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On the visibility of word-internal morphological features*

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Abstract

In this paper I argue that word-internal morphological features can be visible. I present a case from Hebrew, where plural formation of feminine diminutive nouns is blocked due to features associated with an internal suffix. The feminine diminutive form yaldónet *'little girl' consists of a base* yeled *'boy', a diminutive suffix* -on, *and a feminine suffix* -et; -on *is specified for [−Fem] and* -et *for [+Fem]. The plural suffixes in Hebrew are subcategorized for gender,* -ot *for [+Fem] and* -im *for [−Fem]. I argue that diminutive forms such as* yaldónet *cannot be pluralized because* -im *conflicts with the gender of* -et, *and* -ot *with the gender of* -on. *While the conflict with* -et *is expectable, the one with* -on *can be explained only if the gender of the internal suffix is visible.*

There are, however, cases where word-internal suffixes are not visible. These suffixes, unlike the visible suffix -on, *are noncompositional. I thus propose to view words as consisting of compositional and noncompositional morphological domains; only suffixes in a compositional domain can be visible word-internally.*

Introduction

It is generally agreed that word-internal structure is invisible, and so are the features associated with this structure. The strongest version of this view is introduced in Anderson (1992), who argues that words do not have internal structure (with the exception of compounds). Earlier studies, which assume that words do have internal structure, propose various principles that have the effect of limiting the accessibility of word-internal structure and features; for example, the *adjacency condition* (Allen 1978; Siegel 1978), the *atom condition* (Williams 1981), and the *strict cyclicity condition* (Kiparsky 1982).

In this paper I argue that word-internal morphological features CAN BE VISIBLE. What allows me the opportunity to put forward this argument

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is a case in Hebrew, where in a sequence of formatives XYZ, the gender of X, which differs from that of Y, is visible when Z is attached. Visibility is, however, restricted to within a morphological domain. Domains are assigned on the basis of semantic compositionality, distinguishing between compositional and noncompositional domains. Thus, the gender of X is visible to Z only when X and Z are within the same morphological domain. In turn, X and Z are within the same domain when they have the same value of compositionality. The case presented here argues for visibility within a compositional domain — the portion of the word where speakers can easily recognize its semantic/morphological units.

Nouns in Hebrew are associated with masculine or feminine gender and with singular or plural number. There are several types of common gaps in the gender–number paradigm of Hebrew, but there is one unique gap that is quite peculiar. Nouns with the diminutive suffix *-on* may be associated with any combination of gender and number EXCEPT FEMININE PLURAL. For example, from the base *pil* 'elephant m.sg.' it is possible to form *pilon* 'little elephant m.sg.', *pilonim* 'little elephant m.pl.', and *pilónet* 'little elephant f.sg.', but not **pilonot*[1] 'little elephant f.pl.' (stress is final unless otherwise specified).

I argue that this gap is due to a gender conflict accessible to the *morphological-agreement constraint* (M-AGR), which bans disagreement between a gender specified in the base and the subcategorized gender of the plural suffix. There are two plural suffixes in Hebrew, *-ot* and *-im*, where *-ot* is subcategorized for a [+Fem] base and *-im* for a [−Fem] ([+Fem] is feminine and [−Fem] is masculine). Feminine diminutive forms such as *pilónet* 'little elephant f.sg.' (from *pil* 'elephant m.sg.') or *milónet* 'little word f.sg.' (from *mila* 'word f.sg.') are composed of formatives with conflicting genders, [−Fem] of the diminutive *-on* and [+Fem] of the feminine *-et*. Addition of either of the plural suffixes, *-ot* or *-im*, would result in M-AGR violation. The crucial point is that when the plural suffix is added, and thus M-AGR is in force, THE WORD-INTERNAL GENDER, that is, [−Fem] of *-on*, IS VISIBLE.[2]

It is not, however, the case that word-internal gender is always visible in Hebrew. There are many other forms with formatives of conflicting genders, yet they can be pluralized. The noun *milonit* 'electronic dictionary f.sg.' is morphologically similar to *milónet* 'little word f.sg.'. In both nouns the base *mila* 'word f.sg.' is followed by a suffix *-on*; in *milónet* it is the diminutive *-on* and in *milonit* it is the nondiminutive *-on* (see section 2.1 for the nondiminutive *-on*). Both nouns also end in a feminine suffix, one in *-et* and the other in *-it*. Thus, although *milonit*, like *milónet*, has conflicting genders, [−Fem] of the nondiminutive *-on* and [+Fem]

of *-it*, its plural form *miloniyot* is well formed (see note 1 for the relevant segmental phonology involved here and in other plural forms).

This apparent inconsistency in the effect of the conflicting genders is explained here by viewing words as consisting of morphological domains. The domains are assigned on the basis of semantic compositionality such that the noncompositional portion of the word belongs to one domain and the compositional portion to another. The domain structure of *milónet*, where the internal gender is visible, is distinct from that of *milonit* because the former is compositional and the latter is not.

The analysis provided in this paper relies in part on some concepts of *optimality theory* (Prince and Smolensky 1993), in particular on the notion that phonological and morphological structure is governed by a set of well-formedness constraints that are violable and ranked. A constraint-violating structure can be acceptable just in case all alternative structural candidates involve the violation of a higher-ranked constraint or constraints. Constraint ranking is language-specific; in Hebrew, M-AGR dominates M-PARSE (morphological parse), where the latter requires each morpheme to be parsed into a morphological domain. In the formation of a feminine diminutive plural M-AGR and M-PARSE are in conflict. In order to respect M-AGR it is necessary to violate M-PARSE, and violation of M-PARSE entails that the form does not exist.

The paper is organized as follows: section 1 provides the essence of the nominal gender–number system with emphasis on plural formation (1.1) and presents the gap in the gender–number paradigm of diminutive *-on* forms (1.2). Section 2 proposes that words consist of compositionality-based morphological domains, where visibility is governed by c-command (2.1). It then argues that the gap stems from a gender conflict that arises when two suffixes specified for distinct gender features are c-commanded by the plural suffix (2.2). Section 3 considers the adjacency condition as an alternative account, showing the problem it raises in forms that contain empty morphs (3.1). It also suggests that the distinction between compounds and constructs in Hebrew and the visibility of the word-internal [Abstract] feature in Italian should be reconsidered in the light of the relation between compositionality and visibility put forward in this paper (3.2).

1. Hebrew nominal morphology

1.1. *Gender and number*

Nouns in Hebrew are associated with masculine or feminine gender and with singular or plural number. For most animate nouns all four combinations of gender and number are possible, as in the following paradigm:

(1)

m.sg.	*f.sg.*	*m.pl.*	*f.pl.*	
xayal	xayélet	xayalim	xayalot	'soldier'
tabax	tabaxit	tabaxim	tabaxiyot	'cook'
xatul	xatula	xatulim	xatulot	'cat'
sus	susa	susim	susot	'horse'

The familiar types of gaps are found also in Hebrew. Some nouns are associated with only one number (identified by agreement): for example, the singular nouns *cédek* 'justice m.', *ʔeš* 'fire f.', and *briʔut* 'health f.' have no corresponding plural forms (*singularia tantum*); the plural nouns *panim* 'face'[3] and *raxamim* 'mercy m.' have no corresponding singular forms (*pluralia tantum*). All inanimate nouns are associated with only one gender: for example, *mixtav* 'letter m.' and *kise* 'chair m.' have no corresponding feminine forms; *simla* 'skirt f.' and *tmuna* 'picture f.' have no corresponding masculine forms. Among the animate nouns, some denoting animals and insects are also associated with one gender only: for example, *dag* 'fish m.', *šablul* 'snail m.', and *ʔorev* 'crow m.' have no feminine counterparts; *cipor* 'bird f.', *nemala* 'ant f.', and *dvora* 'bee f.' have no masculine counterparts. Such well-known gaps are typical of languages with number and gender marking (see Glinert 1989 and Schwarzwald 1991a, 1991b for Hebrew; and Corbett 1991 for a cross-linguistic study).

The gender of a singular noun can be identified when the noun ends in a suffix. Nouns ending in one of the feminine suffixes (*-it*, *-et*, *-a*, or *-ut*) are almost always feminine (see some exceptions in Schwarzwald 1991b). Nouns ending in other suffixes (e.g. *-on* and *-an*) are always masculine. However, the gender of inanimate unsuffixed nouns cannot be identified on the basis of their phonological or morphological shape. For example, while the nouns *ʔéven* 'stone' and *ʔir* 'city' are feminine, the phonologically similar nouns *xével* 'rope' and *gir* 'chalk' are masculine. The gender of such nouns can be identified by the modifying adjective: an adjective modifying a feminine noun ends in a feminine suffix (*ʔéven gdola* 'big f. stone'), and an adjective modifying a masculine noun does not have a suffix (*xével gadol* 'big m. rope').

There are two plural suffixes in Hebrew, *-ot* and *-im*, where *-ot* is usually attached to feminine nouns and *-im* to masculine. (I do not consider here the dual suffix *-áim* as it is of a limited distribution and not directly relevant to the present discussion; see discussion in Schwarzwald 1991b and Ritter 1995). Although the plural suffixes are gender-linked, they are themselves not specified for gender.[4] This is shown by the adjectival agreement of irregularly pluralized nouns. When *-ot* is attached to a masculine noun (recall that *-ot* is usually attached to

feminine nouns), the resulting plural noun is masculine, like the base, as evidenced by its masculine agreement, as in (2a). Similarly, when *-im* is added to a feminine noun (recall that *-im* is usually attached to masculine nouns), the plural noun preserves the feminine gender of the base, and the adjective is thus assigned a feminine plural suffix, as in (2b). Needless to say, there are no irregular plural adjectives.

(2) a. xalon gadol; xalon*ot* gdol*im* (xalon*ot* *gdol*ot*)
window m. big m. windows m. big m.pl.
'big window' 'big windows'

b. nemal*a* gdol*a*; nemal*im* gdol*ot* (nemal*im* *gdol*im*)
ant f. big f. ants f. big f.pl.
'big ant' 'big ants'

The fact that the plural suffixes do not change the gender of their bases suggests that they are not specified for a gender feature. (See pluralization of irregular forms in Romanian [Farkas 1990], where the plural noun acquires the gender of the plural suffix, that is, in Romanian, unlike in Hebrew, the plural suffixes are specified for gender.)

The fact that the plural suffixes are gender-linked can be captured by subcategorization, traditionally formulated as follows (irrelevant features are omitted):

(3) -ot: $\underset{[+\text{Fem}]}{X}$ ____]$_{PI}$ −im: $\underset{[-\text{Fem}]}{X}$ ____]$_{PI}$

The subcategorization frames in (3) redundantly repeat two sorts of generalizations: (i) that the plural markers are suffixes, and (ii) that the subcategorized gender of a plural suffix has to match the gender of its base.

It seems that one statement would suffice to indicate the position of the plural markers in the word. Within the framework of optimality theory, the location of an affix can be expressed by an alignment constraint (see, in particular, McCarthy and Prince 1993), which in this particular case aligns the left edge of every plural suffix with the right edge of the base (see also "Edgemost" in Prince and Smolensky 1993: 35).

(4) *Plural alignment:*
Align ($\text{Plural}_{\text{Aff}}$, L, Base, R)

Since the subcategorization frames of the plural suffixes do not specify the position of the base (this is done by *plural alignment*), the subcategorized feature can simply be superscribed on the suffix.

(5) *Subcategorization:*
$\text{ot}^{[+\text{Fem}]}$ $\text{im}^{[-\text{Fem}]}$

These subcategorization frames say that *-ot* selects a feminine base and *-im* selects a masculine base (notice that the term "select" is distinct from the term "specified").

The gender link manifested in both plural suffixes is also preferably captured by a general constraint and not specified independently for each suffix; let it be called the morphological-agreement constraint.

(6) *The morphological-agreement constraint (M-AGR):*

$$*\left(\begin{matrix} X \\ [\alpha] \end{matrix} \quad Pl^{[-\alpha]}\right)_{\omega}$$

where ω is a morphological domain, X is a (possibly complex) base, and α is a gender feature.

M-AGR prohibits disagreement between the gender specified in the base and the subcategorized gender of the plural suffix, when the two are within the same morphological domain. Notice that I assume a full specification of gender features. The only nouns that are not specified for gender are "genderless" nouns, which trigger either feminine or masculine agreement (e.g. *sakin xad/xada* 'sharp m./f. knife').

Plural formation is viewed here as the selection of the optimal plural form among several candidates, in the spirit of optimality theory. For instance, the possible candidates of the plural of *tabax* 'cook m.' and *tabaxit* 'cook f.' are as follows (→ points to the optimal candidate):

(7)

a.	/tabax-PL/ [−Fem]	b.	/tabaxit-PL/ [+Fem]
1.	(tabax $ot^{[+Fem]}$)$_{\omega}$ [−Fem]	1.	→ (tabaxit $ot^{[+Fem]}$)$_{\omega}$ *tabaxiyot* [+Fem]
2.	→ (tabax $im^{[-Fem]}$)$_{\omega}$ *tabaxim* [−Fem]	2.	(tabaxit $im^{[-Fem]}$)$_{\omega}$ [+Fem]
3.	(tabax)$_{\omega}$ $im/ot^{[\alpha Fem]}$ [−Fem]	3.	(tabaxit)$_{\omega}$ $im/ot^{[\alpha Fem]}$ [+Fem]

All candidates, except (7a2) and (7b1), violate some constraint, and in the presence of a candidate that does not violate any of the constraints they are not selected as the optimal candidates. (7a1) and (7b2) violate M-AGR, as the subcategorized gender feature of the plural suffix does not agree with the gender specified in the base. In (7a3) and (7b3) the plural suffixes are not within a morphological domain, and therefore these candidates violate M-PARSE (morphological parse), which

"penalizes failure to assign a morphological structure" (Prince and Smolensky 1993: 49).

Following this selection of a plural form, we expect a genderless noun to take either *-ot* or *-im*; in the absence of gender specification in the base there would be no gender to disagree with the gender specified in the plural suffix. However, the genderless nouns usually take the unmarked plural suffix *-im*.

Schwarzwald (1991b) notes that while there are thousands of nouns that follow the generalization that *-ot* is attached to feminine nouns and *-im* to masculine, there are about 250 with an irregular plural: over 200 masculine nouns are pluralized with *-ot* and about 50 feminine nouns are pluralized with *-im*. These irregularly pluralized nouns must be lexically specified by a diacritic such as [±Pl]. [+Fem^{-Pl}] specified in *cipor* 'bird f.' (plural *ciporim*), is read by M-AGR as [−Fem]; [−Fem^{+Pl}], specified in *xalon* 'window m.' (plural *xalonot*), is read as [+Fem]. These diacritics are relevant only for plural formation; for agreement purposes the basic gender of the base ([±Fem]) is relevant. Schwarzwald's account of irregular plurals includes rules such as "Animal and insect feminine nouns take +*im* plural suffix" (1991b: 590), and "Masculine nouns of nonanimate ... CaCoC pattern[s] take +*ót* plural suffix" (1991b: 592). I suspect that such rules are very unlikely to be included in the native speaker's linguistic knowledge, mainly because of the odd combination of the structural and semantic properties involved. The irregularly pluralized nouns do not seem to form unified semantic or morphological classes and should therefore be considered sporadic exceptions.

1.2. *The gap*

There is an unexpected gap in the number and gender system of Hebrew, one that to the best of my knowledge has not yet been observed. This gap is of very limited distribution, manifested only with the diminutive suffix *-on*. Nouns with the diminutive *-on* may be associated with any combination of gender and number EXCEPT FEMININE PLURAL. This is illustrated in (8) below, obtained from (1) above by suffixation of the diminutive *-on*. (The same paradigmatic gap is manifested by adjectives with *-on*. Although the examples are limited to nouns, the analysis provided here holds for adjectives as well.)

(8)

m.sg.	*f.sg.*	*m.pl.*	*f.pl.*	
xayalon	xayalónet	xayalonim	*xayalonot	'little soldier'
tabaxon	tabaxónet	tabaxonim	*tabaxonot	'little cook'
xatulon	xatulónet	xatulonim	*xatulonot	'little cat'
suson	susónet	susonim	*susonot	'little horse'

Forms such as **xayalonot* and **xatulonot* are, surprisingly, missing in the paradigm. There is simply no way to say 'little soldiers f.' or 'little cats f.' using the diminutive suffix *-on*. In standard reference dictionaries such as Even-Shoshan (1974), forms like **yaldonot* 'little girls' are listed as occurring. However, most native speakers agree that such forms feel bizarre. The strong paradigmatic pressure in favor of such forms probably prevents speakers from judging them as strictly ungrammatical. Nevertheless, the phrasal option *yeladot ktanot* 'little pl. girls' is always preferred when referring to the plural form of *yaldónet* 'little girl'.

This gap is also exhibited by the diminutive forms of inanimate feminine nouns; for example *simla* 'skirt f.'–*simlónet*–**simlonot*. The diminutive forms of inanimate masculine nouns, however, can be pluralized, as well as of animate nouns; for example, *mixtav* 'letter m.'–*mixtavon*–*mixtavonim*. Similarly, feminine nouns that do not have an overt feminine suffix, or irregularly pluralized feminine nouns, do not behave differently with respect to the morphological gap. As shown below, regardless of the idiosyncrasies of the noun, when the base is feminine its diminutive cannot be pluralized, as in (9a)–(9c), but when it is masculine its diminutive can be pluralized, as in (9d).

(9) a. Feminine nouns with no overt feminine suffix

gader	gderot	gderónet	*gderonot	'fence'
f.sg.	f.pl.	DIM f.sg.	DIM f.pl.	

b. Feminine nouns with plural *-im*

teʔena	teʔenim	teʔenónet	*teʔenonot	'fig'
f.sg.	f.pl.	DIM f.sg.	DIM f.pl.	

c. Feminine nouns with no overt feminine suffix and with plural *-im*[5]

cipor	ciporim	ciporónet	*ciporonot	'bird'
f.sg.	f.pl.	DIM f.sg.	DIM f.pl.	

d. Masculine nouns with plural *-ot*

šulxan	šulxanot	šulxanon	šulxanonim	'table'
m.sg.	m.pl.	DIM m.sg.	DIM m.pl.	

Thus, as evidenced by the examples above, diminutive feminine nouns cannot be pluralized.

It must be emphasized that the reason for this gap is not phonological. Forms with the nondiminutive *-on* that (irregularly) take the plural suffix *-ot* are well formed; for example, *pitaron–pitronot* 'solution m.sg.-pl.'. Similarly, nouns that end in the segment *on* (i.e. where *on* is, at least synchronically, not a suffix) and are pluralized with *-ot* are acceptable; for example, *ʔaron–ʔaronot* 'closet m.sg.-pl.'. Thus, despite the

phonological similarity between *šitfonot* or *ʔaronot* and **xayalonot* or **susonot*, only the former two are well formed.

It must then be a morphological property that is responsible for this gap. It will be shown in the following section that the gap is not due to some peculiar morphological property of the diminutive *-on*, but rather to more general properties of morphological structures and constraints.

2. The basis of visibility

2.1. *Compositionality and morphological domains*

Raffelsiefen (1993) argues that there is a correlation between prosodic structure and compositionality. For example, the English words in (10a) below consist of two prosodic domains, as their meaning is always 'X again', while those in (10b) consist of one prosodic domain, as their meaning is not transparently related to X.

(10) a. $(re)_{\omega}\ (birth)_{\omega}$ b. $(re\text{-}ceipt)_{\omega}$
$(re)_{\omega}\ (write)_{\omega}$ $(re\text{-}quire)_{\omega}$
$(re)_{\omega}\ (settle)_{\omega}$ $(re\text{-}semble)_{\omega}$

Raffelsiefen (1993: 117) provides phonological support for this domain distinction. For example, the word *rehabilitate* has two meanings, one compositional, (11a), and one noncompositional, (11b); these two meanings correspond to two distinct phonological representations.

(11) a. 2 1 3 b. 3 1 3
$(re)_{\omega}\ ([hə]bilitate)_{\omega}$ $(re[ə]bilitate)_{\omega}$
'habilitate again' 'restore to a former state'

In this section I propose that there is a similar correlation between compositionality and morphological domains such that compositional material and noncompositional material within a word constitute different domains.[6] The domain structure is essential for resolving the mystery of the gap.

Before proceeding I would like to clarify the notion of compositionality. A compositional form is usually viewed as a word whose properties can be exhaustively drawn from the base and the word-formation rules (WFRs) involved in this form (assuming that affixes are introduced by WFRs). The distinction between compositional and noncompositional material is, however, not always straightforward. Inflectional morphology is in most cases fully compositional, but derivational morphology can also be compositional. For example, the diminutive *-on* nouns in Hebrew

are compositional since X*on* means 'little X'. But since the feature [Diminutive] is not relevant to the syntax it is not inflectional, according to Anderson (1992 and earlier work). Although the diminutive *-on* can attach to adjectives (e.g. *xamudon* 'little cute m.'), it is not assigned by agreement since the presence of *-on* in a noun does not require the presence of *-on* in the modifying adjective.

The value of compositionality in the Hebrew *-an* nouns, however, can be controversial. On the one hand *-an* nouns usually denote agenthood and can therefore be viewed as compositional. On the other hand *-an* nouns carry idiosyncratic properties that indicate whether the noun denotes 'someone who deals with/does X professionally' (e.g. *xalav* 'milk'–*xalban* 'milkman'), 'someone who deals with/does X as an amateur' (e.g. *bišel* 'to cook'–*bašlan* 'someone who likes to cook'), or both (e.g. *rakad* 'to dance'–*rakdan* 'dancer', *psanter* 'piano'–*psantran* 'piano player'). In addition, it is often idiosyncratic what exactly the X*an* noun does with X. For example, the noun *yarkan*, related to the noun *yérek* 'vegetation', means 'someone who sells vegetables', but it could as well mean 'someone who likes vegetables', 'someone who grows vegetables', etc. Since the present discussion requires binary oppositions in compositionality, I consider forms such as the *-an* nouns as noncompositional, despite their great transparency; *-an* nouns are clearly noncompositional when compared with the diminutive *-on* nouns.

Compositional forms have the following properties:

(12) A form $[X\ Y]_Z$, where Y is an affix, is compositional iff
  a. every feature of Y appears in Z,
  b. every feature of X that does not have a value in Y appears in Z,
  c. there is no feature in Z that does not appear in either X or Y, and
  d. X and Y must contribute to Z at least one feature each.

(12a) and (12b) reflect the *feature percolation convention* (Lieber 1981). (12c) ensures that Z does not include an idiosyncratic property, and (12d) specifies that X and Z cannot be empty morphs.[7]

Since forms can be either compositional or noncompositional, it is possible that X-Aff_i and Y-Aff_i (where X and Y can be identical) have different interpretations, as in the English examples in (10) and (11) above. There are two such cases in Hebrew; one involves the feminine suffixes and the other the suffix *-on*.

Some nouns with one of the feminine suffixes *-it*, *-et*, or *-a* are semantically transparent, (13a), while others are not, (13b):

(13) a. Compositional

-it:	tabax	tabaxit
	'cook m.'	'cook f.'
	rakdan	rakdanit
	'dancer m.'	'dancer f.'
	ʔezrax	ʔezraxit
	'citizen m.'	'citizen f.'
-et:	tinok	tinóket
	'baby m.'	'baby f.'
	katav	katévet
	'reporter m.'	'reporter f.'
	mešaret	mešarétet
	'servant m.'	'servant f.'
-a:	sus	susa
	'horse m.'	'horse f.'
	talmid	talmida
	'pupil m.'	'pupil f.'
	yéled	yalda
	'boy'	'girl'

b. Noncompositional

-it:	yad	yadit
	'hand f.'	'handle f.'
	maxsan	maxsanit
	'warehouse m.'	'gun magazine f.'
	xešbon	xešbonit
	'calculation m.'	'VAT receipt f.'
-et:	magav	magévet
	'wiper m.'	'towel f.'
	kartis	kartéset
	'card m.'	'card-index f.'
	kélev	kalévet
	'dog m.'	'rabies f.'
-a:	yam	yama
	'sea m.'	'lake f.'
	šir	šira
	'song m.'	'poetry f.'
	katav	katava
	'reporter m.'	'article f.'

The value of compositionality in (13) can be derived from the animacy of the base. When the base (X) is [+Animate] the feminine form is compositional, that is $[X_{[+\text{Animate}]}\ \text{Suf}_{[+\text{Fem}]}]$ is the feminine counterpart

of X.[8] When the base is [−Animate], it cannot have a feminine counterpart (this is part of extralinguistic knowledge). Therefore, when a feminine form is derived from a [−Animate] base, it has some idiosyncratic properties.

The forms in (13b) violate at least (12c), since the feminine nouns include properties that are not specified in either the suffix or the base, and they are therefore considered noncompositional. The forms in (13a) respect all the conditions in (12) and are therefore compositional. It is thus suggested that there is only one set of feminine suffixes, and the dual function of these suffixes (deriving a new noun and a feminine counterpart of the base) is possible owing to the two available values of compositionality.

The other type of words that exhibit mixed compositionality behavior involves words containing the suffix *-on*. Some *-on* words have a diminutive reading such that X*on* means 'little X', as in (14a). Other *-on* words denote various idiosyncratic semantic properties, as in (14b).

(14) a. Diminutive *-on* — compositional

yéled	yaldon
'boy'	'little boy'
sus	suson
'horse m.'	'little horse m.'
safam	sfamon
'mustache m.'	'little mustache m.'
mixtav	mixtavon
'letter m.'	'little letter m.'

b. Nondiminutive *-on* — noncompositional

ʔavir	ʔaviron
'air m.'	'airplane m.'
cavar	cavaron
'neck m'.	'collar m'.
mexir	mexiron
'price m'.	'price list m'.
mila	milon
'word f'.	'dictionary m'.
šaʔa	šaʔon
'hour f'.	'clock m'.
mapit	mapiyon
'serviette f.	'serviette-holder m.'

Unlike the compositionality of the feminine forms, that of the *-on* nouns is only partially deducible from the properties of the base. When the base is [+Fem], the derived *-on* noun is noncompositional (e.g. *mila–*

milon in [14b]), since the language requires a feminine diminutive form to end in a feminine suffix; this requirement allows determination of the function of *-on* when attached to a [+Fem] base.[9] However, such a strategy is not available when the base is [−Fem] because the base and the suffix *-on* are specified for the same gender (and also, there is no [−Fem] marker). Therefore, when the base is [−Fem] the compositionality of the related *-on* form can vary (cf. *safam–sfamon* in [14a] vs. *cavar–cavaron* in [14b]).

In the case of *-on* nouns it is not quite obvious that we are dealing with the same suffix, rather than with two homophonous suffixes, because the diminutive property found in the compositional forms is absent in the noncompositional ones (cf. the feminine forms in [13] where [+Fem] appears in both the compositional and the noncompositional words). However, the view that it is the same *-on* is supported by the existence of the forms in (15) below, where the *-on* nouns have an idiosyncratic meaning that includes diminutive.[10]

(15) Noncompositional plus diminutive

gan	ganon
'kindergarten m.'	'pre-kindergarten m.'
séfer	sifron
'book m.'	'booklet m.'
séret	sirton
'movie m.'	'short movie m.'
taklit	takliton
'record m.'	'single (record) m.'
gag	gagon
'roof m.'	'cupola m.'
dov	dubon
'bear m.'	'teddybear m.'
maxšev	maxševon
'computer m.'	'calculator m.'[11]

Each one of the *-on* forms in (15) can be interpreted, in the appropriate context, as a regular diminutive form (like those in [14a]). I thus conclude that there is only one *-on* suffix; its dual function, deriving either a word meaning 'little X' or a word that is not transparently related to X, is determined by the surface semantic compositionality.

Given that the feminine suffixes and *-on* have two functions, and that the order between the gender and diminutive markers is not predetermined by selectional restrictions, we might expect eight possible combinations between the compositional (C) and noncompositional (NC) suffixes. However, only four exist (the nonexisting ones are marked with *):

(16) a. 1. *-on* + Feminine
NC NC
mil*onit*
'electronic dictionary f.'

2. *-on* + Feminine
C C
mil*ónet*
'little word f.'

3. **-on* + Feminine
C NC

4. **-on* + Feminine
NC C

b. 1. Feminine + *-on*
NC NC
map*iyon*
'serviette-holder m.'

2. *Feminine + *-on*
C C

3. *Feminine + *-on*
C NC

4. Feminine + *-on*
NC C
map*iyón*et
'little serviette f.'

It is well known that the transparent portion of the word is usually located at the edges of the word. This can be explained by stipulating level ordering, as has been done within the framework of lexical phonology (Kiparsky 1982 and others). Alternatively, in the case of inflectional suffixes, it can be explained by locating inflectional morphology in the syntactic component (Anderson 1982), assuming that syntax follows morphology (and is not parallel to it as proposed in Borer 1991). I do not adopt the lexical phonology framework since there is no phonological evidence for levels, and I do not find affix ordering alone a sufficient base for stipulating level ordering. Notice also that this is not a case of distinction between inflection and derivation since, as noted earlier, the compositional *-on* (the diminutive) is not inflectional. In the absence of sufficient motivation for level ordering it is necessary to stipulate (as level ordering is stipulated) that compositional material must be outside noncompositional material. Notice that this view, unlike that of lexical phonology, does not appeal to serial derivation, which has been recently rejected by optimality theory and Raffelsiefen's (1993) study of base recognition.

The restriction that the transparent portion of the word must be at the edge rules out (16a3) and (16b3), where a noncompositional suffix is outside a compositional one. The sequence of suffixes in (16a4), where a noncompositional *-on* is followed by a compositional feminine suffix, is ruled out by the fact that noncompositional *-on* nouns are always inanimate, and [−Animate] nouns do not have a compositional feminine counterpart; that is, $[X_{[-\text{Animate}]}\ \text{Suf}_{[+\text{Fem}]}]$ cannot be the feminine counterpart of X. Explanation for the absence of (16b2) will be given shortly.

I propose, in the spirit of Raffelsiefen (1993), that the compositional and noncompositional portions of the word belong to distinct morphological domains, as exemplified below (morphological domains are

designated by brackets labeled ω):

(17)	a. Compositional	b. Noncompositional
	$((\text{rakdan})_{\omega}\ (\text{it})_{\omega})_{\omega}$ (13a)	$(\text{maxsan-it})_{\omega}$ (13b)
	rakdanit	maxsanit
	'dancer f.'	'gun magazine f.'
	$((\text{mixtav})_{\omega}\ (\text{on})_{\omega})_{\omega}$ (14a)	$(\text{mexir-on})_{\omega}$ (14b)
	mixtavon	mexiron
	'little letter m.'	'price list m.'
	$((\text{katav})_{\omega}\ (\text{et})_{\omega})_{\omega}$ (13a)	$(\text{katav-a})_{\omega}$ (13b)
	katévet	katava
	'reporter f.'	'article f.'
	$((\text{taklit})_{\omega}\ (\text{on})_{\omega})_{\omega}$ (14a)	$(\text{taklit-on})_{\omega}$ (15)
	takliton	takliton
	'little record m.'	'single (record) m.'

Notice that there is no one-to-one correspondence between a domain and a formative since each domain may include more than one formative. However, an edge of a domain must coincide with an edge of a formative.

Observe now the plural forms in (18) below, obtained from the singular forms in (17) with the addition of *-ot* or *-im*. Since compositional material and noncompositional material belong to different domains, when the base is noncompositional the plural suffix constitutes a separate (compositional) domain, as in (18b), but when the base contains a compositional domain the plural suffix joins this domain, as in (18a).

(18) a. Compositional

$((\text{rakdan})_{\omega}\ (\text{it-ot})_{\omega})_{\omega}$	rakdaniyot
$((\text{mixtav})_{\omega}\ (\text{on-im})_{\omega})_{\omega}$	mixtavonim
$((\text{katav})_{\omega}\ (\text{et-ot})_{\omega})_{\omega}$	katavot
$((\text{taklit})_{\omega}\ (\text{on-im})_{\omega})_{\omega}$	taklitonim

b. Noncompositional

$((\text{maxsan-it})_{\omega}\ (\text{ot})_{\omega})_{\omega}$	maxsaniyot
$((\text{mexir-on})_{\omega}\ (\text{im})_{\omega})_{\omega}$	mexironim
$((\text{katav-a})_{\omega}\ (\text{ot})_{\omega})_{\omega}$	katavot
$((\text{taklit-on})_{\omega}\ (\text{im})_{\omega})_{\omega}$	taklitonim

Given the notion of morphological domains, the absence of (16b2) can now be explained. A compositional form X-Fem-*on* (where both suffixes are compositional) should be interpreted as the diminutive of the feminine counterpart of X. However, since it is the outmost suffix that determines the gender of a noun, the form X-Fem-*on* will be interpreted as a masculine noun (recall that *-on* is specified for [−Fem]). The feminine suffix in X-Fem-*on* will then have no impact on the gender of the form,

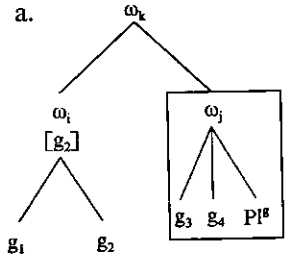
and therefore, according to (12d), the form will not be compositional (recall that [12d] requires the base and the affix to contribute to the form at least one feature each). In order to preserve the feminine property of the form it is necessary to add a feminine suffix at the end of the word. In this case, however, there will be two feminine suffixes within the same domain, both of which contribute exactly the same property and nothing else, [+Fem]. It thus seems that there is a tendency not to overload words with formatives that have the same function.[12]

This tendency is clearly demonstrated by the distinction between the diminutive forms of $(mapit)_\omega$ 'serviette f.' and $((tabax)_\omega(it)_\omega)_\omega$ 'cook f.'. The diminutive form of *mapit* is $((mapiy)_\omega(\acute{o}net)_\omega)_\omega$ (where *iy* is an allomorph of the feminine suffix *-it*; see note 1). The diminutive form of $((tabax)_\omega(it)_\omega)_\omega$, however, is not $*((tabax)_\omega(iy\acute{o}net)_\omega)_\omega$ but rather $((tabax_\omega(\text{-}\acute{o}net)_\omega)_\omega$, where the diminutive *-on* is attached directly to the masculine base *tabax*, and not to a feminine base *tabaxit*. We do not get $*((tabax)_\omega(iy\text{-}\acute{o}net)_\omega)_\omega$ because *-it* and *-et* are in the same domain and they provide the same feature, and nothing else. In $((mapiy)_\omega(\acute{o}net)_\omega)_\omega$, however, *-it* (surface *iy*) and *-et* are not in the same domain and *-it*, in deriving *mapit* 'serviette f.' from *mapa* 'tablecloth f.' contributes to the noun more than just [+Fem].

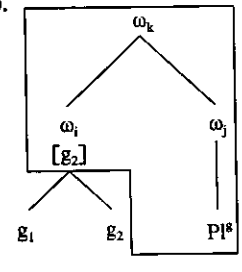
Notice that if the diminutive *-on* is attached directly to *mapa*, the base of *mapit*, the output would be *mapónet*; this is, however, the diminutive form of the base *mapa*. But even when the base is masculine, as in *sak* 'sack m.'–*sakit* 'bag f.', where thus **sakónet* cannot be the diminutive of *sak* because the gender of the base must be preserved in the diminutive form, the diminutive form of *sakit*, *sakiyónet*, includes the feminine suffix. That is, the inclusion of the noncompositional feminine suffix in the diminutive form is not merely for the sake of avoiding ambiguity.

The domain structure proposed above is the only structure relevant for M-AGR. The principle governing the visibility of the gender features when the plural suffix is attached is based on the notion of C(onstituent)-command. X c-commands Y iff the first branching node N dominating X also immediately dominates Y (and X does not dominate Y, nor Y, X). Consider the domain structures and the c-command relations in (19) below (Pl^g is $\text{-}ot^{[+Fem]}$ or $\text{-}im^{[-Fem]}$, and g_n is any gender specification of a formative):

(19) a.



b.



In (19a) the first branching node (N) that dominates the plural suffix (X) and also immediately dominates some gender feature(s) (Y) is ω_j. Therefore, in accordance with M-AGR, the subcategorized gender of the plural suffix should not disagree with g_3 and g_4. In (19b) there are no gender features within the domain of the plural suffix, and therefore ω_k is the first branching node (N) that dominates the plural suffix (X) and some gender feature(s) (Y). In this case, however, only ω_i is immediately dominated by ω_k, and therefore g_2 (percolated to ω_i) and the subcategorized gender of the plural suffix should not disagree; no other gender feature is relevant here. Within this approach, the *feature-percolation convention* (Lieber 1981), by which the feature F of the outmost affix specified for F percolates to the node dominating the domain, is viewed as holding for the entire domain, rather than as applying cyclically with every single affixation.

As will be shown in the following section, the distinction between (19a) and (19b) accounts for the different effect of gender conflict in *milónet* (compositional) and *milonit* (noncompositional).

2.2. *Resolving the mystery of the gap*

A feminine diminutive form cannot be pluralized because it exhibits a gender conflict. A form such as *pilónet* 'little elephant f.' consists of a base plus two suffixes, the [−Fem] diminutive *-on* and the [+Fem] feminine *-et*. The plural candidates are evaluated by M-AGR, which bans disagreement between the subcategorized gender of the plural suffix and the gender features of the base, assuming the compositionality-based domain structure proposed above. Consider two of the plural candidates of *pilónet* in (20).

(20) /pilonet + Pl/

a. $((\text{pil})_{\omega}\ (\text{on}\quad \text{et}\quad \text{ot}^{[+Fem]})_{\omega})_{\omega}$
$\quad\quad [-Fem]\ [+\text{Fem}]\ [+\text{Pl}]$

b. $((\text{pil})_{\omega}\ (\text{on}\quad \text{et}\quad \text{im}^{[-Fem]})_{\omega})_{\omega}$
$\quad\quad [-\text{Fem}]\ [+Fem]\ [+\text{Pl}]$

Both (20a) and (20b), whose structure resembles that of (19a) above, violate M-AGR. In (20a) the subcategorized [+Fem] of *-ot* disagrees with the c-commanded [−Fem] of *-on*, and in (20b) the subcategorized [−Fem] of *-im* disagrees with the c-commanded [+Fem] of *-et*. Notice that if M-AGR were stated positively, requiring agreement rather than banning disagreement, any of the plural suffixes could be assigned to a feminine diminutive form. Attention should be drawn to (20a), where

the internal gender feature, that of *-on*, is visible when the plural suffix is attached; that is, WORD-INTERNAL FEATURES CAN BE VISIBLE.

The optimal candidate is actually the *null parse*, in optimality-theoretic terms, where the plural suffix is not parsed into a morphological domain, and therefore the plural form is not available (cf. the treatment of Latin *re* in Prince and Smolensky 1993). This is indicated below by not including the plural within a morphological domain (i.e. the plural suffix is not within a ω).

(21) /pilonet – Pl/

a. $((\text{pil})_{\omega}\ (\text{on}\quad \text{et})_{\omega})_{\omega}\quad \text{ot}^{[+\text{Fem}]}$
$[-\text{Fem}]\ [+\text{Fem}]\ [+\text{Pl}]$

b. $((\text{pil})_{\omega}\ (\text{on}\quad \text{et})_{\omega})_{\omega}\quad \text{im}^{[-\text{Fem}]}$
$[-\text{Fem}]\ [+\text{Fem}]\ [+\text{Pl}]$

M-AGR states that disagreement is banned when the plural suffix is within a morphological domain, and therefore, when the suffix is not included in a domain M-AGR is vacuously satisfied. The fact that there are two optimal candidates is immaterial as the forms do not have a surface realization.

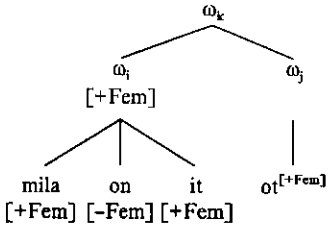
Respecting M-AGR incurs violation of M-PARSE, where the latter requires every formative to be incorporated into a morphological domain. Within the framework of optimality theory, surface violation of constraints is possible, but violation is minimal in the sense that, if it is necessary to violate a constraint, it is better to violate a lower-ranked one. The fact that the null parse, (21), is the optimal candidate indicates that M-PARSE is ranked below M-AGR. Violation of M-PARSE means that the form does not surface and thus explains the fact that there are no feminine plural forms with the diminutive *-on*.

The domain approach, along with the c-command relation imposed on M-AGR, accounts not only for the fact that a feminine with the diminutive *-on* does not have a plural form, but also for the fact that a feminine with the nondiminutive *-on* does have a plural form; that is, that word-internal gender is not always visible. The word *milonit* 'electronic dictionary f.' consists of the base *mila* 'word f.' plus two suffixes: the nondiminutive *-on* specified for [–Fem] and the feminine suffix *-it* specified for [+Fem]. Nevertheless, the plural form *miloniyot* is well formed. Similarly, *yama* 'lake f.' is composed of the base *yam* 'sea m.' specified for [–Fem] and the feminine suffix *-a* specified for [+Fem]. Yet, the plural form *yamot* is fully acceptable.

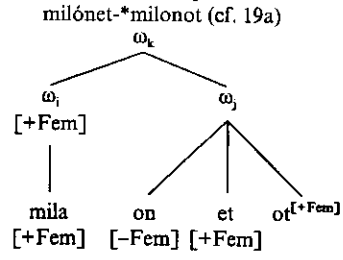
The apparent inconsistency in the visibility of internal morphological features is derived from the different domain structures assigned to compositional and noncompositional forms.

The nondiminutive base in (22a) is noncompositional, and its domain is therefore distinct from the compositional domain of the plural suffix. Thus, the only gender feature c-commanded by the plural suffix is the [+Fem] percolated to ω_i. Since this gender does not disagree with the subcategorized gender of the plural suffix, M-AGR is respected and the plural is well formed. In the diminutive form in (22b) all suffixes are compositional and thus all belong to the same domain. In this domain both the [−Fem] of *-on* and the [+Fem] of *-et* are c-commanded by the plural suffix, and since the subcategorized [+Fem] of the plural disagrees with the [−Fem] of *-on*, M-AGR is violated and the plural is ill formed.[13]

(22) a. Nondiminutive-noncompositional
milonit-miloniyot (cf. 19b)

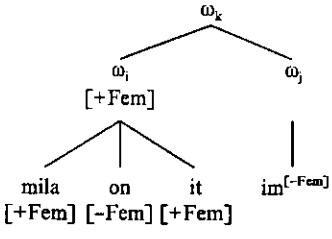


b. Diminutive-compositional
milónet-*milonot (cf. 19a)

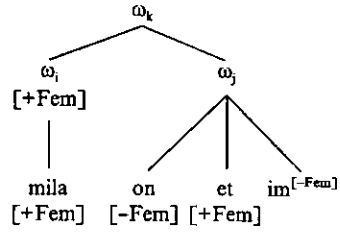


As expected, when the plural suffix *-im* is attached to these feminine forms, M-AGR is violated in both diminutive and nondiminutive forms, since *-im* is subcategorized for [−Fem].

(23) a. Nondiminutive-noncompositional
milonit-*miloniyim



b. Diminutive-compositional
milonet-*milonim



It should be noted that among the two nonoptimal plural candidates of a feminine diminutive form in (20), the one with *-im*, (20b), is much worse than the one with *-ot*, (20a); as noted in section 1.2, the one with *-ot* is often listed in the dictionary. In some cases the *-im* plural is identical to the plural form of the masculine base (cf. feminine *pilonet-im* → **pilonim* vs. masculine *pilon-im* → *pilonim*) due to the phonology affecting the feminine suffix (see note 1). In other cases it is simply an impossible

form (*sakiyonet-im* → **sakiyonim*). However, if one insists on adding a plural suffix to a feminine diminutive, as dictionaries often do, it is better to add *-ot*, which is subcategorized for [+ Fem]. In this normativist dialect it is possible that, under paradigmatic pressure, the scope of M-AGR is not restricted by c-command but rather by adjacency, such that the subcategorized gender of the plural suffix must not disagree with the gender of the adjacent formative.[14]

3. Residual issues

3.1. *The adjacency condition*

The fact that it is usually the outmost formative that is visible to further morphological processes can be captured by the adjacency condition (see Scalise 1986: 170), attributed to Siegel (1978) and Allen (1978):

(24) *Adjacency condition:*
No WFR can involve X and Y, where X is an affix, unless Y is uniquely contained in the cycle adjacent to X.

The adjacency condition states that within a cyclic structure such as [[[X]Y]Z] or [[Y[X]]Z], Z has access to Y but not to X because the cycle of Y, but not of X, is adjacent to that of Z (notice, in the latter structure, that the adjacency condition does not require linear adjacency).

It seems that the adjacency condition could account for the visibility of the internal gender in the Hebrew feminine diminutives. Recall from section 2.1 that when the base is feminine the diminutive form must contain both the diminutive suffix *-on* and the feminine suffix *-et*. That is, in the structure $[X_{[+\text{Fem}]}\text{-on-et}]_{[+\text{Fem}+\text{Dim}]}$ the suffix *-et* is not attached onto an existing word. If we assume that the output of every cycle must be an existing word, then the suffixes *-on* and *-et* must be in the same cycle, as below:

(25) [[[X] on-et] Pl]

Since *-on* and *-et* are in the same cycle and this cycle is adjacent to that of the plural suffix, according to the adjacency condition the gender of both suffixes must be visible, and therefore M-AGR is violated when either plural suffix is attached (the same explanation as with the morphological domains). Thus, it seems that the notion of compositionality-based morphological domain structure proposed here is superfluous in the presence of the adjacency condition.

There are, however, other forms of the shape XYZ, where XY is not an existing word; in these forms Y functions as an "empty morph." Some of the suffixes in Hebrew, most commonly *-an* and *-on*, often participate as empty morphs; that is, in some cases they do not contribute to the overall morphological properties of the word (though they may have a prosodic function).[15] In the examples in (26) below, the suffixed (i) forms contain an empty morph (in italics); these forms are compared with the suffixed (ii) forms, which do not have an empty morph.

(26)

		Base	*Adjective*	*Noun*	*Intermediate form*
a.	i.	leʔom	leʔum*an*i	leʔum*an*ut	*leʔum*an*
		'nation'	'nationalistic'	'nationalism'	
	ii.	leʔom	leʔumi	leʔumiyut	
		'nation'	'national'	'nationalism'	
b.	i.	cémax	cimx*on*i	cimx*on*ut	*cimx*on*
		'plant'	'vegetarian'	'vegetarianism'	
	ii.	cémax	cimxi	cimxiya	
		'plant'	'vegetable'	'vegetation'	
c.	i	léxem		laxm*an*ya	*laxm*an*
		'bread'		'roll'	
	ii.	sukar		sukarya	
		'sugar'		'candy'	
d.	i.	ceida		ceid*an*it	*ceid*an*
		'travelling provision'		'cooler'	
	ii.	beica		beicit	
		'egg'		'ovule'	

In analogy to the cyclic structure in (25), where *-on* and *-et* are in the same cycle (because X*on* is not an existing word in this particular case), an empty morph should be in the same cycle with the suffix that follows it.

(27) [[cemax] on-i], [[cemax] on-ut], [[ceida] an-it], etc.

Following from the adjacency condition, it is expected that *ceidanit*, for example, would not have a plural form because of the familiar gender conflict. The cycle of *-an* and *-it* is adjacent to that of the plural suffix, and therefore the conflicting gender of the two suffixes is visible to M-AGR. This is, however, a wrong prediction since the plural form *ceidaniyot* is acceptable.[16]

To say that an empty morph automatically loses its features would be circular, since an empty morph is, by definition, a formative that does not contribute morphological properties to the word. The question is, then, what is the governing principle that causes morphemes to lose their

properties and become empty morphs (in cases where they correspond to meaningful formatives in the language, as in Hebrew)?

This question takes us back to the notion of compositionality addressed in this paper. Empty morphs in Hebrew are found only within a noncompositional domain. Therefore, although the cyclic structures of *milónet* ([[mila]on-et]) and *ceidanit* ([[ceida]an-it]) are identical in the sense that the two suffixes are assigned within the same cycle, their domain structure is distinct; in the latter the entire word is within a noncompositional domain, $(\text{ceida-an-it})_{\omega}$, while in the former the suffixes constitute a distinct compositional domain $((\text{mila})_{\omega}(\text{on-et})_{\omega})_{\omega}$. The properties identifying empty morphs are thus as follows:

(28) X in $(\text{Base-X-Y})_{\omega}$ is an empty morph iff
   a. Base-X is not an existing word (i.e. noncyclic), and
   b. ω is a noncompositional domain.

The fact that a form with an empty morph can be properly pluralized suggests that the adjacency condition cannot account for the visibility of word-internal features. It is thus necessary to maintain the notion of compositionality-based morphological domains.

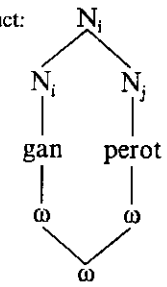
3.2. *Other cases of visibility of word-internal properties*

The gap in the gender–number paradigm of the diminutive *-on* nouns, which turned out to be nonaccidental, has led to the correlation between compositionality and visibility. Further support for this correlation can be drawn from the distinction between compounds and constructs in Hebrew (see Berman and Ravid 1985 and Borer 1988 for a detailed discussion). Compounds are semantically noncompositional while constructs are compositional; consequently, the internal structure of compounds is much less accessible than that of constructs. For example, the non-head element in a construct can be modified while that of a compound cannot (Hebrew compounds and constructs are left-headed).

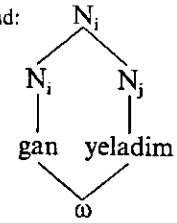
(29) Construct: gan šošanim
'rose garden (garden-roses)'
gan šošanim ʔadumot
'garden of red roses'
Compound: gan yeladim
'kindergarten (garden-children)'
*gan yeladim ktanim
'garden for small children'

Following the approach presented above, compounds and constructs would have an identical morphological structure but different morphological domains (see a different analysis in Borer 1988, where compounds are Ns while constructs are, at least initially, NPs).

(30) construct:



compound:



The internal morphological structure must remain available in both constructs and compounds because the definite article is attached to the modifier (e.g. *gan hayeladim, gan haperot*) and the plural suffix is attached to the head (e.g. *gane i yeladim, gane i perot*). This follows Anderson's (1992) argument that "composites" (compounds), unlike words, have internal structure. The difference in the accessibility of the internal elements exemplified in (29) above is thus accounted for by the compositionality-based domain structure. Further research is required in order to arrive at a systematic and explanatory distinction between aspects of the grammar that refer to morphological structure and those that refer to domain structure.

The issue of the visibility of word-internal morphological features is, as well, not new in linguistic literature. Scalise's (1990) discussion of the adverbial suffix *-mente* points out that *-mente* is attached to $[\text{N-Suf}]_{\text{Adj}}$ only when N is [+Abstract]. That is, the internal [Abstract] feature of N is visible to *-mente*. As Scalise notes, this case poses a problem for the adjacency condition. There are, however, cases where *-mente* is attached to denominal adjectives whose base noun is [−Abstract], but only if the noun has a "metaphoric" meaning (in Scalise's terms), that is, it is noncompositional. In particular, when an adjective derived from a [−Abstract] noun has two meanings, one literal and one metaphoric, the derived X*mente* adverb carries the metaphoric meaning only. For example, the derived adjective *teatrale* 'theatrical' has two meanings, one literal 'related to the theater' and one metaphoric 'dramatic, exaggerated'. The adverb *teatralemente* does not have two meanings, but rather one, the "metaphoric" one.

The constraint on the suffix *-mente* can be viewed as banning an

internal [−Abstract] noun within the domain of the suffix (Scalise 1990: 92):

(31) *(X_N Y_{Adj} mente)$_\omega$
[−Abst]

Assuming that *-mente* is compositional, when attached to a noncompositional ("metaphoric") adjective it constitutes a compositional domain that is distinct from the noncompositional domain of the base, as illustrated in (32a) below. Since the [−Abstract] feature is not within the domain of *-mente*, the constraint in (31) is not violated and the adverb is well formed. If, however, the base is compositional ("literal"), *-mente* joins the compositional domain of the base, as in (32b). In this case the internal noun and *-mente* are within the same domain, and therefore the [−Abstract] feature of N is visible. Consequently, the constraint in (31) is violated and the adverb is thus ill formed.

(32) a. Noncompositional base plus *-mente*
((teatra-le)$_\omega$ (-mente)$_\omega$)$_\omega$
[−Abst]

b. Compositional base plus *-mente*
*(teatra-le-mente)$_\omega$
[−Abst]

This phenomenon provides further support to the correlation between compositionality and visibility of word-internal morphological features. It shows that an internal feature is invisible across domains, where domains are assigned on the basis of compositionality. However, within a compositional domain, word-internal features are visible.

4. Conclusion

Aronoff (1976: 38–39) draws attention to the link between productivity and compositionality ("semantic coherence" in his terms). The idea is that when a word is compositional the speakers can identify the correlation between its morphological and semantic units and are thus more likely to use it (and the WFRs involved in it).

In this paper I have argued that compositionality not only allows us to identify the correlation between the semantic and morphological units of a word but also facilitates the retrieval of all the semantic properties of the morphological units, in particular those that do not appear in the surface form (i.e. those that do not percolate). That is, in a compositional form every property of a formative can be accessible, regardless of its position in the word.

The argument is based on the gap in the gender–number paradigm of Hebrew diminutives with *-on*: the paradigm includes masculine singular, feminine singular, and masculine plural forms, but not feminine plural forms. It was proposed that the gap stems from a gender conflict: M-AGR prohibits disagreement between the subcategorized gender of the plural suffix and the gender specified in the base. The fact that a word such as *milónet* does not have a plural counterpart suggests that the internal gender feature, i.e. that of *-on*, is also visible and thus incurs M-AGR violation.

Comparison between forms where word-internal gender is visible and those where it is not has led to the correlation between visibility and compositionality. Word-internal gender is visible only when the form is compositional. It is thus proposed that words consist of morphological domains, where the compositional and noncompositional portion of the word belong to distinct domains. Internal features are visible within a compositional domain, where visibility is governed by c-command. It has been shown that it is not the cyclic structure that is relevant for M-AGR, but rather the compositionality-based morphological domain structure.

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Notes

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1. The input of **pilonot* is *pil-on-et-ot* 'base-diminutive-feminine-plural'. When a feminine suffix is followed by a marker such as the plural suffix it undergoes some segmental phonology: *-a* (underlying *-at*) and *-et* disappear completely (e.g. *mana–manot* 'portion f.sg.-pl.', *rakévet–rakavot* 'train f.sg.-pl.'); the *t* in *-it* and *-ut* is usually deleted, and a *y* is then inserted (e.g. *tavnit–tavniyot* 'pattern f.sg.-pl.', *xanut–xanuyot* 'store f.sg.-pl.'). The following ordered rules are proposed in Bat-El (1989: 136):

   i. *t* deletion: $t \rightarrow \phi / \_\_\_ V\ t]_{N[+Fem]}$
   ii. *y* insertion: $\phi \rightarrow y /\ V \_\_\_ V$ (+high)
   iii. Two-vowel deletion: $V \rightarrow \phi / \_\_\_ V$

2. Some view *-onet* as a single suffix. One may suggest that this view can explain the absence of a feminine diminutive plural, since *-et* is not an independent formative and

thus cannot be truncated when the plural suffix is added; preservation of *-et* would yield the ill-formed sequence **-onetot*. However, as noted in note 1 above, deletion of *-et* is not due to a morphological truncation but rather to a phonological process. The rules given in note 1 are not sensitive to the morphological source of the segmental material, beyond the [+Fem] property of the noun (in *t* deletion). Therefore, these rules cannot ignore *-et* when it is part of a complex suffix *-onet*, as they do not ignore *-et* when it is part of the stem (i.e. when the feminine noun does not have a masculine counterpart, as in *maxbéret* 'notebook f.sg.' [*maxbar]).

3. The form *panim*, like many *pluralia tantum*, is genderless, as it can trigger either masculine or feminine agreement. See Ritter (1995) for discussion of genderless nouns in Hebrew.
4. The term "not specified" should be distinguished from "unspecified" (see Harris and Lindsey 1995). While unspecified features are filled in at a certain stage of the grammar, "not specified" features are never added. Thus, when a base specified for [+F] ends in a suffix that is "not specified" for F, the feature of the entire form would be [+F]. If, however, this base ends in a suffix "unspecified" for F, the feature of the entire form would be the default value of F.
5. In this case, however, some speakers seem to prefer the masculine diminutive form *ciporon* instead of *ciporónet*; such speakers may accordingly also allow the plural masculine diminutive form *ciporonim* instead of the ill-formed **ciporonot*.
6. I refer to morphological rather than prosodic domains since Hebrew does not provide phonological evidence for the latter. It may, however, be the case that the two overlap.
7. The condition in (12c) wrongly excludes some forms of Georgian verb agreement (Anderson 1992 and earlier work). The word *mo-g-k'lav* means 'I will kill you' although the prefix representing 1pr subject, which is not a zero morpheme, does not surface (because the verb template allows only one person prefix and one person suffix and both the 2pr object and the 1pr subject are prefixes). Inflectional morphology often requires some rules of interpretation, which allow, for example, interpretation of a conjunction of two singular nouns into plural agreement (see Anderson 1992 and references therein).
8. This generalization has a few exceptions. For example, the [+Animate] noun *katav* 'reporter m.' provides the base for a compositional form *katévet* 'reporter f.' and for a noncompositional form *katava* 'article f.'. Also, masculine nouns denoting animals and insects that do not have feminine counterparts (see section 1.1) may have a feminine form. For example, *dag* 'fish m.' does not have a feminine counterpart, but there is a noncompositional feminine form *daga* 'school of fish', which carries the idiosyncratic feature [Collective]. Similar exceptions appear in other cases. The adjective *šamen* 'fat m.' provides the base for a compositional adjective *šmena* 'fat f.' and for a noncompositional noun *šaménet* 'cream f.'. Moreover, participles, which behave in Hebrew like both nouns and verbs, may provide the base for one feminine form that has a compositional and a noncompositional meaning. For example, the feminine form of *colel* 'he is diving' is *colélet*, which means 'she is diving' and 'submarine'. (Notice that the compositionality distinction in the last two examples corresponds to the distinction between inflection and derivation.) These forms would not be considered as counterexamples to the relation between the animacy of the base and the compositionality of the feminine form for those who accept the notion of consonantal root in Hebrew and allows the noncompositional forms to be derived from a root and the compositional forms from a word (see, however, Bat-El 1994 for an antiroot approach).
9. The German diminutive suffix *-chen* assigns a neuter gender regardless of the gender of the base. However, since this suffix has only one function, diminutive, the fact that it changes the gender of the base does not threaten its recoverability, nor the compositionality of the resulting form.

10. As observed in Ritter (1995), the suffix *-áim* behaves in a similar way. It denotes duality when attached to nouns denoting periods of time (*yom* 'day m.'–*yomáim* 'two days m.'), as this group of nouns can be pluralized by the regular plural suffixes (*yom–yamim* 'day m.sg.-pl.'). When attached to nouns that appear in pairs, the dual suffix functions as a plural suffix denoting plurality of inherently dual forms (*yad–yadáim* 'hand f.sg.-pl.'); the latter type of nouns cannot be pluralized by a regular plural suffix (**yadot*). It should also be noted that the feminine suffix *-it* sometimes has the same function as *-on* in (15), assigning idiosyncratic meaning that includes diminutive, and obviously feminine (e.g. *sak* 'sack m.'–*sakit* 'bag f.', *mapa* 'tablecloth f.'–*mapit* 'serviette f.').
11. I do not say that the forms in (15) are historically compositional diminutives. It should be noted, however, that before the appearance of computers on the Israeli market the meaning of *maxšev* was 'calculator'.
12. The specifics of this tendency require further study, as some languages have empty morphs (e.g. Germanic languages) that do not provide any morphological information (though may contribute to structural well-formedness). As will be shown in section 3.1, empty morphs in Hebrew can appear only in noncompositional forms (as they violate [12d]). It is necessary, however, to distinguish between empty morphs that correspond to morphemes in the language and empty morphs represented by an epenthetic segment.
13. Further research may reveal that the compositional domain needs to be divided into two domains, one derivational and one inflectional (where the inflectional domain includes formatives assigned via inflection but not formatives that inherently include inflectional features). That is, internal derivational material is not visible to inflectional material even when it is compositional. In the adjective *tarbut-i-t* 'cultural f.sg.' the [−Fem] feature of the adjectival suffix *-i* is not visible when the plural suffix is added, as *tarbutiyot* is well formed. The adjectival suffix *-i* is derivational, and I assume that it is also compositional (though this might be controversial). The plural suffix is inflectional, as it is assigned via agreement. The fact that the [−Fem] feature of *-i* is not visible to M-AGR when the plural suffix is attached may suggest that *-i* and the plural suffix appear in distinct domains. A different approach would be to assume that there are two adjectival suffixes, one masculine, *-i*, and one feminine, *-it* (as *-it* appears in the language as a feminine suffix). In this case there is only one gender feature in *tarbutit*, the [+Fem] of *-it*, and therefore the issue of conflicting genders does not arise.
14. It may seem as if the domain approach proposed here is too powerful. In principle, it allows for a compositional denominal verb $[[X]_N Y]_V$, for example, to be the base of a suffix Z subcategorized for nouns, such that $[[[X]_N Y]_V Z]$ is compositional. If such cases threaten to arise, it is necessary to assume that the selection of a lexical category by an affix is different from the restriction imposed on the selection by features such as gender, animacy, etc. That is, while the former is governed by c-command the latter is further restricted by adjacency.
15. The base of an empty morph is synchronically and/or diachronically monosyllabic. It thus seems that the prosodic function of the empty morph stems from the requirement of a minimal word (disyllabic). There are, however, monosyllabic bases that do not host an empty morph, probably because these words are historically bisyllabic.
16. The fact that *leʔumanut*, and other nouns ending in *-ut*, cannot be pluralized is not related to the empty morph, but rather to the [+Abstract] feature assigned by the feminine suffix *-ut*. Many abstract nouns do not have plural counterparts regardless of their morphological structure.

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