A Study of Nominal Reduplication in Modern Hebrew*

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The purpose of this study on reduplication is a better understanding of templatic word formation in the nominal system of Modern Hebrew. Hebrew, as other Semitic languages, is known for its templatic word formation. In the traditional grammar templates are assumed both in the nominal and in the verbal system and determine the prosodic shape and the vocalic content of the word. Current research has focused mainly on the verbal system for the obvious reason that the verbal system is solely templatic, in the sense that there exists no verb form, and there cannot exist any verb form, which does not conform to some template (a cell in the paradigm of a specific *Binyan*). The nominal system was studied less attentively. The nominal system of Hebrew is not as homogenously templatic as the verbal system and there are in fact not many instances of clear templatic formation. The most conspicuous cases of templatic formation are the class of the Segolates (type *melex* 'king') and diminutive-formation via reduplication, to be discussed here. It should be noted, however, that instances of templatic formation can be found all over the nominal system, though they are mostly combined with suffixation (*pakid* → *pkid+ut* 'clerk ~ clerical work'). These instances were not studied systematically until now.

Previous research on templates, and especially on reduplication – in Hebrew and elsewhere – has shown that the non-concatenative nature of Semitic languages, which was taken to be cross-linguistically unique, can be brought closer to the grammar of other studied languages.[1] Under that perspective templates are not stored as prosodic shapes in the lexicon but are expressed in the grammar as restrictions on the prosodic wellformedness of words. An argument against templates as morphemes was nicely put by Ratcliffe (1998:29), where he claims that a templatic account "... falls short in its ability to account for derivational

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[1] See Bat-El's on Hebrew 1994 and consequent work, Ratcliffe's work on Arabic 1998 and Ussishkin on Hebrew 2000.

relationships between words". The data to supply that claim are diminutive formation and broken plurals in Arabic. The parallels to the Hebrew system are obvious.

The questions to be addressed in this study are posed on two levels:

(i) Language specific – how can the relations between derived words be formalized? What are the active mechanisms in nominal word formation? Is an analysis of the nominal system compatible with results of research of the verbal system?

(ii) Theoretically – in which way does this research contribute to the discussion regarding the status of templates? Are templates morphemes or are they restrictions in the grammar?

In this paper I will look closely at nominal reduplication, which I take to be an instance of templatic derivation, or in other words, a strategy of word formation. The pattern of reduplication was not looked into very attentively in previous research with the argument that it is not a productive construction. According to Bolozky (1999) and to my own intuition, the productivity of that specific pattern is indeed low. I claim here, however, that the principles operating behind nominal reduplication are still very much active in the nominal system, and arguably in the language as a whole, and as such are worth studying. The study of these principles is the topic of the first part of the paper.

The second part of the paper contains a presentation and a discussion of an experiment, in which non-existing reduplicated forms were elicited from native speakers. The motivation for conducting the experiment lies with the restricted number of reduplicated items in the Hebrew lexicon[2], such that some of the generalizations attested in the data rely on only one or two items. Due to the poor productivity of the pattern, the experiment did not yield many tokens. Nevertheless, it has shown that the pattern is still available for the speakers in some passive manner, such that it is possible to draw synchronic conclusions that are compatible with results from other word formation processes.

1. The data

Diminutive reduplication in the nominal system applies to both nouns and adjectives. Reduplication renders nouns a diminutive meaning and adjectives an associative, *-ish* meaning. The purpose of the operation is the formation of a new stem with the assigned diminutive meaning.

[2] See Appendix I.

(1) Examples of nominal reduplication for nouns and adjectives

NOUNS	zakan	‚*beard'*	zkankan	‚*little beard'*
	xatul	'*cat'*	xataltul	'*kitten'*
ADJECTIVES	kaxol	'*blue'*	kxalxal	'*bluish'*
	ʃamen	'*fat'*	ʃmanman	‚*chubby'*

From a traditional perspective reduplicated forms are defined by a template (*mishkal*), which determines a specific CV-form and contains a specific vocalic melody. In terms of syllabic structure the template has the properties of being (i) disyllabic; (ii) containing the vowel *a* , which 'rewrites' the distinct vowel of the base.

(2) [σ σ]
 ⋁
 a

In terms of segmental make-up the template has the form:

(3) $C_1C_2aC_3.C_2aC_3$.

A template is a rigid construct where consonants and vowels have to fit into a given shape. Diminutive reduplicants fit four consonants into a disyllabic form such that a word-initial onset is created. In this study I claim that a template should be understood as an 'ideal' or optimal prosodic shape, which may not always be realized on the surface. The shape is defined according to general principles on syllable structure, but various properties of the consonants and the vowels of the base may influence the shape of the output according to other, language-particular ranking of principles. This is an indication for relations between words, namely for relations between surface representations, as opposed to the concept of mapping root consonants in a template. In OT-terms, nominal reduplication can be analyzed as output-output correspondence. In the following sections I will look into questions regarding the structure of the reduplicant and the nature of the base-reduplicant relationship, such as:

- What triggers the word initial consonant cluster?
- What are the restrictions on the formation of that consonant cluster?
- What are the vowels of the base realized in the reduplicant?

2. An OT-account

I treat nominal reduplication as reduplication of the final syllable of a disyllabic base. Since the output has to 'fit' into a disyllabic template, we observe significant differences in the prosodic structure and in the segmental content of the reduplicated form (henceforth Output) when compared to a hypothetical faithful reduplicated output that would result from simple suffixation:

(4) 'Affixal' reduplication versus 'templatic' reduplication

BASE	FAITHFUL PARTIAL REDUPLICATION	ACTUAL OUTPUT
za.kan.	za.kan.kan.	zkan.kan.
ka.xol.	ka.xol.xol.	kxal.xal.
xatul	xa.tul.tul	xa.tal.tul.

The actual output differs from an expected faithful reduplication in the following respects:

(i) It is disyllabic and not trisyllabic, which implies that one vowel of the input material is not parsed.

(ii) The initial syllable contains a complex onset.

(iii) The second vowel of the base is not parsed faithfully, unless it is a high vowel. If the vowel is non-high, it is realized as *a* in the output in both syllables. If the vowel is high, the final syllable of the output contains that high vowel, though the first syllable does not.

I follow Gafos (1998) in the assumption that reduplication in general is affixation of a RED-morpheme. The particular RED-morpheme that concerns us here causes the copying of the last syllable of the base and specifies a vowel *a*[3]. But how do we get a disyllabic output from a disyllabic base and an affixed syllable? In accordance with the Generalized Template Theory (McCarthy&Prince 1997), I assume that the disyllabic template itself ("[σσ]") is a result of general principles governing the shape of derived forms in the language. In OT-terms, [σσ] is not a constraint defining a templatic shape, but is emergent as a consequence of constraint interaction. [σσ] serves as a label for a series on demands on the prosodic shape of derived words, which results in disyllabicity.

[3] The vowel can be a part of the RED-morpheme or a separate morpheme. I don't have anything to say about that for the time being.

2.1. How is the shape of the derived word determined?

2.1.1. The structure of the prosodic word

The highest demand on the output is disyllabicity, known from other phenomena in the language, especially verbal forms[4]. The demand [σσ] is taken to be a label for a set of hierarchically ranked demands on alignment of prosodic units. I adopt the proposal made in Ussishkin (2000):

(5) *Disyllabicity of derived forms*
SYLL-ALIGN >> FAITH I-O >> PRWDBRANCH

The sub-grammar given in (5) generates disyllabic forms from inputs that would result in trisyllabic forms, according to maximality and minimality conditions and the alignment of the syllable to the edges of the prosodic word (cf. detailed discussion in Ussishkin 2000).

2.1.2. The structure of the syllables or *'of three syllables make two'*

The dominant demand on disyllabicity suppresses the surfacing of one vowel of the input. It is the function of the grammar, I claim, to determine which syllable or which vowel is to remain unparsed. Consonants, on the other hand, must all be parsed. This robust observation, valid for all Semitic languages to the best of my knowledge, results in accumulation of consonants in the place of simple syllables with a single onset consonant and a single coda consonant. It follows that the grammar needs to determine the position of 'stray', or superfluous consonants.

Another robust observation is that vowels of the stem or base may be deleted, but vowels of the suffixes must surface[5]. This observation can be formalized as a constraint hierarchy:

(6) MAX-C » MAX-V-AFF » MAX-V-STEM

Under (7) possible disyllabic outputs are considered. In each of the three candidates a different input vowel does not surface, whereby all consonants are parsed. The quality of the vowel is ignored at this point:

(7) *Input: varod 'pink' + Red* *Faithful output: *va.ro$_1$d.ro$_2$d.*

	Unparsed vowel	
a.	☞ a	vrad.rad.
b.	o_1	var.drad.
c.	o_2	va.radrd.

[4] See Bat-El 1994 and consequent work, Ussishkin 1999, 2000 for extensive discussion.
[5] For discussion see Ussishkin 2000.

The actual output of nominal reduplication is the CV-structure presented in (7). This output involves a word-initial consonant cluster. The candidate with an initial onset cluster is considered better than candidates (b) and (c) that display medial complex syllable margins. This is due to the cross-Semitic prohibition on a sequence of three consonants in a row (cf. Gafos 2001 on Arabic):

(8) Prohibiting complex syllable margins
*CCC » *CMPLXCODA » *CMPLXONS

Word-initial consonant clusters are attested in other derived environments in the nominal system. This 'nominal strategy' is observed even in cases when there is no danger of creating a sequence of three consonants, as demonstrated in the examples below :

(9) Word-initial consonant clusters in derived environments

Segolates	singular ~ plural	kelev → **kl**a.vim.	*kal.vim.
Participles	masculine ~ feminine	sagur → **sg**u.ra.	*sag.ra.
Nominaization	adj. ~ abstract noun	gamiʃ → **gm**i.ʃut.	*ga.mi.ʃut./ *gam.ʃut.

To sum up the observations at this point, I claim that the syllabic structure of the output is determined by the grammar according to the following principles, formulated as OT constraint-hierarchies:

- Outputs should be disyllabic.
- Faithfulness to consonants is higher ranked than faithfulness to vowels, at the cost of one vowel of the input not surfacing.
- A word-initial syllable is preferred to a word-medial complex syllable margin.

2.2. Deviations from disyllabicity

2.2.1. Deviations from word size

One type of deviation from the expected prosodic form of the reduplicated output concerns the number of syllables. Although most reduplicated forms are disyllabic, and although the grammar is assumed to generate a disyllabic form from a tri-vocalic input, some output forms display three syllables. A trisyllabic output arises due to phonotactic restrictions. When phonotactic restrictions on consonant clusters are violated, the ill-formed structures are 'repaired' by an insertion of an epenthetic vowel. Both the relevant restrictions as well as the repair strategy are typical for all word formations in MH.

- *SON - Sonority Sequence Hierarchy*: sonority in the syllable onset must be even or rising. Sonority in the syllable coda must be even or falling. Sonority plateaus are

allowed in MH unless both segments are sonorants, ruling out clusters such as *rl, *rn, *ml etc. For nominal derived environments, of which reduplication is one, the restriction on the structure of the onset is relevant: if an impermissible onset cluster is created in the derivation (i.e. falling sonority or two adjacent sonorants), an epenthetic vowel *e* is inserted in order to break the ill formed cluster, i.e. *jarok* 'green' → *je**r**akrak* 'greenish' ****jr**akrak.*

- GUTT - *(Historical)* gutturals: if the first consonant of the word-initial cluster is an historical guttural (ʔ,ʕ,ħ), an epenthetic *a* is inserted[6]. Gutturals, though not articulated as gutturals anymore, are prohibited as part of a consonant cluster:

(10) xatul 'cat' → x**a**taltul *'kitten'* *__xt__altul
ʔadom 'red' → ʔ**a**damdam *'reddish'* *ʔdamdam

Although the restrictions SON and GUTT, which need to be formalized, are never violated,[7] they do not cause blocking of the derivation. The nature of the consonants can never hinder a derivation, nor do we ever get a faithful partial reduplication like **jarokrok.* Rather, restrictions on consonantal sequences rank higher than the demand for disyllabicity and lead indirectly to epenthesis:

(11) SON ; GUTT » [σσ] » DEP-V

The effect of these phonotactic restrictions are two variants of the output (or the traditional pattern): trisyllables with either an *e* or an *a* as V_1. Note that even though both types display three vowels, V_1 is not considered to correspond to V_1 of the input, e.g. both output variants are not faithful to the input. For shortage of space I will not get into this interesting issue in detail.

2.2.2. Deviation from vocalic properties of the affix

A different kind of deviation from the expected output concerns the vowels of the base. I assume the reduplication vowel *a* to be an affix in the input. The grammar is assumed to generate an output that parses the affix vowel *a* in both syllables. However, if the second vowel of the base is a high vowel (*i* or *u*), that vowel is reproduced faithfully in the second syllable of the output:

[6] Vowels in the vicinity of (historical) gutturals must be low.
[7] See some more on this in the study on MH loanword phonology with Adam Ussishkin.

(12) *Faithfulness to high vowels*

xat**ul** '*cat*' → xatalt**ul** '*kitten*' *xatalt**al**

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This can be taken as evidence for output-output relations. The derived form has to be faithful to the base for the feature [+high] - IDENT[+high]. This is in accord with the observation regarding the stable status of high vowels in Hebrew: both vowels *i* and *u* may not be deleted nor reduced, as attested in various word formations in both the nominal and the verbal system. The implication of high-ranking IDENT[+high] is that when high vowels are part of the input they will always be parsed faithfully, regardless of their position in the word, blocking syncope or reduction.

I assume the ranking IDENT[+high] » IDENT[-high] such that *a* and *e* may deleted, but *i* and *u* may not. The vowel *o* is a problematic case in the sense that it does not behave uniformly. In nominal contexts it shows the properties of high vowels in that it resists manipulations. In verbal contexts, however, it may be reduced. This issue will not be treated here further. Note that the suggested ranking needs to be further refined for forms where both *a* and *e* are present in the input. In these cases *a* is the preferable candidate for deletion.

Summing up the sketched analysis, reduplicative word formation shares properties with other derivational formations in the language known for templatic effects:

(i) The demand for disyllabicity (i.e. the minimal word);

(ii) Preference for parsing affixal vocalic material rather than the vocalic base material;

(iii) Preference for onset clusters over coda clusters and the prohibition of three consonants in a row;

(iv) Restrictions on consonantal sequences in terms of sonority and feature spreading;

(v) Faithfulness to the vocalic feature [+high] when present in the base

These principles were partly formalized in a fragment of a grammar that shows a great similarity to OT-grammars proposed in previous work for other word formations. As such, the reduplication process can be viewed as providing further evidence for restrictions on the prosodic structure of MH derived word, previously studied in Bat-El (1989, 1994, 1999 and work in progress) Gafos (1998, 2001) and formulated as an OT-grammar in studies on stress and metrical structure in Graf & Ussishkin (to appear) and on verbal derivation in Ussishkin (2000).

3. Restrictions on the base

Studying output-output relations, the interesting aspects of the base are the ones that influence the output in some discernable way, such as the quality of vowels, the position of certain segments etc. For a Semitic language, I claim, the base must have a further quality, namely correspondence with a specific template, such that a derivational pattern X can only be generated when operating on a base Y_x. This relationship between output units is an issue for further research. For our current purposes restrictions on the base of nominal reduplication are stated below:

- *Morphological*: the base is masculine. Feminine forms are usually polymorphemic. Such forms are not reduplicated even if their prosodic structure equals that of a selected base (cf. *laxut*$_F$ 'humidity' with *xatul*$_M$ 'cat'). Some feminine forms are monomorphemic, such as *laʃon* 'tongue' (cf. *varod* 'pink'), but even for these cases reduplication is not an option[8].
- *Prosodic*: the base is disyllabic. The initial syllable is open (CV); the last syllable is closed (CVC). This prosodic shape is one of the most common, if not the commonest, in the language. These two types of syllables are the core syllables of Hebrew.
- *Segmental*: the vowel of the initial syllable is an *a,* with the exception of a few Segolate bases with an initial vowel *e*.

In the preceding sections we have established:

(i) The manner of generation of the reduplicated, derived form;

(ii) The restrictions on the base of reduplication;

(iii) Some correspondence relations between the base and the output.

4. The experiment

In the following sections I present an experiment that was designed to test the productivity of the nominal reduplication pattern. Subjects were given nouns and adjectives for which no reduplicated forms exist, and were asked to reduplicate the word within a context suggesting

[8] Outi Bat-El p.c. points out that all derived forms in Hebrew are masculine unless they have an overt feminine suffix. Since diminutive formation cannot change gender, the restriction on the input can be analysed as a case of faithfulness to gender.

diminutive use. The goal of the experiment was to check the structure of the reduplicated outputs with respect to different conditions on the structure of the base word, and with respect to the expected grammar as presented above.

4.1 The subjects

The experiment was conducted with Hebrew native-speakers adults. I have evaluated the results of 11 subjects.

4.2 The items

The items chosen for the experiment were all existing words of Hebrew with the disyllabic form CV.CVC. and consisting of nouns and adjectives in more or less equal numbers. The items differ in the conditions on the segmental content of consonants and vowels[9]:

- Vowels: V_1 = a; V_2 = i, V_2 = u and one control group where $V_1 \neq$ a
- Consonants: C_1 = ʔ; C_1 = ʕ ; C_1 = ħ ; C_1 = son (m, n, r, l or j)

4.3 The method

The subjects were asked to fill gaps in constructed, written sentences with the specific request to fill in the gaps with words of their own creation. The subjects were explicitly requested not to use suffixing mechanisms for expressing the desired meaning, in particular not the extremely productive diminutive suffix *–on.*

4.4 Results

The results are a mix of different strategies used by the subjects. As expected, speakers felt uncomfortable with producing reduplicated forms and preferred to attain the desired meaning by the popular and very productive suffixing strategy. Nevertheless, when obliged to abandon suffixation, speakers displayed a notion of the reduplication template.

The conditions on consonants yielded the expected results. The tokens show an almost 100% compliance with the expected structures: after (historical) guttural an *a* was inserted, by even sonority in a cluster an *e* was inserted. Since there were no deviations from these structures I take the relevant markedness constraints SON and GUTT to be higher ranked than the demand on disyllabicity, as introduced in section 2.2.1., and indeed to be undominated.

[9] The list of items used in the experiment is given in appendix II.

Interesting variations were found within the vocalic conditions to be discussed in detail below.

4.4.1. (Simple) concatenation

Although the subjects were asked to obtain from suffixing, some of the results consisted of suffixed forms. In order to avoid the productive mechanism of *on*-suffixation (as demanded), the subjects turned to sub-standard alternatives:

- *-uʃ*: the suffix *–uʃ* is used mostly in childrens' language for diminutive
  ʃatil → ʃatiluʃ *'seedling ~ dim.'*
- *–on+-uʃ*: suffixation of two elements in that order as diminutive
  kariʃ → kriʃonuʃ *'shark ~ dim.'*
- *–on+-on*: doubling of the standard diminutive suffix to generate a sub-standard form
  kariʃ → kriʃonon *'shark ~ dim.'*

Notice that in these cases there is a variation between simple concatenation resulting in a trisyllabic word (*ʃatiluʃ*), and suffixation combined with syncope of the first vowel of the base, complying with the demand for disyllabicity discussed above (cf. *kriʃonuʃ; kriʃonon)*[10]. The suffixation-strategy seems to be not very appropriate for adjectives for reasons which are not very clear. However, some of the subjects did use the suffix *–uʃ* for an adjectival form too (cf. *xarifuʃ* 'a little spicy').

4.4.2. Copying the last segment

Some subjects used a different reduplicating mechanism altogether. Instead of reduplicating the last syllable, the last segment of the base (a consonant) was copied and preceded by an *i*, in order to create a permissible syllable. Some tokens show syncope of a base vowel, some do not:

(13)	ʔagas → ʔagas**is**	*'pear'*	[σσσ]
	ʔanaf → ʔan**if**	*'branch'*	[σσ]

The inserted vowel *i* cannot be considered to be an epenthetic vowel in MH. I assume that the motivation for inserting *i* instead of the epenthetic vowel *e,* after copying the last segment of the base, derives from an analogy to other common nominal patterns familiar to the speakers (cf. *daxlil* 'scarecrow', *xamcic* 'a kind of soury flower'). Within this strategy we discover faithfulness to vocalic features of the base: if the second vowel of the base was other

[10] Forms that are longer than 3 syllables are rare in Hebrew. One of the reasons is main stress, which should fall within the three-syllable-window. The suffix *–uf,* typical for childrens' language, and contrary to *–on*, is not stressed.

than *a*, there was no insertion of *i,* rather the base vowel was copied too: *ʔam**ok*** → *ʔamok**ok*** ‘deep’. Since I do not have enough tokens of this type and since there are no tokens with V_2=e I can conclude only preliminary that there seems to be a correspondence relation between the second vowel of the base and the epenthised vowel. If the second vowel was an *a*, the unmarked case, an *i* was inserted.

4.4.3. Choosing a different pattern for the derived form

Some subjects preferred a different familiar nominal template to the desired pattern of reduplication. One minor pattern for adjectives was a participle form: *carud* → *macrud* ‘hoarse’. Note that this specific participle form was borrowed into Hebrew from Arabic in forms like *mabsut* ‘happy’, but does not exist as a native pattern nor is it very productive. A template used more systematically by at least two subjects is demonstrated by the following tokens:

(14) kaluʃ → kaliʃ *‘unlikely’ (adj.)*
ʔanaf → ʔanif *‘branch’ (noun)*

A possible motivation might be an analogy to an existing, reduplicating pattern C_1a.C_2iC_2., which is used for monosyllabic bases, denoting the same diminutive meaning:

(15) dak → dakik *‚slim ~ very slim’ (adj.)*
xam → xamim *‘warm ~ a bit warm’ (adj.)*
kof → kofif ‘*monkey ~ little monkey’ (noun)*

It should be kept in mind, however, that the pattern CaCiC is an extremely accessible pattern used for participles, adjectives and nouns.

4.4.4. Reduplicative template

The expected form involves reduplication of the final syllable. The vocalization depends on the vowel of the final syllable. Some of the tokens agree with the canonical form:

(16) ʔam**o**k → ʔamakm**a**k *‘deep’*
xar**i**f → xar**a**fr**i**f *‘spicy’*

Some tokens show faithful copying of a high base vowel in both syllables of the output:

(17) xar**i**f → xar**i**fr**i**f ‘*spicy’*

Under (18) tokens of the various strategies are given with reference to the base *ʔagas* ‘pear’. I ignore the fact that the first consonant of this base is a glottal stop, a fact that results in epenthesis of *a* in the first syllable of the reduplicated form instead of the expected initial cluster.

(18) Illustration of diminutive strategies for ʔagas *'pear'*

Double suffixation	ʔagas	ʔagas **onon**
Copying of last segment + i-insertion	ʔagas	ʔags**is**
Different template	ʔagas	ʔag**i**s
Reduplication	ʔagas	ʔagas **gas**

4.4.5. Restrictions on the base

Morphological restrictions - two of the presented items were feminine: one polymorphemic item: *kap-it* 'teaspoon' and one monomorphemic item: *laʃon* 'tongue'. Both items were not reduplicated according to the reduplication template **kpatpit*, though I found copying of the final syllable rhyme for *kapit* → *kapitit* 'teaspoon'. For *laʃon* all subjects chose a strategy of feminine (diminutive) formation via suffixation: *laʃon* → *leʃon-it* 'tongue ~ tongue of a lock'.

Segmental restrictions – one group of items was controlled with regard to the first vowel of the base. The 'control items' had the same prosodic structure as the other bases, CV.CVC., but the first vowel of the item was either *o* (*gozal* 'little bird'; *poʃer* 'lukewarm), *i* (*xitul* 'diaper') or *u* (*sulam* 'ladder'). The item with V_1=u was not reduplicated at all. Instead, a feminine suffix was attached by all subjects. The item with *i* was reduplicated *xitul* → *xitultul*, but the first vowel of the base *i* was never deleted, such that the output was always trisyllabic. Moreover, contrary to the default stress location on the last syllable, this reduplicated form was stressed on the penultimate syllable, indicating a 'playful' form. The items with V_1=o were found to be more flexible. One token of the base *gozal* corresponds to the reduplicative template, yielding *gzalzal*, though all other tokens (5) contain the *o* of the base.

4.5 Discussion

4.5.1. More on the strategy of reduplication

The forms I consider to be the result of nominal diminutive reduplication are all forms that contain a reduplicated syllable and have the prosodic form:

(19) Base = $\sigma_1\sigma_2$ reduplicated form = (onset of σ_1)$\sigma_2\sigma_2$

The produced forms are mostly disyllabic, reducing three syllables to two syllables by syncopating the first vowel of the base, and creating a complex word-initial onset, yielding the form [σσ] = $C_1C_2VC_3.C_2VC_3$. Deviations are observed with the vocalism. Thus, the expected reduplicated form contains an *a* in both syllables of the output if V_2 of the base is

non-high. If V_2 of the base is a high vowel, the reduplicated form contains an *a* in σ_1 and a copy of the high vowel in σ_2.

The collected tokens show the following combinations of vowels:

(i) Faithful parsing of a non-high vowel in both σ_1 and σ_2 of the output
ʔam**o**k → ʔam**o**km**o**k *'deep'*

(ii) Faithful parsing of a non-high vowel in σ_2 of the output
ʔar**o**x → ʔaraxr**o**x *'long'*

(iii) Faithful parsing of a high vowel in both σ_1 and σ_2 of the output
xarif → xarifrif *'spicy'*

(iv) Unfaithful parsing of a high vowel in σ_2 of the output
xarif → xarafraf

The expected vocalic parsing, based on the items listed in the Hebrew lexicon is as follows:

- iff V_2-base ≠ [+high] parse the affix *a* in σ_1 and σ_2 of the output
- iff V_2-base = [+high] parse the affix *a* in σ_1 and a copy of V_2-base in σ_2 of the output

In OT-terms the dominant demand to be faithful to high vowels of the base can be accounted for by the interaction of the following constraints:

(20) IDENT[+HIGH] $^{B\text{-}R}$; MAX-V-AFF ; MAX-V $^{B\text{-}R}$

The results of reduplicating a base that contains a high vowel indicate an individual ranking of the constraint IDENT[+HIGH]. Some speakers positioned it very high, such that both vocalic slots of the output were realized as a high vowel. Some positioned it below MAX-V-AFF, such that both vocalic slots were realized as *a*. Some extended IDENT[+HIGH] to the vowel *o* as well.

In sum, speakers are aware that the vowels of the affix have priority over the vowels of the base when syncope is an option. Speakers are also aware of the generalization that outputs are faithful to the feature [+high] of the vowels of the base, whereby *o* is sometimes affiliated to that group. Uncertainty of speakers arises when these two demands need to be combined in a complex derivation like the diminutive reduplicative pattern. In contrast, speakers seem to have no difficulties when the vowels of the base belong to the unmarked, non-high category.

4.5.2. Strategy choice and lexical category

The results show a difference between *nouns* and *adjectives*. The number of reduplicated tokens for the adjectival items is much larger than the number of reduplicated tokens for noun

items. This is true even if an adjective and a noun are very similar in their segmental structure, as far as being a minimal pair (see *xamud*$_{\text{Adj}}$. ~ *ʔamud*$_{\text{Noun}}$). Making nouns diminutive, speakers prefer to use nominal suffixes like *–on*, *-uʃ*, combined *–onuʃ*, *–onon* or other versions of the same. Some nouns were reduplicated *and* suffixed (*ʃatil* → *ʃtiltilon* 'seedling'). I take it to indicate that speakers are not very comfortable with the reduplication option and try to make the produced form more "acceptable" by adding a suffix to it. For adjectives, however, there is no suffixal option as attested for nouns. Thus, speakers are forced to use the reduplicating pattern, or else, not to produce at all. It turns out that adjectives that are not very common (e.g. *harus* 'broken, shattered'), were experienced as difficult to reduplicate. The speakers preferred not to produce at all. Adjectives that are more common and that are part of a semantic field that contains reduplicated forms were produced more willingly, e.g. *kravrav* from *karov* 'near' and *rexakxak* from *raxok* 'far' as there is already *kcarcar* from *kacar* 'short'.

5. Conclusions

Elicitation of reduplicated diminutive forms was a useful experiment in substantiating the general principles that were explored in the lexical data. It could be established that for the speakers:

(i) The preferred structure of the first syllable of the output contains a consonant cluster.

(ii) The initial consonant cluster is subject to undominated restrictions on consonantal sequences with respect to sonority and guttural features.

(iii) Disyllabicity is high-ranking.

(iv) The vowels of the affix have priority over the vowels of the base in the case that one vowel of the input must be syncopated,.

(v) A [+high] vowel of the base must be parsed even at the cost of the vowel of the affix. Sometimes the vowel *o* is affiliated to that class.

(vi) Morphological restrictions on the base are undominated.

In terms of OT I propose the following sub-grammars:

Markedness: SON; GUTT » *CCC » *CMPLXCODA » *CMPLXONSET

Faithfulness: IDENT[+HIGH] » MAX-V-AFF » MAX-V-BASE

The results of the experiment established correspondences between the base and the output in terms of vocalic features. The experiment confirmed the assumption that the vowels of the base are relevant for the derived form. Thus the claim that root consonants can be extracted from one form and mapped into a template in order to form a derived form is disputed. The base is relevant as a unit with consonants and vowels. It remains to be studied if further correspondence relations between the base and the output can be established and if the grammar fragments developed here can be extended for further data in the nominal system in particular and for the language in general.

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Appendix I: Lexical Data

Base	*Gloss*	*Reduplicated form*	*Gloss*	*V_2 of base in reduplicant*
Nouns				
xazir	'pig'	xazarzir	'little pig'	i → i
xatul	'cat'	xataltul	'kitty'	u → u
ʃafan	'rabbit'	ʃfanfan	'little rabbit'	a → a
batsal	'onion'	btsaltsal	'little onion'	a → a
zakan	,beard'	zkankan	,little beard'	a → a
Zanav	,tail'	znavnav	'little tail'	a → a
safam	,mustache'	sfamfam	'little mustache'	a → a
géver	'man'	gvarvar	'little man'	e → a (Segolate)
kélev	'dog'	klavlav	'puppy'	e → a (Segolate)
Adjectives				
ʃaxor	'black'	ʃxarxar	'blackish'	o→ a
jarok	'green'	jerakrak	'greenish	o→ a
tsahov	'yellow	tshavhav	'yellowish'	o→ a
varod	'pink'	vradrad	'pinkish'	o→ a
lavan	'white'	levanban	'whitish'	o→ a
kaxol	'blue'	kxalxal	'bluish'	o→ a
ʔadom	'red'	ʔadamdam	'reddish'	o→ a
ʔafor	'gray'	ʔafarfar	'grayish'	o→ a
sagol	'purple'	sgalgal	'purplish'	o→ a
ʃamen	'fat'	ʃmanman	'chubby'	e → a
katan	'small'	ktantan	'smallish'	a → a
matok	'sweet'	metaktak	'sweetish'	o → a
xaluʃ	'weak'	xalaʃluʃ	'weakish'	u → u
xamuts	'sour'	xamatsmats	'sourish'	u → a
ʔagol	'round'	ʔagalgal	'roundish'	o → a
xalak	'smooth'	xalaklak	'slippery'	a → a
katsar	'short'	ktsartsar	'very short'	a → a

Appendix II: The Items

The items in bold are the ones to which I have collected tokens. All other items were either presented to the subjects but were not accepted as a basis for derivation, or were ruled out for other reasons (cf. *gamad* was not a good idea since all speakers used the established form *gamadon*).

V1=a	**tavas**; gamad; salat; magaf; **kapit**; **karov**; **kacar**
V1 ≠ a	**sulam**; **gozal**; kosem; milon; simun; **xitul**; **poʃer**
V2 = i	**kariʃ** ; **zamir** ; nativ ; **ʃatil** ; zamin ; ʔadif; gamiʃ; **zahir**; ragil
V2 = u	ʔ**amud**; mabul; **kaluʃ**; matun; **sagur**; **ʃafuj**; **carud**
C1 = ħ	xaver; xalom; xalav; xavit; **xazak**; **xarif**; **xadaʃ**; **xamud**
C1 = ʕ	ʕ**amud**; ʕ**anaf**; ʕ**agur**; ʕ**amok**; ʕ**anak**; ʕaluv; ʕacum
C1 = ʔ	ʔ**avaz**; ʔ**agas**; ʔagam; ʔajom; ʔ**arox**; ʔafuj
C1 = h	harus; hafux
C1 son > C2	**manof**; **laʃon**; nahar; **magaʃ**; **makel**; **naxaʃ**; **namer**; **raxok**; **raxav**; **ratuv**