Paradigm uniformity and the locus of derivation: The case of Hebrew vowel epenthesis

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Introduction: We examine vowel epenthesis in Hebrew verbs with stem-medial glottals. The stem-internal epenthetic vowels of these verbs colloquially display variation in some verbal templates, (e.g. *nivhala/nivhela* 'become scared'-3rd-fem.sg) and consistency in others (e.g. *mihara* 'hurry'-3rd-fem.sg, *huvhela* 'be rushed (to hospital)'). We provide empirical evidence for the variation (or lack thereof), accounting for the differences among verb templates and the variation by appealing to paradigmatic faithfulness constraints, and grammatical components deriving verbs. We argue that vowel selection is motivated by competing faithfulness among three different paradigms: other feminine third person forms, base forms, and the general inflectional paradigm (McCarthy 2005). The variation (or lack thereof) results from the component of the grammar deriving verbs lexicon vs. syntax.

General: Hebrew verbs are formed in templates called *binyanim* (*binyan* sg.), e.g., *CiCeC (xibek* 'hug'). The *binyanim* differ in vocalic patterns, syllabic structure and affixation. We examine the *binyanim CiCeC*, **ni***CCaC* and **hu***CCaC*. In inflection, the second stem vowel in these *binyanim* is generally lowered to *a* (e.g. *xibek+ti*→xib**a**kti 'I hugged'). This vowel is deleted with vowel initial suffixes (e.g. *xibek+u*→*xibku* 'they hugged'). 3rd person fem. past verbs are formed by the vowel initial suffix *–a*. Resulting tri-consonantal clusters are avoided by *e*-epenthesis in *niCCaC* (1b) and *huCCaC* (1c). There is no epenthesis in *CiCeC* (1a).

(1) Fem. 3rd person conjugation

masc. form		fem. form
a. siper	'tell'	sip**e**r+a>sipra
b. nisraf	'be/get burnt'	nisr**a**f+a>ni**sr_f**a>nisrefa
c. hudpas	'be printed'	hudp**a**s+a>hu**dp_s**a>hudpesa

However, when the medial consonant is a glottal (*h* or *ʔ*), the epenthetic vowel, normatively *a* in all *binyanim*, is also produced as the epenthetic vowel *e* in some cases, as shown in (2).

(2) Fem. 3rd person conjugation of verbs with glottals

masc. form		normative fem. form	colloquial fem. form
miher	'hurry'	mih**a**ra	mih**a**ra/mih**e**ra
nivhal	'become cared'	nivh**a**la	nivh**a**la/nivh**e**la
huval	'be rushed (to hospital)'	huvh**a**la	huvh**a**la/huvh**e**la

Speaker preferences were tested in an experiment we conducted, where 24 native speakers of Hebrew, aged 22-29 (12 men, 12 women) read a text aloud. The text contained 14 tri-consonantal verbs with medial glottals in: 4 in *CiCeC* and 5 in *niCCaC* and *huCCaC*.

Results: Speakers demonstrated consistency in the epenthetic vowel quality in *CiCeC* (*a*) and *huCCaC* (*e*). In *niCCaC*, in comparison, there was noticeable variation, as shown in (3).

(3) a/e selection

binyan/epenthetic vowel	a	e
CiCeC	84%	16%
huCCaC	17%	83%
niCCaC	45%	55%

Two questions emerge from these results: (i) What determines the vowel quality in *CiCeC* (*a*) and *huCCaC* (*e*)? (ii) Why is there variation in the epenthetic vowel in *niCCaC* (*a/e*)?

Selecting an epenthetic vowel: The epenthetic vowel quality is determined by competing faithfulness paradigm uniformity constraints: faithfulness to the base, to the general inflectional paradigmatic vowel (*a*), and to other 3rd-person-fem. forms in the same *binyan*. The base forms in *CiCeC* and *huCCaC* consist of *e* and *a* respectively. However, participants demonstrated a strong tendency to select *a* in *CiCeC* and *e* in *huCCaC*. *huCCaC* verbs with no medial glottals systematically select the epenthetic vowel *e* (e.g. *hukleda* 'be typed'), which is highly accessible within the fem. inflection system in this *binyan* (Faust 2011/2013) and is therefore selected for glottals as well. In *CiCeC* verbs, however, there is normally no epenthetic vowel in fem. forms, unless the verb consists of a glottal or a homorganic cluster (e.g. *sinena* 'filter'). *e* is less accessible as an epenthetic vowel within *CiCeC* paradigms, and is subsequently hardly selected for glottals. Instead, speakers appeal to the general paradigmatic vowel *a* that surfaces in other forms (e.g. *miharti* 'I hurried'). This shows the importance of paradigm accessibility in morpho-phonological alternations in inflection. The results show that faithfulness to other fem. forms outranks faithfulness to the general inflectional paradigm.

Variation in the selection of a/e: Based on the same faithfulness constraints discussed so far, one would expect the preferred epenthetic vowel in *niCCaC* verbs to be *e*, as in *huCCaC*. *niCCaC* verbs with no medial glottal also consist of the epenthetic vowel *e* systematically (e.g. *nixnesa* 'enter'). However, participants equally selected *a* or *e*. What triggers such variation? There seems to be no morphological or phonological reason for the differences between *niCCaC* and *huCCaC*. We argue that the variation within *niCCaC* verbs, in contrast to *CiCeC* and *huCCaC*, results from the component of the grammar where the verbs in these *binyanim* are derived. Hebrew *binyanim* differ from each other mostly with respect to transitivity and the semantic type of verbs that they tend to host. *CiCeC* tends to host transitive verbs that are basic entries in the lexicon. *niCCaC* verbs are mostly derived from other transitive verbs by valence changing and stored in the lexicon as derived entries. *huCCaC* verbs are passive forms assumed to be derived in the syntax rather than stored in the lexicon (Reinhart & Siloni 2005, Horvath & Siloni 2008). Verbs that are stored as derived entries in the lexicon are more exposed to variation and change (Laks 2013). In contrast, verbs that are derived in the syntax demonstrate higher regularity, as the morphological processes apply online. Passive verbs are syntactically derived and are less frequent in use; hence their formation is more automatic. As a result, there is greater use of the default epenthetic vowel *e*, as demonstrated in other word formation processes in Hebrew. The vowel *a*, in contrast, has a more morpho-lexical status. It is the most unmarked vowel and it is part of various word formation processes, e.g. acronym formation (Plada 1959, Bat-El 1994, Bolozky 1999/2003, Schwarzwald 2002/2013, Schwarzwald & Cohen-Gross 2000). Basic entries in the lexicon tend to take *a* as an epenthetic vowel, while verbs derived in the syntax tend to take *e*. *niCCaC* has a unique status with respect to both morpho-phonology, semantics and syntax (Bat-El 2001/2002, Schwarzwald 1996/2008). Verbs in this *binyan* have an intermediate status, namely they are derived but still stored in the lexicon, and as such they have features of verbs both from the lexicon and from the syntax. This answers the second question, namely why we find variation of the epenthetic vowel in this *binyan*.

The results of this study show the importance of paradigm accessibility in morpho-phonological processes. In addition, they point to a high correlation between the degree of variation in such processes and the locus of application and storage – lexicon vs. syntax.