The role of casual speech in evaluating naturalness of phonological processes: the phonetic reality of the schwa in Israeli Hebrew

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The phonological continuum of 'naturalness' ranges from automatic phonetic rules that have no exceptions, to phonological ones that have been frozen and restricted to specific morphological patterns. One way of determining the naturalness of phonological processes that used to be motivated phonetically but may no longer be so, is to examine their behavior in casual/fast speech. In a case study, Modern Hebrew reflexes of the Biblical Hebrew schwa are examined for naturalness as 'cluster splitters' by observing the processes they undergo in casual speech.

1. Introduction

It is often difficult to delineate a border between the phonological and morphological domains, because there are relatively few phonological processes that have maintained their phonetic naturalness through time. Thus, while regressive voicing assimilation in Hebrew is fairly automatic, applying across the board in informal speech and defying speakers' insistence that they "never apply it," the deletion or reduction of unstressed non-high vowels resulting from the appending of stressed suffixes is morphologically delimited: in the verb system, the pre-tonal vowel is elided; in the nominal system, the ante-pre-tonal one is reduced. And there are, of course, numerous exceptions, resulting from the loss or weakening of historically pharyngeal or laryngeal consonants, etc. This is true of any language, and erosion or transformation of phonetically motivated processes with time is unavoidable. This is not to say, of course, that morphologically-delimited processes are not productive; it is just a different sort of productivity, in which phonemic alternation appears to be associated with specific morphological patterns, or **types** of morphological patterns, rather than with phonetic necessity.

It is often the case that phonetically motivated processes start in the casual register, and at a later stage become 'legitimate' phonological processes across the board, only to be morphologized at some later point in time. But at the casual register, new processes keep appearing, and their application always broadens before it takes hold in non-casual registers. Thus, the phonetic motivation for phonological processes is best tested in the casual register at the point in time at which these processes are studied – before they cross over to the non-casual domain and begin to 'fossilize'. Below, we will look at a number of phenomena associated with the well-known schwa of Biblical Hebrew, and measure the extent to which the reflexes of that schwa are still phonetically motivated, in the light of their behavior in casual speech.

2. The schwa in Biblical Hebrew

The Biblical Hebrew schwa stands for two distinct concepts:

- Orthographically: a Masoretic symbol used by the Tiberian scholars;
- Phonetically: a very short, centralized vowel, typically resulting from reduction in unstressed environments.

The Masoretic symbol actually stands for two phonetic manifestations:

- a zero vowel in the syllable coda (*schwa quiescent*), and:
- a centralized short vowel elsewhere (*schwa mobile*).

How come the same symbol stands for two separate, distinct realities? The reason is that the schwa symbol in the Masoretic text is basically a zero vowel, which is realized as a minimal, very short vowel [ə] when a difficult-to-pronounce sequence needs:

(a) to be broken,
    or:
(b) to be avoided (which would have occurred had full deletion applied).

Essentially, the Biblical Hebrew schwa reflected a constraint on **syllable-initial** clusters. Syllable-initial cluster may potentially occur, and thus are broken – or avoided – in the following environments:

- **Word initially**:

(1)   כְּתִיבָה /*ktī-vā*/ 'writing (N)' > *kə-θī-vā*
        כְּלָבִים /*klāvīm*/ 'dogs' > *kəlāvīm*
        גְּדוֹלִים /*gā-ðō-līm*/ > *gə-ðō-līm*, i.e., reduction to a schwa rather than complete elision,

        or:

        /*gðō-līm*/ > *gə-ðō-līm* (assuming a separate *CCōCīm* pattern),
        or:
        /*gā-ðō-līm*/ > *gðō-līm* > *gə-ðō-līm* (deletion and *ə*-insertion)
        סְגֹר /*sgór*/ 'close!, m.s' > *sə-ɣór*
        תְּדַבֵּר /*tdab-bér*/ 'you speak' > *tə-ðab-bér* (or reduction of /*ta-ðab-bér*/?)

- **Medially**:

(2)   נִסְגְּרָה /*nis-gā-rā*/ 'closed, f.s' > *nis-gə-rā*, i.e., reduction to a schwa rather than   complete elision,

        or:

        /*nis-gā-rā*/ > *nis-grā* > *nis-gə-rā* (deletion and *ə*-insertion)

(3)   After a geminate: דִּבְּרָה /dib-be-rā/ 'she spoke' > *dib-bə-rā*, i.e., reduction to a schwa, or:
         /dib-be-rā/ > *dib-brā* > *dib-bə-rā* (deletion and *ə*-insertion)
Other types of potential clusters were broken by other vowels, *i* or *ɛ*:

- **Word-initial clusters**:

(4)   תִּסְגֹּ֫ר /tsgōr/ 'you (will) close' > *tis-gōr*,

         or:

         /tasgōr/ > *tis-gōr*, i.e., reduction to *i* rather than complete elision

(5)   סִגְרִי /sgō-rī/ 'close! (f.s)' > *sgə-rī* > *sə-ɣə-rī* > *siɣ-rī*, i.e., reduction of a stem vowel *ō* to a schwa and the breaking of the initial cluster with a schwa would have resulted in two subsequent *schwa mobiles*, which Biblical Hebrew does not allow, so the first is transformed into *i*, and the second is elided,
         or:
         /sgō-rī/ > *sg-rī* > *siɣ-rī* (deletion and *i*-insertion)

- **Word-final clusters**: סוֹגֶרֶת /so-ɣért/ > *so-ɣé-rɛt* > *so-ɣé-rɛθ*,

(6)   מֶלֶךְ /málk/ 'king' (cf. *malká* 'queen') > *málɛk* > *mélɛk* > *mélɛx*
         כֶּ֫בֶשׂ /kíbś/ 'sheep' (cf. *kivśá* 'ewe') > *kíbɛś* > *kébɛś* > *kévɛś*
         בֹּ֫קֶר /bóqr/ 'morning' (cf. *boqró* 'his morning') > *bóqɛr*

        Supposedly, an actual schwa was also pronounced in any position in which there used to be a vowel underlyingly, which was then reduced to *ə*. Thus, BH כָּתְבָה /kātabā/ 'she wrote' was realized as [*kā-θə-vā*], probably in order to account for [*v*] showing up there instead of [*b*]; had the output been [*kāθ-vā*], one would have expected [**kāθ-bā*], so scholars assume the realization was [*kā-θə-vā*]. The same applies to any other pre-tonic reduction that does not involve a syllable-initial cluster: כּוֹתְבִים /kōtebīm/ > [*kō-θə-vīm*] or [*kōθ-vīm*].
        However, the spirantization rule (/p t k b d g/ > [*f θ x v ð ɣ*], respectively, after a vowel) ceased to be productive rather early, and one should not expect [*kaθ-va*] to follow the historical stop-fricative alternation. Also, except for the environments listed above, i.e., syllable-initial clusters (medial ones and geminates included), Chomsky (1971) shows that there is little evidence in the tradition of any of the Jewish communities that supports an actual schwa vowel medially (traditional Sephardi [*yoševím*] an exception?).

3. The schwa in Israeli Hebrew

Israeli Hebrew was revived as a spoken medium (starting from the end of the nineteenth century) mostly by speakers of European descent, who had less of a problem with initial clusters. Thus, sequences in items like [*gdolím*] and [*sgór*] were no problem. Even two consecutive zero schwas

in the beginning of the word are acceptable, as in borrowed שְׁפְּרִיץ [*špric*] 'squirt.' Gemination no longer exists, i.e., forms like [*dibbərá*] are realized as [*dib-rá*], and present no difficulty either.

In Israeli Hebrew the schwa and /e/ (*cere*) (except for תֵּבָ(י)ה [*teyvá*] 'ark, box' and a few similar items, where an orthographic *yod* י may be maintained) have merged with /ɛ/ (*segol*). For transcription convenience, we normally use *e* in transcribing Israeli Hebrew, but phonetically the merged vowel is [ɛ], unless reduced to [ə] in an environment/context that favors reduction to a true schwa. The extent to which any current *segol* – or any other vowel, for that matter – is realized as a truly short phonetic schwa is dependent exclusively on the environment, and its occurrence is totally automatic in environments that favor extreme reduction.

Does this mean, then, that today's *segol* has nothing to do with the historical schwa, since it no longer has the role of an 'enforcer' of constraints on consonant clusters? Clearly, this is not the case. We can still find the functionally-identical counterpart of the historical schwa in Israeli Hebrew in a subset of *segol* instances:

In Israeli Hebrew, a segol/schwa is still **required** for phonetic reasons in the following cases:

- To prevent violation of the sonority hierarchy:

(7)   *yla-dim* 'children' > *ye-la-dim* (cf. *klavim* 'dogs')

- To split, or prevent the formation of, identical or closely-similar homorganic consonant sequences (note: stress falls on the word-final vowel, unless marked otherwise):

(8)   *avád+ti* 'I worked' > *avádeti*
       šavát+ti 'I was on strike' > *šaváteti*
       xagag 'he celebrated' ~ *xagega* 'she celebrated' (cf. *katav* 'he wrote' ~ *katva* 'she wrote')

- To prevent the formation of other sequences in which the transition from one segment to another involves two simultaneous changes that are too close/small (e.g., change of voicing simultaneously with a **minimal** shift in place of articulation):

(9)   /*btixut*/ 'safety' (cf. *svirut* 'feasibility') > *betixut*
       /*šazufa*/ 'tanned, f.s' (cf. /*šavura*/ 'broken, f.s' > *švura*) > **šzufa* > *šezufa*

Although the term 'schwa' is normally associated with [ə], we will reserve it here for the subset of /ɛ/ that is still used for enforcing the phonetic constraints of Israeli Hebrew, defining it as a 'new schwa'. As noted above, in Israeli Hebrew the formation of [ə] is a purely phonetic automatic process of limited interest, applying when speech style and the environment allows it, and is not intended *per se* to enforce constraints on consonant clusters.

There are, of course, cases of [ɛ] from *segol* and from *cere* that have nothing to do with breaking or avoiding impermissible consonant clusters. So how could one identify those instances of former schwa that have maintained the role of "preventers of impermissible clusters" in Israeli Hebrew?

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4. Redefinition of the 'new' schwa in Israeli Hebrew

The 'new' schwa is a subset of *segol* /ɛ/ identified by two conditions:

1. It is required in order to split, or to prevent the formation of, impermissible consonant clusters.
2. Its presence is automatic, and it may be elided or assimilated once the conditions necessitating it have been removed – particularly in casual/fast speech, for reasons of 'ease of articulation'.

This definition is intended to separate between instances of current *segol* whose purpose is to prevent, or avoid the creation of, impermissible consonant clusters (i.e., the function of the *schwa mobile* in Tiberian Hebrew) and other cases of *segol* that are already part of the morpho-phonological patterns memorized by speakers acquiring the language.

Like the purely phonetic [ə], which (as already noted) is a totally automatic manifestation of any vowel in environments favoring extreme reduction, the 'new' schwa – manifest in phonetically-motivated insertion or reduction – is fairly automatic as well, and speakers are not necessarily aware of its existence. Speakers are even less aware that, in favorable circumstances, they may get rid of the 'new' schwa, particularly in casual (and/or fast) speech, since the assimilation and reduction processes characteristic of the casual register result mostly from decreased attention – see, for instance, Shockey (1974), Semiloff (1973, 1075), Dressler (1975), Zwicky (1972), Bolozky (1977, 1982). It is obvious that whenever such schwa is elided, elision is allowed to occur because it is no longer needed phonetically, and elision associated with 'ease of articulation' prevails. In the following, we will look at some environments in which the *segol*/schwa may be elided or assimilated in casual/fast speech, including some parallel precedents in Biblical Hebrew. The claim is that if a 'new' schwa can be elided in casual/fast speech when the phonetic need for it no longer exists, and its elision facilitates articulation, then this in itself constitutes evidence that its function has been phonetic to start with, and continues to be so, until it is no longer required.

5. *Bona fide* cases of a 'new' schwa in Israeli Hebrew

5.1 *Elision of e when the sonority hierarchy is violated*

Consider cases of violations of the sonority hierarchy. When the improperly placed sonorant consonant is preceded by a vowel at the end of a proclitic (like *a* 'the,' *ba* 'in the,' etc.) or a preceding word in connected speech, *e*-insertion is no longer obligatory. The absolute need for *e* is removed, since that preceding vowel may attract the sonorant consonant to its coda, causing re-syllabification. *e* may thus optionally be deleted in such environments (see Bolozky and Schwarzwald 1990):

(10) *mè-si-bá* 'party'   *a-mè-si-bá* 'the party' ~ *àm-si-bá*
      yè-la-dím 'children'   *a-yè-la-dím* 'the children' ~ *ày-la-dím*
      šlo-šá ye-la-dím 'three children' ~ *šlo-šáy-la-dím*
      lè-va-ná 'white, f.s.'   *xul-cá le-va-ná* 'white shirt' ~ *xul-cál-va-ná*
      nè-si-xá 'princess'   *a-nè-si-xá* 'the princess' ~ *àn-si-xá*

rè-ši-má 'a list'   *a-rè-ši-má* 'the list' ~ *àr-ši-má*

Actually, this particular deletion of *e* is not restricted to the casual register – it is natural enough to also constitute a common feature in highly formal speech as well, as in the speech of TV announcers, reported in Bolozky (1991):

(11)   *hayèdi`á* 'the news item' > *hàydi`á*
        hayèxasím 'the relations' > *hàyxasím*
        mìsaviv lamèdurá 'around the fire > *mìsavív lamdurá*
        bemà`aréxet hàyxasím 'in the network of relations' (*e* deleted in *hayèxasím*)
        sár ha`àvodá vehàrvaxá 'Minister of Labor and Welfare' (*e* deleted in *vèharèvaxá*)
        bàyozmót hamdìniyót 'in the political initiatives' (*e* deleted in *hàmedìniyót*)
        išúr hànsi`á lama`aráv 'the confirmation of the trip to the West' (*e* deleted in *hanèsi`á*)

Apparently, in a sequence like *a-ye-la-dim* 'the children,' the combination of a sonorant, a weak consonant, with an unstressed *e,* the weakest vowel, is sufficiently unstable and weak to cause *e* to undergo complete deletion.

In Vennemann's (1988) terminology, the loss of this *e* reflects the 'Sequence Law', according to which a sequence of segments in a syllable is the more preferred the less alike (in sonority and strength) the segments are.

Similar contraction can be shown to have applied in Biblical Hebrew. In the Tiberian rendition of Biblical Hebrew, there was no deletion as in Israeli Hebrew *hayešarim* 'the straight (ms. pl.)' > *hayšarim*, but rather reduction to schwa, e.g., *dāvār* 'speech; thing' ~ *də-vā-rīm* 'pl' ~ *had-də-vā-rīm* 'the things said.' The proclitic *ha+* 'the' was appended, resulting in the following consonant being geminated so as to close the open syllable *ha* (an unstressed syllable with *pata* is normally closed), and the schwa was maintained: if a geminate is conceived of as a double consonant, then whether both of its components are assigned to the coda of the first syllable, or one is attached to the consonantal onset of the second, the result is phonetically undesirable. Or to put it differently, a sequence of three consecutive consonants is on the whole marginal in Semitic. In the Tiberian vocalization system, the preserved schwa provided an additional syllabic nucleus, as in *had-də-vā-rīm,* and maintained the optimal syllable structure, CV(C), throughout.

The situation was somewhat different, though, when the word-initial consonant was a sonorant, and the weaker the sonorant (as a consonant), the less likely is the syllable with the schwa to be maintained. In a sequence like *hay-yə-lā-ðīm* 'the children,' the combination of an unstressed schwa, the weakest vowel, with a semi-vowel, the weakest consonant, is sufficiently unstable and weak to cause the schwa to undergo complete deletion (see the 'Sequence Law' above). Without the schwa, the potential undesirable equivalent of a three-consonant cluster (a geminate plus the following consonant, as in **hayylāðīm*) was avoided by the application of degemination. The end result was *haylāðīm.*
Thus, the Tiberian deletion/degemination process applied most widely to *yə* (including *yə* preceding the so-called 'waw consecutive'):

(12) (a)   *hayyəlāðīm*   'the children'   > *haylāðīm*
            hayyə'ōr   'the Nile'   > *hay'ōr*
            hayyəqārīm   'the precious (m.p.)' > *hayqārīm*
            hayyəšārā   'the straight (f)'   > *hayšārā*
      (b)   *wayyədabbēr* 'he spoke'   > *waydabbēr*
            wayyəvaqqēš 'he requested'   > *wayvaqqēš*
            wayyəsappēr 'he told'   > *waysappēr*
            wayyəɣārēš   'he expelled'   > *waygārēš*

Deletion/degemination was normally blocked when the following syllable began with a low consonant, as in

(13) *hayyəhūðīm*   'the Judeans/Jews'
      hayyə`ēlīm   'the mountain goats'
      hayyə`ēfīm   'the tired (m.p.)
      hayyə`ārīm   'the forests'

     Had Deletion/degemination applied, sequences like **hayhūdīm* or **hay`ēlīm*, though pronounceable, would have been phonetically marked, based on Vennemann's (1988) 'Contact Law', according to which it is easier to pronounce a strong syllabic onset preceded by a significantly weaker syllabic offset. Since *y* and *h*, for instance, are both weak consonants, a sequence like **hayhūdīm* is not optimal. Either *hayyəhūðīm* stays, or **hayhūðīm* may even end up undergoing reduction and assimilation processes, resulting in *hayūðīm* (which actually occurs in casual Israeli Hebrew speech).

     Note that in *hay'ōr* above the situation is different: in a **stressed** syllable, the onglide glottal stop /'/ is reinforced, which makes it stronger and thus less vulnerable to reduction.

     In the case of *mə*, deletion/degemination tended to apply particularly when this *mə* was the prefix of *pi`el* and *pu`al*, as in

(14) *hammədabbēr* 'the one who talks'   > *hamdabbēr*
      hamməlaqqəqīm 'the ones who lick'   > *hamlaqqəqīm*
      hammə'assēf 'the rear guard'   > *ham'assēf*
      hamməvaqqəšīm 'the ones who request'   > *hamvaqqəšīm*
      hamməšōrēr 'the poet or singer'   > *hamšōrēr*
      hamməyallέðɛt 'the midwife'   > *hamyallέðɛt*

which perhaps is a function of the frequency of this prefix, as well as its being essentially inflectional. Frequent items are the first to undergo casual or casual-type reduction, and inflectional affixes are most vulnerable – because they are very frequent, easily identifiable and easily recoverable. They are highly accessible to the addressee (see Ariel 1990, 1998), since short, minimally informative forms code mental entities of a ready accessibility.

     Truly derivational prefixes, which are less frequent and less transparent as independent morphemes, were normally unaffected, nor were other cases with *m* when no prefix is involved.

The schwa in *lə* and *nə* and the following gemination were normally preserved – perhaps because unlike *mə*, they do not constitute inflectional prefixes that can be preceded by a *pataħ*, except for rare occurrences like *wannəvaqqēš* 'we requested' or *wannəsappēr* 'we told.'   Only very frequent items with *lə* undergo deletion and degemination:

(15)   *halləwiyyīm* 'the Levites' > *halwiyyīm*

5.2 *Elision of geminate-splitting e*

Israeli Hebrew does not allow intra-morphemic geminates:

(16)   *od ló raíti zalelán kazè* 'I've never seen such a glutton' vs. *od ló raíti šakrán kazè* 'I've never seen such a liar'
        i šàtetá šalóš kosót 'she drank three glasses' vs. *ì kantá šalóš kosót* 'she bought three glasses'
        i xàgegá et yóm a-ulédet šelà etmól 'she celebrated her birthday yesterday' vs. *i xašvá še-ù šaxáx še-yóm a-ulédet šelà ayóm* 'she thought that he forgot it is her birthday today'

        In rapid/casual speech, however, *e* may be elided even when it is normally maintained to prevent the occurrence of such geminates (see Bolozy and Schwarzwald 1990, Bolozky 2003):

(17)   *od ló raíti zalelán kazè* 'I've never seen such a glutton' ~ *odlóraítizallánkazè*
        i šàtetá šalóš kosót 'she drank three glasses' ~ *išattá šalóš kosót*
        i xàgegá et yóm a-ulédet šela etmól 'she celebrated her birthday yesterday'~
        ìxaggátayòmulédetšelàetmól

5.3 *Assimilation of e to a following vowel*

An unstressed *e* is often assimilated into an immediately following unstressed vowel that has resulted from the loss of a glottal or pharyngeal consonant (see Bolozky 2003):

(18)   /*šè`oním*/ 'watches' > *šeoním* > *šòoním* > *šo:ním* (> *šoním*)
        /*nè`umím*/ 'speeches' > *nèumím* > *nùumím* > *nu:mím* (> *numím*)
        /*mèhumá*/ 'tumult' > *mèumá* > *mùumá* > *mu:má* (> *mumá*)
        /*sè`ra*/ 'storm' > *sèará* > *sàará* > *sa:rá* (> *sará*)
        /*bè`ayót*/ 'problems' > *bèayót* > *bàayót* > *ba:yót* (> *bayót*)
        /*tè`udá*/ 'document' > *tèudá* > *tìudá* > *tu:dá* (> *tudá*)
        /*mè`irím*/ 'give light, m. pl.' > *mèirím* > *mìirím* > *mi:rím* (> *mirím*)
        /*šì`amúm*/ 'boredom' > *šiamúm* > *šìimúm* > *ši:múm* (> *šimúm*)

        For most people, at least a residue of some extra vowel length is maintained, but some non-native speakers of European origin never maintain such a trace, even within the stem:

(19)   /lecà`arí/ 'unfortunately (lit. to my regret)' > *lecàarí > lècarí*
        /'aní ma'amín/ 'I believe' > *aní maamín > aní mamín*
        /'im šò'alím 'otì/ 'if they ask me' > *im šòalím otì > ìm šolím otì*

In affixes and clitics, however, a short vowel is a common option (again, owing to the high frequency, easy recoverability and accessibility of affixes):

(20)   *lèasbír* 'to explain' > *làasbír > lasbír*
        lèaxnís 'to bring in' > *làaxnís > laxnís*
        lèapíl 'to drop (tr.)' > *làapíl > lapíl*
        lèarím 'to pick up, lift' > *làarím > larím*
        leìkanés 'to enter' > *liìkanés > lìkanés*
        leìzaér 'to watch out' > *liìzaér > lìzaér*
        leìtlabéš 'to get dressed' > *liìtlabéš > lìtlabéš*
        leìtragéz 'to get angry' > *liìtragéz > lìtragéz*

(21)   *šeìkanés* 'let him enter' > *šiìkanés > šìkanés*
        šeìtlabéš 'let him get dressed' > *šiìtlabéš > šìtlabéš*
        šèipól 'let him fall' > *šìipól > šipól   šèiyú* 'let them be' > *šìiyú > šiyú > šiú*

The tendency to elide or assimilate such 'minimal' vowels is phonetically natural and particularly strong in grammatical formatives. As already noted, clitics, affixes and most function words (shorter than three syllables) usually do not carry lexical stress. Whatever stress they bear is normally a consequence of their syntactic or morphological position. Since they are often unstressed, or the stress they carry can be shifted almost unnoticeably through changes in syllable configuration, it is easier to reduce the vowels within them. Also, because of their frequency, they are easily recoverable from the residue of reduction.

5.4 *Possible e-assimilation and loss in the Bible*

Assimilation and loss of a schwa before another unstressed vowel appears to have had precedents in Biblical Hebrew. Some reduced variants may have resulted from conflation of different sources, each of which was 'too sacred to discard' when the Bible was codified.
        Some of these variants may have resulted from 'errors' by northern scribes, whose mastery of the southern dialect constituting 'Biblical Hebrew' was limited (see Rendsburg 1990, 2002). It is most likely, however, that many of them reflect stylistic and register variation, and that others may have resulted from the effect of casual reduction on scribe performance. When one copies great amounts of materials, which one may vocalize to increase copying efficiency, one is liable to lapse into 'ease of articulation' phenomena that will find their way to the orthographic representation. Another possibility Below are some illustrations (see Bolozky and Schwarzwald 1990, Bolozky 2003):

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(22) Jer 6:12 *wayyərappə'ū* 'and they healed'   Jer 8:11 *wayərappū ('et šever bat `ammī)*

ISam 1:27 *šə'ēlāθī* 'my request'   ISam 1:17 *šēlāθēx* 'your f.s. request'

Gen 38:27 *tə'ōmīm* 'twins'   Gen 25:24 *tōmīm*
Ps 29:6 *rə'ēmīm* 'unicorns'   Ps 22:22 *rēmīm*

(23) IKgs 18:12 *ləhaggīð* 'to tell'   IIKgs 9:15 *laggīð*
Is 10:7 *ləhašmīð* 'to destroy'   Is 23:11 *lašmīð*
Jer 41:5 *ləhāvī* 'to bring'   Jer 39:7 *lāvī*
IISam 19:16 *ləha`ăvīr* 'to make cross'     IISam 19:19 *la`ăvīr*
Dt 3:24 *ləhar'ōθ* 'to show'   Dt 1:33 *lar'ōθ*

(24) Dan 11:34 *ūvəhikkāšlām* 'and on their failing'   Prv 24:17 *ūvikkāšlō* 'and on his failing'
IKgs 18:2 *ləhērā'ōθ* 'to be seen'   Ex 34:24, Dt 31:11, Is 1:12 *lērā'ōθ*
ləhē`ānōθ* 'to humble oneself'     Ex 10:3 *lē`ānōθ
bəhēhārēɣ 'on being killed'   Ezek 26:15 *bēhārēɣ*
bəhē`āt,.ēf* 'on fainting'     Lam 2:11 *bē`āt,.ēf

(25) Same as preceding, in Mishnaic Hebrew:
lēhārēɣ 'to be killed'   *lēhānōθ* 'to enjoy'   *lit,.t,.āhēr* 'to be purified'
lit,.t,.āmē 'to be desacrated'   *likkānēs* 'to enter'   *lissāqēl* 'to be stoned'
ləhinnāśē 'to be married' ~ *linnāśē*   *ləhiggāzēz* 'to be cut' ~ *liggāzēz*
ləhiššāvā`* 'to swear' ~ *liššāvā`

The following is a possible casual speech process,

(26) /*bəyəhūðā*/ 'in Judea' > *biyəhūðā* > [*bīhūðā*]
/*ləyəhūðā*/ 'to Judea' > *liyəhūðā* > [*līhūðā*]
/*miyyəhūðā*/ 'from Judea' > *miyəhūðā* > [*mīhūðā*]

5.5 *Very fine manner and place of articulation distincti*ons

Regressive voicing assimilation is very common in Hebrew (see Bolozky 1997), but there are also cases in which splitting the obstruent sequence with *e* is the preferred solution:

(27) /*avád+ti*/ 'I worked' > *avádeti* ~ *avátti*
/*btixut*/ 'safety' (cf. *svirut* 'feasibility') > [*betixut*] ~ [*ptixut*]
/*btula*/ 'virgin' (cf. *švurim* 'broken, m.pl') > [*betula*] ~ [*ptula*]
/*btelim*/ 'idle; annulled, m.pl' (cf. *kvedim* 'heavy, m.pl') > [*betelim*] ~ [*ptelim*]

10

The two stops involved are produced in relatively close points of articulation (homorganic stops, labial and dento-alveolar, etc.), and consequently, the transition from one to another involves minute, almost-simultaneous adjustments that are not easy to perform: voicing, ceasing voicing, and immediately restarting voicing for the following vowel, and at the same time maneuvering two successive stops that are too close to each other to produce as distinct segments. Note, however, that in fast speech, the vowel may be elided, as long as voicing assimilation applies. Apparently, in fast speech there is no longer the need to maintain semantic differentiation between forms that voicing assimilation would make homonymous (e.g. *betixut* 'safety' and *ptixut* 'openness'). Thus again, the option of eliding the vowel once the need has been removed points out to such *e* being a true 'new' schwa.

6. Cases of segol that do not constitute a 'new' schwa in Israeli Hebrew

While there are many cases in which the *segol* is equivalent to the Biblical Hebrew schwa, there also exist others in which it is not. Thus, the *segol*, or former schwa, of forms like *tisgeri* 'you f.s will close' is not a 'new' schwa, but a regular *segol*, since it is **not** a phonetic requirement (**tis-gri* is pronounceable). The fact that it is not subject to elision under any circumstance – not even in fast speech – although there is nothing to prevent it from happening on phonetic grounds, suggests that it is part of a memorized *Ci+CCeC+V* pattern.

In forms like *telamed* 'she will teach' (cf Biblical Hebrew *tə-ðab-bér* above), *e* may be elided in casual/fast speech, as in

(28)   *i tèlaméd otò ivrít* 'she will teach him Hebrew' ~ *ìtlamédotòivrít*,

but the first condition for phonetic naturalness, i.e., that it be required to split or avoid impermissible clusters, excludes it from consideration as a 'new' schwa to start with. As in *tisgeri* above, it is not a phonetic necessity in Israeli Hebrew, since *tlaméd* is pronounceable even in isolation, and thus does not constitute a 'new' schwa; the *e* of *telamed* is part of the *Ce+CaCeC pi`el* pattern.

The same applies to a *segol* from former epenthetic *segol*. Although it may be elided in fast speech in forms like *sogéret* 'close, f.s,' as in

(29)   *i sogéret et a-délet* 'she is closing the door' ~ *ìsogértadélet*,

it is not a phonetic necessity, and the suffix is underlyingly /+et/, not /+t/.

a from *xataf-patax* (a very short *a* in Biblical Hebrew, which constituted a schwa-variant) is not a new schwa either: in *arugim* 'killed, m.p,' for instance (note: *h* is not realized), or *xašuvot* 'important, f.p,' (historically with ħ) the *a* is not a **phonetic** necessity (though it may be argued that it is required for semantic transparency), and cannot be elided. Apparently, speakers simply learn that *a* cannot be reduced in a sub-class of *CaCuC+im/+ot*, or they memorize a separate but related *aCuC+im/+ot* pattern.

The same claim is made for *e* from *xataf segol* (a very short *ɛ* in Biblical Hebrew, which also constituted a schwa-variant): the *e* in forms like *elohim* 'God; gods' never elides either.

There might be a difference in how 'schwa-like' these 'non-schwas' are, and the degree to which their 'schwa-like' status may depend on the likelihood of their being elided in casual/fast speech. Thus, as noted above, forms like *tisgeri* 'you f.s will close' never undergo elision in any speech style; the same is true of *arugim* 'killed, m.p' and *elohim* 'God; gods.' Such former schwas are clearly morpholo-phonologized. On the other hand, the fact that *telamed* 'she will teach' and *sogéret* 'close, f.s' do readily undergo *e*-elision may suggest that their *e*'s are more 'schwa-like'.

7. Conclusion

We can see that although the 'new' schwa does not correspond to **all** instances of the historical schwa (since in structures exemplified by *tisgeri* 'you f.s will close,' *telamed* 'you m.s will teach,' *sogéret* 'close, f.s,' *arugim* 'killed, m.p,' *xašuvot* 'important, f.p' or *elohim* 'God; gods,' it can no longer be considered a phonetic necessity), it still essentially fulfills the same function as in the Tiberian vocalization of Biblical Hebrew.

The test of whether a *segol* /ɛ/ is an instance of the 'new' schwa is the extent to which it is phonetically necessary, and the option of its being elided once the phonetic necessity has been removed. That type of elision is natural enough to have occurred in Biblical Hebrew too, and occasionally even in higher registers of Israeli Hebrew. Thus, the naturalness of phonological rules, and the segments they generate, can be measured by their behavior in fast/casual speech

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