

# DERIVING [ $\pm$ STRONG] FEATURES FROM MORPHOLOGY: HEAD MOVEMENT

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## *1. Introduction and theoretical preliminaries*

### *1.1. Morphological variation and the [ $\pm$ strong] distinction*

Why and how do languages differ from one another? The question has always been a central concern for any theory of grammar aiming at explanatory adequacy, but a principled and unitary answer could not be attempted before the development of the so-called Principles and Parameters framework, ushered in by Chomsky's Pisa lectures in 1979 and codified in his *Lectures on Government and Binding* (Chomsky 1981). The subsequent developments that culminated in the radically novel Minimalist Program (Chomsky 1995) privileged one line of thought among the various approaches to comparative grammar that had emerged within the Government-Binding model: namely, the leading insight, first extensively articulated by Huang (1982), that the same syntactic processes (say, Wh-movement) can be overt or non-overt across languages. In this perspective, a large part of variation between grammatical systems is a misleading appearance caused by the different timing of essentially the same operations over essentially the same structures. The programmatic chapter 4 in Chomsky 1995 outlines a theory of grammar where differences between grammatical systems should eventually be analyzable in terms of a single formal concept: that of feature checking, whereby grammatically relevant "features" (the only primitive constituents of a linguistic representation) are introduced, moved and formally neutralized (or "checked") in local domains, as steps in the construction of a well-formed syntactic representation. Feature checking is the unitary mechanism underlying syntax; it may or may not bring with it displacement of phonologically realized material ("overt movement"), depending on the [ $\pm$  strong] nature of the features.

In Minimalist terms, weak and strong features are the same type of object, except that strong features must be spelt out (by stipulation, a derivation must check a strong feature on category C before it can construct nodes not headed by C itself;

Chomsky 1995: 233-234). The arbitrariness of this distinction has often been recognized, although there have been attempts to give it a morphological motivation (Pollock 1989, Vikner 1991, Roberts 1992, Solà 1996, Bobaljik 1995, 1997). But attention to the morphological legitimacy of the [ $\pm$  strong] distinction should not obscure the existence of a distinct dimension of crosslinguistic variation: morphological features are grouped and organized differently across languages. That some languages but not others have a full-fledged case system is a morphological fact that must be learned, just as it must be learned how many participles, for example, a given language has in its verbal system, or whether negation will be a particle, a verb, or even a noun (see Payne 1985).

This observation must be carefully distinguished from the observation that languages differ in morphological “richness”. As shown in (1), in a language like Finnish negation is a verbal auxiliary, but it is not morphologically richer than English forms like *doesn't* or *didn't*. Actually, the negative auxiliary only expresses agreement and not tense, therefore *doesn't* is richer because it expresses both. But *doesn't* and *didn't* are not forms of a negative auxiliary, because negation is not expressed lexically on the stem of the verb *do*. There is a morphological difference, but it is not one of morphological richness.

- |     |             |           |                      |                            |
|-----|-------------|-----------|----------------------|----------------------------|
| (1) | a. Finnish: | puhu-n    | e-n puhu             | e-n puhunut                |
|     |             | speak-1sg | neg-1sg speak        | neg-1sg speak-past.part.sg |
|     |             | ‘I speak’ | ‘I don’t speak’      | ‘I didn’t speak’           |
|     | b. English: | doesn’t   | DO [agr 3sg] [-past] |                            |
|     |             | didn’t    | DO [+past]           |                            |

Note that the clustering of morphosyntactic features is not the same thing as Saussurean arbitrariness of the sign. What is arbitrary is that the same concept, say, “day”, is mapped to the sounds *day* and *giorno* in different languages: but this is a matter of phonological realization and not of morphosyntactic features.

In fact, Chomsky himself (1995: 235) explicitly recognizes this as a distinct dimension of crosslinguistic variation, in so far as he mentions language-specific “principles” covering “... aspects of phonology and morphology, choice of parametric functions, and whatever else may enter into language variation”. He also takes into account language-specific conditions on the realization of formal features (Chomsky 1995: 240-241: “Suppose, for example, that specific morphological properties of a language constrain the phonetic correlate of formal features ... It appears to be the case for some languages that “templatic” conditions are required for morphological structure.”). One could certainly object that more research will bring seemingly morphological variation within the grasp of a purely syntactic explanation, using no extra vocabulary than Feature Attraction and Checking Theory. But, as the cited remarks make clear, Chomsky himself does not embrace such a naive rejection of morphology popular among syntacticians (but rejected by

Baker (1988b)). His conclusion is rather that these aspects of grammar ultimately shed no light on the computational apparatus underlying UG (Chomsky 1995: 241: “Then the lexical entries will abstract from these [purely morphological] properties, presenting just the information that they do not determine”.)

We have already mentioned the arbitrariness of the simple [ $\pm$ strong] distinction. But the difference in strength has nothing to do with the clustering of features, either in the abstract sense of morphosyntactic features relevant for syntax and interpretation, or in the purely morphological sense of features defining inflectional classes and ultimately phonological interpretation. Since any one feature, in Chomsky’s system, may be [ $\pm$ strong] in any one language, the way features are clustered under a single terminal does not affect the choice between overt or covert movement, so that the two dimensions of variation I have indicated are not mutually related in any way. This is a significant weakness for a theory having the ambitious (hence interesting) aim of reducing *all* grammatically significant parametrization to feature strength. Indeed, the existence of morphological properties differing across languages and not reducible to phonology or syntax forces Chomsky to the characteristically cavalier assertion that such variation is not grammatically relevant, “.. morphology being a primary repository of exceptional aspects of particular languages” (Chomsky 1995: 241). But denying a problem does not solve it.

### *1.2. Outline of the argument*

In what follows I will treat both the arbitrariness of the [ $\pm$ strong] distinction and the neglect for purely morphological variation as two genuine faults, and I will identify the culprit in an important assumption which Chomsky makes explicit in his section 4.2.2 (1995: 235-241): namely, that morphology is a catalogue of morphemes, supplemented if necessary by ancillary concepts which, however, are typically descriptive and in any case play no role in the workings of the computational system of human language. By morphology, then, Chomsky understands a sort of second-order phonology, a repository of information about “words” and smaller strings of phonological segments (affixes). This background assumption operates through two interrelated assumptions: that syntactic atoms are fully inflected and realized words, or vocabulary items, and that syntax is driven by formal properties of morphosyntactic features (Checking Theory). Because these features are the only relevant formal characterization of syntactic atoms, both overt and covert movement is triggered (and partly enacted) by them; for the same reason, additional information that may be morphologically significant (like the clustering of features) is irrelevant. Moreover, because syntax manipulates fully inflected and realized lexical items as opposed to abstract representations, the features in question cannot be reinterpreted as purely syntactic (as opposed to morphological); therefore, features are all that there is to know about lexical items, form the most abstract properties driving abstract movement to the properties of the spelt-out form. No

room is left for purely morphological information, unless in such a way that it is totally irrelevant for syntax. Hence, no room is left for a theory of lexicalization, that is an attempt to derive the locus of Spell-Out from morphological properties.

The alternative I wish to propose requires that we drop the assumption that such features, *qua* morphosyntactic, have to do with the *realization* of vocabulary items. Understanding “morphological” as “reflecting properties of realized forms” is certainly not the only possible interpretation, and arguably a simplistic one. A host of researchers, in fact, have articulated the view that the clustering and manipulation of morphological features, on the one hand, and the rules and principles governing their realization, on the other hand, are not necessarily isomorphic, although obviously related (Beard 1987–1995; Halle and Marantz 1993; Noyer 1997); in a slogan, the third person singular of a non-past English verb and the element /z/ (with its alternants) are not the same thing. This general stance is generally known as the “Separation Hypothesis”:

(2) *The Separation Hypothesis:*

Rules and generalizations about morphosyntactic feature bundles are separate from rules and generalizations about their realization. Syntactic terminals are feature bundles, not affixes or words.

The authors just cited defend different models of the role and organization of morphology in grammar, but they all share the view that the processes that construct morphosyntactic feature bundles are separate from the processes that map these feature bundles to phonology. The terminal nodes of syntactic structures are not affixes or lexical material, but just feature bundles with no phonologically relevant information. Processes of a different nature map them into words or affixes.

By drawing a clear line between the make-up of syntactic terminals (feature bundles) and their realization (or “lexicalization”),<sup>1</sup> the Separation Hypothesis can help us eliminate the stipulation that some features must be spelt out under a head just because the head is so marked (which is what the [ $\pm$  strong] characterization comes down to). Instead of simply stating which terminal node must be lexicalized, I will propose that lexicalization of a feature bundle is enforced by a particular *match* between syntax and morphology. To this purpose, we need a second theoretical tool: the idea, clearly articulated and motivated by Aronoff (1994), that there is more to morphology than just its interfaces with syntax or phonology. I will refer to this concept as the “Autonomy of Morphology”:

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<sup>1</sup> In what follows I will use “realization”, “lexicalization” and “morphological interpretation” as synonyms. “Lexicalization” in this sense has nothing to do with “lexical” as opposed to “functional”.

(3) *Autonomy of Morphology:*

Morphologically relevant categories have a function within the morphological system independently of their “meaning”.

According to Aronoff, morphologically significant units are autonomously definable linguistic categories that can, but need not, match syntactic or semantic units. The categories relevant to morphology do not coincide with those relevant to syntax: unlike Halle and Marantz 1993, Aronoff 1994 is not committed to a basically “item and arrangement” approach, but recognizes the role of notions such as stem forms or inflectional classes, which can only be construed as linguistic categories (as opposed to taxonomic constructs) within a morphological module. Obviously, morphological categories also include affixes, but crucially morphology is much more than the “syntax” of affixes. Viewed in this way, morphology is genuinely an independent module of grammar, with a conceptual vocabulary that cannot be reduced to that of syntax or phonology.

“A match between syntax and morphology”, therefore, will be a match of a certain kind between, on the one hand, feature bundles that fill terminals in a completed syntactic structure, and on the other hand, a morphological component that does more than simply translate this information into instructions to phonology. A theory of lexicalization, I want to argue, is possible once we recognize that the relevant interface is not syntax-phonology, but rather syntax-morphology. But variation exists on both sides of this interface in the way morphosyntactic features are clustered (so, on the syntactic side) and in the way morphology organizes and realizes these clusters (so, on the morphological side). Since lexicalization is a function of the *match*, it will vary across languages as a function of both syntactic and morphological variation.

## *2. Reinterpreting weak features: extended projections*

### *2.1. The status of abstract “movement”*

A theory of lexicalization requires in the first place that we reinterpret covert movement and the associate notion of [ $-$  strong] features. Abstract movement is supposed to have a number of peculiar properties. First, it is crosslinguistically more uniform than overt movement: a canonical illustration is the raising of verbs along the inflectional complex (which is not unanimously accepted: Hornstein 1995 points out that a phenomenon like antecedent-contained deletion presupposes that a copy of the verb, if not the verb itself, must be present in the VP at LF, to be copied into the ellipsis site; if verb movement out of VP were universal at LF, VP deletion should be equally unavailable or available to all languages, contrary to fact). Secondly, there is by now an ample literature on the apparent relaxation of some locality constraints on LF-movement and -pied piping (Nishigauchi 1990, Manzini 1992, Hornstein 1995, Brody 1995, among others) Finally, Chomsky 1995 sees

abstract movement as the “pure” illustration of the process of feature transfer, which alone is directly triggered by the need for checking. Overt movement, with concomitant pied piping of additional features (including phonological ones), is taken to be a fundamentally accidental by-product of other properties, relative to phonetic interpretability. Note that this approach is consistent with, and indeed required by, the Minimalist assumption that features are the only objects of syntax, not categories, heads, words, or affixes.

Before the introduction of Checking Theory and feature movement, the single rule “move any category” was the most natural way to unify all displacement phenomena, because the notion of category (head or XP) was equally well justified for visible syntax or LF. Once the primitives of movement turn from categories to abstract features, however, the unity of covert and overt displacement must be re-justified: the latter involves more than the former, and this requires an explanation. In a Minimalist setting, the question is turned on its head: Spell-Out is more or less an irrelevant accident affecting some features, so the question is no longer *if* visible and invisible movement are the same thing, but *why* visible movement deviates from the simple feature transfer required by syntax. Displacement must be one and the same thing regardless of lexicalization, since it is uniformly triggered by a single reason, the need to check morphosyntactic features.

In a system like this, the only reason why abstract movement should be triggered by morphology is the desire to put all non-local relations into the same category, that of “movement” (or “feature attraction”); and since overt movement is supposed to be triggered by morphology, so must its abstract counterpart. But if features are clearly distinguished from their realizations, contrary to Chomsky’s assumptions, perhaps we can find a reason for the displacement of abstract features that does not involve properties of their realization.

## 2.2. *Extended projections and categorial identification*

A ready instrument is provided by the concept of extended projection, due to Grimshaw 1991. How much of the functional architecture of the sentence is universally given and how much depends on language-specific inflectional categories remains an open question, but for our purposes the following assumptions will be made: heads with idiosyncratic, lexical content are dominated by a set of functional heads, roughly partitioning the sentence into lexical - inflectional - illocutionary information.

### (4) a. *Extended projection:*

“An extended projection ... is a unit consisting of a lexical head and its projection plus all the functional projections erected over the lexical projection”.

(Grimshaw 1997: 376)

b. [illocutionary [quantificational [inflectional [lexical]]]]

(cf. Rizzi 1995 Cinque 1997)

To provide the partitioning, these projections must be more than simple syntactic templates. They must be inherently interpreted according to very general categories: for example, the grammatical and semantic information loosely referred to as “tense” perhaps requires a finer articulation, but it certainly must be distinguished from the purely grammatical specification of pronominal features typically referred to as “agreement”. Whether UG specifies a full structure sufficient for all natural languages, as proposed by Cinque 1997, or only an essential articulation, is immaterial for our proposal.

Clausal projections, that is extended projections of verbs, are the best studied ones. In this case, the hierarchy in (4b) is generally taken to be instantiated by something like (5), where “Infl” stands for inflectional categories relevant for the language and Comp can accommodate Topic, Focus and illocutionary force indicators. The question whether the practice of including agreement among the heads is justified must be eventually answered, but I will leave the matter unsettled (cf. Iatridou 1990, Speas 1991, Spencer 1992, and, in a Minimalist setting, Chomsky 1995); the same applies to the positioning of negative markers in Inflection (agreement and negation notoriously display a far greater positional variation across languages than other projections; see Cinque 1997).

(5) [Comp<sup>1</sup> ... [Comp<sup>n</sup> ... [Infl<sup>1</sup> ... [Infl<sup>n</sup> [V ]]]]]]

The same approach should extend to nouns and adjectives, although here there is no such broad consensus. Roughly, we expect a pattern where inflectional projections are systematically inside projections relevant for the interpretation: so, Number and perhaps Agreement, if this is a head, should consistently be inside heads that express quantificational or referential properties, whether these are labelled D, Q, or Degree (cf. also Koopman 1994, with references).

(6) [Q [D [Num [N]]]  
[Deg [A]]]

Functional heads are not just there to host affixes. Inflectional heads jointly define a choice of morphosyntactic features for lexical heads, regardless of their actual realization (this partly contrasts with the more recent view of Grimshaw 1997). Projections above the inflectional level contribute information of a different kind, inherently relational: distributivity (following Beghelli and Stowell 1997), force as in imperatives and interrogatives, and discourse-related information like topic and focus. Instead of thinking that a verbal feature raises for abstract morphological requirements of the inflectional heads, we can more simply say that a lexical head must categorially identify all members of its extended projection:

(7) *Categorial identification:*

A lexical head must categorially identify all members of its extended projection.

In a purely syntactic sense, as opposed to morphological, all functional heads identified by a verb are light verbs, and all those above a noun are light nouns. As Grimshaw argued, selection effects are best viewed as restrictions on the co-occurrence of functional categories; for example, we do not expect an assertion projection to dominate a noun, but this does not mean that a complementizer head “selects” verbal inflection in any syntactic sense.

What Chomsky views as abstract feature movement has now nothing to do with morphology, in any sense: it is a formal relation expressing the fact that the information of the functional complex (say, tense) refers to the lexical head (say, the verb): so, in a way all verbs “raise” to the highest functional head of their extended projection. The metaphor of raising is misleading, however: we might as well say that a lexical head categorially identifies its functional shell, and that this is only possible up to the next lexical head. In fact, claiming that categorial identification is brought about by movement would merely replace one motivation for abstract head-to-head movement with another (cf. again Koopman 1994), leaving intact the claim that “movement” as such is independent of lexicalization. A stronger claim is preferable: the lexical characterization expressed by a head *X* (or rather, by a projecting feature bundle *X*) remains visible for all those projections above *X* which lack a lexical characterization. Metaphorically, “lexical” and “non-lexical” information conveyed by features are on different planes: the information provided by pronominal agreement and by a determiner does not obliterate the information provided by a head noun, but becomes part of it, in the same way that a head *X* with feature *F* “projects” *F* to the next bar level in Chomsky 1995: here what I have just called “bar level” is in fact the simple marking that *X* and its complement form a unit sharing with *X* the information encoded as *F*. A bar level, in this sense, is totally void of additional information; a functional projection contributes new information, but of a different type that must be added to that of the lexical head.

This view accords naturally with the intuition that the objects of semantic interpretation are whole “chains”, not just heads. We do not need to state this separately, once it is clear that functional projections express the syntactically contributed information relative to a lexical head — or probably to a simple structure of lexical heads, if we accept with Hale and Keyser (1993) and a host of other researchers that the building blocks of lexical semantics behave like heads in a syntactic representation.



### 2.3. *Visibility of morphological features*

Negation poses an apparent problem that leads to an important clarification. If the functional projections above a lexical head specify syntactically contributed information, and if negation is among these projections, then being negative is one of the properties of an inflected verb. But we do not want to say that every inflected verbal form occurs both in affirmative and negative version. The point generalizes to interrogative, or relative, or emphatic marking. In order to avoid massive and unjustified overgeneration of lexical forms, we must make explicit in what ways our analysis, based on categorial identification of an extended projection, contrasts with Chomsky-style approaches based on abstract movement. The latter holds that morphosyntactic specifications of lexical heads are checked (as in Checking Theory), or alternatively acquired, through movement across the inflectional complex, be it covert or overt. The question whether negation is one of the morphosyntactic specifications of a verb arises in this framework, but not in a framework where the relation between a lexical head and its functional projections is not accomplished through movement (more precisely, not through the same mechanism of displacement operative in overt movement). In this alternative view, the grammatical-interpretive connection between verb and inflection (and complementizer), noun and determiner (and quantifier), lexical and functional categories, has a different nature from the connection between a moved element and its trace. I have informally proposed above that functional heads are, by definition, accessory on a lexical one.<sup>2</sup> The abstract features present under each node *collectively* specify an interpretation for the whole extended projection: if the sentence is negative, or has past tense, or is a question, the node V does not need to carry these specifications, *as long as we consider just abstract morphosyntactic features*. This is stated in (8):

(8) *Visibility:*

Features expressed on the heads of an extended projection are all visible for the interpretation of the extended projection as a whole.

It is assumed that the coarse partitioning provided by UG constrains the position where abstract features appear: for instance, if there is a Tense node, tense features will appear there by definition, not under V.

The realization of such structures, or morphological interpretation, depends on the formatives available to the language; in some languages, inflected verbs might indeed carry affixes (or other forms of exponence) for negation, past tense or interrogativity. Following common practice, explicitly codified in Halle and

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<sup>2</sup> Recall that even in Chomsky's (1995) "bare" model the distinction between lexical and non-lexical heads does not follow from any principle.

Marantz 1993, I will assume that a feature bundle is lexicalized by that inflected form that realizes (or “discharges”, in the more elaborate model of Noyer 1997) most of its features.<sup>3</sup> But by (8) it is not necessary to think that V raises to Tense whenever its form encodes information about grammatical tense: what determines the position of the verb in the tree and what is the relation between abstract features and verbal affixes are two distinct theoretical questions. An answer to the first one, namely which node (or nodes) in the extended chain is lexicalized, will be outlined in the following section. Granting the feasibility of such a theory of lexicalization, let us focus on the second one: our model allows a realized form to match its features not against those present under a single node, but against those of the whole extended projection. In other words, “interpretation” in (8) means both “semantic interpretation” and “morphological interpretation”. In this second sense, (8) may be read as (9):<sup>4</sup>

(9) *Morphological visibility:*

A word form realizing feature F can be inserted under a node X not specified for F, provided that F appears in the extended projection which includes X.

(8) and (9) state that the information provided by a whole extended projection is lexicalized under one or more of its heads (depending on the availability of free forms or bound affixes); any one terminal can in principle be spelt out. The next section will propose a way to constrain this freedom. Note that neither (8) nor (9) make any claim about the ordering of affixes in a realized form; they grant freedom

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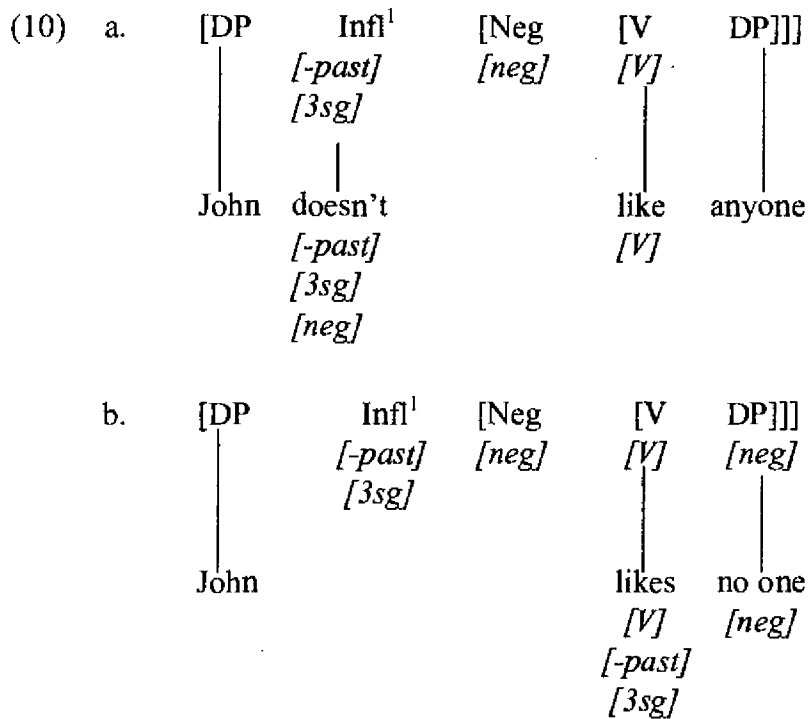
<sup>3</sup> Although the issue of realization will not play an important role in what follows, some assumptions must be made explicit. In general terms, a realized form is associated with morphological features which must match those filling the syntactic terminal it lexicalizes. I will use the expression “word form” when referring to a form where all affixation processes are completed (just what it means to be “completed” should be made clear, but the argument can stand on its feet even without an analysis of cliticization and compounding). Otherwise, the simple term “form” is used: it is more neutral than “affix” or “stem”, and simply refers to those instructions for phonology that constitute the output of morphological operations on a feature bundle. Such a vague term purposely does not specify whether “word forms” are directly the output of realization rules whose input is a feature bundle, or whether they are constructed by assembling smaller “forms” (affixes). It will be clear from the following section that I commit myself to the inclusion of “affixes” among the morphological categories, but this is compatible both with a realizational and with a combinatorial view of morphological interpretation (or “Spell-Out”).

<sup>4</sup> Another necessary assumption is that, following Halle and Marantz 1993, not all features in the input (under a terminal for Halle and Marantz, in an extended projection here) must find a realization: vocabulary items may be underspecified.

to lexicalize under any node(s) of an extended projection, not freedom to lexicalize in just any way.

## 2.4. Negation and Do-support in English

2.4.1. Negation in English provides a convenient illustration. Consider the following examples:



For reasons detailed in Acquaviva 1994, 1995, 1997a, I take negation to be abstractly represented on a node inside the inflectional complex whenever the whole sentence is negated, no matter whether the visible realization of negation appears as an inflectional marker (10a) or lower down, as a negative DP (or rather QP: see Acquaviva 1995 for discussion)<sup>5</sup>. In any case, there is no need for the verb to be

<sup>5</sup> The quantifier *no one* is inserted under a node marked [negative] in (10b) because its head is not itself part of the extended projection of V: the whole direct object *no one* is a distinct extended projection, which must be marked [negative] given the fact that these quantifiers have a negative interpretation even in isolation. This is not incompatible with the claim that negation is interpreted on a [negative] inflectional head: in Acquaviva 1995, 1997b I defend the view that, in sentences like (10b), the head of *no one* and the abstract inflectional head Neg<sup>o</sup> are interpreted at LF as a single complex syntactic object. This proposal, however, has no consequences for morphosyntax.

[negative] just because the whole extended projection is so marked. By the same reasoning, if we take seriously the idea that the objects of interpretation are extended projections, then there is no reason to insert the form *likes* under a node containing agreement features. In order to have the correct verbal form match the correct interpretation, all that is needed is that the information [3 person sg, nonpast] should be present on the extended projection. Where and how this piece of abstract morphosyntactic information is visibly encoded is a related but distinct question, whose answer depends on language-particular mechanisms of morphological realization. In the same way, where and how the negative feature is spelt out depends in part on the morphology of the language, a component that must be learned anyway. In English, evidence like that in 11 will teach the child that *not* is a particle, and that it marks simple negation in sentences and in non-sentential negation (I will briefly consider the reduced form *n't* later on):

- (11) a. I did not talk  
      b. not very well  
      c. not even ten years ago, you could see those movies  
      d. not in my life

This entails, among other things, that the particle *not* does not “select” tense or any other verbal inflection: there is nothing inherently verbal in it. The child will also learn that all other expressions of negation, adverbs like *never* or indefinites like *nobody* carry with them extra lexical information; only *not* is the simple marker of bare negation.

2.4.2 This last observation has some implications for the analysis of *do*-support. Descriptively, *do*-support in negation is one facet of a general phenomenon: whenever the extended projection of the verb contains information not expressible on the verb itself, like negation, emphasis, future tense, interrogativity, and various modalities, finite inflection is lexicalized. If there is no modality to be lexicalized by an auxiliary, *do* appears. A description in these terms is made possible by the clear distinction between bundles of abstract features and their lexicalization (largely dependent on language-specific morphological properties). It contrasts starkly with common conceptions that view syntax as a mechanism that assembles words; however, it echoes some aspects of the analysis proposed by Wilder and Cavar (1994), who argue that the complex of lexical and inflectional features in English is in fact always expressed periphrastically, by means of an auxiliary that happens to be a null form in the present. Instead of following their Minimalist analysis, however, I will reject the idea of a form lexicalized as zero, and propose instead that the feature bundle filling Inflection in cases like (10b) is not lexicalized, for reasons that will become apparent in the next section (when I will attempt to outline a theory of lexicalization). Granted that the feature bundle under Inflection does not need

lexicalization in English, the question now is why it is obligatorily spelt out by *do* in yes-no questions and negation (plus, respectively, movement to C and *not*), despite the fact that neither *do* nor other auxiliaries are inherently interrogative or negative. I will focus just on negation to illustrate the main point, which is that *do*-support is more tightly linked to morphology than to syntax.

2.4.3. As is well known, in sentential negation *do* is ungrammatical with any negative expression except *not* (12a,c,e), and *not* is only grammatical with *do* (12a,b):

- (12) a. John does not speak  
b. \* John not speaks  
c. \* John does never speak  
d. John never speaks  
e. \* John does speak to nobody  
f. John speaks to nobody

Recall that, under widely held assumptions, all negative sentences like those in (12) are marked by the feature [negative] (see (10) above and references there cited). If *do*-support were only sensitive to purely syntactic configurations, and if all negative sentences have a [negative] feature on Infl, then *do* should be uniformly present or absent in (12). Instead of stipulating with Bobaljik (1995) that only *not*, but not the adverb *never*, blocks adjacency between Infl and the verb, thus enforcing *do* as a default lexicalization of Infl to express inflectional features, we can exploit the unique morphosyntactic character of *not*: this particle lexicalizes the negative feature, and nothing else. This circumstance, coupled with the observed mutual implication of *do* and *not*, suggests that *do* and *not* are two discrete lexicalizations of just one syntactic object, which is made up entirely of grammatical features.<sup>6</sup> Elements like *never* or *nobody* are different because they do not consist just of the grammatical feature [negative]. Abstractly, they too are linked with inflection, and that is why the whole sentence is negative; but they also carry with them a certain amount of unpredictable lexical information, and therefore cannot take part in the realization of a grammatical formative. The main word in this last sentence is *realization*: the negative characterization of an English sentence is *realized*, or given visible substance, either through a lexical head (as in *never/nobody*), or through Inflection itself. In the latter case the ingredients of a negative auxiliary are assembled: negation and inflectional features. Since the vocabulary of English has no truly negative auxiliary (a single inflected modal verb that expresses negation inherently by its very stem), the two ingredients appear under distinct nodes, and

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<sup>6</sup> It is uncontroversial that modals and other auxiliaries are like *do* in consisting entirely of grammatical information, as opposed to lexical (cf. Beard 1995: 128-137).

each formative also has other uses. But, crucially, they can lexicalize a set of grammatical features (split between two nodes) because both are exponents of grammatical features and nothing else. This essential distinction between *not* and *never / nobody* in connection with *do*-support could not be drawn disregarding the way features are clustered (that is, disregarding an important component of morphology).

2.4.4. These are morphological facts about the vocabulary entries of English; a child learning Finnish will be led by the evidence to posit a negative auxiliary. In other words, what is lexicalized as a cluster of grammatical features in Finnish is split between two distinct terminals in English. Other Germanic languages express the same information (simple negative sentences) with arguably the same structure as English, but without *do*-support. This again suggests that the obligatory insertion of *do* under an inflectional node appropriately marked is an accident of the English morphology and vocabulary in tandem with syntax: if English did not have a semantically empty, purely functional auxiliary, then the “complex negative auxiliary” made up of *do* and *not* could not arise; but the history of the language led to the emergence of such a dummy element, and therefore finiteness and negation have their inflectional realization (*do ... not*) on a par with finiteness and various modalities.

Our discussion of negation was started by the question whether verbs carry the information that they occur in a negative or affirmative clause; the answer has been that they do not, because being negative is a property of the whole extended projection. Having distinguished abstract featural characterization from morphological realization, we then argued that the distribution of *do*-support is largely determined by properties of the realization: English realizes the feature [negative] on Inflection either by morphologically negative lexical elements or by separately spelling out inflectional and negative features, lexicalized as *do* (or other auxiliaries) and *not* respectively. Now, we can briefly consider how this approach clarifies the question whether negation can really be regarded as an inflectional affix of the verb. The Separation Hypothesis helps us to disentangle two aspects of the question: as an abstract feature, negation *is* indeed like an affix because it is part of the accessory information about a lexical item provided by its extended projection. In this sense, “affix” must mean something like “piece of information added to the core lexical information” — a rather imprecise usage of this word. But the realizations of this information are not necessarily bound affixes, where “affixes” means “forms available to a language for making abstract information visible” — the common meaning of the word. So, in agglutinating languages like Turkish negation is in fact a verbal affix (13a); even in English, Zwicky and Pullum have pointed out that the reduced form *n't* behaves like an affix because it induces allomorphy on the stem of the auxiliary. As shown in (13b), the stem [du] becomes [dou-], and [wil] becomes [wou-].

- (13) a. gel-di-m                      gel-me-di-m                      Turkish (Beard 1995: 58).  
      come-past-1sg                come-neg-past-1sg  
      'I came'                      'I didn't come'  
      b. do [du]                    →        don't [dɒnt]  
      will [wɪl]                   →        won't [wɒnt]                      (Zwicky and Pullum 1983)

But being a bound affix is a property of single forms. Negation may perfectly well take a non-affixal form, just like the category of [future tense] may be realized by an auxiliary like *will* or by a bound inflectional affix. English shows that the same language may have both an affixal variety, *n't*, and a free form *not*.

### *3. Reinterpreting strong features: the role of autonomous morphology*

#### *3.1. Outline of the argument*

The morphological mechanisms by which feature bundles access phonology have already played a role in the foregoing discussion, but have not been focussed on. This section addresses the central question of why access to the component of morphology feeding phonology is restricted to certain syntactic terminals, but not others. The outline of the argument is the following: syntactic terminals are interpreted by feature bundles, not words or affixes; these abstract representations are manipulated by morphology, which eventually provides instructions for the phonological spell-out component; if the features under a syntactic head happen to identify a discrete morphological category, and this in turn identifies a range of phonological realizations, then the syntactic head is lexicalized. The key of this argument is that morphology recognizes its own units and significant categories: it is when morphological and syntactic unit coincide that lexicalization is enforced.

#### (14) *Principle of lexicalization*

If the feature bundle F under the head  $X^{\circ}$  is matched by a unit of autonomous morphology, then F is lexicalized under  $X^{\circ}$ .

- (15) A unit of autonomous morphology is any category (inflectional class, stem form, affix, ...) by reference to which morphological generalizations can be made.

(Cf. Aronoff's (1994) notion of "morpheme")

Instead of specifying what degree of morphological "richness" makes movement mandatory, (14) states under what conditions a node must be lexicalized. As we will see later, this formulation has empirical consequences in cases where (14) enforces lexicalization of more than one head in an extended chain. Another consequence of this formulation is that multiple exponence in the same "chain" is not ruled out in principle, not just for distinct features (as in auxiliary-verb constructions), but also

in cases of multiple exponence of the same features. However, I will not explore this line of analysis here, limiting myself to note that the representational approach underlying (14) is better equipped than pure feature-transfer to handle multiple exponence (cf. the discussion by Holmberg (1997) in a Minimalist setting).

### 3.2. Morphology-driven lexicalization

Aronoff (1994) exemplifies the autonomy of morphology by considering the English formative /z/, which marks plural in nouns and third person singular agreement in non-past finite verbs. As illustrated in 16, this affix defines a range of alternants in a phonologically predictable way, but the rules are stated over the affix and not over the segment /z/.

(16) agr 3sg of V	plural of N	auxiliary	genitive
kick[s]	kick[s]	Dick[s] gone!	Dick[s] arrival
tag[z]	tag[z]	Meg[z] gone!	Meg[z] arrival
row[z]	row[z]	Joe[z] gone!	Joe[z] arrival
miss[iz]	miss[iz]	Ross[iz] gone!	Ross[iz] arrival

Aronoff points out that the same affix is also the exponent of reduced auxiliaries *is*, *has* and, in colloquial registers, *does*, beside marking genitive as a phrasal clitic. The morphophonological alternations it defines are almost the same, with minor differences; so the affix must be recognized as a unit in the morphology of English, although it is put to use to express different and unrelated “meaning”, or morphosyntactic features. In other words, different feature bundles are mapped to a single unit of morphology. What is phonologically interpreted is the unit of morphology, not directly a feature bundle.<sup>7</sup>

Now recall that English main verbs are syntactically lower than Italian or French ones (Pollock 1989). Then we have a correlation: on the one hand lack of overt movement by the verb, on the other hand a morphological marker (/z/) that does not uniquely mark the function [3sg nonpast]. Consider now another example of the same correlation, namely that lexicalization in a high position goes hand in hand with particular morphological status of the relevant marker, and conversely. French and Italian infinitives of main verbs are functionally near-equivalents; I will assume that ignoring spell-out they have the same feature bundles. However, thanks to the

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<sup>7</sup> Still within the English verbal system, past is either marked by unpredictable stem forms, or by a dental affix which is for all intents and purposes undistinguishable from the dental affix of past participle; as Aronoff (1994) again notes, the notion of past participle itself is primarily a morphological category, which expresses quite unrelated meanings such as perfect and passive.



work of Pollock (1989) and Belletti (1990, 1994) we know that Italian infinitives “raise higher” than French ones, as 17-18 exemplify:

- (17) a. Pour ne pas manger.                      French  
      b. \* Pour ne manger pas.  
          ‘For not to eat’.  
      c. [Infl PRO *ne* [NegP *pas* [Infl [VP *manger* ]]]]
- (18) a. \* Per non più mangiare.                      Italian  
      b. Per non mangiare più.  
          ‘For not to eat again’.  
      c. [Infl PRO *non mangiare* [NegP *più* [Infl [VP *t* ]]]]    (Pollock 1989: 412)

Here again we can see a morphological difference. The category [infinitive] must certainly be encoded for both languages in the morphosyntactic representation constructed by syntax. It is irrelevant just what features define this morphosyntactic category. But the realization is different: the endings of French infinitives, listed in (19), are all vaguely similar for historical reasons, but there is no specific infinitival affix recognizable as such by morphological idiosyncrasies:

- (19) chanter, vouloir, prendre, conclure, mourir  
      ‘to sing, to want, to take, to conclude, to die’

*Chanter* ‘to sing’ has the same form in the infinitive, past participle and present indicative 2nd person plural; *prendre* ‘to take’ or *vivre* ‘to live’ have the same endings as the adjectives *tendre* ‘tender’ and *ivre* ‘drunk’, and their final /r/ cannot in any case be considered an infinitive affix because it does not induce any morphologically conditioned effects.

Italian, by contrast, has a single marker consisting of the thematic vowel plus /re/, plus a few nearly identical cases like *condurre* (cf. Vogel 1993):

- (20) cantare, volere, prendere, concludere, morire, condurre  
      ‘to sing, to want, to take, to conclude, to die, to lead’

This ending is recognizable as an affix by its sensitivity to morphological rules, like English /z/ in this respect. If it combines with a clitic, the final vowel must be deleted: ‘to love you’ is [amarti], not [amare ti].

- (21) amare + ti → amar.ti (\*amareti)  
      ‘to love + you’

However, the omophonous *amare*, feminine plural form of the adjective *amaro* ‘bitter’ cannot undergo the same rule; here the pronunciation must be [amare ti]:

- (22) a. le mandorle amare ti piacciono (amare ti.piacciono)  
b. \* le mandorle amarti piacciono (\*amar.ti piacciono)  
'you like bitter almonds'

Syntactically, this means that a clitic attaches to a verb but not to an adjective, a familiar generalization. But this syntactic information must be available at a level where phonological material is being combined: in other words, there is such a thing as an infinitive (and therefore verbal) affix. Like the English /z/, this affix is more than a phonological spell-out; it must be recognized as a unit of Italian morphology (a "unit of the form"); unlike the English /z/, however, here the unit of the form matches a unit of the meaning, that is, the morphosyntactic category [infinitive] is realized by a purely morphological category [infinitive]. It is no accident that Italian infinitives are lexicalized under a higher node than French ones, for the same reason why English verbs do not raise despite being marked by /z/. This regularity points to a principle of lexicalization like (14), here repeated, with (15) as ancillary definition:

(14) *Principle of lexicalization*

If the feature bundle F under the head  $X^0$  is matched by a unit of autonomous morphology, then F is lexicalized under  $X^0$ .

- (15) A unit of autonomous morphology is any category (inflectional class, stem form, affix, ...) by reference to which morphological generalizations can be made.

(Cf. Aronoff's (1994) notion of "morpheme")

### 3.3. *The syntax-morphology interface*

In this simple form, (14) attempts to derive the locus of spell-out among the heads of an extended projection. In accordance with Distributed Morphology and with the syntactic model proposed by Brody (1995), it presupposes that complete syntactic representations are interpreted by an autonomous morphological component. The units and categories of this component must be learned anyway: the morphological properties of English affixal /z/ or Italian infinitival ending /Vre/ must be learned, just like the fact that English expresses future tense by means of an auxiliary while Romance encodes future within verbal inflection. What motivates a verb to appear under Tense is not just the fact that its Tense morphology is "rich" or realized as a discrete affix; rather, a tensed verb appears under Tense if the feature [tense] in the extended projection of V is a sufficient input to define a verbal affix, or possibly a set of realization rules; in other words, a verb raises to Tense in a language if Tense corresponds in this language to one side of a linguistic sign: a mapping of sound and meaning. And, by definition, this must be interpreted

phonologically. English /z/ is not a sign, because it is compatible with a range of unrelated meanings; it is only a unit of the form. The feature [infinitive] in French (or the corresponding feature bundle) is not the “meaning” part of a sign; in that language infinitive verbs are signs, but not infinitive affixes.

If there was no autonomous morphological component, then all syntactic terminals would be directly mapped to phonology. Knowing the grammar and the vocabulary of a language entails knowing, among other things, what features are clustered under syntactic terminals and how and to what extent available formatives match them. Knowledge of morphology, in particular, entails knowing how the information scattered along extended projections is reorganized, expanded and reduced by available forms. When, despite this reorganization, the map from a feature bundle to a “unit of the form” is still direct, then also the map with phonology will be direct. In effect, a syntactic terminal will be spelt out whenever this is possible: that is, whenever its features can be read directly as instructions to phonology.

It is worth emphasizing that a proposal along these lines is incompatible with the view of the syntax-morphology interface sketched out in Chomsky 1995. Whether a terminal will be spelt out depends here on what features are clustered under it and on the way the morphological system is organized in that language. This presupposes that the sound-meaning mapping is not a by-product of syntactic operations (encoded in the form of [+strong] features), but is performed by an autonomous morphological module sufficiently structured to recognize its own significant categories. A global consideration of the morphological system as a whole will tell the speaker whether a given exponent (an affix or a rule of exponence) is a *sign*, something that by itself establishes a match between the “sound” corresponding to a form (or set of forms) and the “meaning” corresponding to a feature bundle under a terminal. Lexemes, of course, tolerate a certain degree of synonymy, but within grammatically encoded information a formative compatible with more than one feature bundles (unrelated) cannot be regarded as a sign. In such a case, the whole inflected word will be a sign, but not the formative. It follows that even a clearly identifiable affix unambiguously signalling a grammatical feature F will not necessarily license lexicalization under the inflectional node hosting F abstractly: what is crucial is the status of the affix within the whole morphological system.

Such a global consideration of the whole morphological system is independently necessary for any analysis attempting to give the [ $\pm$ strong] distinction a morphological motivation. Consider the variety of the exponence of [past] in English verbs:

- |                         |                           |
|-------------------------|---------------------------|
| (23) a. watch, watch-ed | -/t/                      |
| b. drink, drank         | ablaut (root revowelling) |
| c. put, put             | ablaut (no change)        |

Any conclusion drawn from the exponence of [past] in English must take into account that inflected verbs “raise” or stay *in situ* as a whole class, not depending on the morphological make-up of single forms: otherwise, if syntactic properties were directly triggered by the simple presence of discrete affixes, we would expect a difference at least between *put* and the unambiguously past *drank* (neither of which can legitimately be considered a lexically marked exception).<sup>8</sup> Thus, consideration for morphological properties automatically leads to considering the system as a whole, even for approaches that do not otherwise envisage changes in Chomsky’s (1995) framework. But in that framework any connection between syntax and morphology proper is problematic, beyond the expression of morphosyntactic features. Such features do not determine any aspect of their exponence; so much so, that the very same features characterize in the very same way purely abstract forms.<sup>9</sup> As mentioned above, Chomsky explicitly claims that language-specific morphological characterizations are irrelevant for the computational system simply called “grammar”. It is hard to avoid the consequence that this must include information such as the presence of unambiguous affixes, especially if this entails (as we have seen) a global consideration for the whole system of exponence in a language. Therefore, I believe, the lack of any morphological motivation for the [ $\pm$  strong] distinction in Chomsky’s analysis is no accidental gap: a morphological motivation cannot exist, because “grammar” is blind to (or better, does not speak the same language as) the morphological system.

### 3.4. Syntactic head raising

What the principle of lexicalization claims is that under certain circumstances an inflectional head must be spelt out, not that it attracts the verb (or any lexical head). In this respect it differs significantly from any attempt to motivate “raising” of a head. In the consistently representational perspective here assumed heads do not

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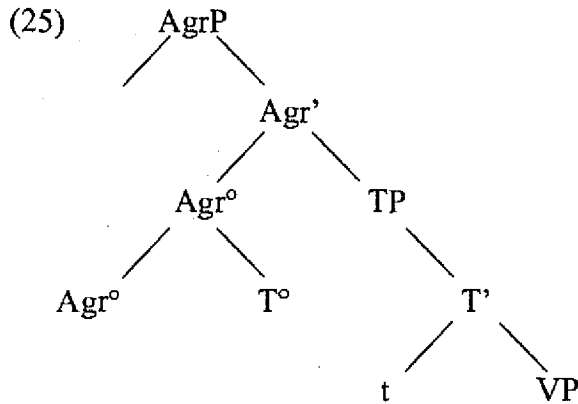
<sup>8</sup> The formal category [past] in English and German characterize verbal forms which are not notionally past, and are traditionally included in the subjunctive mood:

- (i) If John drank a bit less, he would be almost charming.
- (ii) Selbst wenn ich ihm ein neues Auto kaufte, wäre er nicht zufrieden.  
'Even if I bought him a new car, he wouldn't be happy'.

But this is not the reason why the “past” suffix is not a sign. Other languages, like Swedish or Dutch, only express subjunctive analytically; yet, the presence of strong verbs as a well-established class in verbal morphology entails that even in these cases the past suffix is not the sign for past within verbal inflection, although it is within single forms.

<sup>9</sup> This is not the only reason why Chomsky’s “morphosyntactic” features cannot possibly exhaust morphology. As Halle and Marantz (1993: 115, 135) argue, the morphological component must be able to add or copy certain features according to language-specific requirements.





Purely syntactic displacement of features must be retained, along with the severe restrictions that make this an explanatory tool, but its nature is strictly syntactic and not morphological. “Movement” should not be invoked just to account for the position of a visible formative, but for more complex reasons that can only be gleaned by making reference to the positioning of abstract feature bundles. In this case the placement of the node Tense under the node Agreement ensures that both are lexicalized, in compliance to the universal principle of lexicalization, while at the same time the lexicalization of both results in spelling out a single word form: the two affixes plus a verbal base, whose necessity only emerges at the morphological level where Tense and Agreement are introduced as bound forms. The net result is that principle (14) in fact ensures that a terminal that can be lexicalized under node X will be spelt out under X *or higher*, but not lower. We thus derive on principled grounds an important insight due to Brody (1995), whose model underlies many aspects of the present proposal:

(26) *Transparency* (Brody 1995):

The contentive category in the chain must be in the highest position licensed by morphology.

Thus reinterpreted, movement is still triggered by morphological reasons, but it only affects the abstract feature bundles syntax is assumed to operate on, not affixes. Its nature is “abstract”, but it brings about visible displacement of realized categories. It may be possible to dissociate it from the traditional idea of syntactic movement by imposing different constraints, but I see no reasons for doing so, and many for not doing so. In fact, the assumption that the constraints on it are those familiar from much syntactic literature (c-command, locality, and hierarchical nesting of the nodes involved) allows us to retain the wealth of empirical results that followed the pioneering work of Baker 1988a: syntax is not the same thing as morphology (see in particular Baker 1998b and Noyer 1997), but constraints on syntactic operations have important morphological consequences. There is another

desirable consequence in accepting that a feature bundle may move onto another feature bundle: this presupposes a full-fledged syntactic structure, which is necessary to account for the distribution of adverbs and other elements assumed to fill specifier positions. This marks a clear difference between the approach I am defending here, which is still essentially syntactic, and attempts to explain inflection only in lexical and word-structural terms (cf. for instance Sells 1995).

The principle of lexicalization (14) therefore should not be construed as a claim that syntax does not require a theory of movement, or that visible movement results *entirely* from the principles governing morphological spell-out (as advocated by Beard (1995: 356-375)). But the movement allowed, far from being a residue forced by recalcitrant data, is organically integrated in the general approach, because it is limited to abstract movement of the features of one head onto another, triggered by (and obviously compatible with) the tension between the principle of lexicalization and language-specific morphology.

It is worthwhile stressing why this solution does not weaken the analysis, and does not make it indistinguishable from more standard ones. The main difference is that the morphological requirements of affixes here do have some role to play in head movement, but movement as a whole, not even just overt movement, is not based on that. The principle enforcing lexicalization is independent of affixes, and in this way avoids well-known paradoxes like having to claim affixal or clitic-like properties for null heads. A second major difference is that the approach here proposed makes a sharp and principled distinction between affixes that enforce lexicalization, and affixes like English /z/ which do not. Only the former are units of the form biuniquely mapped to units of the meaning. As far as I can see, no comparable result is achieved in the analyses of Beard (1995) and Brody (1995).

#### *4. Beyond inflection: movement to C*

##### *4.1. A different type of movement*

The relation between verb and complementizer (short for “highest heads in the verbal extended projection”) is not of the same type as the relation between a lexical base and its inflectional accessories. In languages like Germanic and Romance, the grammatical information expressed by the verb and its auxiliaries is independent from the interrogative, relative or hypothetical characterization of the whole clause; the former information is grouped in the inflectional complex, the latter in the complementizer region (negation being a conspicuous exception). This distinction is a conceptual one (as opposed to “formally encoded in the grammar”), between information that makes up a predicate and illocutionary information about the predicate thus formed; to what extent either type is encoded by affixes or free forms is a separate and secondary question. The primary one, which will be addressed

here, is how to account for instances of visible “movement” of V or auxiliaries to C within the framework we are developing.

A comparison with “movement” to inflectional positions will highlight the problematic nature of V- (or Aux-) to-C movement, illustrated in (27)-(29):

- (27) a. Do [IP you t speak English] ?  
b. Sprechen [IP Sie t Englisch t] ?
- (28) a. Had [IP you t told me before], ...  
b. Hättest [IP Du es mir t früher gesagt t], ...
- (29) Ich weiß [IP t t nichts t].  
‘I know nothing’.

First, neither English nor German expresses through verbal affixes any of the features plausibly in C, so that the most straightforward way to replicate the effects of head raising is precluded (see (14) above and the ensuing discussion).<sup>10</sup> Second, if raising to C is certainly not triggered by affixes, it appears to be construction-dependent: it signals interrogative or conditional value of the clause, but in other clause types the very same forms remain within IP. This contrasts starkly with movement of V to an inflectional position; it is as if a particular choice of tense or mood (or negation) was expressed by raising V past some adverb, *with no further marking* on V or elsewhere. Third, raising to C is not coextensive with the relevant characterization of C: if the latter position is filled, V or Aux stays *in situ* and no *do*-support is triggered:

- (30) a. I wonder if [IP you speak English].  
b. Ich frage mich, ob [IP Sie Englisch sprechen].
- (31) a. If [IP you had told me before], ...  
b. Wenn [IP Du es mir früher gesagt hättest], ...
- (32) Ich weiß, daß [IP ich t nichts weiß].  
‘I know that I know nothing’.

These well-known facts suffice to discard any variant of the idea that V / Aux raises to C in order to somehow achieve morphological well-formedness, the way V does to Inflection in some languages. Conversely, C cannot be said to attract V / Aux the same way that Infl attracts V: an optionality like that displayed by the synonymous (28) and (31) has no parallel in the inflectional domain (it is as if future tense was alternatively expressed either by a free morpheme or by repositioning the

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<sup>10</sup> See Reuland 1990: 143-146 for a critical view on the purported role of inflection in C in verb-second languages.



*unchanged* verb).<sup>11</sup> Notice in passing that for the same reasons it must be wrong that a functional head FUNCT hosts a lexical one LEX (i.e. LEX raises to FUNCT) unless FUNCT is already filled by a free morpheme.<sup>12</sup> Such a “generalized affixation” approach cannot explain why V / Aux does not appear in C whenever the latter is not filled by a free morpheme, like in English declarative clauses; nor can it explain why (28) are at all possible, given that the vocabulary of the language has free forms available to spell out C that should constantly block (in the morphological sense) a raised V / Aux (again, no such optionality is attested in the inflectional domain).

The nub of the problem is that movement from the inflectional region to C cannot be made to follow from morphosyntactic requirements on the raising element, no matter how the analysis is phrased. The question why this holds for movement to C and not to Infl requires a principled answer; I will turn to this issue later. The other possible approach consists in making use of properties of the target element, namely C. Wilder and Cavar (1994) pursue this line, anticipating Chomsky’s (1995) reformulation of movement as “feature attraction”, where attractors must be functional categories. From this perspective the differences between an approach in terms of feature checking and one in terms of a theory of lexicalization stand out more clearly. The former must primarily identify a feature shared by the choices of C triggering raising and by the raised element; the latter must demonstrate that the raised element biuniquely matches the feature(s) under C — apparently a hopeless task, given that the raised element is a verb or an auxiliary. Checking Theory seems better equipped to analyse the facts, but this is simply because the unconstrained assumption of features, their position and especially their [ $\pm$  strong] value is compatible with many, if not all, states of affairs. In fact, a

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<sup>11</sup> Wilder and Cavar (1994) highlight the peculiarities of construction-dependent movement in an early Minimalist setting (earlier than chapter 4 in Chomsky 1995), arguing that a strong feature on a head X may be checked by a category Y even if that feature is weak on Y. Because Y only raises overtly to check X’s strong feature, it may fail to raise if X’s feature is already checked: thus, Y’s raising depends on the construction. They propose that [+operator] C in English requires checking of a strong [+finiteness] feature, which is performed by raising an auxiliary (which, they argue, is always present in English even if null in simple present and past). In verb-second languages [+finiteness] is strong even on [-operator] C. In addition, embedded [+operator] C always has a weak value for [+finiteness]. My analysis makes ample use of Wilder and Cavar’s views, but attempts to dispense with the stipulations necessary in a Minimalist analysis.

<sup>12</sup> Cf. Beard (1995: 153): “... a more integrated theory of Aux may be developed, one in which Infl categories are raised until the raising process reaches a node which the MS-component invests with a free morpheme.” Beard’s proposal concerns the inflectional domain only, however, while in the text I am criticizing the general application of this simplistic view.

slightly more articulated theory of vocabulary insertion is all that is needed to derive Infl-to-C from the principle of lexicalization. To illustrate this, I will now sketch an analysis of English auxiliary inversion in interrogative and conditional main clauses. Additions and qualifications will no doubt be necessary in order to extend it to subordinate clauses and to verb-second phenomena; but the purpose of the following illustration is to show that the scope of a morphosyntactic explanation goes well beyond the realm of inflection, and to that purpose it will suffice.

#### 4.2. Input features

Some premisses are needed to begin with. First, those choices of C that trigger movement are marked by a contentful feature: call it [Q] for questions and [IF] for conditionals. Second, the feature bundles filling the inflectional node(s) are not marked for [Q] and [IF]. These two assumptions are not stipulative: the first is the mere extension to C of what we are taking for granted throughout (for instance, that tense features are under the Tense node), and the second is the null hypothesis, in absence of any reason for thinking that English has interrogative or conditional auxiliaries.<sup>13</sup> Now the tricky fact to be accounted for is that auxiliaries are exponents for [Q] and [IF] (if and only if they move). Let us restate this descriptive observation and assume, as a third premiss, that the various auxiliaries realize not only their respective bundle of grammatical features (call them [INFLCAN], [INFLMUST], [INFLHAVE], etc.), but also [INFL] + [Q] and [INFL] + [IF], the latter excluding *do*. This may seem a costly move, and requires some justification. I am not claiming that auxiliaries optionally “mean” Q or IF; that would hardly be an explanation, and in addition would incorrectly predict that interrogative or conditional clauses could come about through the simple presence of auxiliaries, regardless of raising to C. The assumption that inflectional nodes (in English) do not host [Q] or [IF] avoids just such circularity (“Aux can express Q because it can mean Q”). I am claiming instead that the language learner has enough positive evidence to take auxiliaries as output forms for both inputs [INFL] and [INFL] + [Q] / [IF], just like *put* may or may not realize [+past], or like in general a form may realize a feature bundle despite being underspecified for some features, so long as

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<sup>13</sup> Both assumptions retain their plausibility within Checking Theory, especially the first one: their naturalness is not theory-internal. The second one, that interrogative or conditional features are not under Inflection, can be supported by the following argument (so it is not really an assumption): in informal registers questions, including yes-no questions, may fail to employ an inverted auxiliary:

(i) % You did it yourself?

But no register admits something like (ii), which would be expected if the interrogative characterization for the auxiliary was in principle independent from raising to C:

(ii) \*You did do it yourself?

no conflict arises (cf. Halle and Marantz 1993). We have already considered another such case: namely *do*, which was argued to be (in descriptive terms) the spell-out of Infl when the latter contains extra information not expressed by the verb. In that case *do* (or any modal verb) and *not* / *n't* jointly express the information corresponding to a negative auxiliary. Likewise, we are assuming, *do* is employed to spell out the interrogative feature [Q], although it does not “mean” Q; and other modals are employed to spell out [IF] even if they do not “mean” IF.

To sum up to this point: [Q] and [IF] are always under C and never under Infl, but auxiliaries may lexicalize [INFL] + [Q] and (just formally past auxiliaries like *had*, *should* and *were*) [INFL] + [IF].<sup>14</sup> In other words, [INFL] + [Q] / [IF] is a possible input to a realization rule, but the input feature cluster is scattered between C and Inflection instead of being under one node:

- (33) a. [agreement]  
    [tense]                   →       *do / does / did*  
    ([Q])
- b. [agreement]  
    [tense]                   →       *have / has / had, must, can, ...*  
    [modality]  
    ...  
    ([Q])  
    ([IF])

If the argument stopped here, “raising” to C could not be derived. By (8) and especially (9) above an auxiliary may be inserted under Inflection and realize both [INFL] and [Q] / [IF], although the latter is under C:

- (9) A word form realizing feature F can be inserted under a node X not specified for F, provided that F appears in the extended projection which includes X.

Because auxiliaries do not spell out [Q] / [IF] at all, least of all by units of autonomous morphology, they would not be forced by (14) to be lexicalized any higher than Inflection. And, by (9), an auxiliary in Inflection can lexicalize [Q] / [IF] on C. This is where a readjustment is needed.

#### *4.3. Lexical and functional heads*

Conditions (8) and (9) were motivated by cases like English verbal inflection: a form like *goes* contains a formative marking [3 sg], but there is no other reason why

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<sup>14</sup> I will not address the question whether “subjunctive” is a genuine morphological category of the English verbal system.

that feature should in fact be under V rather than Inflection (Agreement) in abstract syntactic structure. Besides, the reinterpretation of weak feature checking as categorial identification forces us to regard the whole extended projection as a unit, where the information on one node is interpretively accessible from another node. The whole analysis is simplified if “accessible” means “morphologically accessible”, as in (9). But in so doing we are considering the relation of a *lexical* head to the set of functional heads that complement it. For semantic and morphological interpretation, a lexical category “is” the lexical head plus its functional accessories. Should we extend this to the relation between any two heads in an extended chain, including that between two functional heads? Raising of auxiliaries to C, and in general construction-dependent movement, is a good reason not to do it. The particular trait of such head-to-head relations (“the nub of the problem” alluded to above) is that both heads are functional. This marks a clear difference from the relation of a lexical head to its morphological complements, whether they are free or bound affixes. This difference is stated in (34):<sup>15</sup>

- (34) a. The morphological realization of a lexical head LEX can refer to features which are not under LEX (provided they are in its extended projection);  
b. The morphological realization of a functional head FUNCT cannot refer to features which are not under FUNCT.

(33) and (34) now derive the correct pattern. A feature [Q] under C cannot be directly lexicalized by a free or bound affix (since English has no question particles), so it would remain without exponence without a modal or the default auxiliary *do*. These forms have [Q] among their input features, but as a language-specific fact about English morphosyntax [Q] and inflectional features are not clustered together under the node that hosts auxiliaries, or Inflection. However, the feature bundle under Inflection can be transferred to C, as another instance of the purely syntactic head movement we argued to raise Tense onto Agreement (recall throughout that the label “Inflection” is a convenient way to name all inflectional features grouped under one single terminal, whether or not this is the result of previous head movement). By moving to C, the raised inflectional features join [Q] under the same terminal. The feature bundle under C is realized by the corresponding inflected auxiliary, including *do* if no modality is featurally encoded in the input. The realization schema (33) implies that [Q] can be considered realized if the auxiliary is spelt out, even though no affix in the auxiliary corresponds to that feature. As noted, [Q] could not be realized unless the bundle of inflectional features (“Inflection”) raised to C: because of (34), a word form realizing a functional head is only sensitive to the features under that head, in contrast to what happens with

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<sup>15</sup> Recall that the formal distinction between lexical and functional categories is a necessary condition for reinterpreting abstract feature checking as categorial identification.

lexical heads. The same applies to [IF], except that *do* is not available as default lexicalizer. In addition, the free form *if* is available in the vocabulary. But the conditions for inserting *if* are not more restrictive than those for inserting an auxiliary: in both cases, the only triggering feature is [IF], so that optionality is correctly predicted. If however the auxiliary is chosen, there will be other morphological constraints (formally past form, unavailability of *do*); but these do not qualify as more specific conditions for insertion, because C will uniformly be just [IF].

#### *4.4. Recapitulation*

To summarize, some core aspects of auxiliary movement to C can be derived without reference to checking of [ $\pm$  strong] features, by paying attention to the features that the “raising” auxiliary realize. The guiding idea has been that inflected forms may be the realization for a set of features scattered along several syntactic heads. The relation between a lexical head and its functional satellites can be seen as “inflection”, and it can be assumed that all morphological information is simultaneously available. This does not seem justified, however, for the relation between two functional heads in the same extended projection. Following this intuition, I have proposed that a word form lexicalizing a functional head cannot realize features represented under different heads. Construction-dependent movement may then be viewed as movement of one abstract feature bundle onto a higher one, which is then lexicalized by a form matching the resulting complex of features. In the case of movement of Inflection to C, the auxiliaries that lexicalize Inflection are compatible with certain features of C (features which are not represented under Inflection). Raising of Inflection then allows C to be lexicalized just in case it is marked by such features, despite the fact that auxiliaries are not, strictly speaking, lexicalizers for C. This analysis implies that inflected forms present in the vocabulary of a language need not correspond to syntactic atoms, that is, to those feature bundles that are manipulated by syntax. It follows that the clustering of features under one head, before syntactic movement, is not given, but must be deduced by the learner on the basis of existing word forms and of syntactic word order. Such a strong interpretation of the Separation Hypothesis suggests that purely morphological reanalysis or oscillation in use may have dramatic repercussions on the grammar deduced by speakers of a younger generation, with interesting prospects for historical analysis. However, I will not pursue this suggestion any further here.

#### *5. Conclusion: phrasal movement*

Having found a way to incorporate head-movement and some of its empirical results, the obvious development would be to extend the approach to movement of

phrases into specifiers, like Wh-movement or movement to subject position. This topic would deserve another paper for itself, but a few considerations can be added here by way of conclusion.

First and foremost, it is not at all clear that phrasal movement into specifier is a homogeneous class, as it should be if its trigger were always just the need to check a strong feature. The traditional view of A-movement has been recently called into question by Manzini and Roussou 1997, who claim that it is better understood as a relation between a category and a thematic / aspectual feature, with no movement involved. Independently of this argument, A-movement of DPs into subject position is a little strange among other cases of movement to specifier: it is so common crosslinguistically, and so semantically unmotivated, that the need to have a subject has traditionally been regarded as an independent principle, the Extended Projection Principle. It is certainly possible to reformulate it as the need to check a strong D feature on Inflection, as in Chomsky 1995, but this leads us to expect that VSO languages should not in principle be any rarer than languages where the subject raises overtly, just as languages do not show a clear preference for overt or covert Wh-movement. But VSO languages are comparatively rare.

Movement into the specifier of operator heads is relatively more homogeneous and better understood. Necessary overt specifier-head configurations for operators (the Wh / Neg / Focus / Affect Criterion; see Brody 1995 for references) lend themselves to be reinterpreted as morphosyntactic requirements on the head of the raised XP (cf. Simpson 1995). Notions such as operator or topic are defined over a syntactic structure, and are represented by appropriate features in functional projections. Again, the clustering of features and the availability of affixes or free morphemes from the vocabulary should determine whether the projection is made visible by spell-out of its head, its specifier, or neither (more rarely, both). Even so, the various conditions on the realization of operator phrases converge, but do not overlap completely: to simply assume that movement of a Wh-phrase checks an interrogative feature on C has nothing to say on why in English exactly one Wh-phrase must raise, no more and no less, but in Bulgarian all of them. An analysis in terms of feature checking is ideally suited to explain a yes-no distinction, between raising and non-raising, but the facts are more complex than that (see again Simpson 1995). Adopting multiple specifiers as suggested in Chomsky 1995 gives us the way to represent the data in a Minimalist framework, but does not in itself offer a principled explanation. Problems are even more acute when we turn to cross- and intra-linguistic asymmetries in the raising of negative categories, as detailed in Acquaviva 1995, 1997a.

In general, one thing that is clear is that morphology is involved: raised phrases may or may not be unambiguously marked for the morphosyntactic feature they are supposed to check, like Wh-phrases, and languages differ as to the availability of question, negation or focus particles. But the question whether phrasal and head

movement are both entirely reducible to the same mechanism of feature checking is too broad to be addressed here. In so far as the two are driven by the same principles, the facts and reflections I have presented here suggest that for phrasal movement as well as for head movement the locus of spell-out is predictable if we consider both syntax and autonomous morphology, not just one component or the other. The proposal is that a simple distinction of strong and weak features is at best insufficient, and at worst misguided. If the critical view I have articulated is on the right track, I see three advantages accruing to a revision of the Minimalist along the indicated lines: one, syntax is more uniform and less stipulative across languages; two, the morphological problems of Checking Theory are ameliorated; and three, advances in morphology lead to advances in syntax "by itself".

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