10

Constituent Structure and Grammatical Functions in the Hebrew Nominal Phrase

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10.1 Hebrew Nominal Phrases: An Overview

There have been many important transformational studies on the structure of Hebrew nominal phrases.[1] (Representative studies are Ritter 1988, Shlonsky 1988, Hazout 1995, Siloni 1997, Borer 1999, and Engelhardt 2000.) It is striking that, although they agree in broad outline, the details of these analyses vary so widely. The framework in which these analyses have been couched is a constituent-structure-centric theory. It is based on the idea that the various dimensions of syntax are all formalized in terms of a (derivationally related series of) constituent structure(s). A related assumption is that constituent structures essentially look the same in all languages. The undeniable differences between languages are thus a challenge for such a theory, and it is primarily in the formal nature of the devices needed to account for these differences (specifically, the formal motivation for the derivational process of movement) that the analyses that have been proposed differ from each other. The alternative is to begin from the assumption that

[1]This paper is dedicated to Joan Bresnan. Joan's career has exemplified the proper relationship between description and theory, and I feel privileged to have been one of her students. I have benefitted from comments by Miriam Butt, Carmen Dobrovie-Sorin, Edit Doron, Irit Meir, and an anonymous reader.

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different dimensions of syntax find their representations in different formal objects with distinct properties, which are related to each other by universally constrained language-specific bidirectional principles of mapping or correspondence. The specific model we will assume here is that of Lexical-Functional Grammar (LFG). The previous work which has been carried out in constituent-structure-centric transformational frameworks constitutes a standard analysis against which any alternative must be measured, and we will contrast our proposals which those which have been made in the transformational literature.

One of the central issues in the study of nominal phrases, whether in Hebrew or any other language, is the element which we can informally refer to as the "possessor" (sometimes referred to, somewhat misleadingly, as the "genitive"). It is this question which constitutes the central focus of the present study. In Hebrew, as in English, there are two different possessor constructions: a long one and a short one.

(1) **English**

a. **Long possessor construction**
the old aunt [of [the linguist]]

b. **Short possessor construction**
[the linguist's] old aunt

(2) **Hebrew**

a. **Long possessor construction**
ha- doda ha- zkena [šel [ha- balšan]]
the- aunt the- old [of [the- linguist]]
'the old aunt of the linguist'

b. **Short possessor construction**
doda- t [ha- balšan] ha- zkena
aunt- CONSTR [the- linguist] the- old
'the linguist's old aunt'

Certain similarities and differences between the English and Hebrew constructions are apparent. In both languages, the long construction marks the "possessor" with a preposition, *of* in English and *šel* in Hebrew, and displays a relatively straightforward word order, with the possessor in a normal PP position for the language. The short construction, on the other hand, uses a special morphological form, the genitive form for the possessor in English and the construct form for the possessum in Hebrew, and shows a change in word order. Another difference between the two constructions which is apparent in both languages is the specification of definiteness: in the long construction the main nominal phrase is explicitly marked as definite (by the determiner *the* in

English and the prefix *ha-* in Hebrew), while in the short construction such marking is impossible; the definiteness of the nominal phrase is somehow due to the possessor. Another similarity, not evident in these examples, is that when there is another dependent nominal phrase, the possessor outranks it with respect to binding; for example, a possessor can bind an anaphor elsewhere within the larger nominal phrase, but it cannot itself be an anaphor bound from within the nominal phrase. These similarities are striking, and suggest some commonality between the respective English and Hebrew constructions.

The differences between the languages are equally interesting, and surface primarily in the short constructions. For instance, while the word order is different from the long construction in both languages, it is different in different ways. The English construction exhibits what appears to be a parallel to the sentential SVO order, with the possessor taking on the appearance of being the "subject" of the nominal phrase. In Hebrew, on the other hand, the nominal phrase is noun-initial, despite the fact that Hebrew clauses are not usually verb-initial. Another difference is the nature of the determination of definiteness of the main nominal phrase in the short construction: in Hebrew the larger phrase inherits the definiteness value of the possessor in what is often referred to as definiteness spreading, while in English the status of definiteness is less clear.

An interesting difference between the two languages which is less discussed in the literature has to do with the use of the two constructions. For relational nouns like 'aunt', both languages use both constructions. However, for true possession, English does not ordinarily use the long construction unless the possessor is also suffixed with *'s*.

(3) a. the linguist's computer
    b. *the/that/a computer of the linguist
    c. that/a computer of the linguist's

In Hebrew, on the other hand, the long construction is the one normally used for true possession; the short construction is typically limited to more formal registers. (We use the symbol '#' to indicate formal register-specific forms.)

(4) a. ha- maxšev šel ha- balšan
       the- computer of the- linguist
       'the linguist's computer'
    b. #maxšev ha- balšan
       computer the- linguist
       'the linguist's computer'

In contrast, for naming places and periods of time, English exclusively uses the long construction and Hebrew the short one.

(5) a. the kingdom of Norway
b. *Norway's kingdom

(6) a. mamlexet norvegia
kingdom.CONSTR Norway
'the kingdom of Norway'
b. *ha- mamlaxa šel norvegia
the- kingdom of Norway
'the kingdom of Norway'

Examples such as these show that the long and short constructions are not mere variants of each other, contrary to what is often assumed. These examples also show that there is cross-linguistic variation in the use of long and short possessor constructions.

10.2 Basic Analysis

10.2.1 Overview

It is the interaction between these various similarities and differences, both within Hebrew and between Hebrew and other languages, that has led to certain aspects of the standard analysis, as well as to differences in formal machinery between the analyses. The basic notions on which there is broad agreement, and on which we concur, seem to be the following:

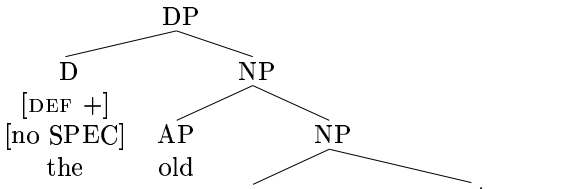
1. There is a syntactic feature of definiteness which is related to the semantics of definiteness, though not necessarily directly (see Danon 2001 on mismatches between syntactic and semantic definiteness in Hebrew). This formal feature is expressed in English through the definite article *the*, and in Hebrew through a prefix (*ha-*) on the noun.
2. In the short construction, the possessor interacts with the definiteness feature.
3. The short possessor is subject-like in some respects. Many analyses also hold that the long possessor is subject-like.
4. In the Hebrew short possessive construction (the construct state), the head noun is morphologically and/or phonologically dependent on the possessor.

10.2.2 The standard constituent-structure-based analysis

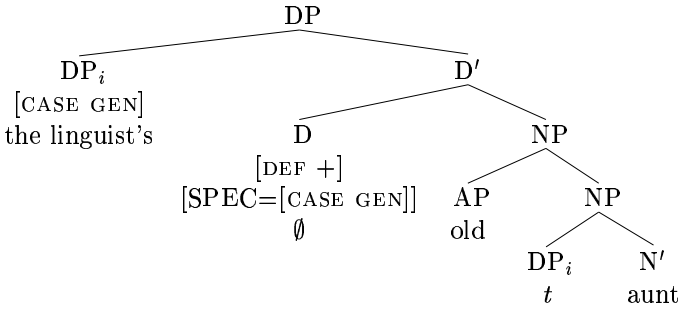
The first three of these properties (which apply in both Hebrew and English) appear to be fairly well accounted for in English by the standard

assumptions of constituent-structure-based theories. The definiteness feature is said to reside in the functional category D, which is the functional head of the nominal phrase (thus DP rather than NP). Assuming that the possessor in the short construction occupies the surface position of the specifier of DP, parallel to the clausal subject's position in the specifier of IP, it will have subject-like properties and it will interact (through SPEC-head agreement or Case marking) with the feature of definiteness in D. Finally, since the possessor is an argument of the noun, it originates within the NP, and then raises to [SPEC, DP]. The exact NP-internal position is unclear, since its subject-like properties suggest the specifier but it follows the noun; Giorgi and Longobardi (1991) suggest that it is extraposed by a Heavy-NP-Shift-like operation.[2] Schematically (and ignoring a lot of technical questions):

(7) a.



b.



Applying the same analysis to the Hebrew equivalents would result in the wrong word constituent order. In the long possessive, it would result in the adjective preceding the noun, and in the short possessive it would result in the possessor and the adjective both preceding the head noun.

The position of the adjective in the long possessive might be accounted for by a language-specific stipulation specifying that adjectives

[2] Alternatively, it is only the possessor in the short construction that occupies a specifier position, and the long construction involves an adjoined PP. This alternative is adopted for Hebrew by Ritter (1988) and Hazout (1995).

in Hebrew are right-adjoined rather than left-adjoined, but, as noted by Borer (1999), this would not explain the fact that adjectives precede other ("complement") arguments of the noun as well as the long possessor. On the assumption that the iteration and scoping properties of adjectives are represented directly in constituent structure, as is standard in constituent-structure–based accounts, they must be adjoined, and therefore will be structurally higher than complements. On a right-adjunction analysis, they would follow the complements.[3] For this reason, N-to-D movement is often assumed as a way of accounting for the noun-initial order (Ritter 1988, 1991, Siloni 1997). This movement is said to be motivated either by the fact that D (the definite article *ha-*) is phonologically a clitic so the noun needs to raise to it to make cliticization possible (Ritter 1988), or by the fact that it is a prefix on N instead of a separate syntactic entity in D, and therefore must check its features with the empty D (Siloni 1997, Borer 1999).

In the construct, in order to get the right word order, an additional functional category is hypothesized between the D layer and the N layer; while the head noun moves all the way to D, the possessor/specifier only moves to the specifier position of this intermediate functional category, due to language-specific stipulations of features or functional categories.

In summary, in the standard analysis head movement of N to D is generally taken to be a result of the affixal nature of the Hebrew definiteness marker. The height to which various elements raise is a result of language-specific specification of features/categories. There is no explanatory value attached to these specifications; they are simply a stipulation of the grammar of the language.

10.2.3 An LFG analysis

In a multidimensional theory like LFG, facts like these take on a different appearance. C-structure is a representation of the overt expression of syntactic objects and the organization of this overt expression. In addition to c-structure, syntax includes representations of such syntactic relations as grammatical functions and features (f-structure) and predicate-argument relations (a-structure). If we examine the list of agreed-upon aspects of the analysis of Hebrew nominal phrases, none of them relates to overt syntactic expression (i.e. to c-structure). They relate primarily to a feature (definiteness) and grammatical functions (subject and possessor), elements which are represented at f-structure. Much thus hinges on the theory of grammatical functions in general

[3] At least under standard assumptions. Edit Doron has suggested (personal communication) that right-adjunction to N rather than N' or NP would derive the right word order.

and subjecthood in particular.

We adopt here the analysis of subjects proposed by Falk (2006), under which the familiar "subject" is an amalgam of two distinct grammatical functions: the core function expressing the most prominent argument, termed $\widehat{\text{GF}}$, and a second, "overlay" function.[4] In familiar nominative-accusative languages, these two functions coincide; in typologically different languages they do not coincide, and sentences can have two different elements which share the familiar properties of subjects. Similarly, we take POSS not to be an actual grammatical function, but rather an amalgam of $\widehat{\text{GF}}$ and an overlay function.

The English *the old aunt of the linguist* and the Hebrew *hadoda hazkena šel habalšan* will have approximately the same f-structure.

(8)
$$\begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'aunt<(}\uparrow \widehat{\text{GF}}\text{)>'} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'old'} \end{bmatrix} \right\} \\ \text{GEND} & \text{F} \\ \text{NUM} & \text{SG} \\ \widehat{\text{GF}} & \begin{bmatrix} \text{CASE} & \widehat{\text{GF}} \\ \text{DEF} & + \\ \text{PRED} & \text{'linguist'} \\ \text{NUM} & \text{SG} \end{bmatrix} \end{bmatrix}$$

In the short possessive, since the possessor determines the definiteness of the entire nominal phrase, we hypothesize that the possessor, which functions as the $\widehat{\text{GF}}$, also functions as the value of the attribute DEF.

(9)
$$\begin{bmatrix} \text{DEF} & \begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'linguist'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \widehat{\text{GF}} & \\ \text{PRED} & \text{'aunt<(}\uparrow\widehat{\text{GF}}\text{)>'} \\ \text{ADJ} & \left\{ \begin{bmatrix} \text{PRED} & \text{'old'} \end{bmatrix} \right\} \\ \text{GEND} & \text{F} \\ \text{NUM} & \text{SG} \end{bmatrix}$$

[4] In the case of subjects, this second function is the function of cross-clausal connection, termed PIV(ot). As we are not dealing with clausal syntax, we hypothesize that the PIV function is irrelevant.

This analysis is a formal expression of the idea, discussed in detail by Haspelmath (1999), that the possessor serves the same function as the definite article: to specify the reference of the nominal. The possessor provides information to anchor the reference of the nominal; the definite article is something of a bleached specification, providing no information other than to instruct the hearer to provide a reference.[5] DEF is the overlay function which is part of the traditional poss; as an overlay function,[6] it is not subcategorizable, but rather must be licensed as sharing a value with a locally licensed function. We will discuss the constraints licensing this structure sharing briefly in §3.

The differences in the overt realization of the nominal phrases in Hebrew and English are a result of language-specific aspects of the f-structure–c-structure mapping. As much as is predictable in constituent-structure–based accounts is predictable here as well: the fact that the Hebrew definiteness marker is a prefix rather than a word belonging to the category Determiner leads to a difference in phrase structure. However, our view of the category D in Hebrew is very different from that taken in constituent-structure–based accounts. Plausible members of the Determiner category in Hebrew are the quantifiers: they are functional noun-like elements which precede NPs which would also be well-formed without them. The presence or absence of a quantifier has no effect on the structure of the rest of the nominal phrase. Therefore, instead of hypothesizing an empty D to which the N moves, the lack of a determiner in unquantified Hebrew nominal phrases (or in the portion of the nominal phrase following the quantifier) is taken to mean that such phrases lack a D and thus are NPs, not DPs. Since the phrases in question are not DPs, there is also no [SPEC, DP] position that the possessor can occupy in the short possessive construction. Under the hypothesis (Bresnan 2001) that lexical categories universally lack specifiers, there is no structural specifier position for the possessor to occupy. This is why short-construction possessors occupy a different position in Hebrew than in English.

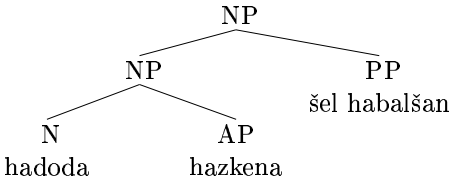
Other differences are not predictable under either analysis, but rather are based on language-specific properties. As shown by Falk (2001), for example, the noun + possessor sequence in the construct

[5] For a similar previous LFG analysis, see Butt, King, Niño, & Segond (1999). This is also similar to the classical analysis (as in Jackendoff 1977), under which determiners and possessors occupy the same structural position.

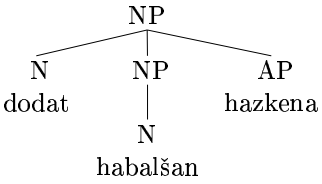
[6] Under this proposal, the value of the DEF attribute can be either atomic or an embedded f-structure. This seems to me to be the best way to express formally the relationship between "possessors" and definiteness marking. As Joan Bresnan has pointed out (personal communication), nothing in the formal architecture of LFG rules this out; f-structures are not typed feature structures.

state does not form a constituent that excludes the adjective(s). The adjective is thus not adjoined to the NP, but rather appears as a daughter of NP and a sister of the possessor in the construct. On the other hand, PPs seem to be adjoined to the NP, even when they are arguments. The Hebrew c-structures thus look very different from those hypothesized in constituent-structure-based theories.[7][8]

(10) a.



b.



Borer (1999) discusses several constituency problems for movement theories. One of them[9] has to do with adjectives in construct state (short possessive) nominals. Adjectives in the construct state, as we have seen, follow the possessor. If both the head and the possessor

[7]Similar, though not identical, structures are proposed by Dobrovie-Sorin (2001). These structures do not obey the c-structure–f-structure mapping principles proposed by Bresnan (2001). Further cross-linguistic study is necessary to determine the possible parameters of variation.

[8]Binding possibilities are often cited as evidence for the usual structural analysis of Hebrew NPs. Cross-linguistic study of binding (Dalrymple 1993, Bresnan 1995, and others) has shown, however, that c-command is inadequate for accounting for the binding patterns found in the languages of the world. Instead, hierarchies at different dimensions of syntactic structure interact to result in the observed patterns. The thematic hierarchy appears to be relevant here.

[9]Borer devotes an appendix to coordination problems with various movement-based analyses of Hebrew noun phrases, including her own. The problems are complex, involving details of specific analyses, and we cannot go into the specifics here. But it is interesting to note that not one of them is a problem for the present analysis: all involve coordination of an NP constituent, either the possessor in a construct state construction (i) or with further elements adjoined (ii, iii).

(i) beit [[ha- rabi mi- Kiryat Arba] ve [raayat- o]]
house.CONSTR the- rabbi from- Kiryat Arba and wife- his
'the house of the rabbi from Kiryat Arba and his wife'

(ii) [[ha- rabi ha- loxem] ve [raayat- o ha- xasuda]] mi- Kiryat Arba
the- rabbi the- militant and wife- his the- pious from- Kiryat Arba
'the militant rabbi and his pious wife from Kiryat Arba'

take adjectival modification, the adjectives must be nested, with the adjective modifying the possessor preceding the adjective modifying the head.

(11) a. dodat ha- balšan ha- generativi ha- zkena
aunt.CONSTR the- linguist the- generative.M the- old.F
'the generative linguist's old aunt'

b. *dodat ha- balšan ha- zkena ha- generativi
aunt.CONSTR the- linguist the- old.F the- generative.M
'the generative linguist's old aunt'

Under a non-movement analysis, there is nothing mysterious about this. The possessor NP is a constituent, and thus coheres in the linear ordering. Since nothing is moved out of this configuration, the constituency is seen transparently in the surface order.

10.2.4 Construct State Nominals

Construct state has certain unique properties: the morphophonological dependence of the head on the possessor, the adjacency of the head and possessor, and definiteness spreading. These properties are often treated as being related to each other (see, for example, Borer 1999), and an analysis that treats them as distinct properties is thus generally considered to be inferior from an explanatory perspective.

However, an analysis that connects these properties is explanatory only if they can be shown empirically to actually be related to each other. A cross-linguistic survey, summarized in (12), shows that these are distinct, unrelated facets of the construction. Consider Welsh (Sadler 2000) and Rumanian (Dobrovie-Sorin 2001).

(12)

	Hebrew	Welsh	Rumanian
dependence	+	−	−
adjacency	+	−	+
definiteness spread	+	+	−

While there may be some tendency for these properties to co-occur, having any one of these properties as the source of the other two is clearly inadequate. We will treat these as three independent properties.

The adjacency between the head noun and the element bearing the function DEF under our analysis (i.e. the possessor) is expressed for-

(iii) [[dirat ha- rav ha- yafa] u [migraš- av ha- rabim]] b- a- ir
apartment the- rabbi the- pretty and lots- his the- many in- the- city
'the rabbi's pretty apartment and his many lots in the city'

The problems Borer discusses are an artifact of the movement theory.

mally in LFG by the annotated phrase structure rule defining the c-structure–f-structure mapping.

(13) NP $\longrightarrow$ N NP AP*
$\uparrow=\downarrow$ $(\uparrow\text{DEF})=\downarrow$ $\downarrow\in(\uparrow\text{ADJ})$

There is clear functional motivation for this position: since the formal purpose of the DEF is to fix the definiteness, and in some sense the reference, of the noun, a position adjacent to the noun is natural. (The English specifier position is natural for different reasons, but, as we have seen, such a position is unavailable in Hebrew.)

The morphological dependence of the head noun on the possessor is often described in terms of de-stressing of the head noun. However, the actual differences in form between free and construct nouns do not support this characterization. There is no phonological justification for the addition of /t/ at the end of feminine nouns or the changing of the masculine plural suffix from *-im* to *-ey*. On the other hand, the construct forms are also used in morphologically bound environments: primarily in compounds, but also with derivational affixes.

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

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

We will represent this semi-formally as a feature [MORPHTYPE BND] at some morphological (or word-structure) projection from c-structure.[10]

(15) NP $\longrightarrow$ N NP AP*
$\uparrow=\downarrow$ $(\uparrow\text{DEF})=\downarrow$ $\downarrow\in(\uparrow\text{ADJ})$
$(\omega(<^*)\ \text{MORPHTYPE})=\text{BND}$

Finally, consider definiteness spreading. The basic fact is that in Hebrew the entire construct noun phrase is definite if the possessor is definite and indefinite if the possessor is indefinite. (An adjective has been included in the Hebrew example to show definiteness agreement, which is a syntactic test for definiteness.)

[10]The notation '$<^*$' refers to the left sister of the node to which is annotated (Dalrymple 2001), and $\omega(<^*)$ thus refers to the word structure correspondent of that node.

(16) a. dodat ha- balšan ha- zkena
aunt the- linguist the- old
'the old aunt of the linguist'

b. dodat balšan zkena
aunt linguist old
'an old aunt of a linguist'

This situation, seen also in other Semitic languages (such as Arabic) and in Celtic languages, has been dubbed "definiteness spreading," because it appears that the definiteness value of the possessor has spread to the larger NP. This rather strange state of affairs has led to several lines of analysis in the generative literature. Perhaps the most common is some variant of feature copying, sharing, or percolation. Such analyses have been proposed in various generative frameworks: GB/MP (inter alia Siloni 1997, Borer 1999), LFG (Sadler 2000), HPSG (Wintner 2000). As observed by Dobrovie-Sorin (2001), this analysis is conceptually problematic: this kind of feature sharing is otherwise unheard of. Dobrovie-Sorin's alternative is problematic as well. She assumes that it is only [DEF +] that appears to spread, and attributes this to properties of semantic interpretation rather than to syntax. However, the definiteness of the main NP in Hebrew is syntactic, as shown by adjective agreement. She also proposes that indefinite constructs are not argument constructions, but rather modifier constructions, which are handled differently in her analysis. This is problematic as the same relations can be expressed by both definite and indefinite constructs.

Let us consider the problem of definiteness spread in light of the analysis proposed here. The f-structures are:

(17) a.
$$\begin{bmatrix} \text{DEF} & \begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'linguist'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{PRED} & \text{'aunt}\langle(\uparrow\widehat{\text{GF}})\rangle\text{'} \\ \text{NUM} & \text{SG} \\ \widehat{\text{GF}} & \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{DEF} & \begin{bmatrix} \text{DEF} & - \\ \text{PRED} & \text{'linguist'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{PRED} & \text{'aunt}\langle(\uparrow\widehat{\text{GF}})\rangle\text{'} \\ \text{NUM} & \text{SG} \\ \widehat{\text{GF}} & \end{bmatrix}$$

There is no question here of "spreading" or "percolating" the feature DEF: both the main NP and the embedded one have the attribute DEF with a value. However, the value of DEF in the main NP is not a simple '+' or '−', it is a subsidiary attribute-value matrix which has its own DEF attribute. Definiteness spreading can be characterized as involving a path of defs terminating in the value + or −.

(18) f is a definite nominal $=_{def}$ $(f\ \text{DEF}^*) = +$
f is an indefinite nominal $=_{def}$ $(f\ \text{DEF}^*) = -$

For example, adnominal adjectives with definite agreement (the prefix ha-) can be specified:

(19) $((\text{ADJ}\ \uparrow)\ \text{DEF}^*) =_c +$

The approach to definiteness spreading adopted here accounts for a phenomenon noted by Engelhardt (2000).She notes that there are environments (such as object of the preposition *tox* 'while') which allow indefinite but not definite NPs, yet do allow construct-state NPs with an embedded definite possessor, which are also ostensibly definite.

(20) a. ha- pixut be- šaar ha- dolar tox horada šel
the- devaluation in- rate the- dollar while decrease of
ha- ribit
the- interest
'The devaluation in the exchange rate of the dollar combined with the lowering of interest.'

b. *ha- pixut be- šaar ha- dolar tox ha- horada
the- devaluation in- rate the- dollar while the- decrease
šel ha- ribit
of the- interest

c. ha- pixut be- šaar ha- dolar tox horadat
the- devaluation in- rate the- dollar while decrease.CONSTR
ha- ribit
the- interest

Under the analysis proposed here, the relevant lexical constraint can be expressed in terms of the value of the local DEF.

(21) *tox*: $(\uparrow\ \text{OBJ}\ \text{DEF}) \neq +$

We need not assume, as Engelhardt does, that such facts force us to say that these nominals are unspecified for definiteness, as a feature copying approach to definiteness spread would lead us to assume.

10.3 Refining the analysis

We turn now to the question of what kind of element can appear as the possessor in the long construction and in the short construction; in the next section we will discuss issues of constituent order.

As noted earlier, not all possessor-like elements are equally grammatical in the short construction and the long one, either in Hebrew or in English. A constituent-structure-based approach, with the standard distinction between external arguments, internal arguments, and adjuncts, cannot make the kind of distinction necessary to account for the various possibilities.

An approach based on grammatical functions provides a more fine-grained approach to the syntactic analysis of arguments. Up to now, we have treated DEF as a second function which can be borne by the $\widehat{\text{GF}}$; while we take it to be universally true that $\widehat{\text{GF}}$ can also function as DEF, we must allow for other, language-specific, identities for DEF. This means that a "possessor" in the short construction bears the function DEF, but may or may not bear the function $\widehat{\text{GF}}$ (it could have some other locally licensed function). Conversely, a "possessor" in the long construction may bear the function $\widehat{\text{GF}}$, but may instead bear some other function which is marked with the same particle (*šel* in Hebrew) that marks $\widehat{\text{GF}}$. In fact, there is reason to believe that not all *šel*-marked elements bear the $\widehat{\text{GF}}$ function. This is because of the existence of what is often described as a third possessor construction in Hebrew: the doubled construction.

(22) #dodat- o šel ha- balšan
aunt- his of the- linguist
'the linguist's aunt'

We follow Engelhardt (2000) in analyzing this construction as agreement (optionally functioning as an incorporated pronoun). The suffix -o is an agreement affix for a $\widehat{\text{GF}}$ with the features [PERS 3, NUM SG, GEND M]. Agreement in possessor constructions in Modern Hebrew is stylistically marked, belonging to a higher register than the ordinary possessor constructions. However, speakers of Hebrew have clear intuitions about the grammaticality of the construction, and it can thus be used as a further indication of grammatical functions. Notably, there are some types of possessors which do not allow agreement, even when they allow both long and short constructions.

(23) a. kos kafe
cup coffee
'a cup of coffee'

b. kos šel kafe
cup of coffee

c. *kos- o šel kafe
cup- 3MSG of coffee

Since $\widehat{\text{GF}}$ is the subject-like argument function, it is natural to suppose that agreement on the noun is with its $\widehat{\text{GF}}$. (This is similar to Engelhardt's 2000 analysis, except that she expresses it in terms of a structural metaphor for the grammatical function $\widehat{\text{GF}}$.) We therefore conclude that dependent NPs which are incapable of triggering agreement do not bear the $\widehat{\text{GF}}$ function. Instead, we hypothesize that *kafe* here bears an oblique function used for containers and measures: OBL_{Con}; both Hebrew *šel* and English *of* can be used to mark the OBL_{Con} function. In Hebrew, although not in English, an element bearing the OBL_{Con} function is allowed to serve also as the DEF.

This behavior of container arguments contrasts, as we have seen, with the arguments of relational nouns like *doda*, which allow the full range of possessor constructions. Also allowing the full range of constructions are deverbal action nouns.

(24) a. ha- sgira šel ha- mankal et ha- misrad
the- closure of the- director ACC the- office
'the director's closure of the office'

b. sgirat ha- mankal et ha- misrad
closure.CONSTR the- director ACC the- office

c. sgirat- o šel ha- mankal et ha- misrad
closure- 3MSG of the- director ACC the- office

(25) a. ha- sgira šel ha- misrad alyedey ha- mankal
the- closure of the- office by the- director
'the closure of the office by the director'

b. sgirat ha- misrad alyedey ha- mankal
closure.CONSTR the- office by the- director

c. sgirat- o šel ha- misrad alyedey ha- mankal
closure- 3MSG of the- office by the- director

Under the analysis proposed by Falk (2001), the two variants of action nominals in Hebrew involve, respectively, a verb-like mapping of arguments and a noun-like mapping, mirroring the mixed nominal/verbal properties of these nominals. Under a verbal mapping, the Agent maps to $\widehat{\text{GF}}$ (called SUBJ in Falk 2001) and the Theme to OBJ, while in the nominal mapping, where the obj function is unavailable, the Theme maps to $\widehat{\text{GF}}$ and the Agent to an oblique function. In each case, the

argument mapped to $\widehat{\text{GF}}$ behaves as expected: allowing agreement and optionally taking on the DEF function.

The most interesting behavior, in both Hebrew and English, is exhibited by what we can call true possessors: NP dependents which bear a semantic relation of possessor to the larger NP. The exact nature of this possessor interpretation depends on the semantics of the head noun: it can be alienable possession, inalienable possession, or the causer of a result. As noted earlier, these arguments do not exhibit the same range of modes of expression as the types of "possessors" we have already discussed. In English, true possessors can be realized either as a prenominal 's element, bearing the function DEF, or as a postnominal element bearing double marking: both the particle *of* and the suffix *'s*.

(26) a. the teacher's bag
b. *a/that bag of the teacher
c. a/that bag of the teacher's

In Hebrew, the most natural realization of true possessors is in a *šel* phrase; i.e. the long possessor construction. The short construction (construct state) is associated with higher registers. The agreeing construction is also possible; as always, it too reflects a higher register.

(27) a. (ha-) tik šel ha- mora
(the-) bag of the- teacher
'the teacher's bag'
b. #tik ha- mora
bag the- teacher
c. #tik- a šel ha- mora
bag- 3FSG of the- teacher

In neither English nor casual Hebrew does the possessor display the behavior of a $\widehat{\text{GF}}$ argument. In English, $\widehat{\text{GF}}$ can be marked by *of* alone (without the additional *'s*), and in Hebrew (as in, presumably, every language) $\widehat{\text{GF}}$ can also be DEF. On the other hand, in formal Hebrew true possessors have all the properties of $\widehat{\text{GF}}$: they can be DEF and, crucially, they can trigger agreement. We propose, therefore, that true possessors are arguments which bear the $\widehat{\text{GF}}$ function in formal Hebrew but the OBL_{Poss} function in both English and casual Hebrew. In English, but not in Hebrew, an element bearing the OBL_{Poss} function can also bear the DEF function.

(28) a. English: *the teacher's bag*
Hebrew: not grammatical

$$\begin{bmatrix} & \begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'teacher'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{DEF} & \\ \text{OBL}_{Poss} & \\ \text{PRED} & \text{'bag<(}\uparrow\text{OBL}_{Poss}\text{)>'} \\ \text{NUM} & \text{SG} \end{bmatrix}$$

b. English: *the bag of the teacher's*
Hebrew: *hatik šel hamora*

$$\begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'bag<(}\uparrow\text{OBL}_{Poss}\text{)>'} \\ \text{NUM} & \text{SG} \\ & \begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'teacher'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{OBL}_{Poss} & \end{bmatrix}$$

c. Formal Hebrew: *tik hamora*
English and casual Hebrew: not grammatical

$$\begin{bmatrix} \text{PRED} & \text{'bag<(}\uparrow\widehat{\text{GF}}\text{)>'} \\ \text{NUM} & \text{SG} \\ & \begin{bmatrix} \text{DEF} & + \\ \text{PRED} & \text{'teacher'} \\ \text{NUM} & \text{SG} \end{bmatrix} \\ \text{DEF} & \\ \widehat{\text{GF}} & \end{bmatrix}$$

Within the context of an external/internal theory of arguments, this is unexpected. Within the context of the LFG theory of argument mapping (Lexical Mapping Theory or LMT), on the other hand, a $\widehat{\text{GF}}$~OBL alternation is natural: the $\widehat{\text{GF}}$ and OBL functions share the feature specification $[-o]$, and thus form a natural class.

Further study reveals that other types of nominal arguments exhibit other mapping properties. Space limitations preclude a full discussion,[11] but it is clear that the mapping of containers (and of true possessors in English and casual Hebrew) — oblique, not $\widehat{\text{GF}}$ — is mirrored in the mapping of other elements as well, such as Theme arguments of agent nouns and result nouns, Agent arguments of action nominals, and names. This contrasts, as we have seen, with the argu-

[11] It is possible that the inherent classification $[+r]$, unused in standard accounts of Lexical Mapping Theory, is used for arguments of nominals which cannot be realized as $\widehat{\text{GF}}$.

ments of relational nouns and the Theme arguments of action nominals, which map as $\widehat{\text{GF}}$ in English and all varieties of Hebrew.

As we have already seen, English and Hebrew differ in which nominal arguments (other that $\widehat{\text{GF}}$s) can bear the DEF function. This is what accounts for the contrasts between English and Hebrew in examples like (6)/(7). English allows Agents of action nominals and true possessors to be DEF, while Hebrew eschews those but allows other elements.

(29) a. English:
$(\uparrow \text{DEF}) = (\uparrow \widehat{\text{GF}}) \mid (\uparrow \text{OBL}_{Poss}) \mid (\uparrow \text{OBL}_{Agent})$

b. Hebrew:
$(\uparrow \text{DEF}) = (\uparrow \widehat{\text{GF}}) \mid (\uparrow \text{OBL}_{Con}) \mid (\uparrow \text{OBL}_{Theme}) \mid (\uparrow \text{OBL}_{Name})$

10.4 Constituent Order

We now turn to the ordering of subconstituents of the noun phrase.

The first relevant observation about ordering is that in the short construction the DEF must immediately follow the head noun. As we have seen, this is a natural position for an element determining the definiteness of the head. We will have no more to say about this ordering here.

In verbally-mapped action nominals, the element bearing the $\widehat{\text{GF}}$ function must precede all other arguments of the noun.

(30) a. ha- sgira šel ha- mankal et ha- misrad
the- closure of the- director ACC the- office
'the director's closure of the office'

b. *ha- sgira et ha- misrad šel ha- mankal
the- closure ACC the- office of the- director

This word order matches that found in clauses: the subject must precede the object. In the transformational literature this is taken to be a result of the unique structural position of the $\widehat{\text{GF}}$ in the specifier position of the NP (Siloni 1997) or an embedded VP (Borer 1999). This explanation of the word order is flawed for two reasons. In the first place, as discussed above for underived nouns, the proposed constituent structure is not confirmed by constituency tests. As argued by Falk (2001), both arguments are structurally adjoined to the NP. Secondly, it is not clear that a transformational theory can explain surface order without language-specific stipulations. Specifically, any order can be achieved by movement, and in comparing Hebrew with English it is necessary to account for the absence of movement from [SPEC, NP] to [SPEC, DP] in Hebrew and for its presence in English. (For example, Borer 1999 "assume[s] that Semitic does not have a [Spec, DP] position.")

Since movement can be invoked, blocked, or relegated to LF to derive whatever word orders are attested, there is no explanatory value to the proposed configuration.

In LFG, constituent order is taken to be a primitive property of constituent structures, one which has a status as a hierarchy defined on c-structure, just as the relational hierarchy is defined on f-structure and the thematic hierarchy on a-structure(Bresnan 1995). The requirement that the $\widehat{\text{GF}}$ precede other arguments is conceptually the alignment of the word-order hierarchy with the relational hierarchy, and is thus a natural requirement. This natural ordering restriction can be expressed in the syntax of Hebrew through the use of functional precedence (Dalrymple 2001): the specification of precedence restrictions by reference to the grammatical functions borne by the constituents.

(31) $\widehat{\text{GF}} \prec_f \text{AF}$ (where AF means "argument function")

Since the linear precedence rules are rules of Hebrew syntax, they apply in clauses as well as in NPs, ensuring that the same order obtains in both.

The ordering of arguments of concrete nouns and of nominally-mapped action nouns is less clear. Consider nominally-mapped action nominals.

(32) a. ha- sgira šel ha- misrad alyedey ha- mankal
the- closure of the- office by the- director
'the closure of the office by the director'

b. %ha- sgira alyedey ha- mankal šel ha- misrad
the- closure by the- director of the- office

The order in which the $\widehat{\text{GF}}$ (Theme) argument precedes the OBL_{Agent} (32a) is unquestionably grammatical. However, there is some disagreement about the status of the other order (32b): it is marked as ungrammatical by Borer (1999), but at least some speakers of Hebrew accept it (Edit Doron, personal communication).

In the case of concrete nouns with a Theme argument and a Possessor argument,[12] the Theme can be realized as the DEF of a construct, as in the following examples from Siloni (1997).

[12] We assume here that the Agent-like argument of picture nouns is a kind of possessor. Note that in English it is possible to express this as (i).

(i) the picture of flowers of the boy's

Since this double-marked form in English is a realization of the OBL_{Poss} function, we take this to be evidence in favor of such an analysis.

(33) a. tmunat ha- praxim šel ha- yeled
picture.CONSTR the- flowers of the- boy
'the boy's picture of the flowers'

b. *tmunat ha- yeled šel ha- praxim
picture.CONSTR the- boy of the- flowers

(34) a. targumey ha- odisea šel ha- sifriya
translations.CONSTR the- Odyssey of the- library
'the library's translations of the Odyssey'

b. *targumey ha- sifriya šel ha- odisea
translations.CONSTR the- library of the- Odyssey

This follows from our analysis: the Theme is mapped to $\widehat{\text{GF}}$ and the possessor to OBL_{Poss}. Since DEF can be identified in Hebrew with $\widehat{\text{GF}}$ but not with OBL_{Poss}, it is the Theme which appears as the sister of the construct-state head.[13] However, since nothing forces $\widehat{\text{GF}}$ to function as DEF, it should also be possible to have two *šel* phrases. It is here that the data begin to be unclear.

In the first place, double *šel* phrases are awkward at best. (Siloni 1997 marks the examples '?', a practice we will follow here.) This awkwardness renders the judgments less than clear. However, we predict that the order should be the same as in the short possessive, with the Theme ($\widehat{\text{GF}}$) preceding the possessor.

(35) a. ?ha- tmuna šel ha- praxim šel ha- yeled
the- picture of the- flowers of the- boy
'the pictures of the flowers of the boy's'

b. ?ha- targumim šel ha- odisea šel ha- sifriya
the- translations of the- Odyssey of the- library
'the translations of the Odyssey of the library's'

[13] Wintner (2000), in what he admits is a particularly permissive dialect, claims to accept both of the following:

(i) a. tmunat mišmar ha- layla šel rembrandt
picture.CONSTR watch the- night of Rembrandt

b. tmunat rembrandt šel mišmar ha- layla
picture.CONSTR Rembrandt of watch the- night
'Rembrandt's picture of the Night Watch'

The acceptability of (ib), claimed to be ungrammatical in Borer (1999), is unexpected under the analysis outlined here. It is possible that this dialect is more permissive about mapping true possessors to $\widehat{\text{GF}}$. Perhaps related to this is the fact that, when there is only one argument for a picture noun and it is in the construct, some speakers are more flexible than others in what relation they allow the DEF to have: some strongly prefer it to be the depicted entity, as we predict here (Borer 1999, who refers to *tmunat van gox* as "not fully ungrammatical"), while others also allow it to be the artist or the owner (Ritter 1988).

Abstracting away from the awkwardness of the double-*šel*, these appear to be basically grammatical (Siloni 1997 and others). Some speakers, but not all, allow the two arguments to be permuted.

(36) a. %ha- tmuna šel ha- yeled šel ha- praxim
the- picture of the- boy of the- flowers
'the pictures of the flowers of the boy's'

b. %ha- targumim šel ha- sifriya šel ha- odisea
the- translations of the- library of the- Odyssey
'the translations of the Odyssey of the library's'

Such examples are cited as grammatical by Shlonsky (1988), Borer (1999), and Wintner (2000). On the other hand, Siloni (1997) reports that not all speakers accept them.

An order in which an oblique argument (the Agent of nominally-mapped action nominals or the Possessor of a concrete noun) can precede the $\widehat{\text{GF}}$ is unexpected under our analysis as developed to this point, but is actually a natural extension. What distinguishes the constructions in which some speakers find this order possible is a mismatch between the hierarchy at a-structure (the thematic hierarchy) and the hierarchy at f-structure (the relational hierarchy). Speakers who allow both orders thus vacillate between aligning the linear order hierarchy with the f-structure relational hierarchy and aligning it with the a-structure thematic hierarchy. Using the standard LFG notation $\widehat{\theta}$ for the most prominent argument at a-structure, and using α for the a-structure–f-structure mapping, the linear precedence rule can be restated:

(37) $\widehat{\text{GF}} \prec_f \text{AF} \vee \alpha(\widehat{\theta}) \prec_f \text{AF}$

Using the symbol $\hat{\text{x}}$ as a cover term for an argument which is highest on either the relational hierarchy or the thematic hierarchy (i.e., either $\widehat{\text{GF}}$ or $\alpha(\hat{\theta})$), we can express this as:

(38) $\hat{\text{x}} \prec_f \text{af}$

Notably, transformational accounts have often resorted to movement to account for these ordering alternations; for example, Borer (1999) suggests that there is an optional reordering rule which operates in noun phrases but not in verb phrases. It is not clear how such a rule would be stated in the framework she assumes. Even if statable, such a rule is arbitrary; the LFG-based approach makes the existence of both ordering possibilities principled.

10.5 Conclusion

We have laid out in this paper an analysis of Hebrew nominal phrases based on the theoretical assumptions of LFG: a parallel constraint-based theory of syntax. We have shown that by shedding the strait-jacket of the assumptions of constituent-structure-based theories we can achieve an analysis which captures the insights of the transformational analyses but is at the same time more faithful to the surface facts of Hebrew and to the cross-linguistic facts.

By adopting a theoretical framework in which grammatical functions are represented as an autonomous dimension of syntax distinct from constituent structure, we have been able to account for both functional and distributional/constituency facts about Hebrew NPs.

References

Borer, Hagit. 1999. Deconstructing the construct. In K. Johnson and I. Roberts, eds., *Beyond Principles and Parameters*. Kluwer.

Bresnan, Joan. 1995. Linear order, syntactic rank, and empty categories: On weak crossover. In M. Dalrymple, R. M. Kaplan, J. T. M. III, and A. Zaenen, eds., *Formal Issues in Lexical-Functional Grammar*, pages 241–274. CSLI Publications.

Bresnan, Joan. 2001. *Lexical-Functional Syntax*. Blackwell.

Butt, Miriam, Tracy Holloway King, María-Eugenia Niño, and Frédérique Segond. 1999. *A Grammar-Writer's Cookbook.*. CSLI Publications.

Dalrymple, Mary. 1993. *The Syntax of Anaphoric Binding.*. CSLI Publications.

Dalrymple, Mary. 2001. *Lexical-Functional Grammar*. Academic Press. Syntax and Semantics Vol. 34.

Danon, Gabi. 2001. Syntactic definiteness in the grammar of Modern Hebrew. *Linguistics* 39:1071–1116.

Dobrovie-Sorin, Carmen. 2001. From DPs to NPs. Paper presented at the Antwerp Conference on From NPs to DPs, February, 2001.

Engelhardt, Miriam. 2000. The projection of argument-taking nominals. *Natural Language and Linguistic Theory* 18:41–88.

Falk, Yehuda N. 2001. Constituent structure and grammatical functions in the Hebrew action nominal. In M. Butt and T. H. King, eds., *Proceedings of the LFG01 Conference*, pages 83–103. CSLI On-line Publications.

Falk, Yehuda N. 2006. *Subjects and Universal Grammar: An Explanatory Theory*. Cambridge University Press.

Giorgi, Alessandra and Giuseppe Longobardi. 1991. *The Syntax of Noun Phrases: Configuration, Parameters and Empty Categories*. Cambridge University Press.

Haspelmath, Martin. 1999. Explaining article-possessor complementarity: Economic motivation in noun phrase syntax. *Language* 75:227–243.

Hazout, Ilan. 1995. Action nominalizations and the lexicalist hypothesis. *Natural Language and Linguistic Theory* 13:355–404.

Jackendoff, Ray. 1977. *Syntax*. MIT Press.

Ritter, Elizabeth. 1988. A head movement approach to construct-state noun phrases. *Linguistics* 26:909–929.

Ritter, Elizabeth. 1991. Two functional categories in noun phrases: Evidence from Modern Hebrew. In S. D. Rothstein, ed., *Perspectives on Phrase Structure: Heads and Licensing*, pages 37–62. Academic Press. Syntax and Semantics 25.

Sadler, Louisa. 2000. Noun phrase structure in Welsh. In M. Butt and T. H. King, eds., *Argument Realization*, pages 73–109. CSLI Publications.

Shlonsky, Ur. 1988. Government and binding in hebrew nominals. *Linguistics* 26:951–976.

Siloni, Tal. 1997. *Noun Phrases and Nominalizations: The Syntax of DPs*. Kluwer.

Wintner, Shuly. 2000. Definiteness in the Hebrew noun phrase. *Journal of Linguistics* 36:319–363.