i>
c.	<i>a-lḍḍʒar</i>	<i>a-lḍḍʒal</i>	f.	<i>zzf</i>		<i>ukrr</i>
				<i>lḡzz</i>		<i>brra</i>
				<i>bdd</i>		
				<i>fss</i>		

These pairs illustrate the fact that, in general,¹¹ the presence of gemination and its location within a given unit (morpheme or word) cannot be predicted (a) on the basis of the phonological make-up of that unit, nor (b) on that of its morphological properties. Or to put things in another way: in general,¹² the presence of gemination in a morpheme and its location within that morpheme remain invariant throughout all occurrences of that morpheme. This is precisely what is to be expected if gemination is represented in the same way in the lexicon of ITB as it is in that of Latin or Finnish, i.e. if it is a property associated with individual melodic units in the lexical representations of individual morphemes.

2.3. LATERAL ASSIMILATION IN NOUNS. Not all the geminates occurring in the derivational bases which will be cited below are underlying. Some of them result from the operation of a rule of assimilation which operates at the beginning of certain nouns. This rule bears directly on our analysis since positing it allows us to explain away many apparent counterexamples to the mapping mechanisms which will be proposed. Let us first recall a few basic facts about the structure of nouns in ITB. Most nominal forms of ITB can be analysed as follows.

(9) (Prefix)[(Thematic vowel) Radical](Suffix)

The radical and, if there is one, the thematic vowel, constitute the stem. The thematic vowel (*a* or *i*) is a number marker which appears in the "free state" (fst) but which is generally dropped in the "bound state" (bst).¹³ The prefix can be the feminine

(1986, 211, 219), Youssi (1977, 140).

10. The forms in (8)a-c are all masculine singular nouns in their free state form, and those in (8)d-h are all perfective stems of verbs. Throughout this article nouns are cited in their free state singular forms, and verbs in their perfective stems, unless stated otherwise. The forms in (8) have the following meanings: (aI) old age (of horses, mules, etc.), (aII) bark; (bI) bastard, (bII) new honeycombs full of honey; (cI) neighbour, (cII) in-law; (dI) go down; (dII) crunch; (eI) poke (an eye), (eII) stand up; (fI) unveil, (fII) be silent; (gI) crouch, (gII) drag; (hI) be the last, (hII) disown.

11. "In general", that is, setting aside (a) phonological rules such as those responsible for the quantity alternations in (6)-(7), and (b) a number of morphological processes, such as mappings onto certain templates (cf. below), or gemination in imperfective stems (cf. Dell and Elmedlaoui 1988, to appear).

12. Cf. the preceding footnote.

13. On the phonology and morphology of the bound state, cf. Basset (1932, 1945), Guerssel (1983).

marker /t/ or a high vocoid indicating the bound state in the masculine; the suffix is a marker of gender and/or number. Here are a few examples: *t-a-funas-t* (P-T-R-S) 'cow, sg, fst'; *t-funas-t* (P-R-S) 'cow, sg, bst'; *t-i-funas-in* (P-T-R-S) 'cow, pl, fst'; *uḍay* (R) 'Jew, sg, fst'; *w-uḍay* (P-R) 'Jew, sg, bst'; *uḍay-n* (R-S) 'Jew, pl, fst'; *a-rgaz* (T-R) 'man, pl, fst'. The examples cited are prototypical of ITB nominals in that in the free state their stem begins with a vowel: the thematic vowel ('cow'), or, if there is no thematic vowel, the initial segment of the radical ('Jew').

There is however a sizeable minority of nouns whose stem begins with a consonant, i.e. nouns which have not thematic vowel in the free state and whose radical begins with a consonant. Most of these come from Arabic, but, as we shall argue below, there is good evidence that they cannot be considered simply as Arabic words spoken with an ITB accent, and that they should be included in a synchronic description of ITB. These nouns have fairly recognizable earmarks: in the singular they begin with an /IC/ cluster whose second member is generally not a coronal (e.g. *lbrad* 'teapot'), or else they begin with a geminate coronal (e.g. *lrrgg* 'ground'). We shall assume that those initial geminate coronals are derived from underlying /IC/ clusters where /C/ is a coronal: a phonological rule operating at the beginning of nouns completely assimilates /l/ to a following coronal; *lrrgg* derives from /l-lrgg/.¹⁴ 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 (for others, cf. note 57):

(10)	sing.	plur.		sing.	plur.	
a.	<i>lbrad</i>	<i>labrarid</i>	'teapot'	<i>llrud</i>	<i>llaḥwad</i>	'watering-trough'
b.	<i>ssuq</i>	<i>laswaq</i>	'market'	<i>lturf</i>	<i>lladruf</i>	'edge' ¹⁵
c.	<i>ʒʒnb</i>	<i>laʒnub</i>	'pocket'	<i>lʒʒrd</i>	<i>llaʒrud</i>	'condition'

Complementary gaps in the distribution of clusters and geminates at the beginning of nouns also support our analysis. Consider first the fact that all the geminate consonants which are found to occur at the beginning of nominal stems are coronals.¹⁶ The proposed analysis provides a simple explanation for that fact, if one assumes that all geminate consonants are forbidden at the beginning of nominal stems in the lexical representations of ITB: the only source for stem-initial geminates is the l-assimilation rule, and that rule only operates before coronal consonants. Another distributional argument involves feminine nouns. With only a few exceptions (e.g. *i-mmi* 'mother', *i-lli* 'daughter', *lalla* 'mistress', *šala* 'competition'), all the feminine nouns of ITB belong to one of the following three categories: (i) those which begin with the feminine prefix *t-*, e.g. *t-a-funas-t* 'cow', (ii) those which begin with IC, e.g. *l-ksib-t* 'livestock', and (iii)

14. The rule has exceptions, e.g. *lʒdd* (pl. *laʒdad*) 'ancestor', *lʒnn-t* (pl. *lʒnn-at*) 'paradise', *lʒir* 'lime', *lʒamaa* 'Friday'.

15. In the singular /l-lrdrf/ yields *lddrf*, whence *lturf*. As a rule, the geminate reflexes of /d, ɣ, ɣʰ/ and /w/ in ITB are respectively *ltt, qq, qqʰ* and *ggʰ*.

16. Nb: this generalization concerns stems, not radicals. Noncoronal geminates can be found at the beginning of (non stem-initial) nominal radicals, as in *a-ggʰrdi* (pl. *i-ggʰrdan*) 'flea', *a-ḥṭram* (pl. *i-ḥṭram-n*) 'bastard', *a-bbankik* (pl. *i-bbankik-n*) 'big stone'.

those which begin with a coronal geminate, e.g. *lrrqb-t* 'boldness'. If the nouns of classes (ii) and (iii) all begin with the prefix /l-/ in the phonological representations, one can make the following generalization about the morphology of feminine nouns in ITB: they all begin either with prefix /t-/ or with prefix /l-/ (our reason for considering the initial /l/ as a prefix is that when nouns beginning with an IC sequence are used as derivational bases, there is no reflex of their initial /l/ in the derived words. Examples of this will be seen later on).

To end this excursus on the nouns which begin with an /l-C/ sequence, let us explain why we think that their occurrence in ITB sentences cannot simply be due to code-switching between ITB and the local Arabic dialect. First, these nouns are used even by those speakers of ITB who do not know Arabic. There are furthermore reasons to believe that even for those speakers of ITB who are also fluent in Arabic, the ITB nouns in question have lexical representations which are distinct from those of their Arabic cognates. In Arabic the initial /l/ is the definite article: *lbrad* 'the teapot', *brad* 'a teapot', *lʒrda* 'the garden', *ʒrda* 'a garden'; it does not belong to the lexical entry of each noun. In ITB on the other hand the initial /l/ cannot be omitted: **brad*, **ʒrda*. It must be part of the lexical entry of the nouns in question, for not all nouns which begin with a consonant begin with an /l/, cf., e.g., *blarʒ* 'stork', *mndqq* 'refreshing beverage', *hrrma* 'kind of clown', *lwury* 'gold'. Also, many of the phonetic differences between ITB nouns and their cognates in the local Arabic dialect are unexpected if these nouns were simply Arabic words pronounced with an ITB accent. For instance, the *a* which appears between /l/ and the following consonant in the plural forms of most /l-C/-initial ITB nouns has no analogue in the corresponding definite plural forms in Arabic, e.g. the definite plural forms of the Moroccan Arabic cognates of items (10)a are *l-brard* and *l-lhwad*, and the occurrence of *a* in the first syllable of ITB *labrarid*, *lahwad* is not imposed by the phonotactics of ITB, witness the well-formedness of *llbʒ-x* 'I squashed' and *lhm-x* 'I soldered'. Finally, the /l-C/-initial nouns can be subjected to the morphological processes of ITB. They resort to the Berber prefix *t-* and/or suffix *-t* to form feminine forms,¹⁷ and they may be used as bases in derivational morphology, as we shall see.

17. For instance the feminine nouns *t-a-l-brad-t* (phonetically [talbratt]) and *t-a-lsbbat-t* are diminutives built on *l-brad* and *lsbbat* (/l-lsbbat/) 'shoe'. The corresponding masculine nouns *a-l-brad* and *a-lsbbat* are augmentatives.

Nouns of this type have properties which are relevant for understanding the behavior of certain derivational bases in our data. When the thematic vowel precedes the prefix /l/, its behavior is exceptional in two respects. First, it does not alternate with *i* in the plural: the plural forms of *a-l-brad* and *t-a-l-brad-t* are *a-l-brad-n* and *t-a-l-brad-in*, not **i-l-brad-n* and **i-l-brad-in*. Second, it does not drop in bound state forms: the bound state forms corresponding to *a-l-brad* and *t-a-l-brad-t* are *w-a-l-brad* and *t-a-l-brad-t*, not **u-l-brad* and **t-l-brad-t*. There exist nouns which are phonologically and morphologically similar to the /(-)a-l-CX/ derivatives, and we shall analyze them as such, although they do not have diminutive or augmentative meanings, and /CX/ does not exist as an independent noun. Such is for instance the case of *alfluk* 'small boat', bound state (sg.) *walfluk* (**ulfluk*), plural *alflukn* (**ilflukn*); there is no noun **ilfluk* in ITB. Given the existence of the *l*-assimilation rule, we can also analyse as /a-l-CX/ a number of nouns in the form aK:X (K: a coronal geminate) whose initial *a* is immune to the regular alternations. Such is for instance the case of *arrfad* 'plot of land' (bst. *warrfad*, pl. *arrfadn*), *aššbar* 'barricade' (bst. *waššbar*, pl. *aššbam*), whose phonological representations we shall take to be /a-l-rfad/, /a-l-šbar/. The same analysis holds for the derivational bases in (36)d and (40)e.

Having provided the necessary background knowledge on geminates and on nouns in ITB, we are now ready to discuss the mapping of bases onto templates in the language.

3. MAPPING A BASE ONTO A TEMPLATE.

ITB has a class of nouns which are derived from nouns or verbs and denote a state or a property, e.g., *tirruga* 'manhood, courage', from *argaz* 'man', and *tiruksa* 'clandestinity', from *rks* 'hide'. We shall henceforth call them the TIRRUGZA nouns, after our first example.¹⁸ All the TIRRUGZA nouns we have encountered are listed in (11)-(17) together with their derivational bases. The TIRRUGZA derivatives are classified according to the patterning of melodic consonants and vowels in their derivational bases. We shall use lower-case *c* and *v* to represent melodic units, in contrast with capital *C* and *V*, which stand for skeletal slots. When the meaning of the derivative noun can be paraphrased as 'the condition of someone who is an X', where *X* represents the meaning of the base, we simply give the meaning of the base. Otherwise the meaning of the derivative and that of the base are separated by a slash. Whenever the base itself is a (synchronic) derivative from another word, this is indicated in a footnote.

(11) ccvc(v) bases

a. <i>t-i-ruga</i>	<i>a-rgaz</i>	'manhood/man'
b. <i>t-i-lmmurya</i>	<i>a-lmyar</i>	'head of a tribe'
c. <i>t-i-mmunya</i>	<i>a-m-nay</i>	'horseman'
d. <i>t-i-ššurfa</i>	<i>ššrif</i>	'sharif'
e. <i>t-i-lldužra</i>	<i>a-lldžar</i>	'neighbor'
f. <i>t-i-lldugla</i>	<i>a-lldgg'al</i>	'in-law'
g. <i>t-i-mmukksa</i>	<i>a-m-kkus</i>	'heir'
h. <i>t-i-nzzumma</i>	<i>anzammu</i>	'bad odour/stinking (person)'

!dduggla

18. The TIRRUGZA nouns are feminine, and they are *pluralia tantum*. In ITB plural nouns whose vocalism is *u-a*, the vocalism of corresponding singular forms is usually *a-u*, e.g.: *t-a-saru-t* (pl. *t-i-sura*) 'key', *t-a-fraššu-t* (pl. *t-i-frušša*) 'sunny spell', *t-a-srraru-t* (pl. *t-i-smura*) 'a type of pitchfork', *t-a-lmadun-t* (pl. *t-i-lmudan*) 'illness'.

19. From *ni* 'ride'.

20. *lidduggla* or *liddugg'la*. In ITB labiovelarized consonants are delabialized when a rounded vowel occurs in the same word. Delabialization is obligatory when the rounded vowel occurs to the right of the labiovelarized consonant, but only optional when it occurs to its left. In the latter case we only give the delabialized variant in order to save space.

21. From *kkusa* 'inherit'.

22. From *z(z)umma* 'to stink (person)'. In (11)h and in (16)d-h the derivational bases are AZDDAYRU nouns, on which see section 9.

(12) *cvcc(v)* bases

- a. *t-i-ttulba*
b. *t-i-wwurga*
c. *t-i-ddukkl*

lttalb
*w(w)urga*²³
d(d)dukkl

'man in charge of a mosque'
'dreaming state/tp/dream'
'friendship/befriend' /o

(13) *cvvc* bases

- a. *t-i-mmuzya*
b. *t-i-mmuzzla*
c. *t-i-mmuttla*

a-mazi
a-mazzal
a-mattal

'free person'
'errand man (a town official)'²⁴
'embezzler'

(14) *ccc(v)* bases

- a. *t-i-nnubga*
b. *t-i-ššurka*
c. *t-i-ruksa*

i-nbgi
šrk
rks

'hospitality/guest'
'partnership/own together'
'clandestinity/hide'

(15) *ccvc* base

- a. *t-i-lmmuyra*
b. *t-i-nffulsa*
c. *t-i-lmhjudra*
d. *t-i-nllumda*

a-n-lmyur
a-n-flus
a-m-lhdar
a-n-lmad

'notability'²⁵
'wealthy person'²⁶
'pupil of a Coranic school'²⁷
'apprentice'²⁸

(16) *ccvc* bases

- a. *t-i-lmššuwra*
b. *t-i-mssufra*
c. *t-i-ššasba*
d. *t-i-lmššurda*
e. *t-i-lntuyfa*
f. *t-i-lnturf*
g. *t-i-lnqurf*

a-m-lšawr-iy
a-m-safr-iy
a-ššasb-iy
a-lmššardu
a-lntayfu
a-lntarf
a-lnqarf

'counsellor'²⁹
'student studying far away from home'
'accountant'³⁰
'rural policeman'³¹
'dummy (in a card game)'³²
'extremist'³³
'scraggy person'³⁴

23. As indicated earlier, verbs are quoted in their perfective stem, which in most cases is a transparent reflex of their lexical representation (cf. Dell and Elmedlaoui, to appear). A problem arises with some of the verbs with an initial geminate, however. Verbs whose radical begins with a geminate in the perfective fall into two classes. In some of these verbs the initial geminate is invariant whatever the morphological environment, and can thus be considered a part of the lexical representation, e.g. *ttu* 'forget', imperfective *tt-ttu*; *ggʾa* 'be the last', imperfective *tt-ggru*; *kkusa* 'inherit', imperfective *tt-kkusi*. In other verbs on the other hand the initial gemination disappears in certain cases in stems where a prefix precedes the radical. Such is the case, for instance, in *ddukk* 'befriend', imperfective *tt-ddukk*; *mmuzzr* 'form a stream', imperfective *tt-muzzr*; *llulli* 'stroll', imperfective *tt-lulli*. We indicate these verbs by putting parentheses around the second letter in the digraph representing their initial consonant, and we assume that that consonant is nongeminate in the lexical representations, as suggested by its behavior with respect to the AZDDAYRU template (cf. note 88).

24. From *uzzi* 'run'.

25. From *lmqur* (aorist *limyur*) 'grow bigger'.

26. From *lflus* 'money'.

27. From *lhadr* 'attend'.

28. From *lmd* 'learn'.

29. From *lšawr* 'confer'. On the suffix *-iy* in the base, cf. note 51. This suffix is not taken into consideration when forms containing it are mapped onto templates.

30. From *l-ššab* 'arithmetic', cf. (36)y.

31. From *lšard* 'enrol as a rural policeman'.

32. From *ltyf* 'be dummy (at cards)'.

33. From *ldrf* 'be on the edge'.

34. From *lnyufa* 'be parched, die with thirst'.

h. *t-i-ntulfa*

a-ntalfu

'lost soul'³⁵

i. *t-i-lmriysa*

a-m-lriys

'director (of a choir)'³⁶

j. *t-i-kttulba*

a-ktatb-iy

'notary public'

(17) *ccvc* bases

t-i-mmussna

m-wassan /m-yassan

'nepotism'³⁷

In the TIRRUGZA nouns and in the other derived nouns of ITB the thematic vowel is not determined by the template but by the morphology of nouns in general. In discussing the formal relationship between a derived noun and its derivational base one needs only take into consideration the radicals of the two words. For the sake of brevity we shall often write about the properties of a certain noun, while meaning to refer to the properties of that noun's radical. We may for instance say that the nouns *a-rgaz* 'man' and *t-i-rugza* 'manhood' are respectively of the form *ccvc* and *cvccv*, intending to refer to their radicals *rgaz* and *rugza*.

TIRRUGZA nouns contain the same consonants as those of the base, and in the same order. The vocalism of the derivational base has no influence on the shape of the derived noun, and neither does the patterning of vowels and consonants in the base: the derived nouns are all of the form (C)CuCCa, regardless of whether the base is of the form (c)ccvc(v) (cf. (11) and (15)), (c)cvcc(v) (cf. (12) and (16)), (c)cvvc (cf. (13) and (17)), or (c)ccc(v) (cf. (14)).

Among the phonemes of the base only the consonants are transferred to the derived word. As we shall see below this fact is not specific to the TIRRUGZA nouns; it is a general fact about templatic morphology in ITB. In order to account for this fact, alternative hypotheses suggest themselves.

One possibility is that the consonants are the only phonemes of the base which are taken into consideration by the mechanisms which map the base onto the template. To explain how it is that the mapping procedure is able to single out the sequence of consonants in any input word, it would be natural to assume that consonants and vowels form distinct sequences in the phonological representation of the input words, i.e. that there is v,c-segregation in the sense of Prince (1987) and McCarthy (1987). Specifically, in the representations which are inputs to the templatic mappings, the feature specifications defining the melodic units which are vowels and the feature specifications defining the melodic units which are consonants are located on different planes.³⁸ This assumption about the phonology of ITB³⁹ must be supplemented by one about its morphology: the content of the vowel plane is unavailable to the mechanisms of templatic mapping.⁴⁰

35. From *tlf* 'be confused'.

36. From *lriys* 'conduct (a choir)'.

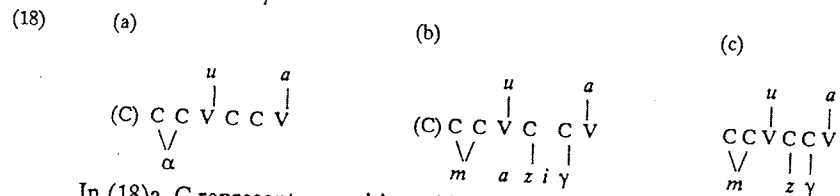
37. The base is the reciprocal form of *ssn* 'know'.

38. Our use of the term "plane" conforms to the proposals in Archangeli (1985).

39. In the sense intended here v,c-segregation is a purely phonological phenomenon. In ITB there are no reasons systematically to ascribe vowels and consonants to different morphemes, as there are in Classical Arabic.

40. Cf. McCarthy and Prince (1986, 79), where the authors cite work by Akinlabi (1984) in which it is shown that in Yoruba the content of the tonal plane is not available for association with certain reduplicative affixes.

One may wonder, however, whether the latter assumption is independently needed, considering that the quality of vowels (*u*, *a*) of the derived word must be specified by the TIRRUGZA template. This, as we shall see, holds true for all the other templates in ITB as well. Instead of introducing a stipulation which requires the mapping procedure to be blind to the vowels in the base, one may assume as well that these vowels are available to the mapping procedure, and that the reason they do not show up in the derived form is that the template has no empty positions to accommodate them. It is this tack that we shall take in what follows.⁴¹ In (18), (a) is a first approximation of the TIRRUGZA template, (b) shows how the radical of the base noun *a-mazi*y (cf. (13)a) is mapped onto that template, and (c) is the representation of the radical of the derived form *-mmuzya*.



In (18)a, C represents a position which can only be associated with a consonant, and V, a position which can only be associated with a vowel. The vowels /a/ and /i/ in the base cannot be associated with any slot in the template: the V slots, the only ones with which these vowels could be associated, are already linked with /u/ and /a/, and we assume, following McCarthy (1981, 383; 1982a, 195), the existence of a general well-formedness condition on multiplanar representations which prohibits the association of two melodic units with the same skeletal slot. Once the mapping is completed the vowels /a/ and /i/ of the base will be disposed of by a general convention which discards all unassociated material (cf., e.g., Marantz (1982, 446)), hence the output *-mmuzya*.⁴²

The antepenultimate consonant of all TIRRUGZA nouns is a geminate, and this is not a property of nouns in general, or even of templatic nouns. The TIRRUGZA template must be formulated so as to require that its antepenultimate C slot and the preceding slot be linked to the same melodic unit. This is represented in (18)a by the

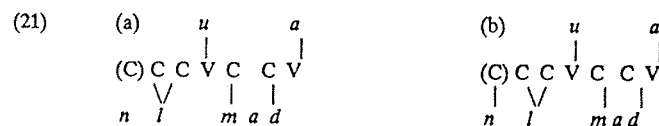
41. Vowels and consonants must be arrayed on the same plane in the representations which are inputs to the mapping mechanisms if, as will be proposed in section 6, Plane Conflation operates prior to the mapping mechanisms.

42. The mapping in (18)b, where the consonants of the base, but not the intervening vowels, get linked to skeleton slots, is in contradiction with the prohibition against skipping melodic units proposed in McCarthy and Prince (1986, 42). That prohibition is necessary in order to account, e.g., for the fact that in Mokilese (ibid., 21) the left-to-right mapping of *diar* onto a skeleton consisting in a heavy syllable yields *dii* rather than *dir*, an outcome which would require skipping *a*. In (18)b, the prohibition against skipping melodic units would prevent linking nonadjacent consonants of the base unless the intervening vowel was also linked. It thus comes into conflict with the well-formedness condition mentioned in the main text, which precludes linking the vowels of the base to the V slots in the skeleton, since the slots in question already have associated melodic units in template (18)a. We assume that in such cases the well-formedness condition takes precedence over the prohibition against skipping melodic units.

association lines linking these slots with a dummy ϕ .⁴³ In addition, we shall adopt the two following universal conditions proposed by McCarthy and Prince (1986, 1987):

- (19) **Template Satisfaction Condition:** all elements in a template are obligatorily satisfied (McCarthy and Prince 1986, 6).
 (20) **Maximality Condition:** the maximal amount of lexically-specified melodic and skeletal structure must be mapped onto the template (McCarthy and Prince, 1987, 25).

Following Broselow (1984, 22) we shall assume that certain slots in templates can be specified as optional, and we shall indicate them with parentheses.⁴⁴ The initial C slot in template (18)a is optional. Consider two mappings of the base *a-n-lmad* (cf. (15)d) onto template (18)a. (21)a yields **-llumda*, and (21)b yields the correct form *-nllumda*.



The Template Satisfaction Condition is met by both mappings, since in both all the obligatory template slots have an associated melodic unit, but the Maximality Condition is only met by (21)b.

Incorrect mappings such as *a-rgaz*/**t-i-rgguzza*, which meet the conditions presented above, are excluded by the requirement that melodic units be linked to as few optional positions as possible (cf. (46) in section 5).

4. MELODIC MAXIMALITY VS. SKELETAL MAXIMALITY.

Besides ensuring that melodic units not associated with obligatory slots will, inasmuch as possible, be associated with optional ones, the Maximality Condition is to a large extent responsible for the way the geminates behave in mappings onto templates in ITB. This behavior can be most easily seen in the UKRIS words, which are *uCCiC* nouns and adjectives derived from verbs, e.g., *ukris* 'trousseau', from *krs* 'tie in a bundle', *urkim* 'rotten', from *rkm* 'rot'. All the UKRIS derivatives we have been able to find are listed below.

(22) ecc bases		
a.	<i>ukris</i>	<i>krs</i>
b.	<i>užlix</i>	<i>žlx</i>
c.	<i>uxšin</i>	<i>xšn</i>
d.	<i>luzlim</i>	<i>lzm</i>
e.	<i>t-luyrif-t</i>	<i>lyrf</i>
f.	<i>lufdir</i>	<i>ss-lfdr</i> ⁴⁵
		'trousseau/tie in a bundle'
		'filthy person/be filthy'
		'ugly person/be ugly'
		'peeled argan nut/peel'
		'flat loaf of bread/flatten'
		'person who brings bad luck/be ominous'

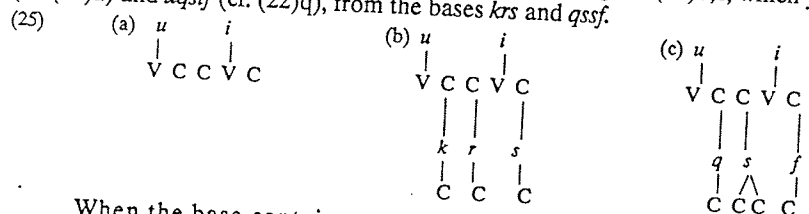
43. A template requiring that two of its positions be linked with the same melodic unit is clearly needed to account for the Ethiopian argot described in Demisse and Bender (1983), cf. McCarthy (1986, 212). If one adopts the proposals in Clements (1985c) concerning the internal structure of melodic units, the dummy ϕ may be taken to stand for a root node.

44. Optional slots are also needed in Yawelmani if the analysis proposed in Archangeli (1983) is recast in a framework which includes the condition (19). In such a reanalysis the verbal templates would be CVC(C), CVVC(C) and CVCVV(C).

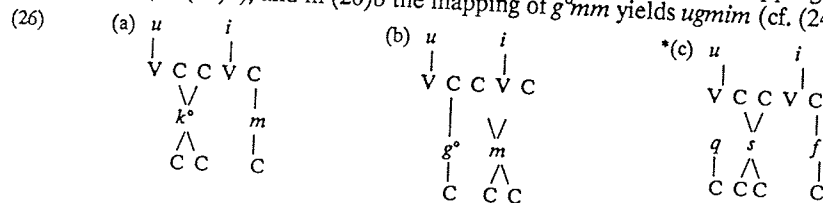
45. In *ss-lfdr* *ss-* is the causative prefix.

g.	urkim	rk ^o m	'rotten thing/rot'
h.	uhrim	hrm	'very old person/be very old'
i.	t-lulbi ³ -t	llb ³	'squashed green olives/squash'
j.	udfiš	d ³ š	'a punch/to punch'
k.	u ^o niš	x ^o mš	'claw mark/scratch'
l.	umsix	mxc	'person transformed by witchcraft/transform'
m.	lušgir	lšgr	'blond person/be blond'
n.	utlif	tlf	'lost soul/be confused'
o.	ludmis	ldms	'someone black with soot/be black with soot'
p.	luxid	lsd	'damned soul/curse'
q.	uqsif	qssf	'squat person/be narrow'
r.	ludrif	ldrf	'someone handsome/be handsome'
s.	t-lušri ^h -t	lšrr ^h	'soaked olives ⁴⁶ /slit'
t.	udmi ^o y	dmm ^o y	'mentally retarded person/be retarded'
u.	u ³ niq	šnnq	'person with a malformation/be malformed'
(23)	ccvc bases		
a.	ulmis	lmmus	'something bland/be bland'
b.	uyzif	yyzif	'long/be long'
c.	umlil	mlilul	'white/be white'
d.	usdid	sdid	'slim/be slim'
(24)	cc bases		
a.	ukkim	kk ^o m	'a blow/strike'
b.	luttid	lttd	'coagulated blood/coagulate'
c.	ubbiz	bb(i)z ⁴⁷	'a punch/to punch'
d.	t-luzzig-t	lzz(i)g	'amount of milk drawn in one milking session/to milk'
e.	t-luffiz-t	ff(i)z	'mouthful/chew'
f.	t-ugnim-t	g ^o mm	'mouthful/hold (liquid) in one's mouth'
g.	luzziz	lgzz	'mouthful/crunch'

The UKRIS template is represented in (25)a. When the base contains three melodic consonants (cf. (22) and (23)), each is associated with one of the template slots. The outcome of the mapping is the same regardless of the quantity of the medial consonant in the base. This is exemplified in the mappings in (25)b,c, which yield *ukris* (cf. (22)a) and *uqsif* (cf. (22)q), from the bases *krs* and *qssf*.



When the base contains two consonants one of which is a geminate, the geminate is mapped onto two slots in the template. In (26)a the mapping of *kk^om* yields *ukkim* (cf. (24)a), and in (26)b the mapping of *g^omm* yields *ugnim* (cf. (24)f).



46. Their skin is slit so as to allow water to penetrate.

47. The source verbs in (24)c,d,e have two radicals in free variation, one of the form C:C (C: a geminate),

Since there are only two melodic units in the base, the only way to meet the Template Satisfaction Condition, which requires all obligatory template slots to be associated, is to map one of the melodic units onto two slots. By so mapping the unit which is associated with two slots in the representation of the base, one complies with the Maximality Condition, which requires the mapping of the maximal amount of melodic and skeletal structure of the base.

Compare *ukkim* (cf. (26)a) and **ukmim*, a form obtained by mapping *kk^om* onto template (25)a in such a way that /m/ rather than /k^o/ is associated with two slots. There is an obvious sense in which more of the structure of *kk^om* is mapped onto the template in *ukkim* than in *ukmim*. Consider now the mapping of *qssf* which yields *uqsif* (cf. (25)c) with the one represented in (26)c, which yields **ussif*. In (25)c all of the melody of the base is transferred to the derived word, but the gemination of /s/ is not. In (26)c on the other hand the gemination of /s/ is transferred, but not the melodic unit /q/. Cases such as this suggest that melodic units weigh more than skeleton slots in the computation of 'the maximal amount of structure' that can be mapped onto a template (cf. (20)). We propose that McCarthy and Prince's (20) be replaced by the two Maximality Conditions (MCs) given below, and we assume that (27) takes precedence over (28):

(27) Melodic MC: the maximal number of melodic units must be mapped onto the template;

(28) Skeletal MC: the maximal amount of skeletal structure must be mapped onto the template.

It is an uncontroversial assertion about morphology that derived words resemble their derivational bases to some extent, and the Maximality Conditions can be viewed as being part of an explicit characterization of the notion "degree of similarity" which is relevant to morphology. The precedence of (27) over (28) implies that the melodic content of a form plays a more basic role than other aspects of its phonological make-up in determining the extent to which the form in question resembles other forms.

John McCarthy and Alan Prince have suggested to us (p.c.) a possible connection between the precedence of (27) over (28) and the fact that in languages with geminates, degemination seems to be the preferred way of mending phonotactically ill-formed sequences which contain geminates. In Yawelmani, for instance (cf. Kuroda 1967, 10), long vowels cannot occur in closed syllables, and the language has a phonological rule shortening vowels which are not syllable-final: *?aaml-it* becomes *?aml-it*.⁴⁸ Shortening the vowel is not the only conceivable way of adjusting the sequence *?aam* to the syllabic canons of the language. Another possibility would be a rule deleting any consonant which follows a long vowel and which cannot be syllabified as an onset; such a rule would rewrite *?aaml-it* as *?aal-it*. The shortening rule leaves melodies unaffected, but not so the truncation rule. The precedence of (27) over (28) in mappings and the preference of degemination over truncation may both be reflections of a deep-seated tendency to minimize variation in the melodic part of representations.

the other of the form C:C.

48. A similar situation prevails in Classical Arabic (Elmedlaoui 1988), in Hausa (Leben 1977), in Sierra Miwok (Kenstowicz and Pyle 1973, 28) and in Turkish (Clements and Keyser 1983, 59ss). On the avoidance of melody loss in English, cf. Myers (1987a, 514-515).

One feature of the TIRRUGZA derivatives which we have yet to account for is the transfer of the gemination of the penultimate consonant of the base. Whereas in (13)a *amazi*y yields *-mmuzya*, in (13)b *amazal* yields *-mmuzzla*, with a geminate before the rightmost consonant; cf. also items (11)f,g, (12)c, (13)c and (17).⁴⁹ The requirement that a penultimate geminate in the base yield a penultimate geminate in the derivative form seems to be peculiar to the TIRRUGZA template: in (34)f *-nftir* does not yield *-nfattr-*, and in (65)a *lkrrf* does not yield *-lkkarrfu*. With the TIRRUGZA template in its present form (cf. (18)a), *amazal* would yield *-mzzuzla*. The template should be reformulated so as to allow its penultimate C slot to be expanded as CC just in case the penultimate consonant of the base is a geminate. We do not know at present how this should be done.⁵⁰ One tenet of McCarthy and Prince's 'prosodic morphology' which we have not adopted here is the claim that the smallest unit which may enter into the definition of a template is the mora. Contrary to the commonly held view which we are following in this article (cf. the references in notes 4 and 5), these authors do not allow for segment size skeleton slots (i.e., Cs and Vs). At present it is unclear to us what an analysis of the syllables of ITB in terms of morae would be. It may be that research in that direction will provide the key to an account for the transfer of the gemination of the penultimate consonant of the base in TIRRUGZA derivatives.

Our proposals lead to incorrect predictions in two of the cases of "quantitative transfer" discussed by McCarthy and Prince: reduplication in Mokilese (1986, 21; 1987, 30-31) and in Ponapean (1986, 27). Both languages have a reduplicative prefix consisting in a heavy syllable (CVC or CVV), and when the base is of the form CVVCX that prefix is realized as CVV. In Ponapean, for instance, the reduplicated form of *duupek* is *duu-duupek*, not *dup-duupek* as predicted by the precedence of (27) over (28). A central piece of McCarthy and Prince's (1987) account of quantitative transfer is what one may call the principle of conservation of lexical distinctness: "lexical distinctness [...] must be maintained up to templatic requirements" (ibid., 22-23). It is this principle which ensures that the length of the first vowel is preserved in the mapping (left-to-right) of *duupek* onto the heavy syllable template which characterizes the reduplicative prefix. In ITB cases such as (25)c, on the other hand, this same principle would lead one to expect the transfer of the gemination of the medial consonant at the expense of the integrity of the melody. We leave this question for further research. The solution of the above dilemma may somehow be related to the fact that whereas the mappings involved in reduplication are typically partial ones (in most cases only one end of the melody of the base is transferred to the reduplicative affix), those involved in the derivational morphology of ITB transfer the melody of the base over its whole length.

5. MAXIMALITY AND DEFAULT INSERTION.

49. (17) is exceptional in that the glide in the base has been left unassociated. The expected forms are *timgg'ussna* and *timyyussna*. In (11)h it is condition (28) which accounts for the fact that *-zzammu* yields *-nzzumma* rather than *-nnuzzma*: only the former retains all the geminates of the base.

50. The transfer of the quantity of the penultimate consonant of the base in the TIRRUGZA forms is reminiscent of that of the last vowel of the singular form in the broken plurals of Classical Arabic, about which cf. McCarthy (1982b), Hammond (1988), McCarthy and Prince (1987, 1988). McCarthy and Prince's account cannot be carried over to ITB.

In the preceding section we proposed that McCarthy and Prince's Maximality Condition be replaced by two separate maximality conditions, one dealing with the melodic part of representations (cf. (27)) and the other with their metric properties (cf. (28)). Mappings such as (25)c can then be accounted for by assuming that in case of conflict the former condition always takes precedence over the latter. We shall now present another argument in favor of our thesis that the Melodic MC and the Skeletal MC are independent of one another. That argument consists in pointing out differences in the way the two conditions interact with the Obligatory Contour Principle. We shall present evidence which suggests that Universal Grammar imposes the following precedence relations.

- (29)
- { Melodic MC
 - { Obligatory Contour
 - { Skeletal MC

We shall first examine the interaction between the Obligatory Contour Principle and the Skeletal MC. Evidence on this point is provided by three derivative nouns of the ABNAKLIY type (cf. (38)q,r,s). But before we can discuss this evidence we must present the ABNAKLIY derivatives. They are named after the noun *a-bnakl-iy* 'snake charmer', from *a-bnkāl* 'snake'. They are nouns and adjectives. The nouns denote persons with a certain occupation or habitual activity. They are all of the form *a(C)CCaCC-iy*, where the initial thematic vowel is independently predictable, and where *-iy* is a derivational suffix which is independently attested.⁵¹ We list below all the ABNAKLIY nouns we have been able to find. Whenever the meaning of an ABNAKLIY noun can be paraphrased as "someone whose trade or occupation involves X", where X is the meaning of the derivational base, only X is given in the glosses, so as to save space. Alternative variants are separated by "~".

In the lists below the ABNAKLIY derivatives are classified according to the phonological properties of their derivational bases. Our primary criterion of classification is the number of melodic consonants, with some secondary groupings depending on the occurrence of geminates. The initial /l-/ of the /l-CX/ nouns (cf. section 2.3) is never taken into consideration by the mapping mechanisms, cf. for instance (34)b,c. Nor is the initial gemination in bases beginning with a coronal geminate (cf., e.g., (37)t,u,v). This is to be expected if, as argued in section 2.3, the gemination of an initial coronal is the surface manifestation of an underlying /l-/.⁵² As noted earlier, when

51. The suffix *-iy* is a very productive one which is used to form occupational nouns and adjectives indicating an origin, e.g. *a-bulis-iy* 'policeman' (*l-bulis* 'police'), *a-lsirt-iy* 'detective' (*lsirt* 'to spy'), *a-rudan-iy* 'from the city of Taroudant' (*l-a-rudan-t* 'Taroudant'). All the nouns and adjectives ending in the suffix *-iy*, including those of the ABNAKLIY class, form their plural by affixing *i-...-n* in the masculine, and *i-i-...-in* in the feminine: *i-bnakl-iy-n*, *i-i-bnakl-iy-in*.

52. This analysis is corroborated by the following plural forms: (35)p: *lladwabit*, (36)e: *la3nayn*, (37)g: *llasayf*, (37)h: *laslayf* (~ *sslayf*), (37)j: *llarqayb*, (37)k: *llasuf* (~ *lsuf*), (37)l: *ladhubat*, (37)t: *lazrid* (~ *zzridat*), (37)u: *lla3radi* (~ *l33rdat*), (38)m: *llasbabit* (~ *id w-a-lssbbat*), (39)d: *laswaqq*, (40)f: *llargu*, (40)g: *la3kuk*. *33na3r* (32)b has no plural form, but it has a free variant *la3nadir*. The other derivational bases with an initial geminate coronal appearing in the lists below are of two types. Some have an initial geminate in the plural as well (e.g. (37)m: *33mtat*). The others have no plural form.

a base ends in the suffix *-iy* that suffix is not taken into consideration by the mapping mechanisms, cf. (36)x, (37)o,p,q,r, (38)f, (40)d,e.

(A) Bases containing more than three consonants ((30)* to (34))

(30) cccc(v)c bases		
a. <i>a-lmḥnāzr-iy</i>	<i>a-lmḥnāzr</i>	'a type of arsenic'
b. <i>a-frskl-iy</i>	<i>i-frskil</i>	'a type of shrub' ⁵³
(31) cvccc bases		
a. <i>a-lyradm-iy</i>	<i>li-yirdm</i>	'scorpion'
(32) ccvc(v)c bases		
a. <i>a-lkrakar-iy</i>	<i>a-lkrakar</i>	'yielded by an <i>lkrakar</i> ' ⁵⁴
b. <i>a-šnadr-iy</i>	<i>ššnadr</i>	'white substance used for welding'
(33) cccvc(v) bases		
a. <i>a-slām-iy</i>	<i>a-slām</i>	'burnous'
b. <i>a-lfrsād-iy</i>	<i>a-lfrsād</i>	'blanket'
c. <i>a-bnāk-iy</i>	<i>a-bnāk</i>	'snake'
d. <i>a-gratl-iy</i>	<i>a-gratl</i>	'mat'
e. <i>a-lmkard-iy</i>	<i>a-lmkard</i>	'rag'
f. <i>a-nxadm-iy</i>	<i>a-nxadm</i>	'pan for baking bread'
g. <i>a-lmsamr-iy</i>	<i>a-lmsamr</i>	'nail'
h. <i>a-mlahf-iy</i>	<i>a-mlahf</i>	'black haik'
i. <i>a-mrsal-iy</i>	<i>a-mrsal</i>	'made with <i>amrsal</i> (earth rich in saltpeter)'
j. <i>a-qzdr-iy</i>	<i>a-qzdr</i>	'piece of zinc (used for coating pans)'
k. <i>a-lbrwt-iy</i>	<i>l-lbrwita</i>	'wheelbarrow'
l. <i>a-b(r)yakl-iy</i>	<i>a-brrkal</i>	'very old/old age (horses, mules, etc.)'
m. <i>a-lm(q)qarš-iy</i>	<i>l-lm(q)qarš</i>	'kettle'
(34) cccc bases		
a. <i>a-lḥabl-iy</i>	<i>i-lḥabl</i>	'a type of carpet'
b. <i>a-mtard-iy</i>	<i>l-mtrd</i>	'large clay dish'
c. <i>a-mx'azn-iy</i>	<i>l-mx'zn</i>	'guard/the State' ⁵⁵

H2

53. Contrary to all the other derivatives cited in this article, this ABNAKLIY derivative and the next one below it are not in current use among the speakers of ITB; they were coined by one of us (ME), who, as a native speaker, finds them perfectly acceptable. For instance, nobody presently makes a living by raising or hunting scorpions, but it is ME's feeling that the noun *a-lyradm-iy* (cf. (31)) would be perfectly appropriate to refer to such a person, in the same way as *scorpionnier* would be in French.

54. *A-lkrakar*, a field which is unirrigated and full of stones.

55. The long *a* in *llaabr* and *laanabriy* is the realization of an underlying *ḥ*. A phonological rule of ITB rewrites as *aa* all occurrences of *ḥ* which precede a consonant. Before the operation of that rule the representations of the base and of the derived noun are respectively /l-ḥnabr/ and /a-l-ḥnabr-iy/. Alternations between prevocalic *ḥ* and preconsonantal *aa* are found below in items (37)g,h.

Independent evidence in favor of the *ḥ*-to-*aa* rule is the existence of nouns which begin with *aa* in the singular and with *yaa* in the plural. For instance, the plural form of *aazriy* 'bachelor' is *yaazriyn*. Provided the phonological representation of its radical is taken to be /ʔzriy/, this noun can be considered as forming its plural in the same way as do others such as *a-lfrdiy* 'tree' (pl. *i-lfrdiy-n*), *a-ḥšmiy* 'boy' (pl. *i-ḥšmiy-n*), *a-ḥšmiy* 'big knife' (pl. *i-ḥšmiy-n*). Once the *ḥ*-to-*aa* rule has applied in the plural /i-ḥšmiy-n/, the thematic vowel is in prevocalic position, an environment where the high vocoids of ITB are always realized as glides. If the radical of *aazriy* began with a vowel in the underlying form, this noun would contradict an otherwise exceptionless generalization about the morphology of nouns in ITB. According to that generalization, only nouns whose radical begins with a consonant may have a thematic vowel. Other similar nouns with an initial preconsonantal /ʔ/ are *aalluḥ* 'calf' (pl. *yaallaḥ* or *yaallān*), *laattar* 'pedlar' (pl. *lyaatran*), *aassas* 'guard' (pl. *yaassan*).

Further support is lent to the *ḥ*-to-*aa* rule by the *laaCC/laaCuC* nouns, e.g., *laayn* 'fountain' (pl. *laayun*), *laayb* 'flaw' (pl. *laayub*), *laarg* 'sweat' (pl. *laarg*), *laadr* 'pretext' (pl. *laadur*). If *laaCC* derives from /l-ḥCC/, these nouns can simply be viewed as particular instances of the *iCCC/laCCuC* alternation, which is quite common in ITB, cf., e.g., *llḥrb* 'stunt' (pl. *llḥrub*), *lḥdd* 'Sunday' (pl. *lahdud*), *ššm* 'share' (pl. *lāshum*).

d. <i>a-šfanž-iy</i>	<i>ššfnž</i>	'dumpling'
e. <i>laanabr-iy</i>	<i>l-laabr (l-l-ḥnabr/)</i>	'amber'
f. <i>a-lḥftr-iy</i>	<i>a-lḥftr⁵⁷</i>	'container for measuring alms'
g. <i>a-lmžamr-iy</i>	<i>l-lmžm(m)⁵⁸</i>	'brazier'
h. <i>a-fnadq-iy</i>	<i>l-fndqq⁵⁹</i>	'caravanserai'
i. <i>a-mnadq-iy</i>	<i>mndqq</i>	'a refreshing beverage'

(B) Bases containing three consonants ((35) to (38))

(35) cvc(v)c(v) bases		
a. <i>a-lkayd-iy</i>	<i>l-lkayd</i>	'paper'
b. <i>a-lkwat-iy</i>	<i>l-lkarta</i>	'cards (game)'
c. <i>a-lbwast-iy</i>	<i>l-lbusta</i>	'postal service'
d. <i>a-qwadš-iy</i>	<i>a-qadus</i>	'pipe (in sewers, etc.)'
e. <i>a-swatr-iy</i>	<i>a-satur</i>	'beam'
f. <i>a-mwakn-iy</i>	<i>l-makina</i>	'power-driven mill'
g. <i>a-mwagn-iy</i>	<i>l-magana</i>	'wrist-watch'
h. <i>a-mwašn-iy</i>	<i>l-mašina</i>	'train'
i. <i>a-lswadr-iy</i>	<i>a-lsadr</i>	'tureen'
j. <i>a-zwakn-iy</i>	<i>a-zuknni</i>	'thyme'
k. <i>a-ḥyayk-iy ~ a-ḥwayk-iy</i>	<i>a-ḥayk</i>	'white haik'
l. <i>a-lkyatr-iy</i>	<i>a-lkitar</i>	'stallion'
m. <i>a-lhyadr-iy</i>	<i>a-lhidur</i>	'tanned hide used as mat'
n. <i>a-lwray-iy</i>	<i>lwury</i>	'gold'
o. <i>a-lbtayt-iy</i>	<i>t-a-lbatat-t</i>	'potato'
p. <i>a-lḥbayt-iy</i>	<i>lḥdabit</i>	'tax on agricultural income'
(36) ccvc(v) bases		
a. <i>a-bḥayr-iy</i>	<i>t-i-bḥir-t</i>	'vegetable garden'
b. <i>a-ḥlays-iy</i>	<i>a-ḥlas</i>	'packsaddle'
c. <i>a-lgrayd-iy</i>	<i>l-lgrad</i>	'seasoned/rank (military)'
d. <i>a-zrayb-iy</i>	<i>t-azzrib-t</i>	'cattle owner/cowshed' ⁶⁰
e. <i>a-žnayn-iy</i>	<i>žžnan</i>	'country bumpkin/irrigated land'
f. <i>a-lrsays-iy</i>	<i>lrsas</i>	'firebrand/gunfire'
g. <i>a-dbayy-iy ~ a-dbaby-iy</i>	<i>ddbay</i>	'preparation used for tanning hides'
h. <i>a-lḥdayn-iy</i>	<i>a-lḥdan</i>	'hide of a slaughtered animal'
i. <i>a-lḥdayr-iy</i>	<i>a-lḥdar</i>	'flea market shopkeeper/scrap'
j. <i>a-gnayr-iy</i>	<i>a-gnar</i>	'loft'
k. <i>a-lg'lays-iy</i>	<i>a-lg'las</i>	'barley (as fodder)'
l. <i>la-k'lāyt-iy</i>	<i>ll-k'lata</i>	'rifle'
m. <i>a-žwayž-iy</i>	<i>žžwiža</i>	'shotgun'

a-lwrayy-iy

56. Since the underlying source of labiovelarized consonants is a matter of debate in the literature on Berber, cf. Elmedlaoui (1985), it is worth noticing that they behave as single units in mappings onto templates in ITB. This is evidence that they are indeed single units, not sequences, in the phonological representations of ITB.

57. On the transfer of geminates, cf. infra.

58. In the source-word the penultimate consonant alternates in free variation between a plain consonant and a geminate. We assume that it is the variant without gemination which is mapped onto the template.

59. /q/ is probably not a geminate in the underlying representation of the source-word. Plain *q* and its geminate counterpart can contrast only in a restricted range of environments in ITB. The rules accounting for the near complementarity of their distribution have yet to be worked out.

60. Here and in (40)e the thematic vowel of the base is retained in the bound form (*tazzribt*, *tassliyt*), and it remains *a* in the plural (*tazzribin*, *tassliyin*). As explained in section 2.3., we posit the underlying forms /t-a-l-zrib-t/ and /t-a-l-sll-iy-t/.

n.	a-k ^o fayf-iy	a-k ^o faf	'pertaining to roofs/roof'
o.	a-lstatw-iy	a-lstatu	'sieve'
p.	a-snayf-iy	a-snu	'young donkey'
q.	a-hsayf-iy	l-hsiša	'hashish'
r.	a-bhaym-iy	l-bhim-t	'cattle'
s.	a-hrayr-iy	t-a-hvir-t	'soup'
t.	a-fyayf-iy	a-fyaš	'argan nut peel (as fodder)'
u.	a-(q)q ^o layl-iy	a(q)q ^o lil	'jug'
v.	a-(q)q ^o nayn-iy	a(q)q ^o nin	'rabbit'
w.	a-l(q)q ^o rayb-iy	la(q)q ^o rab	'kind of bag'
x.	a-šwayr-iy	a-šwar-iy	'pannier (on pack animals)'
y.	a-hsarb-iy	l-hsab	'accountant/arithmetic'
(37)	ccc(v) bases		
a.	a-hrayf-iy	l-hrf-t	'professional/profession'
b.	a-skayr-iy	skr	'drunkard/get drunk'
c.	a-xnayf-iy	l-xnš-t	'bag (for holding grain)'
d.	a-hlayq-iy	l-hlq-t	'mountebank/group of onlookers'
e.	a-zrayg-iy	a-zrg	'millstone mender/mill'
f.	a-fsayk-iy	i-fsk	'medicinal plants'
g.	a-lsnayf-iy	lssnaa-t (/lšnš/)	'craftsman/craft'
h.	a-slaf-iy	sslaa-t (/slš/)	'wholesaler/goods'
i.	a-kxayb-iy ~ a-kxasb-iy	l-kxib-t	'livestock'
j.	a-lraqyb-iy	lraqb-t	'bold/boldness'
k.	a-lsrayf-iy	lssrf	'money changer/money'
l.	a-dhayb-iy ~ a-dhahb-iy	ddhb	'gold'
m.	a-šmayt-iy	ššmt-t	'crook/deception'
n.	a-fhaym-iy	fhm	'connoisseur/understand'
o.	a-lzrayb-iy	t-a-lzrb-iy-t	'carpet'
p.	a-žnayw-iy	a-žnw-iy	'big knife'
q.	a-rtayb-iy	t-a-rtb-iy-t	'scholarship'
r.	a-lmsayr-iy	t-a-lmsr-iy-t	'storey'
s.	a-(q)qhayb-iy	l-qqb-t	'concerning whores/whore'
t.	a-zrayd-iy	zrda	'person keen on blow-outs/banquet'
u.	a-lžayd-iy	lžžda	'garden'
v.	a-šayf-iy	ssš	'pipe smoker/pipe'
w.	a-zgaym-iy	t-a-zgmu-t	'argan marc'
x.	a-(q)qhayw-iy	l-qhwa	'café'
y.	a-fradw-iy	a-frdu	'mortar'
z.	a-ymažw-iy	a-ymaž	'ladle'

61. At present it is not clear to us whether the *w* which appears at the end of the radical in the feminine *t-a-ymaž(w)-t* and in the plural *i-ymažaw-n* is already present at the most abstract level of representation.

(38) Bases containing a geminate

a.	a-brard-iy	l-brad	'teapot'
b.	a-lfram-iy	a-lfran	'oven'
c.	a-qšasb-iy	a-qššb	'smock'
d.	a-lstatb-iy	t-a-lstatb-t	'broom'
e.	a-lkrars-iy	l-lkrusa	'cart'
f.	a-žlalb-iy	t-a-žllab-iy-t	'jellaba'
g.	a-skakf-iy	a-skakf	'soup'
h.	a-k ^o nanš-iy	l-k ^o nnas	'notebook'
i.	a-bqaql-iy	a-buqqal	'small jar'
j.	a-k ^o šasl-iy	t-a-kššul-t ⁶²	'churn'
k.	a-ždadg-iy	a-ždadig	'flowers (collective)'
l.	a-l ^o rarf-iy	a-l ^o rraf	'cup'
m.	a-lsbabt-iy	lssbbat	'shoy'
n.	a-lnq ^o aq ^o r-iy	lnnqq ^o r-t	'silver'
o.	a-lhnam-iy	l-lhnmms	'chickpea'
p.	a-lhhraym-iy	l-lhhram	'cunning/cunning person'
q.	a-lizayz-iy	a-lizzaz	'plant used as a shampoo'
r.	a-lhmaym-iy	l-lhmmam	'hammam'
s.	a-qalayl-iy	a-qllal	'head of a slaughtered animal'

(C) Bases containing two consonants (39) and (40)

(39)			
a.	a-ldaym-iy	ldama	'chess player/chessboard'
b.	a-žwayž-iy	žžaz	'glass (matter)'
c.	a-lkwayr-iy	t-a-kur-t	'soccer player/ball' ⁶³
d.	a-swayq-iy	ssu(q)q	'mass-produced/market'
e.	a-bwayq-iy	l-bu(q)q	'pedlar/megaphone'
f.	a-lfwayt-iy	l-lfuta	'towel'
g.	a-kwayf-iy ~ a-kfayf-iy	l-kif	'kef'
h.	a-lwant-iy	t-a-lhanu-t	'shop'
i.	a-lwayw-iy	l-tawa	'mess tin'

(40) Bases containing a geminate

a.	a-lfsayf-iy	l-lfss-t	'lucerne (alfalfa)'
b.	a-lbtayt-iy	l-lbtta	'bottle'
c.	a-lstayt-iy	a-lstta	'loom'
d.	a-k ^o maym-iy	l-k ^o mm-iy-t	'dagger'
e.	a-slal-iy	t-assll-iy-t	'basket'
f.	a-lrgayg-iy	lrgg	'one who speculates in land/land'
g.	a-škayk-iy	šškk	'incredulous/doubt'

Let us posit the template in (41)a. The principles mentioned earlier are sufficient to account for most of the ABNAKLIY derivatives formed on bases which contain more than three consonants. (41)b represents the derivation of *-gratl-* from *-grtil* (cf. (33)d), and (41)c represents the derivation of *-frsakl-* from *-frskil* (cf. (30)b).

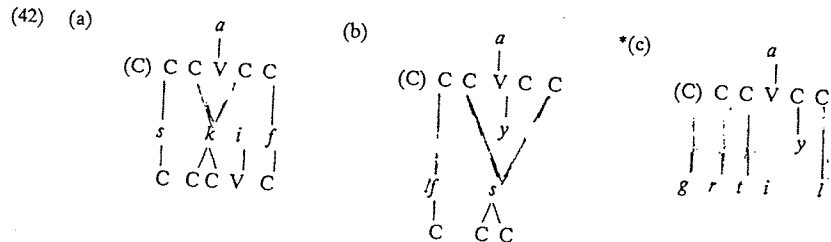
(41)	(a)	(b)	(c)
	a	a	a
	(C) C C V C C	(C) C C V C C	(C) C C V C C
	g r t i l	g r t i l	f r s k i l

Let us now turn to those cases where the base contains fewer melodic consonants than there are obligatory C slots in the template. When the medial consonant

62. The labialization of the initial underlying /k^o/ does not appear in *t-a-kššul-t* because of the presence of *u*; however it appears in the plural: *t-i-k^ošl-in* or *t-i-k^oššal*.

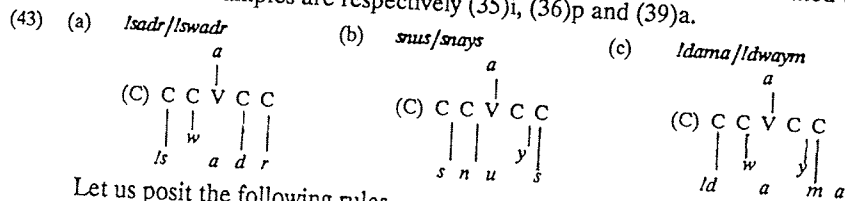
63. Only the derivative shows pharyngealization. This is a lexical idiosyncrasy.

of a triconsonantal base is a geminate, its reflex in the derivative word is associated with the two medial C slots in the template: *-skkif* yields *-skakf-* (cf. (38)g and the other data in (38)a-o). The mapping is given in (42)a. (42)b and (42)c will be commented on later.



The principles mentioned earlier are again sufficient to account for these facts, and they operate, *mutatis mutandis*, as explained in our discussion of the mappings in (26)a,b. There is one systematic exception to the pattern illustrated in (42)a, which is when in the base the medial consonant and the final one are identical, cf. (38)q-s. The mapping of *-lzzaz* onto the template does not yield *-lzzaz-* but *-lzzayz-*, with a default /y/. But before we discuss the situation in (38)q-s, let us first examine how default consonants become associated with the ABNAKLIY template.

Default consonants appear when there is not enough material in the base to fill all the obligatory slots in the template. The ABNAKLIY template allows default /w/ to appear in the second obligatory slot,⁶⁴ and default /y/ to appear in the third; both default consonants may appear in the same derivative word. This is illustrated below. The items used as examples are respectively (35)i, (36)p and (39)a.



Let us posit the following rules.

- (44) a. Associate /w/ with the second obligatory C in template (41)a;
b. Associate /y/ with the penultimate C in template (41)a.⁶⁵

The yod introduced by (44)b may not be unrelated to that which is optionally inserted in sequences of two /a/s separated by a clitic boundary. Such sequences can be pronounced as *aya* or as long (monosyllabic) *a*: *i-nna as* 'he said to him' [innayas] ~

64. The default consonant which appears in the second slot is y in (35)k-m. These seem to be exceptional forms. (35)l,m might be taken to suggest that the default consonant associated with the second slot is normally /y/ when the leftmost vowel in the base is i. This is contradicted by *-kwayf-* (from *l-kif*) in (39)g. The well-formedness of *-hyayk-* ((35)k) suggests that the w in *-kwayf-* is not an avatar of a more abstract yod which has been dissimilated under the influence of the following yod.

65. One is reminded of the default w and ? which appear in some broken plurals in Classical Arabic, as in *jawaamiis* 'buffaloes' (sg. *jaamuus*), *jazaa'ir* 'islands' (sg. *jaziir(at)*), cf. McCarthy (1982b), McCarthy and Prince (1987, 1988). These authors argue that w and ? are surface reflexes of the same underlying segment. It is not clear how compelling an argument could be given to the same effect in the case of (44).

[innaas], *targa ann* 'that channel' [targayann] ~ [targaann], *štta at* 'eat (pl. imperative)' [šttayat] ~ [šttaat]. It is tempting to assume that whereas default w is indeed inserted by a rule which makes specific reference to the ABNAKLIY template, insertion of yod in the penultimate C slot is due to a general default insertion rule. We leave this question open.

Nothing in (44) indicates that the rules should apply only in the case that the material contained in the base is not sufficient for the Template Satisfaction Condition to be met. This need not be stipulated in the rules, for it is a consequence of the Maximality Conditions. Consider for instance the fact that the mapping of *-lmhazr* yields *-lmhazr-*, where all five consonants of the base occur. If a default /y/ was inserted there would be only four template slots left to accommodate the five consonants of the base, and one of those consonants would have to be discarded, hence an output such as *-lmhazayr-*, to which the Melodic MC prefers the attested *-lmhazr-*. As for the interaction of Default Insertion with the Skeletal MC, consider the fact that when a base with three melodic consonants contains a geminate, transfer of that geminate takes precedence over the insertion of default consonants. Thus *-buqqal* (cf. (38)i) yields *-buqqal-* and not *-bwaql-*; *-lhmms* (cf. (38)o) yields *-lhmams-* and not *-lhmays-*.⁶⁶ Default glides are resorted to if and only if there are fewer C slots in the skeleton of the base than there are obligatory C slots in the template.

What has just been said is sufficient to account for the number of default glides in the ABNAKLIY derivatives: (i) zero when the base contains at least four C slots (cf. (42)a),⁶⁷ (ii) two when the base contains at most two C slots (cf. (43)c),⁶⁸ and (iii) one when the base contains exactly three C slots.⁶⁹ But in the latter case one has yet to account for the location of the default glide. Can one predict when the default glide occurs in the second (obligatory) slot of the template (cf. (43)a) and when it occurs in the third (cf. (42)b and (43)b)?

Examining all the instances of case (iii) in our data leads to the following observation: the default glide appears in the second slot when the base begins with CV, and in the third slot otherwise. It looks as though the location of the default glide was chosen so as to minimize the discordance between the CV patterning in the derivative and that in the base. We shall leave at that for the time being. Transfer effects pertaining to the CV patterning will be the subject of a separate article.

66. Given the precedence of the Skeletal MC over Default Insertion, *-zukkni* (cf. (35)j) should yield *-zukkann-* (phonetically [-skann-]) rather than the attested *-zwakn-*. We have no explanation for this discrepancy.

67. (38)p is an exception.

68. (39)h and the second variant of (39)g are exceptions.

69. There are a few exceptions: A) (37)y,z; B) (36)y and the second variant in (36)g and (37)i,l. In the items in B, where one would expect a default consonant in the penultimate slot, one finds instead an exceptional spreading of the (nongeminate) second consonant of the base. We are assuming that spreading (i.e. associating a melodic unit with more slots in the template than in the derivational base) can occur only when required by language-specific mechanisms. *-hrf-* (cf. (37)a) does not yield *-hrarf-*, nor does *-lfs-* (cf. (40)a) yield *-lfsax-*, because there is no spreading rule associated with the ABNAKLIY template.

In order to avoid line crossings in mappings such as (42)b one must assume in general that in the outputs of mappings the default consonants are not sitting on the same plane as the consonants contributed by the base.⁷⁰

Up to this point, we have established the following precedence relations (the lines indicate crucial orderings):

- (45)
- | | |
|----|-------------------|
| 1. | Melodic MC |
| 2. | Skeletal MC |
| 3. | Default Insertion |

The Maximality Conditions belong to UG, whereas default insertion is language specific, indeed it may have to refer to specific slots in specific templates.

The reason we have not yet said anything about the directionality (left to right or right to left) of the mappings is that the data examined in this article do not seem to provide any evidence on that point. Evidence could in principle be gathered by examining derivatives where the base contains more melodic consonants than there are slots in the template, and seeing at which end of the base consonants are left stranded in the mapping (on Classical Arabic, cf. McCarthy 1981, 399). Unfortunately we have not been able to find any attested form for which this is the case.

Evidence is also scarce on certain aspects of the behavior of optional slots. The initial optional C in template (41)a is always left unassociated in the ABNAKLIY derivatives where default /w/ or /y/ occur. In other words, default /w/ and /y/ only show up in cases where their appearance is needed to avoid leaving obligatory slots unassociated.⁷¹ Consider for instance mapping (42)c, where *-grtil* incorrectly yields *-grtayl-* instead *-gratl-* (compare with (41)b). The reason why in (42)c the penultimate slot of the template is available for default insertion is that a consonant has been associated with the optional slot, and, as a result, there are not enough consonants left to fill all the obligatory slots in the template. This mapping yields an incorrect output, and yet it does not violate any of the conditions mentioned up to this point. In order to exclude mappings like (42)c we could propose the following condition, which prefers (41)b to (42)c.

- (46) Link melodic units to as few optional positions as possible.

Since (46) presumably belongs to UG, it is not surprising that it should take precedence over the rules of default insertion.⁷² Let us examine the precedence relations between (46) and the Maximization Conditions. The Melodic MC takes precedence over (46), as shown by cases like the preference of (21)b over (21)a. As for

70. The ill-formedness of crossing association lines is assumed throughout this article. On this question, cf. Sagey (1988).

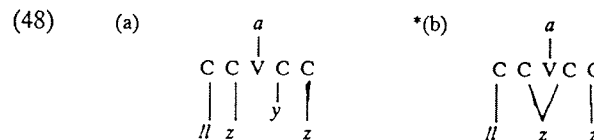
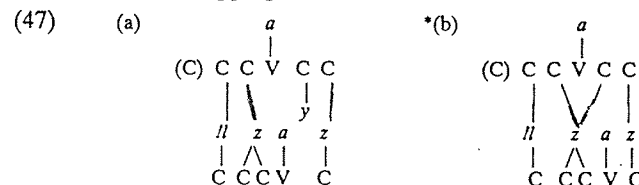
71. The only exception to this generalization is in (38)p, where *-lħħram* yields *-lħħraym-* and not *-lħħram-*. This is the only ABNAKLIY noun derived from a base with an underlying initial geminate.

72. Item (38)p is an exception, cf. the preceding footnote.

the relation between (46) and the Skeletal MC, the evidence in our data is scarce. The forms which suggest that the Skeletal MC takes precedence are *-nzzumma* (**-nnuzzma*, cf. (11)h), *-lħħraym-* (**-lħħraym*, cf. (38)p) and *-lñfatr-* (**-lñfatr*, cf. (34)f). In one item, however, it is the Skeletal MC which yields to (46): in (55)n, mapping *llm* onto template (C)CCi yields *-lmi* (**-llmi*).

6. THE OCP TAKES PRECEDENCE OVER THE SKELETAL MC.

We are now ready to examine the forms (38)q,r,s, whose problematic behavior was pointed out in the text immediately under (42), and to show how they provide evidence on the interaction of the Obligatory Contour Principle and the Skeletal MC, as announced at the beginning of section 5. We give in (47)a the mapping whereby *-lzzaz* yields *-lzzayz-*, in (47)b the mapping which would result in *-lzzazz-*, and in (48)a,b the outputs of these mappings, once the unassociated material has been discarded:

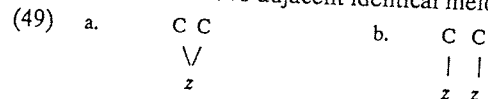


Why is it that (47)a is preferred over (47)b? Whereas in general, when a base with three melodic consonants contains a geminate, the Skeletal MC takes precedence over Default Insertion (cf. (42)a and the data in (38)a-o), why is it that it is Default Insertion which takes precedence in the particular case where the two last melodic consonants are identical (cf. (38)q,r,s)?

The agrammaticality of *-lzzazz-* is not due to a general prohibition against tautomorphic CVCC sequences in which the three consonants are identical, for such sequences are attested in ITB, for instance in *tt-lulluy*, the imperfective stem of *l(l)ulli* 'stroll', or in *k(k)rbubbi* 'have a spherical shape'. Neither can it be due to some property of the mappings which would force the two rightmost C slots in a template always to be linked with melodic units differing in their feature contents, witness the existence of *-nzzumma* (cf. (11)h) and the items in (54)e,g-i, in (56) and in (69)b. We wish to claim that the exclusion of (48)b is due to the Obligatory Contour Principle (henceforth OCP): "at the melodic level, adjacent identical elements are prohibited" (McCarthy (1986, 208)).

The OCP was already implicit in the discussion of the UKRIS derivatives (section 4), where it was tacitly assumed that all geminates are monomelodic, i.e. that the two

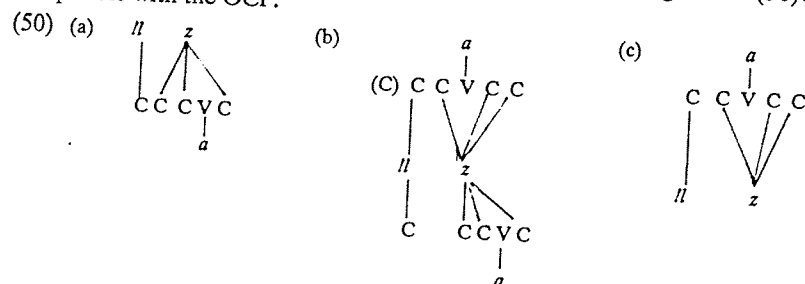
skeletal positions of a long segment are always linked to a single melodic unit as in (49)a, and never to two adjacent identical melodic units as in (49)b:⁷³



One type of evidence adduced by McCarthy in favor of the OCP is the phenomenon he calls antigemination. For instance, McCarthy (1986, 230ff.) discusses the case of Afar, a language which has a phonological rule deleting unstressed vowels in peninitial two-sided open syllables, e.g. /wager-é/ is realized as *wagré*. The syncope rule of Afar fails to operate when the consonants on both sides of the vowel in question are identical: /xarar-é/ is realized as *xararé*, not *xarré*. McCarthy proposes that the ill-formedness of *xarré* is not due to any language-specific restriction on the syncope rule, but to the fact that the representation of *xarré* would contain two adjacent occurrences of the melodic unit /r/, in violation of the OCP. According to McCarthy, the OCP acts as a well-formedness condition on representations at all stages of the phonological derivations, and phonological rules are prevented from operating in contexts where their normal application would give rise to representations violating the OCP (cf. also Yip (1988)).

We wish to suggest that the ill-formedness of (48)b and the likes is also a case of antigemination. But whereas McCarthy's cases of antigemination all involve the blocking of a phonological rule, cases like (47)a involve the suspension of a universal condition on templatic mappings, viz. the Skeletal MC.

In order for the mapping of the radical -/lzzaz/ to give rise to an output violating the OCP, it is essential that in that radical the consonants on both sides of the vowel be realizations of distinct melodic units, as is assumed in (47). If on the contrary the C slots on either side of the vowel in -/lzzaz/ were linked to the same occurrence of /z/, the representation of -/lzzaz/ would have to be as shown in (50)a, with vowel melodies and consonant melodies sitting on different planes in order to avoid any crossing between the lines linking /z/ and /a/ to the skeleton. Mapping (50)a in accordance with the Skeletal MC (cf. (50)b) would result in the form -/lzzaz/- given in (50)c, which is compatible with the OCP.

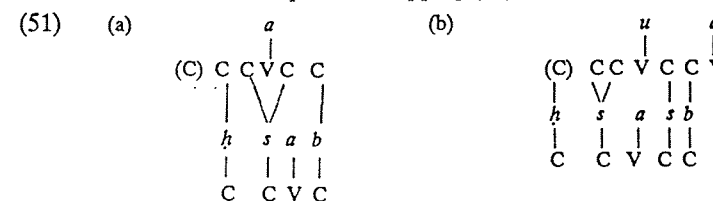


Given the OCP, the representation of -/lzzaz/ could only be (50)a if it were the case that ITB had v,c-segregation in the sense of Prince (1987) and McCarthy (1987), 19

73. For a discussion of gemination in a perspective differing from that adopted here, cf. Elmedlaoui (1988).

i.e. if at the most abstract level of representation vowels and consonants were arrayed on different planes. At present we know of no decisive evidence bearing on this question,⁷⁴ but our data contain one form which suggests that even if ITB has v,c-segregation at the most abstract level, v,c-segregation does not prevail anymore in those representations which are inputs to the mapping process.

The form in question is *t-i-hssusba*, a TIRRUGZA noun derived from *a-hsashb-iy* 'accountant' (cf. (16)c). The base *a-hsashb-iy* is itself an ABNAKLIY noun derived from the noun *l-hsashb* 'arithmetic' (cf. (36)y). *A-hsashb-iy* is one of a few ABNAKLIY nouns whose derivation from a triconsonantal base resorts to lexically governed spreading of the medial consonant, instead of the default /y/ predicted by (44).⁷⁵ The mapping of -/hsashb/ onto the ABNAKLIY template is represented in (51)a, and that of -/hsashb- (the radical of *a-hsashb-iy*) onto the TIRRUGZA template is represented in (51)b. Mapping (51)b is similar in all relevant aspects to mapping (21)b.

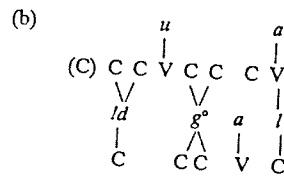
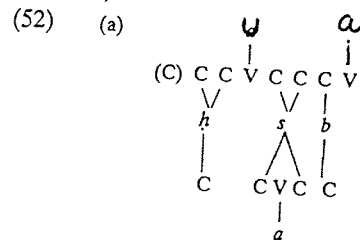


Although the radical of *a-hsashb-iy* has a skeleton with four C slots, at the most abstract level of representation its phonemic melody contains only three consonantal units (cf. (51)a). On the other hand, in the representation of *a-hsashb-iy* which is an input to mapping onto the TIRRUGZA template, the two occurrences of *s* should represent distinct melodic units /s/ (cf. (51)b), for if that representation contained only three melodic consonants, the medial one linked to two skeleton slots, its mapping onto the TIRRUGZA template would yield **-hhussba*, in the same fashion as *-ldgg'al* yields *-dduggla* (cf. (11)f). The mappings yielding **-hhussba* and *-lduggla* are represented below. Recall that when the penultimate consonant of the base is a

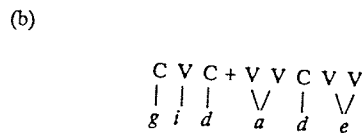
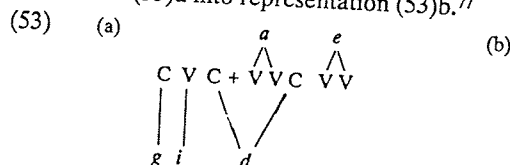
74. It has already been stated that in ITB vowels and consonants do not belong to separate morphemes as they do in Classical Arabic. Systematic heteromorphemicity of vowels and consonants is not the only source of v,c-segregation, according to McCarthy (1989). ITB also lacks some other features which McCarthy suggests have v,c-segregation as their necessary concomitant, viz. templatic morphology resulting in apparent consonant-vowel metatheses, tight constraints on the canonical shape of roots, and syllable structure limited to cv. The following two facts might be taken as evidence in favor of v,c-segregation in ITB. They both concern the formation of the imperfective stem of certain verbs ending in a CC sequence, where a vowel is inserted between the two consonants (cf. section 2, and for more details cf. Dell and Elmedlaoui (to appear)). First, in those radicals which already contain a vowel the inserted vowel is a copy of that vowel; otherwise the inserted vowel is *a* (cf. (5)). If, as is sometimes suggested, copying can only be effected by autosegmental spreading, vowels and consonants must belong to different planes in the representations which are inputs to the processes of imperfective stem formation. If vowel and consonant melodies were coplanar in *tt-skiwis*, for instance (cf. (5)a), one could not link /i/ to the two V slots without crossing the line which links /w/ to the intervening C slot. The second fact suggesting v,c-segregation is that a vowel is inserted between the two consonants even when they are the two halves of a geminate (cf. (5)a'-c'). In order to avoid crossing lines when /a/ is linked to the V slot in (5)c', /a/ and /d/ must be located on different planes. The relevance of these facts for v,c-segregation in Tashlhiyt was pointed out by Ahmed Lasri in a talk given at the Institut de Phonétique de Paris in May 1988.

75. Other such exceptional forms are those in B) in note 69.

geminate, the penultimate consonant of its TIRRUGZA derivative is also a geminate (cf. section 4).



Reasoning along the same lines as McCarthy (1986), we can view the situation as follows. By virtue of the fact that it is derived from *l-hsab*, the radical of *a-hsarb-iy* contains a long-distance geminate *s* (i.e. a melodic unit /s/ linked to two nonadjacent slots), but this information is not accessible anymore when *a-hsarb-iy* is used as a derivational base to form a TIRRUGZA noun, at which stage the two occurrences of *s* in *-hsarb-* are treated as the realizations of two distinct melodic units. This is due to Plane Conflation, a general process which folds together into a single plane the melodic units arrayed on the various planes.⁷⁶ For instance Plane Conflation turns representation (53)a into representation (53)b.⁷⁷



The linear order of the melodic units on the single plane resulting from Plane Conflation reflects the ordering of the skeletal slots to which these units are associated. Whenever a representation contains a single melodic unit linked to two nonadjacent slots, Plane Conflation avoids line crossing by splitting that melodic unit into two distinct occurrences, each occurrence being independently linked to its own slot. Thus, whereas (53)a contains a long-distance geminate /d/, the corresponding skeletal slots in (53)b each have their own associated occurrence of /d/.

The operation of Plane Conflation on the representation which is the outcome of mapping (51)a folds together into a single plane the melodic sequence contributed by the derivational base and that contributed by the template (i.e. /hsb/ and /a/). The long-distance geminate /s/ is split into two occurrences of /s/, and as a result, the triconsonantal melody in (51)a is changed into the quadriconsonantal one in (51)b, which is the suitable one from which to derive *-hssusba*.

76. This process is actually called Tier Conflation by McCarthy, but for the sake of consistency it is called Plane Conflation in this article. McCarthy attributes the original idea of Plane Conflation to Younes (1983), which was not available to us during the preparation of this article. Examples of Plane Conflation are also discussed in Schein and Steriade (1986, 737-8).

77. This example is taken from McCarthy (1986, 231-2). (53)a is the outcome of spreading the final consonant of the root (/gid/) to the empty C slot in suffix /aaCee/: /gid + aaCee/ surfaces as *gidaadee*.

More generally, let us assume that any representation which is to be used as an input in a templatic mapping must first be subjected to Plane Conflation. Consequently one should expect identical consonants separated by a vowel always to behave as two melodic units in mappings onto templates. This expectation is never contradicted by the facts of ITB, as far as we know.

The evidence we have adduced in favor of Plane Conflation in ITB is admittedly minimal, since it consists of a single set of cognates (*l-hsab*, *a-hsarb-iy*, *t-i-hssusba*).⁷⁸ But it is suggestive of a new area where evidence can be gathered as to the exact workings of Plane Conflation. Whereas most of the evidence presented in McCarthy (1986) and in Schein and Steriade (1986) consists of cases where the two halves of long-distance geminates behave as distinct melodic units when they are subjected to a phonological rule, the preceding discussion suggests that they may also count as distinct melodic units when they are mapped onto a template.

7. THE MELODIC MC TAKES PRECEDENCE OVER THE OCP.

We now turn to the second half of the argument sketched in (29), which concerns the interaction between the OCP and the Melodic MC.

The reason we gave why mapping (47)b is excluded is because its outcome, (48)b, violates the OCP. But what about mapping (47)a, which we said results in a well-formed output? Its immediate outcome (48)a actually does violate the OCP, since the two occurrences of /z/ are adjacent on the plane where the melodic units contributed by the base are arrayed.⁷⁹ Similarly, in the representation which is the immediate outcome of mapping *hsarb* onto the TIRRUGZA template (cf. (51)b), discarding the /a/ of the base, which did not get linked to the template, creates a sequence /ss/ which violates the OCP. One obvious difference between mapping (47)b, on the one hand, and mappings (47)a and (51)b on the other, is that in the former mapping, not only are the identical melodic elements adjacent in their plane, but they are furthermore linked to adjacent slots. This might suggest that the OCP (or rather the notion "adjacency" which is a component thereof) should be weakened in such a way that the only sequences of identical melodic units which count as violations be those where the identical units are linked to slots which are adjacent in the skeleton.⁸⁰ But the treatment of identical melodic consonants in certain TIFRDI forms suggests that what is involved in the difference between mapping (47)b and mappings (47)a and (51)b is rather a difference in the interaction between the OCP and the Maximality Conditions.

The TIFRDI forms are nouns derived from verbs, e.g. *t-i-frdi* 'grazing' (from *frd* 'graze (animal)'), *t-i-nmi* 'straightness' (from *nm* 'be straight'). A list of all the TIFRDI nouns known to us is given below.

78. A pair parallel to *a-hsarb-iy* / *t-i-hssusba* is *a-ktatb-iy* / *t-i-ktutba* (cf. (16)). *a-ktatb-iy* is obviously related to the Arabic root *ktb* 'write', but unfortunately we have not been able to find compelling evidence that the two identical consonants surrounding the vowel in *-ktatb-* are a long-distance geminate. The lexicon of ITB contains two other items related to the Arabic root *ktb*, viz. *iktatb* 'book' and *taktubu* 'witchcraft resorting to written spells', but it is unclear whether these can be considered cognates of *aktatbiy* in a synchronic account of ITB.

79. Default /y/ is not located between the two occurrences of /z/ since it sits on a different plane, as indicated in the text above (45).

80. Cf. Dell and Elmedlaoui (1985, 123-125), Odden (1986, 362-363), Myers (1987b, 154-155).

(54) Bases containing three melodic consonants

a.	<i>t-i-frdi</i>	<i>frd</i>	'graze (animals)
b.	<i>t-i-lyrsi</i>	<i>lyrs</i>	'cut the throat'
c.	<i>t-i-lkrdi</i>	<i>lkrd</i>	'scratch'
d.	<i>t-i-lwryi</i>	<i>lwry</i>	'be yellow'
e.	<i>t-i-sddi</i>	<i>sddi</i>	'be slim'
f.	<i>t-i-lmsi</i>	<i>lmmus</i>	'be bland'
g.	<i>t-i-fssi</i>	<i>fsus</i>	'be light (in weight)'
h.	<i>t-i-snmimi</i>	<i>snmum</i>	'be sour'
i.	<i>t-i-milli</i>	<i>millul</i>	'be white'
j.	<i>t-i-lmzki</i>	<i>lmzzikk</i>	'be cute'
k.	<i>t-i-yzi</i>	<i>yyzif</i>	'be long' ⁸¹

(55) Bases containing two melodic consonants

a.	<i>t-i-lzmi</i>	<i>lzma</i>	'be frightened'
b.	<i>t-i-lzri</i>	<i>lzra</i>	'see'
c.	<i>t-i-kni</i>	<i>k^{na}</i>	'be crooked'
d.	<i>t-i-gni</i>	<i>g^{na}</i>	'sew'
e.	<i>t-i-gri</i>	<i>g^{ra}</i>	'pick up/mussels (picked up)'
f.	<i>t-i-mdi</i>	<i>mda</i>	'wear away'
g.	<i>t-i-zbi</i>	<i>zba</i>	'make haste'
h.	<i>t-i-yli</i>	<i>yli</i>	'go up'
i.	<i>t-i-lrmi</i>	<i>lrmi</i>	'become tired'
j.	<i>t-i-lrzi</i>	<i>lrza</i>	'break'
k.	<i>t-i-lryi</i>	<i>lrya</i>	'be hot'
l.	<i>t-i-nwi</i>	<i>nwa</i>	'cook'
m.	<i>t-i-nmi</i>	<i>nm</i>	'be straight'
n.	<i>t-i-lmi</i>	<i>llm</i>	'weave'
o.	<i>t-i-ddi</i>	<i>b(i)dd</i>	'stand'

(56) Bases containing one melodic consonant

a.	<i>t-i-kki</i>	<i>akka</i>	'give, impf.' (pf. <i>fka</i>)
b.	<i>t-i-ssi</i>	<i>ssa</i>	'drink, impf.' (pf. <i>swa</i>)

The TIFRDI derivatives all have radicals of the form CCCi or CCi: CCCi when the base contains three melodic consonants, and CCi when the base contains less than three melodic consonants. Assuming that the TIFRDI template is (C)CCi, here are the mappings which account for *-frdi* (cf. supra), *-lmzki* (from *lmzzikk*, cf. (54)j) and *-kki* (from *akka*, cf. (56)a):

(57) (a)	(b)	(c)
$\begin{array}{c} i \\ (C) \ C \ C \ V \\ \quad \quad \\ f \quad r \quad d \\ \quad \quad \\ C \quad C \quad C \end{array}$	$\begin{array}{c} i \\ (C) \ C \quad C \quad V \\ \quad \quad \quad \\ lm \quad z \quad i \quad k \\ \quad \wedge \quad \quad \wedge \\ C \quad C \quad C \quad V \quad C \end{array}$	$\begin{array}{c} i \\ (C) \ C \ C \quad V \\ \quad \wedge \quad \\ a \quad k \quad a \\ \quad \wedge \quad \\ V \quad C \quad C \quad V \end{array}$

(57)b is further support for the precedence of the Melodic MC over the Skeletal MC (cf. section 4): the correct output is *-lmzki*, not *-lzkki* or *-lmzzi*.⁸²

Consider now the TIFRDI forms derived from bases of the form ccvc with identical consonants on both sides of the vowel, as in the mapping of *sddi*, which yields *-sddi*.⁸³ Whatever the representation of *sddi* may be at the most abstract level, let us

81. (54)k is an idiosyncratic violation of the Melodic MC, as is (55)o.

82. Other TIFRDI forms which provide evidence in favor of the precedence of the Melodic MC over the Skeletal MC are (54)d and (54)f.

83. Our list contains four such forms: (54)e,g,h,i.

assume, following our conclusion in the preceding section, that the representation of *sddi* which is mapped onto the TIFRDI template is a uniplanar one, and consequently that the two occurrences of *d* represent distinct melodic units. The mapping of *sddi* onto the TIFRDI template is represented in (58)a, and (58)b is the outcome of that mapping once the unassociated melodic units have been discarded:

(58) (a)	(b)
$\begin{array}{c} i \\ (C) \ C \ C \ V \\ \quad \quad \\ s \quad d \quad i \quad d \\ \quad \quad \\ C \quad C \quad V \quad C \end{array}$	$\begin{array}{c} i \\ C \ C \ C \ V \\ \quad \quad \\ s \quad d \quad d \end{array}$

(58)b violates the OCP, whatever one's definition of adjacency. It seems, then, that some violations of the OCP do occur after all. But in the face of the well-formedness of (58)b, how can one still invoke the OCP as an explanation for the ill-formedness of (48)b? We suggest the following answer. The source of the difference in well-formedness between (48)b and (58)b does not lie in the representations themselves but in the mappings that produce them. In mapping (47)b the first melodic /z/ is linked to the penultimate C slot in order to enforce the Skeletal MC. In mapping (58)a, on the other hand, it is the Melodic MC which is involved. This suggests that whereas the OCP takes precedence over the Skeletal MC, it is overridden by the Melodic MC.

Under the assumption that the Melodic MC takes precedence over the OCP, one should find no language where (nonadjacent) identical melodic units in the derivational bases systematically fail to be mapped onto adjacent template slots.

Returning now to the questions raised at the beginning of this section, we can see why the representations which are the immediate outcomes of mappings (47)a and (51)b are well-formed despite the fact that they violate the OCP: the violations in question are due to the enforcement of the Melodic MC.

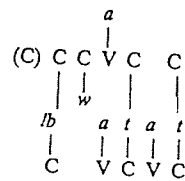
8. THE OCP BLOCKS THE INSERTION OF DEFAULT /w/

We shall end this discussion of the antigemination effects of the OCP in mappings by examining two forms which may shed light on the interaction of the OCP with default insertion. Consider the derived radicals *-lbtayt-* (from *-lbata-*, cf. (35)o) and *-lwray-* (from *lwry*, cf. (35)n). Since the two bases begin with CV, (44) leads one to expect the derived radicals *-lbwatt-* and *-lwuary-*, with default /w/.⁸⁴ Rather than simply consider *-lbtayt-* and *-lwray-* as idiosyncratic exceptions to rule (44)a,⁸⁵ one might try to argue that the derived forms with default /w/ would violate the OCP. We give below the mappings corresponding to **-lbwatt-*, *-lbtayt-* and **-lwuary-*:

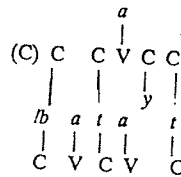
84. Radicals beginning with the sequences *bw* and *ww* are not always ill-formed, witness the existence of *a-lbwast-iy* (cf. (35)c) and *w(w)urga* (var. *w(w)arga*, cf. (12)b).

85. This has to be done for *-ldbayt-* (from */l-l-dabit/*, cf. (35)p); rule (44)a predicts *-ldwabt-* instead.

(59) (a) *-lbwatt-



(b) -lbttayt-



(c) *-lwary



Considering first the representations which are the immediate outcomes of the mappings, we see that mappings (59)a and (59)b lead to similar violations of the OCP, for once one has discarded the /a/ separating the two occurrences of /t/, which is not linked to any slot in the template, both mappings yield melodies which end in a /tt/ sequence. Violation of the OCP is unavoidable at that level of representation as long as the mapping of -lbatt- is to satisfy the Melodic MC, and this is true whatever the location of the default consonant. Matters are different, however, at the surface level, after the outputs of the mappings have undergone Plane Conflation:⁸⁶ whereas Plane Conflation leaves the offending /tt/ sequence in (59)a unchanged, it destroys the adjacency of the two occurrences of /t/ in (59)b by inserting between them the /a/ preattached to the template and the default yod. Choosing, then, to apply (44)b despite the fact that the base begins with CV avoids a surface violation of the OCP. The same is true for the mapping of /wury/. No violation of the OCP occurs in the representation which is the immediate output of mapping (59)c, for in that representation the two occurrences of /w/ belong to different planes; but Plane Conflation creates such a violation by putting the two occurrences of /w/ side on the same plane.

In conclusion, rather than being a lexical quirk, the failure of (35)n,o to undergo rule (44)a may be yet another instance of antigemination. Whereas earlier in our discussion the mechanism overridden by the OCP was a principle of Universal Grammar (the Skeletal MC), here it is a language-specific device (rule (44)a).

We summarize below the precedence relationships which we have established up to this point.

- (60)
- | | |
|----|-------------------|
| a. | Melodic MC |
| b. | OCP |
| c. | Skeletal MC |
| d. | Default Insertion |

In the course of our discussion we have provided direct evidence for each one of the six ordered pairs in (60):

86. We assume that in addition to operating on the inputs to templatic mappings (cf. section 6), Plane Conflation operates on all forms at a late stage of the derivations, so that all melodic units end up in the same plane in the phonetic representations.

a,b	sdid	→	-sddi (section 7)
a,c	qsf	→	uqsif/*ussif (section 4)
a,d	-lmh nʒr	→	-mh nʒaʒr/*h nʒayr- (section 5)
b,c	-lzzaz	→	-lzzayz/*lzzaz- (section 6)
b,d	-lbatt-	→	-lbttayt-/*lbwatt (section 8)
c,d	-buqqal	→	-bqaql-/*bwaql- (section 5)

9. VIOLATIONS OF THE SKELETAL MC

Yet a third argument might be devised in favor of distinguishing between the Skeletal MC and the Melodic MC. The argument involves comparing the numbers of idiosyncratic violations to each of the MCs which occur in our corpus. If significant at all, these numbers would tend to suggest that the Skeletal MC lends itself to infractions more easily than the Melodic MC. Up to this point we have encountered two violations for each MC: forms (54)k and (55)o for the Melodic MC, and forms (35)j and (55)n for the Skeletal MC. In this section we shall come across several more idiosyncratic violations of the Skeletal MC. These occur among the AZDDAYRU derivatives, to which we now turn briefly. The AZDDAYRU forms are templatic nouns or adjectives of the form *a-CC:aCCu*, e.g. *a-zddayru* 'the one below', from *zdr* 'be located below'; *a-mggansu* 'internal', from *a-gʷns* 'interior'. A list of all the AZDDAYRU forms which have come to our attention is given below. In order to save space we only give the meaning of the base whenever an approximate paraphrase of the meaning of the derivative is "(person who or thing which) has the property X, has undergone X", where X represents the meaning of the base.

(61)	<i>a-lnqqarfu</i>	<i>lnyurfa</i>	'scraggy / be parched, die with thirst' ⁸⁷
(62)	ccc bases; default /y/		
a.	<i>a-zddayru</i>	<i>zdr</i>	'the one below / be located below'
b.	<i>a-xʃaynu</i>	<i>xʃn</i>	'be ugly'
c.	<i>a-lgʒʒaydu</i>	<i>lgʒʒʔd</i>	'chip a corner of' ⁸⁸
d.	<i>a-gʒʒaymu</i>	<i>gʒʒm</i>	'be amputated, lose one of its parts'
(63)	ccc bases; default /m/		
a.	<i>a-nttalfu</i>	<i>tlf</i>	'lost soul/be confused'
b.	<i>a-lmʒʒarʃu</i>	<i>lʒrʃ</i>	'drop-out, failure (person)/would'
c.	<i>a-nzzalfu</i>	<i>zlf</i>	'one with the looks of having been in a fire /singe'
d.	<i>a-mggansu</i>	<i>a-gʷns</i>	'internal/inside'
e.	<i>a-nʒʒaʃu</i>	<i>ʒaʃʒʹ</i>	'be emancipated'
f.	<i>a-lnbbarsu</i>	<i>l-lbrs</i>	'a kind of skin disease'
(64)	ccc bases with medial geminate; default /y/		
a.	<i>a-qssayfu</i>	<i>qsf</i>	'squat person/be narrow'
b.	<i>a-lrrayfu</i>	<i>ldrf</i>	'be beautiful'
c.	<i>a-dccaynu</i>	<i>dcen</i>	'have a dark complexion'
d.	<i>a-lzzayqu</i>	<i>lzzq</i>	'be broke'
e.	<i>a-qzzaybu</i>	<i>qzzb</i>	'have too few clothes on'

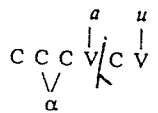
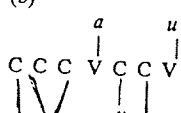
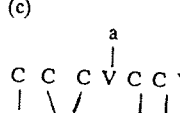
87. *qq* is the normal geminate reflex of *y* in ITB, cf. note 16.

88. In (62)c and (62)d the initial consonant of the base shows up as a nongeminate when it is not stem-initial (cf. note 24). The imperfective stems of *lgʒʒʔd* and *ggʒʒm* are respectively *tl-gʒʒʔad* and *tl-gʒʒʔam*. The Skeletal MC predicts that if the geminate were underlying the derivatives would be *a-lmʒʒaʒdu* and *a-nggaʒnu*.

89. Underlyingly /ʒʃt/, /a-nʒʒaʃfu/. About /ʃ/ cf. note 51.

- (65) ccc bases with medial geminate; default /m/
- | | | | |
|----|-------------------|-------------|---|
| a. | <i>a-lkkarfu</i> | <i>lkrf</i> | 'be rejected (for not meeting certain standards)' |
| b. | <i>a-lttarfu</i> | <i>ldrf</i> | 'extremist/be on the edge' |
| c. | <i>a-nittarfu</i> | <i>tqaf</i> | 'become impotent as a result of a spell' |
| d. | <i>a-mʒʒanqu</i> | <i>ʒnq</i> | 'be deformed' |
- (66) cvcc(v) bases
- | | | | |
|----|-------------------|--------------|---|
| a. | <i>a-nzzaʃmu</i> | <i>zaʃm</i> | 'rival/to crowd' |
| b. | <i>a-lmʃʃardu</i> | <i>ʃʃard</i> | 'enrol as a rural policeman' |
| c. | <i>a-nggasnu</i> | <i>gusna</i> | 'have an upset stomach' |
| d. | <i>a-nssafu</i> | <i>safr</i> | 'leave one's home town in order to attend school' |
| e. | <i>a-mʒʒayfu</i> | <i>ʒiyh</i> | 'outcast/throw away' |
| f. | <i>a-nʒʒayfu</i> | <i>ʒiyf</i> | 'one who looks breathless/strangle' |
| g. | <i>a-nltayfu</i> | <i>ltiyf</i> | 'be dummy (at cards)' |
- (67) ccvc bases
- | | | | |
|----|-------------------|----------------|------------|
| a. | <i>a-gzzayfu</i> | <i>gzzul</i> | 'be short' |
| b. | <i>a-yzzayfu</i> | <i>yzzif</i> | 'be long' |
| c. | <i>a-mllayfu</i> | <i>mlul</i> | 'be white' |
| d. | <i>a-lmzzayku</i> | <i>lmzzikk</i> | 'be cute' |
- (68) cccv bases
- | | | | |
|----|------------------|------------|--------------------|
| a. | <i>a-mzzaʃzu</i> | <i>zza</i> | 'careless/neglect' |
|----|------------------|------------|--------------------|
- (69) (v)cvcc(v) bases
- | | | | |
|----|-------------------|-------------------|------------------|
| a. | <i>a-luzzaymu</i> | <i>t-luzzum-t</i> | 'median/middle' |
| b. | <i>a-nzzammu</i> | <i>z(z)umma</i> | 'stink (person)' |
- a-nʒʒayfu*
a-mzzahzu
zzhza

All the AZDDAYRU forms contain four consonants, the second of which is a geminate, and we shall posit the template in (70)a, which has five obligatory C slots, and in which the second and third C slots must both be linked to the same melodic unit. When the radical of the base contains less than four melodic consonants, a default /y/ may fill the penultimate slot, as in *a-zddayru* (cf. (62)a and (70)b), or a default /m/ may fill the first C slot, as in *a-mggansu* (cf. (63)d and (70)c), or both default consonants may appear together, as in *a-luzzaymu*, from *t-luzzum-t* (cf. (69)a).⁹⁰

- (70) (a)  (b)  (c) 

Template (70)a must be supplemented by the following default insertion rules:

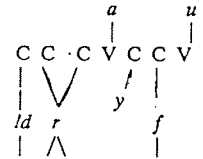
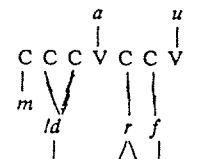
- (71) a. Associate /y/ with the penultimate slot of template (70)a;
b. Associate /m/ with the first slot of template (70)a.

The first rule is common to the ABNAKLIY and the AZDDAYRU templates.

The AZDDAYRU forms which are derived from triconsonantal bases with a medial geminate fall into two classes. Some, such as *-qssayfu* (from *qssf*, cf. (64)a),

90. Default /m/ dissimilates to *n* when a labial consonant occurs somewhere on its right. Besides the initial /m/ which appears as a default consonant at the beginning of certain AZDDAYRU forms, there exists a prefix /m/ which is used to form nontemplatic agentive nouns, e.g. in *a-m-kz* 'ploughman', from *kz* 'to plough', *a-m-zug* 'absconder', from *zyg* 'flee from home', *a-n-lmi* 'a tired person', from *lmi* 'be tired'. The default /m/ and the prefix /m/ may be historically related, but they cannot be equated in a synchronic description. The fact that they are both changed into *n* when a labial consonant follows is no argument in favor of their identity, for the prefix /mm/ used to form reciprocal verbs is also subject to the same dissimilation, cf. Dell and Elmedlaoui (to appear).

have a default /y/, while others, such as *-lkkarfu* (from *lkrf*, cf. (65)a), have a default /m/. In the mapping of the bases in (64) and (65), default /y/ is the expected outcome of the regular interaction between the Skeletal MC and rule (71), and the forms with default /m/ must be considered exceptional.⁹¹ To see this, compare the mappings below, which correspond to items (64)b and (65)b, where the derivational bases happen to be homophonous.

- (72) (a)  (b) 

Mapping (72)b is not optimal with respect to the Skeletal MC: the geminate /r/ of the base is mapped onto a single template slot, and there exists another mapping, namely (72)a, in which a greater amount of skeletal structure is mapped onto the template, since in that mapping the geminate /r/ is mapped onto two template slots. *-lnttarfu* and the other forms in (65) suggest that the Skeletal MC is not as stringently enforced as the Melodic MC.

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91. Another violation of the Skeletal MC is (67)d, where one would expect *-lmzzakku* (cf. *-nzzammu* in (69)b).

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