Constituent Structure and Grammatical Functions in the Hebrew Action Nominal

Yehuda N. Falk
The Hebrew University of Jerusalem

Proceedings of the LFG01 Conference

University of Hong Kong, Hong Kong

Miriam Butt and Tracy Holloway King (Editors)

2001

CSLI Publications

http//csli-publications.stanford.edu/

I would like to thank Joan Bresnan for suggesting to me that I look into Hebrew action nominals. Versions of this paper were presented at the 2001 conference of the Israel Association of Theoretical Linguistics (Jerusalem) and the LFG2001 conference (Hong Kong). I have benefitted from discussions (in person and by e-mail) with Joan Bresnan, Miriam Butt, Carmen Dobrovie-Sorin, Rob Malouf, and Irit Meir.

1. Overview

Hebrew noun phrases in general, and action nominals in particular, pose interesting theoretical and descriptive problems.

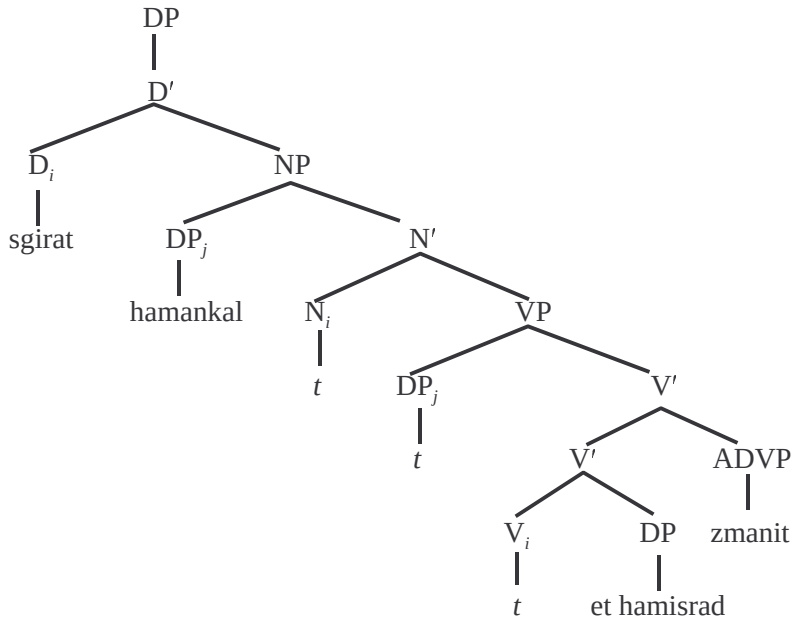
(1) a. ha- iša šel ha- politikay
the- wife of the- politician
b. ešet ha- politikay
wife.CONSTR the- politician
c. išt- o šel ha- politikay
wife- his of the- politician
'the politician's wife'

(2) a. ibud ha- mumxim et hakolot yadanit
processing the- experts ACC votes manually
'the experts' manual processing of the ballots'
b. sgirat ha- mankal et ha- misrad zmanit
closure.CONSTR the- director ACC the- office temporarily
'the director's temporary closure of the office'

In (1) we see the three types of genitive constructions in Hebrew. In the free genitive (1a), the possessive nominal is marked by the preposition *šel*. In the construct state genitive (1b), the possessive immediately follows the head noun, and the head noun appears in a special morphological form traditionally called the construct state. The double genitive (1c) combines a pronominal suffix on the head noun (in a form phonologically related to the construct state) with a PP headed by *šel*. In (2) we see a clearly nominal head in a construct state genitive construction, followed by an accusative object and an adverb.

These Hebrew noun phrase patterns have been discussed in a series of studies in the Government/ Binding (GB) and Minimalist Program (MP) variants of transformational theory. The analyses, although they differ from each other in details, all posit head movement from N to a functional head position (generally identified with D), and most of them hypothesize V-to-N head movement in the action nominal.

(3)



The claim to be made here is that various aspects of this analysis are unmotivated, in particular

details of the constituency and the presence of the functional category D. It will be argued that the standard GB/MP analysis is the consequence of a theory in which grammatical functions are represented in terms of constituent structure, and that an approach in which grammatical functions are modeled as a distinct dimension of linguistic structure is better able to account for both the grammatical functions and the constituency. On the other hand, we will support the hypothesis that the structure of the action nominal in Hebrew includes both verbal and nominal projections. In lexicalist terms, the Hebrew action nominal is what Bresnan (1997) calls a "mixed category," and we will show how Bresnan's theory accounts for the mixed properties of the action nominal without derivations and empty categories. We will also argue that the lexicalist implementation of the NP-over-VP analysis of mixed categories is superior to the derivational implementation in the analysis of Hebrew action nominals.

2. The Hebrew Noun Phrase

2.1. The Problem

The N-to-D movement structure shown above (3) is supposed to account for various facts about noun phrases, such as the relative order of nouns and adjectives, the special morphology of construct state, and the inheritance of the definiteness of the possessive noun phrase by the construct state head. These are illustrated in the following.

(4) a. ha- gina ha- metupax- at
the- garden(F) the- cared.for- FSG
'the tended garden'

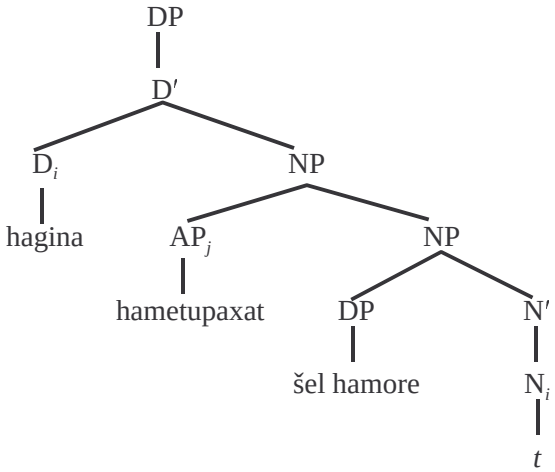
b. gina metupax- at
garden(F) cared.for- FSG
'a tended garden'

(5) a. ha- gina ha- metupax- at šel ha- more
the- garden the- cared.for- FSG of the- teacher(M)

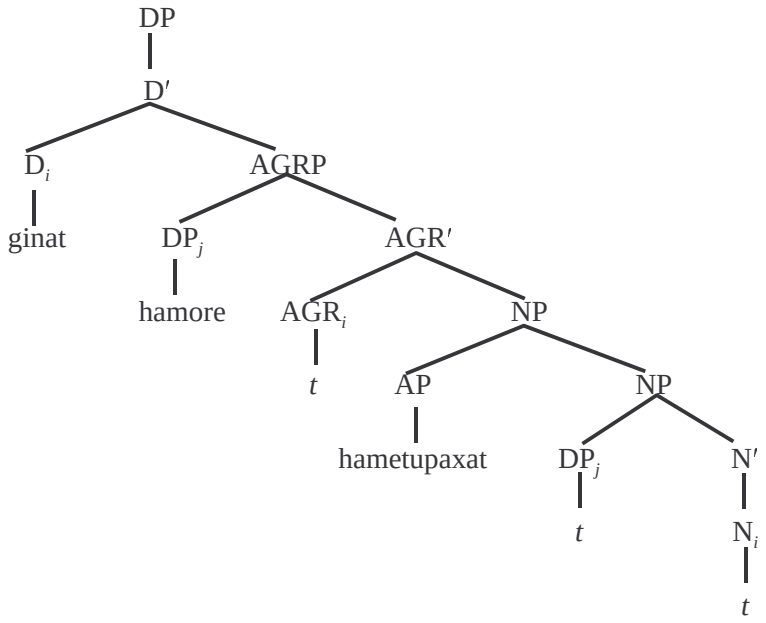
b. ginat ha- more ha- metupax- at
garden(F).CONSTR the- teacher(M) the- cared.for- FSG
'the teacher's tended garden'

To make this somewhat more concrete, consider the structures assigned by the theory of Siloni (1997) to (5a,b):

(6) a.



b.



These structures, and similar ones in other analyses, are motivated by several considerations. In the first place, the possessor must occupy the D-structure position [SPEC, NP], the structural position universally associated with possessors ("subjects" of noun phrases). This specifier position of possessors is motivated even further in the case of nominals with two arguments, like action nominals, in which the possessor can bind the other (complement) position. On the assumption that binding is governed by the structural relation of c-command, this provides evidence for the higher structural position of possessors. Second, the AP adjunct must be in an adjoined position; again, this is motivated on universal grounds. Finally, positions must be hypothesized as the targets of movement in order to derive the surface word order, which does not correspond to the D-structure. The functional category D and other functional categories (such as AGR) are motivated on those grounds. On the assumption that agreement is the reflex of a SPEC-head relation, the movement to higher positions also supports various elements of the morphology.

The above argumentation for the constituent structure of the Hebrew noun phrase is theory-internal. It is based on an unconstrained theory of categories and structure, one in which categories need not be justified on lexical grounds and constituency need not be argued for. It is therefore instructive to test the resulting constituency against a more constrained theory, such as those assumed in unification/ constraint-based lexicalist theories.

The first problem is the positing of a category Determiner. As observed by Wintner (2000), there is no evidence in Hebrew for such a category. The Hebrew "definite article" *ha-* is a prefix, not a word (Engelhardt 1998). It provides what in Hebrew is an inflectional feature of definiteness, one which triggers agreement on modifying adjectives. The only reason for positing D is, as mentioned above, to provide a landing site for the noun.

Second, as argued by Sadler (2000) for similar analyses of Welsh, the constituency itself is inconsistent with traditional constituency tests, like coordination.

(7) a. ha- gina ha- metupaxat ve- ha- bayit ha- yafe šel ha- more
the- garden the- cared.for and- the- house the- beautiful of the- teacher
'the teacher's tended garden and beautiful house'

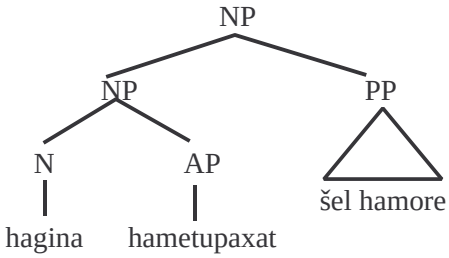
b. *ginat ha- more ha- metupaxat ve- ha- talmid
garden.CONSTR(F) the- teacher(M) the- cared.for.F and- the- student(M)
ha- muznaxat
the- neglected.F
'the teacher's tended garden and the student's neglected one'

c. *ginat ha- more ve- beyt ha- talmid
garden.CONSTR the- teacher and- house.CONSTR the- student
ha- xadaš- im
the- new- PL
'the new garden of the teacher and house of the student'

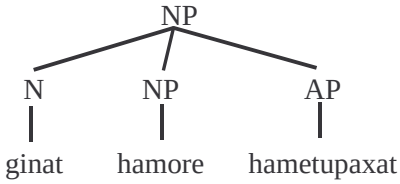
Contrary to the structures assumed in the transformational literature, (7a) shows that the noun and adjective form a constituent which excludes the *šel* phrase and (7b) shows that the possessive NP and adjective do not form a constituent. On the other hand, contrary to what one might expect, the construct-state nominal and possessive NP do not form a constituent that excludes the adjective (7c).

The constituent structures motivated by the above considerations are significantly different from the ones proposed in transformationalist accounts of Hebrew noun phrases.[1]

(8) a.



b.



The question is how to reconcile the apparently conflicting evidence concerning the structure of Hebrew NPs, so that the observations of both approaches can be accounted for.

2.2. Analysis

The theoretical framework to be assumed here is Lexical-Functional Grammar (LFG: Bresnan, ed 1982, Bresnan 2001, Falk 2001). In LFG, constituency and grammatical functions are treated as distinct dimensions of syntactic structure, coexisting in the overall linguistic representation. Parallel to the constituent structure (c-structure), which models the constituency relations, and thus the distribution, of overtly occurring elements, there is a functional structure (f-structure) which models the grammatical functions. First approximations at the f-structures of (5a,b) are as follows:

(9) a.

$$\begin{bmatrix} \text{PRED} & \text{'garden } \langle(\uparrow \text{ POSS})\rangle\text{'} \\ \text{GEND} & \text{F} \\ \text{NUM} & \text{SG} \\ \text{DEF} & + \\ \text{POSS} & \begin{bmatrix} \text{CASE} & \text{POSS} \\ \text{PRED} & \text{'teacher'} \\ \text{GEND} & \text{M} \\ \text{NUM} & \text{SG} \\ \text{DEF} & + \end{bmatrix} \\ \text{ADJ} & \{[\text{PRED } \text{'cared-for'}]\} \end{bmatrix}$$

[1]Similar, though not identical, structures are proposed by Dobrovie-Sorin (2001).

b.
$$\begin{bmatrix} \text{PRED} & \text{'garden } \langle(\uparrow \text{ POSS})\rangle\text{'} \\ \text{GEND} & \text{F} \\ \text{NUM} & \text{SG} \\ \text{DEF} & + \\ \text{POSS} & \begin{bmatrix} \text{PRED} & \text{'teacher'} \\ \text{GEND} & \text{M} \\ \text{NUM} & \text{SG} \\ \text{DEF} & + \end{bmatrix} \\ \text{ADJ} & \{[\text{PRED } \text{'cared-for'}]\} \end{bmatrix}$$

The f-structures in (9) correctly represent the grammatical functions as identical in the two structures. The functional analysis matches closely the D-structure positions hypothesized in the transformational approach. The only difference is that in LFG it is not assumed that grammatical functions are uniformly encoded in constituent structure. The abandonment of this assumption is justified independently of the Hebrew facts by data in nonconfigurational languages (Austin and Bresnan 1996, Nordlinger 1998, Bresnan 2001, Falk 2001). Instead, the mapping between c-structure and f-structure is determined on a language-specific basis, and is formalized as functional equations which are annotated to c-structure positions in phrase structure rules and to lexical entries. The following phrase structure rules provide the basis of the constituency-function mapping in Hebrew NPs:

(10) a. $\text{NP} \rightarrow \underset{\uparrow=\downarrow}{\text{NP}} \quad \underset{(\uparrow(\downarrow \text{CASE}))=\downarrow}{\text{PP}}$

b. $\text{NP} \rightarrow \underset{\uparrow=\downarrow}{\text{N}} \quad \underset{(\uparrow \text{POSS})=\downarrow}{\text{NP}} \quad \underset{\downarrow \in (\uparrow \text{ADJ})}{\text{AP*}}$

That is to say, the immediately postnominal NP position is assigned the function POSS, (we will modify this later) and PPs adjoined to NP have grammatical functions defined by the Case properties of the prepositions. At the lexical level, we assume the following lexical entries.

(11) a. *hamore* N
($\uparrow$ PRED) = 'teacher'
($\uparrow$ GEND) = M
($\uparrow$ NUM) = SG
($\uparrow$ DEF) = +

b. *šel* P
($\uparrow$ CASE) = POSS

c. *hametupaxat* A
($\uparrow$ PRED) = 'cared-for'
((ADJ $\uparrow$) GEND) = F
((ADJ $\uparrow$) NUM) = SG
((ADJ $\uparrow$) DEF) = +

The heart of the analysis is the treatment of the various realizations of the head of the NP, *gina* 'garden' in the example. We assume that non-action nouns optionally take a POSS argument,[2] variously interpreted in terms of different kinds of possession (alienable, inalienable, agent responsible for a result) depending on the semantics of the noun. We thus have the following two lexical entries for the word *gina*.

[2]This essentially follows the approach of Bresnan (2001), where the addition of POSS to the argument structure is stated in terms of an a-structure augmentation template.

(12) a. *gina* N (↑ PRED) = ‘garden’
(↑ NUM) = SG
(↑ GEND) = F

b. *gina* N (↑ PRED) = ‘garden ⟨(↑ POSS)⟩’
(↑ NUM) = SG
(↑ GEND) = F

Nouns can be affixed with the definite prefix *ha-*, which adds a definiteness feature.[3]

(13) a. *hagina* N (↑ PRED) = ‘garden’
(↑ NUM) = SG
(↑ GEND) = F
(↑ DEF) = +

b. *hagina* N (↑ PRED) = ‘garden ⟨(↑ POSS)⟩’
(↑ NUM) = SG
(↑ GEND) = F
(↑ DEF) = +

The construct state is a morphophonological variant of the ordinary form of the noun. The form is usually predictable: the two most common alternations in the singular are that in feminine nouns ending in *-a* the construct usually ends in *-(a)t*, sometimes with the reduction of an internal vowel (‘garden’ *gina* construct *ginat*, ‘lip, language’ *safa* construct *sfat*, ‘family’ *mišpaxa* construct *mišpaxat*), and nouns with dipthongs simplify the diphthong (‘house’ *bayit* construct *beyt*, ‘olive’ *zayit* construct *zeyt*). The plural suffix *-im* is changed into *-ey*. In addition to its use in syntax, and perhaps more centrally, the construct is used morphologically as the bound variant of a word, similarly to English forms like *destruct* and *recept*. It is found primarily in compounds (14a), although it is sometimes used with affixes as well (14b).

(14) a. *bayit* ‘house’ + *sefer* ‘book’ → *beyt sefer* ‘school’
safa ‘lip, language’ + *em* ‘mother’ → *sfat em* ‘mother tongue’
miflaga ‘political party’ + *avoda* ‘work’ → *mifleget (ha)avoda* ‘(the) Labor Party’

b. *bayit* ‘house’ + *-i* adjective → *beyti* ‘domestic’
safa ‘lip, language’ + *-on* → *sfaton* ‘lipstick’
šana ‘year’ + *-on* → *šnaton* ‘(annual) course catalog’
zayit ‘olive’ + *-im* plural → *zeytim* ‘olives’

In its syntactic use, the construct has a bound “feel” as well. Some following NP is obligatory, either a POSS (1, 2) or an adjunct similar to English pre-nominal NP/DP adjuncts (15).

(15) *sfarim* ‘books’ + *Harry Potter* → *sifrey Harry Potter* ‘Harry Potter books’
gina ‘garden’ + *vradim* ‘roses’ → *ginat vradim* ‘rose garden’
bgadim ‘clothing’ + *yeladim* ‘children’ → *bigdey yeladim* ‘children’s clothing’

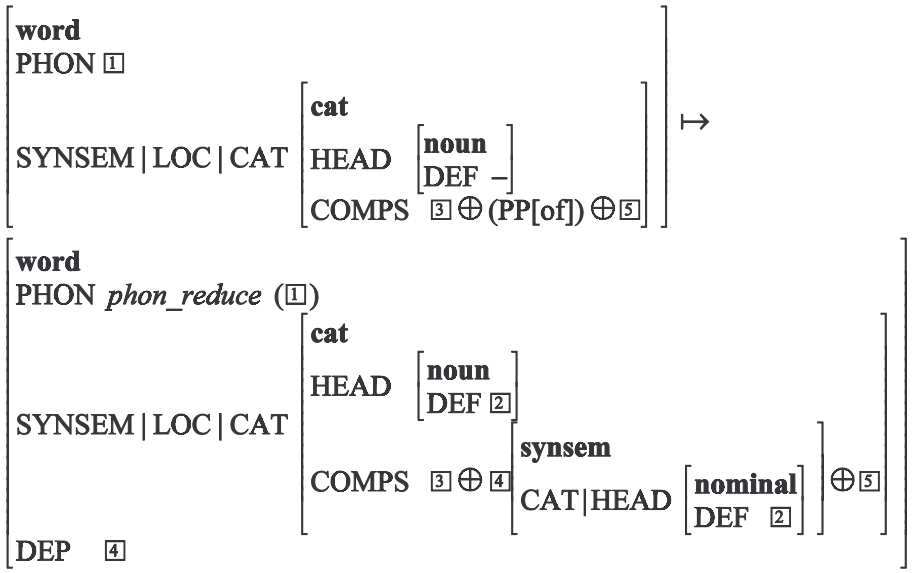
This bound-morpheme-like quality also manifests itself in the fact that the head noun inherits its definiteness from the NP, and the fact that POSS is realized as a plain NP rather than a PP headed by *šel*.

[3]We assume that nouns with no definiteness feature get the default value ‘–’ in the f-structure.

When faced with this kind of collection of facts, the question is how they are to be related to each other. The derivational approach generally accounts for the difference between regular and construct state nouns by attributing different Case-marking properties to construct state nominals and free state nominals (Ritter 1988, Siloni 1997). The abstract determiner is endowed with special Case features in the construct state, thus allowing the possessor nominal to be expressed without morphologically overt Case. The availability of "structural" genitive Case in the construct also controls the surface position of the possessor nominal, and given the appropriate feature-checking mechanism can be used to achieve the passing of the definiteness feature.

What is not explained by the Case-based approach is the morphophonological form, or the relation between the syntactic and morphological uses of the construct form. Wintner (2000) comes a step closer to these aspects in an HPSG-based analysis, hypothesizing a "dependency" attribute DEP for the construct, and linking its value to an immediately postnominal NP.

(16) The relation between absolute and construct forms (HPSG, Wintner 2000)



We will follow Wintner's basic idea here. We take the basic property of the construct form to be its bound-morpheme-like quality, which we express in terms of an attribute similar to Wintner's DEP. However, Wintner's name for the attribute is counterintuitive, since the value of the attribute is the dominant element rather than the dependent one. We will call the attribute DOM. In addition to its grammatical function (POSS or ADJ), the postnominal NP position also fills the value of the head's DOM attribute. Wintner ignores the question of exactly how this attribute fits into the overall structure, including it neither in PHON nor in SYNSEM. Ultimately, this seems to be a morphological property marking bound forms of stems; we will tentatively include it in f-structure. Nothing hinges on this, and it probably should be part of some morphological projection.[4] We update the phrase structure rule for NP as follows.

[4]The analysis in the text, involving the attribute DOM, is undoubtedly an overly simplified implementation, but it will do for present purposes. There seem to be several aspects involved here. First, the postnominal NP has some grammatical function, the exact nature of which needs further investigation; perhaps a better understanding of the relation between POSS and SUBJ will help. Second, the head noun is a morphologically bound form; we can tentatively hypothesize a word-structure projection (ω) and semi-formally express this as a lexical property of the construct form: (ω(↑) MORPHTYPE)=BOUND. Finally, the postnominal NP is what the construct form is bound to.

(17) $NP \rightarrow \quad N \quad NP \quad AP^*$
$\uparrow = \downarrow \quad (\uparrow DOM) = \downarrow) \quad \downarrow \in (\uparrow ADJ)$
$\{(\uparrow POSS) = \downarrow\}$
$\{\downarrow \in (\uparrow ADJ)\}$

We assume that construct state nouns are lexically marked to require the DOM attribute; by default, nouns not explicitly marked to require the DOM attribute forbid it.

(18) construct nouns: $(\uparrow DOM)$
free nouns: $\neg (\uparrow DOM)$ (by default)

We hypothesize a lexical rule under which nominals which require a DOM inherit definiteness from it. This appears to be a manifestation of the morphological head-like quality of DOM.

(19) **Definiteness Dependency**
$(\uparrow DOM) \Rightarrow (\uparrow DEF) = (\uparrow DOM\ DEF)$

We note in passing that this account of definiteness dependency is probably oversimplified. In the first place, the duplication of a feature of a syntactic dependent on the syntactic head is unexpected. Second, similar phenomena are apparent in languages where the morphologically dominant/dependent relation cannot be argued for. For example, in Welsh (Sadler 2000) an adjective may intervene between the head and the POSS and there is no morphophonological reflex of the "construct state" construction on the head noun. Despite the total lack of evidence for the kind of morphological relation that obtains in Hebrew, Welsh exhibits the same definiteness inheritance as Hebrew.

(20) llun rhyfedd y ferch
picture strange the girl
'the strange picture of the girl'

In addition, as observed by Dobrovie-Sorin (2001), definiteness effects related to possessors can be observed in languages like English and Rumanian. Note the following examples from Rumanian.[5]

(21) a. casa vecinului
house.the neighbor.the
'the neighbor's house'

b. *o casă vecinului
a house neighbor.the
'a house of the neighbor'

c. o casă a vecinului
a house of neighbor.the
'a house of the neighbor'

These cross-linguistic facts need to be examined in more detail; Dobrovie-Sorin proposes a semantic account of definiteness inheritance. Of course, the existence of semantic motivation does not rule out a lexical specification of the kind we are positing here. It is possible that a better understanding of the grammatical functions involved in possessor constructions might provide a better analysis of how these

[5]Rumanian also requires adjacency between the head and the possessor in the "construct."

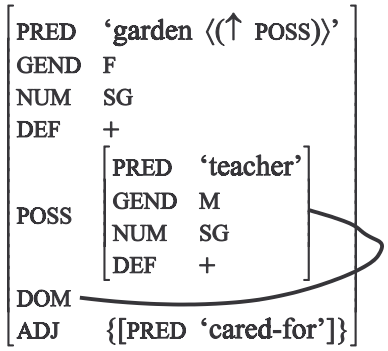
languages are similar and differ.

The lexical entry for (the possessed version of) *ginat* is:

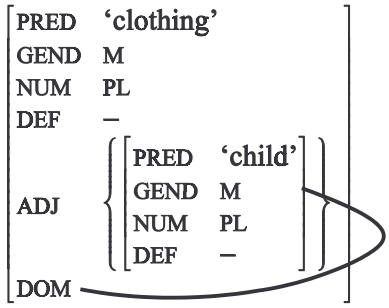
(22) *ginat* N (↑ PRED) = 'garden ⟨(↑ POSS)⟩'
(↑ NUM) = SG
(↑ GEND) = F
(↑ DOM)
(↑ DEF) = (↑ DOM DEF)

Note that since the construct form has an equation specifying a DEF value, it cannot be prefixed with the definite *ha-*. The f-structures of *ginat hamore hametupaxat* (5b) and *bigdey yeladim* 'children's clothes' are as follows.[6]

(23) a.



b.



We can extend this analysis to include the following noun phrase types.

(24) a. ginat- o ha- metupax- at
garden- his the- cared.for- FSG
'his tended garden'

b. ginat- o ha- metupax- at šel ha- more
garden- his the- cared.for- FSG of the- teacher
'the teacher's tended garden'

The suffix *-o* is a POSS agreement suffix (Engelhardt 1998). As an agreement morpheme, it can only cross-reference arguments, not adjuncts; this is a restriction noted by Engelhardt. As with other agreement affixes, a POSS agreement affix can optionally function as an incorporated pronoun (Bresnan 2001 and references cited there). In LFG, this means that it has an optional [PRED 'PRO'] feature. Unlike the

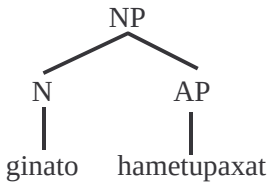
[6]The curved lines in the f-structures indicate that the same f-structure element is the value of more than one attribute (i.e. has more than one function).

construct form from which it is derived, the form with the agreement suffix is not a morphologically bound form; it does not take a DOM element. As a result, when the agreement suffix is not pronominal, the POSS is realized as a *šel* phrase rather than a bare NP.[7] Finally, as observed by Engelhardt (1998), the suffixed form is inherently definite.

(25) *ginato* N
(↑ PRED) = 'garden ⟨(↑ POSS)⟩
(↑ NUM) = SG
(↑ GEND) = F
(↑ DEF) = +
¬ (↑ DOM)
(↑ POSS PERS) = 3
(↑ POSS NUM) = SG
(↑ POSS GEND) = M
((↑ POSS PRED) = 'PRO')

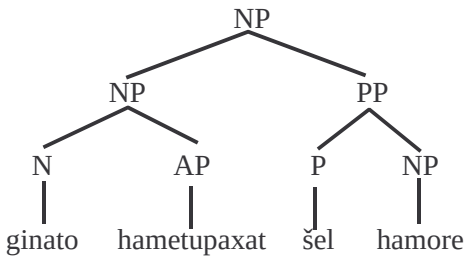
The c- and f-structures for the NPs in (24) are:

(26) a.



$$\begin{bmatrix} \text{PRED} & \text{'garden } \langle(\uparrow \text{POSS})\rangle\text{'} \\ \text{NUM} & \text{SG} \\ \text{GEND} & \text{F} \\ \text{DEF} & + \\ \text{POSS} & \begin{bmatrix} \text{PRED} & \text{'PRO'} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \\ \text{GEND} & \text{M} \end{bmatrix} \\ \text{ADJ} & \{[\text{PRED} \quad \text{'cared-for'}]\} \end{bmatrix}$$

b.



$$\begin{bmatrix} \text{PRED} & \text{'garden } \langle(\uparrow \text{POSS})\rangle\text{'} \\ \text{NUM} & \text{SG} \\ \text{GEND} & \text{F} \\ \text{DEF} & + \\ \text{POSS} & \begin{bmatrix} \text{CASE} & \text{POSS} \\ \text{PRED} & \text{'teacher'} \\ \text{DEF} & + \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \\ \text{GEND} & \text{M} \end{bmatrix} \\ \text{ADJ} & \{[\text{PRED} \quad \text{'cared-for'}]\} \end{bmatrix}$$

[7] Although stated differently, this is essentially Engelhardt's analysis. She shows convincingly that the usual GB/MP analysis under which the suffix is a pronominal clitic which absorbs the abstract genitive Case associated with the construct is untenable, and proceeds to argue for agreement status, as assumed here. She attributes the inability of the suffixed form to appear in the construct to a requirement that the head of a construct must be unmarked for definiteness. She does not show how this intuitive idea can be formalized in the MP framework within which her analysis is developed, nor is it clear how we could formalize it in LFG. However, taking the lack of inherent definiteness as a symptom of the bound-morpheme character of construct-state nouns, we can reconstitute Engelhardt's insight as we have done here.

3. Action Nominals

3.1. Overview

Abstracting away from the different methods of realizing a POSS, there are basically two ways for a Hebrew action nominal to express its arguments. In one, the subject argument of the corresponding verb is realized as a POSS and the object argument as an accusative-marked phrase. In the other, it is the object argument that is projected into the syntax as POSS, with the subject argument surfacing optionally as a *by* phrase.

(27) a. sgirat ha- mankal et ha- misrad
closure.CONSTR the- director ACC the- office
b. sgirat ha- misrad (alyedey ha- mankal)
closure.CONSTR the- office (by the- director)
'the closure of the office by the director'

We will refer to these as the "accusative" and "non-accusative" forms of the action nominal. The non-accusative form is the more common version.

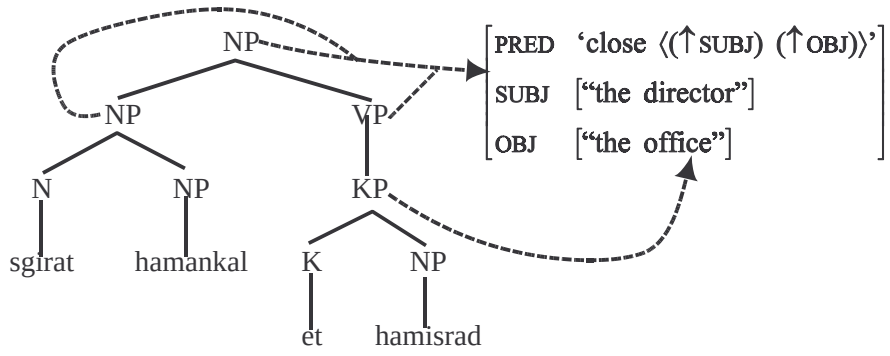
Despite the higher naturalness of the non-accusative form of the action nominal, it is the accusative form that has attracted much attention in the literature. Since accusative Case is otherwise attested only in the objects of verbs, it has invited an analysis in which the structure of the NP includes an embedded VP. In a derivational framework, the most straightforward way to implement this is to insert the nominalized verb in V position and for it to undergo head-movement to a higher N. Such analyses have been argued for by, inter alia, Hazout (1995) and Engelhardt (1998). On the other hand, Siloni (1997) argues against this kind of analysis. We will argue here for a nonderivational version of the NP-over-VP analysis of Hebrew action nominals.

3.2. Hebrew Action Nominals as a Mixed Category

3.2.1. The Analysis: Accusative Nominals

The LFG theory of mixed categories is based on the concept of head-sharing, the LFG equivalent of head-movement. A construction which would be analyzed as head movement in a derivational framework (say, V-to-I movement) can be thought of in terms of two phrases (an IP and a VP) sharing a head. In a head-sharing construction, the shared head is located in the highest of the head-sharing phrases: in I rather than V, for example. A construction like the Hebrew action nominal can be similarly analyzed, as shown in the following c-structure and partial f-structure.[8]

(28)



The noun *sgirat* is the head of both the root NP (of which it is the $\bar{X}$ head), and of the headless VP embedded in it. The head sharing is a result of the fact that the NP and VP map to the same f-structure

[8] I am assuming that the accusative particle *et* belongs to the category K (Case), which is a functional head. Nothing hinges on this.

element, as shown by the arrows indicating the mapping. We assume that the VP is adjoined to NP.

(29) $NP \rightarrow \underset{\uparrow=\downarrow}{NP} \quad \underset{\uparrow=\downarrow}{VP}$

The relative acceptability of coordinating N+POSS in this construction suggests that this structure is correct. (An explanation is still needed for why informants tend to stop short of identifying it as fully grammatical; one possibility is that the relatively marked status of the accusative form of the nominal makes it harder to process, and the coordination adds to the processing load.)[9]

(30) ?ibud ha- mumxim ve- hašmadat ha- politikaim et
processing the- experts and- destruction.CONSTR the- politicians ACC
pitkey hahacbaa be- xodeš november
the.ballots in- month November
'the experts' processing of the ballots and the politicians' destruction of the ballots in November'

Mixed categories result from some cases of category-changing morphology, on a language-specific basis. In addition to Hebrew (and the related construction in Arabic), Bresnan (1997) cites examples from Italian, Kikuyu, German, Japanese, and Dagaare. (In these examples, the head is bolded and labeled with its lexical category.)

(31) a. **Italian infinitive** (NP-over-VP)
[$_{DP}$ il [$_{NP}$ suo continuo **mormare**$_{N}$ [$_{VP}$ [parole dolci] $_{VP}$] $_{NP}$] $_{DP}$]
the his/her continual whisper.INF words sweet
'his continual whispering of soft words'

b. **Kikuyu agentive nominalization** (NP-over-VP)
[$_{DP}$ [$_{NP}$ **mũ- thĩĩnj- i**$_{N}$ [$_{VP}$ [mbũri] $_{VP}$] $_{NP}$] ũyũ $_{DP}$]
1- slaughter- NMNL 10.goat 1.DEM
'this slaughterer of goats'

c. **German adjectival participle** (AP-over-VP)
ein [$_{AP}$ [$_{VP}$ [mehrere Sprachen] $_{VP}$] **sprechender**$_{A}$ $_{AP}$] Mann
a several languages speaking.NOM.MSG man
'a man speaking several languages'

d. **Japanese verbalized nominalization** (VP-over-NP)
[$_{S}$ Taroo ga [$_{VP}$ [$_{NP}$ [kinmedaru no] $_{NP}$] **morai- ta- sa- no**$_{V}$ $_{VP}$] $_{S}$]
Taro NOM goldmedal GEN receive- want- NMNL- COP
'Taro's desire to receive a gold medal'

e. **Dagaare action nominal** (NP-over-VP)
[$_{DP}$ a [$_{NP}$ Dɛre [$_{VP}$ [ga- ma] [wiewie] $_{VP}$] velaa **sɔr- oo**$_{N}$ $_{NP}$] $_{DP}$]
the Dɛre book- PL quickly good read- NMNL
'the nice way of Dɛre's reading books quickly'

They result from a mixed argument structure; in the case of a noun/verb mixture, an argument structure

[9]Note that this is not Right Node Raising, as the "shared" material is not a single constituent under anybody's analysis.

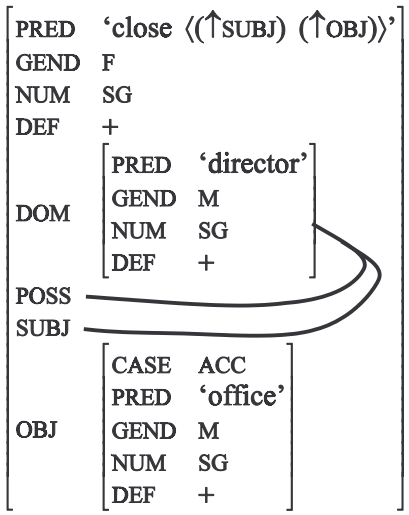
with verbal and nominal characteristics (Bresnan 1997; Bresnan and Mugane 2000). The verbal argument structure requires that its c-structure correspondent be a VP, and the nominal argument structure requires that its c-structure correspondent be an NP.[10]

(32) a. $(\uparrow \text{PRED}) = \text{`close} \langle \langle x, y \rangle_v \rangle_n$
b. *v:* $\text{VP} \in \lambda(\phi^{-1}(\uparrow))$
n: $\text{NP} \in \lambda(\phi^{-1}(\uparrow))$

As a result, both nominal and verbal projections appear in the c-structure. The word itself is a noun, and thus occupies the structural position of the $\bar{X}$ head of the NP. The theory of head-sharing stipulates that the head occupy the head position of the highest projection, so the NP dominates the VP. As for the appearance of the subject of the action nominal in positions normally reserved for the POSS function, the answer may lie in the relation between the POSS and SUBJ functions; for concreteness, we can follow the proposal in Bresnan (2001) for English gerunds, and assume that Hebrew action nominals include the following specification:

(33) $(\uparrow \text{POSS}) = (\uparrow \text{SUBJ})$

The full f-structure of (28) is:

(34)


We thus account for the properties of the accusative form of the Hebrew action nominal.

3.2.2. Non-accusative Action Nominals

The mixed-category analysis of the accusative version of action nominals raises questions concerning the analysis of the non-accusative form. One analysis, based primarily on the optional appearance of the *by* phrase, and also on the object argument appearing as a "subject", is that the non-accusative form is a passive (Rosén 1977, Engelhardt 1998). However, as discussed by Siloni (1997), there are serious problems with such an analysis, such as the lack of relation between which verbs undergo passivization and which action nominals can appear in the non-accusative version.

We will add an additional consideration which argues against a passive analysis. Of the two forms of the action nominal in Hebrew, the non-accusative form is by far the more natural. The accusative form has been described as being not as common (Rosén 1977), "an occasional formal usage" (Glinert 1989), and "stylistically highly marked"(Ritter 1988). There are even speakers of Hebrew who do not accept the

[10] λ is the category labelling function.

accusative version. This contrasts sharply with the relation between active and passive in Hebrew: the passive is a highly marked construction which is not used much in natural Hebrew speech.

We will argue for a different analysis of the non-accusative version, based on the LFG theory of argument mapping. Argument mapping in LFG is mediated by argument structure (a-structure), a level of representation in which argument positions are classified by a system of distinctive features for grammatical functions. The theory of mapping, called Lexical Mapping Theory (LMT), posits the following system of features:

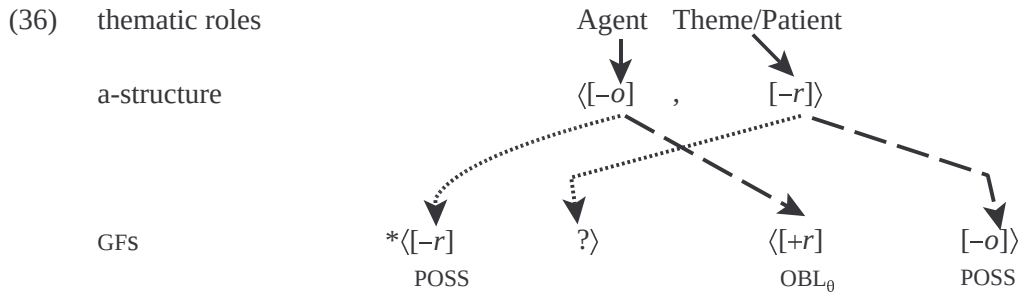
(35) a. restricted
[+*r*]: OBL_θ, OBJ_θ (or OBJ2)
[−*r*]: SUBJ, OBJ

b. objective
[+*o*]: OBJ, OBJ_θ
[−*o*]: SUBJ, OBL_θ

Arguments with Theme-like and Patient-like thematic roles are classified as [−*r*] and those with other thematic roles (including Agent) are classified as [−*o*]. In the mapping to f-structure, remaining features are filled in; if possible, the thematically most prominent argument becomes SUBJ. Two arguments cannot map to the same grammatical function. As a result, in a typical transitive Agent-Patient verb, the Agent becomes SUBJ and the Patient, which is inherently classified as [−*r*], has to become OBJ.

As discussed by Laczkó (2000), the feature [+*o*] is not available to the arguments of nominals. This affects the possibilities for argument mapping in nominals. Assuming that the function POSS is the nominal equivalent of SUBJ, and thus [−*r*, −*o*], we find the following.

(36)



A verb-like mapping, in which the Agent is mapped to the SUBJ-like function POSS, leaves no grammatical mapping for the Patient. A "passive" mapping, in which the Patient maps to POSS, results in an oblique realization of the Agent; without any additional stipulations, this is the mapping in a nominal. In some languages there are additional stipulations: in Modern Greek an unergative argument cannot be realized in nominals (Markantonatou 1995) and in English a [+*r*] mapping is allowed for the Patient, thus permitting the Agent to be POSS (Laczkó 2000). However, in the simplest case, instantiated in Hungarian according to Laczkó, the lexical form of the nominal of a transitive verb will be one in which the Agent is an oblique (often optional, since oblique arguments of nominals are usually optional) and the Patient is POSS.

(37) 'close ⟨∅/(↑ $\text{OBL}_{\text{Agent}}$) (↑ POSS)⟩

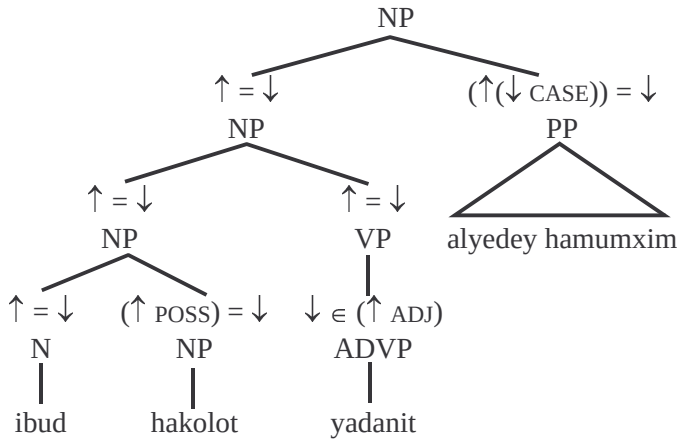
The lexical form in (37) is exactly what is needed to generate the non-accusative version of the action nominal in Hebrew. The simplest analysis of the non-accusative action nominal in Hebrew is thus that it involves a nominal mapping of arguments, while the accusative version involves a verbal mapping.

Even when it maps its arguments as a noun, the action nominal is a mixed category. Modification

by both adjectives and adverbs is possible.

(38) a. ibud ha- kolot yadanit alyedey ha- mumxim
processing the- votes manually by the- experts
b. ibud ha- kolot ha- yadani alyedey ha- mumxim
processing the- votes the- manual by the- experts
'the manual processing of the votes by the experts'

c. c-structure of (a) with partial functional annotations



The proposed analysis of the non-accusative form is natural under a lexicalist implementation of the mixed category analysis but not under a derivational implementation. From the lexicalist perspective, there is something natural about something with mixed nominal/verbal argument structure being able to map its arguments either as a noun or as a verb. Given the fact that the nominals themselves are lexically nouns, it is also not unexpected that the nominal mapping of arguments will be the less marked one. This explains the intuition of unnaturalness that many Hebrew speakers attribute to the accusative form. On the other hand, it is hard to see how the derivational approach could adopt this analysis. The derivational approach treats the VP as a projection of the (nominalized) verb, with its projected (internal) arguments realized within the VP. While the nominalization is accounted for by raising the verb to N, there is no reason for the arguments to move and become nominal arguments. There is no way to capture the idea that in the non-accusative form of the nominalizations the arguments are realized like the arguments of nouns, nor is it clear how the greater naturalness of the non-accusative form could be explained.

3.3. Alternatives

The analysis we have presented is the lexicalist equivalent of what has become the conventional analysis of Hebrew action nominals. However, this kind of analysis has been argued against, both for Hebrew and universally. We will discuss Siloni's (1997) argument that Hebrew action nominals are purely nouns, as well as Malouf's (1998) lexicalist (HPSG) analysis of mixed categories as intermediate between (in this case) noun and verb instead of having distinct nominal and verbal structural sections.

Siloni (1997) argues against a mixed-category analysis for Hebrew action nominals, arguing that they are pure nouns. At the conceptual level, she questions the possibility of mixed categories. However, since they can be shown to exist in other languages they cannot be ruled out in principle. She also argues, on empirical grounds, that action nominals do not take adverbs and that the accusative Case on the object is "inherent" accusative Case.

Siloni's claim that action nominals do not take adverbs is based on contrasts such as the following.

(39) a. mexikat ha- maxšev et ha- kvacim bi- mhirut
erasing.CONSTR the- computer ACC the- files in- speed
b. *mexikat ha- maxšev et ha- kvacim maher
erasing.CONSTR the- computer ACC the- files quickly
'the computer's quick erasing of the files'

As Siloni correctly observes, forms like *bimhirut*, which are often cited as adverbs, may be better analyzed as PPs (note the gloss). She shows that the adverb *maher* cannot cooccur with action nominals, and argues that this inability is evidence against any analysis involving an embedded VP. However, in the examples in (2) and (38a) we have seen cases of other adverbs, *yadanit* 'manually' and *zmanit* 'temporarily', which can occur in action nominal phrases. We repeat (2a) and (38a) here.

(40) a. ibud ha- mumxim et kolot yadanit
processing the- experts ACC votes manually
'the experts' manual processing of the votes'
b. ibud ha- kolot yadanit alyedey ha- mumxim
processing the- votes manually by the- experts
'the manual processing of the votes by the experts'

The most direct way to express the fact that some adverbs (those formed regularly from adjectives) can occur in action nominal phrases while others (with irregular morphology) cannot is to hypothesize that there is a VP in the structure of the action nominal, but that adverbs like *maher* are lexically marked not to appear in phrases which are co-heads of NPs.

(41) $NP \notin \lambda (\phi^{-1} (ADJ \uparrow))$

Siloni provides several arguments that the accusative Case which appears on the object of an action nominal is not the normal accusative Case, and therefore provides no evidence for an analysis in which the action nominal has verbal properties. The burden of proof is clearly on the kind of an analysis which Siloni argues for: as noted by Hazout (1995), the accusative Case which surfaces on the objects of action nominals seems to have all the properties of accusative Case. Most salient among Siloni's arguments are the ungrammaticality of indefinite objects and the ungrammaticality of pronominal objects. In Hebrew, as in many other languages, accusative Case only appears on OBJs when they are definite; indefinite OBJs are not overtly marked with Case. Siloni argues that the accusative Case in nominals is "inherent" accusative Case, and thus an object on which accusative cannot surface is of necessity ungrammatical (42a). However, as she herself notes, heavier NPs make the construction significantly more acceptable (42b).

(42) a. *ibud mumxim pitkey.hacbaa
processing experts ballots
'experts' processing of votes'

b. ?ibud mumxim mi- florida pitkey.hacbaa šel kšišim yehudim
processing experts from- Florida ballots of senior.citizens Jewish
'processing by experts from Florida of the ballots of Jewish senior citizens'

This casts doubt on the "inherent Case" analysis of accusative in nominals. A more plausible analysis would be to attribute the reduced acceptability of (42) to a difficulty in parsing what is already a highly marked construction.

As for the ungrammaticality of pronominal objects, Siloni adds the observation that dative

pronouns are also excluded from action nominals. This point is expanded on by Engelhardt (1998), who notes that even oblique pronouns are excluded. Engelhardt proposes, plausibly, that pronouns need to be adjacent the head. They are not adjacent to the head in the action nominal because the POSS/SUBJ intervenes.

Finally, again as noted by Engelhardt, the fact that the appearance of an overt accusative Case particle in nominals is governed by definiteness, just as it is with verbs, suggests strongly that the accusative Case is the usual grammatical accusative found on the objects of verbs.

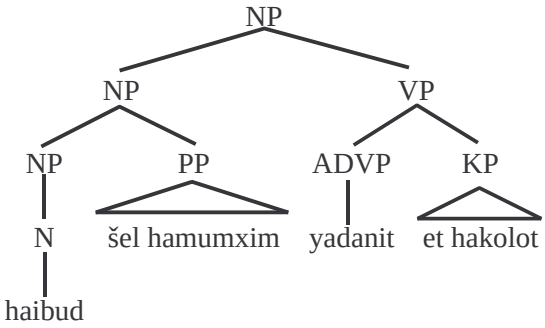
Malouf (1998) proposes an analysis of mixed categories which involves not distinct categorial projections but rather a single category having partial properties of both. In his HPSG analysis of English gerunds, he proposes that the HEAD value *gerund* is a subtype of both *noun* (other subtypes of which are *common noun* and *proper noun*) and *relational* (other subtypes of which are *verb* and *adjective*. He claims that since the external distribution of NPs is based on the type *noun*, mixed categories like gerunds will have the same distribution as NPs. Similarly, since adverbs modify relational elements and adjectives only modify common nouns, gerunds are modified only by adverbs. The verb-like complements of gerunds are attributed in his analysis to the lexical rule deriving gerunds from verbs, which retains the COMPS structure.

There is a fundamental difference between a c-structural two-category approach to mixed categories and Malouf's intermediate category approach. A structurally mixed account predicts that mixed categories should exhibit what Malouf calls "phrasal coherence," whereby the nominal and verbal aspects of the mixed category occupy distinct regions of the c-structure. Hebrew action nominals exhibit phrasal coherence.[11]

(43) a. ?ha- ibud šel ha- mumxim yadanit et ha- kolot
the- processing of the- experts manually ACC the- votes
b. **ha- ibud yadanit šel ha- mumxim et ha- kolot
the- processing manually of the- experts ACC the- votes
'the experts' manual processing of the votes'

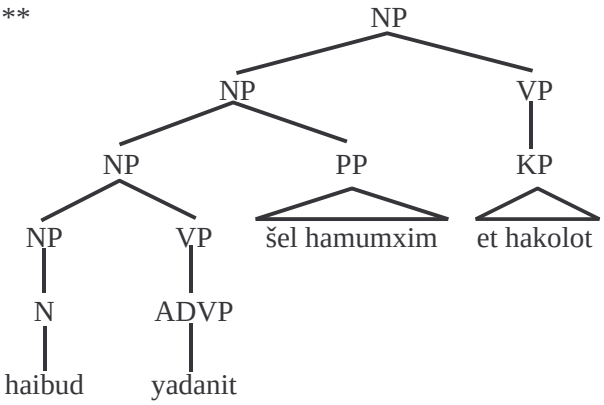
The c-structures of these NPs are as follows.

(44) a.



[11]Speakers of Hebrew are generally not very happy about the preverbal position of the adverb, but for those who do accept it the non-phrasally-coherent version is ungrammatical, and for those who do not the non-phrasally-coherent version is much worse.

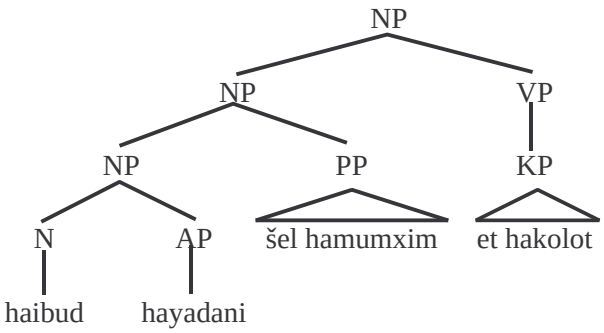
b. **



In the ungrammatical tree, the VP parts and NP parts are interspersed, violating phrasal coherence. On the other hand, Malouf's approach suggests that noun/verb mixtures should be modifiable by adverbs but not adjectives, on the grounds that adjectives only modify common nouns. All things being equal, this should apply to Hebrew action nominals as well.[12] Yet, both adjectival and adverbial modification are possible. On the other hand, given the phrase structure rules we have hypothesized for Hebrew, such a structure is predicted to be grammatical.[13]

(36) a. ?ha- ibud ha- yadani šel ha- mumxim et ha- kolot
the- processing the- manual of the- experts ACC the- votes
'the experts' manual processing of the votes'

b.



c. ha- ibud ha- yadani šel ha- kolot alyedey ha- mumxim
the- processing the- manual of the- votes by the- experts
'the manual processing of the votes by the experts'

This pattern of allowing both adverbs and adjectives seems to be somewhat unusual; it is the opposite of what Bresnan and Mugane (2000) report for Kikuyu, for example, where mixed-category agent nominalizations take adverbs and not adjectives. However, the c-structure-based theory of mixed categories is more capable of accommodating such properties than Malouf's theory.

---

[12]All things are not necessarily equal, since Malouf's theory allows different feature hierarchies in different languages.

[13]Siloni describes a nominal in which both arguments are expressed (in either the accusative or non-accusative form) as "somewhat clumsy and marginal" (p. 51), a description which matches my informants' judgments more for the accusative form than the non-accusative form. Since we have argued that the non-accusative form is "more nominal" than the accusative form, this clumsiness may be a result of the stronger verb-like properties of the accusative version. There may even be speakers who reject an adjective in the accusative form completely; however, the non-accusative form clearly allows both adjectives and adverbs.

It also should be noted, as observed by Siloni, that action nominals are completely and unambiguously nominal in their morphological properties. For example, they take the nominal negative prefix *i-*, which never appears on verbs. This is to be expected in a structurally mixed analysis, where the word itself has to be identified with a specific category, but not from an intermediate-category analysis of the kind Malouf argues for.

4. Conclusion

We have shown that the parallel architecture of LFG allows us to express the properties of Hebrew NPs in a constrained theory of constituent structure: one in which categories not lexically motivated cannot be assumed to exist and in which constituent structure expresses distributional properties rather than functional ones.

We have also shown that deverbal action nominals have NP-over-VP structures, as proposed in some of the literature. However, a lexicalist mixed-category implementation of this analysis along the lines of Bresnan (1997) has the advantage of allowing the nominal to project its arguments into the syntax either as a verb or as a noun. This provides a superior account of the two patterns of argument realization that are found. It also provides a natural explanation of the less marked status of the non-accusative version of the Hebrew action nominal.

References

Austin, Peter, and Joan Bresnan (1996) “Non-configurationality in Australian Aboriginal Languages.” *Natural Language and Linguistic Theory* 14: 215–268.

Bresnan, Joan, ed. (1982) *The Mental Representation of Grammatical Relations.* Cambridge, Mass.: MIT Press.

Bresnan, Joan (1997) “Mixed Categories as Head-sharing Constructions.” in Miriam Butt and Tracy Holloway King, eds., *Proceedings of the LFG97 Conference, University of California, San Diego*. On-line: CSLI Publications. `http://csli-publications.stanford.edu/LFG/2/lfg97.html`.

Bresnan, Joan (2001) *Lexical-Functional Syntax.* Oxford: Blackwell.

Bresnan, Joan, and John Mugane (2001) “Mixed Categories in Gĩkũyũ.” presented at LFG00, University of California, Berkeley.

Dobrovie-Sorin, Carmen (2001) “(In)definiteness Spread: From Rumanian Genitives to Hebrew Construct State Nominals.”

Engelhardt, Miriam (1998) *The Syntax of Nominalized Properties.* Doctoral dissertation, The Hebrew University of Jerusalem

Falk, Yehuda N. (2001) *Lexical-Functional Grammar: An Introduction to Parallel Constraint-Based Syntax.* Stanford, Calif.: CSLI Publications.

Glinert, Lewis (1989) *The Grammar of Modern Hebrew.* Cambridge: Cambridge University Press.

Hazout, Ilan (1995) “Action Nominalizations and the Lexicalist Hypothesis.” *Natural Language and Linguistic Theory* 13: 355–404.

Laczkó, Tibor (2000) “Derived Nominals, Possessors, and Lexical Mapping Theory in Hungarian DPs.” in Miriam Butt and Tracy Holloway King, eds., *Argument Realization* Stanford, Calif.: CSLI Publications. 189–227.

Malouf, Robert P. (1998) *Mixed Categories in the Hierarchical Lexicon.* Doctoral dissertation, Stanford University

Markantonatou, Stella (1995) “Modern Greek Deverbal Nominals: An LMT Approach.” *Journal of Linguistics* 31: 267–299.

Nordlinger, Rachel (1998) *Constructive Case: Evidence from Australian Languages.* Stanford, Calif.: CSLI Publications.

Ritter, Elizabeth (1988) "A Head-Movement Approach to Construct-State Noun Phrases." *Linguistics* 26: 909–929.
Rosén, Haiim (1977) *Good Hebrew: Studies in Syntax (Ivrit Tova: Iyunim Betaxbir)*, Third Edition, Corrected And Expanded. Jerusalem: Kiryat Sefer.
Sadler, Louisa (2000) "Noun Phrase Structure in Welsh." in Miriam Butt and Tracy Holloway King, eds., *Argument Realization* Stanford, Calif.: CSLI Publications. 73–109.
Siloni, Tal (1997) *Noun Phrases and Nominalizations: The Syntax of DPs.* Dordrecht: Kluwer.
Wintner, Shuly (2000) "Definiteness in the Hebrew Noun Phrase." *Journal of Linguistics* 36: 319–363.