

# The Changing Phonology of Modern Hebrew

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The Hebrew language has existed as an independent member of the Semitic subgroup of the Afro-Asiatic family for well over three thousand years. Until the mid-second century AD (around the time of the Bar-Kokhba revolt against the Romans), it served continuously as the spoken language of the Jewish inhabitants of Palestine, and it underwent gradual change like any other living language. However, after the Romans subjugated Palestine and exiled or killed most of its Jewish population, Hebrew ceased to be used as an everyday language (Kutscher 1982:116). It was maintained for nearly two millenia as a literary, religious, and poetic language by communities of Diaspora Jews in the numerous countries where they settled. In the nineteenth century, Zionists returning to Palestine resumed the use of Hebrew as a spoken language, essentially resurrecting it after many centuries in which there had been no native speakers.

Although Hebrew was not used as an everyday language during the Diaspora period, many traditions existed as to how it should be pronounced in prayers and poetry. These pronunciations were clearly influenced by the native languages of the speakers. For example, Jews in the Arab-speaking world tended to preserve the pharyngeal fricatives /ʕ/ and /ħ/ as contrastive phonemes, because these sounds are present in most varieties of Arabic (Kutscher 1982:249, Bolozky 1978:12). On the other hand, European Jews, who mostly spoke the Germanic language Yiddish, merged these phonemes with /ʔ/ and /x/ respectively. After the revival of Hebrew and the foundation of the state of Israel, children grew up speaking Hebrew as their first language and a standard pronunciation evolved. The sound system of Modern Hebrew continued to change as many non-native

speakers immigrated to Israel.

The phoneme inventory of Biblical Hebrew has been heavily reduced in Modern Hebrew. Although a few mergers<sup>1</sup> may have already taken place before the Diaspora, Biblical Hebrew originally had twenty-three consonant phonemes:

|   |   |   |                |   |    |   |   |   |   |
|---|---|---|----------------|---|----|---|---|---|---|
| p | b | t | t <sup>s</sup> | d | k  | g | q | ʔ |   |
| פ | ב | ת | ט              | ד | כ  | ג | ק | א |   |
|   |   | s | s <sup>s</sup> | z | ʃ  |   | ħ | ʕ | h |
|   |   | ס | צ              | ז | שׁ |   | ח | ע | ה |
| m |   | n |                |   |    |   |   |   |   |
| מ |   | נ |                |   |    |   |   |   |   |
|   |   | l |                | r |    |   |   |   |   |
|   |   | ל |                | ר |    |   |   |   |   |
| w |   |   |                | j |    |   |   |   |   |
| ו |   |   |                | י |    |   |   |   |   |

The place of articulation of the twenty-third phoneme /ʔ/, written שׁ, is uncertain (Kutscher 1982:13).

In Modern Hebrew, /ʕ/ has merged to [ʔ], /ħ/ has merged to /[/s], and /t<sup>s</sup>/ has merged to [t]. Additionally, /q/ has become [k], /ħ/ has become [x], and /w/ has become [v], so they no longer contrast with /k/, /k/, and /b/ respectively in some environments. This leaves only seventeen of the original contrastive consonants in some environments. Moreover, many speakers do not pronounce /ʔ/ at all in some environments or registers and they often vary /h/ freely with  $\emptyset$  (Chayen 1973:25). As for non-phonemic changes, the Biblical Hebrew emphatic /s<sup>s</sup>/ is now pronounced as the affricate [ts]<sup>2</sup>. Also, the rhotic /r/ is generally pronounced as the uvular fricative [ʁ] in most speech (Berman 1997:314).

The ancient geminate consonants have been degeminated in Modern Hebrew. A similar loss of the vowel tension (or maybe length) contrast occurred in the vowel system: Biblical Hebrew had five contrastive vowel qualities and what was probably a [ $\pm$  tense] distinction. Modern Hebrew has preserved the five-vowel system /i e a o u/, but has

<sup>1</sup>It is likely that /ħ/ and /s/ merged in the Mishnaic period, around 300 BC–100 AD (see Kutscher 1982:120-122)

<sup>2</sup>Normally written as the /c/ phoneme, so as not to be confused with the /ts/ sequence, which also occurs in Modern Hebrew.

lost the additional contrast.

Modern Hebrew has not only lost many of the phonemes of Biblical Hebrew but has created new ones as well. In Biblical Hebrew, the oral stops /p b t d k g/ were subject to a simple lenition rule that caused them to be realized allophonically as /f v θ ð x ɣ/ in any postvocalic environment:

$$\left[ \begin{array}{l} - \text{continuant} \\ - \text{geminate} \end{array} \right] \rightarrow [+ \text{continuant}] / V \text{ —} \quad (1)$$

However, as mentioned above, in Modern Hebrew the historical phonemes /ħ/ and /w/ are now realized as [x] and [v]. Based on the “splits follow mergers” principle, /x/ and /v/ have now achieved phonemic status, since they are contrastive in some phonetic environments. Because it was not involved in a merger, /f/ has not fared similarly, although it may have marginal phonemic status due to its presence in some loanwords. In Modern Hebrew, /g/, /d/, and /t/ do not have fricative allophones.

Due to the loss of numerous consonants, geminates, and historical schwa (which broke up certain disallowed consonant clusters, see Bolozky 1978:34), many of the very regular phonological rules of Biblical Hebrew have lost their conditioning environments in Modern Hebrew. Yet in some cases the results of these phonological rules appear “frozen” in Modern Hebrew. That is, the surface forms still show the results of these rules although it is difficult to explain how the underlying forms could still contain the conditioning phonemes. As Bolozky observes,

With historical phonetic conditioning being obliterated this way, it transpires that phonetically conditioned variation is relatively limited in Modern Hebrew — although low-level phonetic processes do account for some expected, almost universal allophones of the language; for example, nasal assimilation may optionally yield a velar nasal before a velar stop, . . . In most cases, however, allophonic variation does not seem to offer the kind of insight into the sound system of Modern Hebrew as is afforded by the rich array of its morphophonemic variations. (Bolozky 1978:15).

Identifying these seemingly anachronistic phonological rules is fairly easy because the Hebrew orthographical system completely preserves the distinctive consonantal phonemes

of Biblical Hebrew.

One of the most interesting problems of Modern Hebrew phonology, and the focus of the remainder of this paper, concerns the distribution of the sounds [k] and [x] in Modern Hebrew. These are the reflexes of three Biblical Hebrew phonemes /q k ħ/. In Biblical Hebrew, /k/ was realized as [x] post-vocally, by lenition rule (1) as previously noted. Due to the above-mentioned sound changes, Modern Hebrew now has two sources of [k] and two sources of [x]. Yet in many cases, it appears as if modern speakers must “know” the etymology of the words that they pronounce, because modern surface forms appear to show the results of phonological rules acting on the phonemes /q k ħ/, which no longer exist as such.

Kutscher points out the fact that surface forms containing [x] apparently obey different sets of phonological rules depending on their etymology:

...the classical Hebrew system, which has partially broken down in Israeli Hebrew, does nonetheless exist to a large extent in Israeli Hebrew. For example, while [x] < [Biblical Hebrew /k/] may have a phonemic character, it may also function as an allophone of [Modern Hebrew /k/] as in Biblical Hebrew, e.g., כתב [ktav] ‘writing’ but בכתב [bixtav] ‘in writing’. This is not the case, however, with [x] < [Biblical Hebrew /ħ/]! The same applies to [k] < [Biblical Hebrew /k/], which, as mentioned, has an allophone [x], but not to [k] < [Biblical Hebrew /q/] which always remains [k], e.g., קרב [krav] ‘battle’ but בקרב [bikrav] ‘in battle’. (Kutscher 1982:250)

The examples used by Kutscher suggest that [ktav] ‘writing’ and [krav] battle have different underlying representations in Modern Hebrew because their initial segments respond differently to the prefixed preposition /b/ despite the fact that they are in essentially the same phonetic environment in both words. Yet in other cases we find that etymologic /k/ does *not* weaken to [x] after the /b/ prefix: [bəkita] ‘in a classroom’ < /kita/ ‘classroom,’ and [bəkise] ‘in a chair,’ for example.

In another set of words containing [x] in Modern Hebrew, where this phone is the reflex of Biblical Hebrew /ħ/, the surface forms reflect different phonological rules. One such rule actually applies to all of the so-called “guttural” phonemes of Biblical Hebrew, the pharyngeal fricatives /ħ ʕ/ and the glottal stop and fricative /ʔ h/. In Biblical

Hebrew, these consonants tended to have a lowering effect on the vowels around them. The low vowel /a/ was always epenthesized between a non-low vowel and a word-final guttural<sup>3</sup>:

$$\emptyset \rightarrow [a] / \left[ \begin{array}{l} + \text{syllabic} \\ - \text{low} \end{array} \right] \text{ — } \left[ \begin{array}{l} + \text{cons} \\ + \text{back} \end{array} \right] \# \quad (2)$$

Thus Biblical Hebrew had contrasts such as [šaweaʔ] ‘satisfied (m. sg.)’ ⇔ [šaweaʔim] ‘satisfied (m. pl.),’ [ʔaliaħ] ‘messenger (m.)’ ⇔ [ʔaliaħim] ‘messengers (m.),’ and [gavoah] ‘tall (m. sg.)’ ⇔ [gavoahim] ‘tall (m. pl.).’ In Modern Hebrew, although the pharyngeal fricatives /ħ ʔ/ are now invariably pronounced as  $\emptyset$  and [x] in word-final position, and thus are no longer phonetically [+back], the low vowel is still epenthesized where it would have been according to the ancient rule (2). However this does not occur in other Modern Hebrew words ending in  $\emptyset$  and [x] which historically had final /ʔ/, /ħ/, or /k/. For example, Modern Hebrew has [namux] ‘short (m. sg.)’ ⇔ [namuxim] ‘short (m. pl.).’

How can we analyze these alternations? What changes in the underlying forms and phonological rules of Biblical Hebrew could produce the surface forms observed in Modern Hebrew? It is apparent that a simple mapping of Biblical Hebrew /q k ħ/ → Modern Hebrew /k k x/ is utterly insufficient. One possible explanation for the seeming persistence of the /q k ħ/ phonemes in the synchronic grammar of Modern Hebrew is that these phones are simply “irregularities” or “artifacts” of Biblical Hebrew which must be memorized by Hebrew speakers. This occurs in other languages: English speakers memorize forms such as *tear/tore/torn*, *dig/dug/dug*, and *goose/geese*; their irregular morphology is the result of *umlaut*, formerly a productive phonological process in English.

However, there is a variety of evidence that indicates that forms containing reflexes of Biblical Hebrew /q k ħ/ cannot be explained as simply frozen irregular forms. Firstly, they are very numerous compared to the number of strong verbs and irregular nouns in

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<sup>3</sup>Since “the glottal stop /ʔ/ could never close a syllable” (Bolzky 1978:41-42), it did not feed this rule, having been deleted previous to its application

English. They defy classification on the basis of category and to some extent morphology and frequency. Moreover, Bolozky (1978) observes<sup>4</sup> that children sometimes epenthesize [a] before word-final [x] when this phone is actually derived from etymologic /k/ and not /ħ/. This is extremely revealing: it shows that rule (2) can be hyperextended, and thus it, or some variant of it, must be a productive rule even in Modern Hebrew.

Other evidence shows that lenition of /x/ can in some cases be extended beyond its original post-vocalic domain (see rule (1)). Ben-Horin and Bolozky (1972) give as examples the free variation of [limkor] ~ [limxor] ‘to sell’ and [liskor] ~ [lisxor] ‘to rent.’ They also observe lenition of /b/ and /p/ in non-post-vocalic position.

As Bolozky says of stop lenition in Modern Hebrew phonology, “the overall picture is one of a state of flux.” However one explains the lenition and pre-guttural [a]-epenthesis in Modern Hebrew, the phonological system governing these processes must be quite complex and hence unstable. Either Modern Hebrew has an extremely large number of irregular words which are exceptions to its phonological rules, or it contains phonological rules that apply to groups of phonemes which are *never* realized distinctively in surface forms.

Some regularities are already emerging which may simplify the complicated underlying phonology of Modern Hebrew. For example, Bolozky’s observations of hyperextension of the epenthesis of [a] before [x] in child and colloquial speech suggest that the rules governing this phenomenon are becoming simpler and more regular. Specifically, they show that children are learning that a normal rule affecting word-final NON-LOW V + [x] is:

$$\emptyset \rightarrow [a] / \left[ \begin{array}{l} + \text{ syllabic} \\ - \text{ low} \end{array} \right] \text{ — } [x] \# \quad (3)$$

However, this does not apply in all cases, clearly, because many *segolate* nouns (stressed on the penultimate rather than final syllable) show no signs of this rule: [mélex] ‘king,’

<sup>4</sup>Similar hyperextensions also occurs less frequently in adult speech; Bolozky mention a few cases in which another rule applying to etymologic /ħ/ is overextended in colloquial speech.

[dérex] ‘way,’ [sámex] ‘letter of Hebrew alphabet,’ and [xó]ex] ‘darkness.’ There are also many *segolate* nouns that historically contained final /ħ/, but in all of these words the vowel of the final syllable is realized as [a] (and is presumed to be /a/ underlyingly in Modern Hebrew), and thus neither rule (1) nor (3) would act on them.

Conversely, all of the words that historically contained /ħ/ and underwent rule (1) have final stress underlyingly: for example, [lokéax] ‘take’ < /lokéħ/, and /saméax/ ‘happy, be happy’ < /šaméħ/. Perhaps children learning to speak Hebrew today are attempting to distinguish between historical /ħ/ and [x] < /k/ on the basis of stress. The two words that Bolozky cites as examples of hyperextended [a]-epenthesis are both stressed on the second syllable: [no]féax] instead of [no]féx] ‘bite’ and [lehafríax] instead of [lehafríx] ‘to refute.’ Thus, it seems reasonable to suppose that children actually learn a more selective version of rule (3):

$$\emptyset \rightarrow [a] / \left[ \begin{array}{l} + \text{syllabic} \\ - \text{low} \\ + \text{stress} \end{array} \right] \text{ — } [x] \# \quad (4)$$

Of course, there are still exceptions. The very common verb [holéx] ‘go’ is never pronounced [holéax], but this may be less problematic because it is natural for more common verbs to retain conservative forms, as is the case for the strong verbs in English.

Determining the exact conditions under which [k] undergoes lenition in Modern Hebrew is bound to be a difficult problem because of the absolutely exceptionless requirement that [k] < historical /q/ never undergo lenition. It also seems as if there may be morphological constraints on lenition of [k]. As noted earlier, [bixtav] ‘in writing’ < [ktav] shows the result of [k]-lenition while [bəkita] ‘in a classroom’ < [kita] does not. Likewise, [bixdi] ‘in vain’ and [lixlol] ‘to include, generalize’ shows lenition while [ləkulam] ‘to everyone’ does not. There seems to be a general pattern: only when a PREFIX + NOUN or PREFIX + VERB combination has a somewhat bound or fixed meaning not easily analyzable as the combination of the meaning of its parts, the initial stem consonant may undergo lenition (stems beginning with [b] or [p] also appear to adhere to

this pattern). Note also that [bixtav], [bixdi], and [lixlol] are bisyllabic with a CVCCVC pattern, very common in Hebrew when a fourth consonant<sup>5</sup> is added to words with three stem consonants. Compare with [kotev] ‘write (masc. sg.),’ [kolel] ‘include (masc. sg.),’ and [katvu] ‘they wrote.’ In contrast, [bəkita] and [ləkulam] are trisyllabic.

This evidence indicates that there are probably multiple levels of morphology and phonology in Hebrew, similar to the Level Ordering Hypothesis in English (for a very good description see Plag 1999:54-5). If we accept two levels of morphology and phonology in Modern Hebrew, then we may posit that in the first level of morphology, more opaque or more syntactic affixes with less semantic content are bound to stems. Next, in the first level of phonology, lenition of the stops [k p b] occurs. Affixation of more transparent affixes with more semantic content would then occur in the second level of morphology.

If level ordering or a similar framework were accepted as part of the synchronic grammar of Modern Hebrew, this would go a long way towards explaining why stop lenition does not occur in some phonological environments in Modern Hebrew where it did occur in Biblical Hebrew. Unfortunately, it cannot explain why Biblical Hebrew /q/, now pronounced [k], does not undergo lenition. For example, it does not explain why [mélex] ‘king’ and [mláxim] ‘kings,’ (historically from /málk/ according to Bolozky 1999:39) are pronounced differently from [délek] ‘fuel’ (historically from the stem /dálq/) and [dlákim] ‘fuels’ in Modern Hebrew. We cannot simply suppose that the [x] of [mélex] has been reanalyzed as underlying /x/ in Modern Hebrew because of the obviously related forms [malká] ‘queen’ and [malkót].

Some of the remaining difficulties in analyzing [k] and [x] may be due to Modern Hebrew’s heavy reliance on discontinuous or radical morphology (a feature that it shares with all Semitic languages), in which consonantal roots are overlaid with discontinuous sequences of vowels to form complete words. In Modern Hebrew, these roots typically

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<sup>5</sup>Final high vowels /u i/ were historically the glides /w j/

consist of three consonantal phonemes, sometimes four, and occasionally just two. Generally only content words (nouns, verbs, adjectives, and deadjectival adverbs) take part in discontinuous morphological processes, while function words have a more or less continuous and fixed form. In Modern Hebrew, discontinuous morphology totally dominates the verb system: for example, [kotev] means ‘write (masc. sg.),’ while [katavt] means ‘you wrote (fem. sg.),’ and [maxtiv] means ‘make write, dictate (masc. sg.).’ Discontinuous morphology is also important in the derivation of nouns and adjectives from verbs and vice versa.

Discontinuous morphology, unlike simple prefixation and suffixation, allows morphological processes to change the phonetic and prosodic environments of not only the initial and final segments of a morpheme, but all the medial segments as well. This can vastly increase the possibilities for allophony and other conditioned sound changes. Bolozky (1999:12) cites evidence that discredits “the common assumption of the ‘classical’ Semitic [discontinuous] root playing a central role in word-formation among even educated speakers” of Modern Hebrew. Instead, he claims that words are simply derived from other existing words, noting that “it is very difficult ... to identify a neologism which has no possible base in an existing word” (Bolozky 1999:18). He particularly stresses the fact that, in Modern Hebrew, consonant clusters are frequently preserved when new words are derived from old ones. For example, the word for ‘computerize’ is [mixʃev], rather than [məxaʃev] (the more typically form in the *pi‘el* conjugation pattern), due to the fact that it is derived from [maxʃov] ‘computer.’ Additionally, non-root consonants are often preserved in derived forms: for example, the verb [tirgel] ‘exercise (trans.)’ is derived from the noun [targil] ‘exercise,’ although the initial [t] of the noun was originally part of the discontinuous noun template on which the root consonants [r-g-l] were superimposed.

This method of derivation may help to explain why [k] < historical /k/ can alternate with [x], while [k] < historical /q/ cannot: as soon as a speaker knows two related words,

one of which contains [x] where the other contains [k], he or she is able to derive new forms containing [x] from the known words. However, when a speaker knows a set of related words all of which contain [k] in the same place, derivation of new forms containing [x] would be highly unlikely under the framework proposed by Bolozky. This theory is clearly incompatible with traditional phonology and morphology, because it supposes that new forms are derived from existing surface forms rather than from underlying representations.

The phonology of Modern Hebrew seems somewhat artificial overall. This is to be expected thanks to the recent and unusual circumstances of the revival of Hebrew as a living, spoken language. Because Hebrew was revered as a sacred and literary language, the revivers of Hebrew often attempted to piece together as many of the disparate components of the ancient language as they could. Not surprisingly, they often made mistakes, for example in reconstructing the tense system of Hebrew verbs (Kutscher 1982:190), and they attempted to juxtapose words or grammatical elements taken from different time periods of ancient Hebrew. As the language has now become the native language of some 5 million people, it has evolved rapidly, often erasing or reducing the idiosyncrasies of the reconstructed language.

In the domain of phonetics and phonology, however, the synchronic grammar of Modern Hebrew apparently remains quite complex and irregular. This is largely due to the fact that Modern Hebrew has lost or merged many of the phonemes of Biblical Hebrew, while retaining or seeming to retain many of the phonological rules and processes of the ancestor language, even when they now lack phonetic motivation or appropriate conditioning environments.

This makes it extremely difficult to formulate an accurate synchronic description of the inventory of Modern Hebrew phonemes and to determine the phonemic forms of words and morphemes. Some evidence, such as that presented by Bolozky (1999), suggests that underlying representations have diminished importance in the synchronic

description of the Modern Hebrew sound system. Nonetheless, we can observe certain processes underway in the language which are helping to regularize not only the surface forms of Hebrew words but also their underlying representations. In child speech we find an attempt to do away with phonological rules that distinguish between the two historical sources of the phone [x] and to replace them with new rules based on the synchronically defined property of word stress. Elsewhere, we observe that level ordering of phonology and morphology can explain at least some of the irregularities of lenition of oral stops.

It will be extremely interesting to follow the development of Modern Hebrew phonology as the language continues to change in the coming years and decades. Whether it retains its irregularities and seemingly unanalyzable surface structures or not, its evolution will help linguists to answer fundamental and universal questions about underlying phonemic representations and the extent and manner in which etymology can play a role in the synchronic grammar of a language.

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