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How much should we Distribute Morphology?

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Abstract

Studies of morphology, as carried out in practice, focus on a proper subset of bound morphemes which satisfy two properties: their inherent “meanings” are those of general grammatical categories, and they don’t receive stress like members of compounds. A question then arises, are there any morphology-specific principles, those of a “Morphological Component,” that apply only to such forms? A number of candidates are examined in turn: “Non-maximality,” Head Placement, Merger, Alternative Realization, and two Phonological Boundary Conditions. It is argued that the only principles specific to morphology are the last ones, i.e. that properly formulated principles of boundary erasure permit morphology to be completely “distributed” to the syntactic and phonological components.

1. What’s Morphology?

In order to answer the title’s question we must first decide what the term “Morphology” covers, at least for the languages we will touch on here, namely those in the Germanic and Romance families. In particular, English Morphology seems to be the study of a proper subset of bound morphemes, for which those listed in (1) are a reasonably representative list:

- (1) -al, -(a)tion, -age, -(e)d, -en, -er, -(e)s, -ess, -est, -ic, -ify, -ing, -ism, -ity, -ize, -ly, -ment, -th, -ward, -y, -ton, co-, de-, ex-, mis-, re-, un-

One can find such lists for example in Selkirk’s (1982) relatively comprehensive study of English word structure, and the other titles containing “morphology” in the bibliography adhere in practice to this same coverage.

Interestingly, Morphology *has not included* the morphemes italicized in the following examples, even though they are “bound.” Hyphens here indicate morpheme boundaries.

- (2) *aero-space, astro-naut, catty corner, chock-full, e-market, helter-skelter, jay walk, multi-plex, neat-nik, pell-mell, shilly-shally, sleep-aholic, topsy-turvy, x-ray, geo-metry, gyne-phobic, micro-scapy, micro-manage, mono-maniac, necro-philia, neo-philia, phonographic, sino-phobe, taxo-nomic, tri-lingual*

On the other hand, Morphology has typically treated some potentially free morphemes which also occur in bound patterns, such as: *-able (consumable), -ful (harmful), over- (overexert), and out- (outswim).*

The following descriptive generalization then describes the practice of investigations of this area.

- (3) **English Morphology** traditionally covers the study of those bound morphemes, productive or not, which (i) *do not contribute to stress like members of compounds*, and (ii) *lack semantically detailed intrinsic feature content*.

(In this study as well as elsewhere, I use lower case “f” for such features, in contrast to upper case “F” for the less semantically detailed features that appear in grammatical analysis, e.g. ANIM, DEF, FEM, LOC, MODAL, NEG, PAST, PATH, PLUR, WH, etc.) We can now reserve the term “Morphology” for the study of the morphemes that satisfy (3).

1.1 A generalization about word stress

The fact is, the correlation between (3i) and (3ii) allows us to entertain an equivalent and highly falsifiable claim:

- (4) **Morphological Destressing** (English). If the only inherent LF features of a bound morpheme μ are *purely grammatical head feature(s) F*, then μ entirely lacks stress prior to merging with larger domains.

For English, I henceforth use the term “affix” for only those morphemes that obey (4). Now the italicized morphemes in (2) participate in English compounding patterns, since each has at least secondary stress. Furthermore all these morphemes also seem to have features of semantic detail f. Consequently, none of them are “affixes,” and none of them figure except perhaps marginally in any standard traditional or generative treatments of “Morphology.”

Using a generalization like (4), a morpheme’s status as an affix is predictable from its other lexical properties, namely whether or not it has features f of semantic detail. The approach here thus agrees with Lieber (1992); “affix” has no formal status as a category, e.g., in lexical entries. In pairs like *highness/ high class*, *rebirth/ after birth*, *stressful/ stress-free*, and *deepen/ deep fry*, the internal category structures are identical:

- (5) [N [A high] [N class / -ness]] [N [P re-/ after] [N birth]]
 [A [N stress] [A free/ -ful]] [V [A deep] [V fry/ -en]]

A few items in English that are often called suffixes actually lead to compound stress. Again in these examples, hyphens are used for clarity to indicate morpheme boundaries.

- (6) a. picture-ésque, statu-ésque, carnival-ésque, Roman-ésque
 These are like compound adjectives: *picture-frée*, *noise-frée*, *visitor-frée*
 b. friend-ship, assistant-ship, receiver-ship, survivor-ship
 neighbor-hood, knight-hood, bachelor-hood, maiden- hood
 These are like compound nouns: *stéamship*, *báttle-ship*, *féry boat*

The features for characterizing these suffixes don’t appear to require status as (semantically general) grammatical F. Thus, the nuance of *-ésque* is something like “notably, remarkably,” while *-hood* and *-ship* suggest some dimension of being “socially conferred” or “socially recognized.” In any case, grammatical description becomes no less general if we analyze the items in (6) more akin to *-nik*, *-nomic*, *-philia*, etc., namely as open class items that are bound, i.e., they appear in compound combinations but cannot be free morphemes.¹

¹ Section 5 briefly treats roots such as *necess-* (*necessity*, *necessary*, *necessitate*) and *-tray-* (*betray*, *betrayal*, *traitor*, *traitorous*). Actually, this sort of bound morpheme is so common that they almost don’t merit comment: *bapt-* (*-ism*, *ize*, *-ist*, *-istry*), *fratern-* (*-al*, *-ity*, *-ize*), *trans-* (*-figure*, *-fix*, *-literate*, *-lucent*, *-port*, *-scribe*), etc.

1.2 Stress patterns of prefixes

In both compounds and “stem + affix” combinations of English, the head is generally the right hand member (Lieber, 1980). Therefore, as far as (4) is concerned, a prefix is a non-head.² There are then two possibilities. If a prefix carries a (non-head) grammatical feature F, it will consequently be *stressed as in a compound* (7a). Or, if a prefix itself carries no intrinsic LF content (it has no constant interpreted feature), it is *unstressed* (7b). This contrast is much remarked in grammars of Old English.

- (7) a. 2 – 1 pattern; prefixes stressed as in compounds:
de-plane, ex-wife, fore-tell, mis-speak, out-play, re-think, trans-figure, un-happy
- b. 0 – 1 pattern; prefixes unstressed:
be-take, de-tain, con-fuse, for-get, re-ceive, sub-mit, under-stand, with-hold

The same phonological contrast in German separates stressed, “separable” prefixes as in (8a) from unstressed, “inseparable” prefixes as in (8b).

- (8) a. auf-stehen ‘get up,’ ab-steigen ‘dismount,’ teil-nehmen ‘take part’
b. verstehen ‘understand,’ besteigen ‘climb,’ entnehmen ‘take’

As Maylor (2002, Ch. 1) argues, for German the term “separable prefix” misnames what are actually incorporated particles. As then expected, the meanings in (8a) are “compositional” and their stress is parallel to (7a). The true “inseparable” prefixes are unstressed parallel to (7b) and do not contribute to meaning by virtue of any intrinsic content (Maylor, 2002, 234).

1.3 Idiosyncrasy of derivational formations

It is unfailingly remarked that forms derived from open class stems, such as result nominals and causative verbs, can have idiosyncratic meanings. Thus a *building* is not simply something that is built (e.g., a child’s toy car constructed out of a play set), nor can we say **the containment of warm air in uninsulated houses is difficult*. Though Starbucks’s management succeeded in making it nationwide and even in internationalizing it, they nonetheless did not first *nationalize Starbucks*, since the causative *nationalize* implies government control. From the sheer number of such restrictions, analysts often conclude that there is some systematic link between a subset of bound (“derivational”) morphology and derived forms that express semantic detail, specificity and/or idiomatity. This type of link, based on pairs {open class item(s) + derivational morpheme}, would then differentiate morphological pairings from those of productive syntax.

However, there are equally well numerous links between groups of open class items and various grammatical free morphemes such as light verbs or post-verbal particles, giving rise to both sets of semantically detailed combinations (9a) and idioms (9b):

- (9) a. **take** a nap/ break/ rest/ vacation/ breather {nouns for “relaxing” + *take*}
eat/ drink/ crumble/ burn/ break/ tear/ slice NP **up** {consuming verbs + *up*}
- b. **take** a powder (‘leave’), **take** a flying leap (‘go to hell’)
bring something **up** (‘introduce’), hold something **up** (‘delay’)

Thus, the affixes of derivational morphology, notorious for their idiomatic ways of combining with stems, are actually no different in this respect from any number of closed class free morphemes.

²Lieber proposes that a few English prefixes are exceptionally heads, e.g., *be-* and *en-*. This special status is undermined by arguments in Walinska de Hackbeil (1985) and in Maylor (2002, section 5.4).

1.4 Scope of principles affecting Morphology

It is widely thought that several distinct principles apply to "morphology," defined as the study of bound morphemes of (3). However, many such principles apply as well to compounds, i.e. they simply cover *both types of maximal X^0 constructs* exemplified in (5).

- (10) **Strong Acceptability Judgments.** Speakers perceive violations of word/ morpheme order in X^0 domains more strongly than in X^j domains ($j > 0$).
- (11) **"No Phrase Constraint"/ "Domain Size Restriction"/ "Nonmaximality."** A productive X^0 domain cannot contain categories characteristic of maximal or "closed" projections, such as D, I, Degree Words, Intensifiers, Focus Particles, etc.

A useful discussion of this restriction appears in Hoeksema (1988). By virtue of it, elements characteristic of maximal phrases are prevented from appearing inside X^0 domains whose heads are bound morphemes, but equally well, they are prevented from appearing inside compounds:

- (12) *a [_N city very high school]
 *to have rarely [_V our baby sat] for us
 *that new [_N must think tank] outside town

Bound morphology obeys this No Phrase Constraint, but it has no special relation to it. That is, constraints (10) and (11) are in fact *not* candidates for a specialized "Morphological Component." A third such principle merits fuller treatment in the next section.

2. Left-right Order is *independent of Morphology*

Many researchers currently follow the hypothesis of Kayne (1994) that heads in syntactic domains are underlyingly, or at least at some level, uniformly on the left. However, almost all the work subscribing to this latter view fails to concern itself with comparing head placement in phrasal domains to that in word domains.

One reason for this is that specialists in morphology often propose, e.g., as in Lieber (1992), that particular languages order a head in morphological domains differently than in syntactic domains. But if one considers both types of domains across a range of languages, it becomes apparent that heads *on the right* result from some kind of "elsewhere" condition; that is, a parsimonious characterization of cross-linguistic patterns allows elegant statements only of when heads are on the left. The situations where heads are on the right are a patchwork of what is left out of the conditions for when heads are on the left Emonds (1985, Ch. 2). A more detailed discussion of this pattern appears in Emonds (2002).

- (13) **Universal Default Word Order.** In any constituent, the head is the rightmost sister specified as a category X^j , where $X = N, V, A, P, D, \text{ or } I$.

Certain more general considerations support (13). From the perspective of language use by speakers with innate capacities for language, because heads are obligatory they are *expected* by a hearer. From this follows certain other properties: since heads are expected, they are typically less stressed than complements; they can be null more freely, and their production can be "delayed." This last property amounts to saying that the default position for heads is *final* (Emonds, 2000, section 3.5).³ This line of thought motivates Principle (13) for both

³The section cited and Chapter 9 of that work argue for stricter limitations on *null complements*, both inside and outside X^0 domains.

word and *phrase* domains. And indeed head-final word order is observed at all levels in many languages, e.g. Japanese, Sanskrit and probably Latin.

Language-particular variants nonetheless develop by virtue of which certain domains have left hand heads. Usually, such domains are phrasal. Since much syntactic research pays little heed to the internal structure of X^0 domains, it has not hesitated to elevate left-headedness to a universal property. In two extensively studied syntactic systems, however, these left-headed domains include *only proper subsets of phrasal structures*.

2.1 Phrasal headedness in English

English phrasal projections can be open or closed (Fukui & Speas, 1986). DPs and IPs are “closed,” i.e., they cannot further project. Interestingly, they have right hand heads D^1 and I^1 .⁴ In the same sense, English measure phrases also serve to close AP and PP projections (*three miles away, quite a bit behind the fence, three times as expensive*). Again, these measure phrases *precede* the phrasal heads A^1 and P^1 .

Even within open XP phrases, it appears that certain *pre-head* modifiers are not actually phrases (*other, ever, never, mere(ly), hardly, etc.*) Left-headedness within English syntax seems therefore to be circumscribed as follows:

- (14) **English Word Order.** English heads X^0 precede only *phrasal* sisters YP in only *open* X^1 projections.

From (13) and (14) taken together, it now follows that English morphology and compound structures are all right-headed. No additional statement is needed for ordering within its X^0 domains. That is, English provides no evidence that any stipulation of headedness applies to morphological or X^0 domains.

2.2 Headedness in French (and more generally)

In French and several Romance languages, the position of heads inside X^0 domains, unlike in English, is not uniformly on the right. The position of the head depends additionally on whether morphemes are “bound” or “free.”

- (15) **French Word/ Morpheme Order.** French heads precede sisters in open X^j projections *only if both items are free morphemes*.

Thus, French typically exhibits left hand heads in open but not closed phrases, just as in English. Notably, however, there are candidates in French for phrases that are not free morphemes, namely its much analyzed class of pronominal and adverbial verbal clitics.⁵ By (15) any “bound morpheme phrases,” i.e., these clitics, should *precede* a head verb, and in fact French clitics instantiate precisely this order: French *le voit* vs. English *see 'im* ‘see him.’

Whether or not such one can sustain an analysis of Romance clitics as “bound morpheme phrases,” another and perhaps more telling difference between French and English word order concerns patterns in compounds. Extensive lists comparing and contrasting French and English compounds are provided in Emonds (2000, Ch. 3). Here are some reduced lists:

⁴The research including Emonds (1985, Ch. 3) that doesn’t gloss over this fact has proposed an ad hoc principle by virtue of which “subjects precede predicates.” Besides the fact that it often doesn’t hold in other languages, the principle says nothing about English measure phrases.

⁵The adverbial clitics are *en* ‘from/ of it/ there’ and *y* ‘to/ at it/ there’. As established in Kayne (1975), these are essentially “pro-PP” that realize the features [LOC, ±GOAL]. Italian but not Spanish has counterparts in their verbal clitic systems. The adverbial clitics always follow the pronominal “pro-DP” clitics.

- (16) French left-headed compounds of two free morphemes (contrast with English):
tarte aux pommes 'apple pie,' *ville dortoir* 'bedroom city,' *emballage à vide* 'vacuum pack,' *ticket restaurant* 'restaurant ticket,' *camion citerne* 'tanker truck,' *chemin de fer* 'railway,' *sac à main* 'handbag,' *cassette vidéo* 'video cassette'
- (17) French right-headed compounds containing a bound morpheme (like English):
contre-exemple 'counter example,' *franco-allemand* 'French-German,' *mi-Janvier* 'mid-January,' *pluridisciplinaire* 'multi-disciplinary,' *russophobie* 'Russian phobia,' *télé-journal* 'television news,' *malheur* 'misfortune,' *pyromane* 'pyromaniac'

These lists demonstrate that heads of French compounds are not always on the left, as is often thought. They are on the right, just as in English, if either member of the compound is a bound morpheme. Then since all suffixal morphology by definition contains a bound morpheme as a right hand head, French morphology is also right headed, like English. This result is a corollary of (13) and (15) taken together. *It is not a "principle of morphology"*.

We thus see that left-headedness is not simply a symmetric counterpart to right-headedness, a fact that is already clear in Greenberg's (1963) original distinctions between head-initial and head-final languages. Rather, left-headedness results from language-specific patterns that deviate from the default case of heads being final. However, nothing prevents a whole language from being left-headed; according to Lieber (1992, Ch. 2), Tagalog has this property. Again, this isn't a fact about its "morphology" but about the language as a whole.

Recall that our purpose here is to discover what is properly speaking "in Morphology". From the above discussion, I conclude that word and morpheme order principles are independent of and more general than the domain of Morphology.

3. What's left for Morphology?

Counter to suggestions of some partisans of an autonomous morphology component, we have just seen that principles such as Strong Acceptability Judgments (10), the No Phrase Constraint (11) and statements specifying left-right order of heads have no place in a separate "Morphological Component." These results are compatible with a different approach to bound morphemes, called Distributed Morphology ("DM").

- (18) **Distributed Morphology.** "...the machinery of... morphology is not concentrated in a single component of the grammar, but rather is distributed among several different components." (Halle & Marantz, 1993, 111–112)

DM therefore *expects* results whereby (10), (11), and (13)–(15) are *not* "concentrated" in Morphology. So I emphatically concur: *DM is on the right track.*

Nonetheless even these authors maintain a reduced Morphological Component MS. "DM recognizes is a level of grammatical representation with its own principles and properties." (Halle & Marantz, 1993, 115) So the question is: *How much should we distribute morphology?* To answer this question, we next consider in short subsections four prototypical instances of bound morpheme behaviors. What further principles determine them? Are they part of some Morphology Proper (MS) or located in other components?

3.1 English finite suffixes on verbs

Chomsky (1957) provided an early convincing generative treatment of English tensed affixes. We can summarize his proposal in today's syntactic terms as follows:

- (19) **Affix movement.** [I, -MODAL, +PAST] are spelled out as suffixes under a c-commanded head V if and only if a lexical I and VP are adjacent sisters.

Chomsky's affix movement is a lowering operation that applies "late" in a sequence of ordered *transformations*. But in retrospect, almost all convincing transformational analyses (i) involve *raising* of bar notation constituents α^j and (ii) *affect all instances of such α^j* . Since affix movement contravenes both of these general transformational properties, one would not today propose (19) as a transformational movement.

Indeed, Halle and Marantz attribute affix placement rather to an MS operation "Merger," which "generally joins a head with the head of its complement XP" (Halle & Marantz, 1993, 116). As welcome consequences, this step eliminates an instance of transformational "lowering" (Halle & Marantz, 1993, 134) as well as the ad hoc restriction in (19) to -MODAL.

However, if Merger is not itself to be some ad hoc solution, there must be other instances of it, and in addition, some general statement providing for possible Mergers, which is stated here as (20). Since Emonds (1985), I have used the term "Alternative Realization" to include such operations where Marantz has used "Merger." A difference between the two conceptions will emerge below.

- (20) **Merger/ Alternative Realization (AR).** A syntactic feature F canonically interpretable on β can be realized *in a closed class item* under γ^0 , provided projections of β and γ are sisters.

Affix movement (19) is an instance of Merger/ AR (20), as follows: F corresponds to PAST, β is I, and γ is V. As a result of Merger/ AR, a single feature, e.g., PAST, splits as it were into two realizations, one where it can be universally interpreted (its "canonical position"), here in I, and another where it is "spelled out," here on V. Plausibly, *only* the canonical position contributes to interpretation. The Merged/ AR position where it is physically observed is simply a PF phenomenon; in other words, Merger/ AR results from PF insertion. This derives the stipulation in Chomsky's early system that affix movement must apply "late" in a derivation.

In the light of the limitations imposed by Merger (20) on where non-interpretable features can occur, affix movement (19) itself *no longer has any status in grammar*. Rather, only the *output values* of Merger, here the bound suffixes on the lower head V, need be specified by entries in the English grammatical lexicon.

- (21) a. -(e)d, +PAST, -MODAL, +V__
 b. -(e)s, -PAST, -PLUR, +III, +V__

From (21b) we can see that the phrase "are sisters" in (20) must be interpreted exactly as in Chomsky's early use of "is an α ." That is, γ "is a" sister of β if all lexical material dominated by an actual sister α of β is in fact also dominated by γ . This interpretation of "is a sister" permits empty heads between β and γ . For example, the bound morpheme -(e)s in (21b) can alternatively realize the [-PLUR, +III] features of a subject D, since VP "is a" sister of DP even though an empty I intervenes.

Finally, we must ask what causes the canonical or interpreted position of a feature F to be always or sometimes empty when F is alternatively realized. It appears that the motivation for AR is related to Economy, i.e., that AR permits derivations with fewer free morphemes or fewer potential inherent stresses. Consequently, canonical positions are either always or whenever possible empty in the presence of AR. The interested reader is directed to a fuller discussion in Emonds (2000, section 4.4).

The locus of the statements in (21) is therefore the lexical component. The Merger/AR Principle (20) thus defines a space of “possible lexical entries”; it is a convention governing the form of entries in the grammatical lexicon, the “Syntacticon”.⁶ The question that interests us here is then, is Merger/AR a principle governing only bound morphemes in the Syntacticon, or does it have some more general status?

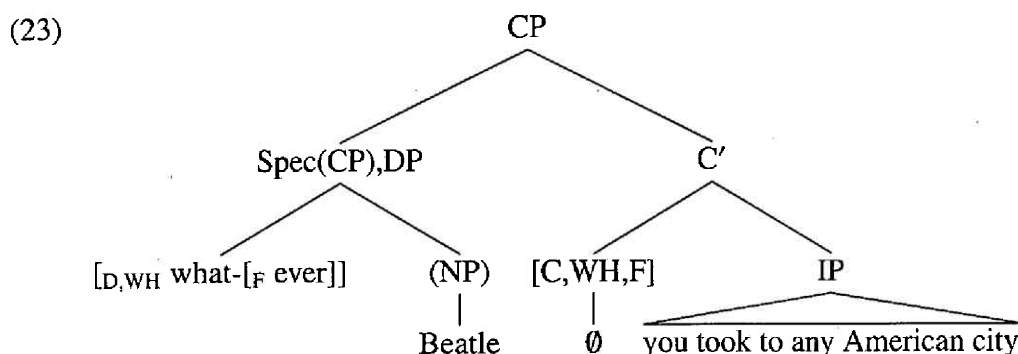
3.2 Applicative morphology

Baker (1988, Ch. 3) analyzes “applicative” constructions from various language families. In such constructions, a noun phrase that typically appears in a PP complement, such as a benefactive, instrument, or “inner locative,” can alternatively be “promoted” to direct object status. One essential property of such constructions is that the language-particular prepositions [P,+F_i] (introducing the benefactive or instrumental DP complements that can “promote” in a given language) are realized as suffixes on the selecting *higher head* V (Chung, 1976; Baker, 1988). Clearly, the PP complement is a projection of P and as such is a sister of the maximal V⁰. We can observe that AR as stated in (18) accurately describes this configuration; in this case β is P and γ is V. This instance of AR then permits and in fact requires the Ps to be zero.⁷

3.3 Conditionals with indefinite DPs

AR (20) doesn’t require c-command between the two constituents β and γ , but crucially, only that *their projections be sisters*. This is shown by an English construction in which the suffix *-ever* alternatively realizes the conditional Comp *if* on a head D inside Spec(CP). We can suppose that in general, *if* = [C, WH] and that some additional feature F characterizes the *if* of conditionals. The sisters that satisfy (20) are then DP and C’.

- (22) [C_F If] you took any Beatle to any U.S. city at any time, he would be mobbed.
 [SPEC(CP) Whatever Beatle] you took to any U.S. city at any time, he’d be mobbed.
 [SPEC(CP) Whatever U.S. city] you took to any Beatle to at any time, he’d be mobbed.
 [SPEC(CP) Whenever] you took any Beatle to any U.S. city, he would be mobbed.



Consequently, the Spec(CP) here alternatively realizes *two* features, one being WH and the other the feature of the bound morpheme *-ever*.

⁶As in Emonds (2000), I use the term Syntacticon for the grammatical lexicon, that is, the lexical entries which lack features *f* of semantic detail that are not used in transformational derivations.

⁷An exact analysis of applicative constructions is not at issue here. In my view their empty P, which results from the interplay of AR and Economy, is a necessary and sufficient condition for the promotion (movement) of the prepositional object DP to direct object position. It is this promotion, not the empty P itself, that gives rise to the essentially *universal re-ordering* observed between the applied and the deep direct objects. See Emonds and Ostler (2005).

As mentioned earlier, a given instance of *AR* leads to zeroing of β in some or all cases. (Thus, I is null with English verbs inflected for Tense or Number, and applicative suffixes lead to zeroed Ps). Since C is typically null in English whenever WH forms are present in Spec(CP), the venerable but totally ad hoc “Doubly-Filled COMP filter” of English is clearly nothing other than a standard case of AR. Here, AR explains a paradigm that is an archetypical instance of syntax, and so is not limited to bound morphology.

3.4 English adjectival comparison

Since AR is a condition accounting for the range of possible grammatical entries in the lexicon, we might expect that they can sometimes include specified phonological contexts. This appears to be the case. For example, the English degree words *more/most* can be alternatively realized (undergo Merger) as the bound suffixes *-er/-est* on the head of an AP. The details of this instance of AR closely parallel affix movement (19); in both cases, the least marked members of c-commanding functional categories (DEG and I) surface as bound suffixes on lexical heads A and I of sister phrases.

However, in addition the insertion contexts A__, the entries for *-er* and *-est* have a phonological dimension: The category A here can consist at most of a single trochaic foot, and even many of these are excluded: **drastic(k)er*, **aridest*, **explicitest*, **contenter*. Since AR is a general restriction on possible lexical (Syntacticon) entries, it is not surprising that some of them, such as those for *-er* and *-est* in English, contain phonological specifications.

Incidentally, the near perfect parallelism in English between adjectival comparison and verbal tense morphology, which is captured by AR, should dispel any lingering nostalgia for affix movement as an ad hoc lowering transformation. As is widely acknowledged, a transformation should not be subject to a phonological condition.

In general, AR appears to subsume the morphological operations termed Merger in Halle and Marantz (1993, section 4), and several more as well. Clearly, Merger/AR is a central tool for characterizing lexical entries of bound grammatical morphemes, that is, in the study of morphology, as defined in Section 1.

4. Some morphology: lexical entries and a syntactic convention

As foreseen in the previous section, the question arises: *is AR or some generalized form of Merger a specifically morphological principle?* Or should this apparent general principle of bound morphology be “distributed” to some other component? If so, the obvious candidate is syntax, since all the terms used in stating AR are syntactic in nature.

4.1 Bare NP adverbials

Emonds (2000, section 4.5) argues on the basis of paradigms presented in Larson (1987) that AR (20) is by no means limited to specifying the feature values of bound morphemes. Consider for example (24):

- (24) John phrased the letter { a better way/ *a quite refined style}.
 Mary worded her response { the way I said to/ *a style I didn't like}.
 Nobody acts { that same way/ *such rowdy fashion} at movies anymore.
 The children should behave { the way we used to/ *a dignified manner}.

The Vs *phrase* and *word* require a PP or AP of manner, and the verbs *behave* and *act* allow one. But the usual P *in* can be zeroed with *way*, though not with other nouns of manner. This is plausibly because the (lower) grammatical noun *way* alternatively realizes a feature of P,

perhaps of “abstract location.” If this analysis of the well-formedness in (24) is correct, *AR has an effect outside of “morphology”*.

4.2 English finite copulas in I

The English finite forms *am, are, is, was* and *were* are well-known for displaying the syntax of a I rather than V; they appear in tag questions, invert in questions, precede *n't*, etc. Emonds (2000, section 4.5) argues that the essence of these special forms is that they instantiate AR of the feature STATIVE of a main verb unspecified for any other features, i.e. of the copula *be*. The grammatical lexicon then need list only the forms themselves, the “outputs” of AR, as choices for the complex [I, STATIVE]. There is no ad hoc rule of *be*-raising, subject to many conditions and restrictions, needed to account for these forms.⁸

Certainly the behavior of English finite copulas as I rather than V, thus explained by AR, is always considered a cornerstone of English syntax. So once again, AR has an effect outside morphology strictly speaking.

4.3 *Do* and *have* in I

A deservedly famous exemplar of “English syntax” is Chomsky’s (1957) rule of *do*-support. Chomsky’s analysis simplified the analysis of a range of English syntactic constructions such as tag questions, negations, inversion in questions, and VP ellipsis. The essence of his account is simple; there is a “late” transformational insertion of the unmarked verb *do* under I only if no other free form occurs there. As with affix movement, the “late” status of this rule is explained if it is simply a lexical insertion in PF, i.e. an instance of AR. In this case, the “unmarked syntactic feature” of V alternatively realized under I is V itself. And precisely because the LF interpretation of V is “ACTIVITY”, the AR of the unmarked [_V *do*] under I accounts for why “auxiliary *do*” has no interpretation as an activity.

The only other inflected verb in Modern English that appears in I is a second unmarked stative verb *have*.⁹ Why then are the only two transitive V that can appear under I the unmarked grammatical verbs *do* and *have*? Precisely because: *their presence in I perfectly satisfies AR as stated in (20)*. Auxiliary verbs in I is thus a third construction where AR properly restricts the distribution of free morphemes (syntax). Thus, we cannot say that AR is limited to statements for bound morphemes.

4.4 “Vestigial” pronominal case

Consider next the personal pronouns in English and Spanish. The unmarked English forms are those known as “objective” (*us, him, them, etc.*), while those of Spanish are the so-called nominative forms (*yo* ‘I’, *tu* ‘you’). We say these forms are “unmarked” because they are used in predicate nominal position, as the focus in cleft sentences, in left-dislocated positions, etc.. The marked English pronominal forms are the “subjective” forms, *I, he, they, etc.*, and the marked Spanish forms are the oblique forms *mi* and *ti*.

As argued in Emonds (1985, Ch. 5), marked pronouns in these two systems do not result from “abstract case marking” unlike their counterparts in languages where morphological case is productive. Rather, English nominatives *alternatively realize the category I* on D subjects

⁸Note that retaining *be*-raising does not avoid the listing of the output forms, since they are phonologically distinct from the element raised, namely *be*.

⁹A number of authors, going back to Benveniste (1966), argue that the unmarked stative verbs *be* and *have* are in complementary distribution. *Have* appears only in contexts where accusative case is assigned, including with perfect participles (Emonds, 2000, section 5.6), and in a few idioms (*have at someone, have to VP*); *be* appears elsewhere.

(I' and DP being sisters); in interesting contrast, the Spanish oblique pronouns (*mi, ti*) *alternatively realize the category P* on the D objects of P.

Again, the case realizations of these monomorphemic pronouns, as determined by their phrasal contexts, is not "Morphology," unless we vastly extend the earlier definition of morphology as the study of bound morphemes. The distribution of cases in a language, on pronouns or otherwise, has always constituted syntax. So we must conclude that *Alternative Realization (20), or Merger properly generalized, is a general principle for describing the possible form of Syntacticon entries, whether they are realized as bound or free morphemes*. Therefore, it is not a candidate for a principle in an autonomous morphological component.

5. Some other morphology: lexical entries plus phonological conventions

We have seen that there are no syntactic principles that apply only to bound morphology. That is, as far as syntax is concerned, bound morphology is entirely subsumed under whatever statements constrain lexical entries and the form of X^0 domains in general, including compounds.

In some sense, this is not surprising, since the very definition of the traditional domain of morphology, as we saw in Section 1, mentions a phonological rather than a syntactic criterion:

- (4) **Morphological Destressing (English).** If the only inherent LF features of a bound morpheme μ are purely grammatical head feature(s) F, then μ entirely lacks stress prior to merging with larger domains.

In fact, Principle (4) is nothing more than a *purely phonological consequence* of Syntacticon membership (= items with only grammatical features F). Let's express this in formal terms, using a series of principles for assigning word-internal and compound stress. These principles are in turn adapted from Chomsky and Halle (1968) and justified on the basis of their impressive descriptive results.

A basic assumption is that all morphemes belong to a syntactic category and enter phonological derivations with brackets labeled by this category. Then the basic definition of Morphology (4) reduces to a consequence of (25) and (26) taken together.

- (25) **Bound morphemes.** If μ is a bound morpheme in the Syntacticon with host X^0 , the suffix μ loses its bracket on the side of X^0 .
- (26) **Word Stress.** The initial domains for assigning word-internal stress are *minimal bracketed labeled strings* [...].
- (27) **Compound Stress.** Compound stress is assigned in *branching domains* [[...] [...]].

For stress-neutral or so-called "Level 2" morphemes in English, no more need be said. Suppose we start out with an artificially complex formation *sweetenerlessness* in (28a) and then apply (25), yielding (28b):

- (28) a. [N [A [N [V [A sweet] [V en]] [N er]] [A less]] [N ness]]
 b. [N [A [N [V [A sweet] en]] er]] less]] ness]]

It's clear that Word Stress (26) applies only to *sweet*, since no other domains [...] are minimal. There are no domains that satisfy Compound Stress (27) either, thus deriving the correct stress pattern 1-0-0-0-0.

However, as established in Chomsky and Halle's system, the more Latinate or "Level 1" suffixes (in e.g. *rapid-ity, history-ic, invite-ation, Vietnam-ese*) do affect word-internal stress,

so they should be specially represented in lexical entries, say as *+ity*, *+ic*, *+(a)tion*, *+ese*. Then:

- (29) **Extended Word Formation.** When a bound morpheme μ with a boundary $+$ is inserted, *the stem also loses its bracket at this boundary*.¹⁰

Consider the contrasting Syntacticon entries (30a-b), using the notation $X_$ for the word-internal subcategorization of a suffix from Lieber (1980).

- (30) a. $+ation, N, V_ , F_i$ (a "Level 1" suffix)
 [[derive] [+ ation]]
 → by (25) [[derive] + ation]]
 → by (29) [[derive + ation]]
 Word stress (26) now correctly applies to a larger domain and yields [[derive átion]].
- b. $ing, N, V_ , (F_j)$ (a stress-neutral or "Level 2" suffix)
 [[derive] [ing]]
 → by (25) [[derive] ing]]
 Word stress (26) now correctly applies in the inner domain and yields [[deríve] ing]].

Since the affixes with a $+$ boundary are non-productive, Dictionary entries must specify which stems combine with which non-productive affixes, a practice that is often also implemented in written dictionaries:

- (31) $derive, V, f_i, _ (\{ +ation/ +ative \})$
 $arrive, V, f_j, _ (+al)$
 $necess, f_k, _ \{ +ary/ +ity/ +itate \} \quad (necessary, necessity, necessitate)$
 $tray, f_m, \{ _ +tor (ous)/ be+ _ (+al) \} \quad (traitor, traitorous, betray, betrayal)$

Correctly, combinations such as **arriv+ation* and **deriv+al* are ill-formed, since the suffixes are not sanctioned by the lexical entries (31). Similarly, both these suffixes are also ill-formed on other verbs such as *arise*, *contrive* and *despise*: **arisal*, **contrival*, **despisal*, **arisation*, **contrivation*, **despisation*.

To formally complete the description of derivational morphology, we need a convention to reflect non-productivity:

- (32) **Lexical non-productivity.** A morpheme boundary $+$ of α is licit only if lexically selected by an adjacent β .

This scenario now further allows (and is thus confirmed by) simplified statements of irregular allomorphy for otherwise completely productive morphological processes. For example, the English "regular" and "irregular" past tense morphemes (*-t/-d*) can now both be expressed with a *single Syntacticon entry*.

As discussed in Section 3 above and with more motivation in Emonds (2000, Ch. 4), AR features such as PAST on a verbal suffix are not themselves interpreted in LF; their role is rather to allow zeroing of the features that *are* interpreted (in this case, PAST in the position of I). Hence the entry (33) for the past tense morpheme *lacks interpretable features*, so both its productive and non-productive variants must be uniformly *inserted in PF*.

¹⁰Whether $+$ also disappears by virtue of this operation is irrelevant in our examples here.

(33) (+)[alveolar stop], V __, PAST

The left hand boundary symbol + in entry (33) is *crucially optional*. Parallel to (31), Dictionary entries for irregular verbs such as *keep, weep, leave, feel, meet, cut, do*, etc. select the irregular past variant of (-t/-d) with + as in (34a).

(34) a. *leave*, V, f_j , __ (+PAST)

[[lív] [+ D] → [[lív] + D] → [[lív D]] → left (*left*)

English: Inside a word domain, final obstruent clusters must be unvoiced, and vowels shorten before these *word-internal* clusters.

b. *heave*, V, f_k

[[hív] [D]] → [[hív] D]] → hívd (*heaved*)

Across a single bracket], English voicing assimilates rightward.

For irregular verbs, Aronoff's (1976) Blocking Principle excludes the productive or "Level 2" options: *[*keep*] ed], *[*leav*] ed], *[*feel*] ed]. In contrast, the Dictionary entries for regular verbs like (34b) are unspecified for any affix. Hence by (32) regular Vs co-occur only with the variant of (33) lacking +.

From this discussion, the old conundrum of "*regular vs. irregular*" morphology has pretty much been "*distributed*" to the phonological component, i.e., to English stress assignment (26) and (27) and a set of phonological conventions (25), (29) and (32). Moreover, the system devised seems fully in line with Chomsky and Halle's formulations of the English stress system, which can serve to specify the contents of the stress assignments in (26)–(27).

We can now answer the question, *what remains in Morphology Proper*, the Morphological Structure (MS) referred to by Halle and Marantz? Perhaps their *readjustment* and *impoverishment* rules constitute a kind of phonology sensitive to (= operative only in the presence of) bound morpheme boundaries, such as "single bracket" or "+." or But since the first symbol has its source in syntax and the second in the lexicon, such rules just indicate ways in which syntactic domains and lexical boundary symbols influence phonology. That is, such readjustment and impoverishment rules are not actually autonomous morphological principles. They are just consequences of *how the phonology/syntax interface is organized* in the too little investigated space between minimal X^0 (morphemes) and maximal X^0 (word) domains.

In syntax proper, the syntactic possibility of AR can specify, as a special case, everything that is general about bound morphemes. What remains "in morphology" is finally only the single principle of Bound Morphemes (25), supplemented by a lexical device that permits, in a non-productive set of cases, larger than minimal Extended Word Formation (29).

One can of course ask, why should there even be two such principles, whose roles seem mainly to have effects on stress contours? In Emonds (2000, Ch. 4), I attributed the obligatoriness of both Alternative Realization and of Bound Morpheme Formation to an economy measure, whereby as few free morphemes as possible are to be inserted in the course of derivationally realizing a given underlying structure. A somewhat more motivated description can be stated in terms of a kind of Phonological Economy. The principles under discussion allow realizations of given underlying structures with fewer word stresses. Plausibly, "stress is stressful," that is, transformational computations should economize the number of independent stresses which are assigned. This derives the formulation in Emonds (2000): "Insert as few free morphemes as possible." That is, "apply AR (20) and Bound Morphemes (25) as much as possible, and save your breath."

6. Fission, Fusion and Templates: a range of lexical possibilities

6.1 Fusion

In discussing aspects of what they retain as an autonomous morphological component, Halle and Marantz (1993, 116) distinguish between the operations of Merger and Fusion. Slightly rearranging the order of their phrasing: “Merger ... maintains two independent terminal nodes under ... a zero-category node ... On the other hand, fusion takes two terminal nodes ... and fuses them into a single terminal node A simple example of fusion is the single affix signaling number and case encountered in many Indo-European languages ...” Fusion is thus a descriptive term for porte-manteaux morphemes. In addition to Indo-European case morphemes, other examples are (a) French fusing of two unmarked P with definite articles (*à* ‘to’ + *les* ‘the’ → *aux*), and (b) English finite copulas: *were* = [I, -MODAL, +PAST, +PLUR], where +PLUR is an AR feature of a subject DP.

The discussion of Merger in Section 3 subsumes it under a principle of “Alternative Realization” that places limits on what can appear in the lexicon’s grammatical entries. As stated there in (20), AR subsumes fusion as a special case, rather than being counterposed to it. Namely, fusion is just a certain way of spelling out syntactic features whose canonical positions are on adjacent heads. When individual lexical items spell out combined sets of features, Halle and Marantz call it fusion, and when they spell out separate sets in a morpheme sequence under a single X^0 , they call it merger. But overall, in both situations, *AR limits the types of syntactic configurations which individual morphemes can express.*

6.2 Fission

Halle and Marantz also describe structures where different features from a unified feature matrix may be realized in different morphemes under a single X^0 . They do not give many cases, but none of the cases discussed seem to require principles beyond specifying items as prefixes or suffixes, in accord with the locality restriction imposed by AR (20).

The term “fission” also calls to mind different “circumfixes,” such as the notorious discontinuous German past/passive participle *ge- ... -t/ ge- ... -en*. Emonds (2000, Ch. 5) argues that the syntactic features F_i that characterize any Germanic passive participles are alternatively realized phi-features of a direct object DP. This DP is of course a sister to a passive participle of category A^0 , whose internal right hand head is *-t/-en*. Again, AR suffices for the general structural relation between the bound participial morphemes μ and the canonical syntactic position of the features they alternatively realize. Nothing then prevents “fission” of how the features of μ are spelled out under a single X^0 , here A^0 .

6.3 Templates and grammatical morpheme order in X^0

Attempts to find *general principles* for templates expressing morpheme order have met with little success, beyond predictions made by Baker’s (1985) *Mirror Principle*—which is by its nature unstatable as an autonomous principle of morphology.

For example, verbal clitic combinations across Romance languages are known to vary from language to language and are very dependent on syntactic context (imperatives, root contexts, etc.). Certain language-particular properties of these clitic systems can nonetheless be discerned: a language has “pro-PP clitics” (French, Italian) or lacks them (Spanish). These clitics placed on infinitives are pre-verbal ($_V$, in French) or post-verbal ($V_$, in Italian and Spanish). Individual Syntacticon entries can easily specify these properties of linear order and presence or absence, using the word-internal subcategorization features of Lieber (1980).

But what can specify their orderings of clitics among themselves? Precisely because these

vary across languages, it is unlikely that some “principles of morphology” will successfully generalize over item-particular, language-particular statements such as those above. In any case in work to date, no such principles have emerged. But my general claim is precisely that a language’s “bound morphology” reduces to at most single lexical statements exhibiting this variety and complexity.

The variety is limited, at least in English and French, only by restrictions such as Alternative Realization (20), itself a more general principle of syntax, Morphological Destressing (4) and Extended Word Formation (29).¹¹ The latter two statements specify only how X^0 -internal elements have less phonological prominence than ordinary members of compounds of the same category, as seen in examples like (35).

- (35) *búrial/ cárry-àll*
forjíve/ fóreground
condemnátion/ cóndom nation

Beyond these two “Boundary Conditions” of phonology, I claim that linguistic theory needs *no group of special concepts, rules, or principles that apply only to or in some component “Morphological Structure”*.

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¹¹In the more formalized framework of Section 4, the Bound Morpheme Principle (25) replaces Morphological Destressing.

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