On vowel assimilation and deletion in casual Modern Hebrew

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ON VOWEL ASSIMILATION AND DELETION IN CASUAL MODERN HEBREW

by

SHMUEL BOLOZKY
and
ORA (RODRIGUE) SCHWARZWALD

1. Introduction

A simple procedure for measuring casualness of speech is to compute the degree of low level phonetic reduction and assimilation in a given speech style—see, for instance, Shockey (1974), Semiloff (1973, 1975), Dressler (1975), Zwicky (1972), Bolozky (1977, 1982). We accept Dressler’s (1975) claim that such casual speech phenomena are essentially a function of decreased attention, which results in unstressed syllabic nuclei not fully achieving their target, i.e., becoming laxed, reduced, assimilated, etc. With the increased (relative) attention paid in casual speech to syllables with primary stress in lexical items central to the utterance, the low prominence of other syllables makes them likely candidates for reduction. Rate of speech and casual style are separate parameters that may exist independently of each other (see Shockey, 1974, and Semiloff, 1975); with heightened attention, for instance (as in the case of a paper delivered under severe time restrictions), it is possible to increase one’s rate of speech without failing to achieve vocalic targets. Nevertheless, a significant correlation can be observed between rate of speech and degree of casualness as manifest in degree of phonetic reduction (see Bolozky 1977, 1982). The role of increased rate of speech in reduction and assimilation may also be related to decreased attention to syllables of low prominence: Since the attention focused on stressed syllables maintains their relatively long duration, speeding up the general rate of speech in the casual register will primarily be achieved by reduction of the low troughs of prominence. In this paper we are dealing with reduction and assimilation associated with the casual register, bearing in mind that it may be correlated with increased rate of speech, but not necessarily.
In Modern Hebrew (henceforth MH), when there are two or more syllables of low prominence in a sequence, the least prominent would often be elided. The most likely vowels to be affected by casual reduction/deletion are 'minimal' derived vowels (typically e and to a lesser extent i and a), and of those, the first ones to undergo laxing and reduction are the frequent ones. 'Derived' status refers either to derivation by a previous phonological process, or to affixation. Of minimal vowels derived by process, the most likely candidates for casual reduction/deletion are those that have a purely phonetic function which is not required in the casual register. On the other hand, deletion is restricted by some surface structure constraints, as well as by the prosodic constraint against stress clash. As far as affixation is concerned, the casual register distinguishes between the affix vowels themselves, which are subject to reduction/deletion processes, and vowels in stems, which do not undergo the same processes—unless they have been derived by a previous phonological rule. In this respect, the 'derived' notion is somewhat different from the one which serves as a base for lexical phonology (Kiparsky, 1982; Mohanan, 1986; etc.), where no such distinction is made. The distinction may reflect a systematic difference in frequency. Frequent items are always the first to undergo casual processes, as is also evident from the early fossilization of some reduced casual variants and their virtual acceptance as new lexical items. Affixes are of course more frequent than stems, and affix vowels are more easily recoverable by the hearer, by virtue of greater affix frequency and affix predictability in context as a grammatical formative. For some speakers, it is not only the frequency of the lexical items affected by deletion that plays a role, but also the frequency of the context triggering deletion. Frequently occurring collocations facilitate reduction; e-deletion is more likely to occur in the neighborhood of clitics and clitic-like words. Apparently, frequent co-occurrence reinforces the attachment between such items and the ones containing the vowels to be reduced, which facilitates the transition between the two syllables flanking the vowel subject to deletion. The deletion process further bonds the lexical item and the attached clitic together, emphasizing their prosodic status as a single 'phonological word' by contraction across word boundary.

The likelihood of casual reduction and deletion is primarily, then, a function of the following factors: (a) the absence of stress prominence; (b) the number of unstressed syllables in a sequence; (c) rate of speech (not a necessary factor, though); (d) frequency and predictability in context, and the capacity for recoverability associated with it (including the contribution of frequency to 'collocatability' of adjacent items); (e) the acceptability of syllabic restructuring that would result from the loss of a vowel whose phonetic raison d'être no longer exists; and (f) some surface structure constraints, including prosodic ones.

In MH, e (and occasionally i) can be deleted at the level of the 'phonological', or 'prosodic', word (i.e., including clitics—see Selkirk 1984). At the intonational phrase or sentence level, any one of the five phonemes (i, e, a, o, u) of MH can be shown to be affected to some degree by casual speech processes. Thus, for instance, Semiloff (1973) describes a variety of rules applying to subsets of the above. (For brevity, the following illustrations of reduction are taken out of their sentential context): Laxing may affect any vowel except u, especially when unstressed (e.g., bišvîlā 'for her' > [bišvîlā], axšāv 'now' > Axšāv)); an unstressed non-round vowel may be neutralized to a vowel approaching a schwa (e.g., avāl 'but' > [vāl], laavōd im 'to work with' > [laavōdīm]), which in turn may be deleted initially in high-frequency function words (e.g., avāl 'but' > [vāl] > [vāl]); unstressed i and e may be devoiced and lost between a spirant and a consonant (e.g., šišim 'sixty' > [šišim] > [šišim], dēreš 'way, through' > [dērēs] > [dērēs]); and so on. More likely to be affected, however, are unstressed non-round vowels in frequent words. Of those, function words are reduced first, and among function words pronouns are the most likely to delete (ani 'I' > ni, an or n, atā 'you m.f.' > ia, etc.). Next are lexical items; as expected, frequent ones are more easily recoverable. Only at the very casual register can round vowels in regular lexical items be affected as well:

(l) mà atā xošāv al zê 'What do you think of it?'
what you m.s. think on it

> mà ta xšēv al zê

éyfo ha-šutāf šelxā 'Where is your partner?'
where the-partner your

> éfo aštāf šxfā > éfo aštāf šxa

Although we are interested in any type of casual reduction or assimilation, we will focus below on casual processes that affect syllable structure, such as reduction that ends up in total deletion and complete assimilation. As noted above, it is particularly e that is affected by reduction to the point of deletion or total assimilation, since it is the 'minimal', or weakest, vowel of MH. Consequently, we will concentrate on two major casual processes affecting: e: e-deletion, probably the commonest vowel deletion process in Hebrew casual speech, which elides a 'minimal' e that has either been derived by a previous process for
phonetic reasons, or that constitutes part of an affix; and (complete) e-assimilation, which affects an unstressed e that is immediately followed by another unstressed vowel.

It should be noted that MH e corresponds to three Biblical Hebrew (henceforth BH) segments: /e/ (seghol), /e/ (tsere), and schwa mobile, the three non-round mid vowels of Tiberian Hebrew. Traditional Ashkenazi Hebrew pronunciation maintains the phoneme /e/, but in Modern Israeli Hebrew, which follows the Sephardi tradition, all three have merged into /e/. The precise phonetic realization of this /e/ is variable, ranging from [ɛ] to [e] and to a central vowel approaching a schwa (see, for instance, Chayen, 1973). Normally, the particular phonetic quality is environmentally determined, with schwa-like variants resulting from greater reduction in unstressed syllables. For most speakers, they seem to be in free variation, and there is little doubt that in systematic phonemic terms, we are dealing with a single phoneme. For typographic convenience, MH /e/ is represented as e.

2. e in ante-pretonic position

In MH, a morphophonemic rule deletes a from an open syllable, followed by another open syllable, followed by the syllable carrying the main stress. Although defined in phonetic terms, it is restricted in application to non-verbal forms.

<table>
<thead>
<tr>
<th>(2) MS. SG.</th>
<th>FM. SG.</th>
<th>MS. PL.</th>
<th>FM. PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>katán</td>
<td>ktná</td>
<td>ktaním</td>
<td>ktnót</td>
<td>small</td>
</tr>
<tr>
<td>gadól</td>
<td>gdólá</td>
<td>gdolin</td>
<td>gdolót</td>
<td>big</td>
</tr>
<tr>
<td>katuv</td>
<td>ktuvá</td>
<td>ktuvim</td>
<td>ktuvót</td>
<td>written</td>
</tr>
<tr>
<td>davár</td>
<td>dvarím</td>
<td>dvarót</td>
<td>dgerót</td>
<td>fence</td>
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</tbody>
</table>

A derived e, however, is found when the resulting cluster would violate the sonority hierarchy (see Rosen, 1956, 156–160; Ornan, 1973, 186–190; etc.) as in:

<table>
<thead>
<tr>
<th>(3) MS. SG.</th>
<th>FM. SG.</th>
<th>MS. PL.</th>
<th>FM. PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>yašár</td>
<td>yešará</td>
<td>yešarím</td>
<td>yešarót</td>
<td>straight</td>
</tr>
<tr>
<td>naxón</td>
<td>nesoná</td>
<td>nesoním</td>
<td>nesonót</td>
<td>correct</td>
</tr>
<tr>
<td>matún</td>
<td>metúm</td>
<td>metúnim</td>
<td>metúnot</td>
<td>moderate</td>
</tr>
<tr>
<td>ratúv</td>
<td>retúvá</td>
<td>retúvim</td>
<td>retúvot</td>
<td>wet</td>
</tr>
<tr>
<td>laván</td>
<td>levaná</td>
<td>levaním</td>
<td>levanót</td>
<td>white</td>
</tr>
</tbody>
</table>

or where deletion would have yielded a consonant cluster the second member of which is low:

<table>
<thead>
<tr>
<th>VOWEL ASSIMILATION AND DELETION IN MODERN HEBREW</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4) MS. SG.</td>
</tr>
<tr>
<td>ša?ól</td>
</tr>
<tr>
<td>ga?ón</td>
</tr>
<tr>
<td>ca?ir</td>
</tr>
<tr>
<td>ta?ún</td>
</tr>
<tr>
<td>sa?ir</td>
</tr>
<tr>
<td>ša?ön</td>
</tr>
</tbody>
</table>

Consider the cases involving sonorant consonants first. As noted in Bolozky (1977, 1982), the derived vowel in yešarim, etc., may optionally be deleted even in moderately casual or moderately fast speech when a CV proclitic is appended. The now-unassociated sonorant onset is consequently reassigned to the coda of the initial syllable (e.g., ha.ye.ša.rim > ha.ya.ša.rim > hay.ša.rim):

| (5) hayešarim ‘the straight (ms. pl.)’ | háyšarim |
| hanexoná ‘the correct (fm. sg.)’ | hánxoná |
| lametunót ‘to the moderate (fm. pl.)’ | lámtunót |
| harétuvim ‘the wet (ms. sg.)’ | hártuvim |
| lalevaná ‘to the white (fm. sg.)’ | lálevaná |

Deletion is favored in such cases because the phonetic need for the e concerned is removed by resyllabification beyond the word level. The resulting strings conform to the sonority scale. Note that deletable e does not necessarily have to have been derived by an actual process; its non-basic nature can be suggested by similarity of canonical patterns, as in:

<table>
<thead>
<tr>
<th>(6) CCA+a</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. braxá</td>
<td>blessing</td>
</tr>
<tr>
<td>šmamá</td>
<td>desert, wilderness</td>
</tr>
<tr>
<td>ii. nedavá</td>
<td>donation, alms</td>
</tr>
<tr>
<td>renána</td>
<td>happy singing</td>
</tr>
<tr>
<td>yelalá</td>
<td>wailing</td>
</tr>
</tbody>
</table>

The speaker knows that the (ii)-forms belong to the same canonical forms as the (i)-forms (i.e., CCA+a), and that the function of the e distinguishing between them is essentially phonetic. Once the phonetic need has been removed by resyllabification, the speaker concludes that such e can be subject to casual deletion, just as other derived e’s are:
(7) anî lò yaxôl li-smóa et ha-yênal-ôt ha-êle ‘I cannot listen to
I not can to-hear acc. the-wail-pl. the-these
these wails’ > an lò yaxôl li-smóa tâ yalôt âêle

For some speakers, the process is most commonly triggered by clitics. As explained above, the strong collocation of a clitic with the word containing the affected syllable, caused by frequent co-occurrence, facilitates the transition from the clitic to the following vowel once the ‘minimal’ one in between has been removed. A contracted, closely knit phonological word is formed in the process. Other words ending in a vowel may trigger deletion as well, but it depends on the degree of their ‘collocability’ with the following item. Thus, while for some speakers all three illustrations in (8) below are equally acceptable, for others (8iiii) is marginal. They would accept (8i) because the numeral closely collocates with the following noun, as well as (8ii) (though perhaps less readily) as a noun-adjunctive collocation, but would consider (8iiii) to be less acceptable than either (8i) or (8ii), since the verb and the lexical direct object do not collocate very well:

(8) i. slošá yeladim ‘three children’ > slošáłyadim
three children
ii. xulcâ levanâ ‘a white shirt’ > xulcâlvânâ
shirt white
iii. hem hikú yeladim ba-rexôv > ñêmikúleydîm barxôv
they beat children in the-street

In Bolozyk (1977, 1982) it was suggested that the motivation for casual e-deletion is in contributing to a more regular stress pattern, in which strong and weak feet alternate rhythmically:

(9) slošá yeladim ‘three children’ > slošáłyadim
three children

This follows the general tendency in MH for mechanical rhythmic alternation, according to which secondary stress is assigned to every other syllable of a prosodic word in a linear right-to-left fashion, starting from the main stress (see Bolozyk 1982 and Bolozyk forthcoming). Sometimes, however, the stress pattern resulting from casual e-deletion achieves precisely the opposite effect, i.e., causes a regularly alternating stress pattern to be replaced by a less regular one. (Whether this occurs by de-stressing of subsidiary stress to prevent stress clash, or by subsidiary stress distribution—constrained by stress clash avoidance—is a separate question, addressed in Bolozyk, forthcoming):

(10) ba-mêkom-ôt ha-rexok-im ‘in the distant places’
in-the-place-pl. the-distant-pl.
> bâmkomôt arxokîm
hâ-xulcâ ha-levan-à ‘the white shirt’ > hâxulcâl alvanâ
the-shirt the-white-fem.

It appears, then, that the role of secondary stress distribution in normal speech in determining casual e-deletion is either marginal or irrelevant. One plausible explanation is presented in Semiloff (1973), according to which e-deletion is caused by attraction of the onset of e to a preceding syllable carrying a higher degree of stress, which leaves the weak vowel ‘stranded’ and thus makes it a likely candidate for deletion. Semiloff’s proposal indeed explains slošá yeladim ‘three children’ > slošáłyadim, but may or may not account for cases in which the sonorant in question is preceded by a monosyllabic proclitic, as in râinu et ha-yêladim ‘We saw the children’ > râinu tâyladim. It will depend on how secondary stress is understood to be assigned. tâyladim, for instance, does end with secondary stress on ta; attraction to this secondary stress can explain why e is deleted. But there is no independent reason for shifting that secondary stress to a in ayêladim to start with; in fact, such a shift changes meaning, by bringing about contrastive focusing on the initial syllable. Secondary stress that is independent of intonational focus is essentially the manifestation of mechanical rhythmic alternation, and in our opinion is assigned to the a in tâyladim as a result of the loss of e. Unless one can account independently for the shift in secondary stress, the stress-attraction explanation would not suffice. We will assume, then, that e is deleted in order to reduce the number of unstressed syllables between the primary stress of the word concerned and that of an adjacent word (as in slošá yë.la.dim ‘three children’ > slošá-shy.la.dim, ba-mê.ko.môt a.re.xo.kîm ‘in the distant places’ > bâm.ko.môt.ar.xo.
kim), so as to facilitate production at a register in which unstressed syllables are very low in prominence and rate of speech is often increased. This does not mean that MH casual speech is ‘stress-timed’ while formal speech is ‘syllable-timed’. We agree with Dauer (1983) that the tendency for stress to recur regularly is a language-universal property, and that rhythmic grouping takes place even in languages which have been called syllable-timed. Perhaps the MH casual register is more ‘stress based’ than the formal register, and because of the relatively greater prominence of the primary stresses in the former, the unstressed syllables would tend to reduce more readily within a particular stress
group. Possibly Dauer (1983) also has the answer to why the 'minimal' vowels are the ones that are completely eliminated: She explains the deletion of the ‘e muet’ in French as the realization of a tendency to re-establish the evenness of successive syllables by eliminating an inherently short syllable. The MH ‘minimal’ e has a similar status, and even if its deletion does not result in measurable evenness of successive syllables, it appears to have this effect conceptually.

It should also be noted that e-deletion is sifted through an output filter, to make sure that it does not result in a syllable structure that is more complex than CV(C), which constitutes the optimal MH syllable (see Semiloff, 1973). Thus, if the sonorant consonant is preceded by a consonantal coda, deletion is blocked:

(11) xulcöt levanöt > xul.cöt.va.nöt (*xul.cöt.lva.nöt)
  shirts white, f. pl.

Clearly, syllables like *cotl or *lva can be excluded on universal grounds (by a constraint against coda-final or onset-initial sonorant consonant being separated from the nucleus by a less sonorant consonant), but it will be shown below that the output constraint would be needed independently for other cases.

As noted above, a is reduced to e also in sequences involving a low consonant in second position. The phonetic realization of such sequences is quite different from those involving sonorants, though. In MH, the pharyngeal fricative (and for many speakers h as well) merges with the glottal stop, which in turn is only realized (optionally) in pretonic position. There are many methodological reasons for continuing to postulate low consonants in the underlying structure, as well as residual phonetic clues that facilitate perception of a low consonant even when it is not there: Rabin (1973), for instance, argues that there are differences in intonation that can be attributed to the loss of c and ?, and Farrar and Hayon (1980) point to laryngealization and syllabication as perceptual cues for underlying glottals. But although native speakers often tend to perceive a glottal stop in a number of conditions, it is rarely heard acoustically. The vowel sequences resulting from low consonant loss involve a variety of casual speech processes, including complete assimilation, merger, and possibly even shortening, depending on word frequency and degree of casualness, as in an illustration from Blanc (1957, p. 37), šesmœt ‘six hundred’ > šøsmœt > śøsmœt > śøšmot, and in:

(12) šoönim ‘watches’ > šoönim > šonim ( > šonim)
  cemir ‘young, masc. pl.’ > cèmir > cèrim ( > cèrim)
  tuënim ‘loaded, masc. pl.’ > tuënim > tu:nim ( > tu:nim)

Our claim is that this type of reduction is also motivated by the need to decrease the number of unstressed nuclei between primary stresses, to facilitate casual production without overloading the inter-stress interval. Semiloff (1973) correctly points out that the CV output is an improvement in syllable structure from the original V (in CV+V), and introduces the preference for CV(C) as an explanation for the assimilation and merger (and shortening) processes. In our opinion, this is not the cause for reduction, but rather a filter on the output of casual processes. Furthermore, we are not fully convinced that V(C) are as marginal in MH as they were in BH; there is no clear evidence that MH indeed tries to eliminate them (see Bolotzky, in preparation).

It is interesting to note here that certain deviations from the norm in BH could be attributed to casual reduction of a similar kind. Such deviations are normally assumed to constitute scribal errors, or to have resulted from conflation of different manuscripts. Whatever their origin, merely-synchronous observation of the data makes it possible to regard them as casual variants of their regular formal counterparts:

(13) Gen 38,27 š®tomim ‘twins’ Gen 25,24 tomim
  I Sam 1,27 š®laõòlı ‘my request’ I Sam 1,17 šelõõx ‘your f.s. request’
  II Sam 23,37 habb®eroòlı ‘from Beheroth’ I Chr 11,39
  habberoòlı
  Ps 29,6 r®emim ‘unicorns’ Ps 22,22 remim
  I Chr 34,9 š®eròlı ‘the rest of’ I Chr 12,35 šeriš

3. Casual Deletion of posttonic word-final e

A posttonic e is likely to be deleted in MH casual/fast speech from the feminine suffix et, which in Tiberian Hebrew was represented as /et/. (Historically, [ə] was inserted to prevent formation of word-final consonant clusters in BH):

(14) PRES.  PRES.  CASUAL  GLOSS
  MS. SG.  FM. SG.  VARIANT
  šomêr  šomêret  šomêr  guard
  kotêv  kotèvet  kotêvt  write
  medabêr  medabêret  medabêrt  talk
  mesadêr  mesadêret  mesadêrt  arrange
  mitlabês  mitlabêst  mitlabêst  get dressed

Although undoubtedly facilitated by the t of et being the least sonorant non-glottal consonant, the process is again motivated by the need to reduce the number of syllables between primary stresses, and
This merger is again a manifestation of the need in casual speech to reduce the number of syllables between primary stresses, and results in more optimal syllable structure. Note that similar a may also be deleted following a $x$ from historical $h$ (mostly before clitics):

(18) $hi$ šoláxat $et$ ha-yéléd 'She is sending the child'  
    she send f.s. acc. the-child  
    $>$ $hi$ šoláxet ayéléd $~ hi$ šoláx tayéléd  
    hi boráxat itò maxár 'She escapes with him tomorrow'  
    she escapes with him tomorrow  
    $>$ $hi$ boráxt itò maxár  
    $hi$ šoláxat itónim 'She is sending newspapers'  
    she send f.s. newspapers  
    $>$ *hi šoláxtn itónim [Less acceptable for some speakers because of weaker collocation]  
    hi šoláxat sfarim 'She is sending books'  
    she send f.s. books  
    $>$ *hi šoláxt sfarim

It should be observed that $e$ from BH /$e$/ that was inserted to break an unpermitted word-final consonant cluster is not as likely to be deleted from stem-final position, not even in the optimal environment. Deletability of such $e$'s is, essentially, a function of frequency. To start with, any particular stem is always less frequent than an affix; and beyond that, individual frequent stems undergo deletion more readily than individual infrequent ones do. $e$ is never deleted from infrequent items, such as kēves 'male sheep', pēleg 'spring' :

(19) ani ohév kēves bātanūr 'I like baked lamb'  
    I like sheep in-the-oven  
    $>$ *ni ohév kēv bātanūr  
    šatīti mē-a-pēleg ha-hēzē 'I drank from this spring'  
    I drank from-the-spring the-this  
    $>$ *šatīti mēapēlāg azē

In frequent stems, however, $e$ is more likely to delete:

(20) raīta kvar et ha-sērēt ha-hēzē 'Have you already seen this movie?'  
    you saw already acc. the-movie the-this  
    $>$ raīta kvar tā sērēt azē  
    šel mi ha-yéléd ha-hēzē 'Whose child is this?'  
    of who the-child the-this  
    $>$ šel mi ayélēd azē
4. Casual e deletion in prefixes

Casual deletion also applies to prefixes such as tv (the prefix of all 2nd person forms as well as the 3rd person singular feminine form of future paradigms), mv (the present tense prefix of most consonant verb patterns), nv (the 1st person plural of future paradigms), and v (the 3rd person singular masculine prefix of future paradigms), whenever v is realized as e, provided that the output is a CV(C) syllable, and preferably when the preceding item is a clitic:

(21) hi telamēd otō ivrīt ‘She will teach him Hebrew’
    she will teach him Hebrew
    > hi mšamēd otō ivrīt
xāna telamēd otō ivrīt ‘Hannah will teach him Hebrew’
    Hannah will teach him Hebrew
    > xāna telamēd otō ivrīt [Less acceptable for some
    speakers because of weaker collocation]
hu mšamēd otī ivrīt ‘He teaches me Hebrew’
he teach (m.s.) mē Hebrew
    > hu mšamēd oti ivrīt
ānānē nēdēvbēr itō maxār ‘we will speak with him
    we will speak with him tomorrow
    > anānē nēdēvbēr itō maxār

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hu yēdēvbēr itō maxār ‘He’ll speak with him
    he will speak with him tomorrow
    > hu yēdēvbēr itō maxār
hu mēvalbēl li et ha-mōax ‘He nags me
    he confusing to me acc. the-brain
    > hu mvalbēl li tamōax
atēm telamēd otō ivrīt ‘You (ms. pl.) will teach
    you ms. pl. will teach him Hebrew
    him Hebrew > *atēm telamēd otō ivrīt

When, as a result of the loss of a low consonant, an HCV+ prefix is followed by an identical unstressed vowel, the sequence undergoes reduction similar to the merger and shortening in šōmaa ‘ear, f.s.’ > šōmaa > šōmaa above; ‘minimal’ vowels other than e are affected as well:

(22) taavōd ‘you will work’ > ta:vōd > tavōd
    taazōr ‘you will help’ > ta:zōr > tazōr
    heevir ‘he passed’ (tr.) > e:vir > evir
    neelām ‘he disappeared’ > ne:lām > nelām
    hoovār ‘he was transferred’ > o:vār > ovār

5. e-deletion in proclitics and other function words

Colloquial MH has lost the enclitic pronouns of BH, but it maintains most of its proclitics. Proclitics such as le ‘to’, be ‘in’ or še ‘that’ (see Schwarzwald, 1984a, for a detailed description of their realizations in semi-formal Modern Hebrew) not only facilitate reduction of ‘minimal’ vowels in words to which they are attached, but are also often subject to casual e-deletion themselves. Like affixes, they are easily recoverable by virtue of their inherent frequency and predictability from context as grammatical items. Again, deletion is constrained by the CV(C) output condition:

(23) racinu le-dēvbēr itō ‘We wanted to talk to him
    we wanted to-talk with him
    > racinu ldēvbēr itō
racit le-dēvbēr itō ‘You f.s. wanted to speak to him
    you f.s. wanted to-speak with him
    > *racit ldēvbēr itō
raitī otō be-shābāt ‘I saw him on Saturday’
    I saw him in-Saturday
    > raṭī otō pšabāt
raúi  otáx  be-šábát  ‘I saw you on Saturday’
I saw you f.s. in-Saturday
> *raitiotáx pšábát
ani rocé  še-tavú  ‘I want you (pl.) to come’
I want that-you (pl.) will come
> ni rocé šavúvú
matáy racit  še-navó  ‘When did you (f.) want us to come?’
when you wanted that-we will come
> *matáy racit šnavó

but avoidance of stress clash presents an additional complication: It explains the blocking of deletion in:

(24) hú kará  le-xána  ‘He called Hannah’ > *hú kará lxána
he called to-Hannah

but does not account for differences in acceptability of deletion following an unstressed syllable, where the presence of an additional unstressed syllable after the vowel to be deleted increases the likelihood of deletion:

(25) tagidu  lê-cipóra  šalóm  ‘Say hellow to Ziporah’
you pl. say to-Ziporah hellow
> tagidu lecipóra šalóm

tagidu  lê-xédva  šalóm  ‘Say hellow to Hedvah!’
you pl. say to-Hedvah hellow
> *tagidu lxédva šalóm

Why is *tagidu lxédva šalóm less acceptable than tagidu lecipóra šalóm, in spite of the fact that it does not appear to involve stress clash? We believe that a form of stress clash is actually involved. In Hebrew, penultimate stress is marginal, and it is possible that for purposes of rhythm the vowel following it is ‘extra-metrical’, in the sense of Liberman and Prince (1977), Hayes (1982), etc., and thus does not count as a clash-preventing beat. In other words, for those speakers who do not accept *tagidu lxédva šalóm, stress clash is a viable explanation.

Proclitics preceding an unstressed vowel in stem-initial position (resulting from loss of a low consonant) also tend to lose an unstressed e in casual speech, via assimilation, merger and shortening, similarly to šeonom ‘watches’ > šošnom > šonom (> *šonom). The typical environment is a verb-initial vowel resulting from non- realization of h in hitf’il, nif’al and hitpa’el, preceded by le ‘to’ (e.g., when a form like lēhashbir is realized as lēashbir):

(26) lēashbir  ‘to explain’  >  lāashbir  >  lašbir  >  lazbir
lēaxnis  ‘to bring in’  >  lāaxnis  >  lašxnis  >  lazxnis
lēapil  ‘to drop (tr.)’  >  lāapil  >  lašpil  >  lašpil
lēarim  ‘to raise’  >  lāarim  >  lašrim  >  lašrim
leikanés  ‘to enter’  >  liikanés  >  liškanés  >  liškanés
leizáer  ‘to be careful’  >  ližáer  >  lišzáer  >  lišzáer
leisavér  ‘to break (int.)’  >  lišavér  >  lišavér  >  lišavér
letlabeš  ‘to get dressed’  >  lišlabeš  >  lišlabéš  >  lišlabéš
leitrágéz  ‘to get angry’  >  lištrágéz  >  lištrágéz  >  lištrágéz

As in the case of tōtōnim etc. above, one can find BH forms that exhibit what appears to be assimilation, merger and shortening resulting from loss of h that is preceded by a clitic, both in hitf’il:

(27) Dt 3,24 l’har’ōd  ‘to show’  >  Dl 1,33 lar’ôd
II Sam 19,16 l’hā’avir  ‘to make cross’  >  II Sam 19,19 lašavir
I Kgs 18,12 l’haggiōd  ‘to tell’  >  II Kgs 9,15 laggiōd
Is 10,7 l’hāšmiōd  ‘to destroy’  >  Is 23,11 lašmiōd
Jer 41,5 l’hōvî  ‘to bring’  >  Jer 39,7 lāvî
II Chr 5,13 l’hāšmiā  ‘to make hear’  >  Ps 26,7 lašmiā
Ps 8,3 l’hāšbîō  ‘to still’  >  Am 8,4 lašbîō
Neh 9,19 l’hānḥōṭām  ‘to direct them’  >  Ex 13,21 lanḥōṭām

and in nif’al:

(28) I Kgs 18,2 l’hera’ōd  ‘to be seen’  >  Ex 34,24; Dt 31,11; Is 1,12 lera’ôd
Dan 11,34 uv’hikkašlām ‘and on their failing’  >  Prv 24,17
uvikkašlō ‘and on his failing’
1’hēc’anōd  ‘to humble oneself’  >  Ex 10,3 le’c’anôd
b’heherēzy ‘on being killed’  >  Ezek 26,15 beherēzy
b’he’atēf ‘on fainting’  >  Lam 2,11 be’atēf

The same phenomenon occurred in Post-Biblical Hebrew—see Segal (1936, 114, 120), Haneman (1980, 132–134, 151). It may also be advanced that the transition from lēha ‘to the’, be’ha ‘in the’ and ke’ha ‘like the’ into la, ba and ke, respectively, is the consequence of the same kinds of processes. Certain ‘rule inversions’ in BH (primarily in the later books), in which the underlying sequences resurface, may be regarded as indirect supporting evidence:

(29) I Sam 13,21 ul’hakkaradumnim  ‘and to the axes’  reg.
w’e’lakkaradumnim
II Sam 21,20 l’harařâ  ‘to the giants’  reg. luarřâ
II Kgs 7,21 b’haššāḏē  ‘in the field’  reg. baššāḏē
Vowel Assimilation and Deletion in Modern Hebrew

6. e in pretonic position

MH a or e in an open syllable is deleted before a stressed vowel in suffix-initial position; it is a morphophonemic rule restricted to verbal forms:

<table>
<thead>
<tr>
<th>3RD MS. SG.</th>
<th>3RD FM. SG.</th>
<th>3RD PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>katav</td>
<td>katva</td>
<td>katv</td>
<td>wrote</td>
</tr>
<tr>
<td>sagar</td>
<td>sagra</td>
<td>sagru</td>
<td>closed</td>
</tr>
<tr>
<td>dibor</td>
<td>dibra</td>
<td>dibru</td>
<td>talked</td>
</tr>
<tr>
<td>limad</td>
<td>limad</td>
<td>limdu</td>
<td>taught</td>
</tr>
<tr>
<td>hitlabesh</td>
<td>hitlabsha</td>
<td>hitlabu</td>
<td>got dressed</td>
</tr>
<tr>
<td>hitraguz</td>
<td>hitragza</td>
<td>hitragu</td>
<td>got angry</td>
</tr>
</tbody>
</table>

Deletion would not apply, however, where it would have created a three consonant cluster in the process; instead, a basic e is maintained, and a is reduced to e. [Alternatively, a CCC cluster created in the deletion process is broken with the minimal vowel e]:

<table>
<thead>
<tr>
<th>3RD MS. SG.</th>
<th>3RD FM. SG.</th>
<th>3RD PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>nissger</td>
<td>nissera</td>
<td>nisseru</td>
<td>be closed</td>
</tr>
<tr>
<td>nixtevu</td>
<td>nixteva</td>
<td>nixtevu</td>
<td>be written</td>
</tr>
<tr>
<td>huxtevu</td>
<td>huxteva</td>
<td>huxtevu</td>
<td>be dictated</td>
</tr>
<tr>
<td>husgera</td>
<td>husgera</td>
<td>husgeru</td>
<td>be delivered up</td>
</tr>
</tbody>
</table>

Deletion would not apply, however, where it would have created a three consonant cluster in the process; instead, a basic e is maintained, and a is reduced to e. [Alternatively, a CCC cluster created in the deletion process is broken with the minimal vowel e]:

<table>
<thead>
<tr>
<th>3RD MS. SG.</th>
<th>3RD FM. SG.</th>
<th>3RD PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>megalgelim</td>
<td>megalgel</td>
<td>roll (tr.)</td>
<td></td>
</tr>
<tr>
<td>mefarnesim</td>
<td>mefarnesim</td>
<td>give subsistence</td>
<td></td>
</tr>
<tr>
<td>mitgalgelim</td>
<td>mitgalgelim</td>
<td>roll (int.)</td>
<td></td>
</tr>
<tr>
<td>mitparnesim</td>
<td>mitparnesim</td>
<td>live (on), subsist</td>
<td></td>
</tr>
</tbody>
</table>

Now, casual e-deletion never applies to either the reduced or the basic e in this environment. Although Hebrew does contain a few clusters of three consonants (always involving a sonorant consonant, though, and mostly from a non-native source), as in

<table>
<thead>
<tr>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>pianist</td>
</tr>
<tr>
<td>shoemaker</td>
</tr>
<tr>
<td>a dude</td>
</tr>
<tr>
<td>pine cone</td>
</tr>
<tr>
<td>be squirted</td>
</tr>
</tbody>
</table>
and in spite of the fact that across word boundaries, such clustering is quite common (since Hebrew allows numerous two consonant clusters word-initially), nisiğra or nixtevá are never reduced to *nisğrá or *nixtvá respectively at any degree of casualness or increased tempo.

It is easy to see that the CV(C) constraint is at work here. Deletion of this ē would either create a two consonant coda in the syllable to the left, or a two consonant onset in the syllable to the right, neither of which would be optimal. It might be argued, though, that a preference for CV(C) cannot explain total exclusion of forms like *nisiğra in spite of their not actually being unpronounceable. One can also refer, then, to Bolozy (1985), where this exclusion is attributed to a ‘strict cyclicity’ condition on structure-changing casual processes. e-deletion fails to apply to such cases because the derivational process responsible for its creation had applied earlier, in a previous cycle, which makes it irrelevant for the present one.

Another condition under which basic a and ē in pretonic position in the verb are reduced instead of being deleted is when the second and third radical of the stem are identical. A derived ē (or the basic ē itself) prevents the formation of a geminate consonant:

(38) 3RD MS. SG. 3RD FM. SG. 3RD PL. GLOSS
xagág xagégá xagégú celebrated
zaláli zalálá zaláli devoured
xítetú xíttetú xítetú bored (hole)
bísé bisesá bisesú solidified
hitpalél hitpalél hitpalél prayè
hitketét hitketetí hitketetú quarreled

(39) PRES. MS. SG. PRES. MS. PL. GLOSS
xogég xogegím celebrate
mexatét mexatetím bore (hole)
mipalél mipalélím pray

The same applies to verb-related nouns and adjectives, as in:

(40) SG. PL. GLOSS
şodédom demi robber (cf. kotév ~ kotvím above)
domém domemím silent (cf. kotév ~ kotvím above)
metoféf metoféfím drummer (cf. medabéér ~ medabvim above)
as well as to other nouns and adjectives, based on canonical pattern similarity as exemplified by the relationship between the (b)-forms and the (a)-forms below:

(41) C(C)aCC(C)+an type nouns and adjectives:

(a) kamcán ‘miser, miserly’ batláni ‘loafer’
kabláni ‘contractor’ šátkán ‘silent person’
(b) zálélán ‘glutton’ xašěsán ‘timid’
lakekán ‘flatterer’ hasesán ‘hesitant’

Now, at most casual styles and speech tempos, this ē cannot be deleted. Deletion is restricted to very fast/casual style, in which reduction is more likely to occur when fricatives are involved, as in:

(42) hem šaxxéxú ‘they forgot’ > hem šaxxú they forgot
le-xoxéváním ‘for amateurs’ > lexòxváním for-amateurs
metoféfim ‘drummers’ > mètofím

than in other forms, where it is quite marginal:

(43) xagégá > xágág ʒodédim > ʒodím
xítetú > xítú zálelí > zallán
hitpalél > hitpalá

Restricting the deletion of ē in these forms to the ‘fringes’ of casual speech is surprising, since MH readily allows geminates resulting from morpheme combinations:

(44) dán+nu ‘we discussed’ yašán+nu ‘we slept’
     hit+tamém ‘he feigned naïveté’
/hit+dardér/ ‘he deteriorated’ > [hiddardér]

and because one finds geminates resulting from casual reduction across words:

(45) ló kól kax roim tov ‘One cannot see so well’
     not all so see m.pl. good
     > ýévax kax roim tov
     éyze šehú ‘some kind of . . . ’ > éyšεu
     some whatever

The explanation for why ē-deletion does not apply to forms like xagégá at most casual registers is not related to the preference for CV(C) syllables. It is accounted for by McCarthy’s (1986) ‘antigemination’ principle, which prohibits syncope rules from creating sequences of identical homomorphemic consonants. The ‘strict cyclicity’ explanation (Bolozy 1985) will also work here: The reduction from /xagag+á/ to xagégá occurs at a cycle preceding the one at which casual ē-deletion applies, which blocks the latter from applying to it.
7. Exceptions to e-deletion and the role of frequency

All forms introduced above involved either e from BH schwa or e from BH seghol (/ e/). e originating from BH /e/, however, is less likely to be deleted in the same environment. In the case of ante-pretonic e involving the canonical sequence CeCuC (a variant of BH CiCuC, with /e/ replacing /i/ when followed by a non-geminated r or ?), deletion is blocked:

<table>
<thead>
<tr>
<th>PL. DEF.</th>
<th>CASUAL</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>šerût</td>
<td>hašrutim</td>
<td>service</td>
</tr>
<tr>
<td>teruç</td>
<td>hašrutim</td>
<td>excuse</td>
</tr>
<tr>
<td>cerûf</td>
<td>hačrutim</td>
<td>combination</td>
</tr>
<tr>
<td>berûr</td>
<td>hačrutim</td>
<td>clarification</td>
</tr>
</tbody>
</table>

In BH, the /e/ in forms like šerutim was not reduced to a schwa, as ante-pretonic a was. In other cases, where in BH /e/ was reduced, casual e-deletion may apply, but only to frequent forms:

<table>
<thead>
<tr>
<th>PL. DEF.</th>
<th>CASUAL</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>memâd</td>
<td>haḥmadim</td>
<td>dimension</td>
</tr>
</tbody>
</table>

It cannot delete such e in infrequent forms:

<table>
<thead>
<tr>
<th>PL. DEF.</th>
<th>CASUAL</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>mesâv</td>
<td>haṃsamim</td>
<td>ball bearing</td>
</tr>
<tr>
<td>melic</td>
<td>haṃlimim</td>
<td>advocate</td>
</tr>
</tbody>
</table>

Is it awareness of the origin of e from BH /e/ in the exceptional forms that blocks casual deletion? Not necessarily; deletion of such e is possible in at least one form (for those speakers for whom mexûš is reasonably frequent):

<table>
<thead>
<tr>
<th>PL. DEF.</th>
<th>CASUAL</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>mexûš</td>
<td>haṃmexûšim</td>
<td>pain</td>
</tr>
</tbody>
</table>

Apparently, then, either deletion is excluded before r in the sequence CeCuC+im, or (as proposed by Prof. Rabin, personal communication) there is still some phonetic feature differentiating the e of forms of the šerut type—perhaps a degree of tenseness, caused by awareness of CeCuC being a variant of the CiCuC pattern before r. In any case, the more frequent the form is, the greater the likelihood of reduction.

Like most cases of e from BH /e/ in ante-pretonic position, e from BH /e/ does not seem to delete in ante-pretonic position either. Consider the CaCaC/CiCaC pattern, historically with a geminate middle consonant, as in:

<table>
<thead>
<tr>
<th>SINGULAR</th>
<th>HISTORICAL</th>
<th>PLURAL</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>tabáx</td>
<td>tabaxim</td>
<td>cook</td>
<td></td>
</tr>
<tr>
<td>ikár</td>
<td>ikarim</td>
<td>farmer</td>
<td></td>
</tr>
<tr>
<td>šabát</td>
<td>šabatót</td>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>ikár</td>
<td>ikarim</td>
<td>principle, essence</td>
<td></td>
</tr>
</tbody>
</table>

Unlike the a of katán 'small' etc., this a is not affected by the morphophonemic deletion rule introduced above—a remnant of the effect of the now-lost gemination, which blocked deletion historically. When the second consonant is x (historically h, which as a pharyngeal could not be geminated), the vowel a/i is replaced by e from BH /e/:

<table>
<thead>
<tr>
<th>MASC.</th>
<th>HIS-</th>
<th>RECON-</th>
<th>PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>pexáx</td>
<td>geháx</td>
<td>gehiráx</td>
<td>pexamim</td>
<td>coal</td>
</tr>
<tr>
<td>gexáx</td>
<td>geháx</td>
<td>gehiráx</td>
<td>gexamim</td>
<td>ember</td>
</tr>
</tbody>
</table>

Casual deletion does not apply to such e, i.e., sequences like hantpexamim or hantgexalim do not arise. Although it could be claimed that speakers are aware of the origin of this e and distinguish it from deletable e by referring to its origin, it is more likely that either speakers memorize that e does not delete in the CexaCim when the first consonant is non-sonorant, or that they are aware of the connection between CeCaC and CaCaC (both with a historical geminate), and by analogy with the blocking of a-deletion in the latter they also block e-deletion in the former. In other words, we are dealing here with morphologically-defined conditioning.

In the stem, pretonic e from BH /e/ that has not been affected by morphophonemic e-deletion (deletion manifest in tipšē 'foolish, m. sg.' ~ tišpim 'foolish, m. pl.; ilém 'mute, m. sg.' ~ limim 'mute, m. pl.') is not deleted in casual speech, as fast as it may be:

<table>
<thead>
<tr>
<th>SING.</th>
<th>TONAL</th>
<th>STRUCTED</th>
<th>PL.</th>
<th>GLOSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>macevá</td>
<td>macevá</td>
<td>macevá</td>
<td>macevá</td>
<td>tombstone</td>
</tr>
<tr>
<td>magefá</td>
<td>magefá</td>
<td>magefá</td>
<td>magefá</td>
<td>plague</td>
</tr>
<tr>
<td>xaverá</td>
<td>xaverá</td>
<td>xaverá</td>
<td>xaverá</td>
<td>friend, member (f)</td>
</tr>
</tbody>
</table>

The only manifestations of reduction in such forms can be found in the construct state variants of some, e.g., xaverá ~ xaverat kibbutz 'kibbutz member (f)' or xašexá ~ xaškát lāyā 'darkness of night', where the
collocations are sufficiently frequent. Although it is possible that speakers are still aware of the now-obsolete variant with a tense vowel, it is more plausible to assume that they memorize that in the CaCeC-pattern, e cannot be affected at any casual register. Note that it is not the case that pre-tonic e is excluded per se. Rather, it is an historical accident that there are very few e’s that do not originate from BH /e/. In this position. e-deletion does apply to words like halayv ‘I wish’ (> halayv), to a prosodic word like beyom ‘on the day of’, in beyom xamis ‘on Thursday’ (> hyom xamis), to some verbs like mevin ‘understand’ in atà mevin oti ‘Do you understand me?’ below ( > ata mvin oti), to forms like (see Schwarzwald, in press) beseder ‘all right’ ( > pseder), bezol ofen ‘nevertheless’ (> pxol ofen), etc.

There is variation among prefixes containing e from BH /e/. In pa’al, when the future prefix contains e from BH /e/ (which is the case with verbal roots with an initial underlying y), e.g.,

(53) tered ‘you/she will go down’ telax ‘you/she will go’

(54) ха-иаша tered me-ha-отобъс ‘The woman will get off the bus’

The same behavior can be observed for cases in which the present-tense MV prefix was realized as /e/ in BH (preceding verbs with ‘hollow’ or ‘double’ roots in the hif’il conjugation). In such forms, e.g.,

(55) mešiv ‘bring back’ meric ‘cause to run’

MH fast/casual deletion does not apply:

(56) moše meric et ist о ‘He makes his wife run’

moshe makes run acc. his wife

(57) atà mevin oti ‘Do you understand me?’ > atà mvin oti ‘you understand me’

All of these cases, however, involve pretonic vowel, whose deletion yields a closed syllable adjacent to the one that carries the main stress—which would create a stress clash with the normally word-final stress of the preceding word. Although the likelihood of deletion should improve when the preceding word is penultimately stressed, as in, for instance, xàna tered mehaotobus ‘Hannah will get off the bus’, the improvement is only marginal. We would argue that the marginality of sequences like xàna tered mehaotobus can again be attributed to ‘extra-metricality’ of the unstressed vowel following the marked penultimate one, i.e., since that vowel does not count, the potential for stress clash is there.

On the other hand, when an a, im, or ot suffix is appended to a frequent hif’il item with e from BH /e/ in the prefix, the likelihood of deletion increases significantly, because the potential for stress clash resulting from deletion has definitely been removed. Also note that for some speakers, (58i) and (58ii) are more acceptable than (58iii), since owing to their frequency, the clitics in the triggering environment facilitate deletion as a means of contraction towards prosodic conglomeration:

(58) i. hem lо mevin oti ‘They do not understand me’

they not understand, m.pl. me

(59) a. mа atа mabat алю ‘Why are you looking at me?’

what you look on me

(59) b. mahim abat ‘I don’t know her’ > anlо mkira ota

I not know-fm. her

In other words, it is probably not the origin of e from BH /e/ that blocks deletion in forms like tered or meric, but the triggering environment.

There are also hif’il forms that lost a root-initial n, in which a seems to be elided in similar environments, as in

(59) ма atа mabat алю ‘Why are you looking at me?’

what you look on me

(59) а. mа atа mabat алю ‘I don’t know her’ > anlо mkira ota

I not know-fm. her
Apparently, it is the sub-standard common variants of such forms, e.g. mebit, mekir, which cause the process to apply analogically—see Schwarzwald (1984b).

8. Conclusion

It appears, then, that the widespread use of unstressed e-deletion and the total assimilation and/or loss of e (as well as other weak vowels in comparable positions) is a function of the low prominence of unstressed troughs in the casual register, of word frequency, of the degree to which adjacent words collocate with the word subject to deletion as a result of frequent co-occurrence, and of speech rate. Both processes indicate preference in casual speech for CV(C) syllables—a preference that also functions as a constraint against the formation of other syllabic structures resulting from deletion. Avoidance of stress clash also functions as an output constraint.

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