Distributed Morphology I

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Refs.: Halle & Marantz (1994; 1993)

1. Halle & Marantz (1994) on Clitic Object Pronouns in Spanish

Goal:
Halle and Marantz set out to introduce some basic assumptions of Distributed Morphology on the basis of the system of clitic object pronouns in Spanish.

Question:
Where does the name *Distributed Morphology* come from?

Answer (Halle & Marantz (1993, 111-112&171)):
"We have called our approach *Distributed Morphology* (hereafter DM) to highlight the fact that the machinery of what traditionally has been called morphology is not concentrated in a single component of the grammar, but rather is distributed among several different components."

"The term *Distributed Morphology* and the general view that it incorporates resulted from discussions with David Pesetsky."

Assumption:
The basic element of morphology is the *vocabulary item*. A vocabulary item pairs phonological features on the one hand with morpho-syntactic (and semantic) features on the other. The latter features encode the possible *context of insertion* of the vocabulary item; the former is also sometimes called *signal*.

(1)   *Structure of vocabulary items*:
      /phonological features/ $\leftrightarrow$ [morpho-syntactic features]

Three central assumptions of Distributed Morphologie:
(i) *late insertion*
(ii) *underspecification*
(iii) *syntactic hierarchical structure all the way down*

1.1. Late Insertion

(2)   *Late Insertion*:
      Morphology follows syntax; morphology realizes abstract syntactic structures. The syntax itself merely deals with abstract categories that are bundles of morpho-syntactic and semantic features: so-called *f-morphemes* (functional morphemes) and so-called *l-morphemes* (lexical morphemes).

[At least, late insertion holds for f-morphemes; as for l-morphemes, proponents of Distributed Morphology do not necessarily agree, and both options have been pursued in Distributed Morphology.]
Syntactic X^0 categories (i.e., morphemes) are morphologically realized by insertion of vocabulary items (*vocabulary insertion*, VI). This way, (f-) morphemes get phonological features.

Consequences of late insertion

Remark:
A crucial assumption is the distinction between (abstract) *morphemes* and (concrete) *vocabulary items* (inflection markers, inflectional exponents). This difference is not recognized in (standard) theories that rely on *early insertion*.

Observation:
In contrast to early insertion, late insertion leaves room for possible modifications of syntactic structures with their morpho-syntactic features before morphological realization (vocabulary insertion) takes place. One such operation that changes syntactic structures before morphology applies is *impoverishment*.

1.2. Underspecification

(3)   *Underspecification*:
      The morpho-syntactic features (which make up the 'context of insertion') of vocabulary items are often underspecified. Such an underspecification makes a simpler, more economical description of inflectional systems possible, and it significantly contributes to an account of instances of syncretism.

Remark:
As a consequence of underspecification, constraints are needed that regulate the correct insertion of vocabulary items and decide the competition between different vocabulary items in the case of conflict: Subset Principle, Specificity.

1.3. Syntactic Hierarchical Structure All the Way Down

(4)   *Syntactic Hierarchical Structure All the Way Down*:
      Morphological insertion is sensitive to syntactic operations that manipulate (f- or l-) morphemes and create word forms: head movement, syntactic lowering.
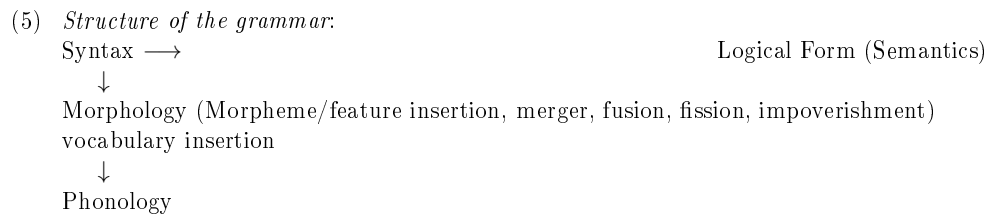   In addition, genuinely morphological operations (which apply after syntax but before insertion) manipulate syntactic items and respect syntactic principles (to a certain degree). Among these purely morphological operations are *merger*, *fusion*, *fission*, and *impoverishment*.

1.4. Structure of the Grammar

Observation:
In practise, Distributed Morphology typically (though not necessarily) envisages syntactic structures that employ many different functional categories. In that respect, the approach is very much compatible with a certain type of syntactic approach developed within the general

Principles and Parameters framework (or, possibly, the Minimalist Program); see, e.g, studies based on *cartography*.

(5) *Structure of the grammar*:

Syntax $\longrightarrow$ Logical Form (Semantics)

      $\downarrow$

Morphology (Morpheme/feature insertion, merger, fusion, fission, impoverishment) vocabulary insertion

      $\downarrow$

Phonology

Side remark (Arregi & Nevins (2012, ch. 6)):

Assuming a Distributed Morphology approach, there are various operations that apply post-syntactically (after all regular syntactic operations) but before phonological realization: *copying, fission, dissimilation, impoverishment, metathesis*). Here the order is relevant, and it follows from how close to syntax, or close to phonology, a given post-syntactic operation is: Rules where concepts like hierarchy play a role apply before rules that mention phonological features.

1.5. Impoverishment

An important concept: impoverishment:

Refs.: Bonet (1991), Noyer (1992; 1998), Halle & Marantz (1993; 1994), Bobaljik (2002), Frampton (2002), Harley (2004)

Impoverishment rules reduce morpho-syntactic feature bundles between syntax and morphology; rules of the morphological component (like vocabulary insertion) then operate on impoverished (simplified) structures, and this effects a *retreat to the general case*.

Note:

The classical concept of impoverishment fully corresponds to (and in a way complements) underspecification of vocabulary items:

(i) underspecification of vocabulary items: "underspecification"

(ii) underspecification of syntactic categories: "impoverishment"

1.6. Syntax vs. Morphology

Observation:

(i) Normally, underspecification of morpho-syntactic features does not play any role whatsoever in the syntax.

(ii) Therefore, impoverishment of syntactic structures can only apply *after* syntax has done its work.

(iii) Hence, impoverishment (or, more generally, underspecification of syntactic structures) is possible only in theories that rely on late insertion.

1.7. Examples

(6) *An abstract example* (Halle & Marantz (1994)):

    a. *Category X*:

      (i) $P_A \leftrightarrow [F_1, F_2]$ (vocabulary item A)

      (ii) $P_B \leftrightarrow [F_1]$ (vocabulary item B)

    b. $[_X \ F_1, F_2, F_3]$ (f-morpheme)

    c. $F_2 \rightarrow \emptyset$ / $[\ X[\_] \ Y \ ]$ (impoverishment)

    d. $[\ [_X \ F_1, \overline{F_2, F_3}] \ Y \ ]$ (f-morpheme after impoverishment, before insertion)

    e. Insertion applies to P_B, not to P_A (even though the latter is more specific).

(7) *A concrete example: Adjectival markers in Norwegian* (Harley & Noyer (2003), Sauerland (1996)):

    a. *Vocabulary items*:

      (i)   /t/ $\leftrightarrow$ [−pl,+neut] /Adj__

      (ii) $\emptyset$ $\leftrightarrow$ [−pl,−neut] /Adj__

      (iii)   /e/ $\leftrightarrow$ [   ] /Adj__

    b. *Impoverishment*:

      [±neut] $\rightarrow$ $\emptyset$ in syntactic contexts with wek inflection

Paradigm 1: Adjectival markers in Norwegian

STRONG	[−neut]	[+neut]
[−pl]	$\emptyset$	/t/
[+pl]	/e/	/e/

WEAK	[−neut]	[+neut]
[−pl]	/e/	/e/
[+pl]	/e/	/e/

1.8. Clitic Object Pronouns in Spanish

(8) *Structure of object clitics* (as with nouns):

[$_{Det}$ [$_{Det}$ Det Theme] Number]

Assumption:

Vocabulary insertion applies cyclically, from left to right (from the stem to the edge), according to the *Subset Principle*.

Subset Principle and Specificity

(9) *Subset Principle* (Halle (1997)):

A vocabulary item V is inserted into a functional morpheme M iff (i) and (ii) hold:

  (i) The morpho-syntactic features of V are a subset of the morpho-syntactic features of M.

  (ii) V is the most specific vocabulary item that satisfies (i).

(10) *Specificity of vocabulary items*:

A vocabulary item V_i is more specific than a vocabulary item V_j iff V_i has more morpho-syntactic features than V_j.

Vocabulary Insertion 1: Det markers

(11) *Det markers* ('stems'):

/n/$_{[I]}$ ↔ [1.Pers] /__[+pl]
/m/$_{[III]}$ ↔ [1.Pers]
/Ø/ ↔ [2.Pers] /__[+pl]
/t/$_{[III]}$ ↔ [2.Pers]
/l/ ↔ [ ] /__[case]
/s/$_{[III]}$ ↔ [ ]

Assumption:
After insertion of the stems, but *before* insertion of theme vowels and number markers, the two *redundancy rules* in (12-a) and (12-b) apply, in this order.

(12) *Redundancy rules*:

a. [ ] → [III] /__[dat]
b. [ ] → [II] /__[+fem]

Remark:
At least redundancy rule (12-a) should possibly be understood in such a way that it applies only in the context [3.Pers]:
[ ] → [III] /__[dat],*[3.Pers]*
Otherwise, it seems that wrong predictions would be made for [2.Pers]-dative contexts. But see below.

Vocabulary Insertion 2: Theme vowels

(13) *Theme vowels and inflection class features*:

/e/ ↔ [III]
/a/ ↔ [II]
/o/ ↔ [ ]

Vocabulary Insertion 3: Number markers

(14) *Number markers*:

/s/ ↔ [+pl]
(Ø ↔ [ ])

All Vocabulary Items

(15) *Det markers* ('stems'):

/n/$_{[I]}$ ↔ [1.Pers] /__[+pl]
/m/$_{[III]}$ ↔ [1.Pers]
/Ø/ ↔ [2.Pers] /__[+pl]
/t/$_{[III]}$ ↔ [2.Pers]
/l/ ↔ [ ] /__[case]
/s/$_{[III]}$ ↔ [ ]

(16) *Redundancy rules*:

a. [ ] → [III] /__[dat,3.Pers]
b. [ ] → [II] /__[+fem]

(17) *Theme vowels and inflection class features*:

/e/ ↔ [III]
/a/ ↔ [II]
/o/ ↔ [ ]

(18) *Number markers*:

/s/ ↔ [+pl]
(Ø ↔ [ ])

Paradigm 2: Clitic object pronouns in Spanish

| [−pl] | [3.Pers] | | [2.Pers] | [1.Pers] |
	[+masc]	[+fem]		
Acc	/l/-/o/-Ø	/l/$_{[II]}$-/a/-Ø	/t/$_{[III]}$-/e/-Ø	/m/$_{[III]}$-/e/-Ø
Dat	/l/$_{[III]}$-/e/-Ø	/l/$_{[III]}$-/e/-Ø	/t/$_{[III]}$-/e/-Ø	/m/$_{[III]}$-/e/-Ø
Refl	/s/$_{[III]}$-/e/-Ø	/s/$_{[III]}$-/e/-Ø	/t/$_{[III]}$-/e/-Ø	/m/$_{[III]}$-/e/-Ø

| [+pl] | [3.Pers] | | [2.Pers] | [1.Pers] |
	[+masc]	[+fem]		
Acc	/l/-/o/-/s/	/l/$_{[II]}$-/a/-/s/	Ø-/o/-/s/	/n/$_{[I]}$-/o/-/s/
Dat	/l/$_{[III]}$-/e/-/s/	/l/$_{[III]}$-/e/-/s/	Ø-/o/-/s/	/n/$_{[I]}$-/o/-/s/
Refl	/s/$_{[III]}$-/e/-Ø	/s/$_{[III]}$-/e/-Ø	Ø-/o/-/s/	/n/$_{[I]}$-/o/-/s/

1.9.   *Comments*

Remark:
The inflection class features typeset in boldface in paradigm 2 do not come from inflection markers, but from the two redundancy rules.

Problem: How can the distribution of number markers be derived in the Refl-Plural domain?

Questions

• What is the theory-internal reason for the (few) differences between accusative and dative marking? And what is the reason for the (few) gender-related differences?
Not a single inflection marker (vocabulary item) bears case features; case features are only mentioned in redundancy rule (12-a). Similarly for gender features and (12-b).

• The analysis involves a highly specific zero marker for stem positions. This assumption may not be completely unproblematic (from the point of view of iconicity at least). What is the theory-internal task of this zero marker? And why can be problem not be avoided by a slightly different specificaiton of the context of insertion of some marker? How would the whole system have to be changed so as to be able to dispense with the highly specific zero marker?
The zero marker blocks /t/. /t/ could in principle be restricted to singular contexts; but then /l/ or /s/ would have to be inserted instead. Consequently, these latter markers would also have to be classified as incompatible with 2.Person contexts. Such an approach

might eventually be viable, but it contradicts the assumption that one marker is usually radically underspecified. (We will come back to this issue.)

Questions 2

- Inflection class [I] is the default class; the vocabulary item /o/ in (13) does not depend on the presence of this feature for insertion. Why, then, is the stem marker /n/ equipped with this feature in order to trigger subsequent /o/ insertion (in contrast to /l/ and /Ø/). Perhaps this assumption can simply be dispensed with?
  A problem can only arise if a redundancy rule can apply in this context that instantiates a different inflection class feature. By assumption, [+fem] is irrelevant for [1.Pers]; therefore, the only problem would be created by the dative-related rule (12-a). However, as noted above, this rule may only hold for [3.Pers] contexts; would it also apply in [2.Pers] contexts, Ø would also need class information ([II]). Thus, the sole remaining scenario under which [I] would be needed for /n/ would be one where (12-a) holds for [1.Pers] [3.Pers], but not for [2.Pers].

- Why do vocabulary insertion and the redundancy rules have to apply cyclically, from the center to the periphery?
  Insertion of a stem marker and the two redundancy rules create the context for theme vowel insertion. Among the redundancy rules, the order of application is crucial; and similarly, the fact that both rules only apply after insertion of stem markers is very important.

Note:
At this point, Distributed Morphology ceases to be fully realizational.

1.10. Observations

First observation:
In American varieties of Spanish, the clitic pronoun /os/ for 2. person plural contexts is missing.

Analysis:
This can be traced back to *impoverishment rule*.

(19) *Impoverishment rule for [2.Pers]*:
    [2.Pers] → Ø /[+pl]

Consequence:
There is a *retreat to the general case*: In the plural, the [2.Pers] features is deleted. Therefore, Ø cannot be inserted, and the same goes for /t/. As a result, the most specific remaining stem marker is /l/. Consequently, /los/ shows up in the context [2.Pers,+pl,Acc]. Still, to ensure that the output form is /les/ and not /los/ in [2.Pers.,+pl,Dat] contexts, (12-a) needs to be able to apply before theme vowel insertion. (In this context, Halle & Marantz (1994, 283) state: "Note also that like other 3. Person clitics and unlike its singular counterpart, the erstwhile 2. Person Plural clitic is subject to Case distinctions.") This means that the redundancy rule at hand cannot be confined to 3. Person. No problem arises if [3.Pers] is

characterized by an absence of features.

Second observation:
"Spurious *se*": *se* shows up if a clitic 3. Person Dative pronoun is adjacent to a clitic 3. Person Accusative pronoun.

Analysis:
Again, an impoverishment rule is at work.

(20) *Impoverishment rule for [Dative]*:
    [Dat] → Ø /___[+Acc]

Consequence:
In Acc-Dat contexts, /l/ is blocked for the dative position because there is no case feature left. Therefore, the maximally nonspecific form /s/ is used.

Spurious 'se'

(21) *Spurious* se (based on Bonet (1995)):
  a. el premio, *lo*   dieron   a Pedro ayer
     the price   [3.Acc] have[3.Pl] to Pedro yesterday
  b. A Pedro, *le*   dieron   el premio ayer
     to Pedro [3.Dat] gave[3.Pl] the price   yesterday
  c. A Pedro, el premio *se lo*   dieron   ayer (*le lo*, *lo le*)
     to Pedro the price   se [3.acc] gave[3.Pl] yesterday
     'Yesterday, they gave Pedro the price.'

Interaction of impoverishment rules
Prediction:
The two impoverishment rules just discussed can interact in varieties of American Spanish.

(22) [2.Pers,Dat]+Theme+[+pl] & [3.Pers,Acc]+Theme+[−pl]
    ⇒   [ ]+Theme+[+pl] & [3.Pers,Acc]+Theme+[−pl]
  a. *European Spanish*:
     Os lo di   'I gave it to you.'
  b. *American Spanish*:
     Se lo di   'I gave it to you.'

Syntactic structure all the way down:
So far, we have evidence for (i) late insertion (because of impoverishment) and (ii) under-specification (motivated by syncretism). What's still missing is evidence for (iii) syntactic hierarchical structure all the way down. The argument can be provided on the bsis of Spanish *imperatives*, which may co-occur with clitic object pronouns.

(23) *2.Pers.Plural imperatives with clitic pronouns, Spanish*:
  a. d- e- n- l-   o-   s
     give IMP 2.PL 3. ACC THEME PL

'You give them (to someone).'

   b. d- e- *n*- m- e- l- o
      give IMP 2.PL 1.DAT THEME 3.ACC THEME
      'You give it to me!'

(24) *2.Pers.Plural imperatives with clitic pronouns, Carribean Spanish* :

   a. d- e- n- l- o- s
      give IMP 2.PL 3. ACC THEME PL
      'You give them (to someone).'

   b. d- e- m- e- l- o- *n*
      give IMP 1.DAT THEME 3.ACC THEME 2.PL
      'You give it to me!'

Generalization:
In Carribean Spanish (or, more precisely, a version thereof), clitic pronouns that have no plural suffix end up in the middle of the imperative verb – after the imperative marker, but before the plural suffix of the verb.

Analysis:
The clitic cluster is a D(eterminer) category. Post-syntactically (but pre-vocabulary insertion), it is left-adjoined to Agr by means of the operation of *merger*, and therefore comes to be part of the verb.

1.11. *Structures*

(25) *Structure in Standard Spanish*:

(26) *Structure in Carribean Spanish*:

Comment:
This operation illustrates that inflectional morphology is sensitive to subtleties of syntactic phrase structure. The observable effect cannot possibly be purely phonological in nature because there are cases where /n/ is a part of the imperative verb but *not* a plural sufix; and these cases do not trigger a reordering of the clitic pronouns.

(27) *No reordering with other kinds of /n/*:

   a. pon-me(-lo)
      'You put (it) for me!'
   b. *po-me(-lo)-n
      'You put (it) for me!'

Consequence for Other Theories

Claim:
This systematic morphological effect cannot be captured in other, classical theories of inflection (e.g., in word and paradigm approaches) because the account presupposes that (a) highly articulate syntactic structure is needed for morphology, and (b) syntactic structure needs to be modifiable before morphology.

The Trigger for Impoverishment

What triggers impoverishment is that (in Carribean Spanish) abstract morphemes with person and case features need to show up to the left of an abstract morpheme with a plural feature. Therefore, there is no reordering if the clitic pronoun itself is plural:

(28) a. d-e-n- l-o-s   *de-lo-n-s, *de-los-n
     b. d-e-n- n-o-s   *de-no-n-s, *de-nos-n

Like other kinds of *merger*, this merger operation satisfies a general *peripherality condition*: If (e.g.) *me* in (29) comes to show up to the left of an abstract morpheme with a plural feature, it cannot satisfy the condition by merger, "since it does not fall at the right periphery of the relevant domain" (p. 287). (On the other hand, there is no reason for such a movement because *me* already is located to the left of a plural morpheme.)

(29) a. d- e- n- m- e- l- o- s
         geben IMP 2.PL 1.DAT THEME 3. ACC THEME PL
         'You give them to me.'
     b. *d- e- m- e- n- l- o- s
         geben IMP 1.DAT THEME 2.PL 3. ACC THEME PL
         'You give them to me.'

Concluding remark:
Data such as (24-b) argue against the existence of paradigms as genuine objects of grammar (rather, they are epiphenomena). Here is why: If the set of possible word forms for a verb were to be fully characterized by a paradigm, this would also mean that, e.g., the combinations of all possible clitic pronouns with verbs would have to be part of this paradigm. Such an approach would be implausible.

2. Halle & Marantz (1993): Fusion and Fission

Background:

Fusion vs. *merger*:

(i) Merger leads to independently available morphemes that separately trigger vocabulary insertion.

(ii) In contrast, fusion combines two morphemes in such a way that only one vocabulary item can be inserted after the operation has taken place.

(iii) Thus: Merger is *not* (as in nuclear physics) the same thing as fusion.

(30) *Fusion* (Halle & Marantz (1993, 116)):

    a. Fusion takes two terminal nodes (morphemes) M_1 and M_2 that are sisters, and fuses them into a single terminal node M_α.

    b. M_α has the features of both M_1 and M_2.

    c. At this point, only *one* vocabulary item V can be inserted in M_α; insertion is regulated by the Subset Principle.

Assumption:

In the syntax, there is a functional head *Case* and a functional head *Number* in nominal domains. In the case of fusional noun inflection in Indo-European languages, there is post-syntactic fusion of the two heads into a single morpheme.

Fission

(31) *Fission*; based on Halle & Marantz (1993, 166ff)):

    a. Fission separates a feature bundle β from a terminal node (morpheme) M_α, such that two terminal nodes M_1 and M_2 come into existence.

    b. M_1 has the features β; M_2 has the features of $M_\alpha - \beta$.

Note:

For Halle and Marantz, fission is the opposite of fusion: It takes a signle morpheme and creates two morphemes by splitting of features.

Side remark:

The concept of *fission* in Noyer (1992), Trommer (1999) is different. (This latter version may be a bit more widely adopted in the recent literature.)

The two concepts of fission

(32) *Fission$_a$* (Halle & Marantz (1993)):

    a. Fission separates a feature bundle β from a terminal node (morpheme) M_α, such that two terminal nodes M_1 and M_2 come into existence.

    b. M_1 has the features β; M_2 has the features of $M_\alpha - \beta$.

(33) *Fission$_b$* (Noyer (1992)): If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α, then α is split up into β and $\alpha - \beta$, such that (a) and (b) hold:

    a. $\alpha - \beta$ is available for further vocabulary insertion.

    b. β is not available for further vocabulary insertion.

3. Verb Agreement in Georgian

Example:

Agreement markers on the verb in Georgian (based on Anderson (1992); also see Stump (2001)). Halle & Marantz (1993, 116ff) analyse the agreement marking on the verb by presupposing functional clitic morphemes that have undergone fusion.

(34) *Paradigm*

    With a 3.Pers object – X paints 3.Pers.:

a.	v-xatav	"I paint him."
b.	v-xatav-t	"We paint him."
c.	Ø-xatav	"You$_{sg}$ paint him."
d.	Ø-xatav-t	"You$_{pl}$ paint him."
e.	xatav-s	"He paints him."
f.	xatav-en	"They paint him."

    With a 3.Pers subject – 3.Pers. paints X

g.	m-xatav-s	"He paints me."
h.	gv-xatav-s	"He paints us."
i.	g-xatav-s	"He paints you$_{sg}$."
j.	g-xatav-(s-)t	"He paints you$_{pl}$."
k.	xatav-s	"He paints him."
l.	xatav-s	"He paints them."

    With 1.Pers. and 2.Pers. – 1.Pers. paints 2.Pers. or 2.Pers. paints 1.Pers.

m.	g-xatav	"I paint you."
n.	m-xatav	"You paint me."
o.	g-xatav-t	"We paint you$_{sg}$/youpl."
	or	"Ipaint you$_{pl}$."
p.	gv-xatav	"You$_{sg}$ paint us."
q.	gv-xatav-t	"You$_{pl}$ paint us."

Fusion → fission → insertion

Assumptions about fusion:

(i) The clitic cluster incorporates, under a single head, all pronominal 1.Pers and 2.Pers arguments (normally, this does not hold for 3.person arguments; there are exceptions that will be ignored here).

(ii) The terminal nodes in the clitic cluster fuse into a single terminal node.

(iii) After fusion, the rule of fission in (35) applies.

(iv) Finaly, vocabulary insertion takes place.

(35) *Fission of clitic clusters in Georgian*:

    [$_{Cl}$ ... [+pl] ...] + stem → [+pl] + Cl + stem, where

    a. linear order is irrelevant; and

    b. fission does not apply if [+pl] is part of an argument bearing the features [+1],[DAT].

Further assumptions

1. A fused T/Agr-head (tense/agreement head) follows the clitic cluster and the verb stem. This head agrees with a [NOM]-marked argument with respect to person and number. the vocabulary items that are inserted in T/Agr are organised according to so-called "screeves".

   ("Screeves": loanword from Georgian; specific conjugation patterns that are roughly comparable to tenses.)

2. A (phonologically oriented) *readjustment rule* applying after vocabulary insertion deletes an /-s/ with 3.Pers.Sg. before a plural /-t/.

3. An *impoverishment rule* deletes a terminal plural-node if the latter follows some T/Agr-node with the features [+3],[+pl].

Vocabulary items

(36) *Vocabulary items for clitic positions*:

    a. /gv-/ ↔ [+1],[DAT],[+pl]
    b. /m-/ ↔ [+1],[DAT]
    c. /g-/ ↔ [+2],[DAT]
    d. /v-/ ↔ [+1]
    e. Ø ↔ [+2]

(5) *Vocabulary items for plural*:

    f. /-t/ ↔ [+pl]

(37) *Vocabulary items for T/Agr in the examples above*:

    a. Ø ↔ [+1] oder [+2]
    b. /-s/ ↔ [+3],[−pl]
    c. /-en/ ↔ [+3],[+pl]

Specificity problems
Question:
It is really clear whether the competition of vocabulary items in (36) can always be resolved by specificity. As noted by Halle and Marantz, additional assumptions may be called for for cases like (36), for the choice of (b) vs. (c) (in other contexts, where "both sets [in a clitic cluster] in principle might be DAT"; Halle & Marantz (1993, 120)). A similar reasoning applies in the case of (d) vs. (e). Halle and Marantz consider two options.

1. Specificity is sensitive to appropriate feature hierarchies, here: [+1] > [+2].

2. There is an extrinsic ordering of vocabulary items.

Stump's Critique
Side Remark:
Stump (2001, 281, fn.3) claims that Halle & Marantz (1993) need an extrinsic ordering in their analysis of verb agreement in Georgian: "The ordering of /g-/ before /v-/ [...] is just stipulated." This does not have to be the case: the vocabulary item /g-/ in (36) has more

features in its context of insertion than the vocabulary item /v-/ in (36).
(An indeterminacy with respect to specificity could only arise if an element α can only be more specific than another element β if the features of α are a proper superset of the features of β. Something along these lines has indeed been proposed, but it is not the case under present assumptions.)

Syntax

(38) *Syntactic structure for vocabulary insertion*:

    1   2   3   4
    [$_{Cl}$ {Pers.,CASE,NUM} {Pers.,CASE,NUM}] [stem] [T/Agr] [+pl]

Remarks on (38):

1. Position 1 contains the clitic cluster and up to two case and Φ feature bundles (1. or 2. Person).

2. Position 2 encodes the verb stem.

3. Position 3 contains a case and Φ feature bundle that realizes agreement with the subject (i.e., the nominative-marked argument).

4. Position 4 is only activated under fission. By assumption, it does not have to be stipulated that the [+pl] feature that has been split off from the clitic cluster is realized as a (final) suffix; this is supposed to follow from the suffixal status of the vocabulary item /-t/, which is the only one that fits in this context.

Derived paradigm for xatav *in Georgian*:

Subj→ Obj↓	1.Sg.	1.Pl.	2.Sg.	2.Pl.	3.Sg.	3.Pl.
1.Sg.	–	–	m-xatav-Ø	m-xatav-t	m-xatav-s	m-xatav-en
1.Pl.	–	–	gv-xatav-Ø	gv-xatav-t	gv-xatav-s	gv-xatav-en
2.Sg.	g-xatav-Ø	g-xatav-t	–	–	g-xatav-s	g-xatav-en
2.Pl.	g-xatav-t	g-xatav-t	–	–	g-xatav-(s-)t	g-xatav-en
3.Sg.	v-xatav-Ø	v-xatav-t	Ø-xatav-Ø	Ø-xatav-t	Ø-xatav-s	Ø-xatav-en
3.Pl.	v-xatav-Ø	v-xatav-t	Ø-xatav-Ø	Ø-xatav-t	Ø-xatav-s	Ø-xatav-en

Comments:

- /-s/ in 3.Sg.→2.Pl. contexts is deleted via readjustment.

- In 1.Pl.→2.Pl. context, there should be two /-t/ markers if nothing else is said.

- In (e.g.) 1.Sg.→3.Pl. or 2.Sg.→3.Pl. contexts, there is no /-t/ because 3.Pers. clitics do not undergo incorporation.
  Alternative (?): [±pl]-impoverishment with 3.Pers. in the clitic cluster.

Conclusion: Georgian verb agremeent

Conclusion:

- *Fusion* is needed in this approach because two arguments need to be encoded in transitive contexts in Georgian, but evidently, there is only enough space for the encoding of one argument in the relevant position in front of the verb.

- *Fission* is needed in this approach because the argument that has "lost" in the preverbal (and is not encoded there) can at least be encoded with respect to number, in the post-verbal position (see 1.Pers.Pl.→2.Pers.Sg.: *g-xatav-t*).

4. Verbflexion im Englischen

Relevante morphologische Operationen:

1. Verschmelzung (*merger*) von T und V.

2. Insertion eines Agr-Morphems (auch bekannt unter dem Terminus *Dissoziierung* (*dissociation*)).

3. Fusion (*fusion*) von T und Agr.

4. Readjustment von Vokabularelementen in T/Agr.

4.1. Satzstruktur im Englischen

(39) They sleep late

    a. *Oberflächenstruktur (Input für Morphologie)*:
    [CP C [TP [DP [D {[+3,+pl]}]] [T′ [T {[−part,−prät]}] [VP V AP]]]]
    b. *Struktur nach Verschmelzung von T und V unter Adjazenz*:
    [CP C [TP [DP [D {[+3,+pl]}]] [T′ [VP [V V [T {[−part,−prät]}]] AP]]]]
    c. *Struktur nach Insertion von Agr und Fusion von T und Agr unter Schwesternschaft*:
    [CP C [TP [DP [D {[+3,+pl]}]] [T′ [VP [V V [T [T {[−part,−prät]}] [Agr {[+3,+pl]}] AP]]]]

4.2. Bemerkungen zur Satzstruktur

1. Der Schritt in (39-b) wird oft als Resultat von Senkung (*lowering*) in der Syntax angesehen (so von Chomsky (1995, ch.2)). Hier ist es jedoch eine genuin morphologische Verschmelzung unter Adjazenz, die V und T verbindet (Halle & Marantz (1993, 134)).

2.
   - Die Insertion von Agr in (39-c) verletzt die *Inklusivitätsbedingung* (*Inclusiveness Condition*) von Chomsky (1995; 2001), derzufolge nach Beginn einer Derivation keine neuen, noch nicht in der Numeration vorhandenen Elemente mehr eingeführt werden dürfen.

   - Andererseits deckt sich das Fehlen von Agr in der Syntax mit der Annahme in Chomsky (1995, ch.10) und Chomsky (2000; 2001), dass semantisch leere funktionale Kategorien (wie AgrP) in der Syntax nichts verloren haben.

- "Agr morphemes are added to heads at morphological structure (MS) in accordance with language-particular requirements about what constitutes a morphologically well-formed word in that language." (Halle & Marantz (1993, 135)).

- Die morpho-syntaktischen Merkmale werden vom Subjekt auf das eingesetzte Agr-Morphem kopiert.

4.3. Paradigma der Verbflexion im Englischen

Abzuleitendes Paradigma für Verbflexion im Englischen:
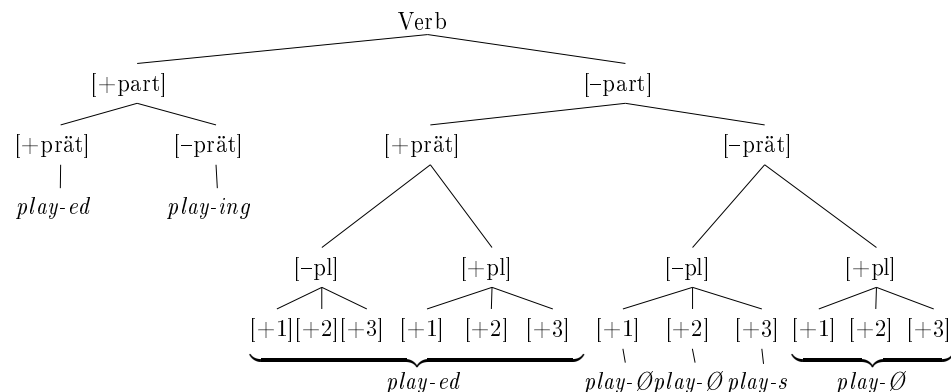
4.4. Vokabularelemente für englische Verbflexion

(40) *Vokabularelemente für fusionierte T/Agr-Morpheme im Englischen*:

    a. /-n/ ↔ [+part,+prät] / X + __, wobei X = ∼hew, ∼prove, go, beat, ...
    b. Ø ↔ [+prät] / Y + __, wobei Y = *beat, drive, bind, sing, ...*
    c. /-t/ ↔ [+prät] / Z + __, wobei Z = *dwell, buy, send, ...*
    d. /-d/ ↔ [+prät]
    e. /-ing/ ↔ [+part]
    f. /-z/ ↔ [+3,−pl]
    g. Ø ↔ [ ]

Notation:
∼ = Verben, die optional /-d/ oder /-n/ nehmen.

4.5. Bemerkungen zu den Vokabularelementen

- *Spezifizität*:

  – Per Annahme zählen kontextuelle Merkmale bei der Ermittlung von Spezifizität nicht mit.

  – Für die Ordnung in (40-def) reicht das einfachste Spezifizitätskonzept (GröSSe von Merkmalsmengen) nicht (Annahme: [+3,−pl] ist *nicht* spezifischer als [+prät]; wenn dem so wäre, würde ja auch im Präteritum ein /-z/ bei der

3.Pers.Sg. erwartet). Hier hilft entweder eine universelle Hierarchie wie
$$Tempusmerkmale > Aspektmerkmale > \Phi\text{-}Merkmale,$$
oder eine extrinsische Ordnung.

- *Nullmarker*:

    – Der Nullmarker Ø kommt hier zweimal vor; einmal als unspezifizierter Default-Marker, ein anderes Mal als spezifischer Marker. Letzteres mag man für problematisch halten. Halle & Marantz (1993, 127, 133f.) sagen dazu:

    – "Since in language there is an arbitrary relation between the morpho-syntactic and phonological features of a Vocabulary item (Saussure's *arbitraire du signe*), it is not surprising that the relationship between morpho-syntactic and phonological features is one-to-many. Thus, phonological Ø is the phonological realization of two distinct sets of features in [(40)]." (p. 127)

    – "We recognize at least two types of zero morphemes, leaving open the question of whether these are actually distinct. [...] It may be that Universal Grammar provides a zero spell-out as the default phonological realization of a morpheme in the unmarked case. This possibility in no way undermines the existence of zero morphemes." (pp. 133-134).

    – (Dass hier zweimal von "zero morpheme" die Rede ist, ist u.U. missverständlich: Gemeint sind ja nicht die abstrakten f-Morpheme, in die hinein Einsetzung erfolgt, sondern die Vokabularelemente, die f-Morpheme realisieren.)

4.6. Phonologische Korrekturen: Readjustment Rules

Beobachtung:
Damit ist die Analyse noch nicht ganz am Ende; in vielen Fällen müssen noch phonologische Korrekturen am soweit durch Syntax und Morphologie determinierten Ergebnis vorgenommen werden. Dies leisten *readjustment rules*.

(41) *Notwendigkeit weiterer Veränderungen*:
    a. (i)   beat – beat – beat-en
             drive – drove - driv-en
             break – broke – brok-en
             fall – fell – fall-en
       (ii) put – put – put
             sing – sang – sung
             bind – bound – bound
             come – came – come
    b.   dwell – dwel-t – dwel-t
             leave – lef-t – lef-t
             send – sen-t – sen-t
             buy – bough-t – bough-t
    c. (i)   prove – prove-d – prov-en
             do – di-d – do-ne

       (ii) yell – yell-ed – yell-ed
             tell – tol-d – tol-d

(42) *Readjustment rules*:
    a. Reim → /u/ / X __ [+prät],
       wobei X-Reim = *shall, will, can, stand.*
    b. Reim → /i/ / Y __ [+prät,–part],
       Reim → /ʌ/ / Y __ [+prät,+part], [–prät,+3,-pl],
       wobei Y-Reim = *do.*
    c. Reim → /e/ / Z __ [+prät], [–prät,+3,–pl],
       wobei Z-Reim = *say.*
    d. V → [+hinten,+gerundet] / W __ U [+prät],
       wobei WVU = *sell, tell.*
    e. C → Ø / Q __ [+prät], <[–prät,+3,–pl]>, wobei QC = *make,* <*have*>

4.7. Suppletion

Grundannahme:
Sehr viel morphonologische Stammvariation ist vorhersagbar; echte, willkürliche Suppletion gibt es kaum. In den wenigen Fällen, wo es echte Suppletivformen gibt (wie bei *go – went*), liegen zwei unterschiedliche Vokabularelemente vor. Diese haben dieselben substantiven Merkmale; aber sie unterscheiden sich so, dass eines der beiden Elemente (*wen-*) noch die kontextuellen Merkmale [__+prät,–part]] aufweist.
(Das Fehlen von massivem Gebrauch von Suppletivformen wird im Übrigen als Argument gegen Andersons (1992) inferentiell-realisationalen Ansatz betrachtet: "Since suppletion is not of central importance in the morphology of English or of any other language, the approach did not seem to us to be on the right track" (p. 113).)

Anderson, Stephen (1992): *A-Morphous Morphology*. Cambridge University Press, Cambridge.

Arregi, Karlos & Andrew Nevins (2012): *Morphotactics: Basque Auxiliaries and the Structure of Spellout*. Springer, Heidelberg.

Bobaljik, Jonathan (2002): Syncretism without Paradigms: Remarks on Williams 1981, 1994. In: G. Booij & J. van Marle, eds., *Yearbook of Morphology 2001*. Kluwer, Dordrecht, pp. 53–85.

Bonet, Eulàlia (1991): Morphology after Syntax. PhD thesis, MIT, Cambridge, Mass.

Bonet, Eulalia (1995): Feature Structure of Romance Clitics, *Natural Language and Linguistic Theory* 13, 607–647.

Chomsky, Noam (1995): *The Minimalist Program*. MIT Press, Cambridge, Mass.

Chomsky, Noam (2000): Minimalist Inquiries: The Framework. In: R. Martin, D. Michaels & J. Uriagereka, eds., *Step by Step*. MIT Press, Cambridge, Mass., pp. 89–155.

Chomsky, Noam (2001): Derivation by Phase. In: M. Kenstowicz, ed., *Ken Hale. A Life in Language*. MIT Press, Cambridge, Mass., pp. 1–52.

Frampton, John (2002): Syncretism, Impoverishment, and the Structure of Person Features. In: M. Andronis, E. Debenport, A. Pycha & K. Yoshimura, eds., *Papers from the Chicago Linguistics Society Meeting*. Vol. 38, Chicago, pp. 207–222.

Halle, Morris (1997): Distributed Morphology: Impoverishment and Fission. In: B. Bruening, Y. Kang & M. McGinnis, eds., *Papers at the Interface*. Vol. 30, MITWPL, pp. 425–449.

Halle, Morris & Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. In: K. Hale & S. J. Keyser, eds., *The View from Building 20*. MIT Press, Cambridge, Mass., pp. 111–176.

Halle, Morris & Alec Marantz (1994): Some Key Features of Distributed Morphology. In: A. Carnie, H. Harley & T. Bures, eds., *Papers on Phonology and Morphology*. Vol. 21 of *MIT Working Papers in Linguistics*, MITWPL, Cambridge, Mass., pp. 275–288.

Harley, Heidi (2004): The Importance of Impoverishment. Ms., University of Arizona.

Harley, Heidi & Rolf Noyer (2003): Distributed Morphology. In: L. Cheng & R. Sybesma, eds., *The Second GLOT International State-of-the-Article Book*. Mouton de Gruyter, Berlin, pp. 463–496.

Noyer, Rolf (1992): Features, Positions, and Affixes in Autonomous Morphological Structure. PhD thesis, MIT, Cambridge, Mass.

Noyer, Rolf (1998): Impoverishment Theory and Morphosyntactic Markedness. In: S. Lapointe, D. Brentari & P. Farrell, eds., *Morphology and its Relation to Phonology and Syntax*. CSLI, Palo Alto, pp. 264–285.

Sauerland, Uli (1996): The Late Insertion of Germanic Inflection. Generals paper, MIT.

Stump, Gregory (2001): *Inflectional Morphology*. Cambridge University Press, Cambridge.

Trommer, Jochen (1999): Morphology Consuming Syntax' Resources. In: *Procceedings of the ESSLI Workshop on Resource Logics and Minimalist Grammars*. University of Nijmegen. http://www.ling.uni-osnabrueck.de/trommer/papers.html.