## TWO FUNCTIONAL CATEGORIES IN NOUN PHRASES: EVIDENCE FROM MODERN HEBREW

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### 1. INTRODUCTION

A number of independent proposals, based on data from a variety of languages, have suggested that noun phrases, or at least some classes of noun phrases, contain one or more functional heads, and that these heads are parallel to COMP, INFL, or AGR in the sentential system (cf. Abney, 1987; Horrocks and Stavrou, 1987; Kornfilt, 1984; Reuland, 1983; Szabolcsi, 1987). In this article I provide evidence for two functional categories in noun phrases, based on the analysis of the three genitive constructions in Modern Hebrew. This proposal permits a unified account of these constructions and retains the structural parallelism between noun phrases and sentences originally captured in analyses that posited a nominal functional category analogous to INFL.

It will be argued that noun phrases are DPs, maximal projections of the functional category DET (determiner), and that the complement of DET is not NP, but rather the maximal projection of a second nonlexical category, which I call NUM.<sup>1</sup> I suggest that the head of this intermediate projection bears the number specification (singular or plural) of the noun phrase. Throughout the discussion I use the term NOUN PHRASE to refer to the maximal projection of a nonclausal

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- 37

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argument, regardless of its syntactic category, and abbreviations such as NP to specify a particular category.

This article is organized as follows: Section 2 provides evidence for DP, based on the analysis of one type of genitive construction, the simple construct state. Section 3 provides evidence for NUMP based on the analysis of a second type of genitive construction, the free genitive, and section 4 provides a unified analysis of the simple construct state and free genitive constructions. In section 5 the analysis is extended to account for the third type of genitive construction in Modern Hebrew, the clitic doubled construct state. In section 6, it is argued that the head NUM bears the number specification (singular or plural) of a full noun phrase and that the head N bears its gender specification (masculine or feminine). Finally, section 7 demonstrates that an analysis that assumes two distinct functional categories in Modern Hebrew noun phrases permits a straightforward account of the syntactic properties of quantifiers in this language.

### 2. SIMPLE CONSTRUCT STATE NOUN PHRASES: EVIDENCE FOR DP

In this section I provide evidence that noun phrases are maximal projections of a functional head, based on the analysis of the construct state construction. A construct state (henceforth CS) is a type of noun phrase containing a bare genitive phrase immediately following the head noun, that is, a genitive phrase that is not overtly case marked. CSs may be used to express any number of semantic relations between the head noun and the genitive phrase, including alienable and inalienable possession, theme source, qualification, and quantification. Some examples are given in  $(1)^2$ :

(1) a. parat ikar cow farmer

'a farmer's cow'

- b. *bat* rofa daughter doctor 'a doctor's daughter'
- c. *fir ha-cipor* song the-bird 'the bird's song'
- d. yaldey ha- gan
   children the-kindergarten
   'the children of the kindergarten'

As these examples show, the head noun precedes the genitive phrase in a CS. In a CS containing a derived nominal that takes two arguments, the word order is noun-subject-object (NSO), as illustrated in  $(2)^3$ :

# Functional Categories in Noun Phrases

(2) a. ahavat dan et ift- o love Dan ACC wife-his 'Dan's love of his wife'
b. axilat dan et ha- tapuax eating Dan ACC the-apple 'Dan's eating of the apple'

The surface order of constituents in the above examples provides little insight into the hierarchical structure; however, the examples in (3) show that a full noun phrase subject can bind an anaphoric object, but a full noun phrase object cannot bind an anaphoric subject.

(3) a. ahavat dan et acmo love Dan ACC himself
Dan's love of himself'
b.\*ahavat acmo et dan love self ACC Dan

I interpret this contrast as evidence that the subject asymmetrically c-commands the object in CSs. In Ritter (1988a), it is suggested that NSO order in CS noun phrases is parallel to VSO order in sentences in languages such as Welsh and Irish. In both cases the lexical head (N or V) raises to the functional head that governs it. The derivation of a CS is schematized in (4).

(4) Simple CS Noun Phrases (Preliminary Structure):



The hypothesis that the derivation involves movement of the lexical head permits a structure in which the subject asymmetrically c-commands the object in the noun phrase. The assumption that the landing site of the moved head is a functional category permits an analysis that observes the head movement constraint of Travis (1984).

(5) THE HEAD MOVEMENT CONSTRAINT

A head  $(X^0)$  can move only to the position of the head  $(Y^0)$  that properly governs it.

The question remains as to why head movement should apply in CSs. Let us assume that Hebrew CSs contain a phonetically null determiner  $(D_{ern})$  which is

constrained to assign genitive case to a noun phrase on its right. Movement of N to DET serves to identify the functional head of the noun phrase, which would not be visible otherwise. This proposal essentially extends Sproat's (1985) V-movement analysis of VSO word order in Welsh and Irish. According to this account, INFL is constrained to assign nominative case to the right in these languages, and consequently INFL must precede the subject. Movement of V to INFL, which is required to provide a morphological anchor for INFL, derives VSO word order.<sup>4</sup>

Another defining characteristic of CSs is that they never have a definite determiner (ha) in initial position. This is shown by the contrast between (6a) and (6b,c). Note that definite non-CS noun phrases do contain the definite article in initial position, as exemplified in (6d).

(6) a. beyt ha-mora

house the-teacher 'the teacher's house'

- b.\**ha- beyt ha-mora* the-house the-teacher
- c.\**ha- beyt mora* the-house teacher
- d. ha- bayit
- the-house
- 'the house'

The hypothesis that CSs are DPs headed by  $D_{gen}$  permits an explanation of this fact. Following Abney (1987), I analyze the definite article as a DET that does not assign genitive case. One consequence of the claim that  $D_{gen}$  and *ha* are both DETs is that they appear in complementary distribution. In other words, the reason that *ha* cannot appear as the first element in a construct state DP is that this position is filled by the abstract case assigner  $D_{gen}$ . The phonological alternation exhibited by the noun in (6a–c) versus (6d), that is, *beyt* versus *bayit* 'house' might be construed as independent evidence for  $D_{gen}$  because the phonological changes serve to make the features of this functional element visible. In other words,  $D_{gen}$  is comparable to morphemes in certain tone languages that consist solely of floating tones that attach to a phonological host.<sup>5</sup>

In Hebrew, modifying adjectives always agree in definiteness, as well as number and gender, with the noun they modify. Definiteness agreement is indicated by the presence or absence of a copy of the definite article on the AP, as exemplified in  $(7)^6$ :

(7) a. yeladim nexmad-im garim alyadenu children nice-MASC-PL live beside-us 'Nice children live beside us.' b. *ha-yeladim ha-nexmad-im garim alyadenu* the-children the-nice-MASC-PL live beside-us 'The nice children live beside us.'

Adjectives modifying the head noun of a CS are marked as definite whenever the genitive phrase is also definite, as illustrated in (8):

 (8) a. kaniti et simlat ha-cemer ha-yafa bought-I ACC dress the-wool the-pretty 'I bought the pretty dress of wool.'

b.\*kaniti et simlat ha-cemer yafa

**Functional Categories in Noun Phrases** 

- c. kaniti simlat cemer yafa bought-I dress wool pretty
  'I bought a pretty dress of wool.'
- d.\*kaniti simlat cemer ha-yafa

This suggests that the definiteness of a CS noun phrase is determined by the definiteness of the genitive phrase.<sup>7</sup> When the genitive phrase is itself a CS the more embedded genitive phrase will determine the definiteness of both containing DPs. In fact, in multiply embedded CSs, all DPs are interpreted as definite if the most embedded genitive phrase is definite, that is, if the most embedded genitive phrase is definite, that is, if the most embedded genitive phrase is a pronoun, a proper name, or a full noun phrase headed by the definite article (*ha*). For example, the CS in (9) is definite because the most embedded genitive phrase, *ha-mora* 'the teacher', is definite. This is shown by the fact that the adjective *famen* 'fat', which modifies the head noun, must be overtly marked as definite.<sup>8</sup>

(9) a. ben xaverey ha-mora ha-famen higia son friends the-teacher the-fat arrived 'The fat son of the teacher's friends arrived.' b.\*ben xaverey ha-mora famen higia son friends the-teacher fat arrived

One way to interpret this fact is to view definiteness as a feature that a DP headed by  $D_{gen}$  acquires from its genitive phrase. It seems reasonable to assume that the definiteness specification must be contributed by another element in the construct state DP because the head of the projection is is not inherently specified for this feature. The NP complement of  $D_{gen}$  is not inherently specified for definiteness either, although it does have its own number and gender specification. Consequently, a mechanism of SPEC—head agreement between the genitive phrase in [SPEC, NP] and N permits N to acquire the definiteness specification of its specifier. Subsequent movement of N to DET can convey this specification to the head of DP, from which point it percolates to the maximal projection.<sup>9</sup>

42

Elizabeth Ritter



### 3. FREE GENITIVE NOUN PHRASES: EVIDENCE FOR A SECOND FUNCTIONAL CATEGORY

The hypothesis that noun phrases are maximal projections of the functional category DET permits an account of simple CSs; however, the assumption that DET selects NP as its complement is problematic for the free genitive construction (henceforth FG), illustrated in  $(11)^{10}$ :

- (11) a. *ha- bayit fel ha- mora* the-house of the-teacher 'the teacher's house'
  - b. bayit fel ha-mora house of the-teacher 'a house of the teacher's'
  - c. *ha- axila fel dan et ha- tapuax* the-eating of Dan ACC the-apple 'Dan's eating of the apple'

These examples show that there is an overt genitive case marker (fel) immediately preceding the possessor in this construction. Example (11a) establishes that the definite determiner (ha) may appear in initial position in a FG noun phrase. Example (11b) indicates that a FG is interpreted as indefinite if it does not contain an initial determiner, even when the genitive phrase is definite. In other words, it is the presence or absence of ha in initial position that determines

#### **Functional Categories in Noun Phrases**

whether or not a FG noun phrase is definite. Example (11c) shows that the word order of an argument taking nominal is still NSO.

The examples in (12) indicate that the binding relations between the subject and the object are the same as in the simple CS construction. This suggests that, just as in CS noun phrases, the subject asymmetrically c-commands the object in the FG construction.

(12) a. ha-ahava fel dan et acmo the-love of Dan ACC himself
\*Dan's love of himself
b.\*ha-ahava fel acmo et dan the-love of himself ACC Dan

Recall that NSO order in CSs arises by movement of N to DET. I posited a phonetically null genitive case assigner as the head of a construct state DP to account for the fact that a CS noun phrase is never headed by the definite determiner. As a free genitive DP may be headed by the definite determiner, NSO order cannot be derived by raising N to  $D_{gen}$  in this context. Moreover, the presence of the overt case marker *fel* on the subject suggests that genitive case is assigned by some means other than  $D_{gen}$  in the FG construction.

Nevertheless, the subject-object asymmetry suggests that the surface order is derived by N movement. Let us suppose the FG construction is derived by raising N, but not to the head of DP. Assuming that the head movement constraint applies in FG noun phrases leads to the postulation of another landing site for N, that is, another head position intermediate between DP and NP. Example (13) shows the derivation of (11c), with this intermediate category labeled NUM.

(13) ha-axila fel dan et ha tapuax<sup>11</sup>
 'Dan's eating of the apple'



As can be seen from this structure, the subject in a FG noun phrase is realized in [SPEC, NP]. Following Borer (1984), I analyze fel as a dummy case marker

and not a preposition because it does not affect the c-command relations between its noun phrase complement and other arguments of the derived nominal. This treatment of *fel* assumes that the presence or absence of an overt case marker does not affect the c-command relations between noun phrases because a case marker, unlike a preposition, is inside the maximal projection of the noun phrase it case marks. For the purposes of this analysis, it is irrelevant whether *fel* is the realization of case assigned by N or whether it is inserted in a particular structural configuration, that is, in [SPEC, NP]. The first proposal extends the account of English *of* proposed by Chomsky (1986), and the second suggests a treatment comparable to the one Chomsky proposes for English prenominal genitive 's.

Summarizing the results of this analysis thus far, I have claimed that Modern Hebrew has two distinct genitive case assigning strategies, insertion of the case marker *fel* and structural case assignment by  $D_{gen}$ , either of which may be used to license a genitive noun phrase. In section 4 it will be demonstrated that the observed differences between the FG and the CS constructions derive from the mechanism of genitive case assignment used. Moreover, the claim that genitive case may be assigned in either of two ways leads to the prediction that a single DP may contain both genitive case assigners. In section 5 it will be argued that this is precisely what happens in clitic-doubled CSs.

### 4. A UNIFIED ANALYSIS OF CONSTRUCT STATE AND FREE GENITIVE NOUN PHRASES

According to the analysis presented thus far, CS noun phrases contain only the functional projection, DP, whereas FG noun phrases contain both DP and NUMP. In this section I adduce evidence, based on the order of adjectives relative to the head noun and its arguments, that all Hebrew noun phrases contain an NUMP projection.<sup>12</sup>

Adjectives modifying an argument-taking nominal in a CS follow the subject but precede the object<sup>13</sup>:

- (14) Construct State: N Subj (A) Obj
  - a. ?? axilat dan ha-menumeset et ha- uga eating Dan the-polite ACC the-cake 'Dan's polite eating of the cake'
  - b. \* axilat dan et ha- uga ha- menumeset eating Dan ACC the-cake the-polite

Now consider the FG examples in (15). Adjectives appear between the head noun and the subject in this construction.

#### **Functional Categories in Noun Phrases**

- (15) Free Genitive: DET N (A) Subj Obj
  - a. *ha- axila ha- menumeset fel dan et ha- uga* the-eating the-polite of Dan ACC the-cake 'Dan's polite eating of the cake'
  - b.\**ha-axila fel dan ha-menumeset et ha-uga* the-eating of Dan the-polite ACC the-cake 'Dan's polite eating of the cake'

To account for these facts, I assume that adjectives are base-generated as NP adjuncts and that they always remain in their D-structure position throughout the derivation. The surface order is derived by moving the head N across the adjective to NUM in both the CS example of (14) and the non-CS example of (15). In the CS, N+NUM subsequently raises to DET, but in the FG, there is no need for further head movement. On analogy with accounts of V movement to the head of AGRP and TP, I assume that movement of N is required for reasons of morphological well-formedness or to avoid violations of syntactic constraints. For example, when a given functional head is an affix, movement of a lexical head provides a stem for it to be attached to.

The fact that adjectives follow the subject in the CS follows from the assumption that the argument raises from [SPEC, NP] to [SPEC, NUMP] in the course of the S-structure derivation. This movement is motivated by case considerations. Specifically, if the subject is to receive structural case from  $D_{gen}$ , it must be string adjacent to this genitive case assigner. Retaining the assumption that  $D_{gen}$  is constrained to assign Case rightward provides an explanation for the fact that subject raises to [SPEC, NUMP] and not [SPEC, DP] to get Case. The structure of the CS noun phrase in (14a) is depicted in (16).<sup>14</sup>

(16) axilat Dan ha-menumeset et ha-uga 'Dan's polite eating of the cake'



**Functional Categories in Noun Phrases** 

In the FG construction, on the other hand, the subject remains in its D-structure position, that is, in [SPEC, NP]. The structure of the FG noun phrase in (15a) is depicted in (17).





There is no difference in meaning between the CS and FG constructions. Therefore, I suggest that the differences in the surface realization are simply a consequence of which genitive case-assignment strategy is applied to the subject of the noun phrase.

The discussion in this section has been concerned with the structure of noun phrases containing derived nominals, such as *axila* 'eating', and their  $\theta$ -marked arguments; however, the conclusions drawn from this data provide no insight into the structural position of possessors of primitive nouns. In the remainder of this section, I suggest that the bare genitive phrase in a CS is always realized in [SPEC, NUMP], regardless of its semantic relation to the head noun, but that possessors case marked by *fel* do not occur in the same position as  $\theta$ -marked subjects.

It seems reasonable to assume that the bare genitive phrase occupies [SPEC, NUMP] position in all CS noun phrases because of the adjacency requirement on structural case assignment by  $D_{gen}$ . A second consideration is the fact that a bare genitive phrase will always precede adjectives modifying the head noun in a CS. For example, the contrast in (18) shows that a bare possessor must precede the adjectives modifying the head noun. This is consistent with the claim that the possessor is realized in [SPEC, NUMP].

(18) Construct State: N POSS (A)

a. *beyt ha-mora ha-gadol* house the-teacher the-big 'the teacher's big house'

### b.\*beyt ha- gadol ha- mora house the-big the-teacher

A third reason to suppose that all bare genitive phrases are realized in [SPEC, NUMP] is the fact that the definiteness of the CS is invariably determined by the definiteness of its genitive phrase. If this is a consequence of SPEC-head agreement, then the genitive phrase must be in the specifier of some projection. Given the case considerations noted above, the genitive phrase must be in [SPEC, NUMP]. If we assume further that a genitive phrase that is not  $\theta$ -marked by N is base generated in [SPEC, NUMP], then the account of the definiteness specification in CSs must now be modified. Specifically, if the genitive phrase is in [SPEC, NUMP] rather than [SPEC, NP], then SPEC-head agreement between the genitive phrase and NUM, rather than N, permits the construct state DP to acquire a specification for the feature definiteness.

In FG noun phrases, on the other hand, there is little evidence that possessors are realized in the same position as  $\theta$ -marked arguments, that is, [SPEC, NP]. First, case assignment by *fel* does not impose the same structural constraint on the possessor as case assignment by  $D_{gen}$ . Although there may be only one bare genitive phrase for each construct state DP, there may be multiple *fel* phrases:

(19) ha-tmuna fel ha-yalda fel ha-mora the-picture of the-girl of the-teacher 'the picture of the girl of the teacher'

In Ritter (1988a), possessors such as *fel ha-mora* are analyzed as base-generated KPs that are adjoined to the right periphery of the containing DP.<sup>15</sup> This analysis also predicts that possessors will follow adjectives. The examples in (20) show that this prediction is borne out.

(20) a. ha-bayit ha-gadol fel ha-mora the-house the-big of the-teacher 'the teacher's big house'
b.\*ha-bayit fel ha-mora ha-gadol the-house of the-teacher the-big

Finally, as shown in Ritter (1988a), this analysis gains support from the existence of CS picture noun phrases such as (21), which contain both a bare genitive theme and a possessor case marked by *fel*.

(21) *tmunat ha-yalda fel ha-mora* picture the-girl of the-teacher 'the teacher's picture of the girl'





Note that this modification implies that there are two sources of fel: This case marker is either the realization of case assigned by N to an argument inside NP or the head of a DP adjunct.

### 5. CLITIC-DOUBLED CONSTRUCT STATE NOUN PHRASES

If the existence of two synonymous genitive constructions is due to the fact that Modern Hebrew has two distinct genitive case-assigning strategies, both of which are freely available, then in principle there should be a third genitive construction in the language, one that simultaneously employs both case-assigning strategies. In this section I suggest that clitic doubled construct states (doubled CS) arise when both genitive case-markers are present in the same noun phrase.

The doubled CS construction is illustrated in (22). A comparison of (22a) and (22b) shows that doubled CSs never contain an initial determiner. In this respect clitic-doubled CSs are like the simple CSs discussed above. They are distinguished from simple CSs by the appearance of *fel* before the subject/possessor, and by the appearance of a pronominal clitic suffixed to the head noun. This clitic has the same person, number, and gender features as the full noun phrase subject/possessor. In (22a), for example, the clitic -o manifests the features third person, masculine, and singular to agree with *dan*, and in (22a'), the clitic -a manifests the features third person, feminine, and singular to agree with *sara*.

(22) a. beyt -o fel dan house -his of Dan 'Dan's house' a'. beyt -a fel sara house -her of Sara 'Sara's house'

#### Functional Categories in Noun Phrases

b.\*ha-beyt -o fel dan the-house-his of Dan b'.\*ha-beyt -a fel sara the-house-her of Sara

Example (23a) shows that clitic-doubled CSs also manifest NSO order. The contrast between (23a) and (23b) indicates that the adjective *ha-menumeset* 'polite' must precede the subject, as in the FG construction.

(23) a. axilat-o ha-menumeset fel dan et ha-uga eating-his the-polite of Dan ACC the-cake 'Dan's polite eating of the cake'
b.\*axilat-o fel dan ha-menumeset et ha-uga eating-his of Dan the-polite ACC the-cake

From the fact that the head noun has the construct form (beyt) rather than the free form (bayit), and from the fact that doubled CSs never contain an initial determiner, I infer that N(+NUM) raises to DET in this construction. From the fact that the subject of a doubled CS precedes the object, but follows any modifying adjectives, and from the fact that it is case marked by *fel*, I infer that the subject is realized in its D-structure position, that is, in [SPEC, NP].

In short, the doubled CS construction is a hybrid: it has the subject of a FG noun phrase and the head of a CS. The full noun phrase subject receives genitive case in its D-structure position from *fel*, just as in the FG construction. In addition, there is movement of N+NUM to  $D_{gen}$ , which occurs only in CS constructions. Let us assume that  $D_{gen}$  has a case that it must discharge. For the derivation to be licit, there must be an element that absorbs the case assigned by this head. The pronominal element, which is realized as a clitic on the head of the DP, serves this purpose.

Before providing a structure for the clitic-doubled CS, it should be pointed out that pronominal subjects of simple CSs are also realized as clitics on the head noun, as illustrated in (24):

(24) a. beyt -a house-her 'her house'
b. axilat -o et ha-tapuax eating-his ACC the-apple 'his eating of the apple'

Following Borer (1984), I assume that pronominal clitics are base generated on the lexical head of the noun phrase.<sup>16</sup> From this assumption, it follows that these elements never appear in a position to receive genitive case from *fel*; that is, they are never realized in [SPEC, NP] or adjoined to DP. However, they may receive genitive case from  $D_{gen}$ , as a consequence of movement of N (through NUM) to DET, in the simple CS. In addition, I adopt Borer's claim that the clitic is coin-

#### **Functional Categories in Noun Phrases**

### Elizabeth Ritter

dexed with a complement of N. In the framework of the current analysis this means that the pronominal clitic is coindexed with an empty category in [SPEC, NP] or adjoined to DP.

The major difference between a simple CS containing a pronominal subject and a clitic-doubled CS is the presence of a second genitive case-assigning mechanism which permits the realization of two overt genitive case-marked elements. In the clitic-doubled CS, the clitic on N absorbs the case assigned by  $D_{gen}$ , and the full noun phrase is case marked by *fel*. Note that the assumption that the pronominal clitic is coindexed with the full noun phrase accounts for the feature matching between them. Thus, the structure I attribute to (23a) is given in (25).

(25) axilat-o ha-menumeset fel Dan et ha-uga 'Dan's polite eating of the cake'



In short, the three genitive constructions in Hebrew have essentially the same D-structure. The S-structure differences with respect to the position of the lexical head and its subject may be attributed to the case-assigning strategy or strategies employed in each construction.

### 6. ON THE CONTENT OF THE FUNCTIONAL CATEGORY NUM

In this section I provide motivation for analyzing the functional head between DET and N as number (NUM). I argue that this head is, inter alia, the locus of the number specification (singular or plural) of the noun phrase, but not of the grammatical gender (masculine or feminine). This approach concords with the intuition that, in a language with grammatical gender, one of the properties that must be learned when learning a new noun is whether that noun is masculine or feminine. On the other hand, it is not necessary to learn whether the noun is singular or plural.<sup>17</sup> The discussion in this section is based on the assumption that functional projections may be headed by inflectional affixes that are attached to

the lexical stem in the syntax as a consequence of head movement, as illustrated schematically in (26). Derivational elements, on the other hand, are affixed in the lexicon.<sup>18</sup>



The evidence will show that, with respect to nouns, number is an inflectional affix whereas gender, and in particular feminine, is a derivational affix.

Hebrew distinguishes two grammatical genders (masculine and feminine) and two numbers (singular, plural). The table in (27) depicts the various suffixes that are attached to nouns bearing these grammatical features.

(27) Nominal Inflection in Hebrew

	Singular	Plural	
Feminine Masculine	-et, -it, -a(t)	-ot -im	

Although -et, -it, and a(t) are generally analyzed as feminine, singular suffixes, I argue that they manifest gender, but not number. I suggest that these feminine affixes are interpreted as singular by default because they are not overtly marked for plural.

Bat-El (1986) argues that feminine marking is derivational on nouns, but inflectional on verbs and adjectives. The first piece of evidence indicating that Hebrew feminine suffixes are derivational is the fact that they may be used to derive new words. For example, the addition of a feminine suffix (-*it*, -*et*, or -*a*) to a masculine noun stem derives a distinct noun. On the other hand, the addition of a plural suffix (-*im*) or (-*ot*) simply derives the plural of the base noun<sup>19</sup>:

(28)	Masculine	Nouns - Fen		ninine Nouns	
	maxsan	'warehouse'	maxsan-it	'magazine'	
	maxsan-im	'warehouses'	maxsani-ot	'magazines'	
	magav	'wiper'	magev-et	'towel'	
	magav-im	'wipers'	magav-ot	'towels'	
	amud	'page'	amud-a	'column'	
	amud-im	'pages'	amud-ot	'columns'	

Bat-El (1986) also demonstrates that the feminine affixes are often analyzed as part of the base form of a noun from which a new verb is derived. For example,

the verb *tixnet* 'to program' is derived from the feminine noun *toxnit* 'program' by extraction of the root consonants t, x, n as well as the consonant t from the feminine suffix *-it*. (Note that the related masculine noun *toxen* 'content' contains the same root consonants, but lacks the feminine suffix.) However, the plural affixes, *-im*, and *-ot*, are always ignored for purposes of extraction. This is expected given the assumption that the latter are inflectional rather than derivational because, as Bat-El points out, extraction is restricted to derivational material.

Additional evidence that the feminine suffix is derivational may be gleaned from the fact that the morphology of the gender marker (-a, -it, or -et) is unpredictable. The examples in (29), which are also due to Bat-El (1986), show that semantically distinct nouns can be derived from the same stem by the affixation of different feminine suffixes.

(29)	Stem-a		Stem-it	
	a. txun-a	feature	txun-it	'feature (linguistics)'
	b. mexon-a	machine	mexon-it	'car
	с. beyc-a	'egg'	beyc-it	'ovum'
	d. toxn-a	'program (computers)'	toxn-it	ʻplan'

The feminine markers have no inherent semantic content, so the meaning of these derived forms is not compositional. For example, the meaning of *txunit* 'linguistic feature', which is derived by the addition of -it, is more specific than the meaning of *txuna* 'feature', which is derived by the addition of -a. On the other hand, the meaning of *toxna* 'computer program', which is derived by the addition of -a, is more specific than the meaning of *toxna* 'term 'program', which is derived by the addition of -a.

Hebrew also has feminine nouns that bear no gender marking whatsoever:

0)	a. <i>femef</i>	'sun'
	b. beten	'stomach'
	c. xacer	'yard'
	d. <i>ef</i>	'fire'
	e. even	'stone'

(3

The unpredictability that characterizes the morphological form of gender marking on nouns does not extend to adjectives and verbs, both of which acquire their number and gender features by agreement. Regardless of whether a feminine noun is overtly marked as feminine, it will trigger overt feminine agreement on these lexical items, and the shape of this agreement will be predictable from the morphology of the base verb or adjective to which it attaches<sup>20</sup>:

#### Functional Categories in Noun Phrases

- (31) a. ha-mexon-a/ha-magev-et/ha-even nofel-et kol ha-zman the machine/the towel /the stone fall-FEM-SNG all the-time 'The machine/towel/knife is always falling.'
  - b.\*ha-mexon-a/ha-magev-et/ha-even nofel kol ha-zman 'the machine/the towel /the stone fall(MASC-SNG) all the-time.'
  - c. toxn-a /toxn-it/xacer gdol-a program/plan /yard big-FEM-SNG 'a big program/plan/yard'
    d.\*toxn-a /toxn-it/xacer gadol
  - program/plan /yard big(MASC-SNG)

This systematic difference between nouns and adjectives/verbs follows from the assumption that nouns are inherently specified for gender, but verbs and adjectives obtain their gender specification by agreement. Consequently, this feature will be generated on the lexical head (N) of a nominal projection, but on a functional head (AGR) of a verbal or adjectival projection.

Nouns that are derived by affixation of a feminine marker have their own lexical entry. This lexical entry includes a gender specification, which may be distinct from that of the base form. On the other hand, plural forms of nouns are derived in the syntax by amalgamation of N and NUM. This account assimilates the affixation of plural marking on nouns to the affixation of tense and agreement on verbs.

Until now, the discussion has focused on the gender specification of the lexical category N. In the remainder of this section, it will be argued that NUM affixes are not specified for gender. The fact that Hebrew has both a masculine plural suffix and a feminine plural suffix poses a challenge to this claim. One might argue that the existence of two distinct plural forms shows that gender is specified both on the noun stem and on the plural affix. This proposal makes two predictions. First, feminine nouns will always co-occur with feminine plural markers. Second, assuming that Hebrew nouns are right-headed, it will be the gender of NUM rather than the gender of the stem that determines the gender of the derived form. Neither prediction is supported by the data. First, some masculine nouns exceptionally select the feminine plural. Second, the gender of the stem, not the plural marker, is the one that triggers agreement on adjectives or verbs, as shown in (32):

(32) a. *fan-im* 

year-FEM-PL good-FEM-PL \*fan-im tov-im year-FEM-PL good-MASC-PL

tov-ot

52

b. xalon-ot gdol-im window-MASC-PL big-MASC-PL \*xalon-ot gdol-ot window-MASC-PL big-FEM-PL

Summarizing the results of this discussion, the evidence indicates that plural affixes are inherently specified for number and that nouns are inherently specified for gender in Modern Hebrew. As this language has no overt singular suffixes, I shall assume that a singular noun phrase has an empty category in the head of NUMP that is interpreted as singular by default. Raising of N to NUM serves only to license the null head in this context. In section 7, it will be shown that overt NUMs that are not inherently specified as singular or plural are also grammatically singular when they take an NP complement. As these overt NUMs are independent words that do not need to be morphologically anchored by a lexical head, I suppose that in this context N remains in its D-structure position throughout the derivation.

It should also be pointed out that this distribution of features does not hold for other types of noun phrases. For example, Abney (1987) argues that pronouns are DPs that contain no NP projection; that is, they contain only the functional head, DET. On this analysis person, number, and gender features are all specified on the same functional head. Assuming two functional heads in noun phrases, Ritter (1988b) suggests that pronominal features may be borne by both DET and NUM. In the next section, it will be demonstrated that NUMs that lack an NP projection obtain their gender specification from a DP in [SPEC, NUMP].

### 7. QUANTIFIERS AS NUMs

Hebrew has a class of quantifiers that may head simple CSs, but not doubled CSs or FGs, as illustrated in (33). The syntactic differences between this class of quantifiers and nouns follow straightforwardly from the assumption that the former are NUMs, rather than Ns (or DETs).<sup>21</sup> In particular, it will be argued that both the unavailability of case assignment by *fel* and the lack of inherent gender specification on quantifiers may be attributed to the fact that they are functional, rather than lexical heads.

(33) a. kol ha-yeladim	(CS)
all the-boys	
b.*kol fel yeladim	(FG)
all of boys	
c.*kul-am fel ha-yeladim	(doubled CS)
all -them of the-boys	

CSs headed by these quantifiers manifest many of the same properties as CSs headed by nouns. First, the definite determiner may not appear in initial position. Compare (34) with (33a).

(34) \*ha-kol (ha-)yeladim the-all (the-)children

**Functional Categories in Noun Phrases** 

Second, the definiteness of a quantifier CS is determined by the definiteness of the genitive DP, as shown in (35).

(35) a. fney yeladim gdolim

two boys big 'two big boys'
b. *fney ha- yeladim* two the-boys 'the two boys'

As observed earlier, the genitive subject/possessor of a nominal CS may be realized as a pronominal clitic on the head of the DP. Alternatively, the genitive phrase of a nominal CS may itself be a CS. The following examples demonstrate that quantifier CSs can take the same range of genitive complements. In other words, the quantified element in a quantifier CS may be a pronominal clitic as in (36a) or an embedded CS as in (36b).

(36)	а.	kul-am	a'.	beyt-am
		all-3MASC-PL		house-3MASC-PL
		'all of them'		'their house'
	b.	kol yaldey ha-kita	b'.	beyt xaver ha-mora
		all boys the-class		house friend the-teacher
		'all the boys in the class'		'the teacher's friend's house'

The hypothesis that quantifiers are of the functional category NUM rather than N permits an account of these facts. I propose that *kol* 'all' in (33a) and *fney* 'two' in (35) are NUMs that take no lexical complement, that is, no NP. One consequence of this suggestion is that the quantifiers will never appear with a genitive phrase licensed by case assignment via *fel* insertion because this case-assignment strategy applies only to arguments inside the NP projection or to possessors, and the quantified noun phrase is neither. Therefore, neither FGs nor clitic-doubled CSs may be headed by a quantifier. The fact that simple quantifier CSs are possible suggests that quantifier CSs are headed by D<sub>gen</sub>, just like nominal CSs. This assumption accounts for the unavailability of an initial determiner in both cases. Let us also suppose that the genitive phrase is realized in [SPEC, NUMP] in quantifier CSs are NP projection, it follows that the genitive phrase must

be base generated in its S-structure position. The structure I attribute to the quantifier CSs in (34b) is depicted in (37).



The account of the definiteness specification developed for nominal CSs mentioned in section 4 can be extended to quantifier CSs. Recall that it was suggested that a construct state DP gets its definiteness specification from the genitive phrase in [SPEC, NUMP] via SPEC-head agreement between this DP and the head, NUM, and subsequent adjunction of NUM to D. As the genitive phrase of a quantifier CS is in the same position as the genitive phrase of a nominal CS, I assume that the same mechanism is used to provide the definiteness specification in both cases.

In section 6, I argued that in full noun phrases, NUM bears the number specification and N bears the gender specification. As quantifier CSs contain no NP projection, they should not be inherently specified as masculine or feminine. The evidence suggests that quantifier CSs are specified for gender because they can function as subjects, in which case they trigger gender agreement on the predicate. Moreover, the gender specification is determined by the gender of the genitive phrase of the CS, as shown by the following examples.

- (38) a. *kol ha-yeladim ohav-im* /\*ohav-ot glida all the-boys love-MASC-PL/\*love-FEM-PL ice cream 'All the boys love ice cream.'
  - b. kol ha-yeladot ohav-ot /\*ohav-im glida all the-girls love-FEM-PL/\*love-MASC-PL ice cream 'All the girls love ice cream.'

Thus, it seems reasonable to assume that a quantifier construct state DP acquires its specification for both these features by the same mechanism of SPEC-head agreement.

In fact, there is evidence that the quantifier kol also agrees with its subject in number in CSs.<sup>22</sup> In other words, it appears that the quantifier kol triggers plural agreement when it occurs with a plural quantified noun phrase and singular

#### Functional Categories in Noun Phrases

agreement when it occurs with a singular quantified noun phrase. Compare the examples in (38) with those in (39):

- (39) a. kol ha-gdud ohev /\*ohavim all the-unit(MASC-SNG) love-MASC-SNG/\*love-MASC-PL glida ice cream 'The whole unit loves ice cream.'
  b. kol ha-kita ohevet /\*ohavot glida
  - all the class(FEM-SNG) love-FEM-SNG/\*love-FEM-PL ice cream 'The whole class loves ice cream.'

Given the analysis to this point, it appears that some NUMs select a complement (e.g., plural affixes select NP) and other NUMs select a subject (e.g., quantifiers select DP). The examples in (40) show that the quantifier *kol* may also select an NP complement. Note that in these examples *kol* is glossed as 'every' rather than 'all/whole'.

(40) a. kol (\*ha-) yeled ohev glida every (\*the-) boy love-MASC-SNG ice cream 'Every boy loves ice cream.'
b.\*kol yeladim ohavim glida every boys love-MASC-PL ice cream

These examples differ from those in (37) and (38) in that the quantified element is singular and indefinite. This is exactly what one would expect if *kol* is NUM that selects an NP complement<sup>23</sup>:



Note also that the analysis of *kol* as NUM predicts that the quantifier may cooccur with either the definite determiner or  $D_{gen}$ . Although the definite determiner is not possible in examples such as (41), it may appear when the quantifier has neither a complement NP nor a DP specifier. In this context the quantifier DP is interpreted as 'everything':

(42) dani axal et ha-kol Dani ate ACC the-all 'Dani ate everything.'

Finally, it has been suggested that one of the characteristics of functional heads is that they include closed-class lexical items, such as complementizers and determiners. As quantifiers are also closed-class items this criterion indicates that they should be analyzed as functional rather than lexical heads. The hypothesis that the quantifiers *kol* and *fney* are of the category NUM rather than DET permits a principled account of the distribution of these elements and the properties of the constituents that contain them.

### 8. CONCLUSION

In conclusion, I have provided evidence for the existence of two distinct functional categories in Modern Hebrew noun phrases based on the analysis of three genitive constructions. Both functional projections are motivated, in part, by a head movement analysis of derived word order. One feature is associated with each syntactic head in the noun phrase; N is specified for gender (masculine or feminine), NUM for number (singular or plural), and DET for definiteness (definite or indefinite). In the absence of an inherent specification for any given feature, a CS noun phrase may still be well formed if it can acquire a feature specification by SPEC-head agreement with a bare genitive phrase.

### ACKNOWLEDGMENTS

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### NOTES

<sup>1</sup>Lamontagne and Travis (1986) have argued that noun phrases are in fact KPs, maximal projections of the category K(ase). They claim that KP is the noun phrase counterpart of CP, the maximal projection of a clause. Pursuing this analogy, the functional categories

#### Functional Categories in Noun Phrases

investigated in the present work are analogous to inflectional projections, TP and AGRP, proposed by Pollock (1989).

<sup>2</sup> In fact the head noun forms a phonological word with the head of the genitive phrase with which it is in construct. As a consequence of the compounding process, some nouns undergo a variety of phonological and morphological rules. The nouns in (1) that have distinct bound and free forms are listed in (i):

(i)	Free	Bound (CS)	
	bayit	beyt	'house'
	para	parat	'cow'
	yeladim	yaldey	children

Cf. Prince (1975), McCarthy (1979), Borer (1984), and references cited therein for discussion.

<sup>3</sup>In Hebrew, nominals derived from transitive verbs retain their ability to assign accusative case to their objects, as indicated by the presence of the accusative case marker *et* in these examples. Hazout (1988) argued that only verbs may assign accusative case, and consequently that these nominals may be verbs at some level of syntactic representation. See also Borer (forthcoming) for discussion. Alternatively, nominals derived from verbs may be nouns at all levels of syntactic representation. On this view, it may be that Hebrew derived nominals retain the ability to assign accusative case to their objects because of the existence of the morphological case marker *et*.

<sup>4</sup>Both Irish and Standard Arabic have VSO as the unmarked order in cfauses and construct state-type noun phrases. For a head movement analysis that provides a unified account of Irish clauses and noun phrases, see Guilfoyle (1988). A similar proposal for a unified analysis of Standard Arabic clauses and noun phrases is independently developed in Fassi Fehri (1989). A similar unified treatment of Modern Hebrew noun phrases and sentences is not possible, because the unmarked word order for sentences is SVO, although VSO is also attested, and the only possible word order for noun phrases is NSO. Doron (1983) develops an analysis that derives VSO order by raising V to I and SVO order by lowering I to V. On her account, the availability of these two options is due in part to the fact that AGR is alternatively realized in INFL or on V. The unavailability of SNO word order in noun phrases may result from the absence of agreement on the functional head. Shlonsky (1990) shows that the presence or absence of agreement in quantifier phrases determines whether the quantifier will precede or follow the quantified DP:

(i) a. *kol ha-yeladim* all the-children 'all the children'

b. \*ha-yeladim kol

 a. ha-yeladim kul-am the-children all-3PL 'all the children'
 b. \*kul-am ha-veladim

Cf. section 7 for further discussion on differences between quantifier phrases and noun phrases.

<sup>5</sup>I am grateful to an anonymous reviewer for this suggestion. Cf. also note 2.

#### Functional Categories in Noun Phrases

#### Elizabeth Ritter

<sup>6</sup>As this language has no indefinite article, only definite noun phrases have an overt determiner. Sometimes a reduced form of the numeral 'one' (*exad/axat*) is used as an indefinite article, as in *ha-me il fel yeled xad/yalda xat*, 'the coat of some boy/girl'. Unlike the definite determiner, however, *xad/xat* appears postnominally and is inflected for gender (either masculine or feminine). In short, it has the syntactic properties of an adjective, not a determiner.

<sup>7</sup>The present account of the definiteness specification for CSs differs from that in Ritter (1988a). As pointed out in Hazout (1988), multiply embedded CSs pose problems for that analysis, which assumes that  $D_{een}$  is inherently specified for definiteness.

<sup>8</sup> An anonymous reviewer has pointed out that indefinite multiply embedded CSs such as (i) are ungrammatical.

### (i) ??? ben xaver mora son friend teacher 'a teacher's friend's son'

This is a surprising fact given the assumption that indefinite noun phrases have the same structure as definite noun phrases, and that they are distinguished only by the fact that definite DPs have a head that is specified as [+definite] and is spelled out as *ha* whereas indefinite DPs have a head that is specified as [-definite] and has no phonetic content.

<sup>9</sup>Definiteness is the only feature that is acquired from the genitive phrase because the matrix DP is independently specified for number and gender. In section 6, it will be demonstrated that the gender specification (masculine or feminine) is provided by N and the number (masculine or plural) is contributed by the functional head NUM.

<sup>10</sup>The data cited here are due to Hazout (1988). Hazout's analysis is similar in spirit to the one presented here, in that it also assumes that the surface order is derived by raising the noun; however, his account entails adjunction of the head noun to its own maximal projection. Consequently, he analyzes CS noun phrases as NPs rather than DPs. As the present DP analysis crucially assumes that such movement is blocked by the head movement constraint. I will not review the details of this alternative.

<sup>11</sup>For the sake of convenience I omit nonbranching intermediate nodes (i.e., DET', Num').

<sup>12</sup> It may be the case that indefinite nonconstruct noun phrases are NUMPs rather than DPs with a phonetically null head; however, nothing in this analysis hinges on this issue.

<sup>13</sup> The question marks in this example are intended to indicate that adjectives in a simple CS construction with both a subject and an object are considered marginal, rather than fully acceptable. What is important here is the contrast between (14a) and (14b).

<sup>14</sup> If D<sub>gen</sub> is constrained to assign Case rightward, we have an explanation for the fact that subject raises to [SPEC, NUMP] and not [SPEC, DP] to get Case.

<sup>15</sup>Given this analysis, possessed indefinite noun phrases such as *bayit fel ha-mora* 'a house of the teacher's' should be DPs rather than NUMPs. The head of DP in this case would be a phonetically null element, and presumably it would require movement of N(+NUM) to be licensed. Note also that this indefinite determiner could be distinguished from  $D_{gen}$  by the fact that it has no effect on the phonetic content of the raised head. For example, the possessed noun meaning 'house' has the free form (*bayit*) rather than the bound form (*beyt*) when it appears as the lexical head of an indefinite FG noun phrase.

<sup>16</sup>In fact Borer (1984) assumes that the node dominating the noun and clitic is non-

branching. In line with recent developments in X-bar theory, I depart from this aspect of the analysis, and assume that the clitic is adjoined to  $N^0$ . See Roberge (1990) and references cited therein for discussion.

<sup>17</sup> There are exceptions to this last claim. For example, the Hebrew word *mayim* 'water' is always plural. I assume that this exceptional property, as well as the fact that *mayim* is a masculine noun, is specified in its lexical entry.

<sup>18</sup> Although linguistic theory traditionally distinguishes derivation from inflection, this distinction has been questioned by, for example, Lieber (1980) and Di Sciullo and Williams (1987). Among those who adopt this distinction, there is some debate as to the level of attachment (cf., e.g., Anderson, 1982; Bat-El, 1986).

<sup>19</sup>See Bat-El (1986) for a detailed analysis of word formation strategies in Hebrew, and for further discussion of the differences between feminine and plural affixes. Although Bat-El analyzes gender affixes as derivational and plural affixes as inflectional, she assumes that both types of affixation occur in the lexicon.

<sup>20</sup> As noted above, modifying adjectives always agree in definiteness, number, and gender with the noun they modify. There is no definiteness agreement between a subject and predicate. Rather, predicative adjectives and present tense verbs always agree with their subject in number and gender, and past and future tense verbs agree with their subjects in person, as well as number and gender.

<sup>21</sup>The data in this section are due to Hazout (1988). He also discusses a second class of quantifiers, which includes *harbe* 'many' and *kama* 'some'. Quantifiers of this second class never co-occur with the definite article, never appear in CS constructions, and always appear to the left of the nouns they quantify. On Hazout's analysis, these are QPs that are realized in [SPEC, NP] (either [SPEC, DP] or [SPEC, NUMP] in the analysis presented here). Assuming that quantifiers of this class are in [SPEC, NUMP] would account for both their position and their distribution.

 $^{22}$  The genitive phrase that appears in quantifier CSs headed by numerals like *fnayim* 'two' must be plural, suggesting that, unlike *kol*, these numerals are inherently specified as plural. This is consistent with the fact that, while numerals are unambiguous, *kol* may be glossed as 'all' or 'whole', depending on the context.

 $^{23}$  As it is unclear whether the maximal projection of quantifier phrases such as (41) is DP or NUMP, I leave this question open to future research.

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# **ON THE POSITION OF SUBJECTS**

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### 1. INTRODUCTION

In this article, I suggest that, in addition to the Pollock/Chomsky parametrization of AGR as [ $\pm$ strong], AGR can be [ $\pm$ lexical], with Spanish marked positive and English and French marked negative for this parameter.

The main reflex of this parameter is that in a language where AGR is [+lexical], it has no specifier, in accordance with Fukui and Speas' (1986) proposal concerning the difference between lexical and functional categories.<sup>1</sup>

I assume that adjuncts in general can be licensed at S-structure only if they are canonically governed; otherwise, they are licensed at LF by a process akin to predication. I also assume, based on arguments presented in Contreras (1989) and further refined by Huckabay (1989), that the domain of a chain that is fully licensed at S-structure cannot include any elements that are not licensed at that level. Finally, I assume a slightly modified version of Rizzi's (1990) relativized minimality proposal.

Several differences between English and Spanish follow from the interaction between the  $[\pm lexical]$  parametrization of AGR and the licensing principles just mentioned:

1. Possibility versus impossibility of topicalization ('This lesson Mary knows very well')/\**Esta lección María sabe muy bien*): The Spanish structure violates relativized minimality; the English one does not. For details, see section 3.

63

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