Towards a Theory of Morphology as Syntax

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1. Introduction

In this paper, we discuss the relationship between syntax and morphology. In particular, we are interested in the question of the extent to which morphological generalizations can be accounted for in terms of syntactic operations and principles. The thesis that will be defended is the following (see Caha 2020: 8 for a very similar statement concerning Nanosyntax):

(1) Morphology as Syntax (MS)
Morphological generalizations are accounted for in terms of syntactic operations and principles. There is no morphological component in UG. There are no post-syntactic morphological operations.

MS a program for research. The underlying assumption is that you cannot separate morphology and syntax in any natural way. Furthermore, it is impossible to do work on morphology in isolation from syntax. For example, it is impossible to understand syncretism in a verbal paradigm without an analysis of the syntax of the language (see section 7 on Spanish for a case study).

MS is a consequence of the SMT (Strong Minimalist Thesis) of Chomsky 2000, which states that "Language is an optimal solution to legibility conditions." A theory lacking a morphological component is plausibly more optimal. Furthermore, just like the operations and principles of syntactic theory can be subject to scrutiny from the point of view of the SMT (e.g., D-Structure, S-Structure, traces, c-command, labels, etc.), proposed operations and principles of morphology can be subject to scrutiny from the point of view of MS.

MS raises the question of what constitutes syntactic theory. We assume the broad outlines of minimalist syntax, recently formalized by Collins and Stabler 2016. The basic assumptions are sketched in section 2. But we are not making the claim that all morphological generalizations can be reduced to syntactic principles as they are understood today. Rather, it may be that we will learn a great deal about how syntax works by trying to give syntactic explanations of morphological generalizations.

We put aside the issue of the relationship between phonology and syntax. Works such as Dobashi (2020) argue for a particularly close connection between certain aspects of phonology and syntax. But one can ask more generally if the kinds of structures and constraints found in phonology fall under syntactic theory. For example, can tone spreading in autosegmental phonology be understood in the same terms as successive cyclic movement in syntax? For the purposes of this paper, we put these important issues aside and assume that there is a clear distinction between phonology and syntax. At the very least the primitives manipulated in syntax (e.g., formal features such as PL) are distinct from the primitives manipulated in phonology (e.g., [+voiced]) .

2. Syntactic Framework

In order to defend (1), we need to have some idea of what the theory of syntax is. We are assuming the minimalist theory of syntax, as outlined and formalized in Collins and Stabler 2016. Perhaps the most important assumption is that syntactic objects are combined by Merge:

(2) For all syntactic objects X and Y, Merge(X,Y) = {X,Y}

In (2), Merge takes two objects and produces an unordered set (but see Kayne 2019c argues for incorporating linear order into the definition of Merge). For the purposes of this paper, we adopt (2) and leave open the question of how morphological phenomena bear on the issue of whether or not the definition of Merge incorporates linear order.

There are two subcases of Merge: internal Merge (movement) and external Merge. Movement yields various patterns such as: successive cyclic movement, roll-up movement, remnant movement, smuggling, etc. Movement is subject to locality conditions such as the MLC/RM (Minimal Link Condition, Relativized Minimality) and PIC (Phase Impenetrability Condition).

The set of syntactic objects includes the set of lexical items (morphemes). We assume that lexical items can be defined as follows (for an alternative in the spirit of MS see Collins 2017: 61):

(3) LI: {FF, PHON},
Where FF is a set of formal features and PHON is a sequence of phonological segments.

This definition excludes late insertion, since it assumes that lexical items pair up FF and PHON pre-syntactically (in the lexicon). Important questions include: Can PHON = ∅ (the empty sequence)? What is the set of formal features of UG? What kinds of sets of FF are allowed? Can they be of arbitrary complexity? Kayne (2005: 212) (see also Bobaljik 2012: 212) formulates the following hypothesis:

(4) Principle of Decompositionality
UG imposes a maximum of one interpretable syntactic feature per lexical item.

The question of formal features in the definition of lexical items is very closely related to the question of hierarchies of functional projections in the clause (e.g., the left periphery, the adverb hierarchy, extended projection of lexical categories, and other hierarchies discussed in the cartographic literature). The syntactic hierarchies interact with syntactic constraints on movement to yield cross-linguistic variation. A striking example of this kind of work is Cinque 2005 who argued that Greenberg's Universal 20 (Greenberg 1966) can be accounted for in terms of a universal hierarchy of modifiers combined with restrictive theories of linear order and movement. In MS, one would expect such syntactic argumentation to carry over into the domain of morpheme order. In fact, Cinque 2015 argues that the order of Mood, Tense and Aspect morphemes can be accounted for by similar principles.

On syntactic approaches to morpheme order see Julien (2007), Kayne (2019b, chapter 14), Koopman (2005, 2017), Zyman and Kalivoda (2020) and Buell, Sy and Torrence (2014). On syntactic approaches to clitic order see Kayne (1994), Ordóñez (2002), Săvescu-Ciucivara (2009) and Terzi (1999).

Once a syntactic object is formed, it must be spelled out at the phase level. So, we assume that there is an operation Transfer that has two components Transfer_{PF} and Transfer_{LF}.

(5) For any syntactic object SO,
$\text{Transfer}(SO) = \{\text{Transfer}_{PF}(SO), \text{Transfer}_{LF}(SO)\}$

Transfer is often referred to as Spell-Out in the syntax literature. Spell-Out may have the function of establishing a linear order of the morphemes, which we will assume conforms to the Linear Correspondence Axiom (Kayne 1994). Spell-Out also determines which occurrences of a syntactic object are spelled out (e.g., in remnant movement).

3. Empty Elements

Related to Spell-Out is the issue of when a morpheme can fail to be pronounced (or alternatively, when a morpheme can be spelled out as zero). Any morpheme that is unpronounced must either be lexically zero (specified in the lexicon as having no phonological form) or syntactically licensed as unpronounced in some way or the other. The issue of zero morphemes and how they are licensed is of great importance in the MS framework. Here, we briefly survey the relevant syntactic principles.

First, if a constituent X undergoes movement (internal Merge), typically only the highest occurrence is spelled out (although some care is needed to get spell-out to work correctly for remnant movement, see Collins and Stabler 2016).

Second, if a constituent X has an identical antecedent, in many cases it may undergo ellipsis. See Van Craenenbroeck and Merchant (2013) for a survey.

Third, there are many effects resembling the Doubly Filled Comp Filter in syntax. These are situations where the head and the specifier of a maximal projection cannot be filled overtly at the same time (see Collins 2007, Koopman 2000: 350-253, Koopman and Szabolcsi 2000).

Fourth, Kayne (2010: chapter 4) has proposed that the specifier of a phase is in general not spelled-out. He has used that principle to explain the presence of a null MUCH in expressions like ‘enough money’ (as opposed to ‘too much money’).

Fifth, there are null pronominals of various sorts, including PRO, pro and implicit arguments, each with its own licensing conditions (on null pro in object position see Rizzi 1986, on the syntactic status of implicit arguments, see Bhatt and Pancheva 2006: 581).

There are many other areas where people have proposed empty elements in syntax. These empty elements and the principles that license them are the basis for analyzing the distribution of zero morphemes in morphology.

4. Examples

In this section, we will go over a number of short case studies illustrating some analyses that conform to MS, and some that do not.

4.1. Ellipsis

Caha (2013: 1023) argues that Case Attraction in Classical Armenian should be analyzed as ellipsis (see also Erschler 2018 for another relevant case study).

(6) a. N-ABL N-GEN (underlying)
b. N-ABL N-GEN AGR=ABL (case agreement)
c. N-ABL N-~~GEN~~ AGR=ABL (ellipsis)

In (6a) there is a head noun and a complement noun. Normally the nominal complement is in the genitive. However, if the head noun has dative, ablative or instrumental case, the complement can optionally show up in that case instead. Caha argues that there is a process of case agreement between the complement and head noun (see (6b)), followed by ellipsis of the case marker of the complement noun (see (6c)). The reason why ABL can trigger ellipsis of GEN is that ABL actually contains GEN structurally. See Caha (2013) for details.

Two aspects of this explanation deserve comment from the perspective of MS. First, ellipsis under identity with an antecedent is a mechanism that is independently needed in syntax (in the spell-out of syntactic objects). Therefore, Caha's explanation of Case Attraction falls squarely in the MS program. Second, just like in current discussions of ellipsis in syntax, there is no need to assume that any structure has been removed in (6c) (unlike impoverishment in DM). Rather, GEN is simply unpronounced under identity with a subpart of ABL.

4.2. Contextual Restrictions

Kramer (2016: 544) analyzes double plurals in Amharic. The possible plurals of the word for "baby" are given below:

(7) a. hɨs'an-at (pg. 528)
b. hɨs'an-otʃtʃ (pg. 544)
c. hɨs'an-at-otʃtʃ (pg. 544)

In her framework, the irregular plural (7a) is a little n with an uninterpretable [+pl] feature. The regular plural (7b) is formed by adding Num which has an interpretable [+pl] feature. The double plural in (7c) combines the irregular and regular plurals.

The structure of the double plural is given in (8):

(8) $[_{NumP}\ [_{nP}\ [\ Root]\ n\ ]\ Num]$

To account for the data in (7), Kramer assumes the following vocabulary items:

(9) a. Num, [+pl] ←→ -otʃtʃ (regular)
b. n, [+pl] ←→ -at / {HɨS'AN,….} (irregular)

Kramer elaborates "Overall, since every nominal has a regular plural and there are double plurals, I conclude that regular and irregular plural morphology do not compete for insertion in Amharic; in other words, they do not occupy the same syntactic head (Num). Instead, I propose a split analysis of number: the ''regular'' plural suffix is the realization of Num[+pl] and irregular plural morphology is the realization of n[+pl]…".

How are such contextual restrictions as those in (9) handled in MS? Contextual restrictions on morphemes define where a morpheme can be merged into a syntactic object. Such

contextual restrictions are to be understood in terms of relations familiar from syntax (c-selection, s-selection, l-selection, the relation between the parts of idiomatic expressions). In other words, there is no such thing as morphology specific contextual restrictions on morphemes (or on vocabulary insertion). Syntactic selectional restrictions obey locality conditions, therefore contextual restrictions on morphemes will obey the same locality conditions (for a survey of existing theories, see Choi and Harley 2019). However, the general goal should be to reduce or eliminate the use of such restrictions as much as possible, since each restriction is a stipulation.

It is sometimes easy to translate DM style vocabulary items into MS style lexical items. From the point of view of MS, the regular plural in Amharic has the following lexical entry (on morphology and selection, see Fabb 1988):

(10) LI: {-otʃtʃ, Num[+pl]} selects nP

If the positions of NumP and nP in the functional sequence where part of universal grammar, there would be no need for the selectional restriction ("selects nP") to be listed in the lexical item in (10).

The irregular plural *at-* is more restricted. It can be defined as follows:

(11) LI: {-at, n[+pl]} selects {hɨs'an 'baby',…}

The restriction is that the irregular plural *at-* can only appear with one of a small number of roots. Such a restriction is similar to the lexical restrictions found in the following phrases in English:

(12) a. by dint of
b. to keep tabs on

In both cases, there is a lexical item that can appear in a very specific context. In (12a), the noun *dint* only appears in the expression *by dint of*, and in no other expression. Similarly, *tabs* (in the relevant sense) can only appear with *keep* in (12b).

In MS, (10) and (11) are lexical items, and are not inserted post-syntactically. Rather, they are merged together with the root or the noun to form plurals in Amharic. The syntactic derivation of the double plural in Amharic is given in (13). As is customary, the lexical items in the derivation are represented by their phonological forms:

(13) a. Merge(hɨs'an, -at) = {hɨs'an, -at}
(satisfying the selectional requirements of *-at*)
b. Merge({hɨs'an, -at}, -otʃtʃ) = {{hɨs'an, -at}, -otʃtʃ}
(satisfying the selectional requirements of *-otʃtʃ*)
c. Spell-Out({{hɨs'an, -at}, -otʃtʃ}) = hɨs'an-at-otʃtʃ

Since Kramer assumes that the n and Num heads appear finally, the result of (13b) would be spelled out as in (13c). There is no late insertion in this derivation.

4.3. Allomorphy

A case related to Amharic irregular plurals arises with English irregular plurals. Consider the treatment of the irregular plural *ox-en* given in Embick (2015: 171-172):

(14) a. [+pl] ←→ -en/{OX, CHILD, …}
b. [+pl] ←→ ∅/{FISH, MOOSE…}
c. [+pl] ←→ /-z/

The vocabulary items in (14) represent a late insertion analysis for the English plural. The late insertion analysis of the English irregular plural is considered a flagship example for the analysis of allomorphy in the DM literature, see for example McGinnis (2017: 395), Bonet and Harbour (2012: 196), Bobaljik (2012: 7), Emick and Noyer (2007: 298-299). In section 5 below, we will argue that late insertion is incompatible with MS. But there are other problems with (14).

For example, there is a difference between irregular and regular plurals in compounds (see also Pinker 1999: 179 who gives "draft horse, mule and oxen power"):

(15) a. ox cart, oxen cart
b. dog sled, *dogs sled

While both forms in (15a) seem to be more or less acceptable, *dogs sled* in (15b) is sharply degraded. The facts suggest that the irregular plural and the irregular plural *-en* do not occupy the same syntactic position, contrary to the claim of the analysis in (14). Rather, *-en* occupies a lower position than *-s*. Following Collins (2018), we propose that *-en* occupies an inner plural position (PL1) and *-s* occupies an outer plural position (PL2). Only the inner plural is compatible with noun compounds.

Our split plural analysis of *ox-en* is similar to the analysis of English plurality in Punske and Jackson (2017: 268): "In English, the higher position Num encodes individuation while the lower position, n, encodes general plurality." They show convincingly that only lower plurals appear in compounds. The explanation is as follows: "…when a head requires that its complements be individuated, the plural is disallowed, because that larger structure including Num cannot be incorporated, and therefore cannot be part of a compound." (pg. 271)

In an MS style analysis, the relevant lexical items are given below:

(16) a. LI_1: {PL2, -s} selects N or PL1P
b. LI_2: {PL1, -en} selects *ox*

If the positions of PlP and PlP2 in the functional sequence where part of universal grammar, there would be no need for the selectional restrictions ("selects N or PL1P") to be listed in the lexical item in (16a).

These morphemes do not compete with one another. In fact, many speakers allow both kinds of plurals:

(17) a. oxes
b. oxen

As Pinker (1999: 52) notes: "Most Americans meet *oxen* mainly in writing, and commonly say *oxes* instead." On the analysis in (14), such a state of affairs would be completely unexpected. Since the irregular plural *-en* is more specific (having a more specific context for vocabulary insertion), it should block the regular plural. However, under the split plural analysis, the data in (17) is completely expected, just like in Amharic both the irregular and regular plurals are possible (see (7)).

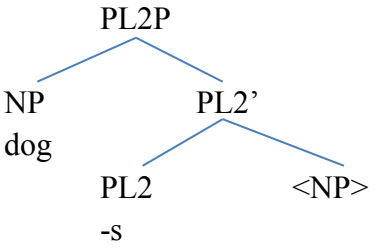
A piece of evidence for the split plural analysis is the following contrast:

(18) a. ??oxens
b. *oxesen

While both forms seem unacceptable, the order of the plural markers in (18a) is much better than (18b). This contrast follows from our analysis in that the order in (18a) reflects the order inner plural before outer plural. A future project would be to investigate whether *oxens* appears in internet searches, and whether the form exists in different English dialects. A related question is whether the double plural *childrens* appears in child English.

We assume regular plurals lack the PL1 projection. Assuming the LCA, the structure of the regular plural *dog-s* is as follows:

(19)



The structure in (19) raises the issue of anti-locality, since NP is moving from the complement to the specifier position. No such violation would be incurred if there were some other projection just below PL2 (but above NP) which is skipped by movement of NP. We leave the matter for further work. Furthermore, replacing NP by nP (plus root) would be compatible with our general approach. In that case, nP would undergo movement to Spec Pl2P.

What about irregular plurals like *ox-en*? Following Collins 2018, we propose that they are to be analyzed as double plurals, analogous to double plurals in Amharic. In other words, *ox-en* has both an inner plural and an outer plural, which is spelled-out as zero:

(20) ox-en-s → ox-en-Ø

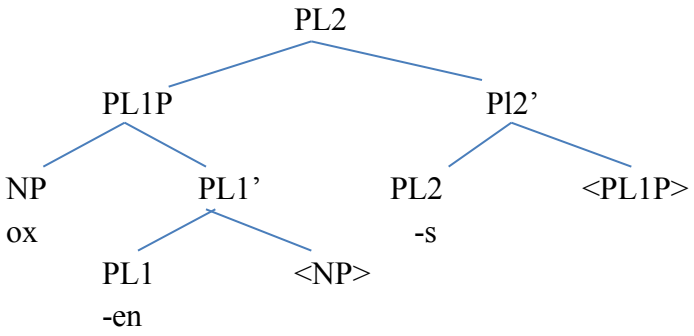
An alternative is that *ox-en* only involves PL1 and not PL2, so that the regular plural is simply missing. However, putting aside compounds, *ox-en* behaves like a regular plural in all other ways:

(21) a. When those oxen are put to work in the field,…
b. Two of the oxen are white.

Sentence (21a) shows that *oxen* can be used with the plural distal demonstrative, and that *those oxen* triggers plural subject-verb agreement. Sentence (21b) shows how *the oxen* can appear in a partitive construction with a numeral. Therefore, it seems plausible that *oxen* has a null regular plural morpheme, since it behaves like a regular plural syntactically (other than in the case of compounding).

The syntactic structure of *ox-en* is then given below:

(22)



The remaining question is what accounts for the deletion of the regular plural morpheme in (22) as opposed to (19), where there is no deletion of the plural. In the following paragraphs we sketch a possible analysis.

Collins 2007 looked at cases of preposition deletion in English. As shown in (23a,b), *go* and *stay* normally select prepositional phrases.

(23) c. I went to that place.
d. I stayed at that place.

But no such prepositions are used with *there* in the sentences below (*here* and *where* have a similar distribution):

(24) a. I went there.
b. I stayed there.

Following Katz and Postal (1964), Collins argued that there are null prepositions in these examples:

(25) a. I went TO there.
b. I stayed AT there.

We propose that the regular plural is null in *oxen* for similar reasons. Collins (2007) proposed that the distribution of null prepositions follows from a general version of the Doubly Filled Comp Filter:

(26) No Crowding Condition
a. Edge(X) must be phonetically overt.
(Edge(X) includes both the head and the specifier of XP)
b. The condition in (a) applies in a minimal way so that either the head, or the specifier, but not both, are spelled-out overtly.

Applying this condition would yield deletion of the plural morpheme in both (19) and (22), which is not the correct result. Either the structure of (19) has to change (so that Spec of PL2P is empty for *dog-s*), or the condition in (26) needs to be altered. We propose that (26) be relativized to features:

(27) No Crowding Condition (relativized to formal features FF)
If X and Y both have FF, then if YP appears in the specifier of XP, X is not spelled-out.

In (19), the formal feature PL only appears in the head of PL2P, so the head is spelled out. In (22), the formal feature PL appears in the specifier and head of PL2P, so the head is not spelled out.

While we have proposed (27) in the context of the irregular plural *oxen* in English, it should be more widely applicable. In particular, Choi and Harley (2019: 1346, 1347, footnote 32) note that it is often the case when X triggers suppletion of some other head Y, X is realized as a zero allomorph. This pattern might ultimately be understood in terms of a No Crowding Condition similar to (27). Similarly, some of the cases of haplology discussed in Neelman and van de Koot (2017: section 3.2) might be reducible to a similar constraint.

The difference between double plurals in Amharic and English is that deletion of the outer-plural is obligatory in English, but optional in Amharic. We leave an account of this difference to future work.

Although it is unclear that the above analysis can serve as a general model for contextual allomorphy, one important general assumption is the following (see (3) for the definition of morpheme):

(28) Contextual allomorphy involves two or more different morphemes.

In the example at hand, it is not that the irregular *-en* and the regular *-s* are competing for insertion in a given position. Rather, each of the morphemes heads its own functional projection. The reason it looks like there is competition is that when both appear together (in the split analysis), the inner plural deletes the outer plural.

Of course, the above account still leaves open many unanswered questions, one of the biggest is what differentiates PL1 and PL2 semantically (see Punske and Jackson 2017 for some preliminary informal remarks).

In general, on the approach to contextual allomorphy outlined in this paper, in any given case there will be at least four questions to answer. Consider the example of *oxen* again. Here are the relevant questions: (a) Why can *ox* combine with *-en*? (b) Why can *ox* combine with *-s*? (c) Why can *fox* not combine with *-en*? (d) Why can *fox* combine with *-s*?

Here are the answers to those questions: (a) *ox* can combine with *-en* because *ox* satisfies the contextual restrictions of *-en* (see (16b)). (b) *ox* can combine with *-s* because *ox* satisfies the contextual restrictions of *-s* (see (16a)). (c) *fox* cannot combine with *-en* because *fox* does not satisfy the contextual restrictions of *-en*. (d) *fox* can combine with *-s* because *fox* satisfies the contextual restrictions of *-s*.

The mechanisms of late insertion, competition, blocking and the elsewhere condition will play no role in the answers to these questions. Our proposal is that these mechanisms are not part of UG and never play a role in the analysis of contextual allomorphy.

On an account of suppletion in the spirit of MS see Kayne (2018, 2019a).

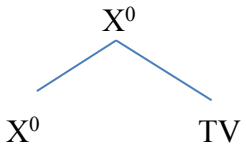
4.4. Insertion of Dissociated Morphemes

Distributed Morphology postulates the post-syntactic insertion of morphemes, referred to as ornamental or dissociated morphemes in the DM literature (see Embick 2015: 65). See also Choi and Harley (2019: 1331), who refer to insertion of dissociated morphemes as node-sprouting. Embick and Noyer (2007: 309) add that "As a working hypothesis, it has been suggested that only features irrelevant to semantic interpretation, that is, features that are not interpretable, can be introduced at PF…" The kinds of morphemes that are introduced this way include Agreement nodes (AGR), case features, theme vowels (for verbs), and class markers (for nominal declension classes) (see also Halle and Marantz 1993: 135), honorific morphemes (Choi and Harley 2019).

An example of a dissociated morpheme in Italian comes from Calabrese (2015: 74) (see also Harris 1998: 44):

(29) "Thematic Vowels (TV) are special morphological elements adjoined to certain functional heads in morphological structure by the rule in (11)."

That rule is given below:

(30) X^0 → 

The problem with (30) from the point of view of MS is that it allows morphemes to be combined with other morphemes in a way that is very different from Merge. To put it another way, what would block such a morpheme from being introduced by Merge in ordinary syntax?

(31) Merge(TV, X^0)

From this perspective, (30) is redundant with the syntactic operations of UG. In addition, the rule in (30) is highly specific. It is specific to the TV morpheme, so it raises the question of whether each dissociated morpheme will need its own special rule, greatly complicating particular I-languages. Furthermore, (30) raises the question of how such rules vary cross-linguistically. Therefore, it is very different from Merge which is part of UG, able to combine any two syntactic objects. Calebrese did not discuss why the more general formulation in (31) would not work, nor how it would have affected his analysis.

A more challenging example of this kind of analysis is found in Baker and Kramer (2014). They claim that case markers in Amharic ('from', 'to', 'by', 'for') are introduced post-syntactically. Some examples are given below:

(32) a. kä-bet (pg. 150)
from-house
"from a house"

b. kä-tɨllɨk' bet (pg. 150)
from-big house
"from a big house"

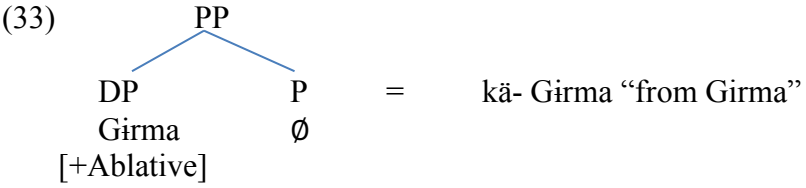
c. bä-zzih bet (pg. 145)
in-this house
"in this house"

d. lä- Gɨrma wändɨmm (pg. 151)
to-Girma brother
"to Girma's brother"

e. kä-rädʒdʒɨm-u näggade suk' (pg. 155)
from-tall-DEF merchant shop
"from the shop of a tall merchant"

To handle this kind of data, Baker and Kramer (2014) assume that in these examples there is a null adposition following the noun, which assigns a case feature to its complement.

(33)



The case marker itself is inserted post-syntactically by the following rule (m-word = morphological word). A more complicated, recursive version of this rule is needed to handle cases like that of (32e). We put the recursive version aside for brevity's sake.

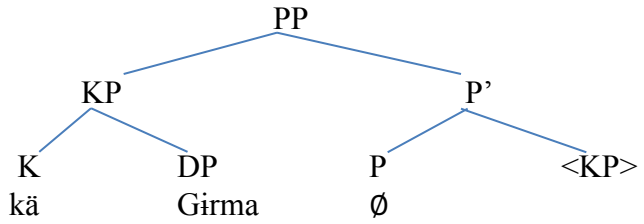
(34) Insertion Rule (Preliminary Version)
If a feature F is to be inserted within constituent X, then attach F to the m-word Z such that Z asymmetricially c-commands all the other m-words in X.

Once again, the problem with (34) from the point of view of MS is that it allows morphemes to be combined with other morphemes in a way that is very different from Merge. Also, this rule is completely different from the one postulated by Calabrese in (30), raising the question of how many such post-syntactic insertion rules there are. Lastly (34) is meant to be a rule of post-syntactic case insertion, but relies on the notion of asymmetric c-command which is a purely syntactic relation, again raising the issue of whether the insertion rule should be carried out by syntactic mechanisms.

In formulating an alternative analysis, we adopt from Baker and Kramer (2014) the restriction of the case marker to m-words. We also adopt their idea that there is a null post-position present. But, we assume that the case maker and its m-word are combined by Merge: Merge(K, m-word). Additionally, a crucial requirement is that there must be a local syntactic relation between the overt case marker K and the null P (see (38) below).

Under these assumptions (and the LCA), the structure in (33) would be replaced by the following:

(35)



In this example, the KP is the sister of P'. As for the other examples in (32b-e), they resemble pied-piping:

(36) a. I wonder who she saw.
b. I wonder whose picture she saw.
c. I wonder whose brother's picture she saw.

In (36a), the embedded [+Q] complementizer requires a wh-phrase in its specifier. But this requirement can be satisfied under pied-piping as shown in (36b). Kayne (1994: 24) gives the following condition:

(37) The wh-phrase in interrogatives must asymmetrically c-command the [+wh] head.

Adapting this condition to the case at hand, we have:

(38) The KP must asymmetrically c-command the corresponding null preposition P.

Consider (32d), which has the following structure:

(39) [$_{PP}$ [$_{DP}$ [$_{KP}$ lä- Gɨrma] wändɨmm] P']

"to Girma's brother"

In the specifier (possessor) of the complement of the postpostition, the case morpheme is still accessible to P, just as in pied-piping, the possessor *whose* is accessible to the [+Q] complementizer. The Amharic example in (32e) is parallel to the case of pied-piping in (36c), where *whose* is the specifier of a specifier.

It is not possible in this short space to analyze all the complicated examples (some involving relative clauses) discussed by Baker and Kramer. Whether or not our analysis is correct, it ties the current set of facts to the general theory of pied-piping.

In general, MS holds the following to be true:

(40) There is no post-syntactic insertion of morphemes.

5. Against Late Insertion

The preceding sections have given an overview of a morphological approach to syntax. But the discussion so far leaves open the following question: What is the status of late insertion? That is, is late insertion consistent with the general MS framework? In this section, we will argue that it is not. The basic point is this: Late insertion involves wide ranging formal mechanisms that operate on syntactic structures, but are independent from syntactic theory. Assuming early insertion may render those mechanisms redundant.

Two theories that adopt the assumption of late insertion are Distributed Morphology and Nanosyntax. As Baunaz and Lander (2018: 12) phrase it: "In realizational, late-insertion theories like DM and Nanosyntax, however, sound and meaning are not inherently linked but are separate entities, and it is only when the syntactic derivation reaches a certain point that the meaning is paired with (for some, replaced by) sound." In the remainder of this section, we focus on DM, but the conclusions largely carry over to Nanosyntax as well.

The syntactic operation Merge takes two syntactic objects X and Y and puts them together to form a third syntactic object Z = {X,Y}. This operation can be looked at in two different ways, corresponding to the two interfaces (CI and SM) that need to interpret the syntactic object formed. From one angle, Merge is combining X and Y so that they can be composed semantically. From another angle, Merge is combining X and Y so that when they are linearized (at Spell-Out) the result is a phonological string determined by the phonological form of X and of Y. In effect, Merge is introducing phonological forms into syntactic objects. There is no need for extra rules introducing phonological forms into terminals.

As discussed in section 2, Spell-Out incorporates general principles of morpheme order (e.g., the LCA) and principles dealing with the spell-out of occurrences (e.g., in remnant movement). These general Spell-Out principles are also needed in late insertion theories.

Late Insertion theories do not adopt these assumptions about Merge. In DM, morphemes have no phonological form. They are combined to form syntactic objects (by Merge and a set of post-syntactic operations), and then post-syntactically the terminals (morphemes) are provided with phonological forms by vocabulary insertion. Implementing late insertion theories requires

wide ranging and complicated additions to that part of syntactic theory dealing with the spell-out of syntactic objects (the phonology-syntax interface).

First, there needs to be an independent list of vocabulary items (the Vocabulary) that are defined by the pairing of formal features and phonological forms. If restricted to the functional vocabulary, there will be hundreds such vocabulary items for each I-language. In addition to this list, there will have to be another list of terminals (morphemes) that are combined by Merge. In many cases, the vocabulary items and the terminals will be defined by identical sets of formal features. For example, suppose the English preposition *to* is defined the formal feature DAT. Then in DM, there will be a terminal DAT as well as a vocabulary item: DAT ←→ *to*. All formal features will have to appear twice in the grammar: in the terminals and in the vocabulary items.

Each time vocabulary insertion applies to a particular syntactic terminal, every one of those vocabulary items will have to be checked to see if it matches the terminal. That is, the features of the vocabulary items need to be a subset of the formal features of the terminal (the Subset Principle, see Embick and Noyer 2007: 298). If a syntactic object contains 10 terminals (a small tree) and there are 100 vocabulary items (a small Vocabulary) for a particular grammar, then there will be 1,000 operations of checking. Of course, in practice, there may be ways to optimize this search, and to cut down on the total number of operations needed.

Second, once a small subset of matching vocabulary items is selected, they will have to be ranked according to how well they match the terminal. If there are five matching vocabulary items, the one with the most features wins (the Subset Principle again). So, if V1 matches terminal T with three features and V2 matches T with four features, V2 wins. This means that UG must be able to take two vocabulary items and compare them in terms of size and choose the biggest one. Also, it is clear from the DM literature that the competition does not just refer to the formal features of the vocabulary item, but also contextual restrictions on vocabulary items (Halle and Marantz 1993: 123). As far as we know, the algorithm which carries out this comparison has not been formalized. Are the features and contextual restrictions actually counted or is some other method used? In some cases, where there is a tie, it might be necessary to refer to feature hierarchies (Embick and Noyer 2007: 298, fn. 14), adding another level of complexity and stipulation to the process.

It is important to note here that the mechanism of comparing the size of the feature sets of two different vocabulary items (both of which match a terminal) is completely foreign to syntactic theory. For example, it is never the case that the choice between Merge(X,Y) and Merge(X,Z) depends on how large the feature sets of Y and Z are.

Third, once the winning vocabulary item is determined, its phonological form will have to be inserted into the terminal, so when the syntactic object is linearized the phonological features of the vocabulary item are incorporated into the output. Such insertion changes the syntactic object formed (by replacing one of its morphemes with a morpheme specified for phonological form). So, it is important to stipulate that this process lies outside of syntax, which is constrained by the No Tampering Condition (no altering syntactic objects already formed).

Similar remarks hold for other post-syntactic operations like fission, fusion, impoverishment, and post-syntactic insertion of dissociated morphemes. All of these would violate

the No Tampering Condition, if they were syntactic operations. These other operations raise the additional issue that even though they have syntactic structures as both input and output, they are not syntactic operations.

Late insertion requires wide ranging and powerful formal mechanisms that do not find any basis in syntactic theory. The MS program adopts early insertion, so that Merge itself (not vocabulary insertion) introduces phonological material into syntactic structures. The hypothesis is that by adopting early insertion, it will be possible to dispense with these non-syntactic formal additions needed to implement late insertion.

This section can be summarized as:

(41) There is no late insertion.

6. Syncretism

In both DM and Nanosyntax, the primary motivation for late insertion is accounting for morphological syncretisms (see Embick and Noyer 2007: 299). We propose a theory of syncretism that does not rely on late insertion:

(42) Syncretism involves a single morpheme being used in two or more different syntactic contexts.

In this definition, morpheme means a pair {FF, PHON} (see (3)).

The assumption in (42) generalizes the approach of Kayne 2010, who analyses syncretism between dative clitics, locative clitics and others (chapter 6) and syncretism between 1PL object clitics and locative clitics and others (chapter 7). In the cases Kayne discusses, the contexts are defined in part by empty categories.

Here is an example to illustrate how (42) works. Greenberg (1966) stated the following two generalizations concerning syncretism:

(43) *Universal 37.* A language never has more gender categories in nonsingular numbers than in the singular.

(44) *Universal 45.* If there are any gender distinctions in the plural of the pronoun, there are some gender distinctions in the singular also.

In English, these generalizations capture the behavior of the third person plural pronouns (*they*, *them*, *their*) which do not show the gender distinctions found in the singular (e.g., *he* versus *she* versus *it*). Here are some preliminary steps towards an analysis of Greenberg's generalization for English.

First, we assume *they* is specified for gender (not merely underspecified for gender). One piece of evidence for this assertion is that English does show gender contrasts in the singular: *he*, *she*, *it*. This means that gender is a feature of the English pronominal system, including the plural pronouns (even if it is not realized overtly). A second piece of evidence is that even fairly closely related Indo-European languages (e.g., French) have gender contrasts in the plural pronouns (3PL:

elles versus *ils*). Assuming a universal functional hierarchy, English would also have to have these features represented in its plural pronouns. But there is also some syntactic evidence:

(45) Every one of them (said about a group of boys) hates himself.

It is well known that a reflexive pronoun in English must match the gender of its antecedent (see for example Collins and Postal 2012 for extensive discussion). Since the reflexive pronoun in (45) is masculine, it implies that its antecedent must also be masculine, and hence that *them* must be specified for gender.

Second, in MS we can invoke independently needed syntactic hierarchies of functional projections. In this case, we assume that the syntactic structure of the pronoun *they* is as follows (on the internal structure of pronouns, see Koopman 2000: chapter 3, for relevant discussion of gender see Bernstein 1993, Picallo 2008, Kramer 2016).

(46) $[_{DP}$ D $[_{\#P}$ # $[_{GenP}$ Gen NP]]]

In this structure, since we are dealing with a pronoun, NP is null. D is specified as definite. # is specified as plural and Gen is specified as masculine (see (45)). Now clearly, *they* is bimorphemic: *th-ey*. For example, it is parallel to *th-em* and *th-eir* which are also third person pronouns. We analyze *th-* as a definite determiner because of its presence in the definite determiner *the*. But if *th-* is a definite determiner, then what is *-ey*? It cannot be gender since it is overt and does not vary between masculine and feminine. We suggest that it is an irregular form of the plural morpheme used in pronouns.

What about gender? We argued in (45) that it is syntactically present. In this case, it must be syntactically present, but phonologically null. Putting these assumptions together, we have the following structures (MASC and FEM are not pronounced, as indicate by the capital letters):

(47) a. $[_{DP}$ th- $[_{\#P}$ -ey $[_{GenP}$ MASC NP]]]
b. $[_{DP}$ th- $[_{\#P}$ -ey $[_{GenP}$ FEM NP]]]

On this analysis, the 3MPL and 3FPL are syncretic in English, because the two morphemes *th-* and *-ey* are being used in two different contexts defined by the null MASC and FEM morphemes. The claim of MS is that this pattern of explanation will hold for all cases of syncretism.

Unlike the singular (e.g., *he/him/his* versus *she/her/her* versus *it*), no gender is realized overtly. Why is gender unpronounced here? There are two possible analyses in MS. Either Gen is a lexical zero (specified in the lexicon as zero in the context of the plural). Or Gen has a phonological form (perhaps *he*) that is unpronounced in this particular context. The assumption that Gen is a lexically specified as zero does not seem sufficiently strong. For example, it would allow an English dialect to show gender distinctions in the third plural. As far as we know, there are no such English dialects. And in fact, the syncretism holds more widely across Germanic. What remains to be understood in this analysis is how the empty GEN morphemes in (47) are licensed syntactically.

7. Metasyncretism

Harris (1998) and Embick (2015: 154) analyze syncretism between 2PL and 3PL in the Latin American Spanish verbal paradigm. As can be seen in the paradigm below, the 2PL and 3PL of the present tense of *hablar* 'to speak' are identical.

(48) *hablar* 'to speak'

	present
1SG	hablo
2SG	habla-s
3SG	habla-Ø
1PL	habla-mos
2PL	habla-n
3PL	habla-n

As Embick (2015: 26) notes: "Latin American Spanish shows only five distinct phonological exponents, with an -n appearing in both the second person plural and third person plural contexts."

Embick (2015: 27) proposes to analyze this syncretism in terms of the following vocabulary item:

(49) [-1, +PL] ←→ -n

Because of the underspecified nature of the vocabulary item, it can be inserted post-syntactically in both a second person plural terminal and a third person plural terminal.

However, the identity of 2PL and 3PL is not limited to this one paradigm. Rather, as Harris (1998: 31) notes, the syncretism between 2PL and 3PL is pervasive in Latin American Spanish:

(50) "Unlike standard Iberian, Latin American dialects systematically lack second person plural morphology: every semantic/syntactic second person plural item is realized overtly with third person plural morphology. This generalization is all-inclusive, covering not only all verb inflection but also nominative and object-of-proposition pronouns; long and short possessive adjectives and pronouns; accusative, dative, and reflexive clitic pronouns; etc."

Since the syncretism extends to various paradigms (verbal, clitic and pronominal), it would miss a generalization to analyze it in terms of underspecified vocabulary items. For example, the vocabulary item for *-n* in (49), would not apply to the syncretism between 2PL and 3PL object clitics (e.g., *los* and *las*, for masculine and feminine respectively).

To account for this pervasive syncretism Harris postulates an impoverishment rule. I present Embick's (2015: 154) version below:

(51) [+/- 2] → Ø [__,+pl]

As Harris (1998) comments, this rule "…removes the feature [2pers] in the context of [+plural], leaving no person feature at all. This is the formal counterpart of 'third person', the default person in Spanish (and perhaps universally). All other features are unaffected; in particular, the features of case, gender and number necessary for realization of overt phonological distinctions

in these properties remain intact. It is important to bear in mind that impoverishment is a purely morphological operation; syntactic and semantic representations are not affected by it at all."

From the point of view of MS, the use of impoverishment rules to capture pervasive syncretisms, like that illustrated above for Latin American Spanish, is problematic in a number of ways.

First, as Harris (1998: 40) points out: "Spell-out transfers syntactic arboreal structures into the Morphology model, where they continue to be subject to syntactic-type operations, among others. Thus, morphological representations and their operations do not necessarily differ radically from their syntactic counterparts."

This quote recognizes the syntactic nature of impoverishment rules. They take syntactic structures (those specified for +2 or -2) and produce new syntactic structures, by removing features. But such impoverishment rules are not syntactic rules. Rather they apply post-syntactically. They are not syntactic rules because they do not obey constraints on syntactic computation (e.g., the No Tamepering Condition). In effect, adding impoverishment rules introduces a new kind of unconstrained second syntactic component, operating outside of the core syntactic system.

Second, there is an issue of restrictiveness (on which, see Chomsky 1981: 5). What are the constraints on impoverishment rules? Can any combination of formal features be deleted? If not, why not? Are there languages with the following impoverishment rules for verbal paradigms?

(52) a. Delete +1
b. Delete -1
c. Delete +2
d. Delete -2.
E. Delete +PL
f. Delete -PL
g. Delete +1, -PL
h. Delete +1, +PL
i. Delete -1, -PL
j. Delete -1, +PL
k. Delete +2, -PL
l. Delete +2, +PL
m. Delete -2, -PL
n. Delete -2, +PL

The above rules do not even take into account gender or other proposed features which would add another layer of possible deletions.

In general, if there are n features, there will be 2^n -1 impoverishment rules. For example, if there are five features, there will 31 impoverishment rules. The operation of impoverishment seems

unrestrictive, unless accompanied by a strong theory of constraints, which was not given in the above sources.

Third since impoverishment operations have contextual restrictions there is an issue of ordering. Harris (1998: 42) makes use of ordering between two impoverishment rules to obtain the correct subjunctive verb forms in Spanish. The possibility of ordering impoverishment rules adds further to the unrestrictiveness of the system, since each choice of ordering leads to a new I-language.

Fourth, when there is a pervasive syncretism involved, as in the case of Latin American Spanish, it might reflect a deeper syntactic property of the language. All dialects of Spanish use the third person forms *usted* and *ustedes* to refer to the addressee. In Iberian Spanish, the use of *usted* and *ustedes* correlates with formality. In some Latin American Spanish, the use of *ustedes* to express the second person plural is the only option. In those dialects, there are no morphologically second person plural forms (such as the subject pronoun *vosotros*).

Collins and Ordonez (2020) analyze *usted* and *ustedes* as imposters, in the sense of Collins and Postal (2012). In particular, they analyze *usted* as follows:

(53) Structure of *usted*
[$_{DP}$ D [TU usted]]

In this structure, there is a null 2SG pronoun TU that is embedded in a 3SG DP whose head noun is *usted* (see Collins and Postal 2012 for a precise structural proposal). Crucially, an overt 2SG pronoun *tu* (or sometimes *vos*) is found in all dialects. As with proper names, the determiner is null. On this analysis, the reason why *usted* refers to the addressee is because of the presence of the null 2SG pronoun TU. The reason why *usted* shows 3SG verb agreement is because of the 3SG head noun.

The structure of *ustedes* is parallel, except there is an additional plural morpheme:

(54) Structure of *ustedes*
[$_{DP}$ D [TU usted]-s]

The plural morpheme forms the semantic plural of TU, but syntactically it merges with the 3SG [TU usted]. In this case, *ustedes* refers to a plural addressee, but agrees in 3PL with the verb.

On the above account, the pervasive syncretism between 2PL and 3PL in Latin American Spanish is given a purely syntactic analysis. Here are the steps in the argument:

(55) Syntactic account of metasyncretism between 2PL and 3PL in Latin American Spanish:
a. Latin American Spanish dialects lack the 2PL pronoun *vosotros*, the 2PL clitic *os*, and 2PL possessive forms *vuestro/a/os/as*.
b. It is not necessary to assume that there is a constraint of the form *2PL ruling out these forms, rather the relevant forms simply don't exist.
c. 2PL and 3PL are syncretic in those dialects because reference to a plural addressee is only expressed with the imposter *ustedes*.
d. There is no need for an impoverishment operation.

See Collins and Ordonez 2020 for further detail.

Harley (2008: 255) defines meta-syncretism as "…a syncretism that holds for a particular set of features in a language, regardless of the particular affixes used in any particular instance of the syncretism". The 2PL and 3PL syncretism in Latin American Spanish is a meta-syncretism because it runs across pronouns, clitics and subject-verb agreement. If the above account of Latin American Spanish can be generalized, we have the following:

(56) Metasyncretism is the result of syntactic properties of a language
(not morphological impoverishment).

8. Comparison of Theories

In this section, we give a brief comparison of MS (Morphology as Syntax) with DM (Distributed Morphology) and NS (Nanosyntax) along several dimensions (for an introduction to Nanosyntax, see Baunaz and Lander 2018). Before getting to the differences, it is important to note that all three theories adopt minimalist syntactic assumptions. For example, they all recognize Merge as the syntactic structure building operation. See Stump (2001: chapter 1) for a broader overview of morphological theories.

First, MS does not have late insertion, contrary to both DM and NS. For example, in DM a terminal (morpheme) will get a phonological form by vocabulary insertion post-syntactically. In MS, lexical items are defined as a pair of a set of formal features and a phonological form, so the phonological features piggy-back into the syntactic structure when the lexical items are merged. This difference entails other differences. For example, MS has no notion of competition, unlike DM (which has the Subset Principle) or NS (which has the superset principle).

It is possible to make the same point at a more abstract level. Consider the relation of subset (not proper subset). There are three relations that can hold between two sets based on that relation. A is a subset of B, B is a subset of A, and A and B are equal. These three configurations define three morphological theories: DM is based on the subset relation (for late insertion). NS is based on the superset relation (for late insertion). Finally, MS is based on the equality relation: the formal features of a lexical item are equal to the formal features of a syntactic terminal, because syntactic trees are built by merging lexical items. So, in this sense, DM, NS and MS constitute a partition of the logical possibilities of Merg based syntax. The different possibilities are illustrated below:

(57)	a.	A	$\subseteq$	B	(subset, Distributed Morphology)
	b.	A	$\supseteq$	B	(superset, Nanosyntax)
	c.	A	=	B	(equality, Morphology as Syntax)

Second, MS has no post-syntactic operations. For example, there is no post-syntactic movement of morphemes that one finds in the DM literature. There is also no post-syntactic insertion of dissociated or ornamental morphemes (e.g., theme vowels). Nor are there operations such as impoverishment (or fusion and fission) that operate on syntactic structures and produce syntactic structures, but are not syntactic operations. In this regard, MS is similar to NS which also eschews such post-syntactic operations (with the exception of late insertion).

Another way of putting the same point is in terms of the expression "syntactic hierarchical structure all the way down" (see Halle and Marantz 1994: 276). Syntactic hierarchical structures are those that are created by syntactic operations (such as Merge) and that obey syntactic principles

(such as binary branching). Because of the widespread use of post-syntactic operations (such as fusion, fission, impoverishment and post-syntactic insertion of dissociated morphemes), DM definitely does not fall under this description. However, MS and NS do.

Similarly, only MS and NS fall under the rubric of "single generative engine". While structure is only formed through Merge in MS and NS, in DM there is the possibility of forming structure through the post-syntactic insertion of dissociated or ornamental morphemes (sprouting). Therefore, DM cannot be characterized by the expression "single generative engine".

Third, both MS and DM claim that morphemes bear phonological features. For MS, the phonological features are specified in the lexicon. For DM, the phonological features are inserted post-syntactically by vocabulary insertion. For NS, late insertion is defined in terms of syntactic phrases. A phrase gets paired up with a phonological form post-syntactically.

The differences are summarized in the following chart:

(58)

	MS	**DM**	**NS**
late insertion	no	yes	yes
post-syntactic operations	no	yes	no (only late insertion)
morpheme based	yes	yes	no (phrase based)

Actually, these three properties define a space of eight different Merge based theories. We leave it to future work to explore the other possible theories, and the relationships between the three properties that define them.

9. Conclusion

In this paper, we have sketched the basic assumptions MS, a syntactic approach to analyzing morphological generalizations. We have illustrated the approach with some examples involving ellipsis, contextual restrictions, allomorphy and post-syntactic insertion of dissociated morphemes. We have argued that MS does not allow late insertion of phonological material, and discussed the consequences of this conclusion for theories of syncretism. We have argued that the operation of impoverishment is unrestrictive, and at least in one case, not necessary to capture the empirical facts. Lastly, we have argued that MS is one of three logically possible kinds of Merge based theories of morphology, the other two logical possibilities being represented by DM and NS.

To help the reader keep all the various assumptions of MS in mind, we have written up the following cheat sheet:

(59)
a. There is no morphological component in UG.
b. Definition of a morpheme: {FF, PHON}
c. For all syntactic objects X and Y, Merge(X,Y) = {X,Y}
d. Contextual restrictions on morphemes are to be understood in terms of relations familiar from syntax (e.g., c-selection, s-selection, l-selection, idioms etc.).
e. There is no late insertion.
f. There is no competition (or blocking) between morphemes.
g. Contextual allomorphy involves two or more different morphemes. (e.g., *-en* is an inner plural morpheme, *-s* is an outer plural morpheme).
h. Syncretism involves a single morpheme being used in two or more different syntactic contexts. (see Kayne 2010: chapters 6 and 7)

i. Metasyncretism is the result of syntactic properties of a language.
j. There is no post-syntactic insertion of morphemes.
k. There are no other post-syntactic morphological operations.

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