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The representation of consonant length in Hebrew

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The Representation of Consonant Length in Hebrew

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Leben (1980) presents a stimulating contribution to the problem of segmental quantity cast in terms of a metrical theory of syllabification, which I will not summarize here. Justification for this theory comes from consonant quantity paradoxes—instances of apparently contradictory treatment of long consonants as single segments and as clusters—in Hausa and Biblical Hebrew.[1] In this squib, I will offer an alternative theory of quantity which, while incorporating many of Leben's insights, constitutes just one aspect of the broader prosodic theory of morphology of McCarthy (1979b; to appear). An analysis of the Biblical Hebrew data (hereafter, Tiberian Hebrew or TH) illustrates this proposal. A treatment of the Hausa facts under the same theory can be found in Halle and Vergnaud (1980; in preparation).

The basic properties of the prosodic theory as applied to the characteristic morphology of the Semitic languages are as follows. Verbal and nominal morphological categories stipulate prosodic templates, composed of the archisegments C and V, which give the canonical pattern of each form. Melodies on separate autosegmental tiers make up the consonantal roots and affixes and the vowel patterns that are typical of a language like TH. The regular universal autosegmental conventions for association of Clements and Ford (1979), augmented by a few language-particular rules, effect a mapping between consonantal melodies and C positions of the template and between vocalic melodies and V positions of the template. Under this theory, the representation of a TH form like *dibbēr* 'he said' will be roughly as given in (1):

(1)

The major problem in TH consonant quantity concerns the proper formulation of a rule regularly spirantizing oral stops

[1] Leben's (1980) Hebrew evidence is drawn from Sampson (1973) and Barkaï (1974).

postvocalically. This rule fails to apply to long consonants (**diβbēr, *diββēr*), an observation that could be expressed by requiring the target of Spirantization to be [−long] (Sampson (1973)) or by requiring it to have a nonbranching metrical representation (Leben (1980)). This rule is, however, somewhat more complicated than this. Spirantization must also be prevented from applying to the oral stops usually transcribed as *q* and *ṭ*: *lāqaḥ* 'he took', **lāXaḥ*; *nāṭaʕ* 'he planted', **nāθaʕ*. These segments are members of the class of emphatics, which are characterized phonetically by retracted tongue root and lack of oral release.[2] Prince (1975) insightfully suggests that the first member of a geminate stop cluster shares this lack of release with the emphatics. Since this appears to be a common characteristic of the articulation of geminates across languages, it is certainly not implausible to suggest this for TH.

Prince incorporates this observation into his formulation of the Spirantization rule. Under the analysis proposed here, the rule appears as shown in (2), making no reference at all to the quantity of the affected consonant:[3]

(2) *Spirantization*

$$\begin{bmatrix} -\text{son} \\ +\text{inst rel} \end{bmatrix} \rightarrow [+\text{cont}] \,/\, \underset{\text{V C}}{\underline{\quad\quad}}$$

However, this reformulation of Spirantization shifts the TH problem to one of assigning the feature value [−inst rel] to the first member of a geminate stop cluster. As in the representation of *dibbēr* in (1), under the prosodic morphological theory a geminate consonant appears formally as a CC sequence on the template which is associated with a single unit on an autosegmental tier. This permits us to formulate the process in (3):

(3) *Unrelease*

$$\begin{array}{c} 1 \\ \begin{bmatrix} -\text{son} \\ -\text{cont} \end{bmatrix} \\ \wedge \\ \text{C C} \\ 2\ 3 \end{array} \rightarrow [-\text{inst}\,\overset{1}{|}\,\text{rel}]\,\overset{1}{|}\,\underset{2}{|}\,\underset{3}{|}$$

[2] Evidence for this pronunciation includes Greek transcriptions, which use voiceless unaspirates for *q* and *ṭ*, and old descriptions of the cognate segments in Classical Arabic (Blanc (1978)).

[3] The formulation of Spirantization is also irrelevantly complicated by sporadic application after high glides (Malone (1976)) and regular application between words in certain syntactic contexts (McCarthy (1979b)). Other hypotheses on the failure of geminates to spirantize include the despirantization rule of Gutman (1970), the internally complex heavy segments of Malone (1978), and the Adjacency–Identity Condition of Guerssel (1977).

Other evidence from TH apparently supports a sequential representation of geminates. First, plural stems of certain noun types are formed by infixing *a* between the last two root consonants. Underlying /libb/ has the plural stem /libab/ by infixation of *a* into a geminate cluster. It is noted that infixation into geminates is not typical in TH, but it nevertheless seems to deserve some notice in the grammar.

In fact, the data are somewhat more complicated than this. A study of all the relevant examples shows that, of the approximately 118 nouns of the pattern CVC_iC_i attested in TH, only seven ever show plural stems with the infixed *a*. All of these involve some combination of the following mitigating factors: disyllabic singular doublets of the same noun, poetic usage only, unique attestation, irregular vocalism. The most telling evidence is the existence of singular doublets, so putative infixed /libaboot/ 'hearts' is actually the plural of /libab/, whereas /libbiim/ is the plural of /libb/. Other singular doublets may be unattested only by chance.[4]

In sum, the evidence is persuasive that *a* infixation is possible in CVCC nouns just in case the final two consonants are nonidentical. This regularity, which is similar to that described by Leben for Hausa, can be expressed under the prosodic theory as (4):

(4) *Plural Infixation*

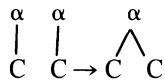
$$\phi \rightarrow \underset{\substack{| \\ a}}{V} \;/\; [CV\underset{\substack{|| \\ \alpha\beta}}{CC}] \;/\; \text{plural}$$

I should note that the nongeminate specification must be stipulated, as in (4), and not deduced from the theory; it is systematically violated in the Classical Arabic reflex of this noun type: *xaṭṭ* 'line', pl. *xuṭuuṭ*; *riqq* 'parchment', pl. *ruquuq*; *ẓill* 'shadow', pl. *ẓilaal*.

Second, heteromorphemic geminate clusters occur without spirantization, as in *kārattî* 'I cut' from /karat + tii/. Under the prosodic theory, application of Unrelease (3) in forms of this type will require the prior application of rule (5), which closely parallels Leben's (1980) rule (29):

[4] Specifically, the data on plural infixation in CVC_iC_i nouns are as follows. /harr/ 'mountain' and /ṣill/ 'shadow' have disyllabic plural stems frequently in poetry but rarely in prose. They also have disyllabic singular stem doublets, as does /libb/. /ḥuqq/ 'statute' has unpredictable vocalism in the initial syllable of the disyllabic plural stem. /ʕamm/ 'people' has probably borrowed the disyllabic plural stem which it shares with Biblical Aramaic. Furthermore, all of these forms also have regular monosyllabic plural stems attested frequently. Finally, /ḥiṣṣ/ 'arrow' and /tukk/ 'oppression' each occur only once with disyllabic plural stems, both times in poetry.

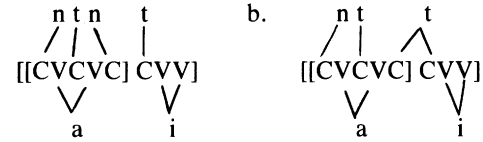
(5) *Conflation*



Conflation can be assumed to apply throughout the phonological derivation. Again, I note that (5) must be stipulated in the grammar of TH. It is argued in detail in McCarthy (1979b; to appear) that a Classical Arabic phonological rule of metathesis must be able to distinguish between heteromorphemic and tautomorphemic identical consonants.[5]

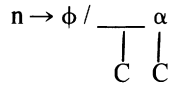
Third, geminate consonants can arise by inter- and intramorphemic assimilation rules (Barkaï (1974)). For example, related to *nāθan* 'he gave' are *yittēn* 'he gives' (from /ya + ntin/) and *nāθattî* 'I gave' (from /natan + tii/). In representations of the prosodic theory of morphology, this assimilation can be characterized as a process of deletion of a melodic element with reassociation of an adjacent element (cf. Goldsmith (1979) for similar proposals). So a representation like (6a) will be transformed to (6b):

(6) a. b.



This assimilation rule is formulated roughly as (7), although it is subject to additional nonphonological conditions:

(7) n-*Assimilation*



Following Clements and Ford (1979), I will claim that the melodic element α spreads to fill the vacant C position of the template because of a universal convention requiring spreading from the context of processes that leave an element unassociated.[6]

[5] It is provided universally in the prosodic morphological theory that tautomorphemic geminates will always be represented by single units on a melodic tier, as in (1). See the discussion of the revised Obligatory Contour Principle in McCarthy (1979b; to appear).

[6] These observations about heteromorphemic and assimilated geminates constitute counterevidence to Guerssel's (1977) claim that the Adjacency-Identity Condition can provide an account of the failure of TH geminates to spirantize. The condition stipulates that adjacent identical segments can be changed in adjacency if and only if they are also changed in identity. Adjacency here is sensitive to morpheme boundaries, so heteromorphemic geminates, as in /karat + tii/, should undergo

Fourth, a number of rules of vowel reduction and vowel lengthening, as well as distributional constraints on consonant clusters, must have access to a closed syllable/open syllable distinction that treats long consonants as geminate clusters. The solution to this under the prosodic theory is apparent. We may assume that rules of syllabification, formulated metrically as in McCarthy (1979a) and Kiparsky (1979), map metrical structure onto the prosodic template, an idea that is implicit in Clements and Keyser (1980). Detailed formulations of these rules of TH in terms of an elaborated theory of metrical structure can be found in McCarthy (1979b).

Fifth, one of the most interesting arguments for sequential representation of TH geminates comes from the morphological parallelism between roots with four consonants and roots with a geminated consonant. The evident defect in this argument has been the lack of any indication of how this parallelism is to be expressed formally in the grammar. But under the prosodic morphological theory, a verb form like *tirgēm* 'he translated' shares the same prosodic template type as *dibbēr*, and the difference between them lies ultimately in the fact that the latter has only three elements in its root melody to map onto four C positions of the prosodic template (McCarthy (1979b; to appear)).

In conclusion, what this brief analysis of TH quantity shows is that the representational apparatus of the prosodic theory of morphology, which is supported by a broad range of independent data, is able to give revealing expression to the same generalizations as a metrical theory of segmental quantity.

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spirantization of the first element. The Condition on Assimilation Rules of Guerssel (1978), which erases a morpheme boundary if assimilation takes place across it, does successfully account for the behavior of /natan + tii/, but since no assimilation rule applies even vacuously in /karat + tii/ and many similar forms, that problem remains.

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