

THE STRUCTURE OF FUNCTIONAL CATEGORIES

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1. Introduction¹

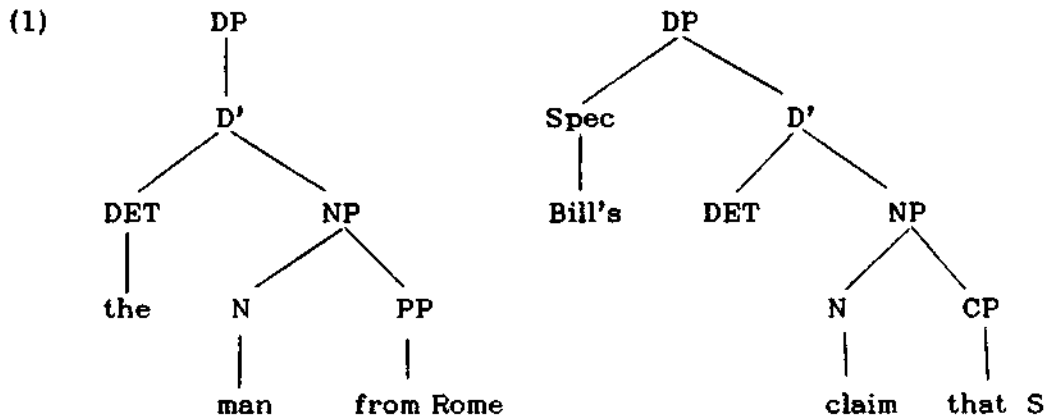
Much recent work in generative grammar has been guided by the idea of developing a theory of grammar in which individual constructions result from the interaction of parametrized universal principles rather than being generated by language-particular rule systems. The major motivation for pursuing this idea has been to find a solution to what is standardly called *the logical problem of language acquisition*, i.e. the problem of how children can acquire language given that the available evidence is of an extremely limited and accidental nature. To the extent that the generative research program turns out to be successful the task of language acquisition can be essentially reduced to the learning of lexical items and their idiosyncratic properties. The types of structures that are grammatical in a given language are then entirely determined by principles of Universal Grammar.

Part of the empirical challenge that such a theory of Universal Grammar must meet is to formulate principles which are both sufficiently restrictive and general. This combined goal of restrictiveness and generality can be achieved by unifying seemingly distinct structural properties under a common abstract notion. During the past years a number of significant advances have been made towards such unification. Thus Stowell (1981) and Chomsky (1986) have shown how the sentential nodes S and S-bar - formerly thought to be structurally different from other phrasal categories - can be integrated into X-bar-theory. Similarly, the notion of barrierhood developed in Chomsky (1986) and Koster's (1986) idea of a parametrized bounding condition represent attempts to arrive at a unified, and thus very general characterization of the domain(s) in which universal principles operate.

In much the same spirit a number of authors have recently proposed a further unification of phrase structure configurations under the rubric of *DP-analysis*. The most detailed and comprehensive defense of the DP-analysis on which the present discussion will primarily focus is given in Abney (1987), but similar proposals appear e.g. in Szabolcsi (1984), Kornfilt (1984), Reuland (1983), Horrocks & Stavrou

¹I am grateful to Gisbert Fanselow, Hildegard Farke, and Peter Staudacher for many critical comments and suggestions.

(1985), Fukui & Speas (1986) and Haider (1987). The basic idea is that the determiner is the head of a maximal projection called DP which typically takes an NP as its complement and (optionally) a genitive-marked expression as its specifier. Under the DP analysis we thus have structures such as those in (1):



Apart from its empirical justification the conceptual advantage of the DP analysis is immediately apparent. Under traditional analyses in which determiners appear in the specifier position of NP, DET is the only category which does not form a maximal projection and thus falls out of the X-bar schema. Furthermore, the specifier is standardly considered to be a position which hosts maximal projections; DET, however, is uncontroversially an X'. Finally, the DP analysis assigns to nominal expressions a structure very similar to that of sentences, thereby accounting for the fact that these two categories frequently show the same type of syntactic behavior with respect to e.g. Subjacency or the Specified Subject Constraint.

In this paper I will expand on some of the ideas currently discussed in the context of the DP analysis. The major purpose of the following discussion will be to show that the structural parallelism between nominal and sentential phrases is even stronger than seems to be standardly assumed and that at the same time there are a number of significant properties in which DP and IP fundamentally differ from maximal projections with N, V, A, or P as their lexical heads. More specifically, I will attempt to present empirical evidence in support of the following two claims:

1. Universally, there are two types of categories, lexical and functional. Lexical categories are those that bear the $[\pm N]/[\pm V]$ features of Chomsky (1970) and that are represented as individual items in the lexicon; i.e. the traditional N, V, P, and A. Functional categories, in contrast, are bundles of abstract features which have no uniform representation in the lexicon. The functional categories to be considered in this paper are INFL and DET. The set of features which define functional categories are universal; however, individual languages may differ with respect to how many and which features they select.

2. Lexical categories may, in principle, take any maximal projection as their complement. Functional categories, however, are subject to a biuniqueness condition with respect to the complement they select. That is, INFL uniquely selects VP as its complement and VP can only be the complement of INFL. An analogous biuniqueness relation will be shown to hold between DET and NP.

2. Functional categories: INFL and DET

Functional categories are bundles of abstract features which have no uniform representation in the lexicon, i.e. there is no individual lexical item that represents exactly the complete feature bundle of a functional category. I will assume that there are (at least) two functional categories, namely INFL and DET.² It will become clear as we proceed that the terms INFL and DET are misnomers in that they are coined after purely language-particular properties of English and structurally similar languages. The reasons I nevertheless adopt this terminology are purely historical. It should be kept in mind, however, that the terms INFL and DET are completely arbitrary choices.

The status of INFL as a functional category seems to be largely uncontroversial, while the corresponding status of DET may be more in need of empirical justification. In this section I will outline some fundamental aspects of the featural composition of INFL and DET with respect to both their universal and language-particular properties. The primary goal of the following discussion will be to demonstrate that INFL and DET show a remarkable number of similarities both in their structural properties and in the way they surface in different languages.

2.1 INFL

As a point of departure I will assume that the functional category INFL minimally contains the following features:

- (2) INFL = [tense, aspect, modality, person, number,...]

This list of features is meant to be illustrative rather than exhaustive. However, I will assume that if these features occur in a language, they will be generated under INFL. This implies that languages may differ with respect to which features they select, though it may turn out to be the case that some features are selected universally.

²It seems reasonable to assume that there is another functional category, namely COMP. However, I will have nothing to say about COMP in this paper.

Tense is presumably the best known INFL feature. In Indo-European languages tense typically surfaces as an inflectional ending attached to the head of the INFL-complement, i.e. the verb. In Chinese, however, past tense surfaces as the clitic morpheme *le* which is attached either to the verb or to the VP:

- (3a) ta jiantian-zaochen shang-le feiji
 he this-morning board-PAST airplane
- (3b) ta jiantian-zaochen shang feiji -le
 he this-morning board airplane PAST
- "he boarded the airplane this morning"

Similarly, in Serbian future tense is expressed by means of an inflected morpheme which may cliticize to the first stressed word of the sentence:

- (4a) ja ću biti kod Stanka
 I FUT be with Stanko
- (4b) moj će otac biti kod Stanka
 my FUT father be with Stanko
- "I/my father will be at Stanko's house"

In Chinese past tense can also be formed by placing the verb *guo* (to pass) immediately adjacent to the matrix verb. That is, in this case the tense-feature is lexicalized:

- (5) wo xue-guo yuyanxue
 I study-pass linguistics
- "I studied linguistics"

Aspect is another INFL-feature which in Indo-European languages is typically encoded through verbal inflections. Modern Greek, e.g. can distinguish between habitual and non-habitual actions by using different inflectional morphemes. Thus (6a) means *I want to write NP* in the sense of repeated action, whereas (6b) implies that the act of writing is restricted to one specific point in time:

- (6a) thelo na ghrafo NP
 I-want I-write NP
- (6b) thelo na ghrapso NP

Interestingly, in many languages there seems to be a tendency to express aspectual distinctions only in conjunction with a subset of the available tense markings. Thus in the Romance languages aspect co-occurs only with past tense, while in Modern Greek aspectual distinctions are obligatorily expressed with past and future tense, but not with present tense.

In the Slavic languages the INFL-feature aspect is frequently expressed through a word formation process; i.e. there are pairs of morphologically related verbs which differ only in their aspectual meaning. Thus Serbian distinguishes between *doci* and *dolaziti*, both verbs meaning to come, but expressing an imperfective and perfective aspect respectively.

The INFL-feature *modality* refers to notions such as *ability*, *permission*, *desire*, etc. when associated with a verb. In English *modality* is expressed by auxiliaries, while in a language like Japanese this feature can surface as a verbal inflection:

(7a) boku-wa tegami-o kanji-de kaita
I letter kanji-with wrote

(7b) boku-wa tegami-o kanji-de kakeru (=can write)

(7c) boku-wa tegami-o kanji-de kakitai (want to write)

"I wrote/can write/want to write the letter with Chinese characters"

To express *ability* Chinese uses the morpheme *de* which is inserted into compound verbs:

(8a) women kanjian hu
we see lake

(8b) women kan-de-jian hu

"we can see the lake"

Person (presumably a subfeature of what is traditionally called AGR) typically surfaces as a verbal inflection in the Indo-European languages, Latin and Greek being one of the classic cases. In Japanese, however, the feature *person* is frequently lexicalized. Thus there are three morphologically unrelated verbs meaning to go, namely *mairu*, *irassharu*, and *iku*. *Mairu* can only be used with an agent that is either the speaker or someone closely related to the speaker (e.g. one's own mother, father, etc.) *Irassharu*, in contrast, refers either to the second person or to someone superior in social hierarchy, while *iku* is *person-neutral*. Consequently, the sentences in (9) are ungrammatical:

(9a) *boku-wa koen-ni irassharu
I to-the-park go

(9b) *otosan-wa koen-ni mairu
your-father to-the-park go

This brief and sketchy survey of how INFL-features are treated in different languages is intended to demonstrate two points. First, languages differ within certain narrow limits with respect to how various INFL-features and their values may surface. Furthermore, individual languages do not seem to treat the entire set of INFL-features in a uniform way; that is, languages with e.g. a rich inflectional system do not uniformly express INFL-features through (verbal) inflection. Thus English uses auxiliaries for *modality*, but inflection for *tense*. Japanese uses

inflection for *modality*, but (at least in certain cases) lexicalization for *person*. Second, this variation, though seemingly impressive, is by no means unlimited. There are essentially three processes through which INFL-features may surface: inflection, lexicalization, and cliticization. Moreover, the domain in which these processes operate appears to be narrowly restricted. If, for example, a language uses inflection, it is either the verb that is being inflected or some lexical instantiation of INFL itself, as e.g. in the case of English auxiliaries or Serbian clitics. The same seems to be true for lexicalization or cliticization. I have not been able to find any language in which an INFL-feature lexicalizes or inflects on, e.g. COMP or the object-NP; i.e. a language in which, say, *aspect* is expressed by a specific complementizer or in which *modality* surfaces as an inflectional ending on the subject³.

In the following section I will look at the functional category DET trying to demonstrate that here we find exactly the same range of phenomena, subject to exactly the same types of restrictions as in the case of INFL.

2.2 DET

I will assume that the functional category DET minimally contains the following features. Again the list is illustrative rather than exhaustive.

(10) DET = [definiteness, case, number, gender,...]

As is clear from this feature specification, I do not consider determiners (articles) to be the only or even the prototypical lexical instantiation of DET. The reason is simply that I presume that there are at least as many languages without determiners as there are with determiners. Consequently, if DET and its maximal projection DP are taken to be universal, then DP cannot be the determiner phrase in the strict sense of the word.

Determiners are then a very specific, i.e. language-particular morphological realization of one out of many DET-features, namely the one referred to as *definiteness* in (10). In an intuitive sense, determiners are with respect to the DET-feature *definiteness* what auxiliaries are with respect to the INFL-feature *modality*; that is, they are both free morphemes encoding one particular feature of the matrix. Again we find substantial cross-linguistic variation in determiner systems. While English and many other languages have both definite and indefinite determiners, Ancient Greek has only definite determiners, Turkish only the indefinite determiner *bir*. Frequently languages have both a singular and plural for the definite determiner, but only a singular for the indefinite determiner, e.g. German or Spanish. However, French has singular and plural for both the definite and the indefinite determiner (*le/la - les; un/une - des*).

³If these observations are correct, then it is precisely the notion of *government* that defines the domain in which INFL-features may surface, a welcome, though by no means unexpected result.

There are furthermore languages such as Roumanian in which the feature *definiteness* surfaces as a nominal inflection (or perhaps clitic), if it has the value [+definite]:

- (11a) munte - muntele (mountain - the mountain)
 (11b) ani - anii (years - the years)

In the Scandinavian languages *definiteness* appears as a determiner if its value is indefinite, but as a clitic attached to the noun when it is definite. Consider the following Swedish example:

- (12a) et bord (a table)
 (12b) bordet (the table)

Something similar appears to happen in Turkish, where we find a nominal inflection which, in conjunction with accusative case, expresses definiteness vs. indefiniteness:

- (13a) mektup(acc/indef)okuyorum
 letter read-PRES-1sg.

"I'm reading a letter"

- (13b) mektubu(acc/def)okuyorum

"I'm reading the letter"

The DET-feature case typically appears as a nominal inflection in the Indo-European languages, but also e.g. in Turkish or Finnish. In Japanese, however, case surfaces as a clitic morpheme attached to the noun, while Hebrew has an accusative-morpheme which precedes the noun:

- (14a) John-no hon-o otosan-ni ageta
 John(gen) book(acc) your-father(dat) I-gave

- (14b) Ya'akov katavt 'et ha-yedi'a ha-zot ba-'iton
 John wrote acc the-message this-on-paper

In Chinese we find constructions in which case arguably surfaces through a lexicalization process. Consider the following examples:

- (15a) wo jintian gei ta xie xin
 I today CASE him write letter

"I'm writing him a letter today"

- (15b) wo ba shu dou mai le
 I CASE book all buy PAST

"I bought all the books"

In traditional textbooks the words *gei* and *ba* are usually termed *co-verbs*, because they can also be used as full verbs with the meaning *give* and *take* respectively:

(16a) *wo gei ta shu*
I give him book

(16b) *ta ba suoyoude shu le*
he take all book PAST

However, in constructions such as those in (15) *gei* and *ba* have completely lost their verbal meaning and are nothing but object case-markers. This becomes most obvious in cases where, in fact, nothing is being "given" or "taken":

(17a) *qing-ni gei wo jieshao-jieshao Wan-xiansheng*
please CASE-me introduce Wan-Mr.

"please introduce Mr. Wan to me"

(17b) *wo ba tamende mingzi dou wang le*
I CASE their names all forget PAST

"I forgot all their names"

Another interesting aspect of *ba* is that this word is not only a lexicalization of case, but also of definiteness, as the following contrast demonstrates:

(18a) *ta gei wo shu le*
he give me book PAST

"he gave me a book"

(18b) *ta ba shu gei wo le*
he CASE-book give me PAST

"he gave me the book"

If (as suggested in footnote 2) the domain in which the features of functional categories can be phonetically realized is defined by notion *government*, and if *ba* denotes definiteness of the noun phrase, then this morpheme cannot be a verbal element, but must be some kind of determiner-like element within the DP.

The DET-feature *number* (*singular/plural*) is realized as a nominal inflection in many Indo-European languages, frequently in conjunction with case. In Japanese plurality is optionally marked either by means of a suffix attached to the noun or by a word formation process which reduplicates the noun itself:

(19) *hito hitotachi hitobito*
man men men

The Chinese plural clitic *men* can be attached to nouns relating to people:

- | | | | | |
|------|----|-------|---------|------------|
| (20) | wo | women | pengyou | pengyoumen |
| | I | we | friend | friends |

The DET-feature *gender* appears to be relatively rare in the languages of the world, even though it is quite frequent in Indo-European languages, where it generally surfaces as a nominal inflection. But even in languages which usually do not encode *gender*, we sometimes find *gender* distinctions in the pronominal domain. Thus Japanese not only distinguishes between *kare* (*he*) and *kanojo* (*she*), but also between *boku* (*I* of a male person) and *atashi* (*I* of a female person).

In summary, it appears that in the domain of the functional category DET we find roughly the same range of phenomena that occur also with INFL. Features surface through inflection, lexicalization and cliticization. Here again the domain in which these processes operate appear to be definable in terms of the notion *government*. Inflections appear with the noun or the NP (in languages where both the noun and the adjective are inflected), lexicalization occurs under DET itself, and clitics usually attach to the noun. INFL and DET can thus be taken to be different instantiations of essentially the same universal mechanisms.

3. Complements of functional categories

It is standardly assumed in the *theory of principles and parameters* that there is a biuniqueness relation between INFL and its complement; that is, INFL selects a unique complement, i.e. VP, and VP can only be the complement of INFL⁴. The latter condition is stipulated by what is called the *extended projection principle*. This biuniqueness relation distinguishes the functional category INFL from lexical categories which, in principle, can take any maximal projection (save, of course, VP) as their complement.

The question arises, of course, how the functional category DET fares in this area. If DET is structurally on a par with INFL, then we might expect a similar

⁴This, of course, is only true for those who believe that VP is universal, i. e. that all languages are configurational (see Fanselow 1987 and Haider 1986 for some discussion with respect to German). More recently Fukui & Speas (1986) has argued that languages may differ with respect to whether or not they have functional categories at all. Thus Fukui & Speas claim that a language like Japanese does not have an INFL-node (nor any other functional category). Consequently, in Japanese a sentential structure is a projection of V, rather than a projection of INFL as in English. It is clear that this view is incompatible with the theory proposed in this paper.

(25a) Maria hat ein rosa(uninfl.)/rosanes(infl.)Kleid gekauft
 Mary has a pink /pink dress bought

(25b) Maria hat ein *rosa(uninfl.)/rosanes(infl.)gekauft

Since Olsen's arguments are essentially based on properties of German adjectival inflection, they cannot be straightforwardly extended to DET+PP sequences as in (22a). Nevertheless, there is evidence to suggest that also in this case we find *pro* as an empty nominal head which takes the PP as its complement. Notice that in German certain nouns select a specific preposition of the PP which is its complement:⁵

(26a) das Verlangen nach Zigaretten
 the desire for cigarettes

(26b) die Angst vorm Fliegen
 the fear of flying

(26c) die Überfahrt über den Atlantik
 the trip across the Atlantic

Crucially, the same regularity obtains in cases where there is no overt noun, i.e. a DET+PP sequence:

(27a) das Verlangen nach Zigaretten und das nach Schnaps
 the desire for cigarettes and the for booze

(27b) die Angst vorm Fliegen und die vorm Schwimmen
 the fear of flying and the of swimming

(27c) the Überfahrt über den Atlantik und die über den Pazifik
 the trip across the Atlantic and the across the Pacific

Since it is the noun, not the determiner that selects the specific preposition, we can account for the regularity by assuming the presence of an empty head which shares features with the lexical noun in the first conjunct.

The possessor relation can be expressed in German by either a PP or a genitive-marked NP:

(28a) ich mag das Buch von deiner Mutter
 I like the book of your mother

(28b) ich mag das Buch deiner(gen.) Mutter(gen.)
 I like the book your(gen.) mother(gen.)

While the PP may also precede *das Buch*, the genitive NP cannot:

⁵I am grateful to G. Fanselow for drawing the relevance of these data to my attention.

- (29a) ich mag von deiner Mutter das Buch
 (29b) *ich mag deiner Mutter das Buch

It seems reasonable to assume the ungrammaticality of (29b) results from some kind of adjacency condition on case assignment; i.e. apparently the head noun can assign genitive case only to an NP that is immediately adjacent to it. Since PPs are not subject to the case filter, (29a) is fully grammatical. Now, we can observe exactly the same regularity, if no overt noun appears:

- (30a) ich mag von deiner Mutter das
 (30b) *ich mag deiner Mutter das

If, however, preposing the genitive NP is blocked by properties of case assignment by the head noun, then an empty head noun must be present in structures which superficially are DET+PP sequences.

I would like to suggest that also in the Spanish examples (21b) and (22b) we have to assume an empty nominal head (see Torrego 1988 for a similar proposal). The crucial observation is that in certain contexts a direct object NP is obligatorily preceded by the preposition *a* if the nominal head bears the feature [+human]:

- (31a) ví un coche fantástico en la ciudad
 I-saw a car fantastic in the city
 (31b) ví a una mujer fantástica en la ciudad
 I-saw PREP a woman fantastic in the city

Exactly the same contrast is found if an overt noun is missing:

- (32a) ví los(pl.) de Madrid
 I-saw the(pl.) de Madrid
 "I saw those from Madrid"
 (32b) ví a los de Madrid

In (32a) the object *los de Madrid* can only refer to some non-human object, while the same phrase in (32b) must refer to people, i.e. to some noun that bears the feature [+human]. From a purely technical perspective, it would, of course, be possible to attach the [+human]-feature to the determiner; however, this would obscure the fact that Spanish does not distinguish between [+human] determiners, but only between [+human] nouns. The most natural way of accounting for the observed contrast is thus to assume that also in the relevant Spanish examples we have an empty nominal head, i.e. *pro*.⁶

⁶Torrego (1987) observes that there are restrictions on the type of PP allowed with "bare" determiners. Thus the preposition cannot be any other than *de* (*compré los de Chomsky* vs. **compré los sobre Chomsky*). Torrego presents a number of

We are then left with structures such as those in (23) in which the determiner is followed by an IP. Let us first look at the German data.

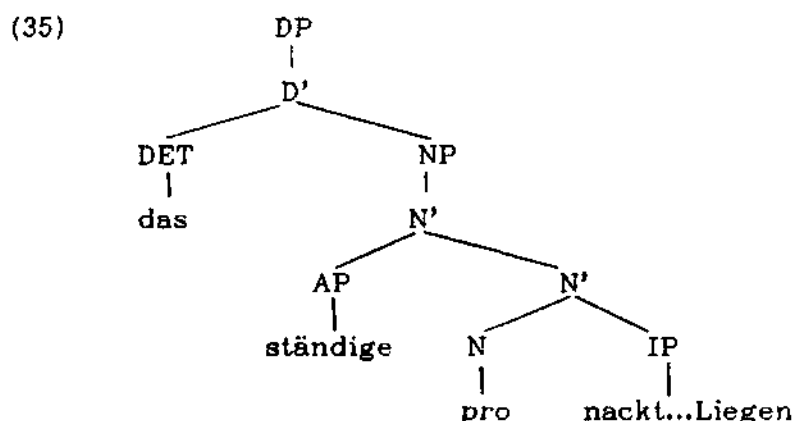
In principle, *das* could be a complementizer which only happens to be homophonic with the neuter determiner. There are, however, two considerations which suggest that *das* in the structures under discussion is, in fact, a determiner. First, German complementizers occur only with finite clauses, never with non-finite clauses. Second, we also find marginal cases in which the determiner is the indefinite *ein* (a) or the demonstrative *dieses*:

- (33a) ?*ein/dieses* nackt auf dem Rasen Liegen ist verboten
 a/this nude on the lawn lie is prohibited

Crucially, we also find cases in which an inflected adjective intervenes between the determiner and the IP:

- (34) *das ständige* nackt auf dem Rasen Liegen ärgert die Besucher
 the constant nude on the lawn lie upsets the visitors

The presence of the inflected adjective identifies the phrase *ständige nackt.....Liegen* as an NP. Since X-bar theory rules out the possibility that the IP could be the head of this NP, it again seems reasonable to assume that the nominal head is empty, i.e. *pro*. We thus obtain a structure as in (35):



A similar case can be made for the Spanish example (23b). Consider first of all the well-known extraction contrast in (36) and (37), i.e. NPs can be extracted from a bare infinitival clause, but not from one preceded by the determiner *el*:

- (36a) no me gusta cantar canciones españolas
 not to-me it-pleases to sing songs Spanish

- (36b) qué canciones no te gusta cantar t
 which songs not to-you it-pleases to sing

arguments that indicate that this restriction must be due to the specific nature of the (empty) nominal head.

- (37a) no me gusta el cantar canciones españolas
 (37b) *qué canciones no te gusta el cantar t

If the infinitival clause were the direct complement of DET, i.e. the determiner *el*, then the *wh*-phrase should be able to move to the specifier position of DP, since by stipulation IP is not a barrier. Since the DP is L-marked by *gusta*, the *wh*-phrase should be able to move from the DP-specifier to the matrix CP (presumably via an adjunction position of the matrix VP). Hence (37b) should be grammatical. In contrast, let us assume that the Spanish structure is analogous to the corresponding German structure; i.e. the complement of *el* is an NP with *pro* as its head which in turn takes the IP as its complement. In this case the *wh*-phrase cannot leave the NP, because this NP inherits barrierhood from the blocking category IP under the plausible assumption that an empty category, i.e. *pro* cannot L-mark the IP. Under this analysis (37b) is correctly predicted to be ungrammatical.

It thus appears that in all the cases where a determiner is superficially followed by an AP, PP, or IP we have reason to believe that these maximal projections are not complements of DET, but rather complements of an empty nominal head whose maximal projection is again complement of DET. We may thus conclude that there is in fact a biuniqueness relation between the functional category DET and its complement; i.e. DET uniquely selects NP and NP can only be the complement of DET.

Interestingly, there are languages in which what is the empty nominal head *pro* in German and Spanish appears a lexical element. In Japanese any sentence can be nominalized by attaching the particle *no* to the end of the sentence:

- (38) nihon-no uta-o utau-no-o kiramu
 Japanese song(acc) sing NOM(acc) I-hate

"I hate to sing Japanese songs"

Note that the particle *no* must be a nominal element, since it is case-marked by *o*, and only nouns can be case-marked in this language. The morpheme *no* doesn't have any lexical meaning, but merely serves to nominalize the preceding sentence. In a sense, then, *no* is a kind of *dummy noun* which serves essentially the same purpose as the empty nominal head *pro* in Spanish or German. So here again we find that the functional category DET which in Japanese appears as the case-marker *o* (see section 2.2) selects an NP as its complement. The head of this NP is the dummy noun *no* which in turn takes the IP as its complement.

4. Nominalizations

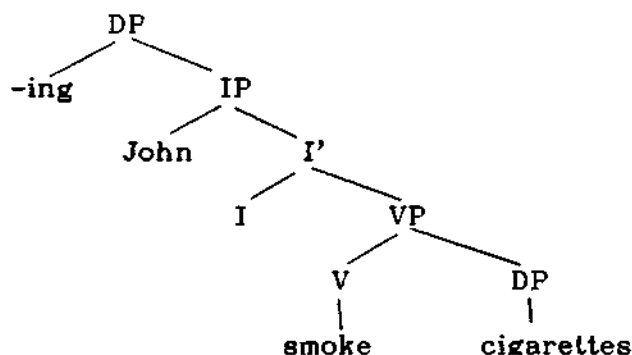
There are two well-known constructions in English which might be considered to provide direct evidence against the claim that DET uniquely selects NP as its complement. These are the so-called *Acc-ing* and *POSS-ing* constructions which can be illustrated by the sentences in (39a) and (39b) respectively:

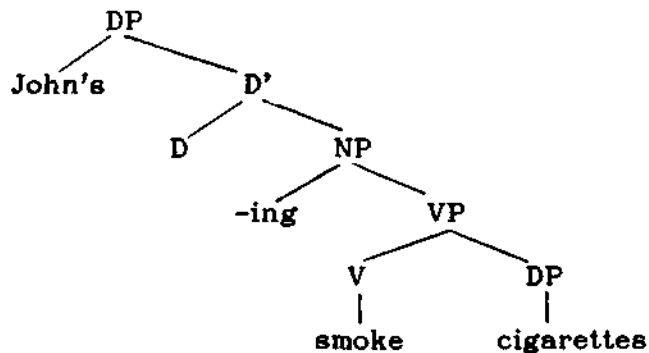
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|--|-----------------|
| (39a) I remember John smoking cigarettes | <i>Acc-ing</i> |
| (39b) John's smoking cigarettes surprised me | <i>Poss-ing</i> |

These two constructions have a long and controversial history in the theory of grammar. The problem is that *Acc-ing* and *Poss-ing* simultaneously show both nominal and sentential properties, with *Acc-ing* being more sentential than nominal and *Poss-ing* being more nominal than sentential. The phrasal part *smoking cigarettes* is clearly a VP and thus marks the sentential character of these constructions. The distributional properties of *Acc-ing* and *Poss-ing*, however, are those of typical noun phrases.

It is immediately clear that traditional (non-DP) approaches run into severe difficulties in accounting for these two constructions. If *Acc-ing* and *Poss-ing* are taken to be dominated by IP, then their nominal nature remains unaccounted for. In contrast, if they are assumed to be dominated by NP, then the VP must be somehow the head of this NP, an assumption which is incompatible with current views about X-bar structure. Abney's (1987) DP analysis provides an elegant solution to these problems by assigning the structures (40a) and (40b) to *Acc-ing* and *Poss-ing* respectively.

- (40a) *Acc-ing*



(40b) *Poss-ing*

If Abney's analysis is correct, then it obviously constitutes an empirical challenge to our claim about the biuniqueness relation between functional categories and their complements. For the *Acc-ing* construction Abney crucially assumes the complement of DET to be IP, not NP. In the *Poss-ing* construction VP is the complement of an N, rather than of an INFL.

Let us first look at the *Acc-ing* construction. The evidence for its alleged nominal nature is extremely weak. In fact, Reuland (1983) has proposed to account for the properties of this construction by assuming that it is a CP with an empty complementizer that selects an IP headed by *-ing*. Abney (1987) who presents a detailed review of the literature on *Acc-ing* arrives at the conclusion that "the only noun-phrase property of *Acc-ing* ... is its external distribution" (p.225). This statement relates to the fact that *Acc-ing* appears in some environments from which sentences are typically excluded. (41) and (42) illustrate some of the relevant contrasts:

- (41a) I heard about John having divorced his wife
 (41b) *I heard about that John has divorced his wife
- (42a) it's John having divorced his wife that surprised me
 (42b) *it's that John has divorced his wife that surprised me

These distributional facts are, however, not particularly convincing as evidence for the nominal character of *Acc-ing*. First, the ungrammaticality of (41b) and (42b) merely shows that CPs with an overt complementizer are excluded from these environments; i.e. it may be the presence of the complementizer rather than the sentential nature of CP that accounts for the contrast (cf. Stowell 1981). Second, there are other environments in which *Acc-ing* tends to pattern with sentences rather than with NPs:

- (43a) I believe that John's divorce was a shock
 (43b) ?I believe that John having divorced his wife was a shock
 (43c) *I believe that that John divorced his wife was a shock
- (44a) did John's divorce surprise you
 (44b) ?did John having divorced his wife surprise you
 (44c) *did that John divorced his wife surprise you

Apart from these observations there are also a number of theory-internal problems with the structure (40a) that Abney assigns to *Acc-ing*. Note that Abney crucially assumes that the DP does not have a structure of its own, in particular, it does not have a head; i.e. "-ing affixes to IP and converts it into a DP" (p. 224). There are essentially three considerations that force Abney to make this assumption. First, if *Acc-ing* contained a "full-fledged" DP, then we would expect determiners and/or DP-subjects to be licensed under this construction. However, none of these elements may co-occur with *Acc-ing*. Second, conjoined *Acc-ing*'s - in contrast to other conjoined DPs - do not trigger verb agreement:

- (45a) John coming early and Mary leaving late was/*were unexpected
 (45b) John's arrival and Mary's departure *was/were unexpected

Abney assumes that subject-verb agreement is triggered by the so-called *phi*-features (person, number, gender) which are standardly generated under DET. Since *Acc-ing*'s do not trigger agreement, Abney is forced to conclude that there is no DET.

Finally, *Acc-ing* - in contrast to NPs - does not permit *long-distance binding*:

- (46a) they thought that each other's paintings would be an insult
 (46b) *they thought that each other painting the scene would be an insult

Abney accounts for this contrast again by assuming that *Acc-ing* does not have a DET, hence no *phi*-features, so that AGR cannot be coindexed with *Acc-ing*. AGR therefore counts as an accessible SUBJECT for anaphors within *Acc-ing* so that the anaphor must be bound inside this construction.

Abney's assumption that *Acc-ing* is dominated by a DP which has neither a head nor an intermediate D-bar level obviously squares with current views about X-bar structure. Furthermore, a mechanism whereby adjunction to an XP creates another (non-projected) XP of a different kind seems to be at best an extremely unusual device which appears to be unknown in other domains of the grammar. Finally, the contrasts in (45) and (46) argue, in fact, against the nominal character of *Acc-ing*, and thus against the idea that this construction is dominated by DP. That there is no subject-verb agreement correlates with the fact that the same is true for conjoined CPs. Similarly, the ungrammaticality of (46b) mirrors the fact that sentences as subjects of *that*-clauses are generally rather bad. It thus appears that Abney's particular DP-analysis of *Acc-ing* creates numerous empirical and theory-internal problems that do not arise if we follow Reuland's (1983) proposal that *Acc-ing* is simply a specific type of CP.

Let us consider next the *Poss-ing* construction. Notice first of all that this construction seems to be extremely rare and marginal in the languages of the world. In fact, Abney who devotes a large part of his dissertation to this construction reports that he has been able to find only two languages having *Poss-ing*, namely English and Turkish. Consequently, whatever turns out to be the

correct analysis of this construction, its extreme marginal status does not warrant to abandon a theory which otherwise seems to be empirically well-motivated. Furthermore, the empirical challenge provided by the *Poss-ing* construction is not only to discover its correct structure, but also - and maybe even more importantly - to account for its marginal status. Since it is standardly assumed within generative grammar that natural languages don't "run wild", but rather are narrowly constrained with respect to the types of structures permitted, there is reason to believe that the English *Poss-ing* construction is nothing but an unusual, i.e. highly language-particular instantiation of a more general natural-language phenomenon.

There seems to be hardly any doubt that *Poss-ing*, though it contains a VP and a thematic subject, has distinct noun-phrase properties. In other words, *Poss-ing* is a kind of nominalized sentence. This fact in itself, however, cannot account for the marginal status of this construction, since sentential nominalizations appear to be an extremely general and wide-spread phenomenon in natural languages. The formal devices which are used for sentential nominalizations, however, may vary cross-linguistically. In section 3 we noted that in many Indo-European languages sentences are nominalized by means of juxtaposing a determiner to them. Frequently such nominalization is only possible with infinitival sentences, but there are also languages which permit finite sentences to be nominalized, as the following examples from Spanish and Modern Greek show:

- (47a) el que tu hayas venido me sorprendi
the that you have come me surprised

"it surprised me that you came"

- (47b) to na mi mathis ta mathimata-su me dhisaresti
the not you-learn the lessons-your me annoys

"it annoys me that you don't learn your lessons"

Another type of sentential nominalization is found in Latin under the traditional heading of *ablativus absolutus*:

- (48) Caesare(abl.) exercitum in Galliam ducente(abl.)
Caesar the-army to Gaul lead

The ablative case in (48) converts the nominalized sentence into a kind of adverbial expression. Crucially, it is not only the subject-NP *Caesare*, but also the verb that is case-marked.

In example (38) we observed that in Japanese a sentence is nominalized by means of the nominal particle *no* which is also case-marked. Chinese, too, nominalizes sentences by means of a nominal particle, namely *de*, though there is no overt case-marking:

- (49) xue-shie zhong-guo zi -de hen nan
learn-to write Chinese-letter NOM very difficult

In Turkish, finally, sentences are nominalized by means of the inflectional morpheme *dig* which attaches to the verb. Crucially, the entire sentence is case-marked as in Japanese:

(50a) Halil'in gel-dig-in-i biliyorum
Halil(gen) come-NOM-3s-acc I-know

"I know that Halil is coming"

(50b) gel-dik-lerin-in haberini aldım
come-NOM-3pl-gen message I-received

"I received the message that they have come"

In summary, we find that sentential nominalization is quite a common process, though languages differ with respect to the formal devices they use. At least for the languages reviewed these devices are: determiners, nominal particles, and verbal inflections. The question thus arises how we can arrive at a unified account of the phenomena observed. Whatever this account will eventually look like, it should be unified in the sense that the concept of nominalization should receive a uniform treatment, because it occurs in many languages, while the differences should ideally relate to the formal devices only.

There are at least two ways in which the phenomenon of sentential nominalization could be analyzed. Focusing on some of the Indo-European languages an obvious idea seems to be that sentences can be the complement of DET as in (51). Under this perspective nominalization would, in fact, be better termed *determinerization*.

(51) [_{NP} [_{D'} DET IP/CP]]

There are, however, a number of both empirical and conceptual considerations which argue against the idea of nominalization being, in fact, determinerization. The first is that it is difficult to incorporate into this perspective languages which do not have determiners. Thus in Japanese we found that sentential nominalization involves the particle *no* which is definitely a nominal, not a DET element. The DET aspect of the Japanese nominalization is the case-marker. Much the same seems to hold for Chinese nominalizations. Similarly, the Latin *ablativus absolutus* is identified by its verbal inflection which is either a verbal or arguably a nominal element, but not a DET-element. The same holds for Turkish *dig*.

An obvious solution would be to introduce a parametrization at this point. That is, the structure (51) holds only for those languages in which nominalization crucially involves a determiner. Other languages have a different structure. But this solution is undesirable for conceptual reasons. It assumes structural differences where, in fact, we only have differences with respect to the formal devices.

Another problem concerns the fact that the IP-as-complement-of-Det idea does not even work in languages that do have determiners. In general, nominalized sentences are islands for extraction, as the Spanish example (37b) has demonstrated. The same is true for Modern Greek and German:

(52a) *miso to na erthi kathe bradhi*
I-hate the he-comes every night

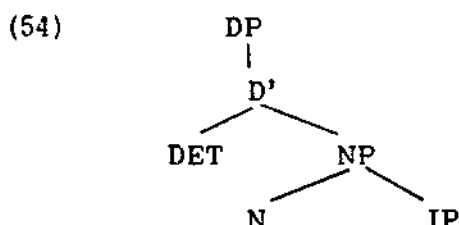
(52b) **potei misis to na erthi ti*
when you-hate the he-comes

(53a) *ich hasse das nackt auf dem Rasen Liegen*
I hate the nude on the lawn lie

(53b) **woi hasst du das nackt ti liegen*
where hate you the nude lie

As noted before, these island effects cannot be accounted for, if it is assumed that IP is the direct complement of DET. In this case the *wh*-phrase should be able to first move to the specifier position of DET and from there to the matrix COMP without any problem. Consequently, the island effects suggest that there must be an additional (non-L-marked) node between DET and IP. Furthermore, at least in German the nominalized sentence can be preceded by an adjective which provides additional evidence for the fact that an NP node must be involved.

In view of these observations it seems reasonable to maintain the claim that DET uniquely selects an NP as its complement, where the nominal head of this NP in turn may select an IP as its complement. The proper analysis for the cases considered so far would thus involve a structure like the one in (54):



In languages in which the embedded sentence is infinitival, i.e. non-finite, the subject of IP is *PRO*, because this position is ungoverned. This is the case in German or Spanish. In languages in which the embedded sentence is finite, its subject may be lexical or *pro*, as in Japanese, Turkish, Modern Greek, or the Spanish example (47a). The nominal head of the NP may be *pro* (licensed by a strong morphology) as in German, Spanish, Modern Greek, etc. or a nominal particle as *no* in Japanese or *de* in Chinese. As for Turkish and Latin I will assume that the verbal inflections *dig* and *-ent* also originate in the nominal head position and are later attached to the verb by a PF-process. This latter assumption does not seem to be unproblematic, since verbal inflections are not standardly considered to be nominal elements. I will return to this issue later. DET, finally, surfaces as a determiner in languages which have a determiner system, and as a case-marker in languages such as Turkish or Japanese.

If this analysis is correct, then we obtain a unified account of sentential nominalizations. Universally, these nominalizations have the structure (54). Languages may differ with respect to the nature of the nominal head: empty, inflectional, or lexical. It can be empty, if the language has a rich enough morphology; it can be inflectional, if the language has a rich system of verbal inflection (as in Latin or Turkish). If the language has neither, the nominal head must surface lexically as a nominal particle as in Japanese or Chinese. All the other aspects follow from independent properties of the respective language.

Assuming that (54) is the universal structure of sentential nominalization two major questions arise with respect to the English *Poss-ing* construction: what is the nominal head and what is the position of the genitive-marked NP?

With respect to the first question I will argue that the nominal head is *-ing*. This idea is, in fact, not new but has been previously suggested e.g. by Horn (1975). The problem with this suggestion is that - in an intuitive sense - *-ing* is not a typical noun (cf. also Abney 1987). While this observation is undoubtedly correct, *-ing* has nevertheless a definitely nominal aspect. Thus it is used in deverbal nouns such as *building*, *frosting*, *filling*, etc. Furthermore the Turkish and Latin cases indicate that the surfacing of the nominal head as a (verbal) inflection is definitely an option that natural languages can take. The Turkish case is particularly suggestive in that a sentence containing the verbal inflection *dig* can be (overtly) case-marked and it is only nouns that can receive case, not sentences (cf. Stowell 1981).

With respect to the nominal head English thus behaves like Turkish or Latin. What is unusual about the English case is that this language - in contrast to Turkish or Latin - does not have a well-developed system of verbal inflections. In this sense, the English *Poss-ing* construction seems to be a residue of times when English did have a much richer system of verbal inflection. It also seems that this construction, while definitely fully grammatical, is not particularly common and has a kind of archaic and stylistically-marked flavor. I would like to argue that this is precisely because English has chosen a nominalization option which somehow squares with its impoverished verbal system. Abney also observes that in earlier centuries nominalizations were much more frequent permitting even the determiner to precede sentential nominalizations.

Let us now turn to the question of where the genitive-marked NP is to be located. Let me first note what is not unusual about this NP, namely that it bears the genitive case. We have observed the same phenomenon in Turkish, and also in Japanese the thematic subject of a nominalized sentence can bear either the nominative or the genitive:

(55a) Taroo-ga(nom) kuruma-o(acc) katta-no-wa taihen da
Taroo car bought-NOM-Case terrible is

"it is terrible that Taroo bought the car"

(55b) Taroo-no(gen) kuruma-o katta-no-wa taihen da

What is somewhat problematic about the *Poss-ing* construction is the fact that it is all but self-evident where in the tree the genitive-marked NP is located. The standard analysis assumes, of course, that the genitive-marked NP is in a specifier position which – under a DP analysis – would be the SpecDP. However, it seems that the only evidence standardly adduced in support of this assumption is the analogy to *John's book*. If we wish to maintain our attempt towards a unified theory of nominalization, this evidence is not particularly strong, since in languages like Turkish or Japanese there is no analogous difference to the English distinction between NP's *N* and *N PP*.

As far as I can see there are essentially two observations which may justify an analysis in which the genitive NP is not in the subject position of the embedded sentence. The first has to do with binding theory, i.e. the fact that the genitive NP can be an anaphor bound by the subject of the matrix sentence:

(56) they hate each other's singing opera arias in the shower

If *each other's* were in the subject position of the embedded IP, then it should be bound within the DP, more specifically by an element in the specifier position of DP. Hence (56) should be ungrammatical. In contrast, if genitive NPs are generally in Spec-DP, then the matrix subject is a legitimate binder.

The second consideration concerns the fact that the genitive NP is subject to severe complexity restrictions. That is, the NP must not have a complement with the only exception of a preposed adjective or AP. But even in this case the AP must not be too complex:

- (57a) the boy's coming home late surprised everyone
- (57b) the young boy's coming home late surprised everyone
- (57c) ?the very young and extremely intelligent boy's coming ...
- (57d) *the boy that I met yesterday's coming home late..
- (57e) *the boy with the red feather on his hat's coming ...

I have no explanation for why the complexity of the genitive NP is restricted in this way; however, it seems to be clear that the same restriction holds for the possessor in noun phrases such as *John's book*, while the specifier position of IP is not subject to any such restriction. It thus appears that the constituent which may appear in the specifier position of DP must for some reason be of little complexity. And since this is true for *Poss-ing* constructions we have at least some reason to assume that the genitive NP is in the specifier of DET.

As (40b) demonstrates, Abney assumes that the complement of *N* in *Poss-ing* constructions is a VP, while our biuniqueness claim implies that the complement is IP. In this case the subject of IP must, of course, be *PRO* which is controlled by the genitive NP in SpecDP.

There are again a number of facts which can be taken as evidence against Abney's VP-analysis and in support of our IP-analysis. G. Fanselow (personal communication) has pointed out to me that, if the complement of the nominal head

were a VP, then it should be possible to move an object from the VP to the specifier position of DP making use of VP-adjunction as suggested in Chomsky (1986). In other words, a sentence such as (58) should be grammatical, which, of course, it is not:

(58) *the car's buying t bothers me

If, however, the complement of the nominal head is an IP, then the ungrammaticality of (58) follows from the fact that movement would cross a barrier; that is, since adjunction to IP is generally ruled out, the NP would inherit barrierhood from the IP.

The second observation concerns the fact that certain adverbial expressions may, in principle, appear in SpecDP, but are ruled out in *Poss-ing* constructions:

(59a) yesterday's election was a great surprise

(59b) *yesterday's electing John was a great surprise

Under an IP analysis the ungrammaticality of (59b) follows from the fact that the subject of IP, i.e. *PRO*, must be controlled and it seems reasonable to assume that an adverbial expression such as *yesterday* cannot be the controller of *PRO*.

Considerations of what may be a possible controller of *PRO* also account for the following contrasts:

(60a) ?I'm unhappy about its raining all day

(60b) ?I'm unhappy about its being likely that John will come

(60c) *I'm unhappy about its seeming that John will come

(60d) *I'm unhappy about there's being a unicorn in the garden

Under the natural assumption that true expletives are not possible controllers of *PRO* the ungrammaticality of (60c) and (60d) follows straightforwardly from an analysis in which IP rather than VP is the complement of the head. With weather verbs and predicates like *to be likely* it seems that the expletive has a kind of quasi- θ -role (cf. Chomsky 1981) thereby being able to act as a controller of *PRO* in a somewhat restricted way.

In summary, it appears that the relevant evidence strongly suggests that also in *Poss-ing* constructions DET uniquely selects NP as its complement and VP can only be the complement of INFL. Consequently, we can maintain the claim that there exists a biuniqueness relation between functional categories and their complements.

5. Discussion

In this paper I have tried to argue for an extremely restrictive theory of phrase structure configurations. The head of a phrasal projection can either be a lexical or a functional category. These two categories differ in at least two fundamental ways. A functional category is a bundle of abstract features which does not have a unique lexical entry, while lexical categories refer to specific representations in the lexicon. Furthermore, whereas lexical categories may in principle take any maximal projections as their complement, there is a biuniqueness relation between functional categories and their complements. Thus DET and INFL uniquely select as their complement NP and VP respectively. Conversely, NP and VP can only be the complements of DET and INFL respectively.

Making the strongest possible claim I will assume that these are universal properties, i.e. all natural languages have both functional and lexical categories with functional categories being subject to the binuniqueness relation stated above.⁷

Apart from questions of descriptive adequacy a syntactic analysis is interesting only to the extent that it contributes to a solution of what constitutes the fundamental problem of the theory of grammar, namely to account for the phenomenon of language acquisition. In this respect, the approach to questions of phrase structure presented in this paper differs fundamentally from the one proposed by e.g. Abney (1987). This point can best be illustrated with respect to the treatment of superficially "unusual" constructions such as *Acc-ing* and *Poss-ing* (see section 4).

Abney's theory accounts for the different properties of *Acc-ing* and *Poss-ing* by assigning different phrase structures to these two constructions. Thus *Acc-ing* is claimed to be dominated by a headless DP with *-ing* in DET-Spec and IP as a complement. In contrast, *Poss-ing* is assumed to be a DP with an NP complement whose head is *-ing*. Of course, the question arises how the child finds out about these structural differences. In other words, how does the child determine that *-ing* is a nominal head in *Poss-ing*, but a specifier of DP in *Acc-ing*. Similarly, how does the child discover that the DP is headless in *Acc-ing*, but not in *Poss-ing*. More generally, if we account for different properties of two constructions by assigning them different phrase structures, then it must be explained how the child can discover these structural differences on the basis of the available evidence. It is far from clear what such an explanation could be in the case of Abney's treatment of *Acc-ing* and *Poss-ing*.

Note that this problem does not even arise in the type of restrictive phrase structure theory proposed in this paper. The reason is simply that all DPs have

⁷It furthermore seems that all natural languages have the full set of functional categories, i.e. DET, INFL and presumably COMP. This, of course, is partly a logical consequence of the biuniqueness claim. If the biuniqueness condition is part of UG, then it follows that if a language has, e.g. an NP it must also have a DET-category.

exactly the same structure which is determined by UG. Thus if the child knows that a given structure is a DP⁸, then s/he knows immediately what the internal structure of this DP must be. All the child has to determine then is which element goes into which slot. And here again the range of possibilities is severely constrained by principles of UG. Thus assuming that the child knows that *Poss-ing* is a DP (see footnote 8), s/he also knows that the complement of DET must be an NP. Since there is no "visible" nominal head, this head must be *pro*. Since VPs are always the complement of INFL, the child furthermore knows that there must be an IP with an empty subject which can only be *PRO*. This IP, in turn, must be the complement of the empty nominal head, because this is the only available head. It cannot be the complement of DET, because DET uniquely selects NP as its complement. Similarly, a Spanish-learning child confronted with a phrase like *el cantar estas canciones ...* knows that the phrase must be a DP with *el* as the head whose complement NP has an empty head which, in turn, takes an IP as its complement. Suppose a Japanese-learning child is confronted with the nominal expression *John-ga* (*John* + nominative case-marker). Assuming that the child knows that *John* is a noun, s/he also knows that there must be an NP which - by the biuniqueness condition - must be the complement of a DET. So the only non-trivial problem for the child is to find out what this DET is. UG tells the child which features are possible DET-features and through which types of processes (inflection, cliticization, lexicalization) these features may surface. Assuming again that the child correctly identifies *-ga* as a kind of clitic attached to the noun, s/he also knows that this morpheme must be a DET-feature rather than, say, an INFL-feature, because features must surface within their government domain. Consequently all the child has to find out then, is whether *-ga* is a case-marker, a number-marker, a marker for definiteness, etc. Obviously, there is sufficient positive evidence to guarantee the correct choice.

In general, under the approach proposed in this paper the problem of language acquisition (in the domain under consideration) reduces to the task of finding out which features of a functional category are selected by a given language and how these features surface. The rest is completely determined by Universal Grammar.

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⁸Quite clearly, it might turn out to be a problem to explain how the child finds out that a given phrase is a DP rather than some other category. But this problem arises in both Abney's and my analysis and the solution to this problem must be along the same lines in both approaches.

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