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Title	Fully Distributing Morphology : The Phonology and Syntax of Latin Case Inflections
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<i>Citation</i>	Theoretical and applied linguistics at Kobe Shoin, No.8 : 1-20
Issue Date	2005
Resource Type	Bulletin Paper / 紀要論文
Resource Version	
URL	
Right	
Additional Information	

# Fully Distributing Morphology: The Phonology and Syntax of Latin Case Inflections\*

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## Abstract

Certain executions of minimalist syntax use “uninterpretable formal features.” This term raises the question, do there really exist features of morpho-syntax that are never interpretable, that play a role in neither Logical Form nor Phonological Form?

Case features are in our view best analyzed as categorical head features that are realized on adjacent DPs. Case features are therefore uninterpretable only when they are not in their base positions; in their base position, they are simply categories such as V and P, and are interpretable. However, lexical features such as declension classes cannot be analyzed as “alternative realizations” of this sort, and so might be examples of purely “uninterpretable formal features.”

We argue that Latin noun and adjective declension class feature bundles (e.g., [3<sup>rd</sup> declension, ablative, singular]) are all better reanalyzed, on independent grounds, as spell outs of case and number suffixes whose forms depend only on the phonological features of the final segment of a preceding stem. Moreover, in almost all situations, these dependencies are phonetically natural. The “6 declension classes” of Latin are simply contextual variants fully determined by 6 possible values of preceding underlying final segments: consonants and 5 distinct vowels. That is, we argue that spell outs of features complexes such as [OBLIQUE, ±PLURAL] or [GENITIVE, ±PLURAL] do not depend on arbitrary uninterpretable morpheme class features. We claim rather that such constructs, at least in the well known Latin inflectional system, are entirely superfluous.

## 1. Autonomous vs. Distributed Morphology

Linguists universally acknowledge that the categories and hence the combinatorial principles of syntax and phonology differ; they are largely and perhaps totally disjoint.<sup>1</sup> Moreover, a possible claim about natural language is that *all categories of phonology and syntax are interpretable*, at least in most of their uses, at their respective interfaces with pronunciation (Phonological Form or PF) and understanding and use (Logical Form or LF).

<sup>1</sup>Hockett’s (1960) study of language universals called this natural language property “duality of patterning.” This duality may be the basis of human language itself: Primates seem to have a potential lexicon of say c. 102 minimal distinct calls or signs. By human duality of patterning, roughly the same number of minimal units (meaningless phonemes) can combine in sequences to make up a much larger number of minimal meaningful units (morphemes). If simple lexical entries contain say two syllables in a system of say 20 consonants and 5 vowels, this permits  $20 \times 5 \times 20 \times 5 = 10,000$  items, which is sufficient to generate what we might consider a minimal natural language.

This need not mean that every instance of a phonemic feature is pronounced and every instance of a syntactic feature interpreted. Rather, features used in representing phonemic material (e.g., in *am, are, that, 's*, etc.) are typically or “canonically” pronounced, though under certain conditions they may not be (*I'm warm; you coming soon? he said (that) she was ill; John('s) knowing the answer is surprising*). Similarly, one may argue that syntactic categories and features are all basically interpretable (Emonds, 2000, Ch. 1), even though a given feature in certain contexts may not be. For instance, the category V canonically represents an “Activity” in Logical Form, but can also function as the uninterpreted lexical category of stative (non-activity) verbs and as an uninterpreted case feature on nominal projections (so-called “accusative”). With such caveats in mind, we can still entertain the following rather strong condition on linguistic categories:

- (1) **Cognitive Categories Condition.** All categories and features in linguistic descriptions are interpretable in some positions of either LF or PF.

Adherence to such a conception is far from standard in linguistic practice, however. Minimalist syntax, for example, is often elaborated with a set of “Uninterpretable Formal Features.”

It is also widely felt that, in addition to syntax and phonology, adequate descriptions of natural language require a third combinatorial system called (Autonomous) Morphology, with its own categories (declension class, conjugation class, diacritic, template slot, word formation rule, affix type, clitic) and principles of combination. The very names in common use for the categories and features of such a module, established through long traditions, indicate that they are *not* associated with either phonological or interpretive content. In this they differ from those of syntax and phonology. In fact, we can say without exaggeration that the categories of Autonomous Morphology have been invented precisely because, for its advocates, the interpretable categories of syntax and phonology are unequal to the task of adequately stating the generalizations involving bound morphemes. We can thus conclude:

- (2) Autonomous Morphology implies that uninterpretable features exist.

Our claim (1) that all linguistic features and categories can be interpreted in PF or LF, at least in some of their positions, is thus *incompatible with Autonomous Morphology*.

A contrasting approach to bound morphemes is called Distributed Morphology.

- (3) ... the machinery of... morphology is not concentrated in a single component of the grammar, but rather is distributed among several different components. (Halle & Marantz, 1993, 111–112.)<sup>2</sup>

A highly restrictive but natural interpretation of Distributed Morphology (DM), which we pursue here, claims further that this (distributed) morphological “machinery” (its categories, features, and principles) utilizes only Interpretable Features, i.e. features with an independent basis in either phonology or LF interpretation. It then follows, for example, that “declension classes” or “conjugation classes” can exist only if they amount simply to renaming syntactic and/or phonological features that are independently motivated in their respective interface components. Such features should offer superior accounts of any generalizations expressed in terms of inflectional classes.

<sup>2</sup>Halle and Marantz continue: ‘For example, “word formation”—the creation of complex syntactic heads—may take place at any level of grammar through such processes as head movement and adjunction and/or merger of structurally or linearly adjacent heads.’

Nonetheless, the above cited version of DM does not seem to make this latter claim. Even if morphology “is distributed among several different components,” we must ask if one of these different components is still properly identified as “Morphology.” Rather surprisingly, Halle and Marantz propose such a component, which they call Morphological Structure (MS) and whose effects they locate in a derivation between S-structure (Spell Out) and PF.

- (4) DM recognizes that Morphological Structure is a level of grammatical representation with its own principles and properties. (1993: 114)

An autonomous morphologist might well respond that these authors have consequently not really implemented a literal interpretation of their claim (3), but have only moved some subset of the “traditional morphological machinery” out of a sort of reduced but still autonomous component MS. For instance, they still use “inflectional classes” (122) and “strong” and “weak” English verb forms (123). Since such terms violate the condition (1) that all categories should have interface interpretations, Halle and Marantz thus do not systematically adhere to a restriction interpretation of DM. One might then term their theory “Partly Distributed Morphology,” since *only some but not all* of traditional morphological principles and properties are “not concentrated in a single component of the grammar,” i.e., MS. Note further that their essay does not indicate how to determine which aspects of morphology are “distributed” and which are in MS.

Under a stronger view that avoids this critique, any principles that appear to be specifically “morphological” and that operate between Spell Out and PF are actually consequences of principles for (“late”) Vocabulary insertion. This is a perspective that we develop here. There is thus for us no morphological component labeled MS, although there are principles regulating Vocabulary insertion—valid not only for the traditionally termed “bound morphemes” but also for *all lexical items*. Consequently, we call the approach in this paper “Fully Distributed Morphology.” For fuller justification, see Emonds (2000, Ch. 3)). Under this term we also include the restrictive claim (1) that all features used in morphology are ultimately justified in the interpretive components.<sup>3</sup>

- (5) **Fully Distributed Morphology.** Proper accounts of the distribution and properties of bound morphemes use only independently justified constructs of LF (of which syntactic features are a subset) or PF.

## 2. Distributed Morphology and Late Lexical Insertion

While we work without their MS level or component, we agree with Halle and Marantz that bound morpheme vocabulary is inserted between Spell Out and PF. “. . . , for DM the assignment of phonological features to morpho-syntactic feature bundles takes place after the syntax and does not create or determine the terminal elements manipulated by the syntax.” (113) Moreover, in both their view and ours, this late insertion of bound morphemes follows from more general principles of lexical insertion.<sup>4</sup>

<sup>3</sup>The difference between the two approaches is fundamental. Fully DM predicts, correctly for English, that a language doesn’t tolerate two distinct productive ways to form a past, whereas a looser version can allow languages to have two productive pasts (+strong) with “autonomous” distributions, i.e. not reducible to syntactic or phonological conditioning. In Fully DM, past stems of English “strong”(irregular) verbs can only be listed, with the Elsewhere Convention then determining that all other (“weak”) verbs form their pasts productively. (In practice, Halle and Marantz use this latter device, e.g. on p. 126.)

<sup>4</sup>Halle and Marantz (1993) propose to insert all vocabulary post-syntactically, from both open and closed classes. No special distributional properties of bound or any other set of morphemes can then follow from such “late insertion,”

For us, insertion “after the syntax” affects only a particular type of morphemes (bound or free): *those whose interpretable features are in uninterpretable positions, i.e. in positions where they do not contribute to LF*. Many free morphemes do not contribute directly to LF (for example, English auxiliary *do* and counterparts in other languages, copulas, purely case-marking P, expletive pronouns, etc.). Many bound morphemes, essentially those traditionally termed “inflectional,” do not either.<sup>5</sup>

In our approach, *the nature of the features in any lexical entry determines the derivational level of its insertion*: pre-transformational, during the syntax, or after Spell Out. Open class items are inserted, as in classical generative grammar, prior to the transformational processing of the lowest domain that contains them. Meaningful closed class items are inserted as an integral part of this same derivation. The inflectional morphemes are among those inserted after Spell Out because they are in positions where their features can’t be interpreted. This view of late “PF insertion,” which generalizes rules like “*do*-support” in Chomsky (1957), is justified in several works starting from Emonds (1985). The late insertion model is further developed and refined in Emonds (1985, 2000), Jo (1996) and Veselovská (2001).

For purposes of this essay, however, the distinction between our late insertion and that of Halle and Marantz plays no role, because the closed subclass of declensional noun and adjective suffixes spells out only features of case and number located in uninterpretable positions. Hence, *case suffixes are inserted post-syntactically in both their version of DM and ours*.

To fully clarify our analysis, we must discuss more specifics of the mechanism we use to account for inflectional morphology, namely “alternative realization” (AR), justified in detail for a wide range of inflectional types in Emonds (2000, Ch. 4). Among other advantages, AR eliminates “lowering” transformations, extracts what is common to the traditional morphological operations of “agreement” and “government,” and eliminates transformations that apply only to small sets of grammatical elements.

An example of alternative realization is English adjectival inflection; of interest here is that its formal properties are also reflected in e.g., Latin’s specifically dative inflection. The basis of adjectival comparison is the canonical modification by degree modifiers DEG, as seen in a).

- (6) a. This table is [DEG too ] high for the door.  
       This table is [DEG as ] high as the door.  
       This table is [DEG, COM, NEG less ] high than the door.  
       b. This table is [DEG, COM  $\emptyset$  ] [A high [A, COM er ] ] than the door.  
           This table is [DEG, COM  $\emptyset$  ] [A high [A, COM est ] ] of all.  
           \*This table is { more high than the door / most high of all }

As seen in b), certain least marked English degree words (the positive comparatives “COM”) are preferentially realized as inflections on a head A.

Throughout this study, word-internal syntactic structure as in b) conforms to the Right Hand Head Rule of Lieber (1980). Assuming that DEG is a sister of some projection of A, COM is realized in two sister constituents in b):

since all insertion takes place in the same way. Although their late insertion can express observed properties of individual morphemes, e.g. a Romance causative is free while a Japanese causative is suffixal, it could also easily express properties never found in natural language—e.g., that open class verbs meaning convince or encourage could be affixed on their V complements, etc.

<sup>5</sup>At first glance, inflections such as TENSE, PLURAL and COMPARISON contribute to meaning. More careful formulations show, however, that their occurrences on lexical heads (respectively V, N and A) license empty categories in those LF positions where these apparent meanings actually reside, respectively I, NUM or Q, and SPEC(AP). The inflectional morphemes themselves thus contribute not to meaning but to economy, by allowing these nodes to be interpreted without corresponding to separate free morphemes.

- (7) Alternative realization. A syntactic feature  $F$  of  $\beta$  can be alternatively realized on a closed class item in a non-canonical position  $\gamma$ , provided projections of  $\beta$  and  $\gamma$  “are” sisters.<sup>6</sup>

In b),  $F$  is the feature of comparison  $COM$  (with the realizations *-er* or *-est*);  $\beta$  is the  $DEG$  category;  $\gamma$  is the inflectional right hand head  $A$ , a suffix on the lexical stem  $A$ . In marked usages,  $AR$  appears *only when the canonical position  $\beta$  of  $F$  is zeroed*, and this is the situation for  $DEG$  in b): *\*more higher*, *\*most highest*. A lexical entry for an inflection like *-er* is shown in (8), where the context symbol  $\tau$  stands for a single trochaic foot that *-er* can attach to.

- (8)  $A, +COM, A \underline{\quad} \backslash \backslash -er, \tau \underline{\quad}$

We use  $\backslash \backslash$  throughout to separate the syntactic and phonological parts of a lexical entry. The underline of the feature  $COM$  indicates that (7) requires that the interpreted, canonical position of this feature (in  $DEG$ ) be phonologically null.

In unmarked instances of  $AR$ , exemplified in Standard English plurals, the base position of a source feature  $F$  can remain overtly realized, like  $D$  in (9).<sup>7</sup>

- (9)  $[D, PLUR \{ \text{these/ all/ both} \}] \text{ handsome } [N \text{ boy } [N, PLUR \text{ s} ]]$

As a third illustration, English number agreement is an example of  $AR$  that combines features from two different canonical positions  $D$  and  $I$ . In (10),  $\alpha \phi$  stands for person and number features. These features instantiate unmarked “agreement  $AR$ ,” since their canonical position, on  $D$  in the subject  $DP$ , remains overt.  $-PAST$ , on the other hand, is marked  $AR$ , since it appears on  $V$  only when  $I$  is empty.

- (10)  $[D, \alpha \phi \text{ He}] [I, -PAST, -MODAL \emptyset] [V \text{ know } [V, -PAST, \alpha \phi \text{ s} ]]$  Mary.

Alternative realization will play a role especially in our treatment of Latin datives in the next section.

### 3. A syntax of Case Features

In most work on case in generative syntax, the following distinction among the basic syntactic categories is fundamental.

- (11) **Stowell’s (1981) dichotomy.** *Complementary distribution* holds between categories that assign case and those that receive case.

For Stowell, the case-receiving categories are  $N$  and  $A$ , while the case-assigning categories in today’s terms are  $I$ ,  $V$  and  $P$ . Yet his proposal and many subsequent treatments fail to agree (or in fact even be very clear) about the source of genitive case. Nonetheless, developments in the theory of nominal projections, as well as some relatively clear patterns of case assignment within these projections, suggest a solution for this problem.

<sup>6</sup>In early transformational grammar, constituents that dominate the same string of terminal elements have the same structural properties. In this sense, a constituent  $\alpha$  “is a” sister of  $\beta$  if and only if all the lexical items under  $\gamma$ , a sister of  $\beta$ , are also under  $\alpha$ . Features do not contribute to LF in their alternatively realized positions, but rather in their canonical positions which the alternative realizations may license as empty. Thus in (7), the uniform locus for adjectival comparison in LF is the canonical position  $DEG$ , not its alternatively realized location under  $A$ .

<sup>7</sup>This reverses a treatment (Emonds, 2000: section 4.4.4), in which  $AR$  that expresses overt agreement is considered “marked.” The earlier version was essentially a terminological decision; the reason for the reversal emerges in our treatment of Latin datives below.

Starting with the DP hypothesis of Abney (1987), more work than can be reviewed here has been directed to determining the nature of functional category structure above a lexical noun phrase. In the convincing synthesis of Lobeck (1996), two fundamental phrasal projections dominate NP. The first is a “Numeral Phrase” or “QP” whose head Q (= Num) is the locus for cardinal numbers and some quantifiers (in Indo-European languages, apparently most if not all existential quantifiers). The second is a “Determiner Phrase” (DP) whose head includes definite elements and plausibly universal quantifiers.

Of interest here are some salient cross-linguistic properties of the Q/Num constituent involving case, and a relevant contrast between it and the head N0 of its NP complement. First, in complex case and agreement patterns inside Czech nominals, the Numeral head Q0 displays little if any case morphology, but plays a central role in both assigning genitive case to NPs and blocking assignment of other cases (Veselovská, 2001). Second, while genitive case has some secondary roles outside of NPs in many Indo-European languages, other systems such as Japanese limit the morphological genitive to strictly DP-internal usages, i.e. assignment by Q. These two facts together suggest an extension of Stowell’s original dichotomy as follows:

(12) **Case-assignment.**

- (i) The case-assigning categories are {I, V, P, Q} notated here as –N.
- (ii) The case-receiving categories are the nominal head categories N, A, and D, notated as sharing a feature +N.<sup>8</sup>

The operation of transferring case from case-assigning to case-receiving categories can be included under the principle Alternative Realization developed in Emonds (2000, Ch. 4), summarized in Section 2 above. By subsuming case-marking under this more general device, the traditionally named “Case Features” (Nominative, Accusative, etc.) are not separate categories of grammar, whose status with respect to their use at LF would then be unclear. They are rather simply the (–N) case-assigning categories themselves assigned as secondary features to the other categories with the feature +N.

- (13) **Case Marking:** The categories I, V, P and Q (=Numeral) are alternatively realized on Ds and Ns, and possibly As.

In this framework, subscripted categories as in (14) are the most perspicuous notation for the core case features; this reflects their bar notation source:

- (14) +N<sub>I</sub> = Nominative = NOM  
 +N<sub>V</sub> = Accusative = ACC  
 +N<sub>P</sub> = Oblique = OBL  
 +N<sub>Q</sub> = Genitive = GEN

#### 4. Recognizing the core case system in Latin

This paper’s investigation of Latin “nominal inflection,” i.e., the bound morphology of Latin nouns and adjectives, undertakes to sustain the restrictive hypothesis of Fully Distributed Morphology (FDM). That is, we ask whether essentially all the patterns of Latin declensions can

<sup>8</sup>Use of a notation +N raises the issue of whether Q shares this feature. Though this question exceeds the scope of this paper, a brief comment may be in order. Quite possibly quantifiers such as many and several and certain quantificational nouns are indeed jointly [+Q, +N], while the cardinals themselves are –N. The content of the feature +N may then involve some “potential for reference,” broadly construed. If so, Case-assignment (12) should perhaps be stated using a symbol that suggests reference (±R) rather than one related to N.

be accounted for in terms of independently motivated categories of phonology and syntax, without recourse to “declension classes.”

The Latin nominal system is an appropriate area to investigate not because it is either a particularly simple or particularly complex challenge to FDM, but because it is so widely known among researchers who treat theoretical issues in morphology. We feel that a strong justification of a positive answer to the question will interest these researchers and thus significantly strengthen the case for aggressively pursuing the underlying claim (1) of FDM: linguistic category systems are never formally arbitrary but always fully grounded in cognition.

#### 4.1 The nature of a Fully Distributed solution

We propose to show that an optimal account of the properties of Latin case endings uses only categories and features independently needed in the phonology and syntax of Latin.

- (15) **Categories to eliminate:** *declension, conjugation, diacritic, template slot, word formation rule, affix type* and any statements utilizing these.

The goal of this study is thus to find *minimal lexical entries for Latin case endings consonant with Fully Distributed Morphology* (5) and formally similar to other entries in such a model as, for example, the English comparative in (8) and the suffixal number allomorphs of Standard Italian nouns:

$$(16) \text{ Italian number: N, } \left\{ \begin{array}{ll} -\text{PLUR, [-FEM]} \text{ \_\_\_} & \backslash \backslash -o \\ +\text{PLUR, [-FEM]} \text{ \_\_\_} & \backslash \backslash -i \\ -\text{PLUR, [+FEM]} \text{ \_\_\_} & \backslash \backslash -a \\ +\text{PLUR, [+FEM]} \text{ \_\_\_} & \backslash \backslash -e \end{array} \right\}$$

Italian grammatical gender  $\pm$ FEM satisfies the Cognitive Categories Condition (1) because on unmarked animate nouns it is interpreted in LF as natural gender.

Why has tradition claimed counter to (1) that phonology and syntax don’t suffice for specifying Latin case allomorphs? One answer is furnished by contrasting the case forms of the two masculine nouns in (17), *nauta* ‘sailor’ and *servus* ‘slave’. In this display, it certainly looks as though the large classes that follow each of the patterns require partitioning Latin nouns into arbitrary subsets, called “declension classes” (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, etc.).

(17)

	-PLUR ← 1 <sup>st</sup> → +PLUR		-PLUR ← 2 <sup>nd</sup> → +PLUR	
NOM	naut + a	naut + ae	serv + us	serv + ī
ACC	naut + am	naut + ās	serv + um	serv + ōs
DAT	naut + ae	naut + īs	serv + ō	serv + īs
ABL	naut + ā	naut + īs	serv + ō	serv + īs
GEN	naut + ae	naut + ārum	serv + ī	serv + ōrum

Another reason for claiming that Latin case morphology is independent of (stem-final) phonology is furnished by the apparent similarity of form among nouns with quite different declensional properties:

(18)

	2 <sup>nd</sup> declension	3 <sup>rd</sup> declension	4 <sup>th</sup> declension	5 <sup>th</sup> declension
	servus, humus	corpus, genus	tribus, manus	
	puer, ager	pater, iter		
		requiēs, pēs		diēs, rēs



We will see as we proceed that these problems slowly disappear as we clarify, in step by step fashion, the syntax of certain cases (in the rest of this section), the phonology of both the stems and the suffixes (in sections 5 and 6) and the interplay of both types of factors (in section 7 and 8).

An analysis of the Latin case system satisfying the Cognitive Categories Condition (1) must make clear how its different cases relate to core system of four abstract cases of Government and Binding in (12): Nominative, Genitive, Accusative and “Oblique”, where Oblique is the case assigned by P. Grammatical tradition usually names six morphological cases in Latin (with distinct forms in the singular and plural). Presumably then, at least two Latin cases will under analysis reduce to “sub-cases” of these basic four.

#### 4.2 Eliminating the VOCATIVE from Declension classes

Latin grammars don’t actually insist that “Vocative” is a distinct case, since vocatives generally have the form of a Nominative, *across all declensions*. For this reason, we don’t include it in Table (17). The exceptions are that in the Vocative, (i) *e* replaces the nominative singular *us* (*Serve!* ‘Slave!’), (ii) and a nominative ending in *-ius*, rather than then exhibiting a vocative in *-ie*, surfaces with a final long  $\bar{i}$  (*Fili!* ‘My son!’). These special cases depend only on the phonological character of stem-final segments. The fact that such nouns are also assigned to the traditional “2<sup>nd</sup> declension” is irrelevant; these alternations affect no other nouns including many in the same declension (*puer* ‘boy’, *bellum* ‘war’, etc.).

Thus, *purely phonological conditions* on a noun’s final segment determine some special Vocative endings. Therefore, this is *not a putative rule for a given declension*, since 2<sup>nd</sup> declension nominatives that don’t end in *-us* undergo no change. Moreover on purely syntactic grounds, vocatives should not even be considered a “case,” because they occur only in root contexts and are not governed or in any kind of constructional relation with the rest of the sentence. Their only role is to furnish an overt antecedent for second person pronouns.

#### 4.3 Eliminating the DATIVE from Declension classes

This subsection will treat the Latin Datives and Ablatives, which we will show are essentially the same case, both syntactically and morphologically. Their relatedness is shown first of all in their morphology, since one of the most notable syncretisms of Latin is that its Dative and Ablative forms are *always the same in the plural*. In the 2<sup>nd</sup> and 4<sup>th</sup> declension, this identity extends even to singular forms. These identical forms can be seen in columns 2-4 of Table (17).

As for their syntax, traditional grammars invariably observe that many non-locative uses of these cases lack any overt prepositions. For example, “bare” datives express animate indirect objects, while “bare” ablatives express manner phrases, price phrases, passive agents, instruments and subjects of participles. Both cases can serve as “quirky” complements of certain V and A, such as the datives after [<sub>V</sub> *noceo*] ‘harm’ and [<sub>A</sub> *contentus*] ‘happy’. Perhaps they have attracted grammarians’ attention because the Romance descendants of these constructions (e.g. in French and Italian) almost uniformly translate them as PPs with overt head Ps, rather than as bare DPs. This uniform syntactic realization in fact suggests that within Latin itself, “bare” *dative and ablative DPs are structurally deep PPs with phonologically empty P*. We assume this in what follows, the justification being the simplifications of the Latin case system thereby made possible.<sup>9</sup>

<sup>9</sup>Preposition-less dative and ablative noun phrases are often said to exhibit “semantic case.” This term has no formal significance in our framework. Independent of any facts about Latin, many arguments based on cross-linguistic

Along the same lines, the category P is fundamental in assigning the “dative” or “oblique” case to the objects of overt Ps in a number of languages such as Classical Greek, German and Icelandic. Assuming that the architecture of these simpler four case systems carries over to Latin, we expect that in addition to their nominatives, accusatives and genitives, a distinct fourth “oblique” case should also be assigned by P.

And generally, if we set aside special uses of Ps that assign (i) “quirky” accusatives or genitives and (ii) accusatives of “motion toward,” overt Latin Ps do assign ablative case. Taking advantage of the dative-ablative syncretism noted above, Emonds (1985, Ch. 5) proposes that Latin ablatives indeed instantiate the expected “fourth case” in a Government and Binding system:

- (19) **Latin oblique Case.** Latin singular ablatives and plural dative-ablatives are assigned by P. We call this fourth case “oblique.”

It remains now to account for the Latin dative singulars that differ in form from ablatives, such as for example in the leftmost column in (17), *nautae* vs. *nautā*. Interestingly, singular datives in all declensions whose forms differ from the ablative exhibit only one underlying suffix: a phonological  $-\bar{i}$ .

We now analyze these datives in terms of Alternative Realization. The inherent semantics of Dative phrases in Latin, such as animate direct objects and bare datives expressing “direction toward” in poetry, is apparently [+PATH, +GOAL, –SOURCE]. Yet Latin grammars emphasize that, unlike other non-nominative cases, *phrases of specifically dative form never occur after any overt P*. Rather, any oblique DP complement with an overt P must appear in the *ablative* case, as per (19). The division between datives and ablatives thus comes down to (20):

- (20) **Latin Datives.** Dative singular forms are distinct from ablatives only if their governing P is both (i) empty and (ii) [+GOAL, –SOURCE].

These conditions on the Dative morpheme  $-\bar{i}$  are transparently those that are expected if we hypothesize that this inflection is a *marked alternative realization of Ps of Goal*. Such a treatment *explains* why overt prepositions never occur with bare or quirky datives of any sort (an “exceptional” restriction in traditional handbooks). Thus the lexical entry introducing the data can be written as follows:

- (21) **Latin dative singular nouns:** +N, +N $\_\_\_$ , P, –PLUR, +GOAL \ \  $-\bar{i}$ ,  $\_\_\_$

The first syntactic category listed in a lexical entry specifies the actual location in the tree of a morpheme to be inserted (Emonds, 2000, Section 8.1.4). The combination +N, +N $\_\_\_$  indicates that case morphemes are suffixes on +N stems, as well as being +N themselves. Next, since P is not a canonical feature on +N, it must be an alternative realization (i.e., oblique case). Finally, since GOAL is underlined, the entry (21) is a marked alternative realization, i.e. applicable only when [ P, GOAL ] =  $\emptyset$ .

The entry (21) is used only when the +GOAL occurs without further specification as +SOURCE, since Latin bare oblique DPs with either a source sense (passive agents) or a static sense unspecified for GOAL (manner phrases, price phrases, instruments, subjects of

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evidence show that almost all uses of bare oblique case DPs are best analyzed along these lines; see Emonds and Ostler (2004).

participles) are not dative but ablative in form. But precisely because +SOURCE is a marked value, if it is not spelled out explicitly in a lexical entry such as (21), it is not present.<sup>10</sup>

As stated presently the entry overgenerates, since it predicts that all dative singulars end in  $-\bar{i}$ , which is not the case. In fact nouns belonging to the so-called 2<sup>nd</sup> declension use the general oblique form. Thus *servus* has a form *servō* which is identical to the “ablative”. The reason for this is phonological. An affixal  $-\bar{i}$  attached to a stem ending in  $-o$  would create a vowel sequence [oi]. As will be discussed in more detail in coming sections, this sequence is often avoided. In this case the default oblique form is preferred. We can present this state of affairs in form of a tableau.

(22)

	Avoid [oi]	Realize[Case]	Max-V	Realize[Goal]
a. <i>servoī</i>	*!			
b. <i>servo</i>		*!		*
c. <i>servī</i>			*!	
d. <i>servō</i>				*

As seen in (22) a candidate such as a. resulting from the direct affixation of the [+GOAL] marker to a stem ending in  $-o$  creates a type of diphthong not tolerated in Latin. Simply leaving out the case marker would avoid this problem, but this is not an option, in particular since it would leave the noun without an overt realization of Case. Deleting the stem final vowel would also resolve the diphthong, with the [+GOAL] marker taking the stem vowels place. But in this case there is another option. Since the [+GOAL] marker is also the overt realization of the oblique case, an alternative is to resort to the other oblique marker instead. The noun is then realized essentially as a “bare ablative”.

There is another context in which Latin oblique singulars are realized as  $-\bar{i}$ . An “ablative” singular of an agreeing adjective *A* with a *consonantal stem* has this suffix (*acrī* ‘sharp’: Stock (1970, 18)), not  $-\bar{e}$  as predicted by general rules (19) and (20) for ablatives. We can express this peculiarity in (23):

(23) **Latin oblique singular adjectives:** +N, P, -PLUR,  $A \setminus \setminus -\bar{i}$ ,  $C \_$ 

This entry means that singular oblique adjectives *generally* have the form  $-\bar{i}$  after a final consonantal segment, whether or not their governing P is  $\emptyset$ .

It appears that (21) and (23) can be collapsed as a single lexical entry:

(24) **Latin oblique singulars in  $-\bar{i}$** 

$$+N, +N \_, P, -PLUR, \left\{ \begin{array}{l} +GOAL \\ A \end{array} \setminus \setminus \begin{array}{l} \_ \\ C \_ \end{array} \right\}, -\bar{i}$$

If the stem is also a noun (rather than an adjective), then that oblique must additionally alternatively realize the complex [GOAL, -SOURCE] (= be governed by a [P, GOAL]). Apparently, only this latter situation is “marked AR,” that is, the type that requires that the canonical position of the feature GOAL be null. The elsewhere case of (24) must be “unmarked AR,” i.e. the suffix  $-\bar{i}$  appears with adjectives even when P is overt and has either value  $\pm$ GOAL. Thus “marked AR” requires some special notation, for example underlining as above, but the unmarked form has no special notation.

<sup>10</sup>In exactly the same way, the AR forms *-er* and *-est* of English comparison don’t occur with marked values of DEG such as *less*, *least* and *as*. Nor does [I, PAST] alternatively realize as *-ed* in situations where I carries the marked feature +MODAL.

The AR of the feature GOAL in (24) is the only place in all of the Latin grammar and lexicon where datives are distinct from ablatives; there is no other dative/ablative distinction. So-called “datives” are simply singular ablatives (the name for “oblique” in Latin grammars) in a certain phono-syntactic environment; a stem that ends other than in a round vowel with a governing null P of GOAL. Thus, *final segment phonology in tandem with interpretable syntactic features fully predicts the special Latin “dative” ending ī*.

#### 4.4 Summary of declensional case categories, after initial simplifications

For two Latin cases, the vocative and the dative, we have adopted rules that do not mention or depend on declension classes: a purely phonological rule for certain singular vocative forms and an alternative realization for the single dative singular inflection (24). These rules are nothing more than the lexical entries for the (late-inserted) case morphemes themselves. No competing account can avoid stipulating such lexical contexts, and in the present account, no further machinery is needed.

This then leaves us with a system of four Latin cases that are traditionally said to justify a lexical partition of the language’s nouns into between five and seven syntactically and phonologically arbitrary “declension classes.” The four cases in fact exactly correspond to the theory based system outlined in Section 3. The case morphemes themselves “alternatively realize” the four case assigning categories of column 1 as suffixes of on N and A stems:

(25)

Case assigning category	Feature bundle	Traditional case name
I	[+N, I ]	Nominative (NOM)
V	[+N, V]	Accusative (ACC)
P	[+N, P ]	Oblique (OBL: dative & ablative)
Q (=Num or Numeral)	[+N, Q]	Genitive (GEN)

Our next two sections argue that most of Latin’s case endings vary only with the stem’s syntactic number and the phonological character of its final segment. Then Section 7 considers certain remaining cases and argues that they require only reference to syntactic features.

### 5. The Regular Phonological Character of Latin Stem Classes

A traditional treatment of Latin inflection, Stock (1970, 10–16), *goes so far as to name* the declensions phonetically as the “*a*-Deklination, *o*-Deklination, konsonantische Deklination,” etc. This constitutes an improvement over the traditional declension names “1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>,” etc. because it recognizes that the choice of the declensional suffixes is to a large extent predictable on the basis of the preceding vowel.

Stock nonetheless treats these vowels as *part of the endings*, which requires a mass of “autonomous” declension class memberships as exemplified briefly in (17). Thus, the stem *puer* ‘boy’ is *o*-declension, while the stem *pater* ‘father’ is in Stock’s “consonant declension,” arbitrarily it would seem. From this perspective, one can easily get the impression that 5 cases, 2 numbers, and say 6 declension classes must yield some 60 stipulated Latin case morphemes. Yet in fact, there are a maximum of 15 different such morphemes, so some generalizations are being missed.

So let’s discard tradition of including the vowels in the case endings. We propose rather that the case endings are “smaller;” they *don’t* include vowels. The “declensional vowels” are simply part of the stems. This step immediately eliminates another traditional stipulation,

whereby Latin noun stems should mysteriously end almost exclusively in consonants. In our view, no special restriction applies to a noun's final phoneme in the Latin lexicon.

- (26) **Phonological Declension Classes.** The noun declensions of Latin simply reflect *the last phoneme of the noun's lexical entry*. This yields five vowel declensions and a consonant declension.

Adopting such an analysis immediately raises two questions.

The first of these has to do with the stems ending in *-a* where several of the declined forms end in a vowel spelled [ae]. It seems clear that in the form of Latin we are discussing in this paper, this convention represents a diphthong pronounced [ai] or [aɪ]. In earlier Latin there may have been a distinction between two diphthongs spelled [ae] and [ai], but in classical Latin this distinction has collapsed. In later forms of Latin, and also in many school traditions, the pronunciation of this vowel is typically [ē], a fact that has no direct bearing on this discussion. The fact of importance for this analysis is that the result of suffixation of *-i* onto an *-a* final stem results in the diphthong [ai], but that this diphthong was represented orthographically as [ae]. In the following discussion we will simply use the phonologically and morphologically transparent form as appropriate.

The second point is the question of the final vowel in stems traditionally assigned to the 2<sup>nd</sup> declension. Our claim will be that this declension pattern is that of nouns where the stem ends in the vowel *-o*, and that the failure of this vowel to consistently appear in many of the declined forms is the result of certain constraints on Latin phonology. The two constraints that are immediately relevant to our discussion, are:

- (27) **Avoid oC<sub>σ</sub>].** Avoid short-o in closed, unstressed syllables. Typically in such syllables the vowel is raised to [u].
- (28) **Avoid oi.** Avoid the vowel sequence [oi], including the diphthong [oi].

While there is a fair amount of evidence for the activity of these constraints aside from the *-o* final stems, both historical and synchronic, there are also some exceptions. Nouns ending in *-or* generally do not have their vowel raised to [u]—though we do encounter *rōbor* → *rōbur* ‘strength’. Also the diphthong [oi] does occur—spelled [oe]—in a small number of words, e.g. *moenia* ‘ramparts’, but only in stressed position. Historical evidence for the effects of these constraints comes from forms like *quī* < *quoi* ‘which’ and *tūdus* < *loidus* ‘game’ for (28) and the genitive ending *-um* < *-om* for (27). Synchronically (27) is responsible for alternations such as *corpo-s* → *corpus* ‘body (nom.)’, cf. *corporis* (gen.).

The results of these constraints can be seen in the declension of *-o* stems: (27) triggers the raising of the stem final vowel in the nominative and the accusative singular, leading to forms ending in *-us* and *-um* respectively, while (28) causes the quality change in the stem final vowel in the genitive singular, as well as the nominative and the oblique plural, turning what might be expected to be a diphthong [oi] into a long vowel [ī]. Two representative forms are presented below, first the nominative singular, and then the genitive singular, both for the stem *serv-* ‘slave’.

- (29)

servo + s[NOM]	Avoid oC <sub>σ</sub> ]	Ident[high]
servos	*!	
servus		*

In this case the analysis is completely straightforward: Constraint (27) forces raising of the vowel. A more sophisticated analysis might be formulated in terms of Dispersion Theory (Padgett, 2003, see Spaelti 2004 for discussion), under the assumption that this actually represents a loss of vowel contrasts in an unstressed environment.

(30)

servo + i[GEN]	Avoid [oi]	Realize[Case]	Ident-o	Max-mora
servoi	*!			
servī			*	
servi			*	*!
servō		*!		

This case is somewhat more complex, but still quite clear. The constraint against diphthongs is the driving force, causing the stem vowel to assimilate to the suffixal vowel. Other possible ways of avoiding the diphthong such as simply deleting the stem vowel are judged inferior, while assimilating the suffixal vowel to the stem vowel leaves the case morpheme unexpressed. It is interesting to compare this case with that of the “dative” analyzed above in (22), since in that case the output *servō* was the result. The important difference is that in that case an option to default to the regular oblique form, i.e. the “ablative”, remained, thereby realizing the Case feature, though not the [+GOAL] feature.

In contrast to the stems ending in *-o*, those ending in *-a* realize the various case ending in nearly perfect form. The one special case is that of the oblique plural, where simple concatenation of *-is* onto the stem would lead to a diphthong in a closed unstressed syllable, a situation resolved in a fashion parallel to that of *-o* stems, and the analysis in (30).

Finally a number of forms involve lengthening of the stem final vowel, a situation that we analyze as affixation of an unspecified vowel, or alternatively of a vocalic mora. We use the notation ‘V’ for such elements. Combining all this information we can now lay out our analysis of the 1<sup>st</sup> and 2<sup>nd</sup> declensions in (31). As can be seen clearly the two “declensions” realize the *same set of endings*, and differ only in their nominative singular.

(31)

	-PLUR ← 1 <sup>st</sup> → +PLUR		-PLUR ← 2 <sup>nd</sup> → +PLUR	
NOM	nauta + ∅	nauta + i	servo + s	servo + i
ACC	nauta + m	nauta + Vs	servo + m	servo + Vs
OBL	nauta + V	nauta + is	servo + V	servo + is
GEN	nauta + i	nauta + Vrum	servo + i	servo + Vrum

By forcing the forms in (31) to conform to the principles of Latin phonology, one obtains the original and superficially very different traditional first and second declension paradigms of (17).

## 6. Phonological Stem Conditioning Factors

Aside from the *-a* and *-o* stems, there are also a number of other cases, where apparent irregularities turn out to be quite predictable, once Latin phonology is taken into account. A number of such cases were discussed in Spaelti (2004). We briefly review such cases here.

### 6.1 Nominative singular

As was seen above in (31) the nominative singular was the one form which distinguished o-stems from a-stems, with the former taking a suffix *-s*, while the latter are suffixless. Since the

a/o split corresponds to a putative 1<sup>st</sup>/2<sup>nd</sup> declension distinction, we might wonder whether the nominative singular offers support for the notion of declension class.

However this turns out not to be the case. There are 3 different nominative singular endings, and none serves as the exclusive marker of a class. What is more, most classes use a mix of several endings, as shown in (32). The declension classes are of no help in determining the form of the nominative singular.

(32)

Class	∅	-s	-m
1	nauta		
2	puer	servus	dōnum
3	pater	turris	
4	cornū	passus	
5		rēs	

While table (32) might make it seem that there is no pattern to the variants, in fact the distribution is governed by just two conditioning factors neither having to do with declension class. The first, which we will put aside until the next section, has to do with gender, as all neuters have a nominative which is identical to the accusative. The second is the quality of the stem final segment. It is to this second that we now turn.

Having put aside the neuters, we note that the remaining nouns fall into two groups; nouns ending in *-a* take no suffix, while all others have *-s* as their nominative singular affix. Among the latter all forms without an overt *-s* are the result of the phonology of Latin. Nouns ending in any of the vowels apart from *-a* have a nominative with an overt *-s*: *servo-s* → *servus* ‘slave’, *diē-s* ‘day’, *passu-s* ‘step’, *turri-s* ‘tower’. Among stems ending in consonants, however, the pattern is more complex.

Stems ending in non-coronals simply affix *-s* so that *op-* ‘wealth’, *pac-* ‘peace’, *urb-* ‘city’ or *hiem-* ‘winter’, become *ops*, *pax*, *urbs*, and *hiems* respectively. Stems ending in a coronal obstruent, such as *requiēt-* ‘rest’, *virtūt-* ‘virtue, valor’, *lapid-* ‘stone’, *laud-* ‘praise’, *ped-* ‘foot’, *art-* ‘art’, *mont-* ‘mountain’, and *noct-* ‘night’, delete the stem final consonant, when *-s* is attached. This leads to alternations such as *requiēs/requiētis*, *lapis/lapidis*, *ars/artis*, *mons/montis*, or *nox/noctis*. In the last case, the spelling “x” should of course be understood as representing the sequence [ks]. Stems ending in continuants are rare in Latin. The noun *bov-* ‘cow’, is somewhat irregular, and results in the form *bōs* (cf. the genitive *bovis*) which nevertheless has an overt *-s*. The noun *vās-* ‘jar’ results unsurprisingly in the form *vās* with the word final sequence of *-ss* resolved to a simple *-s*. In contrast to the forms with coronal obstruents, in forms with coronal sonorants, it is the *s* that is deleted. Thus the many forms in *-n* and *-r*, such as *ōrātiōn-* ‘speech’, *sermōn-* ‘conversation’, *amor-* ‘love’, *frāter-* ‘brother’ result in forms *ōrātiō*, *sermō*, *amor*, *frāter*, and similarly for *sāl* ‘salt’.

Some remaining cases will require a further device for which we adopt the following convention:

- (33) **Lexical parentheses convention.** Segments in parentheses in a lexical entry are realized in accordance with the constraints of the prosodic structure of the language.

Essentially such segments are what are often referred to as ghosts or latent segments (Zoll, 1998). As an example, consider a number of bound suffixes in the Japanese verbal system that appear in two forms, widely notated as *-(r)are* ‘passive’, *-(s)ase*, ‘causative’, *-(i)tai*, ‘want’,

-(a)nai, ‘not,’ etc. The segments enclosed in parentheses appear only to maintain consonant-vowel alternations. This device allows us to analyze some of the remaining cases.

A number of nouns show by their form that they have a stem final *-o* even though they lack any vowel in their nominative singular: *puer/puerī* ‘boy’, *vir/virī* ‘man’, *liber/librī* ‘book’. For such forms we write lexical entries like *puer(o)*, *vir(o)* and *libr(o)*. Since the nominative singular *-s* deletes after the coronal sonorant *r*, these forms surface without an overt nominative affix.

## 6.2 Accusative singular

The accusative singular is among the most regular of the declension endings. With non-neuter nouns it is *-m* throughout, and generally it is affixed directly to the stem vowel, as was already seen for the *-a* and *-o* stems in (31) above. The only case which requires further comment is that of the *-e* stems. Stems ending in *-e* exist in two varieties: with a short final vowel, like *re-* ‘thing, affair’, or with a long vowel such as with *diē-* ‘day’. It is with this latter case that a problem arises, since the accusative singular has a short vowel throughout. This would seem again to be a form of weakening in closed, unstressed syllables.

(34)

	*ē <sub>m</sub> <sub>σ</sub> ]	Max-mora
diēm	*!	
☞ diem		*

## 6.3 Oblique singular and Accusative plural

These two forms have in common that they both add quantity to a stem final vowel. To account for this we propose that these entries consist of a single vowel unspecified for quality or alternatively a vocalic mora. When attached to a vowel final stem, the quality of the suffixal vowel is filled in by spreading the stem vowel resulting in a long vowel. With consonant final stems the vowel slot is filled with the vowel *e* in a form of morphological epenthesis.

(35) **Oblique singular:**  
N, OBL, -PLUR \\ V

(36) **Accusative plural:**  
N, ACC, +PLUR \\ Vs

## 6.4 Genitive plural

The genitive plural suffix provides a good example of how declension class treatments obscure rather regular phonological conditioning. In fact, simply by renaming the declensions according to the final phoneme of the stem, Stock (1970) has laid the groundwork for our analysis. It is then hardly surprising that the phonological form of a suffix generally depends on the phonological quality of the adjacent stem-final phoneme. The regularity is based on a noun stem’s final segment, as stated in (37).

- (37) **Genitive Plural allomorphs:**
- Final non-high vowel (*a, o, e*) -*rum* (with lengthening of the stem final vowel)
  - High vowels (*i, u*) and most consonants -*um*
  - Consonant clusters -*ium*

Leaving aside for the moment the condition requiring stem vowel lengthening, we find that the variants are nearly identical. Using the lexical convention (33) we can unify the lexical form of the Latin genitive plural, namely *-(r)um*.



- (38) **Latin genitive plural:**  
+N, GEN, +PLUR \\ -(r)um

The appearance of the latent segment *r* of this affix is triggered by the onset requirement, thus avoiding hiatus, and appears as expected with the non-high vowels *a*, *o*, *e*, to yield forms *servō+rum* ‘of the servants’ and *nautā+rum* ‘of the sailors’, as well as *rē+rum* ‘of the things.’ The question is then why the same does not happen for the high vowels *u* and *i*. Here we note a seeming quirk of Latin orthography, the form of the *u*-stem genitives is always given as *passuum* ‘of the step’ with double [uu], never as *passūm* with long [ū]. The reason for this is simply that the genitive suffix always forms its own syllable, never joining with the stem. With stem final high vowels the latent segment need not be called upon, because the high vowels themselves can provide a glide to meet the onset requirement of the affixal syllable. The same goes of course for consonant final stems, where again the stem final segment can be directly recruited to meet the affixes onset requirement.

The final case is what Stock calls the “mixed declension.” This group consists of nouns which end in a consonant cluster, including geminates such as *ss*, but excluding clusters such as *tr*. This is a rather intriguing grouping, one on which the traditional system formulated in terms of a blunt instrument like “third declension,” fails to shed any light. The group is entirely internal to the third declension and the traditional classification is utterly incapable of catching this apart from creating yet more classes or sub-classes. However the group is phonologically speaking entirely natural since it consists of exactly those consonants clusters which cannot together form an onset in Latin. Our analysis predicts that the genitive affix will be of the form *-um*, but with an extra epenthetic to syllabify the extra C and to provide a glide onset for the affix

In sum, the Latin genitive plural is a simple alternation dependent only on phonology, without any need for arbitrary declension classes or what might be treated as “uninterpretable formal features” in the lexicon.

### 6.5 Phonologically conditioned variants: the oblique plural

The analysis of the Latin oblique plural that we present here, takes as a starting point the hypothesis of Spaelti (2004) according to which Latin *e* acts phonologically as a mid vowel, while *o* acts as a low vowel. Under this view, the allomorphs for the oblique case are as follows:

- (39) **Oblique plural allomorphs:**
- |                               |       |
|-------------------------------|-------|
| Final low vowel (a, o)        | -is   |
| Final non-low vowel (i, e, u) | -bus  |
| Final consonant               | -ibus |

Trying to express this phonology-based pattern with syncretisms among 5 to 7 declension classes confuses an alternation that clearly involves at most 2 allomorphs. However, a conditioned alternation between two suffixes *-is* and *-bus* seems to be irreducible. Of these two affixes, the first, used exclusively with stems ending in the low vowels *a/o*, completely fuses with the stem as seen with examples *servo-* from which we obtain *servīs* ‘with servants’ and *nauta* we derives *nautīs* ‘with sailors’. A detailed analysis of such cases was presented in section 5 above. But the second displays a pattern that is paralleled only by the genitive plural *(r)um* seen in the last section. The notable features of this pattern are:

1. the affix forms its own syllable separate from the stem,

2. a preceding stem vowel lengthens when the stem vowel is one of the more sonorous vowels (a, o, e), and
3. as a result of (1) and (2) the affix often induces a stress shift in the stem,
4. epenthesis is triggered with consonant final stems as necessary.

Examples<sup>11</sup> which illustrate the stress shift are [d̄íe:s] vs. [dié:rum], [dié:bus] ‘day’, or [s̄érvos] vs. [servó:rum] ‘slave’. An exceptional form, which nevertheless demonstrates the complete generality of the patterns described here is *déa* ‘goddess’. This noun which has an *-a* final stem is expected to have an oblique form [d̄é̄is], which it does, but in addition, it also has a form [deābus], with a lengthened, stressed *ā*.

Here we formulate an analysis that lengthens the vowel in order to accommodate ideal stress placement. Under this analysis the difference between non-high and high stem vowels, is that non-high vowels make better targets for stress.

(40)

	NonFin	Rightmost	Dep-mora
s̄érvorum		**!	
servó:rum		*	*
servorúm	*!		

At this point we can summarize the lexical entries given for both the singular and the plural case markers.

$$(41) \text{ Latin oblique case: } +N, \text{ OBL, } \left\{ \begin{array}{l} -\text{PLUR} \setminus \setminus \text{ V} \\ +\text{PLUR} \setminus \setminus \left\{ \begin{array}{l} [ +\text{LOW} ] \_ , \quad -is \\ \text{elsewhere:} \quad \quad -bus \end{array} \right\} \end{array} \right\}$$

So far we have omitted the genitive singular. The allomorphs for this form and their distribution are as shown here:

(42) **Genitive singular allomorphs:**

- Final low vowel (a, o)    -i
- Final e                    -ī
- Final u                    -Vs
- Final i                    -s
- Final consonant        -is

While the variants are tantalizingly similar, an analysis that takes the data seriously will be hard pressed to combine them. The most likely candidates for combining are the last two, provided the *i* appearing with consonant stems is epenthetic. This leads to a morpheme *-s* for this case. The problem with this however is that this leaves the genitive singular *-s* indistinguishable from the nominative *-s*, even though the realization of these two forms for consonant final stems is typically different. Therefore the alternative is to consider the *i* a latent segment leading to a combined form *-(i)s*. And while this looks almost exactly like the form for u-stems, it seems they cannot be combined, since there will be no prosodic motivation to actualize the latent segment. Thus we leave (42) as the lexical entry for this morpheme.

The genitive singular notwithstanding, our analysis so far has shown, that the declension classes are not supported by the data. They are both too broad—unable to capture the generalization concerning the “mixed declension,” for example—and too narrow—cross-declension-class generalizations amount to pure stipulation.

<sup>11</sup>In these examples vowel length has been marked with a colon, to avoid confusion with the stress marking.

## 7. Syntactic Stem Conditioning Factors and the role of Gender

### 7.1 Relations between gender and declension classes

Some well known properties of Latin nominal declension classes concern correlations with the gender of nouns. Nonetheless these time-worn statements are at once completely unprincipled and insufficiently general. The fact is, our hypothesis (26) of phonologically based declension permits unifying several arbitrary traditional classifications: that first declension, fifth declension and “*i*-declension” nouns are feminine,<sup>12</sup> while those of the second and fourth declensions are not. What has not been noticed is that the final vowels of the “feminine declensions” are front and central unrounded vowels (*a, e, i*), while those of the “masculine/ neuter declensions” are back and rounded (*o, u*).

- (43) a. **Feminine gender.** When a noun’s vocalic final segment is –ROUND, the noun is feminine, except when determined by “natural gender” (e.g. masculine *agricola* ‘farmer’, *nauta* ‘sailor’).
- b. **Non-feminine gender.** When a noun’s vocalic final segment is +ROUND, the noun is masculine or neuter.

The few remaining lexical exceptions are needless to say equally exceptional in the traditional classifications: feminine *fāgo-s* → *fāgus* ‘stick’, feminine *manu-s* ‘hand’, masculine *diē-s* ‘day’. Moreover, though the gender of consonant stem nouns remains somewhat unpredictable (as in earlier treatments), it is still noteworthy that the sub-regularities observed for these nouns, like those noted in Stock (1970, 14–16) also depend entirely on the phonological features of the stems’ final segments, exactly as expected from this study’s approach.

Our hypothesis (26) as reflected in the table (31) has an additional interesting effect on the syntactic relation between the so-called  $\phi$ -features of gender and number. Along the lines of Ritter (1993), we consider that *gender is a feature of noun stems*. In contrast, *number is always expressed in the case ending*. Thus, gender and number are not realized on the same morpheme. Instead, number is systematically external to gender in morphology, a pattern exactly mirroring the conception that a functional head expressing number is higher in noun phrase syntactic representations than the noun itself. This correlation between morphological and syntactic positions conforms perfectly to the expectations of Baker’s (1985) “Mirror Principle.”

### 7.2 Nominative and Accusative

Latin *nominatives and accusatives* often have the same form, and the conditioning factors for differences among them use +PLUR and +ANIMATE more than stem-final phonology. But NONE of the variations depend on any of traditionally defined declension classes, although problems remain in finding the optimal descriptions of the factors themselves.

- (44) **Latin plural morphemes for nominative and accusative.** The allomorphs are \**a*, *Vs*, and *i*.

The rule (45) for (44) assumes that case spell out rules are a singular **disjunctive block** (Anderson, 1982), and that this block treats nominative and accusative as “elsewhere” cases.

<sup>12</sup>According to Stock (1970, 15–16), *i*-declension nouns are all feminine, except for river names (generally masculine in Latin) and a small set whose nominative singulars end in *-al*, *-ar*, and *-e*. This latter group suggests that lexical gender ) doesn’t cover those marked stems without a vocalic final segment in their nominative singular; cf. section 4.2.

(45) **Plural cases:**

$$+N, +PLUR, \left\{ \begin{array}{l} [+ANIM] \_ \text{ NOM } \left\{ \begin{array}{l} \backslash \backslash [+LOW] \_ , i \\ \backslash \backslash V_s \end{array} \right\} \\ [-ANIM] \_ \quad \quad \quad \backslash \backslash a \end{array} \right\}$$

These three allomorphs are entirely independent of declension classes. Traditional treatments all note that the plural neuter ending *-a* is cross-declensional. However, they typically fail to note that the identity of Latin plural nominatives and accusatives is also cross-declensional.

(46) **Latin singular morphemes for nominative and accusative.** The allomorphs are *s*, *m*, and  $\emptyset$ .

It is unclear whether the null allomorph in (46) is a default or not, since I lack optimal formulations of conditioning factors for it and the nominative ending *-s*. So I do not offer here a lexical entry for elsewhere case singular morphemes. In any case, *the regularities again cut across declension classes* and depend rather on phonological and syntactic features (e.g., +ANIM).

There is a special adjectival ending for nominatives and accusatives: consonant stem neuter adjectives take *-e* instead of  $\emptyset$  in the nominative and accusative singular.

## 8. Conclusion

We believe to have argued that the “declension classes” of Latin amount to nothing more than a stipulation, which moreover is ill-suited for the task that it was originally designed. We propose instead that nouns and adjectives of Latin are stems of rather freely varying shape, and that most of the properties originally ascribed to the classes are better predicted by the phonological shape of the stems, particularly their final segment(s), or by other independently motivated properties of the stem. The seemingly complex declension patterns were shown to be the result of interactions between the set of endings—summarized here in (47)—with the regular phonology of the language.

(47)

	SINGULAR	PLURAL
NOMINATIVE	<i>s / <math>\emptyset</math> / m</i>	<i>Vs / a / i</i>
GENTIVE	<i>(i)s / Vs / i / <math>\bar{i}</math></i>	<i>(r)um</i>
OBLIQUE (ablative/dative)	<i>V / <math>\bar{i}</math></i>	<i>bus / is</i>
ACCUSATIVE	<i>m / <math>\emptyset</math></i>	<i>Vs / a</i>

The phonological constraints that we argued to have been active in Latin and responsible for the changes to the affixed forms, are natural effects mostly of stress and weakening in unstressed environments. Throughout this treatment, it can be seen that each statement has *required reference rather to either motivated syntactic or phonological features*. As such we believe that Latin furnishes no evidence for any kind of autonomous morphological component, nor does it require special morphological features or devices.

(48) **Conclusion.** Latin case and number suffixes *depend only on gender and number, and on the phonological features of the final segment of a preceding stem*.

Moreover, in almost all situations, these phonological dependencies are phonetically natural. The “6 declension classes” of Latin are simply contextual variants fully determined by 6 possible values of preceding underlying final segments: consonants and 5 distinct vowels.

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