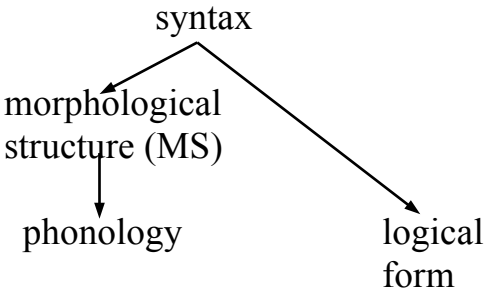
MAPPING MORPHOSYNTACTIC FEATURES TO EXPONENTS: DISTRIBUTED MORPHOLOGY (DM)

1 Some basic features of DM (Halle & Marantz 1993):

(1) a. The lexicon, as a component of grammar, doesn't exist (the lexicalist hypothesis is rejected).
b. Syntax operates only with morphosyntactic features; words are built in the syntax (*syntax all the way down*).
c. Only hierarchical relations are present in the syntax; linearization occurs postsyntactically.
d. Morphosyntactic features and terminals can be altered postsyntactically (in what was originally called Morphological Structure).
e. The morphs or exponents of morphemes (*Vocabulary Items*) are introduced postsyntactically (*Late Insertion*), and provide the input to phonology. Each exponent realizes one terminal node.

The model is called *Distributed* morphology because all the information that in classical models was part of the lexicon is distributed here in different *lists* which are accessed at different points of the derivation: morphosyntactic features that feed the syntax, Vocabulary Items, the Encyclopedia (site of relevant non-linguistic knowledge).

(2) The (Simplified) DM model of grammar (Halle & Marantz 1993)

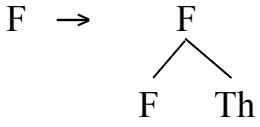


A one-to-one mapping between the terminals left by the overt syntax and the exponents often fails due to several operations that alter the number and content of syntactic terminals. We will later see that the mapping to exponents is also often not transparent.

2 Dissociate morphemes

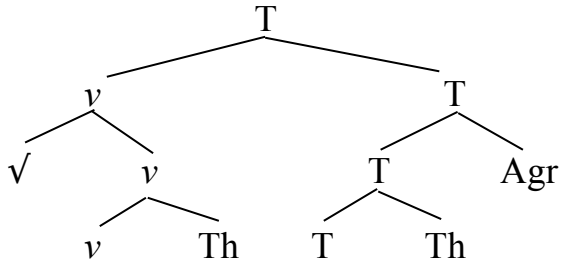
These are terminals that are added postyntactically.
In DM morphological information that is not relevant for syntax (or for semantic interpretation) is added postyntactically. The clearest examples of dissociate morphemes are thematic elements in verbs (typically the ones that determine conjugation class: *cant**a**r*, *sab**e**r*, *dorm**i**r*). Following Oltra-Massuet (1999), Oltra-Massuet & Arregi (2005) propose the following well-formedness condition according to which all functional heads must have a thematic position at MS:

(3) Oltra-Massuet (1999), Oltra-Massuet & Arregi (2005)



Oltra-Massuet (1999) and Oltra-Massuet & Arregi (2005) propose, in addition, that Agr is also introduced postsyntactically (see also Bobaljik 2008).

(4) a. MS internal structure for Catalan verbs (Oltra-Massuet 1999)



b. Example from the Spanish imperfect indicative
(Oltra-Massuet & Arregi 2005)

√	*v*	Th	T	Th	Agr
cant		***á***	*b*	*a*	Ø

'was singing'

3 Postsyntactic morphological operations

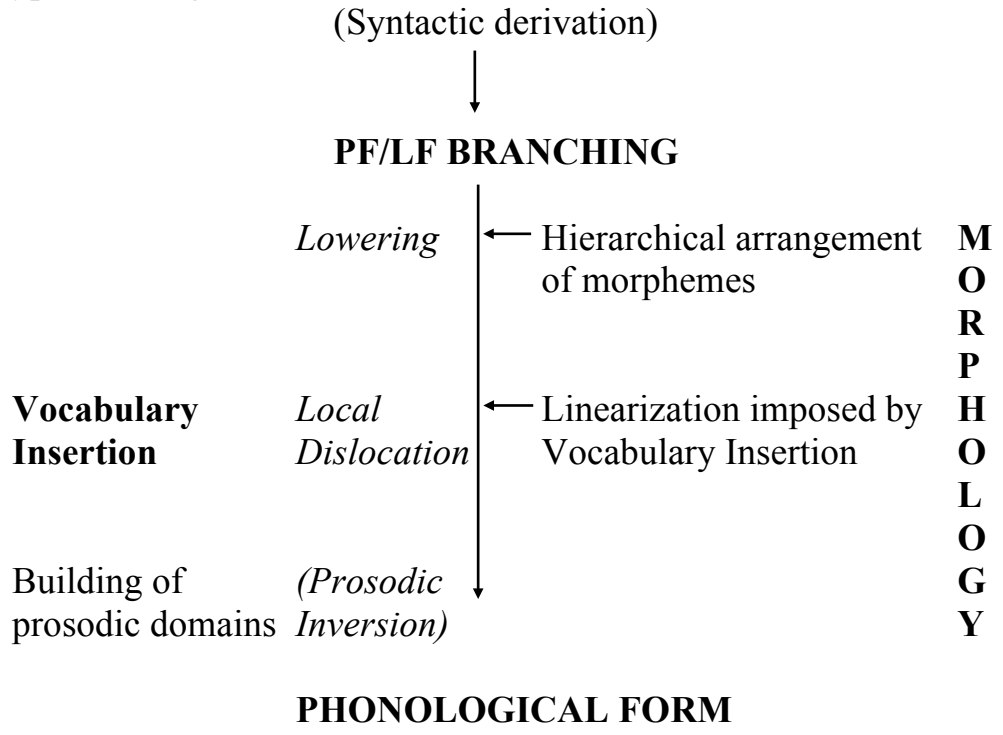
3.1 Merger

It's a concept from Marantz (1984) and requires structural adjacency:

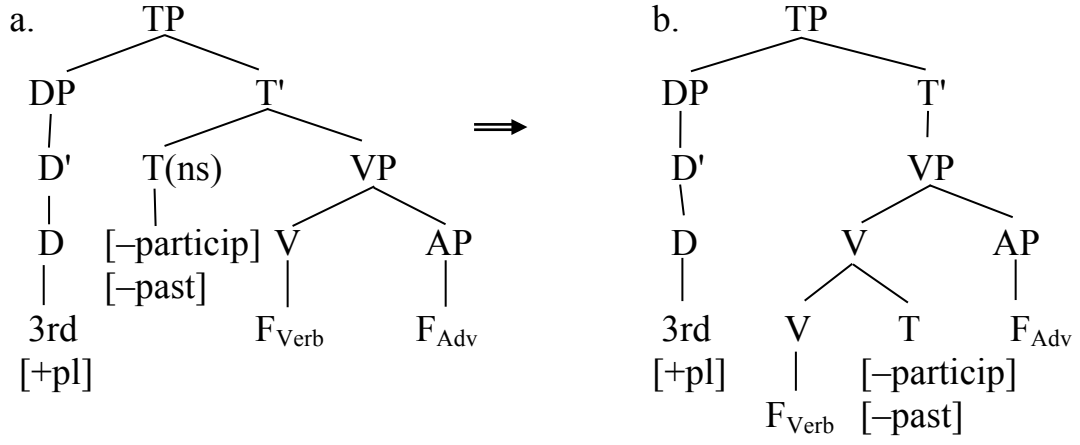
> "At any level of syntactic analysis (d-structure, s-structure, phonological structure), a relation between X and Y may be replaced by (expressed by) the affixation of the lexical head of X to the lexical head of Y".
>
> Marantz (1988: 261 (10))

Halle & Marantz (1993) illustrate this type of operation with English lowering. Other operations of merger have been proposed, for instance, by Embick & Noyer (2001). These authors make a distinction between the merger that takes place *before* Vocabulary insertion, (e.g. English lowering), when only structural locality counts, and the one that occurs *after* Vocabulary insertion, in which case linear adjacency is relevant.

(5) Types of *merger* (Embick & Noyer 2001: 566, figure 1)



(6) Lowering head movement in English: *they sleep late*



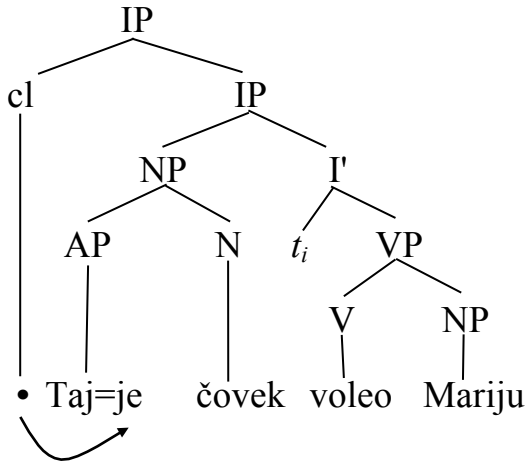
Halle & Marantz (1993: 134-135, (13))

(7) Example of *local dislocation* from Latin (Embick & Noyer 2001, (36),(37))
a. [[bon+ī puer+ ī] [-que [bon+ae puell+ae]]] →
good+NOM.PL boy+NOM.PL and good+NOM.PL girl+NOM.PL
b. (after merger) bon+i puer+i bon+ae+que puell+ae
'good boys and good girls'

The operation *Prosodic Inversion* was proposed initially in Halpern (1995) to account for cases in which a second-position clitic appears after the first prosodic word, not after the first syntactic constituent. This operation appears illustrated below with examples from Serbo-croatian. The configuration in (8b) would be obtained syntactically with movement of the subject, *taj čovek*, to Spec, CP. The configuration in (9a) would arise postsyntactically through prosodic inversion, as illustrated in (9). In both cases the clitic would adjoin to IP syntactically.

(8) a. Taj =je čovek voleo Mariju
that AUX.3s man loved Mary
'That man loved Mary'
b. Taj čovek =je voleo Mariju
that man AUX.3s loved Mary
'That man loved Mary'

(9) Example of prosodic inversion (Halpern 1995)



It has been suggested that Local Dislocation and Prosodic Inversion are variants of the same operation.

3.2 Fusion

While Merger always keeps two terminal nodes and causes, therefore, the insertion of two different Vocabulary items, fusion takes two terminal

nodes that are structurally adjacent and fuses them into a single one; that causes the insertion of a single Vocabulary item. Halle & Marantz (1993) suggest that in English T and Agr fuse, and this new node realizes all visible inflection (*-s*, *-ed*, etc.). Oltra-Massuet & Arregi (2005) propose that in Spanish there is fusion of T and Agr in the context [–past], but not in other tenses (the conditional is F[+future], T[+past], while the future is F[+future], T[–past]).

(10) a. √ *v* Th F Th T Th Agr
cant *a* *r* ***í*** Ø *a* *mos*
'we would sing'

b. √ *v* Th F Th T/Agr
cant *a* *r* ***é*** *mos*
'we will sing'

It has been suggested that fusion is a presyntactic operation (although for Oltra-Massuet & Arregi 2005 it has to be necessarily postsyntactic, because for them the Agr node is generated postyntactically, which prevents it from generating a Th position).

3.3 Fission

Contrary to fusion, fission splits one terminal node into two; each new terminal node will be assigned an exponent.

(11) Example of fission in varieties of Catalan: (Mascaró 1986, Bonet 1991)
a. No ***t'*** escapis
not 2.sg.refl escape-2.sg
'Don't escape.'
b. No ***te*** m' escapis (some varieties)
not 2.sg.refl 1.ben/eth escape-2.sg
b'. No ***se*** ***te*** m' escapis (some other varieties)
not refl 2 1.ben/eth escape-2.sg
'Don't escape (on me).'

3.4 Impoverishment

Mechanism originally proposed in Bonet (1991) by which one or more morphosyntactic features are deleted; they result in less marked forms.

(12) Example of impoverishment of the feature [+feminine] in dialects of Catalan

a. Les pomes *les* [l-ə̲-z] donaré a en Pere demà.
the apples 3-fem-pl will give.1 to the Pere tomorrow
'As for the apples I will give them to Pere tomorrow.'

b. Les pomes, a en Pere, *Els les* [əlzi] donaré demà.
the apples to the Pere 3-fem-pl will give.1 tomorrow
'As for the apples I will give them to him (Pere) tomorrow.'

The notion of impoverishment was further developed in Noyer (1992) and other work.
Impoverishment rules are in many respects very similar to the *Rules of referral* proposed by Zwicky (1985). There are two basic differences between the two types of rules: (a) rules of referral can perform any change, while impoverishment rules always give rise to less marked structures; (b) rules of referral apply prior to the syntax, in the lexicon, while impoverishment rules are postsyntactic.

4 Vocabulary insertion

The last operation in MS is the insertion of exponents, *Vocabulary Items* (VI), which provide the input to phonology; readjustment rules, discussed later, can alter slightly the form of the exponents.

(13) Some examples of VI
a. /i/ ↔ Th/III (Spanish: Arregi, 1999)
b. /z/ ↔ [+pl] (Catalan)
c. /n/ ↔ [pers 2] / ___[+pl] (Catalan pronoun)
d. /m/ ↔ [pers 2] (Catalan pronoun)
e. Ø ↔ [pers 2] (Georgian: Halle & Marantz 1993, adapted)

(13c) and (13d) illustrate one important aspect of insertion, the *Elsewhere Condition* (which goes as far back as Pāṇini): both of them realize the same feature, [pers 2], but in the context of the feature [+pl], the more specific VI (14c) takes precedence over the more general (default) VI (13d), thus giving rise to the form /n+z/ instead of */m+z/.

The *Subset Principle* (Halle 1997): a VI must always contain either all the features of a terminal node or a subset of them, never a superset; a VI cannot be inserted at a node that contains features that are contradictory with those of the VI.

Undespecification: (not to be confused with the term used in phonology to refer to a different notion) refers to the fact that not all morphosyntactic features present after morphological operations get realized (or get "saturated" by a VI); VIs do not realize all the features present in the syntax. A point of debate: do VIs replace morphosyntactic features in terminal nodes? Should morphosyntactic features be accessible by phonology?

5 Order of Vocabulary insertion

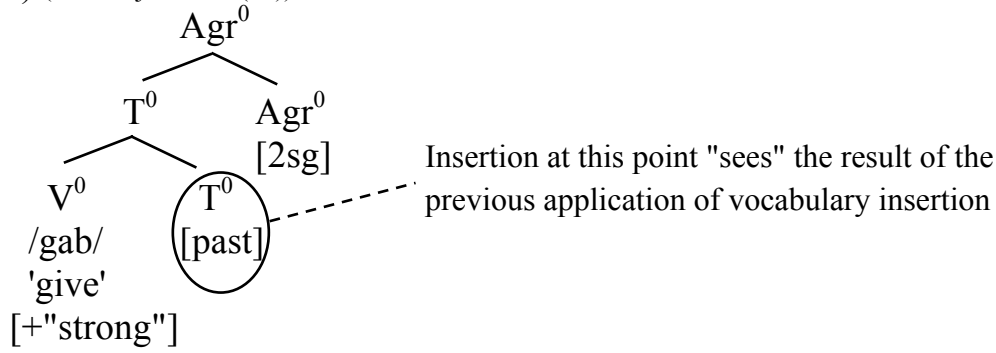
Is the order of insertion free? Must it be cyclic, by phase?

Bobaljik (2000) argues for a cyclic procedure on the basis of allomorph selection. It has been observed (see, e.g. Carstairs1987 and his *Peripherality Constraint*) that in most cases of allomorphy that the conditioning factor, the context, is more embedded than the target (inward sensitivity); in (15), b can determine what allomorph occupies position g, but not the other way around (outward sensitivity):

(14) [[[α] β] γ]

According to Bobaljik (2000), the opposite influence (more external nodes determining the choice of inner VIs) is only possible when the relevant information is morphosyntactic (like tense or agreement), not phonological.

(14) (= Bobaljik 2000: (14))



Embick (2010) adopts an approach along the same lines but within a much more elaborate model. For him category-defining heads (*v*, *n*, *a*) are cyclic, while non-category-defining ones are not; cyclic heads trigger spell-out of their complement.

(16) (= Embick 2010: (43), slightly adapted)

a. [[[[√ *x*] *W*] *Z*] *y*]

y

Cyclic *y* triggers Spell-Out of cyclic domains in its complement. The head *x* undergoes Vocabulary Insertion, as do the edge^{+} heads *W* and *Z*. The root is processed phonologically.

b. [[[[[√ *x**] *W**] *Z**] *y*] ... *z*]

z

Merge of higher cyclic *z* triggers Spell-Out of cyclic domains in its complement. The head *y* defines a cyclic domain and is subjected to Vocabulary Insertion (along with any edge^{+} heads it might have). The heads marked with *—*x*, *W*, *Z*—are present when *y* undergoes Vocabulary Insertion, but have undergone Vocabulary Insertion in the earlier cycle.

These views of allomorphy predict phonological sensitivity to inner morphemes but never to outer morphemes. However, cases of outward-sensitivity have been reported in the literature (see, for instance, Wolf 2013, Svenonius 2012). This means that cyclic models of Vocabulary insertion are too restrictive; at least in certain cases, access to phonologically realized outer morphemes must be available.

An example of outward-looking allomorphy at the phrasal level (from Bonet 2013a): in several Western varieties of Catalan the definite article has two allomorphs, /l/ and /lo/; the choice of allomorph depends both on the adjacent more embedded word and the adjacent less embedded word: /l/ surfaces when the article is preceded and/or followed by a vowel. ((18) = Bonet 2013: (41))

(15) a.	Lo	pa	és	bo	
	the-M	bread-M	is	good-M	'the bread is good'
b.	L'	all	és	bo	
	the-M	garlic-M	is	good-M	'the garlic is good'
c.	Compren	lo	pa		
	buy-3.PL	the-M	bread-M		'they buy the bread'
d.	Compren	l'	all		
	buy-3.PL	the-M	garlic-M		'they buy the garlic'
e.	Compra·	l	pa		
	buy-3.SG	the-M	bread-M		's/he buys the bread'
f.	Compra	l'	all		
	buy-3.SG	the-M	garlic-M		's/he buys the garlic'

g. Diu que· l pa és bo
says that the-M bread-M is good-M
's/he says that the bread is good'

6 Roots and readjustment rules

A commonly held view within DM, which can be traced back to Chomsky & Halle 1968 is that roots, contrary to all other morphemes, are not abstract morphemes but appear with their exponents in the syntax. Embick & Halle (2005: (1)) make the distinction as follows:

(16) a. **Abstract Morphemes:** These are composed exclusively of non-phonetic features, such as [past] or [pl], or features that make up the determiner node D of the English definite article *the*.
b. **Roots:** These make up the open-class vocabulary. They include items such as √CAT, √OX, or √SIT, which are sequences of complexes of phonetic features, along with abstract indices (to distinguish homophones) and other diacritics (e.g. class features).

How would root allomorphy be accounted for then?

As in Chomsky & Halle (1968) or Halle (1973), DM posits *readjustment rules*, which apply to listed inserted VIs in specific morphosyntactic contexts.

(17) Example of a readjustment rule, English (= Halle & Marantz 1993:128, (10a))

Rime → /u/ / X____ [+past]
↓
x

where X-Rime = *shall*, *will*, *can*, *stand*
(cf. *should*, *would*, *could*, *stood*)

As is clear from (18a), exponents of functional heads do not contain a root; the *suppletive* allomorphy that is found typically in auxiliary verbs would not be obtained through readjustment rules because they are considered (and must be considered) functional heads.

(18) *be*, *am*, *is*, *are*, *was...*

The distinction between roots and abstract morphemes in (18) predicts that roots will show very little allomorphy (because readjustment rules can make only small changes) and that only functional heads will show suppletive allomorphy. However, examples of suppletive allomorphy can

be found in roots, as the following example from Kiowa shows (source: Bonet & Harbour 2012: table 6.6):

(19)

sg/du	*pl*	
áágya	k!ul	'be sitting'
ól	p!él	'fall'
thóú	zéi	'wander'

A different type of criticism to the view in (18) has focused on the existence of two different mechanisms to account for allomorphy: readjustment rules, for roots, and competition in exponence (more on this later), for other terminal nodes. Siddiqi (2006, 2009) defends a model with only abstract morphemes and a single mechanism for allomorphy, and Embick (2010) extends the use of readjustment rules also to the exponents of functional categories.

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