

## Surface geminates (*dageš forte*) in Israeli Hebrew

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### 1. Geminaton in pre-modern Hebrew

In traditional Hebrew linguistics, *dageš xazák*, or *dageš forte*, is a term used for gemination, i.e., for a long consonant, represented either by a special mark, or by doubling the consonant. In syllable division, a geminate consonant is assumed to close one syllable and serve as the onset to the next one, as in *dib-bér* ‘he spoke.’ When a stop follows a vowel, it is normally transformed into the corresponding fricative, e.g., /b/ into [v]. Gemination, however, blocks spirantization, e.g., while /dabár/ ‘a thing; an act of speech’ is realized as [davár], *dibbér* is unaffected.<sup>1</sup> One of the most salient differences between Standard Israeli Hebrew (as distinguished from some Arabicized traditions) and earlier phases of the language is the loss of gemination in the former. What is left of it are only its historical residues. A word like Biblical Hebrew *dibber* is realized as *diber* in Israeli Hebrew. Spirantization is still blocked, but now it can no longer be explained why *davár* has undergone spirantization, while *dibér* has not, since the surface environment is the same.

Geminaton can also no longer account for the blocking of vowel deletion. In an open syllable, the vowel *a* is deleted (or was historically reduced to a schwa) two syllables before the main stress, as in:

- (1) *davár* ‘thing’ ~ /davar+ím/ > d(é)varím ‘things’  
*paqid* ‘clerk’ ~ /paqid+ím/ > p(é)qidím ‘clerks’

Historically, when a geminate consonant was present, the syllable concerned was closed, and deletion was blocked, so as prevent the formation of a three-consonant sequence (even with a schwa in between the first two, the sequence is still hard to articulate):

- (2) *pattíš* ‘hammer’ ~ *pattíším* ‘hammers’ (\*p(é)ttiším)  
*tappil* ‘parasite’ ~ *tappilím* ‘parasites’ (\*t(é)ppilím)  
*gannáv* ‘thief’ ~ *gannavím* ‘thieves’ (\*g(é)nnavím)

Since in Israeli Hebrew such words are realized without gemination, e.g., *patiším*, there is no *a priori* reason why /pakid+ím/<sup>2</sup> would undergo reduction, whereas /patiš+ím/ would not, not to mention the blocking of spirantization in *tappilím*. One might argue that historical geminates should still be posited underlyingly in Israeli Hebrew, to account for differences in behavior between superficially similar strings with respect to rules like spirantization and *a*-deletion; once the rules have applied (or in this case have failed to apply), we get rid of all

geminate. But by the same token, one could simply mark the relevant segments for not undergoing spirantization,<sup>3</sup> or for not allowing the preceding vowel to undergo reduction. There is no independent evidence that an actual **geminate** must be assumed there, since such geminates are never realized on the surface. One case for an intermediate level of representation that can be argued<sup>4</sup> to involve gemination is the class of verbs with initial *n*:

- (3) *nafal* ‘he fell’ ~ /*yi+npol*/ ‘he will fall’ > *yippol* > *yipol*

Although weakening and deletion of *n* at the end of syllables is expected, there is no evidence that it continues to be productive in Israeli Hebrew. In fact, exceptions to it occurred as early as in Mishnaic Hebrew. Since there is no independent evidence for mere *n*-deletion in cases in which historical *n*-assimilation is still maintained, nor for the spirant becoming a stop in cases like *yipol*, Ornan<sup>5</sup> suggests that such forms should be accounted for by an intermediate geminate and subsequent cluster-simplification, i.e., gemination would capture both the blocking of spirantization and ultimate “simplification” into a single *n*. It could then be claimed that if **some** theoretical germination is allowed one may as well posit it whenever it occurred historically, and simplify all geminates on the surface.

## 2. Avoiding intra-morphemic gemination in Israeli Hebrew

Pattern comparison suggests that in environments where potential geminates could arise within the morpheme, they are either broken with the minimal vowel *e*:

- |     |                            |                                   |                                    |
|-----|----------------------------|-----------------------------------|------------------------------------|
| (1) | <i>zalelán</i> ‘glutton’   | <i>xatetán</i> ‘meddler’          | cf. <i>kamcán</i> ‘miser’          |
|     | <i>noxexiút</i> ‘presence’ | <i>holeliút</i> ‘folly, hilarity’ | cf. <i>rolexiút</i> ‘pharmacology’ |

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

- (2) *xagág* ‘he celebrated’ ~ *xagegá* ‘she celebrated’  
 cf. *katáv* ‘he wrote’ ~ *katvá* ‘she wrote’  
*kucác* ‘it was cut’ ~ *kucecú* ‘they were cut’  
 cf. *šupác* ‘it was overhauled’ ~ *šupcú* ‘they were overhauled’  
*hitpalél* ‘he prayed’ ~ *hitpalelá* ‘she prayed’  
 cf. *hitlabés* ‘he got dressed’ ~ *hitlabšá* ‘she got dressed’

McCarthy regards the blocking of *e*-deletion in *xagegá*, etc. as “antigemination”<sup>6</sup>: syncope rules are prohibited from creating clusters of identical consonants. This is an immediate corollary of his Obligatory Contour Principle (OCP), which prohibits adjacent identical elements at the melodic level (either consonantal or vocalic, in an autosegmental analysis).

### 3. Geminate across morpheme boundary and in connected speech

Phonetically, geminate consonants do occur in Israeli Hebrew in some environments. Potentially, they **may** be formed across morpheme boundary, although their occurrence is only optional:

- (3) (a) when a suffix with initial *t* is appended:  
*šavát* ‘he was on strike’                      *šavátti* ‘I was on strike’ ~ *šaváteti* ~ *šaváti*  
*avád* ‘he worked’                              /*avádti*/ ‘I worked’ > *avátti* ~ *avádeti* ~ *aváti*
- (b) when a suffix with initial *n* is appended:  
*dán* ‘he discussed’                              *dánnu* ‘we discussed’ ~ *dánu*  
*yašén* ‘he slept’                                *yašánnu* ‘we slept’ ~ *yašánu*
- (c) when a prefix with final *t* is appended:  
*tamím* ‘naïve’                                      *hittamém* ‘he feigned naïveté’ ~ *bitamém*  
/ *bitdarder*/ > *hiddardér* ‘he deteriorated’ ~ *hidardér*

Autosegmental theory allows such geminates: the OCP does not apply to the across-morpheme-boundary cases since different morphemes are represented on different tiers.

In practice, however, among the three types in (5) above, it is mostly group 5a geminates (generated by a suffix with initial *t* being appended) that tend to occur in connected speech. In a study conducted by Aniv,<sup>7</sup> involving 12 speakers and some radio recordings, there were no instances at all of geminates in group 5c (generated by a prefix with a final *t*), and one marginal geminate occurred in group 5b (generated by a suffix with initial *n*). Where potential geminates could arise in group 5a, about half of the instances were split with *e*, and the other half were about evenly divided between cases in which the geminate was maintained and ones in which geminate simplification occurred. Aniv’s data, as well as data collected by the author, suggest that:

- (i) suffix-related ...*t+et* or ...*d+et* realizations can be found at all registers;  
(ii) suffix-related ...*t+t* gemination tends to occur when attention is high and in deliberate speech;  
(iii) complete assimilation of the same sequences (...*t+t* > *t*), i.e., geminate simplification, is characteristic of casual/fast speech.

While suffix-related *t+t* gemination is usually found in deliberate speech, the *e* which splits intra-morphemic geminates may elide when casualness and tempo are high, particularly when sonorant consonant and fricatives are involved (also supported by Aniv’s data), e.g.:

- (4) *od ló raíti zàlelàn kažèš* ‘I have never seen such a glutton’ > ...*žallàn*...  
yet not I saw glutton like this

*em kàlelú et àmorá* ‘They cursed the teacher’ > *èm kàllú tamorá*  
they cursed ac. the teacher

*yéš lo nòxexút norá maršimá* ‘He has an awfully impressive presence’ >  
there is to him presence awful impressive f.s.  
...*noxcut*...

*em šaxxú otò babáit* ‘They forgot him at home’ > *èm šaxxú to babáit*  
 they forgot him at home

but with stops:

*i šàtetá bakbúk šalém* ‘She drank a whole bottle’ > *??i šattá bakbúk šalém*  
 she drank bottle whole

In other words, casual/fast speech may further reduce any reducible sequence, even if the result turns out to be a surface geminate within what used to be the morpheme boundary before it was erased. Thus, although geminates occur only marginally in Israeli Hebrew, they are not totally excluded from any register. It is only within the morpheme in non-casual, deliberate speech that they are excluded. The notion of “strict cyclicity” may explain this constraint.<sup>9</sup> The strict cyclicity principle blocks rules from applying to environments derived in the same cycle, i.e., to environments arising either by morpheme combination or by application of a previous process. Casual/fast speech *e*-deletion is consequently blocked until the level of connected speech: it may apply neither at the base morpheme level, nor at the inflected word level, where *e* results from the appending of the suffix and the ensuing reduction of *a* to *e*. Even if the resulting geminates are within what used to be the morpheme, its boundaries have already been erased at earlier stages of the derivation by the time the processes of connected speech apply.

#### 4. Why some geminate configurations can only undergo geminate simplification and are never subject to geminate splitting

Except for the possible occurrence of geminates of the *šallán*-type in very fast/casual speech, the restriction on intra-morphemic geminates suffices to explain their absence within morphemes. The question is why across morphemes some types of geminates may be broken, while others may not. As shown above, the *šavát+ti* type often undergoes *e*-insertion, which breaks the surface geminate or a homorganic *d+t* sequence -- just as in English *prodded*, *wanted*, except that in English the process is obligatory. But the same never happens to forms like */hit+tamém/* or */hit+dardéér/*, nor to */dán+nu/* or */yašán+nu/*:

- (5) *šavátti* ‘I was on strike’ ~ *šaváteti*                      */avádti/* ‘I worked’ > *avátti* ~ *avádeti*  
 \**yašánenù* ‘we slept’    \**dánenù* ‘we discussed’  
 \**hitétamém* ‘he feigned naïveté’                              \**hitédardér* ‘he rolled down/deteriorated’

As already noted, the */hit+tamém/* and */dán+nu/* types avoid gemination by cluster simplification rather than by cluster split; the question is why the option of degemination by insertion of an epenthetic *e* is totally excluded for these types. Boložky (1997)<sup>10</sup> proposes that inapplication of *e*-insertion in the */hit+tamém/* type means that the process is restricted to sequences involving an **inflectional** affix (*/hit+ /* being a derivational affix), and that it is

blocked in *dánnu* (/+nu/ being inflectional) since *\*dánenu* would have been interpreted as stemming from a geminate root *d.n.n* instead of the correct *d.w.n* (or *š.n.n* instead of *y.š.n* in the case of *\*yašánnenu*). Reevaluation of the data suggests that the reasons are rooted in more solid **phonological** grounds. It essentially has to do with the role of sonority -- or its inverse, consonantal strength -- in determining syllable structure.

#### 4.1 A sonority-based explanation for the blocking of geminate splitting in some configurations

Constraints on syllable structure are often based on the sonority scale. Thus, for instance, the syllable nucleus must be a sonority peak, i.e., a vowel. But in the absence of a vowel, a syllabic consonant may also fulfill this function, e.g., the *n* in English *bu[tn]* ‘button,’ or the *r* in Czech *[br-no]* ‘Brno.’ Sonority scales may differ across languages, but universally, a preferred syllable is one in which the consonants in the syllable onset are arranged in order of increasing sonority towards the nucleus, which is why English *[brejk]* ‘break’ is acceptable but not *\*[rbeyk]*. The reverse order (i.e., gradually decreasing sonority) applies to the progression from the nucleus to the end of the coda, i.e., *pu[?k]* ‘punk,’ but not *\*pu[k?]*. If sequences violate the sonority scale arise, e.g., in the process of borrowing, the sequence must either be broken, or divided between two syllables, or simplified. Hebrew often adopts the first two strategies: */bércl/* ‘Herzl’ > *[bércel]*, */stratégya/* ‘strategy’ > *[as-tratégya]*. Another principle (Vennemann’s 1988 “Contact Law”)<sup>11</sup>: a syllable consonantal contact (i.e. where one syllable ends and the next one starts) is preferred when the offset of one syllable is more sonorant than the onset of the next one, and the greater the difference in sonority, the more preferred is the contact.

One of the criteria for preferred syllable head is that the sonority of the consonantal onset be as low as possible (Venneman’s “Head Law (b)”). Again, the principle underlying it is maximization of sonority distinctions: since the nucleus is a vowel (or a sonorant consonant), and any vowel is more sonorant than a consonant, then the lesser the sonority of the consonantal onset, the more optimal the consonant-vowel sequence is. In our case, *n* is not a preferred onset, since it is a sonorant consonant, i.e., a consonant of high sonority. Furthermore, the *ne* that would have been generated by epenthesis in */dán+nu/* > *\*dánenu* would also be non-optimal in view of the similarly-motivated “Sequence Law”:<sup>12</sup> a sequence of elements (e.g., segments, syllables) is preferred when the adjacent components are less alike (in sonority and otherwise). In the case of *ne*, the vowel and the sonorant consonant are not far from each other on the sonority scale. *te* in *aváteti*, on the other hand, is preferred because of the significant sonority/strength difference between *t* and *e*. The same explanation may be used to account for the preference for sonorants when intra-morphemic geminates resurface, e.g., in *šalelán* > *šallán* etc. above, where *l* and *e* are close in sonority. Although *ll* appears to constitute an instance of “ultimate similarity,” we are actually dealing with a single long consonant, which is far easier to articulate in fast speech than a *lel* sequence. Starting with a sonorant consonant, continuing with a vowel that is of not much

greater sonority, and then shifting back to *l*, is not easy to articulate. Not so in the case of *tet*, where the sonority difference between the stops and the intervening vowel is significant. Although it could be argued that by the same reasoning, *\*bitètamém* should have been as good an alternative for getting rid of the geminate as geminate simplification (*/hittamem/* > *hitamem*), the difference is in the number of unstressed syllables involved. In the case of *aváteti*, there are two unstressed vowels following the main stress; mechanical secondary stress may apply to the final *i*, which is natural. A sequence of three unstressed syllables in *\*bitètamém* is highly irregular, and for mechanical secondary stress to fall on the inserted *e* is unusual.

#### 4.2. An orthography-based explanation for the blocking of geminate splitting

Another approach would invoke the orthography: whereas *dánnu* and *hittamem* are always represented with a single consonant in Hebrew writing, *šavát(e)ti* can be found with either one or two consonants, and *avád(e)ti* certainly maintains the two (orthographic) consonants regardless of how it is realized phonetically. Since we are talking of the formal/slow register, which is clearly affected by literacy, straightforward explanations from orthography are not to be pushed aside as irrelevant.

In fact, the possibility that orthography plays a role here may be more significant than it initially appears to be. Although the loss of gemination is mostly a function of the non-Semitic linguistic substratum of the Ashkenazi speaker community, it is also possible that the absence of gemination marking in normal Hebrew texts was a factor in making this loss easy to accept. Had there been an unbroken chain of speech, it would not have occurred. And as for Arabicized traditions that maintained gemination in spite of the absence of live Hebrew speech, it is obviously the Arabic substratum that encouraged its preservation.

### 5. Conclusion

Gemination is usually not realized phonetically in Israeli Hebrew. Although there is certain evidence for employing it at the underlying abstract level,<sup>13</sup> in most cases it would only be postulated so as to serve as a marking device to either trigger or block an historical process, only to be disposed of later across the board. It is generally excluded from within morphemes, and where potential geminates could arise intra-morphemically, they are split by the minimal vowel *e*. Geminates may optionally arise across morphemes boundaries. When they result from adjoining *+t...* suffixes to stems ending in *t* or *d*, the geminate may be maintained in formal/deliberate speech. Also, in connected speech, at high speech tempo and increased casualness, *e*-deletion may result in the type of geminates that are normally prevented from occurring in normal speech by this very same *e*. In most environments, however, geminates undergo geminate simplification. Since geminates can be gotten rid of either by cluster simplification or *e*-epenthesis, the choice of degemination device can be accounted for by referring to sonority considerations, or to the effect of orthography.

## Notes

<sup>1</sup> Gemination blocks spirantization either because a long consonant is more resistant to lenition, or because regressive assimilation undoes its effect, e.g., *dibbér* > \**divbér* > *dibber*.

<sup>2</sup> Note that in Standard Israeli Hebrew, /q/ merges with /k/.

<sup>3</sup> Actually, in the case of spirantization, the rule has become heavily morphologized, and reduced to certain limited environments. It is possible that instead of marking exceptions to it, it is the items undergoing it or the environments allowing it that should be marked.

<sup>4</sup> Uzzi Ornan, "Theoretical gemination in Israeli Hebrew," *Semitic Studies in honor of Wolf Leslau*, A.S. Kaye (ed), Otto Harassowitz Publication, 1991, pp. 1158-1168.

<sup>5</sup> Ornan, op. cit.

<sup>6</sup> John J. McCarthy, "OCP effects: gemination and antigemination," *Linguistic Inquiry* 17:2, 1986, pp. 207-263.

<sup>7</sup> Hadas Aniv, "*bageminácyá hafonétit bairvit hayisreelit* (Phonetic gemination in Israeli Hebrew,)" 1997, Ben-Gurion University ms.

<sup>8</sup> A grave accent mark represents mechanical secondary accent. Bolozky ("Remarks on rhythmic stress in Modern Hebrew," *Journal of Linguistics* 18, 1982, pp. 275-289) shows that secondary stress in Israeli Hebrew tends to alternate fairly regularly, i.e., is normally assigned to every other syllable away from the main stress. If the secondary stress of one word clashes with the primary stress of another, the former undergoes destressing.

<sup>9</sup> On strict cyclicity see Paul Kiparsky, "From Cyclic phonology to lexical phonology," in H.van der Hulst and N. Smith (eds.), *The Structure of Phonological Representations (Part I)*. Dordrecht: Foris, 1982, pp. 131-175, and Shmuel Bolozky, "The domain of casual processes in Modern Hebrew," *Linguistic Analysis* 15:1, 1985, pp. 19-27.

<sup>10</sup> Shmuel Bolozky, "Israeli Hebrew phonology," Chapter 17 in A. S. Kaye and P. Daniels (eds.), *Phonologies of Asia and Africa*, Winona Lake: Eisenbrauns, Vol. 1, 1997, pp. 287-311.

<sup>11</sup> Theo Vennemann, *Preference Laws for Syllabic Structure and the Explanation of Sound Change, with Special reference to German, Germanic, Italian and Latin*, Berlin/New York/Amsterdam: Mouton de Gruyter, 1988.

<sup>12</sup> Lutz Edzard, "Semitic phonology and preference laws for syllable structure," *The Journal of the Association of Graduate Near Eastern Studies, UC-Berkeley* 1:1, 1990, pp. 34-44.

<sup>13</sup> Cf. Ornan, op. cit.