Weight-by-Cycle:

The Double Life of CVC in Modern Hebrew

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Introduction

This paper makes two claims: The first, a language-particular claim, is that Modern Hebrew (MH) is a quantity-sensitive language, contrary to what previous accounts hold; specifically, an iambic system. The second, typological claim, is that the dual nature of CVC syllables in MH, which in some contexts behave as light and in others as heavy, is best analysed in terms of a distinction between lexical and post-lexical weight visibility. This constitutes a new category in the already growing body of case studies which exhibit dual weight criteria for CVC syllables.

The argument for quantity-sensitivity in MH draws on evidence from secondary stress on derived diphthongs, stress alternations in acronym formation and the major data base of this paper, syncopation in clitic constructions. The latter also supports the observation that although CVC syllables are treated as light by the stress rules, they pattern with heavy syllables in licensing syncope. It is argued that a natural account of this contrast keeps quantity-sensitivity operative throughout the phonology while re-scaling the weight of CVC syllables as they enter the post-lexical cycle. This is achieved by “late” coda moraification, which is severely constrained by general conditions on resyllabification. Embedded in well-established generalizations about the rule and scope of syncope in iambic languages, this analysis illustrates how Moraic Theory can deal with dual CVC paradoxes without weakening the basic universal typology of stress systems.

1 Types of Dual-CVC Languages

The notion of syllable weight is central to the prosodic description of natural languages. The distinction between light and heavy syllables figures prominently in the phonology of stress assignment, tonal systems and segmental processes (lengthening, gemination). During the last decade, Moraic

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Theory has aimed to reduce that distinction to moraic structure (Hyman 1985, McCarthy and Prince 1986, Hayes 1989, Ito 1989), where a heavy syllable is defined as having more than one mora.

However, it is well-known that segments and moras do not stand in a one-to-one correspondence. Whereas vowels universally project a mora, onsets never do. More interestingly, coda consonants project a mora in some languages but not in others. We thus have languages where only CV is light, and CVC groups with the heavy CVV(C) (e.g., Latin, Choctaw); or, languages where CVC groups with the light CV, contrasting with the heavy CVV(C) (e.g., Huasteco, Mongolian). The variable status of CVC was ascribed by Hayes (1989) to a parametric rule, Weight-by-Position, which assigns a mora to a coda consonant in languages where it is active.

Recent research (Crowhurst 1991, Steriade 1991, Hayes 1994, Hayes 1995, Rosenthal and van der Hulst 1996) highlights a third category of languages, namely those where CVC behaves, internal to the language, as heavy in some contexts but light in others. I shall call such languages “dual-CVC languages”. The existence of dual-CVC languages poses a non-trivial challenge to Moraic Theory, and I will discuss below some of the attempts to deal with it.

Descriptively speaking, there seem to be three subtypes of dual-CVC languages discussed in the literature, corresponding to three different criteria for weight. The most common is Weight-by-S-Position, where the weight of the CVC syllable is determined its position in the word; the second subtype is Weight-by-Features, where the weight of CVC is determined by the feature composition of the coda consonant; and the third subtype I will simply call, for lack of a better term, Weight-by-Rule; that is where the weight of CVC depends on the rule that applies to it. Below are examples of languages in each subtype:

(1) **Weight-by-S-Position**

a. **St. Lawrence Island Yupik**: Light unless initial (Krauss 1975, 1985; Jacobson 1985).

b. **Chugach**: Light unless initial (Lehr 1985).

c. **Palestinian Arabic**: Heavy unless final (Kenstowicz and Abdul-Karim 1980; Kenstowicz 1981, 1983).

d. **Estonian**: Heavy unless final (Hint 1973, Prince 1980).

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1 Not to be confused with Hayes' (1989) parametric Weight-by-Position rule, which simply refers to the coda position, rather than to the position of the syllable dominating the coda.

2 Various Yupik dialects, like General Central Yupik, exhibit complex patterns of CVC behavior. Hayes (1995) analyses these cases as involving restricted destressing rules rather than variable weight.
e. **English**: Heavy unless final (Kager 1989).
f. **Kashmiri**: Light unless leftmost in a word with no CVV (Bhatt 1991).

(2) **Weight-by-Features**

a. **Cahuilla**: Light unless the coda is a glottal stop (Seiler 1965, 1977).
b. **Eastern Ojibwa**: Light unless initial and the coda is a nasal (Kaye 1973, Piggott 1983).
c. **Lithuanian**: Light unless the coda is a sonorant (Halle and Kiparsky 1977, Zec 1995).

(3) **Weight-by-Rule**

b. **Cayuga**: Light for stress, heavy for iambic weakening (i.e., laryngeal metathesis VL -> LV) (Foster 1982, Hayes 1995).

The typology in (1)-(3) is merely descriptive and does not necessarily pick out theoretically natural classes. Moreover, the classes are not mutually exclusive, and some languages manifest intersecting possibilities (e.g., (2b), (3b)). Note also that irrespective of class membership, most dual-CVC languages assign a mora to the first half of a geminate.¹

Most cases of Weight-by-G-Position are constrained by word-peripherality (however note (1f)), and examples like (1c-e) are standardly handled by consonant extrametricality. However cases like (1a,b) do not fall under extrametricality and call for additional devices. An optimality-theoretic attempt to unify all cases of “Weight-by-Position by Position” is presented in Rosenthal and van der Hulst (1996).

The cases of Weight-by-Features are argued by Zec (1988, 1995) to respect a universal sonority scale, assigning only natural sonority classes to moraic codas. Other restrictions on feature specification of codas of consonants, like the ban on place articulation, have been investigated by Ito (1986) and Lombardi (1991).

Least understood seems to be the subtype Weight-by-Rule, where different rules of the grammar treat CVC syllables either as heavy or light. Steriade (1991) observes that the split generally goes only in one direction: namely, stress computation is stricter, counting only “nuclear” segments for weight, whereas other processes admit a wider variety of moraic codas. Hayes (1995) proposes a two-layer system of moraic structure, in which a single rime mora dominates two moras, which in turn dominate the nucleus and the coda. Rules that treat CVC as light refer to the higher, monomoraic layer, whereas those treating it as heavy refer to the lower, bimoraic layer. Crowhurst

(1991) proposes a derivational analysis in which moras can be removed prior to stress assignment. Below I evaluate these proposals in view of the case studies from MH.

The central claim of this paper is that Modern Hebrew manifests yet another, quite different sort of a dual-CVC language. Although the weight of CVC in MH does not vary by position, feature composition or arbitrary rules, it does vary in a highly systematic way. Specifically, I will argue that CVC in MH is light at the lexical level but heavy post-lexically. MH thus provides an instance of a new category in the typology - Weight-by-Cycle.

2 Modern Hebrew as an Iambic System

Before we consider the status of CVC syllables in MH, we should situate the prosodic system of the language within the universal typology of stress systems. By identifying the type to which MH belongs we can draw predictions, based on that type, which could interact in interesting ways with the behavior of CVC in the language. However this identification must be argued, not assumed, since previous work on the prosody of MH is largely silent on this issue, if not in opposition to my view.

The following is a simple-minded description of MH stress system: Primary stress is quantity-insensitive, falling within a two-syllable window at the right edge of the word. The unmarked stress is final; marked cases that give rise to penultimate stress include: A restricted class of nouns (segolates); certain pre-accenting suffixes in the nominal/adjectival system; certain “extrametrical” verbal agreement suffixes; vowel-final acronyms, to be discussed below; and lastly, most relevant for this study, N/V+clitic combinations.

Due to stress-finality, it is generally assumed - as in Bat-El (1993) and Sharvit (1994) - that metrical feet in MH are right-headed. Since secondary stress in MH is phonetically subtle, these authors abstract away from it. However to the extent that secondary stress is detectable, it generally shows up on alternating syllables (Bolozky 1982). Therefore I will assume that metrical feet in MH are bounded and iambic, and that the entire stress contour of a word is computed in one fell swoop.

The point where the present study departs from previous analyses of MH is the extent to which the iambicity of the language is taken seriously. Whereas previous studies severed the property of right-headedness from the cluster of properties characteristic of iambic languages, attributing to MH only that single property, I will argue that a close inspection reveals the entire range of iambic features in the language. Following Hayes’ (1995) extensive typology of stress systems, I take it that this range of features stems from the inherently quantity-sensitive nature of the iambic rhythm. Thus the main claim of this section is that MH is a quantity-sensitive language.

This claim is of particular interest for at least two reasons. First, it runs contrary to standard analyses of MH, all of which assume, implicitly or explicitly, that
MH is quantity-insensitive (see Bolozy 1977, 1978, 1982; Bat-El 1989, 1993, 1994; Sharvit 1994). To the best of my knowledge, this study is the first to entertain the opposite view.\(^4\) Secondly, it faces the challenge of explaining why MH, prima facie, lacks two common features of QS-systems - long vowels and bimoraic feet.

I will first address the latter issue, and then present further, independent evidence for quantity-sensitivity in MH. It is indeed true that MH lost all lexical doubly-linked segments, whether long vowels or geminates, that were quite common in Biblical and Tiberian Hebrew. Note, however, that although the great majority of QS-languages have a phonemic vowel length distinction, this is not universal. Thus Hixkarayana, a Cariban language of Northern Brazil, treats CV as light and CVC as heavy - but has no long vowels (Derbyshire 1985).

Yet I would like to claim something stronger for MH. Even though no lexical long vowels exist in the language, derived ones do exist. This is due to another impoverishment process, namely the loss of gutturals, which "reintroduced" long vowels into the language. As a result of this process, YGV sequences, subject to guttural deletion, are reanalysed as VV sequences, which sometimes give rise to a tautosyllabic parade - a derived diphthong.\(^5\)

The interesting point to note is that these diphthongs/long vowels are always stressed. In particular, they hear secondary stress in positions where comparable short vowels do not. Some minimal pairs are given below (compare underlined positions):

\[
\begin{align*}
\text{(4) } & a. \quad \underline{\text{šavá}} - \text{šavá} \\
& \quad \text{\"wax\"} - \text{\"is worth\" Sg Fem.} \\
\text{b. } & \underline{\text{pəxənínim}} - \text{pəxənínim} \\
& \text{\"bells\"} - \text{\"tin huts\"} \\
\text{c. } & \underline{\text{məxnaxím}} - \text{məxnaxím}
\end{align*}
\]

\(^4\) Inkelas (1990) is the only study I am aware of that argues for a syllabic weight distinction in MH. Inkelas proposes to derive the available consonantal positions in the verbal system of MH from prosodic templates which invoke mono- or bimoraic syllables. However the general issue of quantity-sensitivity is not addressed, and indeed, Inkelas remains silent on the major challenge for any QS-analysis of MH (noted by Bat-El 1989), namely why the CVC syllables argued to be bimoraic are nonetheless treated as light by the stress rules. As for the facts of the verbal morphology, see Sharvit (1994) for an alternative account, appealing only to general prosodic constraints and no moraic templates.

\(^5\) Gutturals behave like "ghost" segments in MH. Although never pronounced (in most dialects), their repercussions are systematically maintained throughout the phonology of the language, via complex interactions with processes like schwa-epenthesis, vowel harmony and spirantization. A minimal analysis of this behavior, it seems to me, would have to acknowledge their underlying reality, and I will adopt this assumption here; however, a full analysis of the issue is well beyond the scope of this work.
'perpendicular' (pl.) - 'terms'

-męgkonicím - mgkiconím

't from the extremists' - 'from extremists'

-mıdsamót - mgšavót

'was indicted' (Fem.pl.) - 'colonies'

These contrasts follow straightforwardly from general assumptions about the foot inventory of iambic systems. In particular, under normal circumstances, only three types of feet are available (Hayes 1995), given here in increasing order of markedness: \((\sigma_0, \sigma_{120}), (\sigma_{90}, \sigma_{30}), (\sigma_{30}, \sigma_{0})\). The contrast in the site of secondary stress in (4d), for example, is reduced to the contrast between the two metrical parses, (męa)kiconím vs. (męk)iconím. I assume that degenerate feet of the form \((\sigma_{30})\) are avoided whenever possible, perhaps forced only in mono- and disyllables, under the duress of stress-finality. I thus conclude that the two commonplace objections to quantity-sensitivity in MH are untenable: Although not lexical, CVV syllables are abundant, thanks to guttural deletion; and furthermore, these syllables are invariably stressed, demonstrating the existence of himoraic feet in the language.¹

Facts like those in (4) are expected, in fact inevitable, in quantity-sensitive languages, and are usually captured either by iambic stress algorithms like Hayes’ or by universal constraints like the Weight-to-Stress Principle of Prince (1990). Given that, the question immediately arises why CVC syllables in MH, unlike CVV, fail to attract stress:

\[(5)\]

\a. sälva ‘tranquility’
\b. bazbèzaním ‘lavish’ Masc.pl. (Adj.)
\c. hitnàagüt ‘behavior’

As far as stress assignment is concerned, CVC seems to be non-distinct from CV; thus the initial syllable of (5a) is unstressed, unlike that of (4a); in (5b) an initial CVC fails to disrupt the alternating pattern, unlike in (4d); and in (5c), an initial CVC cannot even attract stress so as to prevent adjacent strong positions, at the cost of de-stressing a CVV syllable.

If CVC syllables had consistently patterned with light syllables in MH, the facts in (5) would have posed no serious problem. One would only have to assume that consonantal codas are not moraic in MH, on a par with languages like Mongolian. However, alongside the facts of stress assignment, one observes an inverse pattern in

¹ I suspect that the prominence of CVV syllables in MH has not received the attention it deserves due to the general neglect of secondary stress. However, my own judgement is that unlike secondary stress on light syllables, which is indeed harder to establish, stress on CVV is distinctively audible. This judgement, of course, should be subjected to acoustic tests.
clitic-syncope, where CVC syllables group with heavy syllables. These facts are reviewed in the next section.

Putting aside for the moment the special status of CVC syllables, then, the data in (4) provide evidence for binomonic feet in MH. There is, however, further evidence in favor of the iambic character of the language, to which I now turn.

Iambic languages typically rank the even iamb, (σ₁ εₙ), lowest in their favorable feet. Various strategies are employed to enhance the quantitative contrast between the weak and the strong position of the foot: Reduction of the vowel in the weak position, lengthening of the vowel in the strong position, gemination of the following consonant and so forth (see Hayes 1995 for numerous examples). It turns out that in one specific domain of MH phonology, which is highly productive in common speech, one sees the prosodic effects of eschewing symmetric iambics.

Acronyms in MH are formed by interspersing vowels, most frequently /a/, between the initial consonants of the words comprising the phrase (occasionally non-initial consonants show up as well). Thus, for example, the acronym for *Perek Zmun Minimali* ('minimal period of time') is *pazdm*; the stressed syllable is the final one, in accordance with the unmarked pattern of the language. Interestingly, when the last consonant is a guttural, and gets deleted as all gutturals do on the surface, stress systematically avoids the final open syllable and lodges on the penult. Some minimal pairs are listed in (6):

(6)  

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<tbody>
<tr>
<td>a.</td>
<td>kabán</td>
<td>kába.</td>
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<tr>
<td>b.</td>
<td>maxát</td>
<td>máxa.</td>
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<tr>
<td>c.</td>
<td>daphar</td>
<td>dápa.</td>
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<tr>
<td>d.</td>
<td>mašák</td>
<td>máša.</td>
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<tr>
<td>e.</td>
<td>kastlar</td>
<td>kástla.</td>
</tr>
</tbody>
</table>

This pattern makes sense under the assumption that CVC in acronyms is deemed heavy by the stress system. This difference with respect to normal CVC might be explained in two ways. First, it could be that MH is currently shifting from a light-CVC language to a heavy-CVC one. One would then expect to observe the emergence of heavy CVC in the most recent lexical innovations that spontaneously enter the language - precisely the case with the acronyms under discussion. Alternatively, it is possible that acronym formation, which must have access to phrasal units, is a post-lexical process. In that case, the fact that it treats CVC as heavy in fact confirms the

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7 This observation is due to O. Bat-El (p.c.). Perhaps a similar argument can be constructed on the basis of nickname formation in MH, where (roughly) the suffix *-i* is attached to the first syllable of the original name, resulting also in stress retraction, e.g., *yonatdn* ---*> yóni, avrahám ---*> ávi, tamár ---*> támí. However penultimate stress in these cases might equally be attributed to an idiosyncratic pre-accenting specification on the suffix *-i*. 
main claim of this paper, namely, that post-lexical syllabification of coda consonants in MH inserts moraic structure.

Given that CVC in acronyms is heavy, stress retraction in the vowel-final forms in (6) can be seen as a repair strategy of the marked even iamb (σ₁, δ₄). The result, an even left-headed foot, is a proper trochee. This account takes very seriously the cross-linguistic asymmetry expressed by the Iambic/Trochaic Law of Hayes (1995): Whereas even iambs are universally marked and usually not tolerated, even trochees are perfectly normal (see also Prince 1990 and Hung 1994). In languages containing genuine long vowels and productive lengthening rules, the most straightforward way to repair an even iamb is to lengthen the head vowel of the foot. MH, lacking such devices, appeals to the alternative strategy - flipping the headedness of the foot.

Finally, I would like to argue that a third characteristic of quantity-sensitive systems - the Minimal Word Condition of McCarthy and Prince (1986) - is found, although somewhat attenuated. In MH, Hayes (1995) notes that this condition, although widespread in iambic systems, is hardly universal; among the exceptions, that is, languages allowing monomoraic content words, are Araucanian, Dakota, Munsee/Unami and Ossetic. Steriade (1991) notes that in Mongolian CVC is not a legitimate heavy syllable for stress but is a legitimate minimal word.

My claim is that the Minimal Word Condition holds of the underlying forms of MH. In particular, all superficially CV content words are underlingly CVG, derived by guttural deletion, as illustrated in (7):

(7) a. ha? --- > ba ('came' 3SG.Masc.)
    b. kneh! --- > kne! ('kneel' IMP.SG Masc.)
    c. sa?l! --- > sal! ('drive' IMP.SG Masc.)

Apparent counterexamples of CV words are, in fact, either function words (e.g. ma 'what'), clitics (e.g. li '1SG.DAT'), or derived, not underlying (e.g., kəxül 'take! (IMP.SG Fem); səwul/ sīt! (IMP.pl.), where the final high vowel is an agreement marker, attached to the CVC bases kəx and səw, respectively, triggering a morphophonemic rule of vowel deletion in the stem).

Assuming that gutturals in MH are underlingly present (see footnote 5), the simplest hypothesis is that they are consistently so. Thus, although MH provides no phonetic evidence for underlying final gutturals (in Tiberian Hebrew, which had long vowels, the deletion of /h/ and /β/ word-finally triggered compensatory lengthening), it provides ample independent evidence that underlying gutturals exist and interact with other processes in the language. Moreover, certain vowel alternations in the verbal

paradigm are also governed by the specific nature of the preceding (root-final) guttural (e.g., *kafa‘i* → *kafati* ('I froze') vs. *kafah* → *kafiti* ('I imposed')). It seems plausible to conclude, then, that the lexicon of MH respects the CVC minimal word limit in general, even if phonetic impoverishment occasionally masks this property on the surface.

3 Modern Hebrew as a Dual-CVC Language

The preceding section argued for MH being an iambic system. The evidence for bimoraic feet in the surface forms of the language came from the behaviour of CVV syllables. It was shown in (5) that CVC syllables count as light for stress assignment. We now turn to evidence to the contrary, indicating that CVC is heavy for other processes. The theoretical resolution of this apparent paradox, in terms of cyclic moraification, will be developed in section 4.

3.1 Cliticization and Syncope

We begin by taking a close look at vowel deletion in accusative pronouns cliticized onto a preceding verb. MH does not express the strong/weak distinction between pronouns by means of a lexical distinction (as the French *lui* vs. *il*); rather, the same form is used in all contexts, stress and intonation serving to indicate the strength of the pronoun. The paradigm of the accusative pronouns is given in (8):

(8) **Accusative pronouns in MH**

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<tr>
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<th>Singular</th>
<th>Plural</th>
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<tbody>
<tr>
<td></td>
<td>Masc</td>
<td>Fem</td>
</tr>
<tr>
<td>1 Ps</td>
<td>otí</td>
<td></td>
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<tr>
<td>2 Ps</td>
<td>otáx</td>
<td>otáx</td>
</tr>
<tr>
<td>3 Ps</td>
<td>otó</td>
<td>otá</td>
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</table>

In its weak guise, the accusative pronoun behaves like a phonological clitic. That is, it forms a single prosodic unit with its host verb. I will refer to this process as Prosodic Fusion:

(9) **Prosodic Fusion:** \[\text{rw} \quad \text{V} \quad + \quad \text{rw} \quad \text{Clitic} \] \[\rightarrow \quad \text{rw} \quad \text{V} + \text{Clitic}\]

The phonetic expression of Prosodic Fusion is either partial destressing of the pronoun, yielding a secondary stress (10a); or, if syncope applies, total destressing, to avoid stress clash with the verb (10b):

(10) a. kibél + otó \[\rightarrow\] kibélōtō ‘accepted him’ 3Sg.Masc.
    b. kibél + otó \[\rightarrow\] kibélo
Importantly, while only (10a) is used in formal speech, both (10a) and (10b) are freely used in fast or casual speech circumstances. However even speakers keen on formal pronunciation are not likely to judge (10b) as ungrammatical - just "common", at most. Therefore, I take this state of affairs to be a case of true optionality in the language, mediated by formality of speech register, rather than a case of two incompatible dialects.

When is vowel deletion allowed in the clitic and when is it blocked? The following generalization\(^*\) captures the relevant facts:

\[(11)\] \(\sigma\rightarrow \emptyset / \ldots\sigma\ldots\) to is possible iff \(\sigma\) is heavy (bimoraic) and stressed.

The examples in (12) show that (11) holds of \(\sigma=CVV(C)\) and stressed:

\[(12)\]

\[\begin{align*}
& a. \quad \text{yodéa} + \text{otó} \rightarrow \text{yodéato} / \text{yodéato} & \text{‘know(s) it’ Sg.Masc} \\
& b. \quad \text{soméa} + \text{otó} \rightarrow \text{soméato} / \text{soméato} & \text{‘hear it’ Sg.Masc.} \\
& c. \quad \text{hisía} + \text{otó} \rightarrow \text{hisiaotó} / \text{hisiaotó}\text{\textsuperscript{10}} & \text{‘drove him’ 3Sg.Masc.} \\
& d. \quad \text{moréax} + \text{otó} \rightarrow \text{moréaxotó} / \text{moréaxotó} & \text{‘smear it’ Sg.Masc}
\end{align*}\]

The examples in (13) show that \(\sigma=CV\), whether stressed or not, does not trigger

\[(11):\]

\[(13)\]

\[\begin{align*}
& a. \quad \text{gamrá} + \text{otó} \rightarrow \text{gamráoto} / \text{\*gamráto} & \text{‘finished it’ 3Sg.Fem} \\
& b. \quad \text{kaná} + \text{otó} \rightarrow \text{kanóato} / \text{\*kanató} & \text{‘bought it’ 3Sg.} \\
& c. \quad \text{karáta} + \text{otó} \rightarrow \text{karátato} / \text{\*karátato} & \text{‘read it’ 2Sg.Masc} \\
& d. \quad \text{herámta} + \text{otó} \rightarrow \text{heramtaotó} / \text{\*heramtaotó} & \text{‘raised it’ 2Sg.Masc} \\
& e. \quad \text{mocé} + \text{otó} \rightarrow \text{mocéoto} / \text{\*mocéoto} & \text{‘find(s) it’ Sg.Masc} \\
& f. \quad \text{lavi} + \text{otó} \rightarrow \text{lavioto} / \text{\*lavioto} & \text{‘escort him!’ Imp.2Sg.Fem} \\
& g. \quad \text{tegadí} + \text{otó} \rightarrow \text{tegadiotto} / \text{\*tegadiotto} & \text{‘will grow it’ 2Sg.Fem}
\end{align*}\]

\(^*\) I am concentrating, for the moment, on vowel deletion: cases of coalescence, which are superficially similar, are discussed below. In what follows the 3Sg.Masc pronoun \(otó\) represents all other accusative pronouns, except the two forms \(otó\) (2Sg.Masc) and \(otxem/n\) (2pl.). The latter fail to reduce in the context of (11), for reasons taken up in section 6.

\(^{10}\) Some verbs with a final [ia] diphthong sound worse than others in context of syncope; compare (12c) with (i):

\[(i)\] \text{hiñtía} + \text{otó} \rightarrow \text{hiñtíaotó} / \text{?? hiñtíaoto} ‘surprised him’ 3Sg.Masc

A plausible account for these cases is that they involve glide-formation, so the verb in (i) should be really represented as [hiñtía], the latter ends with a light syllable, hence fails to satisfy (11). Since the syncopating speech-register often omits glides as well, it is hard to decide on this solely on the basis of audible phonetics.
h. šté + otó --> štėoto / *štěto  'drink it!' Imp.Sg.Masc

The examples in (14) show that just like CVV(C), (11) holds of σ=CVC and 
stressed:

(14) a. kibél + otó --> kibélotò / kibélo  'accepted him' 3Sg.Masc.
b. mafil + otó --> mafilotò / mafítò  'activate(s) it' Sg Masc.
c. tišmör + otó --> tišmórotò / tišmórtò  'will keep it' 3Sg.Fem
d. nikáx + otó --> nikáxtò / nikáxto  'will take him' 1pl.
e. yarúc + otó --> yarúcotò / yarúctò  'will run it' 3Sg.
f. tefarsém + otó --> tefarsémotò / tefarsémto  'will publish it' 3Sg.Fem
g. káx + otó --> káxtò / káxto  'take him!' Imp.2Sg.Masc

Finally, the examples in (15) show that σ=CVC and unstressed fails (11):\[1\]

(15) a. kibáletem + otó --> kibáltemotò / *kibáletmotò  'accepted it' 2pl.
b. hevétem + otú --> hevétemotò / *hevétemtò  'brought it' 2pl.
c. šártém + otó --> šártemotò / *šártémotò  'sang it' 2pl.
d. šomérret + otó --> šomérretotò / *šomérrettò  'keep(s) it' Sg.Fem
e. mekaléfet + otó --> mekaléfettò / *mekaléfettò  'peel(s) it' Sg.Fem

To sum up, contrary to the pattern in the stress domain, licensing of syncope 
in the accusative clitic groups CVC syllables with the heavy CVV(C) and not with 
the light CV. This constitutes the empirical basis of categorizing MH as a dual-CVC 
language.

Before we proceed to account for these conflicting patterns, two points deserve 
some comment. The first one concerns cases of (optional) vowel assimilation, where 
the final vowel of the verb merges with the initial vowel of the clitic. Such are the 
cases in (16), which should be contrasted with (13):

(16) a. gamrú + otó --> gamrúoto / gamnúto  'finished it' 3pl.
b. limcò + otó --> limcótò / limcótò  'to find him' Infinitive
c. šáru + otó --> šáruto / šárutò  'sang it' 3pl.

\[1\] Both the 2pl.Past (-tém) and the Sg.Fem Present (-et) suffixes are extrametrical, 
hence the penultimate stress in (15). The verbal paradigm of MH provides no parallel 
instances of verbs ending with an unstressed diphthong. Note that the reduced forms 
in (15d,e) cannot be ruled out by a ban on gemination as morphemic junctures in MII
 generally admit geminates (O.Bat-El, p.c.); e.g., kaláí + i --> kaláííi  ('I absorbed'). 

The Sg.Fem.Present form (and a few penultimately stressed infinitives) - but 
not the 2pl.Past forms - resort to deletion in the stem, thus the fast/casual speech 
counterpart of (15d) is [šoméríátò]. I return to this surprising asymmetry in section 6 
below, and derive it from general sonority considerations (see also Bolocky and 
Schwarzwald 1990).
d.  $k\nu + otō → k\nu\u0380 otō / k\nu otō$  ‘take him!’ Imp.2pl.

Where the verbs in (16) differ from those in (13) is that they all end with a rounded vowel, /ul/ or /ol/. Thus I take these cases to be surface phonetic assimilation of adjacent homorganic vowels, typical of fast speech, rather than an instance of genuine phonological deletion, as in (14); consequently, they are harmless for the generalization (11).12

The second point concerns the proper analysis of the examples in (12). Recall that all vowel sequences in MH are derived from guttural deletion. An alternative account to the weight-analysis, relying solely on the notion “closed syllable”, would exploit the fact that diphthongs as in (12a) are derived by deletion of a pharyngeal in the coda position, after the epenthetic /al/ is inserted; let us call this the “Triggering Guttural” analysis. There are, I believe, good reasons to suspect that the “Triggering Guttural” analysis is inadequate.

According to this analysis, the reduced form of (12a) would be derived as in (17a), on a par with any final-C verb (17b), the guttural serving to close the syllable at the relevant point in the derivation where $o$-deletion in the clitic is licensed:

(17) a.  yodēā’ + otō → yodēā’otō → yodēā’to → yodēato
      ‘know(s) it’ Sg.Masc.

b.  mošēx + otō → mošēxotō → mošēxtō
      ‘pull(s) it’ Sg.Masc.

However, notice that the derivation in (17a) assumes that a post-lexical syncope, conditioned by a verb-clitic conjunction, precedes a lexical deletion rule (of the pharyngeal); this counter-bleeding relation rests on a counter cyclic derivation. Perhaps one could get around this objection by positing a special, post-lexical $\mathcal{I}$-deletion rule, but then one would wrongly predict syncope to be allowed in (18) - where the same verb as in (17a) is used, only in the past tense:

(18)  yadē’ + otō → yadē’otō → yadē/to → *yadēto  ‘knew it’ 3Sg.Masc.

Here it seems that an underlying guttural fails to license syncope in the clitic - unexpectedly, if $\mathcal{I}$-deletion is post-lexical (the only grammatical form is yaddotō). The ad-hoc solution, positing two distinct rules of $\mathcal{I}$-deletion, one for (17a) and one for (18), applying in identical environments, is unmotivated on any other grounds.13

13 It is actually debatable whether the epenthetic /al/ is inserted to the left of the pharyngeal, keeping it as a coda, or to its right, making it an onset. In the text I assume the former. For paradigmatic reasons having to do with related cases, but it is
The contrast comes as no surprise under the present analysis, which assumes that gutturals are absent from the configurations governing post-lexical syncope. What distinguishes (17a) from (18) has nothing to do with abstractly represented closed syllables: rather, it has to do with overtly represented heavy syllables. Only (17a) contains a diphthong (in virtue of vowel-eapenthesi), hence it falls under (11); in contrast, (18), ending with a light syllable, resists syncope exactly like all the examples in (13) (cf. *kantò).

These considerations suggest that the weight condition on syncope is a genuine quantity-sensitive aspect of the syllabic system of MH rather than an artifact of a particular analysis. Attempts to state the descriptive generalizations with reference to the open/closed distinction alone fall short of covering all the relevant facts and run into serious conceptual complications. The weight distinction advanced in this study, in contrast, makes available a coherent statement of the facts as well as a unified treatment in terms of well-established properties of iambic systems in general.

4 Weight-by-Cycle: Post-Lexical Coda Morafication

The resolution I propose for the dual-CVC phenomenon in MH rests on a distinction between lexical and post-lexical syllabification. In general, I take syllabification to be cyclic, persistent and exhaustive. By “cyclic” I mean that resyllabification cannot overwrite earlier syllabification; it can only link stray material (Steriade 1982). By “persistent” I mean that whenever segmental processes disrupt syllabic structure, syllabification applies to re-link stray material; and by “exhaustive” I mean that this process is maximal, up to general prosodic constraints on syllabic well-formedness.

It is well-known that post-lexical configurations, one of which is verb-clitic conjunction, undergo resyllabification, if necessary. In particular, a vowel initial enclitic attracts an onset from a consonant-final stem, to avoid an onsetless syllable. The post-lexical resyllabification cycle, initiated by operations like that and like syncope, could in principle be different from the earlier, lexical cycle, in certain respects. The following is an explicit proposal as to how the two cycles differ in MH:

(19) Lexical Syllabification: All and only [-cons] segments are moraic.
Post-Lexical Syllabification: All segments are potentially moraic.

Worth mentioning that in those dialects of MH where pharyngeal articulation was preserved, the verb in (17a) is really pronounced yodéTa. If the verb indeed ends with an open syllable, the “Triggering Guttural” analysis faces an analogous problem, for it would have to assume that post-lexical α-deletion in the clitic precedes the lexical α-epenthesis in the verb, so as to access the closed syllable before it is rendered open.
In the terms of Zec's (1995) theory of sonority classes, we might say that the syllabic position in MH is occupied by [-cons] segments across the board, whereas the moraic position is occupied by no segments lexically and by all segments post-lexically. One might speculate that this particular asymmetry makes phonological sense. The "emergence of the unmarked", the less restricted pattern, is expected to characterize processes that are not encoded in the lexicon.

Notice that (19) immediately accounts for the fact that CVC syllables are treated as light by the word-level stress rule (e.g., in (5)). Lexical syllabification projects no moras from consonants, therefore CVC is monomoraic for lexical stress assignment. We now turn to the account of heavy CVC in the syncope cases.

At this stage it is necessary to be more explicit about the role and scope of the syncope rule. I will make two assumptions concerning that rule, one is universal, the other particular to MH:

\[(20)\]

a. Syncope is a prosodic rule: it upgrades lambs, otherwise blocked.

b. Syncope is register-sensitive: It is optional.

\[(20a)\] expresses the cross-linguistic observation that a great number of vowel-changing rules - reduction, deletion, epenthesis, shortening and lengthening - are prosodically driven (see, among others, Bozozy 1982, Myers 1987, Hayes 1989, McCarthy and Prince 1993, Hayes 1995, Piggott 1995, Lamontagne and Rosenthal 1996). Specifically, when no morphological requirements are involved, the phonological environment of vowel-changing rules frequently refers to prosodic units.

In the context of iambic systems, I take it that syncope is a means to enhance the quantitative contrast between the two positions of a foot. Thus, syncope proceeds upwards in the following scale, but not downwards: \((\sigma_u \sigma_m) < < (\sigma_m \sigma_u)\). We will shortly see that for MH at least, one can maintain the stronger condition that even a "neutral" syncope, that neither improves nor degrades the overall prosodic shape of a word, is excluded.

\[(20b)\] simply recapitulates the factual observation that the data surveyed in section 3.1 are all part of the fast/casual speech register of MH, although it is quite ordinary, there is no obligation to entertain that register.

The basic pattern to be derived is exemplified in (21):

\[(21)\]

\[\text{kibél + otó } \rightarrow \text{kibéto.}\]

\[\text{Hayes (1994:64) observes: "In various languages the phonological rules appear to have a conspirational effect in creating optimal foot structure, for example, by "repairing" feet that have been damaged by segmental rules, or by converting a foot from a suboptimum to optimum form. The latter phenomenon is found in iambic feet: Conversion of a } \sigma_u \sigma_m \text{ iamb to the canonical } \sigma_u \sigma_m \text{ shape optimizes it".}\]
b. kibátem + otó ---+ *kibátemtò.
c. ἄσμεα + otó ---+ ἄσμεατο.
d. kaná + otó ---+ *kanáto.
e. karáta + otó ---+ *karátatò.

(22) depicts the derivation of (21a,b):

(22) Derivation of (21a,b)

At stage (a), the lexical level, the stem and the clitic are still prosodically detached. Notice the extrametricality (marked as <σ>) of the agreement suffix -tem.
Stage (b) initiates the post-lexical level: Prosodic fusion applies, and the vowel-initial clitic seizes an onset (here, $m$ or $l$) from the stem’s right edge (I assume that onset-seizure overrides cyclicity). Syncope applies next (stage (c)), deleting of the clitic’s initial nucleus. The stray onset is relinked to its original syllable, and the no-longer peripheral, hence no-longer extrametrical syllable is submitted to foot construction.

Consider now the contrast between the two derivations. In $[kibëlo\tilde{t}o \rightarrow kibëlo]$, syncope is beneficial, as it upgrades the iamb of the stem: The “returning” /ll/, being re-linked post-lexically, projects a mora it did not project at the lexical level, due to (19). Syncope is thus licensed under (20a).

By contrast, the “returning” moraic /m/ in the derivation $[kibål\iota\iota\tilde{m}ot\rightarrow *kibål\iota\iota\iota\tilde{m}ot\tilde{b}]$ is detrimental: It creates a heavy syllable right next to the stem’s primary stress. As metrification is cyclic, the initial foot is unalterable. However, as indicated, all four possible parses of the remaining two syllables are problematic. Since metrification is exhaustive - up to impossible iambic - a sequence of two unparsed syllables is excluded (crucially, the stem’s final syllable is no longer extrametrical). They cannot be grouped together either, because $(\sigma_{m} \sigma_{n})$ is not a possible iamb; likewise the degenerate foot $(\sigma_{n})$. Finally, making a bimoraic foot from the heavy syllable alone creates a stress clash with the preceding stress. Any of the four possible outputs of syncope is worse than its input, therefore it is blocked.

A crucial ingredient in this account is the assumption that post-lexically syllabified codas are moraic. Without that assumption, we would not be able to ascribe any prosodic advantage to $kibëlo\tilde{t}o$ over $kibëlo(lud)$, since both would contain only even iambic. Thus syncope would be expected to fail here, contrary to fact.\footnote{As for the other derivant, it might seem that the assumption that the suffix -tem is rendered heavy post-lexically is redundant, since even if it were light, *(kibál)(temtô) would not metrically improve on (kibál)te(mntô), both containing only even iambic. The next section addresses this issue directly, demonstrating through additional contrasts that this assumption is, in fact, indispensable.} Notice also that throughout the derivation we stick to the strictest cyclicality conventions, disallowing any counter-cyclic operations on fully parsed material.

A word is in order concerning the nature of the syncope rule in (20a). Notice that the rule is constrained not only by its input (which must be already parsed) but also by its output (which must be prosodically improved). In that sense, it is an “output-oriented” rule. Derivational theories in phonology are often “accused” of appealing to “look-ahead” mechanisms, if the application of some rules is conditioned on the output of other, later rules in the derivation. This property severely undermines the concept of a derivation as a deterministic sequence of locally-constrained steps. I take it as a valid condition on derivational theories to banish any look-ahead mechanism from their execution.
However, I would like to argue that the output-oriented syncope rule (20a) does not fall under the category of look-ahead rules, hence the proposed analysis meets the required condition. Specifically, consider the processes that "intervene" between the syncope rule and the relevant output on which it depends. There are two of them: Resyllabification and metrification. We say that the application of syncope is constrained by the shape of the prosodic units these processes produce.

But are syllabification and metrification "rules" in any ordinary sense? Obviously, they lack a crucial feature of rules, namely, a definite structural description. Strings that are submitted to these processes have nothing in common except the trivial fact that they are all unparsed. Secondly, it is generally assumed that stray material cannot be "carried along" the derivation: if it is not immediately re-parsed, it must delete. Thirdly, these processes are persistent, they can re-apply over and over again. Importantly, ordinary rules normally lack all these properties. In general, then, it seems that prosodic linking - at either the syllable or the foot level - is best thought of as a structural reflex of phonological alterations rather than as a step in a sequential derivation. Alternatively, it is not even a "process" that applies to strings but rather a constantly present structural property of strings.

Seen in this light, deletion or epenthesis do not "end" as soon as some segment is removed from or inserted into a string, but rather after prosodic "rearrangement" takes place (if necessary). Whether this rearrangement is coincidental with the segmental alternation or immediately follows it is a "metaphysical" question of no real empirical significance. In the present context, what matters is that the foot-shape resulting from the syncope rule in derivations like (22) does not lie "ahead" of the rule but rather constitutes an indispensable aspect of its output. I take it, then, that this minimal form of a rule oriented to its own output, "ignorant" of later rules, is compatible with the ban on "look-ahead" derivations and raises no conceptual or computational difficulties of any particular sort.

To complete the analysis, consider the derivation of the three remaining cases, (21c-e):

\[(23)\]
\[
\begin{align*}
\text{a. } & \text{Sóméa + otó } \rightarrow (\text{Sô.méa})(\text{o.tó}) \rightarrow (\text{Sô.méa})\text{to} \\
\text{b. } & \text{kaná + otó } \rightarrow (\text{ká.ná})(\text{o.tó}) \rightarrow (\text{ká.ná})\text{to} \rightarrow *(\text{ká.ná})\text{to} \\
\text{c. } & \text{kará<ct> + otó } \rightarrow (\text{ká.rá})\text{ta}(\text{otó}) \rightarrow *(\text{ká.rá})(\text{ta.tó})
\end{align*}
\]

In (23a), syncope eliminates an even iamb by removing an onsetless syllable - possibly a double benefit (I assume that a tautosyllabic parse of three vowels is impossible - possibly a universal constraint; see Steriade 1991). In (23b), however, syncope would simplify a derived diphthong heading an optimal iamb, thereby downgrading it to an even iamb; hence, it is blocked. (23c) exemplifies a "neutral" syncope, exchanging an even iamb for another even iamb; under the strong interpretation of (20a), it is blocked as well.
A general conclusion one can draw from (23) is that a combination of any (non-diphthongal) V-final verb with any V-initial clitic will resist syncope: If the verb has final stress, as in (23b), then syncope downgrades the optimal lamb, and if it has penultimate stress, as in (23c), then syncope makes no prosodic difference. The behavior of other clitics seems to support that conclusion.\footnote{The impossibility of xašvul + alāv $\rightarrow$ *xašvulāv (‘thought about him’ 3Sg.Masc.), presently unexpected, will be addressed in section 6.}

(24) a. xašvul + alāv $\rightarrow$ xašvulālāv / *xašvulāv ‘thought about him’ 3pl.
b. halāxi + elāv $\rightarrow$ halāxīelāv / *halāxīlāv ‘went to him’ 1Sg.

To conclude this section, we have seen that the puzzling dual nature of CVC syllables in MH follows from the difference between the moraic sensitivity of lexical and post-lexical syllabifications. Furthermore, that difference alone, in conjunction with standard assumptions about the cyclicity of prosodic parsing (syllabic and metrical), and the rationale of syncope rules, accounts for the entire range of facts of stress assignment and clitic syncope discussed above. I now turn to additional evidence bearing directly on the issue of weight-by-cycle.

5 More Clitics

The derivations in (22) crucially rely on resyllabification of the stem’s coda at the post-lexical level. This in turn relies on the clitic being vowel-initial, thus attracting the preceding coda (before syncope), to provide itself with an onset. A natural prediction would be, then, that a C initial clitic would not trigger resyllabification, hence the stem’s final coda would remain non-moraic throughout the derivation (assuming that resyllabification is non-vacuous, namely, does not over-write existing linking without changing it). This prediction is indeed borne out.

In addition to pronominal clitics, there is a small class of adverbal clitics in MH. These are mostly “light” elements, monosyllabics, which undergo destressing when attached to the verb. Examples are kun ‘here’, po ‘here’, ñam ‘there’, od ‘even’, kvar ‘already’, rak ‘only’. One can verify they are clitics by inserting them between the verb and another item independently known to be a clitic: for example, the accusative pronoun. The result is perfectly acceptable, whereas non-clitic, non- emphatic elements can never break up a verb-clitic combination:

(25) a. kibālnu po atam kmo melāxim.
   welcomed (1pl.) here them like kings
   ‘we welcomed them here like kings’
b. * kibālnu hañxuña atam kmo melāxim.
   welcomed (1pl.) in-the-neighborhood them like kings
   ‘we welcomed them in the neighborhood like kings’
Consider now the following contrast:

(26)  
a. kibáltem + otó → kibáltemotó → *kibáltemtò  
b. kibáltem + pó → kibáltempò  

Speakers of MH find a robust contrast between the two examples. This is all the more striking since the surface forms kibáltempò and *kibáltemtò are nearly identical, and prima facie, as far as prosodic structure is concerned, should receive identical parses.  

The key to the contrast is indeed the ultimate moraic/non-moraic status of the stem's final coda, /m/. This is how the surface forms are derived:

(27)  
a. kibáltem + otó → (ki.bál)te(motò) → i. *(ki.bál)tem.tò  
    ii. *(ki.bál)(tem.tò)  
    iii. *(ki.bál)tem(tò)  
    iv. *(ki.bál)(tem)tò  
b. kibáltem + pó → (ki.bál)(tem pó)  

As we saw in (22) above, none of the possible metrical footings following syncope is acceptable in (27a). In particular, the second foot in (27a,ii) is illegitimate, precisely because the moraic (boldface) coda makes its trough heavier than its peak. By contrast, the nearly-identical second foot in (27b) is a legitimate even lamb, which improves on the degenerate foot of the isolated clitic; since the stem's final coda did not get to be resyllabified post-lexically (the clitic has its own onset), it remained non-moraic throughout the derivation.  

Notice that both cyclicity and post-lexical moraification play a crucial role in this account. If codas were not post-lexically moraified, (27a,ii) would be as good as (27b); and if syllabification did not respect the Strict Cycle, the latter would be as bad as the former.

The contrast in (27) is particularly enlightening in that it also demonstrates the empirical reality of the syllabic distinction closed/heavy in MH. The syllable [tem]ₙ is closed in the surface forms of both (27a) and (27b), yet it is heavy only in the former. This constitutes an additional, independent argument for the quantity-sensitivity of MH.

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17 The same holds for all the other C-initial clitics listed above.
18 The fact that the junctural cluster [mr] in (27a) is heterorganic and the cluster [mp] in (27b) is homorganic is irrelevant; as noted above, the contrast is reproducible with all of the adverbial clitics (e.g., kibáltemkan, kibáltemšam).
6 Syllabic Constraints on Syncope

Throughout the discussion it has been assumed that whenever conditions for elitic syncope are met, it may apply. However, there is evidence that (20a) is just a necessary, not a sufficient condition for syncope. When vowel deletion results in configurations that violate general constraints on the syllable shape in MH - it is blocked, even if iambic upgrading dictates otherwise. These offending configurations specifically concern consonant clusters.

As noted in footnote (4), the MH paradigm of accusative pronouns (8) contains two members, 2Sg. otstå and 2pl. otxém, which differ from the other pronouns in failing to reduce after heavy stressed syllables; compare (28a,b) with (28c,d), respectively:

(28) a. kibēl + otstå ——> kibēlotstå / *kibēltxa  ‘accepted you’ 3Sg.Masc.
b. yazmīn + otxém ——> yazmīnotxēm / *yazmīntxem
   ‘will invite you’ 3Sg.Masc
c. kibēl + otā ——> kibēlotā / kibēltā  ‘accepted her’ 3Sg.Fem

d. yazmīn + otām ——> yazmīnotām / yazmīntam
   ‘will invite them’ 3Sg.Masc

The obvious thing to note is that the unacceptable reduced forms in (28a,b), unlike the acceptable reduced forms in (28c,d), contain a triconsonantal cluster. Such clusters are generally forbidden in MH, and can only be found in loanwords. Notice that there is nothing inherently resistant to reduction in those two pronouns; after a homorganic round vowel, where reduction would not result in a CCC cluster, it is allowed:

(29) a. kiblū + otstå ——> kiblūotstå / kiblūtxa  ‘accepted you’ 3pl.Masc.
b. yazmīnu + otxém ——> yazmīnotxēm / yazmīntxēm
   ‘will invite you’ 3pl.Masc

Furthermore, it seems that the one case where a CCC cluster resulting from syncope is tolerated is when the first consonant is a sibilant - exactly the one such cluster that MH allows more freely in reduction (e.g., racīti šērxaven oti ——> racīti šērxaven oti ‘I wanted you to direct me’); compare (30) with (28a,b):

(30) a. margīz + otstå ——> margīzotstå / margīztxa  ‘annoys you’ 3Sg.Masc.
b. yegarēs + otxém ——> yegarēsotxēm / yegarēsrxēm
   ‘will expel you’ 3sg.Masc

It thus appears that the relevant constraint has to do with permissible triconsonantal clusters rather than with complexity of onsets (which is the same in (28a,b) and (30)). Syncope is not allowed to work against the particular phonotactics of the language.
A second boundary on vowel deletion concerns the contact between syllables. As noted in footnote (11) of examples like (15b) and (15d), repeated below, although vowel deletion in the clitic is excluded in both cases, vowel deletion in the stem’s suffix is only excluded in the former:

(31) a. hevé-tem + otó --- > hevétemotó / *hevétemto̱ / *hevétemmótó
‘brought it’ 2pl.
b. šomér-ct + otó --- > šomértotó / *šomértettó / šomértotó
‘keep(s) it’ Sg.Fem

Focusing on the contrast between *hevétemtó and šomértotó, notice that both introduce a cluster straddling a syllable contact that is not present in the non-reduced form - [tm] and [rt], respectively. Although such clusters are not generally excluded in MH, there is a clear difference between them in terms of their sonority slope: [tm] is a rising contact whereas [rt] is a falling one. I would like to key the contrast between the (31a) and (31b) to this difference.

In fact, there is compelling, independent evidence that constraints on syllabic contact are operative in MH. Bat-El (1995) shows that the order of the two components comprising a blend in MH is the one that yields a better syllabic contact in the sense of Vennemann (1988) and Clements (1990): In a syllable contact ...X.Y..., Y must be less sonorous than X, and the greater the slope in sonority the better (assuming the standard sonority scale: Vowels > Glides > Liquids > Nasals > Fricatives > Stops). Following is Bat-El’s formulation of the primary (optimality-theoretic) constraint on syllabic contact:

(32) σCONTACT
The onset of a syllable must not be of greater sonority than the last segment in the immediately preceding syllable.

Returning to (31), the contrast between the 2pl.Past suffix -tem and the Sg.Fem.Present suffix -et follows straightforwardly. To see this, consider the syllabic contacts before and after syncope:

(33) a. hevétemotó --- > b. *hevéémotó c. šomértotó --- > d. šomértotó
e.m t.m e.t r.t

Moving from a falling contact (a) to a rising contact (b), we violate (32), whereas moving from a steep falling slope (c) to a mild falling slope (d) we are still within the permissible range. More generally, deletion of the vowel in the 2pl.Past suffix -tem before a vowel-initial clitic will always result in a ...t.m... syllabic contact, violating CONTACT; in contrast, deletion of the vowel in the Sg.Fem.Present suffix -et before a vowel-initial clitic will always result in a non-rising syllabic contact, since the root's...
final consonant cannot be less sonorous than the suffixal [t]; hence, the latter will never violate CONTACT.

The same constraint seems to be involved in an example noted in footnote (16), repeated here with a contrasting case:

(34) a. \(\text{xašáv} + \ \text{aláv} \rightarrow (\text{xašá})\text{(valáv)} \rightarrow *\text{(xašá)v}l\text{áv}\)  
'thought about him' 3Sg.Masc.
b. \(\text{kibél} + \ \text{ótáx} \rightarrow (\text{kibé})\text{(otáx)} \rightarrow (\text{kibél})\text{tax}\)  
'accepted you' 3Sg.Masc.

Even though syncope triggers resyllabification of the preceding coda, thereby upgrading the stem's iamb, it also creates a syllabic contact of rising sonority in (34a) - hence, it is blocked. In (34b), where the syllabic contact remains falling, syncope can take place.

Notice that CONTACT is not an absolute constraint in MH (e.g., \(\text{et mol}\) 'yesterday', \(\text{mas.} \)\(\text{uit}\) 'path'); rather, it constrains the operation of certain processes whenever they turn a 'good' syllabic contact into a 'bad' one. This might suggest an optimality-theoretic analysis, where conflicting constraints compete on the form of a single output. I will not pursue such an analysis here, only note that it would also

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19 Additional evidence that syllabic contact constrains vowel deletion in MH comes from a class of recalcitrant cases dubbed "exceptions" by Boložky and Schwarzwald (1990). They note that MH \(\text{lel}\) originating from Biblical Hebrew (BH) \(\text{lel}\), rather than from \(\text{lel}\) or \(\text{lél}\), cannot be deleted (i) in canonical contexts of deletion (ii):

(i) a. \(\text{ha+serutím} \rightarrow *\text{hašrutím}\) 'the services'
b. \(\text{ha+serutím} \rightarrow *\text{hašručím}\) 'the excuses'
c. \(\text{hu+serutím} \rightarrow *\text{hašručim}\) 'the combinations'

(Boložky and Schwarzwald 1990:42)

(ii) a. \(\text{ha+metutím} \rightarrow \text{hamnutím}\) 'the moderate ones'
b. \(\text{ha+lexucim} \rightarrow \text{halxucim}\) 'the upright ones'
c. \(\text{ha+retuvím} \rightarrow \text{harxuvím}\) 'the wet ones'

Boložky and Schwarzwald speculate that speakers are aware of the BH tense source of the non-deleting \(\text{lel}\) in (i) as opposed to the lax source of the deleting \(\text{lel}\) in (ii) - or, alternatively, that \(\text{e}\) deletion in CeCuC-im is excluded just when the second C is \(\text{r}\).

But notice that none of these synchronically unmotivated assumptions is necessary, once we realize that deletion observes the syllabic contact constraint in (ii), where sonority is falling between the first two syllables, but not in (i), where it is rising. Similar conclusions apply to the failure of deletion in \(\text{ha+pesxamim} \rightarrow *\text{haxamim}\) ("the exal") and in \(\text{ha+gexalim} \rightarrow *\text{haxalim}\) ("the ember") (also mentioned by B&S) - with no further stipulations.
have to face the non-trivial challenge of reconstructing the derivational, cyclic account developed above for the entire range of facts associated with clitic syncope.

Discussion

The argument that MH is a dual-CVC language has proceeded in two stages: First, it was shown that MI's prosody is iambic in nature. Contrary to previous analyses, I have argued for quantity-sensitivity in the language, and have brought evidence from secondary stress assignment, stress retraction, minimal word effects and clitic syncope to bear on this issue. Second, it has been shown that one lexical process, namely stress-assignment, treats CVC syllables as light, whereas the postlexical process of syncope treats them as heavy. That difference has been reduced to a difference in the moraic sensitivity of syllabification applying at the two cycles. The Weight-by-Cycle hypothesis has been shown to yield a natural account for a range of phenomena involving vowel deletion in MI fast/casual speech register.

The proper analysis of dual-CVC languages is currently a moot issue. Roughly speaking, two approaches can be identified: Representational and derivational. Under the former approach, the moraic/non-moraic value of a coda consonant is fixed throughout the derivation - it is an unalterable feature of the representation of every syllable token. Under the latter approach, coda consonants can gain or lose moraic structure in the course of the derivation, so that dual-weight effects are reflected in the alterability of the syllabic representation itself.

On the representational side we find Hayes (1995), Rosenthal and van der Hulst (1996) and Steriade (1991). According to Hayes' (1995) theory of two-layer moraic structure, the distinction between heavy and light CVC is constant throughout the derivation. The observed phenomenological duality stems from different rules accessing different moraic layers. It is unclear what dual patterns, if any, are excluded under this proposal; however, note that MH provides a case where one rule - namely, foot construction - takes CVC to be light in some contexts (lexical) but heavy in others (post-lexical). Since Hayes' analysis is committed to a uniform structure, it must assume that foot-construction in MH is both quantity sensitive and quantity-insensitive. This conclusion would be at severe odds with Hayes' own universal typology of stress systems.

Rosenthal and van der Hulst (1996) derive the cases I labelled Weight-by-σ-Position through constraint interaction between the ban on moraic coda (DEP(μ)), the ban on non-moraic coda (NOCODA) and edge-alignment constraints, requiring or prohibiting the prosodic peak of the word to lodge on a CVC syllable. In this account, unlike in Hayes', CVC can sometimes show up as monomoraic and sometimes as bimoraic. However, since Rosenthal and van der Hulst are also committed to a representational theory, what their analysis cannot allow is CVC being weight-ambiguous in the same position in the word. This is precisely the status of the verbal
suffix in the minimal pair (26), resolved under the present account by a distinction between different stages where syllable weight is determined.

Steriade (1991) proposes that universally, codas are moraic (up to the syllabic weight-limit of bimoraicity), but stress-bearing elements are restricted to tone-bearing elements in any given language (a corollary of the fact that pitch is one of the realizations of accent). "Heavy" for stress would then mean "containing two stress-bearing elements", a characterization excluding CVC, even if it is bimoraic. In certain languages, Steriade's proposal is the only one I am aware of that attempts to explain the cross-linguistic observation that whenever a dual weight criterion is employed, the stress rule picks out the light CVC whereas other rules pick out the heavy CVC. However it is not clear to me how this proposal can be tested in languages lacking any pitch-accent system. Moreover, the case of MH would seem to suggest that whether or not a segment is a proper TBU may change during the derivation - in an unexplained correspondence with whether or not it is resyllabified.

Turning to a derivational approach, Crowhurst (1991) analyses the dual-CVC language Tubatulabal, where CVN (N= nasal) counts as heavy for reduplication and light for stress. Crowhurst proposes a rule of coda demoraification, applying after reduplication and before stress assignment, to resolve this paradox. Since there is independent evidence in the language that stress assignment applies after reduplication, this analysis makes sense of an otherwise quite peculiar pattern.

My present proposal, although dealing with mora-projection rather than mora-removal, rests on a similar logic. What I have attempted to show is that this derivational logic can be made both restitutive and systematic through the notion of the phonological cycle. I have speculated that the derivationally-late dissolution of the restriction against moraic consonants is an instance of "the emergence of the unmarked". If so, the Weight-by-Cycle effect in MH might represent a consistent cross-linguistic pattern, which is expected to show up in other dual-CVC languages as well.

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