

HEBREW SUFFIXES, MORPHEME STRUCTURE, AND PHONOLOGICAL PROCESSES IN INFLECTION AND DERIVATION*

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Abstract: Hebrew inflection is primarily suffixational. Suffixes also serve as means for deriving substantives. Although derivational and inflectional phonetic outputs might overlap under certain conditions, analysis of either the base morpheme structure, the suffixes, or the phonological processes operating in word formation, clearly distinguishes between inflection and derivation. While both include a limited number of suffixes, derivation is tolerant of a larger variety of base morphemes and suffixes than is inflection. The differences involve features such as stems, suffixes, stress patterns, syntactic structures and semantic values, syllabic structures, and dynamic changes. The relationship between lexicon and grammar is considered in the processes involved. Said processes prove that a considerable amount of the inflection is lexically determined, whereas derivation is relevant to grammar as well. The discussion will lead to the formulation of a possible model to account for the differences.

Keywords: Inflection, Derivation, Hebrew morphology, Nominal Suffixes, Lexicon, Linear processes

1. INTRODUCTION

Inflection and derivation have been continuously discussed by linguists with regard to the general theory of morphology. Two important issues raised repeatedly are the differences between inflection and derivation and their place in grammar and lexicon. The goal of this paper on Hebrew linear (concatenative¹) morphological processes involving inflection and derivation is to attempt to shed new light on these processes and contribute to their status in the theory of grammar. The following are the specific questions which shall be addressed:

- a. How different are stem morphemes and suffixed morphemes in inflection and derivation?
- b. What is the relationship of inflection and derivation to the grammar or the lexicon?

Data from Hebrew inflectional and derivational processes in substantives (nouns and adjectives) will be presented to show that while both include a limited number of suffixes and possible final syllables, derivation is tolerant of a larger variety of either stem morphemes or suffixes than is inflection. The differences involve features such as stems, suffixes, stress patterns, syntactic structures and semantic values, syllabic structures, and dynamic changes (3.1-3.6). The results will shed light on the two questions presented and will account for the similarities and differences of inflectional and derivational processes within the grammar and lexicon. This will then lead to the formulation of a possible model (Figure 1).

2. SOME FACTS ABOUT HEBREW MORPHOLOGY

Hebrew lexemes are primarily formed in the following ways:² (a) non-derived stems, either primitives as in (1a), or borrowed as in (1b); (b) a nonconcatenative combination of a consonantal root with a pattern (the so-called *miškal* for substantives, *binyan* for verbs) as in (2); and (c) linear suffixation to a stem (formed by either (a), (b), or even (c)), as in (3).³

- (1) a. 'av 'father,' 'em 'mother,' yom 'day,' ben 'son'
 b. *pardes* 'orange grove,' *sandal* 'sandal,' *gizbar* 'treasurer,' *televizya* 'television'
- (2) *gadol* 'big' < \sqrt{gdl} + pattern $C_1aC_2oC_3$; *gidel* 'raised' < \sqrt{gdl} + pattern $CiCeC$; *manhig* 'leader' < \sqrt{nhg} + pattern $maCCiC$; *nahag* 'drove' < \sqrt{nhg} + pattern $CaCaC$; *séfer* 'book' < \sqrt{spr} + $CéCeC$;⁴ *maḥbéret* 'notebook' < \sqrt{hbr} , pattern $maCCéCt$; *nadván* 'philanthropist' < \sqrt{ndv} + pattern $CaCCan$
- (3) *giri* 'limestone-like' < *gir* + *i* 'chalk' + *i* (adjectival suffix); *malxuti* 'royal' < *malxut* (< \sqrt{mlk} + $CaCCut$) 'kingdom' + *i* (adj. suf.); *malxutiyut* 'royalty' < *malxuti* + *ut* (abstract noun suf.); *pardesan* 'citrus grower' < *pardes* 'orange grove' + *an* (attributive or occupational suf.)⁵

A fourth method is the formation of acronyms and portmanteau words⁶ which are derived linearly by adjoining word segments, as in (4) and (5). Despite their syllabic regularity, they do not constitute a predictable method as (b) and (c) mentioned above. Each word must be analyzed separately.

- (4) *sakum* = *sakinim*, *kapot u+mazlegot* ‘cutlery (< knives, spoons and forks),’ *’éšel* = *’axila*, *štiya*, *lina* ‘perdium’ (< food, beverage, lodging),’ *daš* = *drišat šalom* ‘regards (< sending greetings)’
- (5) *rakével* = *rakévet+kével* ‘cable car (< train+cable),’ *tapugan* = *tapuah+metugan* ‘potato chips (< potato+fried),’ *’arpiah* = *’arafel+piah* ‘smog (< fog+soot)’

Hebrew pronouns (personal, demonstratives), interjections, prepositions, conjunctives, particles, and many number names and adverbs are formed through method (a). Verbs are formed only through root and *binyan* combinations (method (b) above). Substantives are formed through all of the aforementioned methods.

Hebrew inflectional categories are gender, number and possession in nouns, and tense, mood, person, number and gender, and possibly gerund in verbs. Definiteness is a syntactic category of nouns assigned by the prefix *ha+* ‘the.’ Other prototypical and non-prototypical inflectional categories found in languages of the world (Dressler, 1989; Dressler & Merlini Barbaresi, 1994:43), are assigned in Hebrew through syntactic and lexical means.

As indicated above, our discussion here focuses on Hebrew substantives, verbs and other parts of speech will, therefore, be excluded.⁷ Hebrew inflection in substantives is always suffixational, where certain endings indicate gender, number, and possession, as in (6).

- (6) *sus-susa* ‘horse-mare,’ *sus-susim* ‘horse-s,’ *susa-susot* ‘mare-s,’ *sus* ‘avoda’ ‘work horse,’ *susat⁸* *meruc* ‘race horse (f),’ *susi* ‘my horse,’ *susati* ‘my mare,’ *susxem* ‘your (pl.m.) horse,’ *susoteyxem* ‘your (pl.m.) mares’

Suffixes also serve as means for deriving substantives through method (c), as in (7)

- (7) *susi* ‘horse-like’ (adj.; *sus+i*), *mad’an* ‘scientist’ (n.; *mada* ‘science’ +*an* ‘doer suffix’), *kcarot* ‘shortly’ (adv.; *kacar* ‘short’ +*ot*), *yamay* ‘sailor’ (n.; *yam* ‘sea’ +*ay* ‘doer suffix’), *suson* ‘small horse, pony’ (n.; *sus+on* ‘diminutive suffix’), *kamcanut* ‘miserliness’ (n.; *kamcan* ‘miser’ +*ut* ‘abstract noun suffix’).

These facts lead us to the first distinction between inflection and derivation. Inflection is done in Hebrew only through linear concatenative formation,⁹ whereas derivation may be linear, but can be formed other ways as well, including non-concatenative formation.

There are two conditions in which derivational and inflectional phonetic outputs might overlap:

- (a) The suffixes for inflection and derivation share the same phonetic structure, e.g.

- (8) *’arci* ‘my country (inf.)’ or ‘earthy (der.),’ both related to *’érec* ‘earth, country,’ with suffix +*i* (1st per. sg. possessive; adj. suf.), *’arukot* ‘long (f.pl.; inf.)’ or ‘at length (der.)’ both from *’arox* ‘long’ with +*ot* suffix (f.pl.; adv.).

- (b) Part of the derivational pattern includes a whole syllable after the root slot and this syllable is of the same phonetic structure as the inflectional suffix, as in (9).

- (9) *šmura* ‘guarded (f)’ (< *šamur+a*) or ‘reservation’ (< $\sqrt{\text{šmr}}$ and pattern *CCuCa*), *tayéset* ‘pilot (f.)’ (< *tayas+et*), or ‘squadron’ (< $\sqrt{\text{tys}}$ and pattern *CaCéCet*).

Inflection and derivation can be distinguished by various aspects pertaining to base morphemes, phonological processes operating in word formation, and suffixes. The differences will be described below.

3. THE DIFFERENCES BETWEEN INFLECTION AND DERIVATION IN LINEAR WORD FORMATION

3.1. Bases and stems

Definitions: As opposed to Indo-European languages, a Hebrew **root** is an unpronounceable consonantal skeleton to which a pattern must be added in order to create a pronounceable word. For instance, the root $\sqrt{\text{mlk}}$ mentioned above in (3), is the root of the following words (the pattern is in parentheses):

- (10) *mélex* ‘king’ (*CéCeC*), *malax* ‘(he) reigned’ (*CaCaC*), *mamlaxa* ‘kingdom, state’ (*maCCaCa*), *malxut* ‘sovereignty’ (*CaCCut*), *himlix* ‘(he) enthroned’ (*hiCCiC*), *humlax* ‘was enthroned’ (*huCCaC*), *hamlaxa* ‘coronation’ (*haCCaCa*), etc.¹⁰

As the consonantal root is irrelevant for linear inflection and derivation, the terms **base** and **stem** will be used here as follows: **base** to denote the abstract morpheme that participates in the process, in many cases a related lexical item, and **stem** to denote its actual phonetic realization within a given derived word. For instance, the base for both *beyci* and *beycati* in (11a) is *beyca* ‘egg’; however, the stem for *beyci* is *beyc-* and for *beycati* it is *beycat-*. The base *derex* ‘way’ underlies *darki*, *derex hatałmid*, *draxim*, and *darxey hatałmid* in (11b), but its stems are *dark-*, *derex-*, *drax-*, and *darx-*, respectively.

- (11) a. *beyci* or *beycati* ‘egg-shaped’
 b. *darki* ‘my way,’ *dérex hatałmid* ‘the student’s way,’ *draxim* ‘ways,’ and *darxey hatałmid* ‘the student’s ways’

Base distinctions: The inflectional and derivational stems of substantives vary in a number of ways: possessive inflection can take either the singular or the plural stems, depending on the suffixes, e.g. with the *+i* (possessive 1 per.sg.) only singular stems can occur, whereas with *+ay* suffix (possessive 1 per.pl.) only plural stems can occur, as in (12).

- (12) *sifri* ‘my book’ (< *séfer* ‘book,’ stem *sifr+i*), *simlati* ‘my dress’ (< *simla* ‘dress (f),’ stem *simlat+i*), *sfaray* ‘my books’ (< *sfarim* ‘books,’ stem *sfar+ay*), *simlotay* ‘my dresses’ (< *smalot* ‘dresses,’ stem *simlot+ay*)

Suffix *+i* cannot occur with plural stems and *+ay* cannot occur with singular stems, hence **sifray*, **simlatay* or **sfari*, **simloti* are impossible.

The derivational suffixes, on the other hand, may be added to any stems, be they singular, plural, masculine or feminine. For instance, *+i* is a productive derivational adjective suffix. In

'*arci* mentioned above in (8) it includes the singular stem '*arc-* (of the base '*erec*'), but in '*pra'i* 'wild' it is added to the plural stem '*pra'im*' 'wild (pl.)', and not to '**pir'i* from the singular stem. The word '*naši* 'feminine,' is derived from the plural '*naš(im)*' 'women,' and not from the singular base '*iša* 'woman.'"¹¹

Moreover, parallel formations can be derived from the same base through both singular and plural stems, as in '*beyci~baycati* 'egg-shaped' in (11a) (pl. '*beyc(im)*', sg. '*beyca*'), and also '*'agadi~'agadati* 'legendary' (pl. '*'agad(ot)*', sg. '*'agada*', stem '*agadat-*').

The derivational suffix *+ay* appears in nouns denoting people, e.g. '*banay*, '*ramay*, '*yamay*, '*bankay* 'builder, cheat, sailor, banker,' the first two derived through root and pattern formations (\sqrt{bny} , \sqrt{rmy} + *CaCaC*; see 3.6 below), and the latter two derived from the bases '*yam* 'sea' and '*bank*. Unlike the case with inflection, *+ay* is attached to singular stems, as in (13).

(13) '*yomanay* 'diarist, registrar' (< '*yoman* 'diary' +*ay*), '*milonay* 'lexicographer' (< '*milon* 'dictionary' +*ay*).

Non-existing bases: In '*haklay* 'farmer' the suffix *+ay* is clearly recognized as a suffix, although the stem '*hakil-* has no existing base in Hebrew.¹² The same is true for a word such as '*sitri* 'directional' in '*had sitri* 'one way' which has no base '**séter* (like '*cran-* in '*cranberry*; Aronoff, 1976). These facts lead to a further distinction. Inflection is related to lexical bases, whereas that is not necessarily true for derivation. While in derivation the stems can be non-existing words, in inflection they are always stems of existing bases.

3.2. Suffixes

Meanings: The semantics of suffixed derivation is far less predictable than that of inflection.

There is a stock of inflectional nominal suffixes in Hebrew and their meanings are fixed and defined by features of number, gender, and possession. The plural suffixes are stressed *+im* or *+ot*, and rarely *+áyim* (dual-plural) whose distribution is quite complex (Schwarzwald, 1991a); the singular base is unmarked and carries the [+Count] feature. The feminine suffixes are stressed *+a* or *+it*, and unstressed *+et*, *+at*, or *+t* depending on the unmarked singular masculine stem that must be [+Animate] (Schwarzwald, 1982, 1991b). The possessive suffixes are as presented in Table 1 and exemplified in (14) and (15).

Table 1: Possessive pronominal suffixes

Stem	Singular					Plural				
	my	your (m)	your (f)	his	her	our	your (m)	your (f)	Their (m)	Their (f)
Sg.	<i>+i</i>	<i>+xa</i>	<i>+ex</i>	<i>+o</i>	<i>+a(h)</i>	<i>+énu</i>	<i>+xem</i>	<i>+xen</i>	<i>+am</i>	<i>+an</i>
Pl.	<i>+ay</i>	<i>+éyxa</i>	<i>+áyix</i>	<i>+av</i>	<i>+éha</i>	<i>+éynu</i>	<i>+eyxem</i>	<i>+eyxen</i>	<i>+eyhem</i>	<i>+eyhen</i>

(14) '*talmid* 'student (m)': '*talmidi*, '*talmidxa*, '*talmidex*, '*talmido*, '*talmidah*, '*talmidénu*, '*talmidxem*, '*talmidxen*, '*talmidam*, '*talmidan* 'my student, your (m) student, ... their (f) student'

- (15) *talmidot* ‘students (f)’: *talmidotay*, *talmidotéyxa*, *talmidotáyix*, *talmidotav*, *talmidotéha*, *talmidotéynu*, *talmidoteyxem*, *talmidoteyxen*, *talmidoteyhem*, *talmidoteyhen* ‘my students, your (m) students, ... their (f) students’

Construct state possession are stem modifications of either m., f., pl.m., or pl.f. For instance,

- (16) *hadar* ‘avoda, *hadrey* ‘avoda ‘study-ies’ (< *héder-hadarim* ‘room-s,’ ‘avoda ‘work, study’); *simlat ha’iša*, *simlot ha’iša* ‘the woman’s dress-es’ (< *simla-smalot* ‘dress-s,’ ‘iša ‘woman’).

The number of derivational suffixes seems to be limited as well (but see 3.2 and 3.6), but, they vary in their meanings and show a larger number of semantic categories:

- (17) a. +*an* ‘agent, has the profession or feature’ — *psantran* ‘pianist’ (< *psanter* ‘piano’ +*an*), *kalkelan* ‘economist’ (< *kalkala* ‘economy’ +*an*), *hovevan* ‘amateur’ (< *hovev* ‘admirer, amateur’ +*an*)
 b. +*ay* ‘agent, has the profession of’ — ‘*itonay* ‘journalist’ (< ‘*iton* ‘newspaper’ +*ay*), *yamay* ‘sailor’ (< *yam* ‘sea’ +*ay*), *bankay* ‘banker’ (< *bank*+*ay*), *hašmalay* ‘electrician’ (< *hašmal* ‘electricity’ +*ay*)
 c. +*ut* ‘abstract noun’ — ‘*itonut* ‘journalism’ (< ‘*iton* ‘newspaper’ +*ut*), *banka’ut* ‘banking’ (< *bank* or *bankay* ‘banker’ +*ut*), ‘*imahut* ‘motherhood’ (< ‘*em* ‘mother,’ plural stem ‘*imah*(ot) ‘mother(s)’ +*ut*)
 d. +*on* ‘diminutive and derogatory; periodical; collection; has the profession of’ — *suson* ‘pony, small horse’ (< *sus* ‘horse’ +*on*), *tipšon* ‘silly little fool’ (< *tipeš* ‘silly’ +*on*); ‘*iton* ‘newspaper’ (< ‘*et* ‘time’ +*on*), *šnaton* ‘year book’ (< *šana* ‘year’ +*on*); *še’elon* ‘questionnaire’ (< *še’ela* ‘question’ +*on*), *tašbecon* ‘book of puzzles and riddles’ (< *tašbec* ‘crossword puzzle’ +*on*); *historyon* ‘historian’ (< *histórya* ‘history’ +*on*), *semantikon* ‘semantician’ (< *semantika* ‘semantics’ +*on*)
 e. +*iya* ‘place; clothing; collection’ — *sandlariya* ‘shoemaker’s shop’ (< *sandler* ‘shoemaker’ +*iya*), *nagariya* ‘carpentry shop’ (< *nagar* ‘carpenter’ +*iya*); *guftiya* ‘undershirt’ (*guf* ‘body’ +*iya*), *haziya* ‘bra, vest’ (< *haze* ‘chest, breast’ +*iya*); *taklitiya* ‘collection of records’ (< *taklit* ‘record’ +*iya*), *cimhiya* ‘flora’ (*cémaḥ* ‘plant, growth’ +*iya*)
 f. +*it* ‘diminutive; clothing; adverb; vehicle’ — *kapit* ‘teaspoon’ (< *kaf* ‘spoon’ +*it*), *mapit* ‘napkin’ (< *mapa* ‘tablecloth’ +*it*); *haca’it* ‘skirt’ (< *haci* ‘half’ +*it*), ‘*imunit* ‘sweatsuit’ (< ‘*imun* ‘training’ +*it*); *yahasit* ‘relatively’ (< *yahas* ‘relationship’ +*it*), *yadanit* ‘manually’ (< *yad* ‘hand’ +*n*¹³ +*it*); *širyonit* ‘armored car’ (< *širyon* ‘armor’ +*it*), *tiyulit* ‘tour-bus’ (< *tiyul* ‘excursion’ +*it*)

This is a partial list of very productive derivational suffixes. It shows that there is no one-to-one correspondence between the meanings and the suffixes: a) various suffixes carry the same meanings (+*an*, +*ay*, +*on* ‘agent’; +*on*, +*it* ‘diminutive’), and b) the same suffix might carry several meanings (+*on*, +*iya*, +*it*). This is unlike the inflectional suffixes with their fixed meanings.

Source of suffixes: Inflectional suffixes are all of Hebrew-Semitic origin, whereas derivational suffixes might stem from various sources, Hebrew and foreign. The following list demonstrates just a few of the loan suffixes attached to loan and to Hebrew stems.

- (18) a. +*nik* (Russian) ‘doer, member’ — *núdnik* ‘pest,’ *kibúcnik* ‘kibbutz member,’ *klúmnik* ‘good-for-nothing’ (< *klum* ‘nothing’)
 b. +*tšik* (Yiddish) ‘diminutive; doer’ — *politúrtšik* ‘furniture polisher’ (< *politúra* ‘polish’), *xaltúrištšik* ‘one who does side-jobs’ (*xaltúra* ‘side-job, non-serious job’), *katántšik* ‘tiny’ (< *katan* ‘small’), *šaméntšik* ‘chubby’ (< *šamen* ‘fat’)
 c. +(á)*cya* (Slavic) ‘abstract noun’ — *integrácya* ‘integration,’ *pitputácya* ‘blabbering’ (< *pitput* ‘blabber’), *bilbulácya* ‘confusion’ (< *bilbul* ‘disorder’)
 d. +*ist* (English) ‘agent, activist’ — *mazoxist* ‘masochist,’ *kabalist* ‘one who practices or studies Kabbala’ (< *kabala* ‘Kabbala’), *bardakist* ‘mess maker or troublemaker’ (< *bardak* ‘mess’)
 e. +*ika* ‘abstract noun, profession’ — *polítika* ‘politics,’ *mexánika* ‘mechanics,’ *réprika* ‘replica(s)’

Order of suffixes: Derivation may apply more than once to previously derived bases, and the order of suffixation is relatively flexible, though not entirely free, as in (19).

- (19) a. *sus+i* ‘horse-like’ (adj.) > *susi+ut* ‘horse-like feature’ (n.) > *susiyut*
 b. $\sqrt{d(w)n} + mCCiCa > medina$ ‘state, nation’ (n.) > (1) *medin+i* ‘political’ (adj.) > *medini+ut* ‘policy’ (n.) > *mediniyut+i* ‘political’ (adj.) or (2) *medin+ay* ‘diplomat’ (n.) > *medina(y)+i* ‘diplomatic’ (adj.) > *medina’i* > *medina’+ut* ‘diplomacy’ (n.)
 c. $\sqrt{hll} + CaCiC > halil$ ‘flute’ (n.) > *halil+an* ‘flautist’ (n.) > *halilan+ut* ‘flute playing’ (n.)
 d. $\sqrt{hcp} + CuCCa > hucpa$ ‘impudence’ (n.) > *hucp+an* ‘impudent’ (n.) > (1) *hucpan+i* ‘impudent’ (adj.) or (2) *hucpan+ut* ‘impudence’ (n.)
 e. $\sqrt{mc} + CCiCut > meci’ut$ ‘reality,s actuality’ (n.) > (1) *meci’ut+i* ‘realistic’ (adj.) > *meci’uti+ut* ‘reality’ > *meci’utiyut* (n.) or (2) *meci’ut+an* ‘existentialist’ (n.) > *meci’utan+ut* ‘existentialism’ (n.)

Examples (19b-e) show that linear suffixation must follow concatenative derivation. Once a word is formed by root and pattern combination, various suffixes can be added, sometimes recursively: +*i* can be added to words ending in either +*ut* or +*an*, and +*ut* can be added to words ending in either +*i*, +*ay* or +*an*. Thus +*ut*, the abstract noun marker, can occur more than once in words like *meci’utiyut* (19e), *havrutiyut* ‘friendliness,’ and *yahadutiyut* ‘Jewishness,’ and +*i* occur more than once in *mediniyuti* (19b).¹⁴ The suffix +*an* or +*ay*, however, which are more restricted in meaning (see (17a) above) cannot occur freely after either +*i* or +*ut*; they can only occur when +*ut* is part of the basic pattern as in *meci’utan* (19e).

In contrast, inflection operates only in the following order, as shown by the examples in (20):

Stem	Number/Gender	Possessive
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- (20) a. *sus+a* (f.) ‘horse + fem. suffix’ > *susa* > *susa(t)+i¹⁵* ‘my mare,’ *susa+ot* (f.pl.) > *susot+ay* ‘my mares’
 b. $\sqrt{d(w)n} + mCCiCa > medina$ ‘state, nation’ > *medinat+énu* ‘our nation’; > *medina+ot* > *medinot* ‘nations’ > *medinot+ehem* ‘their (m) countries’
 c. *halilan+im* ‘flautists (m.)’ > *halilan+ey* ‘flautists of’
 d. *sfar+(im)* (pl.) ‘book+s’ > *sfar+ay* ‘my books’

3.3. Stress patterns¹⁶

Hebrew suffixes: Hebrew derivational suffixes convert loan stems' stress into Hebrew stress patterns, whereas inflectional suffixes of number and gender leave the loan stems in their foreign stress pattern. Compare Hebrew derivational suffixes in loan stems *tšelan* 'cellist' (< *tšélo+an*), *bankay* 'banker' (< *bank+ay*), and *banka'ut* 'banking' (< *bank+(a)+ut*), with Hebrew stems *hucpan* (19d), *hašmalay* or *'itonut* (17c), all ultimately stressed.

Hebrew inflectional suffixes for gender and number do not have that effect on foreign stems. In most cases the stress remains unchanged on the loan stem, while in Hebrew stems the stress shifts to the suffixes. Compare *báncim* 'bank-s' (< *bank+im*), *studéntit* 'student (f.)' (< *student+it*), *váflot* 'wafers (pl.f.)' (< *váfla+ot*), penultimately stressed, with *bokrim* 'cowboys' (< *boker+im*), *saparit* 'hairdresser (f.)' (< *sapar+it*), *braxot* 'blessings' (< *braxa+ot*), ultimately stressed. Possessive inflectional suffixes have a fixed stress as shown in Table 1 above, but they rarely apply to loan stems, even when their stress fits Hebrew patterning. The examples in (21) are, therefore, questionable.

- (21) ?*telefono* 'his telephone' (< *telefon+o*), ?*'universitatam* 'their university' (< *'universita(t)+am*), ?*kurseyhem* 'their courses' (< *kurs+(im)+eyhem*)

Loan suffixes: Loan derivational suffixes convert all stems into the loan stress pattern, as in *katántšik* 'tiny' (< Hb. *katan+tšik*), *kibúcnik* 'Kibbutz member' (< *kibuc+nik*), *pitputácya* 'blabbering' (Hb. *pitput+ácya*), just like *politúrtšik* 'one who polishes furniture,' *núdnik* 'nagger,' and *'integrácya* 'integration' with foreign stems (18). The inflectional stress pattern of such words, either with foreign stems and Hebrew suffixes (22) or with Hebrew stems and foreign suffixes (23), as with any loan bases (24), stays on the stem and does not shift to the suffix.

- (22) *politúrtšikit* 'furniture polisher (f)' (< *politúrtšik+it*), *núdnikim* 'naggers (m.)' (< *núdnik+im*), and *'integrácyaot* 'integrations' (< *'integrácya+ot*)
 (23) *katántšikit* 'tiny (f)' (< *katántšik+it*), *katántšikiyot* 'tiny (f.pl.)' (< *katántšiki(t)+ot*), *kibúcnikit* 'kibbutz member (f)' (< *kibúcnik+it*), *kibúcnikim* 'kibbutz member (pl.)' (< *kibúcnik+im*), *pitputácyaot* 'blabberings' (< *pitputácya+ot*)
 (24) *banánot* 'bananas' (< *banána+ot*), *studéntit* 'student (f)' (< *student+it*), *profésorim* 'professors (m)' (< *profésor+im*), *profésoriyot* 'professor (f)' (< *profésori(t)+ot*)

The stress pattern presented here clearly shows that inflection is sensitive to the derivational history of the word. When either the stem or its ending is recognized as foreign during any point of the derivation, the stress pattern of inflection adapts to its foreign rules.¹⁷ The stress in derivation, on the other hand, takes only the actual suffixes into consideration. This point will be raised again in the conclusion (section 4).

The above examples also prove that derivation is more easily integrated than inflection. While derivation takes a possible syllabic form in the language and follow the rules of word formation, inflection tends to retain the foreignness of the word by preserving its stress

patterns. This point can also be proven through acronyms: although formed as possible pronounceable words, their inflectional pattern follows the foreign stress patterns, e.g.

- (25) *hak* ‘member of parliament (m)’ (< *haver knéset*) > *hákit* (*hak+it* (f)), *hákim* (*hak+im* (m.pl.)), *hákiyot* (*háki(t)+ot* (f.pl.)); *sakum* ‘cutlery (see example (4))’ > *sakúmim* (pl.)

3.4. Syntactic dependence

Gender and number inflection is obligatory and depends on sentence structures.

(25)

- a. *yald+a ktan+a ve+yaf+a sihak+a be+ca'acu'+im gdol+im ve+civ'only+im.*
 girl+f small+f and+nice+f played+f with+toy+s big+pl and+colorful+pl
 ‘A small pretty girl played with big colorful toys’
- b. *yelad+im ktan+im ve+yaf+im sihak+u be+bub+ot gdol+ot ve+civ'only+ot.*
 child+ren small+pl and+nice+pl played+pl with+doll+s big+pl and+colorful+pl
 ‘Small nice children played with big colorful toys’

The nouns *yeled* ‘child’ in its feminine form *yalda* ‘girl’ or plural *yeladim* ‘children’ in (25), as well as *ca'acu'im* ‘toys (m.)’ and *bubot* ‘dolls (f.)’ require syntactic agreement of the adjectives *ktan* ‘small,’ *yafe* ‘pretty, nice,’ *gdol* ‘big,’ and *civ'oni* ‘colorful,’ and of the verb *sihek* ‘play.’

Possessive and construct state inflections are stylistically optional and can be replaced by analytic *šel* ‘of’ constructions, except for fixed expressions such as *leda'ati* ‘in my opinion’ (*lade'a šeli* ‘to the opinion of mine’ has a different meaning), *hadar hamorim* ‘the teachers’ lounge’ (not equal to *hahéder šel hamorim* ‘the room (any room) of the teachers’). Syntactic and semantic restrictions determine the choice of the synthetic inflectional possession or construct state vs. the analytical method.¹⁸ In general, suffixational possession belongs to a higher register, and there is no difference in meaning between its formation by either the suffix or *šel* ‘of’, as in (26). It should be emphasized, though, that these are the only two options for expressing the possessive forms morphologically.

- (26) *dod+i* = *ha+dod šel+i*
 uncle+my = the+uncle of+mine ‘my uncle’
- mekom+xa* = *ha+makom šel+xa*
 place+yours (m) = the+place of+yours (m) ‘your place’
- simlot+eha* = *ha+smalot šel+a(h)*
 dresses+her = the+dresses of+her ‘her dresses’
- rixvey hahayalim* = *ha+rexavim šel ha+hayalim*
 vehicles of+the soldiers = the+vehicles of the+soldiers ‘the soldiers’ vehicles’

As opposed to inflection, derivation is always optional in its formation. Once a word is formed through one of the methods, it becomes part of the arbitrary lexicon of the language. Though it can be formed systematically by morphologically productive means, it can also be expressed lexically or syntactically.

In order to make a diminutive, one can make a morphological choice in Hebrew among the suffixes *+on*, *+it*, *+tšik*, *+iko*, *+le* or a reduplicate root-stem formation. The examples in (27) show the various devices:

(27) Base	Gloss	Diminutive	Gloss	Device
<i>ħamor</i>	donkey	<i>ħamoron</i>	small donkey	<i>ħamor+on</i>
<i>kaf</i>	spoon	<i>kapit</i>	small spoon (tea-spoon)	<i>kap+it</i>
<i>mamzer</i>	bastard	<i>mamzeriko</i>	little bastard	<i>mamzer+iko</i>
<i>šamen</i>	fat	<i>šaméntšik</i>	chubby	<i>šamen+tšik</i>
<i>buba</i>	doll	<i>búbale</i>	affectionate address	<i>buba+le</i>
<i>kelev</i>	dog	<i>klavlav</i>	small dog (puppy) ¹⁹	$\sqrt{klv}+CC_aC_jC_aC_j$
<i>ħatul</i>	cat	<i>ħataltul</i>	small cat (kitten)	$\sqrt{ħtl}+CC_aC_jC_\mu C_j$

There are no **ħamorit*, **ħamarmor*, **kalbit*, **kélevle*, *kélevtšik*, **ħatulit*, **kapon*, **káfle*, **káftšik*, **šameniko*, or **šamenon*. All the devices listed above are used for creating diminutive nouns. The suffix *+on* is the most productive one for [+Animate] nouns, whereas *+it* is common in [-Animate] nouns. The suffixes *+tšik*, *+iko* and *+le* are acceptable only in the colloquial register, not in formal one. Diminutives are rarely expressed lexically, as in *se* ‘sheep,’ *gdi* ‘kid’; *para* ‘cow,’ *égel* ‘calf.’ More commonly they are expressed syntactically as in *kelev katan* ‘small dog,’ *kaf ktana* ‘small spoon,’ *kapit ktana* ‘small teaspoon.’ One morphological device does not exclude the other, and double diminutives are possible as in *klavlavon* ‘small small-dog,’ *ħamoróntšik* ‘small small-donkey.’

The existence of a register option in the derivation of diminutives makes the process look like the choice of possessive suffixes in inflection, which is also optional. Inflection and derivation are alike in this respect.

To create an agent noun in Hebrew, one may use either the root and pattern combination, especially the verb participle forms, as in (28), or the suffixed word formation, as in (17a, b, and d) above. Both options exist, and speakers use just one of the ways for creating new nouns carrying these meanings (29). The reasons for the specific choice have yet to be discovered, however, unlike inflection, the creation of these forms is clearly not syntactically motivated.

(28) *menahel* ‘director’ ($\sqrt{nhl}+meCaCeC$), *manhig* ‘leader’ ($\sqrt{nhg}+maCCiC$), *šoter* ‘policeman’ ($\sqrt{str}+CoCeC$), *mu‘amad* ‘candidate’ ($\sqrt{md}+muCCaC$), *ne’ešam* ‘accused’ ($\sqrt{šm}+niCCaC$)²⁰

(29) *tšelan*, but not **tšelay*, **tšelon* ‘cello player’
bankay, but not **bankan*, **bankon* ‘banker’
ħucpan, but not **ħucpatan*, **ħucpay*, **ħucpon* ‘impudent’
ħašmalay, but not **ħašmalan*, **ħašmalon* ‘electrician’

While there is a similarity in options between possessive inflectional and derivational processes, they differ as the competition among the forms is greater in derivation than in inflection.

3.5. Syllabic patterning

Let us consider the following nouns ending phonetically with *+an*:

- (30) *psantran* ‘pianist’ (< *psanter+an* or $\sqrt{psntr+CaCCCan}$), *gandran* ‘coquettish’ (< $\sqrt{gndr+CaCCCan}$), *kantran* ‘provocative’ (< $\sqrt{kntr+CaCCCan}$)
 (31) *kalkelan* ‘economist’ (< *kalkala+an* or $\sqrt{klkl+CaCCeCan}$), *mišpetan* ‘jurist’ (< *mišpat+an* or $\sqrt{mšpt+CaCCeCan}$), ‘*avdekan* ‘bearded’ (< ‘*av-dekan* ‘thick-beard’)

Although formed similarly, in the first group of nouns (30) a three-consonant cluster is created in the derivation, whereas in the second group (31) only a two-consonant cluster is formed. It could be argued that the sonority of *n* and *r* as one of the components of the clusters in (30) is the reason for the difference, but there is a sonorant *l* in *kalkelan* in (31), and nevertheless, there is no **kalklan*. Moreover, three-consonant clusters can occur when there are no sonorants at all in loan words such as *biskvit* ‘biscuit’ and *paskvil* ‘pasquil.’

Inflection handles the stems differently: the stems in both groups do not change into three-consonant clusters with the addition of either the number or possessive suffixes, e.g.

- (32) *psanterim*, *psanteram* ‘pianos, their piano’ (< *psanter+im/+am*)
kalkalot, *kalkalat bhirot* ‘economies, economy in times of election’ (< *kalkala+ot/kalkala(t)+bhirot*)
mišpatim, *mišpato* ‘sentences, his sentence’ (< *mišpat+im/+o*).

However, a three-consonant cluster previously formed by derivation is kept in gender and number inflection, as in (33).

- (33) *psantranit*, *psantranim*, ‘pianist (f., pl.)’ (< *psantran+it/+im*), *gandranit*, *gandranim* ‘coquettish (f.,pl.)’ (*gandran+it/+im*), *kantranit*, *kantranim* ‘provocative (f.,pl.)’ (*kantran+im*).

Unlike the feature having to do with the derivational history of the word discussed above in section 3.3, inflection takes the derivational phonetic outputs and handles them identically regardless of their past history and of the phonological processes. The derivational phonological processes occur first and then inflection applies to their phonetic outputs.

3.6. Dynamic changes

It was argued in section 3.2 that inflectional suffixes are only of Hebrew-Semitic sources, while derivational suffixes may be derived from foreign sources as well. Moreover, inflectional suffixes are exactly the same as they were in classical Hebrew.²¹ Derivational suffixes were not only added to Hebrew throughout its history, but they also changed their status and meanings.

In classical Hebrew *+ay*, *+it* and *+ut* were primarily parts of the patterns of roots ending in *y* or *w*. The phonetic ending *+ay* occurred in the $CaC_iC_i\dot{a}C$ pattern denoting ‘agent, has the profession,’ as shown in (34).²²

- (34) a. *gallâv* ‘barber,’ *gannâv* ‘thief,’ *zammâr* ‘singer,’ *naggân* ‘musician’ (roots \sqrt{glb} , \sqrt{gnb} , \sqrt{zmr} , \sqrt{ngn} ; pronounced today *galav*, *ganav*, *zamar*, *nagan*)
 b. *dawwây* ‘sick,’ *bannây* ‘builder,’ *rammây* ‘swindler,’ *zakkây* ‘innocent’ (roots \sqrt{dwy} , \sqrt{bny} , \sqrt{rmy} , \sqrt{zky} ; pronounced today *davay*, *banay*, *ramay*, *zakay*)

A comparison of the forms in (34a) and (34b) clearly shows that the final syllabic *-ay* is determined by the root. In post-biblical times, due to Aramaic influence, it was spelled with an additional aleph <‘ay>, as *matres lectionis*, e.g. <*ban*•‘ay, *ram*•‘ay, *zak*•‘ay>, unlike the other words of this pattern, and this ending was perceived as an independent ending that was then assigned to any noun, as shown in (13) and (17b) above.

The same applied to the other endings: *+it* and *+ut* were first part of the pattern with final *w* or *y*, and due to Aramaic influence they became independent suffixes, *+ut* denoting abstract nouns (17c), and *+it* becoming a feminine derivational formative (17f). Here are some examples from biblical Hebrew:

- (35) *gâlut* ‘exile,’ *zânūt* ‘prostitution,’ *bârît* ‘covenant,’ *zâwit* ‘angle’ (roots \sqrt{glw} , \sqrt{zny} , \sqrt{bry} , \sqrt{zwy} ; pronounced today *galut*, *znut*, *brit*, *zavit*)

Moreover, some of the endings in classical Hebrew served as mere formatives, while in modern Hebrew they have clear meanings. For instance, *+on* was part of the patterns *CiC_iC_iâCon* or *CiCCCon*, as in *šiggâ‘on* ‘craziness,’ *šilton* ‘government’ (*šiga‘on*, *šilton* in MH), or an adjectival suffix in words like *rišon* ‘first’ (<*roš* ‘head’ +*on*, by dissimilation), *‘išon* ‘pupil (of the eye)’ (?< *‘iš* ‘man), *œh^aron* ‘crescent, pendant’ (< *sâhar* ‘moon’). The diminutive meaning is rare and quite questionable in the classical sources, as described by Gross (1993: 278-280). Nevertheless, *+on* is the dominant diminutive marker in MH, and other meanings were added to it as well, as demonstrated above in (17d).

The ‘agent’ suffix *+an*²³ was predominantly part of the patterns *CiCCan* and *CuCCan* in the classical sources, and it also occurred as an adjectival formative. For instance, *pilpelan* ‘smart’ (< *pilpel* ‘pepper’), *qolanit* ‘noisy (f)’ (< *qol* ‘voice’ +*an* [adj.] +*it* [f.]). The adjectival function turned into a productive nominal device in MH word formation.

The above data prove that not only has there been a change in the function of derivational suffixes, but semantic shifts occurred along with the change of their morphological formation.

The fact that new suffixes are added in derivation and there are changes in their forms and meanings shows that from a diachronic point of view derivation is different from inflection. Derivation is subject to dynamic changes whereas inflection is not. Thus, for instance, loan words which were accepted in Hebrew as singular nouns, but are plural in the original language, are inflected in Hebrew for plural like any other singular noun, e.g.

- (36) *burékas-burékasim* ‘filled pastry’ (< Ladino *boréka* + Ladino plural marker +*s* +*im* (pl.)), *tšíps-tšípsim* ‘French fries, potato chips’ (< *chips* +*im*); *média-médyot* ‘media’ (*média* ‘medium’ +*ot*), *tšizbatim* ‘lies, fairy tales’ (< Palestinian Arabic (*kiðb* ‘lie (sg.)) > *tšidba:t* (pl.) > *tšizbat* ‘lie’ +*im*)

The examples in (36) further strengthen the observations made above, that inflection is more productive and quite straightforward in meaning compared to derivation. The only cases that seem counter to the conservative tendencies in inflection are nouns borrowed from Yiddish. Nouns ending in *-le* are pluralized by *+lax* (37a), and very few loans that came back to Hebrew from Yiddish are pluralized by *+s* (37b).²⁴

- (37) a. *béygale-béygalax* 'pretzel-s,' *búlkale-búlkalex* 'bulge-s', *búbale-búbalex* 'honey-darling-s'
 b. *máyse-máyses* 'tale' (< Hb. *ma'ase* 'story' > Yd. *máyse+s*), *éyce-s* 'questionable advice' (< Hb. *'eca* > Yd. *éyce+s*)

These scarce examples seem to be unproductive. They occur only in a few items in which the singular and the plural are both lexicalized. Hence they do not violate the above stated generalization regarding the dynamic nature of derivation compared to that of inflection.

4. CONCLUSION

The above discussion shows that both stems and suffixes play a major role in determining the differences between inflection and derivation. Although there are similarities between inflectional and derivational phonetic outputs, significant differences do exist and can be summarized by the following features (The generalizations are presented according to the order in which they appeared in the paper and not according to their importance. The section in which they were discussed is in parentheses at the end of each generalization, and whenever available, it is followed by reference to Dressler's (1989) distinctions marked by D-n where n stands for his generalization.):

1. Inflectional devices are more limited than those of derivation. Inflection is done in Hebrew only through linear formation, mainly suffixation. Although derivation may be linear, it can be formed in other methods as well (2, 3.1).
2. The accessibility of derivation to stems is greater than that of inflection. Derivation has access to both singular, plural, masculine and feminine stems, whereas inflection has access to either singular or plural, or to either masculine or feminine. (3.1.2; D-20, also related to D-7, D-16)
3. Derivation has access to non-existing lexical bases, whereas inflection predominantly has access to existing bases (3.1). This feature is strengthened by the fact that many words in Hebrew are productively derived through the combination of unpronounceable consonantal roots with patterns that include vowels (section 2, method (b); D-20).
4. The semantics of suffixed derivation is much far less predictable than that of inflection. On the one hand, various derivational suffixes have the same meanings, while on the other, the same suffix may have several meanings. (3.2; D-4, D-5, D-6, D-10, D-15).²⁵
5. Derivational suffixes are constantly added to the language, whereas inflectional suffixes are more conservative and do not show fluctuation (3.2.2; D-20).
6. The order of the suffixes in derivation is more flexible than that of inflection (3.2; D-14, D-19).
7. Stress patterns vary in inflection and derivation. Stress in inflection tends to identify foreignness of either stems or suffixes, whereas derivation depends on the type of suffixes, either Hebrew or foreign (3.3).

8. While inflection is syntactically motivated and requires gender and number agreement whereas derivation is not (3.4; D-2, D-9).
9. Inflection in number and gender categories is obligatory, derivation is optional in its formation, and is subject to competition of varieties (3.4; D-3, D-5).
10. Despite the similarity between possessive inflection and derivational processes in their optionality feature and in the register restriction, they are different. The competition among the forms is greater in derivation than that in inflection (3.4).
11. Derivational word formation allows syllabic structures (medial three consonant clusters) which inflectional word formation does not allow. However, once created through derivation, inflection does not interfere with these structures (3.5)
12. Due to 5, inflectional suffixes are historically resistant to change, whereas derivational suffixes are historically dynamic in both form and meaning (3.6; D-15)
13. Inflection is morphologically more productive, and more stable in terms of meaning than derivation (3.6; D-4, D-11).

Most of the differences support the well summarized differences in Dressler's (1989) paper. Features 1, 7, 10 and 11 above are Hebrew language specific and, therefore, do not fit any prototypical differences discussed there. Dressler's features D-1, D-8, D-12, D-13, D-17, and D-18 were neither discussed nor found here. They belong to the general criteria for differentiating inflection from derivation, and were not found truly relevant for our suffixational word formation.

It has been assumed in generative grammar that the theory should account for the difference between inflection and derivation. Various approaches have been postulated regarding the distinction, most suggesting that inflectional and derivational morphology should be handled separately. Anderson (1982) includes inflection within grammar and leaves derivation within the lexicon to what has been known as the Split Morphology Hypothesis. Halle (1973), Lieber (1980), and Williams (1981) handle inflection and derivation similarly, paving the way for the Strong Lexicalist Approach, where both inflection and derivation are placed in the lexicon (Selkirk, 1982). Kiparsky (1982) and Mohanan (1982) place inflection at a different level of the Level Ordered System in their Lexical Phonology Approach, thus allowing some type of flexibility between grammar and lexicon. Bybee (1985, chapter 4) views inflection and derivation on a continuum defined by several criteria with no sharp distinction between them.

Most of the features discussed above may definitely place derivation in the lexicon because of their unpredictability and fluctuating status. Inflection, on the other hand, does not seem to be relevant for the lexicon according to features 8-10. Syntax is relevant for inflection and not for derivation. This implies that inflection is in fact part of the grammatical process. Feature 2, however, clearly shows that derivation must have access to inflectional stems. Although some Hebrew bases with very fixed syllabic structures do not show any stem modification (for example, *sus* 'horse,' *talmid* 'student'), most Hebrew bases have several stems. The stems are not always automatically derived through phonological rules (e.g. *séfer* ~ *sifr* ~ *sfar* 'book' (examples (2) and (12) above), *héder* ~ *hadar* ~ *hadr* 'room' (ex. (16) above), *simla* ~ *simlat* ~ *siml* ~ *smal* 'dress' (ex. (12) and (16) above), *tikra* ~ *tikrat* ~ *tikr* 'roof'). This information about the stems must be brought in the lexicon, thus forcing inflection to have relevant access in the lexicon.

Features 7 and 11 are of special importance in determining the place of inflection and derivation. Although in principle inflection operates on the phonetic output of derivation, regardless of the phonological processes involved in the derivation, derivational history is important to inflection. Either foreign bases, or bases derived from foreign stems by Hebrew suffixes, or Hebrew stems by foreign suffixes, behave similarly as foreign stems in inflection. Their stress patterns are the same. The theoretical implication is that inflection must have access to the lexical derivational processes (not to the phonological ones) with its [+Foreign] feature assignment in the lexicon. Hence, once the feature [+Foreign] is assigned — whatever its derivational source is — inflection might treat the word uniformly.

The accessibility of inflection to lexical derivation could also be shown by some compound derivations. Examples such as *bney yisra'el* 'the children of Israel, Israelites,' *divrey hayamim* 'history,' and *dvarim kedorbanot* 'caustic remarks,' show that inflection precedes derivation and is integrated in it. The forms *bney* and *divrey* are the construct (possessive) state of *banim* 'children, sons' and *dvarim* 'things, sayings,' respectively; and *banim*, *yamim* 'days,' *dvarim* and *dorbanot* 'spurs, stings' are plural forms of *ben*, *dabar*, *yom* and *dorban*, already derived in the lexicon. There are no phrases like **ben yisra'el*, **davar hayom*, or **davar kedorban* in the singular²⁶

Compounds are a special category in word formation. They belong to derivation because they create new lexical items (D-1). Their formation makes use of formerly derived single words, together with syntactic phrase construction rules and inflectional processes. This means that compound derivation is related to both the lexicon and the grammar.²⁷

These forms may lead us to the conclusion that inflection exists in the lexicon as well as at the syntactic level. Whenever number, gender and possession are called for in the derivation of the word (compound or simple), the phonological rules of inflection apply. For instance,

- (38) a. *gan hayot* 'zoo' (< *gan* 'garden/park of,' *hayot* 'animals,' *haya* 'animal' +*ot*)
 b. *be'alim* 'owner or owners' (< *bá'al* 'husband, owner' +*im*)
 c. *maxšefa* 'bitch' (< **maxšef* +*a*, instead of *mexašf-mexašefa* 'witch (m-f)')

In (38a) a compound is formed as a possessive construct state in which the second component is formed in the plural form. There is no **gan šel haya*, **gan šel hayot* or even **gan haya*. In (38b) *be'alim* is derived as pluralis tantum, with a different meaning from *ba'al*. One could say *habe'alim to'en* 'the owner claims' or *habe'alim to'anim* 'the owners claim,' and use the same form, *be'alim*. *Maxšefa* in (38c) is always a feminine form. Native speakers relate it to the base *mexašef*, although its word formation indicates that it should have been derived from **maxšef*.

Stem inflection is also relevant to the lexicon. As shown in 3.1, derivation has access to various inflectional stems. Some stems could be derived by straightforward phonological rules, e.g. *galil* 'cylinder' > *galil+i* > *glili* 'cylindrical,' or *cava* 'army' > *cava+i* > *cva'i* 'military,' through a deletion when away from the stress, just like inflectional *glilim* 'cylinders' and *cva'ot* 'armies.' Other bases need to be marked for stems, as the examples in (39) show.

- (39) a. *géves* 'gypsum' > *geves+i* > *givsi* 'containing gypsum'
 b. *késef* 'silver, money' > *kesef+i* > *kaspi* 'silvery, financial'
 c. *'éder* 'flock' > *'eder+i* > *'edri* 'gregarious'
 d. *pére* 'wild' > *pere+i* > *pir'i* ~ *pra'i* 'wild'

Although the bases are formed similarly as CéCe(C), their adjectival forms take various stem vowels. The first three and possibly the first form of the forth take the typical singular possessive inflection (*givso* 'his gypsum,' *kaspexa* 'your money,' *'edrénu* 'our herd,' *?pir'o* 'his wild'), whereas the other variety of the forth is derived from the plural form (*pra'im* 'wilds').

In other cases, the regular phonological and morphological rules of derivation apply (e.g. producing three-consonant clusters word medially). Then inflection applies again with the same phonological rules at the syntactic level.²⁸ However, what had been previously formed in the lexicon is kept unchanged later in grammar during inflection, even through counter-inflectional phonology, as the examples in section 3.5 prove. Thus the model proposed is as follows (Figure 1): During the derivation, various word formation rules apply. Non-derived forms are created as bases, and when they are loans, they might deviate from the regular syllabic Hebrew structure, either through stress patterns or through consonant cluster formation. Root and pattern non-concatenative formation requires both morphological and phonological rules of derivation. When derivation is created through suffixation, there might be two conditions: 1. Inflectional suffixes are added to stems (especially in compounds), or 2. Derivational and possibly inflectional suffixes are added to stems. In the first conditions, only inflectional rules apply phonologically; in the second condition, both morphological and phonological rules apply. Once the derivational processes are over, syntactic rules apply, and the phonological rules of inflection apply once more.²⁹ The examples in (40) show the processes.

Lexicon					
	Formation		Rules		
	non-derived		Minimal adaptation	phonological	[+Foreign] feature assignment
Derivation	root & pattern		Morphological	and	"
			Phonological	Rules of	
	Stem + Inflectional Suffixes		Phonological Inflection	Rules of	"
	Stem + Derivational or inflectional Suffixes		Morphological Phonological Derivation	Rules of	"
Grammar (Syntax)					
Inflection	Derivational Output	Phonetic	Phonological Inflection	Rules of	

Figure 1: Word formation and rules in the lexicon and the grammar

- (40) Derivation: 'em 'mother' (non-derived) > ('imahot 'mothers) > 'imahi 'motherly' (<'imah+i); Plural Inflection: 'imahot ~ 'imot (in possessive constructions)
 Derivation: 'em 'mother' (non-derived) + \sqrt{kr} '+CCiCa > kri'a 'reading' > 'em kri'a 'matres lectionis' (< mother of reading), vowel letter'; Plural Inflection: 'imot kri'a
 Derivation: psanter 'piano' (non-derived) > psantran 'pianist' (< psanter+an or ? \sqrt{psntr} +CaCCCan > psantran forming a three consonant cluster) > psantranut 'piano-playing' (< psantran+ut); Plural Inflection: psanter+im > psanterim, psantran+im > psantranim
 Derivation: $\sqrt{špt}$ +miCCaC > mišpat 'justice,' mišpati 'judicial' (<mišpat+i), mišpetan 'jurist' (< mišpat+an or ? $\sqrt{mšpt}$ + CaCCeCan), mišpetanut 'juriprudence' (< mišpetan+ut); Plural Inflection: mišpat+im > mišpatim, mišpati+im > mišpatiyim, mišpetan+im > mišpetanim, mišpetanut+ot > ?mišpetanuyot
 Derivation: 'estétika 'aesthetics' (non-derived) [+Foreign] > 'estéti 'aesthetic' (< 'estét(+ika)+i), 'estétiyut 'aestheticism' (<'estéti+ut), 'estetikan 'aesthetete' (<'estetika+an), 'estetikáni 'of aesthetete' (< 'estetikan+i) > 'estetikániyut 'aestheticism' (< 'estetikáni+ut);
 Inflection: 'estetikan+it > 'estetikánit (f), 'estetikan+im > 'estetikánim (m.pl.), 'estetikánit+ot > 'estetikániyot (pl.f).

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NOTES

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¹ See McCarthy (1981) for the term.

² See Ornan (1983), Schwarzwald (1991a: 580-581), Ravid (1991).

³ The following conventions are used here: the common ultimate stress is unmarked; non-ultimate stress is indicated by $\acute{}$. The sign $\sqrt{}$ stands for the consonantal root; C stands for the consonantal root radical in the pattern; the sign + stands for a morpheme boundary. Hebrew orthography is simplified and transcribed in this manner: ' = glottal stop; ' = pharyngeal voiced continuant; p , b , and k are represented only phonemically; phonetically they are realized as p/f , b/v and k/x respectively; h is Hebrew *Het*, realized by most speakers as x ; $c = ts$, $y = \text{IPA } j$ (as in English *yolk*).

⁴ Modern Hebrew spirantization rule transforms p , b , k into f , v , x respectively, in certain morphophonemic environments.

⁵ The form resembles *nadvān* cited in (2).

⁶ Ravid (1991) and Nir (1993: 88-91) treat many of them by method (b) presented above, as root+pattern combination.

⁷ A detailed account on the entire Hebrew inflectional system is given in my *Hebrew Morphology*, Units 5-6 (In press a).

⁸ Nouns that end in $-a$ in Hebrew (which are mainly feminine) and are spelled with final silent *He*, alternate with $-at$ when inflected for possession (including construct state).

⁹ This generalization is true for all inflection in Hebrew. Verb inflection for gender, number and person is mainly suffixational; prefixational and suffixational only for the future tense. Present and future tenses are marked by prefixes. Nouns, adjectives, adverbs, and prepositions are always inflected by suffixes.

¹⁰ The pattern is unpronounceable as well, and yet very productive. The pattern *CéCeC* appears, for instance, in words like *bérex* 'knee,' *yéled* 'boy,' *dérex* 'way,' and many more; *CaCaC* is very common verb pattern in *šalax* 'sent,' *šavar* 'broke,' *katav* 'wrote,' *lamad* 'studied,' etc.

¹¹ Note that in inflection, this noun might have a non-existing base as well, e.g. *'iša-našim* 'woman-women' (not **'išot*), inflected for possessive as *nešot ha'irgun~nešey ha'irgun* 'the women of the organization,' *nešotav~našav* 'his wives,' where **našot* does not exist independently. The number of defective nouns that behave in this manner in inflection is very sparse.

¹² It is of Aramaic origin. It cannot be explained by root+pattern formation, as the pattern *CaCay* is restricted to radicals with final y (see section 3.6). See our comment on *'iša-našim*.

¹³ Historically, n was added before suffixes to prevent hiatus, e.g. **'asa+i* 'made + me' > *'asani*; *šilo+i* 'Shilo (place name) + gentilic ending +i' > *šiloni* 'a person from Shilo.' This n was later added in other cases as well for no apparent phonetic reason. Some researchers, therefore view the morpheme $/+i/$ as having several allomorphs, $[+i]$, $[+ni]$, $[+oni]$, etc., see Nir (1993: 73-79).

- ¹⁴ The same thing happens in English in words like *institutionalization*. See Spencer (1991:9), Scalise (1986:23-26).
- ¹⁵ See fn. 8 above regarding *-t* in noun inflection.
- ¹⁶ Ultimate stress is unmarked.
- ¹⁷ Word length plays a role as well in stress assignment in inflection. The shorter the stem with its suffix, the more likely it is to be inflected according to the Hebrew stress rules, e.g. *tšelan* (*tšélo+an*) > *tšelanim* 'cellists (m.pl.)', *bankay* (bank+ay) > *banka'iyot* 'bankers (f.pl.)' ultimately stressed in inflection as in Hebrew words, vs. *'estetikan* (*'estétika+an*) > *'estetikánim* 'aesthetes' (see (40) below), *politikay* (*polítika+ay*) > *politiká'iyot* 'politician (f.pl.)', penultimately or pre-penultimately stressed. See detailed discussion in Schwarzwald (In press b).
It should be noted, that when the loan word is pre-penultimately stressed, the stress shifts in inflection, not to the suffix, but rather to a syllable closer towards the end of the word, e.g. *'ótobus* > *'otobúsim* 'buses,' *télefon* > *telefónim* 'telephones.'
- ¹⁸ See detailed discussion of possessives and construct state structures in Rosen (1977: 144-152), Glinert (1989: 24-49), Ravid & Shlezinger (1995). Their discussions are syntactically and semantically motivated.
- ¹⁹ For lack of morphological devices, English uses the lexical means for creating diminutives such as *pony*, *kitten*, *puppy*, etc. Some languages use the morphological devices, e.g. German and Italian (Dressler and Merlini Barbaresi, 1994), Dutch (Daelemans, Berck and Gillis, 1997), and Hebrew (Bolzky, 1994).
- ²⁰ Vowels may be inserted or lowered in the environment of ' , ' *h*, and *h* in Hebrew.
- ²¹ Classical Hebrew refers to biblical Hebrew (circa 1500-500 B.C.), and to post-biblical Hebrew (until circa 200 A.D.).
- ²² See also discussion at the end of 3.1.
- ²³ See 3.1 and examples (17a), (19), and (30-31) above.
- ²⁴ Compare Perlmutter's (1988) discussion of Yiddish inflection.
- ²⁵ The abstractness of the meanings of the suffixes has not been discussed in this paper. I agree with Dressler's (1989) statement that the meanings in inflectional morphology are more abstract than those of derivational morphology (D-8). This statement does not contradict feature 4 here in any way.
- ²⁶ The same principle applies to construct state inflection of feminine nouns like *gnevat da'at* 'false pretense,' *'ešet ne'urim* 'the wife of one's youth,' *yir'at kavod* 'homage, awe,' that are based on *gneva* 'theft,' *'iša* 'wife, woman,' and *yir'a* 'fear.'
- ²⁷ There are many studies on compounds and their relevance to the grammar and the lexicon. It begins with Chomsky's (1970) remarks on nominalization in English, and continues with Di Sciullo & Williams (1987) on Romance languages, Szymanek (1985) on Polish and English, Shibatani & Kageyama (1988) on Japanese, Borer (1988) on Hebrew, and many others.
- ²⁸ This fits Kiparsky's (1982) cyclic notions of phonological processes.
- ²⁹ Compare it to the Morphology Module presented at Spencer (1991:455), following the discussion on the place of morphology.