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# Israeli Hebrew phonology

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## 1. Introduction

Whether or not it is appropriate to talk of the 'revival' (see Wexler 1990 and references to earlier discussions) of Hebrew as a verbal means of communication in Palestine (now Israel) about a century ago, the phonological inventory of Modern Hebrew as spoken in Israel today is significantly different from that of either Biblical Hebrew (henceforth BH) or Mishnaic Hebrew. Although 'Arabicized' Hebrew (see Blanc 1964 and elsewhere) maintains a few more phonemic distinctions than does Standard Israeli Hebrew (henceforth Modern Hebrew, MH) -- notably the preservation of pharyngeals, and for some groups the uvular stop and the dento-alveolar roll as well -- the former has been steadily losing ground to the latter. The 'compromise' between the Sephardi and Ashkenazi traditions of pronunciations of Hebrew that constitutes MH is a considerably-simpler inventory of phonemes:

**Israeli Hebrew Consonant inventory**:

| **Cons:** | **Bilabial** | **Labio-Dental** | **Dento-Alveolar** | **Palato-Alveolar** | **Palatal** | **Velar** | **Uvular** | **Glottal** |
|---|---|---|---|---|---|---|---|---|
| **Stop** | *p b* | | *t d* | | | *k g* | | *?* |
| **Fricative** | | *f v* | *s z* | *š (ž)* | | | *x* | *h* |
| **Affricate** | | | *c* | *(č) (j)* | | | | |
| **Nasal Stop** | *m* | | *n* | | | | | |
| **Liquid/Trill/ Approxim.** | | | *m* | | | | *r* | |
| **Glide/SemiV** | *(???w)* | | | | *y* | | | |

* The consonants in brackets occur only in borrowings.
* Phonologically, *r* is always an approximant. Phonetically, it is accompanied by frication in some environments, so it might also be regarded as a fricative; in other environments it is realized as a trill, and yet in other vowels as a rather weak approximant.
* It is doubtful whether *w* should be regarded an IH phoneme, since except for alternant pronunciation of *Washington* etc., it is found only in a few rare borrowings from Arabic, whereas words containing other borrowed phonemes are commonly used (*čéxi, čélo, číta, pijáma, bánjo, fríjider, jelatin, jóbnik, žáner, garaž, žurnal*).

Comparison with the BH suggests the following "mergers"/simplifications and other changes/correspondences:

(a) *t* and *ṭ* > *t*
(b) *k* and *q* > *k*
(c) *?* and `(and for some speakers *h* as well) > *?* or *ø* (optional realization as *?* is most likely as onglide to a heavily stressed vowel.)
(d) *h* > *ø* (optional realization as *h* is most likely as onglide to a heavily stressed vowel.)
(e) *s* and *ś*> *s*
(f) *ħ* and *x* as an allophone of /*k*/ > *x*
(g) *ṣ*> *c*
(h) denti-alveolar roll *r* > uvular *r*
(i) *w* and *v* as an allophone of /*b*/ > *v*
(j) MH no longer maintains gemination, except phonetically, across morpheme-boundary: *yašán+nu* 'we slept', *avát+ti* 'I worked' (~*avádeti*).
(k) The stop-fricative alternation of BH is maintained only for *p*, *b* and *k*, and even that part of the rule is rife with exceptions, making it is very opaque. Moreover, segments that

were historically geminate are not subject to spirantization, nor is historical /*q*/. *v* from BH *w* and *x* from BH *ħ* add to further surface opacity. None of the fricatives concerned is an allophone of the corresponding fricative.

**Vowels**: *i e a o u*

Changes from the BH Tiberian inventory:

(a) *e*, *ε* and $^{e}$ > *e* (phonetically *ε*) (b) *a* and *å* > *a*

It should be pointed out, that the gap between the phonemic system of MH and earlier phases of the language cannot be regarded as evidence for MH having lost its Semitic character; phonological, phonetic, or syntactic deviations from what is conceived of as a language-family norm quite commonly result from the inherent instability of these components of the grammar, and should not be interpreted as evidence for severed relationship with the common source.

### 1.1 Characterizing the phonetic-phonological-morphological continuum

The following discussion will present some essential features of MH phonology in a phonetic-phonological-morphological continuum of processes, which can be motivated by a number of criteria. The primary criterion is universal **phonetic-phonological naturalness**, which declines from one end of the continuum to the other. Another is the degree of **automaticity** of a process from a **phonetic/phonological** point of view. An automatic phonetic process applies whenever its structural description is met. The majority of phonetic and phonological rules, however, are restricted in one way or another to particular categories (mostly morphological), to segments of the lexicon, to individual items, etc., and have lexically-marked exceptions. It is also possible to view automaticity from a different angle: the degree to which a speaker is **aware** of the process having taken place. Normally, speakers are not conscious of the application of automatic phonetic rules, whereas the more morphologized a phonological process is, the more likely is the speaker to be aware of its existence -- although there is still the question of whether s/he is aware of an actual process, or merely of the relationship between two related morphological patterns, one of which is our assumed process "output." A fourth criterion, which characterizes the continuum only partially, is the extent to which a process is **optional**, or more accurately **variable**, depending on various sociolinguistic factors (age, gender, education, socio-economic status, speech style or tempo, etc.). Owing to limitations of space, only a few illustrations will be provided for each of the categories below. For additional survey-type data, see Bolozky (1978).

## 2. Natural, automatic phonetic processes

### 2.1 'Mechanical' secondary stress

In Modern Hebrew, as well as in Polish and in other languages, there exists almost-automatic alternation between stressed and unstressed syllables, where the main stress constitutes the base, and in most cases every other syllable before it receives secondary stress. Occasionally, **two** unstressed syllables are squeezed between two stressed ones. The existence of two consecutive unstressed syllables generally results from the non-realization of secondary stress when a penultimately stressed word is followed by a bisyllabic word with final stress, as in *dóar avír* 'air mail', or when the secondary stress -- or the lexical stress of grammatical words -- would have "clashed" (see Bolozky 1982) with the main stress of adjacent words, as in *xàmišá mìxtavím* 'five letters' > *xamišá mixtavím*, *ù kará lànu séfer* 'he read us a book' > *ù kará lanu séfer*. The main stress of most grammatical words is essentially equal to that of regular secondary stress, and is thus subject to destressing in the same way. It is also more flexible than the primary stress of regular lexical items. Unlike the BH situation, where stress retraction (*nåsog ?åħor*) occurred even in lexical items, as in Gen 1:5:

(1) *w$^{e}$laħóšεx qåŕå láylå > w$^{e}$laħóšεx qåŕå láylå*
and (to) the dark he called night

MH does allow adjacent main stresses across lexical items, as in *vèdarás kélev* below:

(2) *ù naág bemèirút mufrézet vèdarás kélev*
he drove in speed excessive and ran over a dog

In grammatical words, on the other hand, clash of the main stress with another main stress results in reconfiguration of the stress pattern in a manner that avoids such clash:

(3) *atà bá* 'are you coming?' > *àta bá*
you come
*ù kará lànu abáyta* 'he called us home' > *ù kará lanù abáyta*
he called to us home

Under relatively-rare conditions of very low contextual prominence (e.g. next to contrastive stress), the main stress of some lexical items is low, equivalent to that of secondary stress, and thus may undergo similar reconfiguration (see Kadmon 1983):

(4) *ù kará pérek xaméšesrè lo šéšesrè > ù kará perèk xaméšesrè lo šéšesrè*
he read chapter fifteen not sixteen

The opposition between stressed and unstressed syllables is a common phenomenon, and fixed repetition of this contrast in the form of rhythmic alternation is a natural phenomenon in the colloquial registers of a number of languages. Regular rhythmic alternation is frequently found in folk poetry, and is also characteristic of counting sequences or memorized numeral sequences. As shown in Bolozky and Haydar (1986), preference for the unsuffixed numeral set in colloquial Hebrew and for the suffixed one in the dialects of Arabic (e.g. Lebanese Arabic below) originates, at least in part, from numeral paradigms in trochaic rhythm as chanted and acquired for the first time by children:

(5) *(a)xát -- štáym šalóš arbá xaméš -- šéš -- šéva šmóne téša éser*
*wáħed tnéyn -- tléte ?árb`a xámse sítte sáb`a tméni tís`a `ášra*

Had the situation been reversed, the chanted sequences would not have flowed as naturally (a partial anapest in Hebrew, and staccato in Lebanese Arabic):

(6) *exád šnáim šloša arbaá xamišá šišá šivá šmoná tišá asará*
*...tlét ?árb` xáms sítt sáb` tmén tís` `ášr*

Alternating stress can also be observed in children's rhymes, e.g.

(7) *mìmromím pcacá yorédet...*
from the sky bomb comes down

and in rhythmic counting by children for 'random selection' purposes, as in

(8) *éven nyár umìsparáim...*
rock paper and scissors

(9) *én den díno sóf a lá katíno...* 'Random selection rhyme of unclear origin'

as well as in rhythmic chants of by groups at sports events and such (see Gil 1986):

(10) *él -- él -- ìsraél* 'sports chant to encourage Israeli team'
*àšofét abáyta* 'referee go home!'
the referee home

Mechanical secondary stress assignment is a natural process, then, applying automatically whenever its structural description is met, and speakers are certainly unaware of its having taken place. It is also variable, at least in that it "cancels out" when clashing with an adjacent primary stress.

**2.2 Voicing assimilation**

MH voicing assimilation of obstruents is anticipatory/regressive, which is the unmarked direction for this kind of assimilation (**progressive** assimilation is unmarked when stems determine the realization of the suffix. Unless marked otherwise, the main stress always falls on the final vowel):

(11)

| **No contact** | **Gloss** | **Frml. Alt.** | **Gloss** | **Informal Variant** |
|---|---|---|---|---|
| *sagar* | he closed | *yisgor* | he will close | *yizgor* |
| *pagaš* | he met | *pgiša* | meeting | *bgiša* |
| *zaken* | old, m.sg.. | *zkenim* | old, m.p. | *skenim* |
| *dakar* | he stabbed | *yidkor* | he will stab | *yitkor* |

As shown in Bolozky (1978, 1985), there appear to be two types of exceptions: normally, *v* does not cause voicing assimilation, and *x* does not undergo it:

(a) *kvar* 'already' *kviš* 'road' *tikva* 'hope'
*tvia* 'claim; drowning' *hitva* 'outlined'
(b) *exzir* 'returned (tr.)' *yixboš* 'will conquer' *hexdir* 'caused to penetrate'

It appears that *v* not causing voicing assimilation is due to substratum influence of Slavic languages such as Russian and Polish, where (owing to *v* originating from a historical glide *w*) the same phenomenon is observed (and furthermore, where at least intra-morphemically in Warsaw Polish, **progressive** assimilation occurs instead -- which may also surface in the speech of some Polish-born Israelis). *x* does not readily undergo voicing assimilation apparently because speakers might be reluctant to assimilate *x* into something that sounds too much like an *r* that should not be there (Hebrew does not have a truly corresponding voiced fricative counterpart *γ*: *r*, the nearest voiced segment, does not have enough friction to qualify as an obstruent.) In (very) casual speech, however, these exceptions tend to be eliminated; the more casual the register and more rapid the tempo, the greater the likelihood of the process having no exceptions:

(c) *gvar* 'already' *gviš* 'road' *tigva* 'hope'
*dvia* 'claim; drowning' *hidva* 'outlined'

(d) *eγzir* ‘returned (tr.)’ *yiγboš* ‘will conquer’ *eγdir* ‘caused to penetrate’

We are dealing, then, with a natural phonetic process (uniformity of voicing clearly facilitates production), working in the unmarked (anticipatory/regressive) direction, which applies automatically whenever the structural description is met, and exceptions tend to be eliminated in fast/casual speech. It is normally not a conscious process; speakers will deny, for instance, that they ever pronounce *yisgor* as *yizgor*, etc. It is also variable, relative to the degree of casualness and tempo involved. The more casual the register and the faster the tempo, the more likely the assimilation.

## 3. Natural phonological processes with some restrictions

### 3.1 Avoidance of identical or homorganic consonant sequences

MH does not maintain the gemination of BH, but geminates may be formed across morpheme boundary:

(12) *dan* ‘he discussed’ *dánnu* ‘we discussed’
*šavat* ‘he was on strike’ *šavátti* ‘I was on strike’
*tamim* ‘naïve’ *hittamem* ‘he feigned naïveté’

Within the stem, however, geminates are either broken with the minimal vowel *e* (the assumption that this *e* is epenthetic is based on pattern comparison):

(13) *zalelan* ‘glutton’ *xatetan* ‘meddler’ cf. *kamcam* ‘miser’
*noxexut* ‘presence’ *holelut* ‘folly, hilarity’ cf. *rokxut* ‘pharmacology’

or the elision of a vowel separating between identical consonants is blocked (although reduction to *e* still takes place), as in

(14) *xagag* ‘he celebrated’ ~ *xagega* ‘she celebrated’
cf. *katav* ‘he wrote’ ~ *katva* ‘she wrote’
*kucac* ‘it was cut’ ~ *kucecu* ‘they were cut’
cf. *šupac* ‘it was overhauled’ ~ *šupcu* ‘they were overhauled’
*itpalel* ‘he prayed’ ~ *itpalela* ‘she prayed’
cf. *itlabeš* ‘he got dressed’ ~ *itlabša* ‘she got dressed’

except for **very** casual/fast speech, in which elision may marginally occur, particularly when fricatives are involved (e.g. *em šàxexú* ‘they forgot’ > *èm šaxxú*). McCarthy (1986) regards the blocking of *e*-deletion in *xagega*, etc. as “antigemination”: syncope rules are prohibited from creating clusters of identical consonants. This is an immediate corollary of his Obligatory Contour Principle (OCP), which prohibits adjacent identical elements at the melodic level (either consonantal or vocalic, in an autosegmental analysis). The OCP does not apply to the across-morpheme-boundary cases, since different morphemes are represented on different tiers.

The *šavátti* type above often undergoes *e*-insertion, which breaks the surface geminate or a homorganic *d+t* sequence (just like in English *prodded*, *wanted* -- except that in English the process is obligatory):

(15) *šavátti* ‘I was on strike’ ~ *šaváteti* */avád+ti/* ‘I worked’ > *avátti* ~ *avádeti*

and needless to say, voicing assimilation and the splitting process will have to be mutually exclusive, to avoid **aváteti* (which can be achieved by Kiparsky's 1973 Elsewhere Condition, according to which the more specific rule applies before the more general one). Its not applying to *hittamem* suggests that the process is restricted to sequences involving an **inflectional** affix, and it is blocked in *dánnu* since **danenu* would have been interpreted as stemming from a geminate root *d.n.n* instead of the correct *d.w.n*.

The avoidance or splitting of identical or homorganic consonants is phonetically natural, but nevertheless restricted; speakers may or may not be aware of its having taken place.

### 3.2 The new imperative in colloquial Hebrew

In Bolozky (1979) it was argued that in colloquial Hebrew, commands are normally realized in future-tense form used imperatively. What appears to be partial colloquial resurrection of the normative formal imperative, as in *štok* 'shut up!', *lex* 'go!', etc., is in fact a future (BH imperfect) form whose prefix has been "chopped off":

| (16) | Fut/Imp. | Reduction 1 | Reduc. 2 | Gloss (m.sg.) |
|---|---|---|---|---|
| | *tešev* | *tšev ~ čev* | *šev* | sit down! |
| | *telamed* | *tlamed* | *lamed* | teach! |
| | *titlabeš* | | *tlabeš* | get dressed! |
| | *tizaer* | *tzaer > DZaer* | *zaer* | watch out! |

That this is **not** the normative imperative can be proven by the absence of the prefixal *h* required for the formal imperative in *hitpa`el* and *nif`al* (i.e. *hitlabeš* and *hiza(h)er*, respectively, would have been expected), as well as by the clearly-reduced new **suffixed** imperatives in *pa`al*, which are clearly distinct from their normative counterparts (illustrations are with the feminine suffux *+i#*; the same applies to the plural suffix *+u#*):

| (17) | Normatv. | Fut/Imp. | Reduction 1 | Reduc.2 | Gloss |
|---|---|---|---|---|---|
| | *sigri* | *tisgeri* | *tsgeri ~ cgeri ~ DZgeri* | *s/zgeri* | close! |
| | *pitxi* | *tiftexi* | | *ftexi* | open! |

This is a natural phenomenon; many languages allow imperative use of their future forms (see Ultan 1978). Shortening increases the stress and urgency of the command: in BH, the shorter jussive form was used for negative imperatives (*?al tešt* 'do not drink!', full form *tištɛ*) and for command or request in the third person (*y$^{e}$hi ?or* 'let there be light!'). Although the first person "command," the cohortative, actually involves lengthening (*?ɛšm$^{e}$ra* 'I will observe, let me observe' vs. imperfect *?ešmor*), it does not involve the urgengy of a shortened form, and the same can be said of other long-form imperatives (*qúma* 'arise' is less urgent than its variant *qum*). The process is also natural in that only deletion of the "minimal" vowels *e* and *i* is allowed; the *a* of *hif`il* (*tasbir* 'explain!') is never affected. It is not automatic, though; it is essentially restricted to the future-used-imperatively, and only occasionally expands to non-imperative future forms. Speakers are at least somewhat aware of its having taken place, as can be shown from occasional orthographic evidence. For a recent, most detailed description of MH imperatives and their substitutes, see Henkin (to appear).

## 4. Morphologically-constrained phonological processes that have no exceptions, but are not (or are no longer) phonetically motivated

### 4.1 Residues of Philippi's Law

Essentially, the general lowering of a stressed *i* or *e* in a closed syllable to *a* is now restricted to the verb system:

| | | |
|---|---|---|
| (18) | *diber* 'he spoke' | ~ *dibárti* 'I spoke' |
| | *isbir* 'he explained' | ~ *isbárnu* 'we explained' |
| | *itlabeš* 'he got dressed' | ~ *itlabášta* 'you got dressed' |

In the verb, however, it has no exceptions: *šévna* 'sit! (f.pl..)' etc. no longer exist in MH. It is not a variable rule, and speakers are aware of the alternation. For additional discussion, see Bolozky (1978).

### 4.2 *hitpa`el* Metathesis

In *hitpa`el*, and in related derived nominalizations (e.g. *istalkut* 'going away', cf. *istalek* 'went away'), a coronal sibilant metathesizes with the prefixal *t*:

| | **Underlying** | **Surface** | **Gloss** | **Underlying** | **Surface** | **Gloss** |
|---|---|---|---|---|---|---|
| (a) | */hit+labeš/* | *itlabeš* | got dressed | | | |
| (b) | */hit+saken/* | *istaken* | took risk | */hit+šameš/* | *ištameš* | used |
| | */hit+zaken/* | *izdaken* | became old | */hit+camek/* | *ictamek* | shrank |

When voicing assimilation is involved (see above), the two processes should apply simultaneously, to block **istaken* for 'he became old' (see Bolozky 1978). Ordering voicing assimilation before metathesis would have also worked, but one would not wish to order a phonetic process before a morphologically-restricted rule like this one.

Since this is an historical, established process, it might make more sense to ask not what the actual phonetic motivation for this rule is, but rather why it is not inverted or lost. One possible explanation is avoidance of single-unit affricate interpretation of a *t*-plus-sibilant, which would make the *hitpa`el* prefix opaque, causing the forms concerned to look like infinitives or imperatives of *nif`al* (e.g. */hit+saken/* > **hitsaken* > **hicaken*). It would also make the underlying root opaque. So the process can be explained on phonological-semantical grounds, and has no exceptions among *hitpa`el* forms, but can hardly be motivated phonetically: even *hif`il* forms with the same structural description, such as *hitsis* 'caused to ferment', *hitšiš* 'tired out (tr.)', do not undergo the rule, let alone other items (*/t+šuv+a/* 'answer' > *tšuva*, not **štuva*). It is strictly restricted to *hitpa`el*. It is not a variable process; determining speakers' awareness of its application would require testing.

## 5. Other morphologically-constrained phonological processes that are not (or are no longer) phonetically motivated

### 5.1 Pretonic and antepretonic *a/e*-deletion

In the verb, a non-high vowel is elided in a pretonic open syllable:

| | | |
|---|---|---|
| (19) | *katav* 'he wrote' | ~ *katva* 'she wrote' |
| | *(y)ikanes* 'he will enter' | ~ *(y)ikansu* 'they will enter' |
| | *diber* 'he spoke' | ~ *dibru* 'they spoke' |
| | *sudar* 'he/it was arranged' | ~ *sudra* 'she/it was arranged' |
| | *itlabeš* 'he got dressed' | ~ *itlabšu* 'they got dressed' |

Exception: the present/*present participle* of *pu`al* (*mesudarim* 'are (m.) arranged', not **mesudrim*). If a sequence of (any) three consonants or two identical ones (see above) would be formed in the process, they are broken/avoided by an intervening *e*:

(20) *tixtov* 'you (m.sg..) will write' ~ *tixtevi* 'you (f.sg..) will write'
*nixtav* 'it was written' ~ *nixtevu* 'they were written'
*uxtav* 'it was dictated' ~ *uxteva* 'she/it was dictated'

Two exceptions: the present/*present participle* of *nif`al* (*nixnasim* 'enter (m.pl.)', not **nixnesim*) and of *huf`al* (*mustarim* 'are (m.) hidden', not **musterim*).

This **could** have been a natural phonetic rule, since pretonic reduction and elision are (universally) expected. It is, however, restricted to the verb system, and even there one finds exceptions that are hard to account for. Reduction/elision does apply to one non-verbal pattern, as in

(21)

| **M.Sg.** | **F.Sg.** | **M.Pl.** | **F.Pl.** | **Gloss** |
|---|---|---|---|---|
| *tipeš* | *tipša* | *tipšim* | *tipšot* | fool(ish) |
| *xiver* | *xivéret* | *xivrim* | *xivrot* | pale |

and to a few other items, like

(22) *psanter* 'piano' ~ *psantran* 'pianist'
*totax* 'gun' ~ *totxan* 'gunner'
*mišpat* 'law' ~ *mišpetan* 'jurist'

but in most cases it is blocked because antepretonic *a*-deletion in non-verbal categories takes precedence:

(23)

| **M.Sg.** | **F.Sg.** | **M.Pl.** | **F.Pl.** | **GLOSS** |
|---|---|---|---|---|
| *šamen* | *šmena* | *šmenim* | *šmenot* | fat |
| *šafan* | *šfana* | *šfanim* | *šfanot* | rabbit |
| *davar* | | *dvarim* | | thing |

Antepretonic *a*-deletion is **also** heavily morphologized, and is certainly less motivated phonetically. Historically, reduction of either pretonic or antepretonic vowels appears to have applied to any unstressed non-high vowel in an open syllable, regardless of distance from the main stress, that was not affected by pretonal lengthening or other tensing processes. Thus, since the second *a* in */davar+im/* was lengthened, and the second one in */šafann+im/* was closed by gemination, reduction could only apply to the first *a*. In MH, though, with no lengthening and no gemination, there is no particular phonetic reason for deleting a vowel **two** syllables before the stress, and the restriction to *a* to the exclusion of *e* (*terucim* 'excuses' > **trucim*, *pexamim* 'coals' > **pxamim*, etc. -- see Bolozky and Schwarzwald 1990) makes it even less plausible as a phonetically-motivated process. Another point: if complete deletion cannot take place, at least *a* is reduced to *e* (*yašar* 'straight' ~ *yešarim* 'pl', *ša(?)ul* 'borrowed' ~ *šeulim* 'pl.'). But reduction does not apply with *a* that was preceded by a now-lost low consonant:

(24) *ašir* 'rich, m.sg.' ~ *aširim* 'rich, m.pl.', not **eširim*
*avud* 'lost, m.sg.' ~ *avuda* 'lost, f.sg.'

*arug* ‘killed, m.sg.’ ~ *arugim* ‘killed, m.pl.’

Historically, low consonants preferred a low vowel. Today, however, with no phonetic realization of such consonants, the blocking of reduction is hard to motivate. Furthermore, the loss of gemination in MH has also removed the motivation for blocking *a*-deletion in forms like:

| (25) | **Singular** | **Histor.** | **Plural** | **Histor.** | **Gloss** |
|---|---|---|---|---|---|
| | *nagar* | *naggar* | *nagarim* | *naggarim* | carpenter |
| | *patiš* | *paṭṭiš* | *patišim* | *paṭṭišim* | hammer |
| | *šapud* | *šappud* | *šapudim* | *šappudim* | skewer |

Historically, deletion was blocked because its application would have created an unpermissible three-consonant cluster, a geminate counting as two consonants. With MH degemination, *a*-deletion **should** have applied, had it been a phonetically-motivated process.

Both deletion/reduction processes, then, have lost their phonetic motivation -- *a*-deletion perhaps more so than *e*-deletion -- and are morphologically restricted. They also are not variable in MH (*yoševim* for *yošvim* ‘sit, m.pl.’, etc. may rarely be heard among former speakers of Judeo-Spanish -- a very marginal phenomenon). Since these are not phonetic processes, it is hard to tell whether speakers actually derive one form from the other by deleting a vowel (e.g. *katav* ‘he wrote’ ~ */katav+a/* ‘she wrote’ > *katva*), or simply make the connection between two related patterns -- e.g. *CaCaC* and a related *CaCC+a* feminine pattern. (Speakers are clearly aware of the relationships between patterns.)

**5.2 Assignment of main stress**

MH main stress is normally assigned to the final syllable, with a number of classes of exceptions that are sufficiently well defined for systematic treatment. One can first take care of these exceptions, and then let all the remaining forms, which constitute the majority, be assigned the unmarked final stress by the universal Elsewhere Condition.

In the verb system, the final vowel of the stem and main stress assignment appear to be mutually exclusive (see Bolozky 1978): a stem-final vowel that has not been affected by elision or reduction is assigned main stress. As noted above, pretonic deletion in the verb can hardly be regarded a phonetically-motivated process in MH. If so, one could let deletion or reduction of a non-high vowel at the end of the verb stem be triggered by a *+V#* or *+VC#* suffix irrespective of whether it is stressed or not, mark a few exceptions (*egena* ‘she protected’, *exela* ‘she began’), and subsequently assign primary stress to all remaining final stem vowels (excluding derived ones resulting from reduction):

| (26) | | | | |
|---|---|---|---|---|
| | *katávti* ‘I wrote’ | *káma* ‘she rose’ | *kanínu* ‘we bought’ | *macáti* ‘I found’ |
| | *yakúmu* ‘they will rise’ | *nišbárti* ‘I broke’ | *nimcénu* ‘we were found’ | |
| | *dibárta* ‘you spoke’ | *hitlabášti* ‘I got dressed’ | *isbíru* ‘they explained’ | |
| | *egéna* ‘she protected’ | *ekímu* ‘they established’ | *ipíla* ‘she dropped (tr.)’ | |

Present/*present participle* forms will have to be excluded, to block **mazkíra* ‘remind (f.sg.); secretary’, **mešubášim* ‘distorted (m.pl.), faulty’, **mušlámim* ‘completed (m.pl.), perfect’ -- which is, perhaps, one of the arguments for considering the *present participle* as part of the non-verbal system.

As for the non-verbal system, there are a few sporadic exceptions, such as *láma* ‘where’, *(?)éfo* ‘where’,

*(h)éna* ‘here’, but in most cases penultimate stress applies to reasonably well-defined groups. The main exception to final stress is the segolate class. Historically, this was hardly a problem, since stress assignment applied **before** the epenthesis of *g* to break an unpermitted final cluster, when the surface penultimate vowel was still the final vowel:

(27) */malk/ ‘king’ > málk > málɛk > mɛ'lɛk > mɛ'lɛx*

Assuming an underlying /malk/ was based on the existence of alternants in which this stem surfaces, e.g. *malka* ‘queen’. As pointed out in Bolozky (1978), however, in MH most segolates do **not** have CVCC alternants (if they do, they are confined to the literary register), e.g.

(28) *téred* ‘spinach’ *téfer* ‘seam’ *rótev* ‘sauce’ *gézer* ‘carrot’ *délek* ‘fuel’
*xóken* ‘enema’ *šéten* ‘urine’ *bóreg* ‘screw’ *dófek* ‘pulse’

which suggests that segolate stress be assigned by surface sequences, i.e. to the penult in *...CeCeC#* and *...CoCeC#* nouns that are not directly derived from verbs (to exclude verbs, e.g. *kotev* ‘write (m.sg.)’, *berex* ‘he blessed’ -- as well as verb-related agent nouns like *šoter* ‘policeman’). If that final *eC#* sequence is an *+et#* suffix, verbs are penultimately stressed as well (i.e. not only *miktéret* ‘pipe’, but also *kotévet* ‘write (f.sg.)’).

When consequences of formerly-low consonants are included, the list may also include *...Ca(x)aC#*:

(29) *ráaš* ‘noise’ *náxal* ‘river’ *mišmáat* ‘discipline’
*mikláxat* ‘shower’ *šomáat* ‘hear’ *šoláxat* ‘send (f.sg.)’

*CeCe#* (*péle* ‘miracle’, *déše* ‘lawn’), *CeCa(x)#* (*téva* ‘nature’, *kérax* ‘ice’), *Co(x)aC#* (*nóar* ‘youth’, *dóar* ‘mail’, *šóxad* ‘bribe’). Exceptions like *nahar* ‘river’, *naxaš* ‘snake’, *šena* ‘sleep’, *koxav* ‘star’, *ge?e* ‘proud’, *kehe* ‘dark’, which are a minority, will be marked as such.

Another group of words that is stressed penultimately involves a “furtive *patax*” -- an *a* inserted before historical word-final *h*, `and ¡ when those were preceded by a vowel-other-than-*a*:

(30) *gavóa* ‘tall (m.sg.)’, hist. *gavóah* *šoméa* ‘hear (m.sg.)’, hist. *šoméa`*
*potéax* ‘open (m.sg.)’, hist. *potéaħ*

If underlying low consonants are assumed, regular final stress applies before *a*-insertion:

(31) */gavoh/* ‘tall (m.sg.)’ > *gavóh* > *gavóah* > *gavóa*

but since the low consonant is not even realized, a more concrete approach would be preferable: stress a vowel other-than-*a* that is immediately followed by word-final *a* that is **not** suffixal (to block **mevi+a* for *mevia* ‘bring (f.sg.)’, **bí+a* for *bia* ‘coming’. Exceptions, like *kia* from *kiha* ‘he scolded’, would be rare), or by *ax#*.

Bolozky (1978) also discusses the influence of Yiddish stress, which in the colloquial shifts final stress to penultimate position in proper names,

(32) *yael* > *yáel* *menaxem* > *menáxem* *naftali* > *naftáli*

occasionally creating ‘minimal pairs’ of common and proper nouns,

(33) *rexovot* ‘streets’ vs. *rexóvot* ‘Rehovot’ *xaim* ‘life’ vs. xáim ‘Chaim’

or of Hebrew and related Yiddishized versions:

(34) *taxlit* ‘aim, purpose’ vs. *táxles* ‘business’
*meci(?)a* ‘finding, bargain’ vs. *mecíe* ‘bargain (only) -- usually ironic’

as well as the colloquial tendency to shift stress to the first syllable when the word concerned is used in the context of games:

(35) *klafim* ‘cards’ vs. *kláfim* ‘card game’
*bulim* ‘stamps’ vs. *búlim* ‘(collecting) stamps’
*rišon* ‘first’ vs. *ríšon* ‘first step in game’
*xamiši* ‘fifth’ vs. *xámiši* ‘fifth step in game’
*monopol* ‘monopoly’ vs. *mónopol* ‘Monopoly (game)’

This phenomenon seems to “spill over” to some common colloquial variants, where the alternative penultimate stress stays on the same syllable even after suffixation:

(36)

| **Sg/Formal** | **Non-Forml** | **Pl/Formal** | **Non-Forml** | **Gloss** |
|---|---|---|---|---|
| *tiras* | *tíras* | *tirasim* | *tírasim* | corn |
| *pilpel* | *pílpel* | *pilpelim* | *pílpelim* | pepper |

In borrowed non-verbs, stress normally (but not always) maintains the position it holds in the language of origin, and stays in a steady relationship to specific suffixes (see Bolozky 1978). The addition of native suffixes does not affect the position of stress in borrowed words. Some familiar native words demonstrate similar behavior in all non-formal registers, not only when the basic stress is penultimate, as in *tíras* ‘corn’ above, but when it is final as well (see Bat-El 1989):

(37)

| **Sg/Forml** | **Pl/Forml** | **Non-Forml** | **Gloss** |
|---|---|---|---|
| *marak* | *merakim* | *marákim* | soup |
| *sabon* | *sabonim* | *sabónim* | nerd |

Note, however, that in its basic meaning, the plural of *sabon* ‘soap,’ *sabonim*, has regular final stress.

It appears, then, that main word-stress can be reasonably well defined for a variety of penultimate (and some word-initial) environments, and once these are taken care of, final word stress applies elsewhere. As for speakers’ awareness of it -- one indication that they do is that they distinguish different meanings for minimal pairs that differ only in the location of their main stress.

**5.4 Residues of historical low consonants**

With the loss of low consonants or their mergers with other segments in MH, their role in the

phonological component requires reevaluation. In the case of *ħ*, for instance, the merger with *x* has indeed resulted in some degree of regularization, particularly in dispensing with the need for *a*-epenthesis to avoid a syllable-final *ħ*:

(38) *sixka* 'she played' (rarely *sixaka*) *maxku* 'they erased' (rarely *maxaku*)
*saxkan* 'actor' (*saxakan* only in very formal register)

but also in allowing variable regularization of the prefix, "returning" it to *i*, as in

(39) *exzik* 'he held' ~ *ixzik* (cf. *isbir* 'he decided') *exlit* 'he decided' ~ *ixlit*

and in variable choice of the stem-vowel in the future of *pa`al*, with an option for using the regular *o* alongside the "guttural"-related *a* when *x* from *ħ* is the **second** radical of the root:

(40) *yivxar* 'he will choose/elect' ~ *yivxor* *yivxan* 'he will examine' ~ *yivxon*

The "ex-guttural" impact is still strongly felt, however, in word-final position: choice of *a* rather than *o* in the future of *pa`al*,

(41) *yišlax* 'he will send' ~ **yišlóax* *yivrax* 'he will flee' ~ **yivróax*

and insertion of *a* if the preceding vowel is not *a*:

(42) */šalix/* 'messenger' > *šalíax* */samex/ 'happy'* > *saméax*

It is also maintained in the replacement of regular *...éxet#* by *...áxat#*:

(43) *šoláxat* 'send (f.sg.)' (cf. *kotévet*) *mefatáxat* 'develop (f.sg.) (cf. *medabéret*)

Since in most cases *x* that corresponds to the historical allophone of *k* can **also** occur in the same environments (except for the *yivxar* group), *x* from *ħ* still requires marking in some way to account for these consequences.

As shown in detail in Bolozky (1978), the ex-gutturals or their traces fulfill a role **even if not realized**: as occupiers of consonantal slots, to give speakers clues as to *miškal* (canonical morphological pattern) membership, as well as to account for deviation from regular *miškal* patterns, owing to processes which were historically natural, but are no longer transparent. There are essentially two ways of accounting for speakers' capability to relate deviant forms with formerly-low consonants to their regular *miškal*-base. One is to start from abstract representations based on regular *miškalim*, derive the forms concerned by means of morpho-phonological processes, then dispose of whatever is not realized phonetically. Assuming underlying low consonants would "motivate" the need to get rid of a low consonant at the syllable coda:

(44) */maca?/* 'he found' > *maca* */maca?+ti/* 'I found' > *macáti*
*/gavah/* 'he was tall' > *gava* (MH only) */šama`/* 'he heard' > *šama* (MH only)

or to add a vowel, which would shift them to syllabic onset position:

(45) */šo?el+im/* ‘ask (m.p)’ > *šo?l+im* > *šo?alim* > *šoalim*
(cf. */kotev+im/* ‘write (m.p)’ > *kotvim*)

and if a prefix is involved, it also echoes that vowel across it:

(46) */ti+`bod/* ‘you will work’ > *ta`abod* > *taavod* (cf. *ti+xtov* ‘you will write’)
*/hi+?min/* ‘he believed’ > *he?emin* > *eemin* (cf. *isbir* ‘he explained’)
*/mi+`rav/* ‘west’ > *ma`arav* > *maarav* (cf. *mi+zrax* ‘east’)

A low consonant is also not allowed with another consonant in the syllable onset:

(47) */`ašir+im/* ‘rich (m.p)’ > *`širim* > *`aširim* > *aširim* (cf. */zariz+im/* ‘nimble (m.p)’ > *zrizim*)
*/hlix+a/* ‘walking’ > *halixa* > *alixa* (cf. *ktiv+a* ‘writing’)
*/ka?uv+im/* ‘painful (m.p)’ > *k?uvim* > *ke?uvim* > *keuvim* (cf. */katuv+im/* ‘written (m.sg.)’ > *ktuvim*)
*/t+`uf+a/* ‘aviation’ > *te`ufa* > *teufa* (cf. *t+rum+a* ‘contribution’)

And a word-final low consonant other-than-a-glottal-stop can be used to account for the “furtive *patax*,” i.e. the insertion of *a* when historical final *h*, `and *ħ* (see above) are preceded by a vowel-other-than-*a*:

(48) */gavoh/* ‘tall (m.sg.)’ > *gavóah* > *gavóa* */yode`/* ‘know (m.sg.)’ > *yodéa`* > *yodéa*

This is an abstract approach, and in most cases is problematic in that it assumes underlying **low** consonants for which there is no sufficient synchronic motivation. Speakers can be argued to refer to consonantal positions where the “gutturals” used to be, but not to actual “gutturals.” A more realistic way of accounting for speakers’ capability to assign forms with former “gutturals” to prototypical *miškalim* is to assume that they form recognition strategies based on regularities observed in surface configurations, and that although they extrapolate from them the existence of consonantal slots, these discovery procedures have nothing to do with the feature ‘low’. Below are some initial formulations of possible slot-discovery procedures.

(i) Any syllable-initial vowel is an obvious indication of a lost “guttural” that used to function as its onset:

(49) *amar* ‘he said’ *oved* ‘he works’ *šual* ‘fox’ *meir* ‘give light (m.sg.)’
*yedia* ‘message’ *eaxzut* ‘settlement’

Exception: *a* preceded by a stressed vowel other-than-*a* and followed by a word-final *x* (e.g. *šalíax* ‘messenger’), where this *a* is epenthetic (i.e. does not constitute part of the *miškal*).

(ii) When the syllable-initial and immediately-preceding syllable-final vowels are identical, the ex-guttural may be signalled by a long vowel in casual speech:

(50) *ta+avod* ‘you (m.sg.) will work’ > *ta:vod* *e+evod* ‘I will work’ > *e:vod*
*revi+i* ‘fourth’ > *revi:* *šiamum* ‘boredom’ > *šiimum* > *ši:mum*

In **very** casual or fast speech, shortening (e.g. to *tavod*, *šimum*) is **also** possible, but is generally

considered substandard; alternatively, it may be argued that a **trace** of length is **always** there, regardless of register. When the two adjacent vowels are identical and the first is prefixal, the second is epenthetic, while the first, which constitutes a component of the *miškal*, is underlyingly */i/* if it surfaces as *a* or *e* (*taavod, eevid*), and */u/* if it surfaces as o (*o+osak* 'he was employed').

(iii) A word-final vowel (*a* or *e*, but theoretically it could be any) that is preceded by a **stressed** vowel in the preceding syllable signals a **following** (syllable-final) low consonant that has been lost (*téva* 'nature', *pére* 'wild one, wildly').

(iv) When a word-final *a* that is **not** suffixal is immediately preceded by a stressed vowel other-than-*a*, it signals a following (syllable-final) lost guttural, while the *a* itself is epenthetic (i.e. does not constitute part of the *miškal*):

(51) *yadúa* 'known (m.sg.)' *gavóa* 'tall (m.sg.)' vs. *heví+a* 'she brought'
*higía* 'he arrived' vs. *higí+a* 'she arrived'

So the historically-low consonants are no longer low, and essentially function as occupiers of consonantal slots in order to account for *miškal* membership and deviations from *miškalim* that are fairly systematic but cannot be motivated independently on phonetic grounds. Normally, these deviations are not variable, with the notable exception of some processes related to *x* from historical *ħ*. Speakers are probably aware of the existence of these "empty" slots.

**5.5 Stop spirantization**

As noted above, the post-vocalic spirantization of BH stops is restricted in MH to *p*, *b* and *k*, and even that part of the rule is very opaque, owing to numerous exceptions and constant flux. Opacity is further increased by degemination, since degeminated segments continue to block spirantization as if they were still geminated, and so does *k* from historical *q*. *v* from BH *w* and *x* from BH *ħ* add to further surface opacity. Residual spirantization has received considerable attention in the literature -- see, for instance, Ben-Horin and Bolozky (1972), Barkai (1978), Bolozky (1980), Schwarzwald (1981) -- most of which seems to suggest that it perhaps should no longer be regarded as a significant generaliztion. At best, one could point to tendencies for the rule to operate in a number of sub-environments, like word-finally (which is, essentially, the only environment in which the rule is rarely contradicted, and even **this** holds true only for the **native** lexicon):

(52) *kaf* 'spoon' ~ *kapot* 'spoons' *dov* 'bear ~ *dubim* 'bears'
*rax* 'soft (m.sg.)' ~ *raka* 'soft (f.sg.)

or after a prefix ending in a vowel:

(53) *katav* 'he wrote' ~ *yi+xtov* 'he will write'
*pitéax* 'he developed' ~ *me+fatéax* 'develop (m.sg.)'
*badak* 'he examined' ~ *ni+vdak* 'he was examined'
*mi+xtav* 'letter' *mi+vxan* 'test' *ma+ftéax* 'key'

or one could simply list stop-spirant alternations as associated with particular paradigms (within the verb and elsewhere), as in Schwarzwald (1981) -- and then try to account for the numerous deviations by additional principles. In Ben-Horin and Bolozky (1972), for instance, it was pointed out that there is

some correlation between the degree of opacity and its impact on either input or output of spirantization -- and the degree and nature of deviation from expected norms. Thus, one would expect more violation of historical *k~x* alternations because of opacity in both input (historical *q*) and output (historical *ħ*), with violations going both ways, whereas in the case of *b~v* increased opacity is only in the output (historical *w*), which consequently causes more output deviations (i.e. "overapplication" on the surface), and the same applies to *p~f*, owing to numerous borrowings with *f* in positions other than post-vocalic. But there are too many exceptions to this generalization -- some of them due to even greater opacity since 1972... Barkai (1978) proposes that inapplication or overapplication be accounted for by avoidance of ambiguity -- which again works only in some of the cases. It appears that the only way of accounting for the various numerous deviations is, as suggested in Bolozky (1980) and in Schwarzwald (1981), to attribute them to analogical leveling, directed towards already-existing opacity (which acts as a trigger, signaling that "it **can** be done"), or towards the unmarked form, or (less frequently) towards the realization that minimizes opacity. Furthermore, with some notable exceptions, the tendency for analogical leveling decreases with the decrease in derivational bond: it is stronger within inflections, but weakens with the increase in distance between an inflectional form and a related derivational one that is not automatically predictable (see Bolozky 1980). Below are a few illustrations, from Bolozky (1980).

At the end of the word (in native words) one always finds a spirant. Analogical leveling is not common; when occurring, however, the formal alternant is rarely used. Analogy is with the unmarked form with a spirant:

| (54) | **Form** | **Gloss** | **Alter.** | **Gloss** | **Col. Var.** |
|---|---|---|---|---|---|
| | *ratov/uv* | wet m.sg. | *retuba* | f.sg. | *retuva* |
| | *metofef* | drummer | *tipuf* | drumming | *tifuf* |
| | *musax* | garage | *musakim* | pl. | *musaxim* |

In the beginning of the stem (particularly in *pi`el*), the *k~x* variation undergoes analogy in the direction of both stop and spirant -- probably owing to the above-mentioned opacity with both output **and** input (*k* from BH *q* and *x* from BH *ħ*); in *b~v* and *p~f* variations analogy is usually with the spirant -- because of opacity with the output (*v* from BH *w*, and *f* because of opacity caused by numerous borrowed verbs with initial *f* -- *fibrek* 'fabricated', *flirtet* 'flirted', *filéax* 'pilfered', *fisfes* 'missed', etc.). When the derivation is automatic, as in the case of derived nominalizations (gerunds), analogical leveling with the verb is almost as likely to occur as within a particular verb-paradigm:

| (55) | **He Past** | **He Future** | **Imper.** | **Gerund** | **Gloss** |
|---|---|---|---|---|---|
| | *kiven* | *yexaven* | *kaven* | *kivun* | aim |
| col. | *xiven* | *yexaven* | *xaven* | *xivun* | |
| or | *kiven* | *yekaven* | *kaven* | *kivun* | |
| | *bikeš* | *yevakeš* | *bakeš* | *bikuš* | ask |
| col. | *vikeš* | *yevakeš* | *vakeš* | *vikuš* | |
| or | *bikeš* | **yebakeš* | *bakeš* | *bikuš* | |
| | *pitéax* | *yefatéax* | *patéax* | *pitúax* | develop |
| col. | *fitéax* | *yefatéax* | *fatéax* | *fitúax* | |
| or | *pitéax* | **yepatéax* | *patéax* | *pitúax* | |

Exception: in the case of quadriliterals, *b~v* pairs are subject to opacity (and consequently to analogy) with the stop only, owing to the tendency to keep reduplicated syllables identical:

| (56) | **He Past** | **He Future** | **Imper.** | **Gerund** | **Gloss** |
|---|---|---|---|---|---|
| | *Bilbel* | *yevalbel* | *balbel* | *bilbul* | confuse |
| col. | *bilbel* | *yebalbel* | *balbel* | *bilbul* | |
| | **vilvel* | **yevalvel* | **valvel* | **vilvul* | |

Across *binyanim* (verb patterns) analogy is likely if the relationship is reasonably-automatic, as in active-passive pairs:

| (57) | **Pa`al Past** | **Gloss** | **Nif`al Pst** | **Gloss** | **Substandard Variant** |
|---|---|---|---|---|---|
| | *katav* | write | *nixtav* | be written | *niktav* |
| | *kavaš* | conquer | *nixbaš* | be conquered | *nikbaš/nikvaš* |

but not when the derivation is more specialized and less automatic, as in a causality relationship:

| (58) | **Pa`al Past** | **Gloss** | **hif`il Pst** | **Gloss** | **Potential Variant** |
|---|---|---|---|---|---|
| | *katav* | write | *hixtiv* | dictate | **hiktiv* |
| | *kašal* | fail (i) | *hixšil* | fail (tr.) | **hikšil* |

In non-automatic derivation, analogical leveling is highly unlikely:

| (59) | **Pa`al Past** | **Gloss** | **Derived Noun** | **Gloss** | **Potential Analogy** |
|---|---|---|---|---|---|
| | *katav* | wrote | *mixtav* | letter | **miktav* |
| | *patax* | opened | *maftéax* | key | **maptéax* |
| | *balat* | projected | *tavlit* | relief | **tablit* |

When the alternation affects the second radical of the root, analogical leveling with the stop is not that common: in *pa`al* it only tends to occur in the imperative, probably because of the new imperative being derived from the future-used-imperatively (see above):

| (60) | **Forml Imp.** | **Gloss** | **Future** | **Colloq. Imper.** |
|---|---|---|---|---|
| | *šxav* | lie down! | *Tiškav* | *škav* |
| | *švor* | break! | *Tišbor* | *šbor* |
| | *šfox* | spill! | *Tišpox* | *špox* |

and in the future of *nif`al* in analogy with the past form:

| (61) | **Nif`al Pst** | **Gloss** | **Future** | **Colloq.** |
|---|---|---|---|---|
| | *niškax* | be forgotten | *yišaxax* | *yišakax* |
| | *nišbar* | be broken | *yišaver* | *yišaber* |
| | *nišpax* | be spilled | *yišafex* | *yišapex* |

More commonly, however, analogical leveling in this position is with the fricative found in the base past-tense form of *pa`al*:

| (62) | **Past** | **Future** | **Colloq.** | **Gloss** |
|---|---|---|---|---|
| | *raxav* | *yirkav* | *yirxav* | ride |

| | | | |
|---|---|---|---|
| *šavat* | *yišbot* | *yišvot* | strike |
| *tafar* | *yitpor* | *yitfor* | sew |

In the case of *p~f*, the colloquial variant with *f* almost totally replaces the one with the stop in some cases, and variants with *v* are more frequent than ones with *x*. Possible explanation: in this environment, *f* may only be derived from *p*, and occurrences in this position of *v* from historical *w* are rare, whereas *x* from historical *¡* is fairly frequent, i.e. inapplication of analogy prevents (potential) additional ambiguity. Clearly, however, the avoidance-of-ambiguity explanation can only account for **some** cases. As in stem-initial position, if the derivational relationship is not automatic, there is (normally) no analogy:

| (63) | **Pa`al Past** | **Gloss** | **Derived Noun** | **Gloss** | **Potential Analogy** |
|---|---|---|---|---|---|
| | *zaxar* | remember | *mazkir* | secretary | **mazxir* |
| | *šavar* | break | *mašber* | crisis | **mašver* |
| | *šafax* | pour | *mašpex* | watering can | **mašfex* |

On the whole it seems, then, that analogy is affected by the frequency of "surface violations" to start with, owing to historical segment mergers, borrowings, etc.; that analogies with *f* and *v* are commoner because less potential ambiguity will result; and that the less inflectional and less automatic the derivation, the lesser the likelihood of paradigmatic leveling. Spirantization is no longer a phonetically-motivated process, and its application is severely restricted and certainly is not automatic. With the analogy factor, though, it has become fairly variable. Speakers are aware of the stop-fricative relationship.

## 6. Processes that use phonological information, but have always been morphological

### 6.1 Formation of segolate plurals

Segolate plural formation, as in

| (64) | **Sing.** | **Plural** | **Gloss** | **Sing.** | **Plural** | **Gloss** |
|---|---|---|---|---|---|---|
| | *mélex* | *mlaxim* | king | *kéves* | *kvasim* | sheep |
| | *kélev* | *klavim* | dog | *bóker* | *bkarim* | morning |
| | *séfer* | *sfarim* | book | *kótel* | *ktalim* | wall |

is often described as a phonological process, from the historical segolate base, as in

(65) */malk+im/* 'king' > *malakim* (by *a*-insertion) > *mlakim* (by ante-penultimate *a*-deletion) > *mlaxim*

As noted above, the phonetic motivation for ante-pretonic *a*-deletion in MH is weak, and this *ad hoc a*-insertion cannot be motivated at all. Segolate plural formation, though defined in phonological terms, is a truly morphological rule, paralleling broken plural formation in Arabic. Speakers simply know that the plural of masculine segolates is *CCaC+im*. This is a large, prominent class, and its deviant plural pattern is reinforced by numerous members, i.e. is not likely to disappear or to be leveled.

The situation is different in segolate **feminine** nouns. Alongside commonly-heard normative plurals like

| (66) | **Sing.** | **Plural** | **Gloss** | **Sing.** | **Plural** | **Gloss** |
|---|---|---|---|---|---|---|
| | *giv(?)a* | *gva(?)ot* | hill | *dim(?)a* | *dma(?)ot* | tear |
| | *yalda* | *yeladot* | girl | *ricpa* | *recafot* | floor |

| | | | | | |
|---|---|---|---|---|---|
| *simla* | *smalot* | dress | *šimša* | *šmašot* | pane |

one also finds non-normative forms based on the singular:

(67)

| **Sing.** | **Normative Pl.** | **Colloq.** | **Gloss** |
|---|---|---|---|
| *darga* | *dragot* | *dargot* | rank |
| *kalba* | *klavot* | *kalbot* | bitch |
| *mišxa* | *mešaxot* | *mišxot* | ointment |
| *malka* | *mlaxot* | *malkot* | queen |

It appears that speakers are not aware of the "segolate origin" of these feminine nouns, which look no different from any other feminine noun with a stressed feminine suffix. They simply know that **some** nouns with *+a#* ending take the plural form *CCaC+ot*. It is also doubtful that speakers are aware of the non-segolate status of similar forms in which the initial *#CV+* sequence is a prefix (usually *#mi+/#ma+* or *#ti+/#ta+*), which accounts for their **not** being realized as *CCaC+ot*:

(68)

| **Sing.** | **Plural** | **Gloss** | **Sing.** | **Plural** | **Gloss** |
|---|---|---|---|---|---|
| *micva* | *micvot* | commandment | *mar?a* | *mar?ot* | mirror |
| *taxana* | *taxanot* | station | *tikva* | *tikvot* | hope |
| *tikra* | *tikrot* | ceiling | *misra* | *misrot* | position |

They simply add *+ot#* to the base, just as they do in */kalba+ot/ 'bitches'* > *kalbot*.

The formation of segolate plurals, then, has always been morphological, and has nothing to do with phonetic naturalness. Speakers are clearly aware of the relationships between the singular and plural patterns. If any variability is involved, it is restricted to some feminine plural segolates, which tend to be regularized in the colloquial register.

**7. Conclusion**

The phonetic-phonological-morphological continuum does not always work, but on the whole it provides a reasonably-coherent picture of MH phonology, showing it to contain the whole gamut of processes and rules found in any other living language -- even though it was "revived" as a living spoken medium after almost two millennia. They range from purely-phonetic, automatic, variable processes, of which speakers are unaware, through phonological ones that are partially motivated phonetically and somewhat restricted morphologically, through rules that lost all phonetic motivation, have been morphologized and have become quite opaque, to morphological rules that use phonological information, but have always been morphological. With some notable exceptions, the continuum is also characterized by decreased variability and increased speaker awareness.

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