# A constraint on interclass syncretism

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## 1. INTRODUCTION

A partition of the vocabulary of a language into arbitrary inflectional classes is very often complicated by stems which seem to belong to two or more classes at once; often such stems belong to one class but appear to 'borrow' affixes from another class. Inflection class mixture of this sort ranges along a continuum where at one extreme there may be a small set of irregular items each with its own unique exceptional pattern, while at the other extreme there may be a coherent SYSTEMATIC MIXED INFLECTION CLASS whose inflectional forms are only partly syncretized with those of another class.[1] In this paper I examine the formal mechanisms within the theory of Distributed Morphology (DM) which produce mixed inflection class behavior, the most important being DEFAULT SPELL-OUT and rules of IMPOVERISHMENT. Default spell-out allows interclass syncretism to occur whenever the affix shared by several classes is a default form. This mechanism may be said to figure in some fashion in all theories of morphology, but impoverishment is more particularly associated with DM. As I will show, when impoverishment rules apply to inflection class features, the result is that the affected form will behave inflectionally as if 'moved' into a default inflectional class. Given this restriction on impoverishment, it is predicted that affixes which are 'shared' by more than one inflectional class must either be default spell-outs OR the spell-out of a default inflectional class.

### 1.1. Idiosyncratic versus Systematic Mixed Inflection

To begin it will be essential to distinguish two types of mixed class phenomena, which we may term IDIOSYNCRATIC and SYSTEMATIC. These types correspond, in essence, to the difference between grammatical facts that result from listing and those that result from the application of general rules. I discuss each type in turn.

#### 1.1.1. Idiosyncratic Mixed Inflection or Heteroclisis

Idiosyncratic mixed inflection often occurs when an item of vocabulary has two or more stem allomorphs belonging to distinct inflectional classes. For example in the Greek of Herodotus the word for 'tree' has three possible forms: a neuter *o-stem *déndr-o-n*, a neuter *o-stem *déndre-o-n*, and finally a neuter *-es/os-stem *déndr+os-Ø*. The first stem occurs only in the nom.acc.sg., in variation with the other two; elsewhere in the sg. Herodotus uses only the second stem.

In the plural the third stem is used in the dat.pl. *déndr+e(s)-Ø-si*, and the remaining pl. cases are ambiguous between coming from the second or from the third stem. In later Attic prose the second stem is lost, and the first stem becomes usual in both the sg. and pl., with the exception that the dat.pl. continues normally to be formed from the third stem.[2]

This pattern of variation and mixed behavior characterizes 'tree' specifically and does not generalize to a group of stems. In such cases it appears highly unlikely that the language learner will construct a specific inflectional class with a single member; rather, the vocabulary item *dendr+* must be entered on certain lists of exceptions in the rules of spell-out. For example, in Attic prose – the simplest case – only the dat.pl. *dendr+e(s)-Ø-si* will require special mention. In this category, the stem extension *-es-* must be added to the root, the nominal theme must be spelled as *-Ø-* instead of as *-o-* and the desinence as *-si* instead of as the expected *-is*. Each such rule (or vocabulary item) has a regular domain of application; besides this the rules/vocabulary items in question must include *dendr-* on a LIST of additional, idiosyncratic contexts of application, for example:

(1)   *si*   $\leftrightarrow$   $\begin{bmatrix} -\,\text{genitive} \\ -\,\text{direct} \\ \text{plural} \end{bmatrix}$ / [$-$thematic] OR {*dendres-*, …} + ___

Here the vocabulary item *si* is inserted into the dative plural case ending position after non-thematic (i.e. [$-$thematic]) stems and after a set of listed exceptions, including *dendres-*. Mixture of this type is traditionally referred to as HETEROCLISIS or METAPLASM; here I will use 'heteroclisis' to mean any such instance of idiosyncratic inflection class mixture.

### 1.1.2. Systematic Mixed Inflection

In the second type, which will be of interest here, a subclass of stems from one inflectional class 'shares' an affix (or affixes) with another inflectional class.[3] This situation is represented schematically below:

(2)   Schema for Systematic Mixed Inflection

|          | class I | class I [+F] 'special' | class II | class III |
|----------|---------|------------------------|----------|-----------|
| case 1   | *a*     | *a*                    | *w*      | *w*       |
| case 2   | *b*     | *b*                    | *x*      | *v*       |
| case 3   | *c*     | *y*                    | *y*      | *y*       |

In the schema illustrated here, we suppose that affix *c* is the normal spell-out for CASE 3 for nouns of inflectional class I. However, a specific subset of

'special' nouns in class I, defined by the feature [+F] let us say, has the spell-out *y* for CASE 3, where *y* is also the spell-out for CASE 3 in another inflection class or classes (classes II and III). In such cases I will speak of SYSTEMATIC MIXED INFLECTION CLASS.

Table 1.  Some Gothic Declensions

|          | O m.       | A f.      | I m.      | I f.        | U m.f.    | T f.       |
|----------|-----------|-----------|-----------|-------------|-----------|------------|
| nom.sg.  | -s        | -a        | -s        | -Ø-s        | -u-s      | -s         |
| gen.sg.  | -is       | -ōs       | -is       | -ái-s       | -áu-s     | -s         |
| dat.sg.  | -a        | -ái       | -a        | -ái-Ø       | -áu-Ø     | -Ø         |
| acc.sg.  | -Ø        | -a        | -Ø        | -Ø-Ø        | -u-Ø      | -Ø         |
| nom.pl.  | -ōs       | -ōs       | -ei-s     | -ei-s       | -ju-s     | -s         |
| gen.pl.  | -ē        | -ō        | -Ø-ē      | -Ø-ē        | -iw-ē     | -ē         |
| dat.pl.  | -am       | -ōm       | -i-m      | -i-m        | -u-m      | -im        |
| acc.pl.  | -ans      | -ōs       | -i-ns     | -i-ns       | -u-ns     | -s         |
| Example  | *stáin-* m.' | *wamb-* f. | *arm-* m. | *waúrt-* f. | *fōt-* m. | *brust-* f. |
|          | 'stone'   | 'womb'    | 'arm'     | 'root'      | 'foot'    | 'breast'   |

For a concrete example, examine in Table 1 the declension of some of the inflectional classes of the noun in Gothic (Wright 1910: 84 ff.). Class O contains historically 'thematic' masculine (and neuter) *o-stems, whereas class A contains the thematic feminines in *-ā. The remaining classes shown are old 'athematic' stems; classes I and U were originally characterized by a predesinential stem alternation *i ~ *ei̯ (*i-stems) or *u ~ *eu̯ (*u-stems). Reflexes of *ei̯ and *eu̯ can be seen in the gen. and dat.sg. of class U and in the feminines of class I. But in the masculines of class I, the declension of the singular no longer follows the expected pattern for class I. Rather, the old masculine *i-stems have 'borrowed' the endings of the (masculines) of class O. This is most conspicuous in the gen. and dat.sg., where in the masculines of class I we find *-is, -a*, just as in class O, as opposed to the expected *-ái-s, -ái-Ø*, which appear only in the feminines of class I.

In descriptive literature the distinction between sporadic heteroclisis and systematic mixed inflection class is not usually discussed, especially since the former sometimes leads to the latter. For our purposes the essential difference is that while heteroclisis is limited to the exceptional behavior of individual items of vocabulary (and therefore often shows a large degree of variation in speakers' productions or textual records), systematic mixed inflection class represents a pattern applicable to all vocabulary items of a certain general type. In other words, for mixed inflection to become systematic in the sense employed here, the set of forms displaying the exceptional behavior must be sufficiently numerous and the phenomenon sufficiently invariant for the learner to abstract an inflectional class feature to define these forms.[4] For example, in the Gothic

declension the masculine stems of class I occupy a well-defined niche in the inflectional system; they decline exactly as do the feminines in the plural, and bear close resemblance, with substitution of *-i* for *-u*, to the masculines (and feminines) of class U. In such a situation, the pattern of systematic mixed inflection diagnoses an innovation in the morphological rule system. In contrast, heteroclitic stems such as Greek *dendr-* 'tree' are listed exceptions and do not provide evidence for rule innovation.

## 1.2. The Grammatical Expression of Systematic Mixed Inflection

Distributed Morphology (DM; Halle and Marantz (1993, 1994), Harley and Noyer (1999) et. seq.) provides three distinct grammatical mechanisms to encode systematic mixed class inflection, each of which will be illustrated in this paper. The first of these, PHONOLOGICALLY-CONDITIONED SPELL-OUT, figures in all theories of morphology. In this case the phonological environment determines the phonological variants of stems or affixes, or may in fact control the introduction of suppletive affixal variants (Carstairs 1988, Carstairs-McCarthy 1990). So if the distribution of $c \sim y$ in (2) is predictable on phonological grounds, we have no mixed inflection class in reality, just two variants of the spell-out of CASE 3 irrespective of class.

    The second and third mechanisms both involve the use of defaults in the grammar. A mixed inflection may involve the 'borrowing' of either the DEFAULT AFFIX for a given category, or of a non-default affix of a DEFAULT INFLECTIONAL CLASS.[5]

    Default spell-out rules introducing default affixes are employed by all theories of morphology that may be termed 'realizational' (Matthews (1972), Anderson (1982), Stump (2001)): here the inflection 'borrowed' in the mixed subclass is simply a default inflectional form that spreads when conditions on the appearance of the replaced inflection become more restricted. In our schema this would require that affix *c* be conditioned specifically by the nouns of class I which are *not* in the special class; affix *y* is then the elsewhere spell-out of CASE 3. This grammar is feasible provided that the set of nouns in the 'non-special subclass' can be specified in some way, as for example below by the feature $[-F]$:

(3)   *Mixed Inflection by Default Spell-Out*

    a.   $c \leftrightarrow [\text{CASE 3}] \; \Big/ \; \begin{bmatrix} \text{class: I} \\ -F \end{bmatrix} + \underline{\quad}$

    b.   $y \leftrightarrow [\text{CASE 3}]$   *(elsewhere)*

In both phonologically-conditioned allomorphy and default spell-out the mixing of inflectional classes arises historically as a result of changes in spell-out rules which alter the distribution of allomorphs in various ways.

Consider now a variation of the earlier schema (2), in which the affix *c* expresses CASE 3 in both inflection class I and in inflection class III, as shown below in (4). This will mean that *y* cannot be a general default. Or, suppose that the 'non-special' subclass of inflection class I stems does not form any natural class to which the grammar may refer (e.g., there is no feature $[-F]$):

(4)  Schema for Impoverishment

|  | class I | class I [F]<br>'special' | class II | class III |
|---|---|---|---|---|
| case 1 | *a* | *a* | *w* | *w* |
| case 2 | *b* | *b* | *x* | *v* |
| case 3 | *c* | *y* | *y* | *c* |

In either situation, the grammar will require more than simply a default spell-out rule. Here DM makes use of a type of rule specific to that theory, namely IMPOVERISHMENT, which has been studied chiefly as a means of expressing syncretisms within (rather than ACROSS) inflectional classes (Bonet 1991, Harris 1994, Noyer 1997, 1998). An impoverishment rule deletes a feature value of a morpheme in certain contexts, making the morpheme behave as a less marked category for the purposes of spell-out. When impoverishment operates on inflection class features of a stem, it has the effect of 'moving' that stem into the default inflectional class of its type.

For the schematic example under discussion, an impoverishment deletes the inflection class feature in the special class I stems in CASE 3; these are then converted to class II by an inflection class redundancy rule:

(5)  *Mixed Inflection by Impoverishment*

a.  $\begin{bmatrix} \text{class: I} \\ \text{F} \end{bmatrix} \rightarrow \emptyset \ / \ \underline{\quad} + [\text{CASE 3}]$

b.  $[ \quad ] \rightarrow [\text{class: II}]$

The combined action of impoverishment (5a) plus redundancy rule (5b) causes the special $[+F]$ class I nouns to behave as if they were class II nouns in CASE 3. Of course this will only be possible if class II is a default inflectional class of some type, that is, if rule (5b) is independently part of the grammar (on which, see section 1.3.1 below).

The mixed inflection of the masculine class I stems in Gothic provides a concrete illustration of the schematic derivation in (5):

(6)   *Gothic Impoverishment*

    a.   $\begin{bmatrix} \text{class: I} \\ +\text{masc} \end{bmatrix} \rightarrow \varnothing \; \Big/ \; \underline{\quad} + [+\text{sing}]$

    b.   $[+\text{masc}] \rightarrow [\text{class: O}]$

Specifically, the 'special', i.e. masculine, nouns of class I undergo impoverishment of the inflection class feature [class: I] in the singular (6a). A redundancy rule (6b) inserts the feature [class: O] on masculine nouns which are unmarked for inflection class. The cumulative result is that masculine (but not feminine) class I nouns inflect as if class O in the singular, as required.

### 1.3.  The Interclass Syncretism Constraint

Both default spell-out and impoverishment share the property that they lead to the replacement of marked entities – inflectional class features or specific affixes – by default ones. This generalization gives rise to the principal hypothesis to be defended and elaborated here, stated as follows:

(7)   *Interclass Syncretism Constraint*

Let *A* and *B* be distinct inflection classes, where the morphosyntactic feature $[\pm\text{F}]$ partitions the set of stems in *A* into two subclasses. If only the $[+\text{F}]$ stems in class *A* share an affix $\alpha$ with the stems in class *B*, then either: (i) $\alpha$ is a default affix, or (ii) *B* is the default inflectional class for $[+\text{F}]$ stems.

The fact that default affixes as well as affixes from default classes are diachronically the most stable (and hence most likely to 'spread' across classes) has been observed by other researchers, most notably Wurzel (1989). The present paper aims at deriving this effect directly from the formal properties of morphological rules and not through an independent stipulation about grammars or historical changes. Thus, I must stress at this point that the Interclass Syncretism Constraint (ISC) is not an axiom of the proposed theory; rather it is DERIVED here as a formal consequence of the types of morphological rules that are available.

### 1.3.1.  Unexpected Patterns

To establish a counterexample to the ISC it must be shown that a 'borrowed' affix is neither a general default nor an affix from a default class. To show the former, it suffices to show only that another affix must be the default; such

scenarios are trivial to construct. For example, returning again to the schema in 4, it is clear that *a* cannot be a general default since *w* must be, given that *w* appears in both classes II and III.[6]

To show that an affix does not belong to a default class one must have evidence regarding what the default classes in fact are. In the examples to be discussed in this paper the condition for insertion of a default class property is the gender of the stem in question; the default class associated with a particular gender is determined by the usual inflection class of adjectives, since, by hypothesis, adjectives ordinarily lack inherent inflection class features, but are assigned gender by syntactic agreement and then assigned into the default inflectional class for that gender.[7] For example, rule (6b) maps masculine stems unmarked for inflection class to class O in Gothic. This rule is needed not only as part of the impoverishment of inflection class in the masculine stems of class I, but is also independently required to map into class O those adjectives that receive masculine gender by agreement.[8]

A hypothetical counterexample to the ISC can be constructed simply by switching the labels of the left two columns in table 1.

(8) 'Pseudo-Gothic'

|         | A f. | O m. | I m. | I f.    | U m.f. | T f. |
|---------|------|------|------|---------|--------|------|
| nom.sg. | *-s* | *-a* | *-s* | *-Ø-s*  | *-u-s* | *-s* |
| gen.sg. | *-is*| *-ōs*| *-is*| *-ái-s* | *-áu-s*| *-s* |
| dat.sg. | *-a* | *-ái*| *-a* | *-ái-Ø* | *-áu-Ø*| *-Ø* |
| acc.sg. | *-Ø* | *-a* | *-Ø* | *-Ø-Ø*  | *-u-Ø* | *-Ø* |
|         | etc. |      |      |         |        |      |

In this 'pseudo-Gothic' the masculine stems of class I 'borrow' inflections from the class A FEMININES. Assuming that rule (6b) is still required for masculine adjectives, it will be impossible for impoverishment to 'move' class I masculines into class A.[9]

### 1.3.2. Prospectus

It should now be clear that the ISC has predictive power only to the extent that the notion 'default inflectional class' or 'default affix' can be independently justified. Moreover, because phonologically conditioned allomorphy and default spell-out can give rise to superficially similar patterns of identity of exponence across inflection classes, it will be essential to distinguish carefully among these when evaluating putative counterexamples of the Interclass Syncretism Constraint.

The remainder of the paper is organized as follows. In section 2 I illustrate the mechanism of impoverishment in an analysis of the allomorphy of the

instrumental case in Old Russian. Then in section 3.1 I present a fairly detailed study of several analogical changes in various dialects of Greek as a test case for the Interclass Syncretism Constraint. Phonologically-conditioned allomorphy, default spell-out and impoverishment are each required depending on the circumstances. I conclude in section 4 with a brief comparison of the Interclass Syncretism Constraint with a related proposal about inflectional defaults, namely the No Blur Principle of Carstairs-McCarthy (1994).


## 2. IMPOVERISHMENT IN THE RUSSIAN INSTRUMENTAL

The nominal declension of Old Russian provides several examples of impoverishment and will therefore be a convenient introduction to the issues of interest here. As in Modern Russian, most of the inflectional classes in Old Russian show some allomorphy based on whether the final consonant of the base is palatalized ('soft') or plain/velarized ('hard'). Where this occurs, I will indicate the soft allomorph in parentheses after the hard one. The symbols ь, ъ denote the short/lax high vowels [ĭ, ŭ] traditionally called 'yers'; the symbol [ĕ] denotes a low front vowel, phonetically approximately [æ]. Table 2 illustrates the inflectional patterns of the various stem types in certain case-number combinations which invite special attention.

Table 2: Old Russian Declension (partial)

| type | nsg. | gsg. | isg. | npl. | apl. | ipl. | example |
|------|------|------|------|------|------|------|---------|
| *(j)ā m.f. | a, i | y (ĕ) | o(e)-ju | y (ĕ) | y (ĕ) | a-mi | *žen-* 'wife' |
| *(j)o m. | ъ (ь) | a | o(e)-mь | i | y (ĕ) | y (i) | *stol-* 'table' |
| *(j)o n. | o (e) | a | o(e)-mь | a | a | y (i) | *lĕt-* 'year' |
| *u m. | ъ | u | ъ-mь | ow-e | y | ъ-mi | *syn-* 'son' |
| *i m. | ь | i | ь-mь | ij-e ∼ i | i | ь-mi | *put-* 'way' |
| *i f. | ь | i | ь-ju | i | i | ь-mi | *kost-* 'bone' |
| *C m. | y | e | ь-mь | e | i | ь-mi | *kam-en-* 'stone' |
| *C n. | o | e | ь-mь | a | a | y | *slow-es-* 'word' |
| *C f. | i | e | ь-ju | e ∼ i | i | ь-mi | *mat-er-* 'mother' |

Old Russian nouns are usually divided into five major inflectional classes falling into two major groups. The first group consists of the stems ending in non-high vowels, i.e. the (j)ā-stems (class A) and *(j)o-stems (class O). The second group collects the remaining types, the *u-stems, *i-stems and consonantal stems (*C-stems).

As can be seen in Table 2, the gen.sg. form is distinct for each of the classes and is the principal diagnostic of class membership. Case-number endings consist of a thematic vowel plus a desinence, but in most cases shown in the table,

the underlying theme vowels do not surface owing to a general rule deleting a vowel before another vowel (at a morpheme boundary). The theme vowel *a* for class A and a front or back yer for the *u-, *i- and (non-neuter) *C-stems can be seen most clearly in the inst.pl. where the consonant-initial desinence *-mi* allows the theme to surface; for class O and the neuter *C-stems where *-mi* does not occur, the theme vowel can be seen in the inst.sg. form instead.

Because the masc. *u-stems and *i-stems exhibit paired hard/soft endings (provided that *u* is understood to have *i* as its soft counterpart), these two classes can be combined together into a single class; the fem. *i-stems can also be included in this class since gender can be used to condition the differences these show from the masculine *i/*u-stems (there are no fem. *u-stems). Furthermore, the *i/*u-stems and the consonantal stems also have certain common properties suggesting that they are subclasses of a more general type (historically the athematic or 'consonantal' stems). For example, masculines of both classes have nom.pl. *-e* and both classes have predesinential yer, where permitted phonologically. I will call this entire group of historically athematic forms the 'yer-stems' or class Y, and assume that the *i/*u-stems are distinguished from the consonantal stems through means other than their major inflectional class feature.[10]

The rule of pre-vocalic vowel deletion creates some surface homophonies which were to have important consequences in the development of modern Russian. The nom.sg. ъ of the masculine *o-stems, underlyingly *-o-ъ*, coincides with that of the *u-stems, which is underlyingly *-ъ-Ø*; the nom.sg. of ь of the masc. *(j)o-stems likewise coincides with that of the masc. *i-stems. In addition, the nom.acc.sg. *-o* of the neuter *o-stems ( <*-o-m) is in Old Russian the same as the nom.sg. of neuter *s-stems ( <*-os-Ø).

Partly owing to these coincidences, masculine class Y stems typically became class O stems by early modern Russian. The masculine *i-stems, with the single exception of *путь* m. 'way', adopted the inflection of the masculine *jo-stems or, in a few instances, changed to feminine *i-stems (OR *gъrtanь* 'larynx' > R *gortánь*, OR, R *pečátь* 'seal, stamp' (Kiparsky 1967: 29)). The masculine *u-stems and C-stems likewise adopted the inflectional pattern of the *o-stems, as did neuters in *s and *nt, while feminine C-stems adopted the *i-stem pattern (the modern Russian third declension). Aside from *путь* then, the only non-feminines which retain third declension behavior in modern Russian are neuters in *en such as *plam-en-* n. 'flag', modern Russian *plam^j-a*, gsg. *plam-en-i*.

Harbingers of the eventual conversion of the masc. class Y stems into class O occur as early as the 12th cent. For example, *ogъn-* 'fire', originally an *i-stem (cf. Lat. *ign-i-s*, Ved. *agn-i-ḥ*), is recorded with gen.sg. *ognja* as early as 1119, and the 'defection' of the *i-stems continued throughout the 13th to 16th centuries (Kiparsky 1967: 29). Confusion of *u-stems and *o-stems also began early; for example, instances of *u-stems with the *o-stem nom.pl. *-i* instead of *-e* are

in use by the late 14th cent. (*syn-ow-i* 'sons', *posl-ow-i* 'envoys', *storož-ew-i* 'watchmen' (Kiparsky 1967: 44)). This confusion was particularly pronounced in the inst.sg. (Matthews 1960: 105–6), which will be one of the main subjects to be discussed here.

## 2.1. *Instrumental Singular*

The inst.sg. desinence has two allomorphs in Old Russian: *-mь* and *-ju*. The distribution of these allomorphs has some important peculiarities. As Table 2 shows, *-mь* occurs in the *o-stems, *u-stems and in the masculines and neuters only of the *i-stems and *C-stems. The allomorph *-ju* occurs for feminine *i-stems, *C-stems and for the *(j)ā-stems. As Kiparsky (1967: 102) points out, the restriction of *-mi to the NON-feminine *i-stems and C-stems is a proto-Slavic innovation not shared by Baltic. For example, in Lithuanian fem. *i-stems such as *ak-ì-s* 'eye' or *šird-ì-s* 'heart' have isg. *ak-i-mì, šird-i-mì.* Similarly, fem. *r-stems in Lithuanian such as *sesuõ* 'sister' and *duktė̃* 'daughter' also have the *-imi* allomorph (at least optionally): *seser-imì, dukter-imì.*

   This new distribution of *-ju* on the basis of gender is however not exact, because the set of class A nouns, although predominantly feminine, also includes masculines such as *slug-a* 'servant', *junoš-a* 'youth', *wojewod-a* 'general', and *djadj-a* 'uncle'. Some of these masculine class A nouns, including *slug-a* and *junoš-a*, are also known from Old Church Slavonic, and decline similarly with the inst.sg. desinence *-ju* (Lunt 2001). Thus the restriction of isg. *-mi to non-feminines in Old Russian does not predate the existence of masculine *(j)ā-stems.[11] Because masculine *ā-stems are not very numerous, the first attestations of the inst.sg. I have been able to locate in Old Russian are all from the 14th century, but in each case show the expected class A allomorph *-o(e)-ju*:

(9)   inst.sg. of *wojewod-a* 'general'                    (Sreznevskij 1989: 280)

    a.   sъ wojewod-o-ju
        'with (the) general'                    (Novgorod Chronicle, after 1333)

    b.   sъ moj-i-mь wojewod-o-ju
        'with my general'         (Contract, Basil I with his uncle Vladimir,
                                         c. 1389)

    c.   podъ tě-mъ wojewod-o-ju
        'under this general'         (Statute, Basil I and Metropolitan Kiprian,
                                         c. 1392)

    d.   podъ mitropolič-i-mъ wojewod-o-ju
        'under the metropolitan general'                              (ibid.)

    e.   podъ moj-i-mъ wojewod-o-ju
        'under my general'                                          (ibid.)

(10)    inst.sg. of *djadj-a* 'uncle'                    (Avanesov 1990:174, v.3)

    a.    z djad-e-ju            (Contract, Dmitri Donskoj with Prince Vladimir
        'with uncle'                                    of Serpukhov, c. 1367)

    b.    s naš-i-mъ djad-e-ju
        'with our uncle'                        (*idem*, 25th March 1389)

Several of these examples (9b–e and 10b) clearly show the masc. *ā-stem with isg. *-ju* collocated with a modifier with the expected 'masculine' inst.sg. suffix *-mь* ( > *-mъ*), such as *mitropolič-i-mъ* 'metropolitan', *tě-mъ* 'this', and *naš-i-mъ* 'our.' It should be clear then that the grammar of Old Russian cannot condition the *-ju* ∼ *-mь* alternation solely on the basis of gender.

What then are the formal conditions on the inst.sg. allomorphy? One possibility, of course, is that the conditions for spelling out *-ju* are simply disjunctive: *-ju* occurs with class Y feminines ᴏʀ with class A stems regardless of gender. Alternatively, one might hope to avoid this disjunctive condition by treating *-ju* as the default for the inst.sg., but this will require that the stems having *-mь* can be characterized as a natural class. This appears impossible, because if, for example, *-mь* occurs in the [−feminine] stems, the masculines of class A will incorrectly receive *-mь* instead of *-ju*.[12]

As mentioned above, however, the status of class Y masculines and neuters (except those in *en) had already become tenuous in Old Russian, with evidence appearing quite early for a shift into class O. But at the same time, a very general conflation of the inst.sg. forms in *-mь* took place. In place of expected *(j)o-stem variants *-o(e)-mь* class O nouns in Old Russian quite frequently have the class Y variants *-ъ(ь)-mь* (Matthews 1960: 105–106), for example isg. *gněw-ъ-mь* m. 'anger', *otc-ь-mь* m. 'father', *čisl-ъ-mь* n. 'number' and *lož-ь-mь* n. 'bed' (Kiparsky 1967: 33). According to Kiparsky (1967: 32), this conflation is in fact so early and so extensive that it cannot even be determined with certainty that *-o-mь* and *-e-mь* were the original forms of the class O instr.sg. rather than artificialities due to Old Church Slavonic influence. Already in what is probably the oldest significant Old Russian text, *Ostromir's Gospel Book* (beginning of the 11th cent.), there are at least 100 occurrences of *o-stems with instr.sg. *-ъ-mь*, such as *glas-ъ-mь* 'voice' and *prorok-ъ-mь* 'prophet' (Sokolova 1962: 108). Indeed, on the basis of developments in Ukrainian and Russian dialects Kiparsky concludes that *-ь-mь* and *-ъ-mь* are probably the more archaic variants.[13] In any event, regardless of how early the replacement of the class O instr.sg. forms was, authorities appear to agree that the *i-stem variants *-ъ-mь* and *-ь-mь* were normal for class O nouns in Old Russian (Schmalstieg 1995, Možejko and Ignatenko 1978, Ivanov 1964: 281).

Let us suppose then that Kiparsky is correct that the *(j)o-stem form *-o(e)-mь* had been lost from Old Russian at an early date and reintroduced only later under the influence of Old Church Slavonic. The usual explanation for the

loss of *-o(e)-mь* is said to be 'analogy' to the *u-stems in particular: by analogy to the *u-stem nom.sg. *-ъ* and inst.sg. *-ъ-mъ*, the *o-stems, also having a nom.sg. in *-ъ*, develop *-ъ-mь* in place of *-o-mь* . But this view does not explain why neuter *o-stems should also be affected, since these have nom.sg. in *-o*, not *-ъ*; moreover it is not clear on this view why the inst.sg. changes, but the other forms of the *o-stems which have a thematic vowel, such as the dpl. *-o-mъ*, dat.loc. dual *-o-mi* and loc.pl. *-ě-xъ*, are able to resist changing under the influence of the *u-stem forms *-ъ-mъ, -ъ-mi* and *-ъ-xъ* respectively.

    Consider again however the underlying forms involved. If we are correct in supposing that the *o-stem nom.sg. has underlying *-o-ъ* surfacing as *-ъ* by prevocalic vowel deletion, it is equally reasonable to suppose that when *-ъ-mь* appears in the inst.sg. of *o-stems it derives from *-o-ъmь* by the same process. Put differently, the change involves a resegmentation of the inst.sg. desinence from *-mь*, with the preceding vowel being thematic and part of the stem, to *-ъ(ь)mь*, with the vowel now analyzed as part of the desinence:

(11)    stage                    *o-stems           *u-stems
        pre-Old Russian          о + мь             ъ + мъ
        early Old Russian        о + ъмь → ъмь      ъ + ъмь → ъмь

    If this is correct of course we must ask why the inst.sg. ending was resegmented but not the dat.pl., for example, giving rise to an *o-stem form **-ъmъ from underlying *-o-ъmъ* . I suggest that the answer to this question is in fact tied closely with the problem of the distribution of the *mь vs. *ju allomorphs of the instr.sg.

    At this juncture, an approach involving impoverishment presents itself. Specifically, once *-ъ(ь)mь* became the inst.sg. desinence not only for non-feminine class Y stems but also for class O, it then becomes the spell-out for the default inflectional class for masculine and neuter stems (as I will argue shortly), as required by the Interclass Syncretism Constraint. The impoverishment rule below provides the first step in mapping class Y stems to class O:

(12)   [class: Y] $\rightarrow$ $\varnothing$ $\Big/$ $\begin{bmatrix} -\text{fem} \\ \underline{\phantom{xxx}} \end{bmatrix}$ $+$ $\begin{bmatrix} \text{instr} \\ \text{sg} \end{bmatrix}$

    Rule (12) deletes the class value Y from masculine and neuter stems in the instrumental singular. This does not have the immediate effect of merging them with class O, but this further change will occur automatically through the gender-to-class redundancy rules, as shown below:

(13)   a.   [ +fem ] $\rightarrow$ [class: A]
       b.   [        ] $\rightarrow$ [class: O]

Because adjectives and demonstratives, which lack gender inherently, decline according to the class O pattern when masculine or neuter, but according to the class A pattern when feminine, I will assume that a rule such as (13) must be part of the grammar of Old Russian.[14] Examples have already been given above in (9) and (10), but the phenomenon can be seen even more clearly in the 'short' adjective declension, which mirrors that of the O and A classes directly, as shown in the following examples from modern Russian:

(14)  a.  Páp-a              gotóv-(ъ)
          daddy.MASC.A   ready-MASC.O
          'Daddy is ready.'

      b.  óčered-ь          dlinn-á
          line.FEM.Y       long-FEM.A
          'The line is long.'

As can be seen above, a short form adjective agrees in gender with the noun it is a predicate of, but does not necessarily agree in inflection class. Since adjectives obtain their gender by agreement they cannot have this property inherently; and because inflectional class depends on gender it cannot be inherent to adjectives either.

The gender-to-class redundancy rules in (13) supply the appropriate class values to adjectives after they obtain gender by syntactic agreement. In the same manner, a masculine or neuter inst.sg. noun impoverished for inflectional class by rule (12) will also be supplied with a default inflectional class, in this case, class O:

$$(15) \quad put + \begin{bmatrix} \text{inst} \\ \text{sg} \end{bmatrix} \qquad im\text{-}en + \begin{bmatrix} \text{inst} \\ \text{sg} \end{bmatrix}$$

$$\begin{bmatrix} -\text{fem} \\ +\text{masc} \\ \text{class: Y} \end{bmatrix} \qquad \begin{bmatrix} -\text{fem} \\ -\text{masc} \\ \text{class: Y} \end{bmatrix}$$

$$\begin{bmatrix} -\text{fem} \\ +\text{masc} \\ \text{class: } - \end{bmatrix} \qquad \begin{bmatrix} -\text{fem} \\ -\text{masc} \\ \text{class: } - \end{bmatrix} \qquad \text{Impoverishment (12)}$$

$$\begin{bmatrix} -\text{fem} \\ +\text{masc} \\ \text{class: O} \end{bmatrix} \qquad \begin{bmatrix} -\text{fem} \\ -\text{masc} \\ \text{class: O} \end{bmatrix} \qquad \text{Redundancy Rule (13b)}$$

The conditions on the spell-out of the inst.sg. are now considerably simplified:

(16)   *Instrumental Singular*

a.   $\begin{bmatrix} \text{inst} \\ \text{sg} \end{bmatrix} \leftrightarrow \textit{ъmь} \ (\sim \textit{ьmь}) \ \Big/ \ \textit{class: O}$

b.   $\begin{bmatrix} \text{inst} \\ \text{sg} \end{bmatrix} \leftrightarrow \textit{ju}$   (elsewhere)

The status of *-ju* as the default affix (and not 'feminine' per se) is further supported by the appearance of *-ju* in the inst.sg. of personal pronouns *mъno-ju* 'me', *tobo-ju* 'you,' and *sobo-ju* 'self'. These pronouns obviously cannot be inherently [+feminine] nor will they be assigned feminine gender by agreement.

Finally, the behavior of neuter *C-stems in the inst.sg. in Old Russian provides some interesting support for this idea. According to Kiparsky (1967: 68), neuters with stem extension *es appear to have lost this extension in the inst.sg. earlier than in other the cases. So *es*-less isg. forms such as *neb-otъ* 'sky', *drěw-otъ* 'tree', *slow-ъmь* 'word', *těl-ъmь* 'body' and *čjud-ъmь* 'miracle' are all known from as early as the 11th cent. Impoverishment offers a potential explanation for this peculiarity: if the stem-extension *-es-* can be inserted only for consonantal stems having the class value Y, then if rule (12) deletes Y, the forms without the extension are produced.

The impoverishment analysis of the inst.sg. syncretism has the advantage of explaining why only the inst.sg. in *-mь* changed for the *o-stems, while the dat.pl. in *-mъ* did not, even though these desinences differ only in the quality of their final vowel. In the dat.pl. all inflectional classes have *-mъ*; along with dpl. *stol-o-mъ* for a masc. of class O there is *žen-a-mъ* for a fem. of class A. The same generality is found for dat.loc. dual *-mi* and loc.pl. *-xъ*, which are the only other consonant-initial desinences appearing in class O where a change like that of the inst.pl. could have occured.

## 2.2.  The Instrumental Plural

Returning now to Table 2 one can see another anomalous pattern of allomorphy, this time in the inst.pl. (rightmost column of suffixes). There are two distinct expressions of this morpheme. In class O and also in the neuter stems of class Y the form *-y (-i)* is used, while in all other types one finds a form with desinential *-mi*. Again, the distribution of the special allomorph *-y (-i)* is disjunctive: it occurs in EITHER class O OR in neuters (of any class). This special suffix disappeared as a normal form in Russian by the end of the 17th cent., being

replaced by *-a-mi* in the general levelling of class distinctions in the plural. But numerous examples indicate that *-y* occured with neuter C-stems as well as with O-stems: ipl. *wrem-en-y* 'times' (12th cent.), *čud-es-y* 'miracles', *uč-es-y* 'eyes' (both mid-14th cent.), *pism-en-y* 'letters, characters' (c. 1400), *slow-es-y* 'words' (16th cent.) (Kiparsky 1967: 78). Old Church Slavonic has the same pattern, showing that this situation is fairly old (Lunt 2001).

The appearance of the class O ipl. *-y* in the neuter consonant stems is a second instance of inflectional class impoverishment:

$$(17) \quad [\text{class: Y}] \rightarrow \emptyset \ \Bigg/ \ \begin{bmatrix} -\text{fem} \\ -\text{masc} \\ \underline{\quad} \end{bmatrix} + \begin{bmatrix} \text{instr} \\ \text{pl} \end{bmatrix}$$

Again, once the class value Y is deleted from neuters in the instrumental plural, the gender-to-class redundancy rule (13) inserts the default class value O. The rules spelling out the instrumental plural desinence are then simply:

(18)   *Instrumental Plural*

    a. $\begin{bmatrix} \text{inst} \\ \text{pl} \end{bmatrix} \leftrightarrow y \ (\sim i) \ \Big/ \ \textit{class: O}$

    b. $\begin{bmatrix} \text{inst} \\ \text{pl} \end{bmatrix} \leftrightarrow mi$    (elsewhere)

As expected the default ipl. *-mi*, just like the default isg. *-ju*, occurs with the personal pronouns *na-mi* 'us', *wa-mi* 'you'. Because rule (17) is a generalization of rule (12) for the neuters (they undergo class impoverishment in both the singular and the plural) the appearance of *-y* for this small class is not an isolated phenomenon but rather is connected directly with the anomalous distribution *-mь ∼ ju* in the singular.

## 3. GREEK SUBSTANTIVES

A final illustration of the proposal can be taken from the substantival declension of Greek. I will begin with a general discussion of the situation in Attic in the 5th cent. BC, and then consider dialect differences as well as subsequent developments in the Koine.[15]

### 3.1. The Greek Declensional System

Greek nouns and adjectives are divided into two main classes, thematic stems (with an overt vocalic theme morpheme preceding the desinence proper) and athematic stems (lacking any overt theme). The thematic stems are further subdivided into *ā-stems (called here declension CLASS I) and *o-stems (declension CLASS II) by the principal expression of the theme morpheme. (Owing to sound change in Attic-Ionic, the *ā-stems frequently have a fronted theme *ē̄.[16]) These are to be distinguished from athematic stems, which comprise declension CLASS III:

(19)  a.  $\begin{bmatrix} +\text{thematic} \\ \text{class: I} \end{bmatrix}$ :   *ánem-o-s* m. 'wind', *pter-ó-n* n. 'wing'

   b.  $\begin{bmatrix} +\text{thematic} \\ \text{class: II} \end{bmatrix}$ :   *kepʰal-ḗ* f. 'head', *krit-ḗ-s* m. 'judge'

   c.  [−thematic]:   *klîmak-s* f. 'ladder', *tʰṓrāk-s* m. 'breastplate',
                                                 *stóma(t)-* n. 'mouth'[17]

   It will also be useful to introduce explicitly the morphosyntactic features by which I propose to define the case categories. The table below shows the values assigned to the cases for the proposed features [accusative], [vocative], [direct] and [genitive]:

(20)  | *case category* | [accusative] | [vocative] | [direct] | [genitive] |
|---|---|---|---|---|
| nominative | − | − | + | − |
| vocative | − | + | + | − |
| accusative | + | − | + | − |
| genitive | − | − | − | + |
| dative | − | − | − | − |

   The precise nature of these features is not of great importance to the present argument: any set of features might be substituted provided that they also define the DIRECT cases (nominative, vocative and accusative) as a natural class opposed to the OBLIQUE cases (genitive and dative), and within the [+direct] cases the nominative and vocative as a class [−accusative].
   Examples of the most typical patterns of inflectional endings are shown in Table 3 (Smyth 1920, Chantraine 1945).[18]

### 3.2. System of markedness for inflectional classes

As in Russian, adjective stems in Greek lack gender specifications in their stored form, receiving gender values through agreement, but unlike in Russian,

Greek adjectives can be inherently either [+thematic] or [−thematic]. Thematic adjectives when assigned masc. gender or neut. gender inflect like declension II nouns, but when assigned fem. gender inflect as declension I nouns. The grammar thus contains the inflection class assignment rules in (21), which map gender to a default inflectional class:

(21)  a. $\begin{bmatrix} +\text{thematic} \\ \text{fem} \end{bmatrix}$  →  [class: I]

      b. [+thematic]  →  [class: II]

These rules should be understood to be ordered with the more specific (21a) preceding the more general (21b), by normal assumptions. The effect of these rules can be stated in general terms as defining declension I as the default class for feminine thematic stems and declension II as the general default. This second rule will in practice apply to all non-feminine thematic stems, including adjectives assigned masculine or neuter gender syntactically.

Rule (21b) functions not only to assign gender to adjectives which lack inherent gender but in addition makes the specification [class: II] redundant for second declension stems which are inherently masculine or neuter. Moreover, because thematic substantives are the most numerous and productive type it is not unreasonable to postulate that [+thematic] is a default value as well:

(22)  [   ]  →  [+thematic]

Thus the stored forms of the stems in (19) require at most:[19]

(23)  a. *krit-* $\begin{bmatrix} \text{masc} \\ \text{class: I} \end{bmatrix}$

      b. *anem-* [masc]

      c. *pter-* [neut]

      d. *kepʰal-* [fem]

      e. *klīmak-* $\begin{bmatrix} -\text{thematic} \\ \text{fem} \end{bmatrix}$

      f. *tʰōrāk-* $\begin{bmatrix} -\text{thematic} \\ \text{masc} \end{bmatrix}$

      e. *stomat-* $\begin{bmatrix} -\text{thematic} \\ \text{neut} \end{bmatrix}$

The redundancy rules in (21, 22) are limited to filling in feature values and cannot change feature values already specified. Thus (21) will be unable to apply to an entry such as *krit-* which is underlyingly specified [class: I], but this stem will receive the default value [+thematic] by (22). No redundancy rule applies to *klūmak-*, *tʰōrāk* or *stomat-* since they are all [−thematic]. The remaining nouns *kepʰal-*, *anem-* and *pter-* are subject to both (21) and (22), becoming [+thematic] and receiving that declension class which is unmarked for their inherent gender, that is, class I for fem. and class II otherwise.

## 3.3. Adjectival Inflection

In adjectives the situation is the reverse of nouns: adjectives may be underlyingly specified for inflectional class, but not for gender. Among thematic adjectives there exists a subclass traditionally referred to as 'two-termination stems': these inflect as class II only, showing the 'masculine' forms even when agreeing with feminine nouns:

(24)

a. *two-termination thematic adjective*

agnôt-a          pʰōn-ề-n        bárbar-o-n        kektēménē
unknown-ACC.SG   speech-ACC.SG   foreign-ACC.SG    possess.PF.MID.PART
'possessed of an unknown and foreign speech'          Aesch. Ag. 1051

b. *three-termination thematic adjective*

katà    t-ề-n      Attik-ề-n       t-ề-n      palai-ằ-n      pʰōn-ḗ-n
in      the-ACC.SG  Attic-ACC.SG    the-ACC.SG  old-ACC.SG.    speech-ACC.SG
'in the old Attic pronunciation'                          Plato Crat. 398d

As shown in (24a) a two-termination thematic adjective such as *bárbar-o-s* 'barbarian, foreign' has a class II theme and desinence even when modifying a feminine class I noun such as *pʰōn-ḗ* 'voice, speech, language.' In (24b) the normal pattern generated by redundancy rule (21a) is shown with the three-termination thematic adjectives *Attik-ó-s* 'Attic' and *palai-ó-s* 'old, ancient'. To derive the behavior of these two-termination adjectives it suffices to assume that they have the inherent specification [class: II]. As such, they are exempt from the feature-filling effects of (21a) and can never decline as class I, even when assigned [fem] by agreement. In this way, it becomes clear that class II is not *per se* associated with masculine and neuter gender specifically; rather, class II is the default thematic class, as rule (21b) expresses directly.[20]

In addition to adjectives limited to class II, there also exist adjectives which inflect as athematic (class III) stems in the masc. and neut., but as class I when fem. One such type is stems in *-u-*, with f. *-ei-ă̆* (< m.n. *-(e)u., f. *-(e)u̯-i̯-ă̆) such as *glukú-s* 'sweet'. Singular forms are given below to illustrate:

(25)  *Mixed Class Adjective*: glukú-, glukéi-ă̆-

|          | masc. (neut.)  | fem.            |
|----------|----------------|-----------------|
| nom.sg.  | u-s (u-Ø)      | ei-a-Ø          |
| voc.sg.  | u-Ø            | ei-a-Ø          |
| acc.sg.  | u-n (u-Ø)      | ei-a-n          |
| dat.sg.  | eu̯-i [ei̯]     | ei-ā-ai [ei.āi̯] |
| gen.sg.  | eu̯-os [e.os]   | ei-ā-s          |

The mixed behavior of such adjectives can be derived straightforwardly by a rule impoverishing the value [−thematic] in the feminine:[21]

(26)  *Mixed Adjective Impoverishment*

$$[-\text{thematic}] \;\;\rightarrow\;\; \emptyset \;\Big/\; \begin{bmatrix} \text{fem} \\ \underline{\quad} \end{bmatrix} \; \textit{stems in *u, *en, *an, *nt}$$

Once rule (26) has applied, rules (22) and (21) supply the default inflectional class for a feminine stem unmarked for inflectional class. In this way *glukú-(s)* obtains the values [+thematic] and [class: II] in exactly the same manner as does a normal class II feminine noun stem such as *kepʰal-(-ḗ)* 'head', which also lacks inflectional class information in its underlying form (23d):

(27)        *kepʰal-*          *gluku-*

         [fem]          [−thematic]        underlying form

         [fem]          $\begin{bmatrix} \text{fem} \\ -\text{thematic} \end{bmatrix}$        agreement

         [fem]          [fem]          Impoverishment

$\begin{bmatrix} \text{fem} \\ +\text{thematic} \end{bmatrix}$   $\begin{bmatrix} \text{fem} \\ +\text{thematic} \end{bmatrix}$        rule (22)

$\begin{bmatrix} \text{fem} \\ +\text{thematic} \\ \text{class: I} \end{bmatrix}$   $\begin{bmatrix} \text{fem} \\ +\text{thematic} \\ \text{class: I} \end{bmatrix}$        rule (21)

### 3.4. Masculine *ā-stems

The masc. *ā-stems present a more restricted but perhaps more interesting instance of inflection class impoverishment. As can be seen in Table 3, a first declension masc. noun such as *krit-ḗ-s* differs from a fem. such as *kepʰal-ḗ* only

Table 3:  Greek Declensions

|          | $kep^hal\text{-}\acute{\bar{e}}$ I f. | $krit\text{-}\acute{\bar{e}}\text{-}s$ I m. | $\acute{a}nem\text{-}o\text{-}s$ II m. | $pter\text{-}\acute{o}\text{-}n$ II n. | $kl\hat{\imath}mak\text{-}s$ III m.f. | $st\acute{o}ma(t)\text{-}$ III n. |
|----------|------|------|------|------|------|------|
| nom.sg   | ē-Ø  | ē-s  | o-s  | o-n  | s    | Ø    |
| voc.     | ē-Ø  | a-Ø (∼ē-Ø) | e-Ø | o-n | Ø (∼s) | Ø |
| acc.     | ē-n  | ē-n  | o-n  | o-n  | a (∼n) | Ø  |
| gen.     | ē-s  | o-o [ọ̄] | o-o [ọ̄] | o-o [ọ̄] | os | os |
| dat.     | ē-ai [ēi] | ē-ai [ēi] | o-ai [ọ̄i̯] | o-ai [ọ̄i̯] | i | i |
| nom.voc.pl. | a-i | a-i | o-i | a | es | a |
| acc.     | a-es [ās] | a-es [ās] | o-es [ọ̄s] | a | as | a |
| gen.     | a-ōn [ōn] | a-ōn [ōn] | o-ōn [ōn] | o-ōn [ōn] | ōn | ōn |
| dat.     | a-is | a-is | o-is | o-is | si | si |

in the nom., voc. and gen.sg. The gen.sg. ending *-o-o* for the masc. noun is identical to that of declension II, and the nom.sg. *-ē-s* of the masc. noun differs from that of the fem. noun in having a final *-s* as in declensions II and III. The voc.sg. is also special in having the theme vowel *a* – in a subset of masc. forms – but the absence of any (overt) desinence here is equally characteristic of the other classes and so does not bear directly on the issue of mixed inflectional class.[22]

### 3.4.1.  *Genitive Singular in -ō*

The least interesting analysis of the distribution in Table 3 would treat the syncretism between the masculine first declension stems and declension II as simply accidental: noun stems must be memorized as belonging to one of the three types in (19), but the choice of allomorph in declension I would in some instances be determined by the gender feature of the stem. On this view, the sets of inflectional affixes assigned to each class are strictly non-overlapping, and the coincidence of *-o-o* in both declension I masc. nouns and declension II nouns is treated synchronically as a chance homophony, as is the appearance of final *-s* in the nom.sg. of both stem stypes (as well as in declension III non-neuters).

Given the system of inflection class markedness established above, how-ever, the inflection of the masc. *\*ā-stem* is not particularly surprising. Consider first the spell-out of the Theme morpheme:[23]

(28)  *Theme*
  a.  a  ↔  THEME  /  [class: I ]  +  ____  +  [+pl]
  b.  ē  ↔  THEME  /  [class: I]  +  ____
  c.  o  ↔  THEME  /  [class: II]  +  ____
  d.  Ø  ↔  THEME    *elsewhere*

In the gen.sg. declension I masculine stems inflect AS IF they were declension II stems; and by (21b) declension II is the default class for masculine thematic stems. Rule (28b) must not apply in, for example, gsg. *krit-ó-o* 'judge'; instead the theme *o*, which is normally restricted to declension II by rule (28c), must be inserted. This syncretism can be obtained in terms of impoverishment: if the underlyingly marked property [class: I] is deleted in the gen.sg. of masculine stems, they will no longer be subject to rule (28b):

(29) *Masculine class I Impoverishment*

$$[\text{class: I}] \rightarrow \varnothing \ \Big/ \ \begin{bmatrix} \text{masc} \\ \underline{\phantom{xxx}} \end{bmatrix} + \text{THEME} + \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix}$$

The redundancy rule (21b) applies to the output of (29) (just as it does to thematic adjectives which are assigned masculine gender in the syntax). The result is that in the gen.sg. all masc. thematic nouns have the default inflection for masc. thematic nouns, regardless of whether the noun in question is specially marked as belonging to declension class I or not.

As illustrated in Table 3, the gen.sg. desinence is spelled *-os* for class III (athematics), *-s* for class I, and *-o* elsewhere, that is, in class II:

(30) *Genitive Singular Desinences*

    a.  os  ↔  [+gen]  /  [class: III]  +  THEME  +  _____
    b.  s    ↔  [+gen]  /  [class: I]    +  THEME  +  _____
    c.  o    ↔  [+gen]    *elsewhere*

The rule of impoverishment prevents *s* from being inserted by rule (30b) because the feature [class: I] has been replaced by [class: II]. As a default for the gen.sg., rule (30c) inserts *-o* instead. An example derivation is shown below:

(31)

a.
$$\text{\textit{krit}} \quad + \text{THEME} + \text{DESINENCE}$$
$$\begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: I} \end{bmatrix} \qquad \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix}$$

b.
$$\text{\textit{krit}} \quad + \text{THEME} + \text{DESINENCE}$$
$$\begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: } - \end{bmatrix} \qquad \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix} \quad \text{Impoverishment (29)}$$

$$\text{c.} \quad \begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: II} \end{bmatrix} \qquad \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix} \quad \text{Redundancy Rule (21b)}$$

*krit* + THEME + DESINENCE

$$\text{d.} \quad \begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: II} \end{bmatrix} \qquad \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix} \quad \text{Spell-Out: (28c, 30c)}$$

*krit* + *o* + *o*

### 3.4.2. *Diachronic Perspective*

The historical genesis of the masc. *$\bar{a}$-stem impoverishment is of some interest, both as an explanation of how such a rule may arise diachronically as well as an illustration of dialect differences and the formal differences that the present approach imputes to such variation.

Historically the masc. *$\bar{a}$-stems are thought to have had the same gen.sg. as the fem. *$\bar{a}$-stems, but only a few remnants of masc.gen.sg. -$\bar{a}$-s survive in other dialects (principally North West Greek and Boeotian) as witnesses of the original declension (Chantraine (1945: 41), Buck (1928: 87), Szemerényi (1956: 195–96)). Obviously such an anterior grammar lacks the impoverishment rule (29) but in other relevant respects is isomorphic to the grammar already discussed.

In dialects other than Attic, -$\bar{a}$-s did not change to -*o*-*o* but to -$\bar{a}$-*o*. Szemerényi (1956) dates this change to the Mycenean period, with -$\bar{a}$-*o* resulting by regular sound change from *$\bar{a}$-i̯o, where *i̯o represents the desinence borrowed from the older class II gen.sg. form *o-i̯o ($>o$-*o* in Attic). The gen.sg. in -$\bar{a}$-*o* occurs abundantly as an Aeolic dialect form in Homer, as *in Atre.íd-$\bar{e}$-s* 'son of Atreus', gsg. *Atre.íd-$\bar{a}$-o* (Il. 1.7, 1.203), as well as contracted to -$\bar{a}$ in Doric.

So outside of Attic and perhaps as early as the Mycenean period, only the desinence -*o* ($<$*i̯o) spreads to the masc. forms, whereas the class I theme vowel -$\bar{a}$- is not replaced by the class II theme -*o*-.[24]

This change cannot be an impoverishment: if the feature [class: I] is deleted rule (28b) will not insert the proper theme vowel -$\bar{a}$-. So in order for the desinence -*o* to appear in such forms, the distribution of gen.sg. -*s* must have been specifically restricted to feminine stems. In other words, the other dialects

differ from Attic not only in lacking the impoverishment rule but also in requiring a slightly more complicated distribution of the *-s* genitive. The grammar of these dialects must contain the rule below in place of (30b) above:

(32)   $s \leftrightarrow [+\text{gen}] \ / \ \begin{bmatrix} \text{class: I} \\ \text{fem} \end{bmatrix} + \text{THEME} + \underline{\quad}$

Because rule (32) applies only when the stem is [fem], it will not apply to a masc. stem such as *Atre.íd-* m. 'son of Atreus.' The default gen.sg. desinence *-o* must be inserted instead (rule 30c).[25]

The Ionic dialect, which shows many common properties with Attic and is generally held to be part of the same dialect continuum, differs from the other dialects in having a general fronting rule *ā > ē, as well as so-called Quantitative Metathesis, whereby the second mora of *ē* is transferred to a following vowel in hiatus. Thus the outcome of what emerged in Aeolic as *-ā-o* is in Ionic *-e-ō*, the normal form in Herodotus (Rosén 1962: 60). Contraction of *-e-ō* to *-ō* in Attic produced a gen.sg. form differing very little from the class II ending *-ǭ* (Szemerényi 1956). However, although the two forms are indeed close phonetically, regular sound change could not have yielded *-ǭ* from *-ō*, so this final change in Attic must be due to a transfer from the class I masc. stems (Chantraine 1945: 42).[26] This confusion is the historical pre-condition for impoverishment (29), and provides an explanation for why such a specific and idiosyncratic rule should be present in the grammar of Attic.[27]

### 3.4.3. *Nominative Singular in -ē-s*

Let us now return to the nom.sg. of the masc. class I stems, which, unlike the fem. class I stems have a final desinence *-s*. This will provide an example of default spell-out rather than impoverishment.

I propose the following spell-out rules for desinences in the direct singular:

(33)   *Desinences*

   a.   $a \leftrightarrow \begin{bmatrix} +\text{accusative} \\ +\text{direct} \end{bmatrix} \ / \ \begin{bmatrix} \dots \text{C} \\ [-\text{thematic}] \end{bmatrix} + \text{THEME} + \underline{\quad}$

   b.   $\emptyset \leftrightarrow \begin{bmatrix} +\text{vocative} \\ -\text{accusative} \\ +\text{direct} \end{bmatrix}$ under specific phonological conditions[28]

   c.   $\emptyset \leftrightarrow \begin{bmatrix} -\text{accusative} \\ +\text{direct} \end{bmatrix} \ / \ \begin{bmatrix} \text{fem} \\ \text{class: I} \end{bmatrix} + \text{THEME} + \underline{\quad}$

   $s \ \leftrightarrow \begin{bmatrix} -\text{accusative} \\ +\text{direct} \end{bmatrix}$ (elsewhere)

d.  $\emptyset \leftrightarrow [+\text{direct}]$  $\Big/ \begin{bmatrix} \text{neuter} \\ -\text{thematic} \end{bmatrix} + \text{THEME} + \underline{\phantom{xx}}$

n  $\leftrightarrow [+\text{direct}]$      (elsewhere)

The theme of a masc.nom.sg. class I stem such as *krit-* is spelled *-ē-* by (28b), and then its desinence is subject to the elsewhere clause of spell-out rule (33c), which inserts *-s*. Crucially, the zero desinence of the fem. class I stems does not appear, because this desinence is inserted only on stems marked [fem].

As in the case of the Aeolic gen.sg. in *-ā-o*, here again we do not have inflection class mixture in virtue of impoverishment, but rather through the restriction on the conditions of allomorphy for a spell-out rule.

Some evidence suggests that the zero nom.sg. desinence was not always limited to fem. nouns in Greek. A number of inscriptions, chiefly Boeotian, preserve traces of a masc.nom.sg. in *-ā-Ø* in names such as *Mogé-ā*, *Olumpioník-ā*, *Nestíd-ā* and so forth; Szemerényi (1956) reconstructs this as the archaic form which was replaced by *-ās* in pre-Mycenean times. In such a grammar, (33c) simply lacks the feature [fem] and so the zero desinence occurs in masculines of class I.

The analysis of the mixed inflection of *kritḗ-s* proposed here requires that the desinence spell-out rules (33) treat the default realizations of the direct categories as *-s* and *-n*. The following sections introduce evidence in support of this idea.

### 3.4.4. Default -s

Consider first the distribution of the desinence *-s*. As we have seen, class I masculines have *-s* in the nom.sg. and so must be differentiated from feminines of class I with zero desinence. This *-s* cannot be specifically conditioned by [masc], since it also appears in class III, which includes masculine as well as feminine stems such as *klîmak-s* f. 'ladder'. Moreover, two-termination adjectives such as *bárbar-o-s* discussed above inflect with *-s* even when assigned [fem] by agreement. Finally, some class II nouns are in fact feminine, such as *pártʰen-o-s* 'maiden' or *nḗs-o-s* 'island', and others can be either masculine or feminine, such as *tʰe-ó-s* m. 'god', f. 'goddess.'

Likewise *-s* cannot be associated specifically with nominative case, since masc. and fem. class III stems ending in an obstruent have *-s* in the vocative as well (e.g. nom. or voc.sg. *pʰúlak-s* 'guard'). As a result *-s* must be a default affix conditioned by at most the features [−accusative] and [+direct].

### 3.4.5. Default -n

The pervasive pattern of direct case syncretism in neuter forms points to *-n* as

the default spell-out of [+direct]. As is typical of archaic Indo-European languages, neuter substantives never differentiate among the direct cases. This systematic syncretism motivates an impoverishment rule which deletes the contrast encoded by the feature [accusative]:

(34)   [α accusative] → Ø / [neuter] + THEME + _____

By deleting any value for [accusative] on a neuter stem, rule (34) prevents the application of (33b) (inserting a zero vocative desinence) as well as (33c) (inserting default *-s*), as both of these rules spell only desinences specifically marked [−accusative]. As shown in (33d), the desinence of a neuter stem in the direct cases is spelled *-n* if the stem is thematic (*pter-ó-n*), or -Ø if the stem is athematic (*stóma-Ø*). It is clear that *-n* cannot be specifically associated with the accusative, since *-n* also appears in the nominative (and vocative) of class I neuters: thus *-n* must be a default direct case desinence.

Moreoever, *-n* occurs as the default spell-out of acc.sg. in class III nouns. Rule (33a) introduces *-a* as the desinence for a non-neuter athematic stem ending in a nonsyllabic segment, as in *klímak-a* or *thórāk-a*. But default *-n* can be seen in barytone athematic stems ending in a (high) vowel or vocoid, such as asg. *póli-n* 'city' and *gráùn* 'old woman.'


## 3.5. Reanalysis of *es-stems

The variable treatment of masc. *es-stems, particularly in later Greek, presents further evidence in favor of default *-n*. The reanalysis of *es-stems as vowel-final will also illustrate a scenario in which heteroclitic inflection arises not from impoverishment explicitly but rather from reanalysis of underlying forms. Table 4 illustrates the behavior of (masc.) *es-stems as compared with masc. stems already considered.

Historically intervocalic *s underwent deletion by regular sound-change (Lejeune 1972). Although certain morphophonological alternations [s ∼ Ø] remained common in Attic, explicit evidence for a synchronic rule of s-deletion diminished over time. One important consequence is that stems in *-es were reanalyzed as vowel-final. As shown in column 'III m.' in Table 4, prior to reanalysis the final *-s* of such stems surfaced only in the nom.sg., voc.sg. and dat.pl. Crucially the nom.sg., which shows a morphophonological lengthening of stem-final *-es* to *-ēs*, is identical in surface form to the nom.sg. of class I masc. stems (column 'I m.').

Although the original acc.sg. in *-ea* (uncontracted) is the norm in the early Ionic dialect of Herodotus (Rosén 1962: 71), the replacement of the asg. *-ē ← -es-a* by *-ēn* began very early for nouns in Attic.[29] In Attic inscriptions, *-ē* is almost entirely absent from *es-stem nouns, and *-ēn* is certainly preponderant by the

Table 4:  Reanalysis of *es-stem

|          | I m.              | II m.           | III m.   | III m. *es                                      |
|----------|-------------------|-----------------|----------|-------------------------------------------------|
| nom.sg.  | ē-s               | o-s             | s        | ēs-s [ēs] ≫ ē-s                                 |
| voc.     | a-Ø ( ∼ē-Ø)       | e-Ø             | Ø ( ∼s)  | es-Ø ≫ e-s ∼ ē-Ø                                |
| acc.     | ē-n               | o-n             | a ( ∼n)  | es-a [ē] > e-a [ē], ≫ ē-n                        |
| gen.     | o-o [ǭ]           | o-o [ǭ]         | os       | es-os [ǭs] > e-os [ǭs] ≫ o-o [ǭ]                |
| dat.     | ē-ai [ēi̯]         | o-ai [ōi̯]       | i        | es-i [ei̯] > e-i, ≫ ? e-ai [ēi̯] ∼ e-i            |
|          |                   |                 |          |                                                 |
| nom.pl   | a-i               | o-i             | es       | es-es [ēs]                                       |
| acc.     | a-es [-ās]        | o-es [ǭs]       | as       | es-es [ēs]                                       |
| gen.pl   | a-ōn [ōn]         | o-ōn [ōn]       | ōn       | es-ōn [ōn]                                       |
| dat.pl   | a-is              | o-is            | si       | es-si [esi]                                      |

late 5th cent., becoming the only form in use by the 4th cent. with only a few dubious exceptions (Threatte 1996: 138 ff.). The textual tradition reflects this change, but less evenly, probably owing to artificial restoration of -*ē*.[30] But in many cases -*ēn* is clearly the norm, so while the gen.sg. of *Sōkrát-ēs* 'Socrates' is *Sōkrát-ōs* as expected for an *es-stem, Xenophon for example regularly has acc.sg. *Sōkrát-ēn*.

The change seems to have originated in proper names, which, lacking a plural inflection, had no dat.pl. in -*e(s)-si* to give evidence of stem-final -*s*. In contrast, adjectival *es-stems resisted the change until well past the Hellenistic period, although the originally deadjectival nouns *triḗr-ē-s* 'trireme' and *tetrḗr-ē-s* 'quadrireme' do vacillate in Attic inscriptions between the -*ēn* form and the -*ē* form (Chantraine 1945: 62), and the form in -*ē* may in many instances simply be an abbreviation (Threatte 1996: 174).[31]

The other cases were also affected, but neither as early nor as widely as the acc.sg. The change in dat.sg. forms is very difficult to evaluate because the diphthong *ēĭ* was monophthongized, perhaps as early as the early 4th cent. (Bubeník 1989: 214), and the orthographic confusion between *ei* [ē], *ēĭ*, and *ē* makes the interpretation of the written materials very hazardous (Threatte (1996: 138 ff.), Mayser (1926: 3, 39)). The phonological merger of front vowels continued so that by 250 BC, according to Teodorsson (1977: 252), *ēĭ* and *ē* had merged with *ī* as [ī] in Egyptian Koine.

One exception is that some evidence suggests that the merger of ē with ẹ̄ occured later in Asia Minor than elsewhere, perhaps being completed only in the first or second century AD (Bubeník 1989: 238). It is of some interest to note then that in Magnesian inscriptions, the spelling -*ē* is always used in dat.sg. of masc. *es-stems (Nachmanson 1904: 51–52), which may suggest an early replacement of this ending. In Lycian inscriptions -*ē* and -*ẹ̄* both occur, while the two examples known from Priene (both 1st cent. BC) have only -*ẹ̄* (Stein 1915:

113). However, in all three dialects the acc.sg. is always -ēn, except for one instance of -ē in Magnesia from the Roman era (Nachmanson 1904: 137). Therefore to the extent that we can discern a difference in the timing of the change, the evidence points to the acc.sg. changing first, and the dat.sg. only later.

Outside of the acc.sg. and possibly the dat.sg. in Asia Minor Koine, then, the principal witness to the change from class III to class I for the masc. *es-stems comes from the gen.sg., with older ōs ← o(s)-os being replaced by innovative ọ̄. In Attic, while asg. -ēn has replaced -ē nearly everywhere from the earliest inscriptions, gsg. -ọ̄ is rare before the later 4th cent. and cannot be said to be normal until at least 330 BC (Threatte 1996: 134). The same delay in the change of the gen.sg. can be seen (although less conclusively) in the dialects of the Koine spoken in Asia Minor and Ptolemaic Egypt, as shown in the table below. (Data for Priene from Stein (1915: 111–13) and for Attic from Threatte (1996: 138, 154), otherwise from the summary in Gignac (1981: 69). All data is from inscriptions except Egyptian, taken from papyri; * indicates uncertainty owing to phonological merger):

(35)  *Change in inflection of masc.* -es *stems*

|  | gen.sg. | dat.sg. | acc.sg. |
| --- | --- | --- | --- |
| Attica | -ọ̄ *usual* 330+ | * | -ēn *usual* 400+ |
| Pergamon | -ọ̄s (*offical lg.*) *varies* 250+ (*popular lg.*) | *not reported* | *varies* |
| Magnesia | -ọ̄  *usual* 200+ | -ē | -ēn (*late hapax* -ē) |
| Lycia | *varies* | *varies* | -ēn |
| Priene | -ọ̄ *usual* 200+ | -ē (2x) | -ēn |
| Ptolemaic Egypt | -ọ̄ *predominant* 200+ | * | -ēn (*sporadic* -ē) |

The data above show that the gen.sg. in -ọ̄ becomes the usual or predominant variant in Attica and in Egypt only after -ēn becomes the norm for the acc.sg. In Magnesia and Lycia variation is still seen in the gen.sg. while -ēn is the only acc.sg. form in use. The data from Pergamon are a little more complicated, but it suffices to note that while variation in the acc.sg. in always present, variation in the gen.sg. emerges only in non-official inscriptions and only in the mid 3rd cent.[32] We can conclude that in all these dialects, the acc.sg. changed first, the gen.sg. completing its change only later. The time of change for the dat.sg. remains uncertain owing to phonological merger, but the data from Magnesian inscriptions suggests an earlier change for the dat.sg. than for the gen.sg. at least in that dialect.[33]

This then appears to be a classic instance of borrowing by one inflectional class from another (Smyth 1920, Blass and Debrunner 1961, Gignac 1981), but seemingly not a borrowing from the default inflectional class. For we have already established that class I is not a default class for masculine stems; on the contrary, class II must be the default. For a masculine gender subclass of class III to borrow from class I, a default class only for feminines, appears to directly contravene the Interclass Syncretism Constraint. Nevertheless, once we examine more carefully the morphological system as a whole, it becomes clear that the appearance of acc.sg. *-ēn* in *es-stems is not a borrowing of *-ēn* as a whole from class I, but rather an extension of the independently required rule spelling out *-n* as the default desinence in the acc.sg.[34]

Consider first the precise nature of the reanalysis that *es-stems underwent. The basic premise is that the existence of underlying *-s* became opaque, leading the learner to postulate an underlying stem form lacking *-s*. If so, then the appearance of surface *-s* in the nom. and voc.sg. can no longer be due to an underlying *s* in the stem, but must instead be provided by the desinence. Thus:

(36)   a.   -ēs-s   ≫   -ē-s   nom.sg.
       b.   -es-Ø   ≫   -e-s   voc.sg.

The desinence *-s* of course is already present in the system as a default, so the learner has ample reason to postulate a desinential *-s* in these forms as well. The only other case-number combination in which historical *s surfaces is the dat.pl. in *e(s)-si*, but, as mentioned previously, the reanalysis that we are considering began with proper names which lacked a plural inflection.

The question that now arises is the morphological status of the pre-desinential vowel following the reanalysis in (36). The traditional view suggests indirectly that the predesinential vowel *-ē-* in the nom.sg. is identified directly with the theme vowel of the class I masc. nouns. This then leads to the borrowing of the acc.sg. in *-ēn* as a whole.

If this were indeed so, why was the acc.sg. the first to be affected? In other words, given only the reanalysis in (36a), all cases ought to be equally subject to replacement by the masc. class I inflections. The differences in susceptibility of the cases to replacement is not explained.

These shortcomings point towards an alternative analysis. The predesinential vowel *-ĕ-* in the *es-stems cannot immediately have been reanalyzed as an expression of the theme. Rather, I analyze the change in these stems in the simplest fashion possible: historical *s was dropped from the underlying forms of *es-stems, but these stems remained formally [−thematic]. In other words, the predesinential vowel was analyzed (at least initially) as part of the stem itself, and not as a theme. What was originally underlying *Sōkratěs-* simply became *Sōkratě-*.

Before explicating the advantages of such a view, I will first illustrate the expected consequences of this reanalysis. Consider first the situation as presented to the learner who has no s-deletion rule as part of his or her grammar. Prior to reanalysis the acc.sg. *-ē* is analytically ambiguous: its underlying source may be either *-e-a* or *-ē-a* or *-ē-Ø*, since all these yield surface [ē]. The alternation in the length of the stem-final vowel is therefore subject to one of the following two conditions:

(37)　a.　-ē- (nom. sg.), -ĕ- (elsewhere)　*or*
　　　b.　-ē- (nom. sg. and acc. sg.), -ĕ- (elsewhere)

The first alternative (37a) replicates the inherited stem allomorphy eventuating from Szemerényi's Law (Mayrhofer 1986). The second alternative (37b) is an innovation which will produce acc.sg. *-ēn* via the intermediate analysis *-ē-Ø*.

I will now establish that this innovation is a natural outcome of the loss of underlying *s and not the product of borrowing from another declension in any simple sense. First, recall that prior to loss of *s the acc.sg. is underlyingly *-es-a*, with the expected *-a* allomorph of the desinence after a consonant-final stem (33a), as in *klîmak-a*. Once *s is lost as an underlying segment, the *es-stems come to be vowel-final, and should not have *-a* but rather the default desinence *-n*.

Given that *-a* is deleted on the surface, the evidence for underlying desinential *-a* in acc.sg. *-ē* is in any case quite minimal. A reanalysis as *-ē-Ø* with zero desinence is just as reasonable as a complication of rule (33a) to idiosyncratically include stems in *-e*. The stem allomorphy rule (37a), which must be included in the grammar in any event, need then only change to (37b).

To make sense of this change in the rule of stem allomorphy we must look beyond the *es-stems to the inflection of other athematic stems at the time when the change originated (5th cent. BC). First, in (most) barytone athematic stems ending in a high vowel plus final coronal obstruent, such as *órnīt^h-* 'bird', a stem allomorphy rule had developed which deletes the final coronal in the sg. direct cases. This can be detected by the fact that they show acc.sg. in *-n*, as in *órnīn*, because *-n-* will be inserted only if the stem is vowel-final (cf. rules (33a) and (33d)). The stem allomorphy rule does not apply in the gen.dat.sg., in which case the underlying coronal surfaces, as in gsg. *órnīt^hos*. Oxytone coronal-final stems however do not undergo the alternation, hence gsg. *elpíd-os* 'hope', asg. *elpíd-a*. So in the surface pattern that the learner is presented with the nom. and acc.sg. stems of barytones are both vowel-final and both distinct from the gen.sg. stem, while in oxytones the acc.sg. stem does not differ from the gen.sg. stem.

The same pattern is seen in stems ending in diphthongs: barytones have matching stems in the nom.acc.sg. while oxytones do not (at least in surface forms);[35] similarly all barytone *i-stems and *u-stems have the same coincidence of nom. and acc. stem allomorphs. The table below summarizes the distribution:

(38)  Barytones in *-(ĕ̆)i̯-, -(ĕ̆)u̯, -ă̆w-, -I(T)-*

| type | nom.sg. | voc.sg. | acc.sg. | gen.sg. | dat.sg. | example |
|------|---------|---------|---------|---------|---------|---------|
| -(ĕ̆)i̯- | i-s | i-Ø | i-n | ēi̯-os [eōs] | ei̯-i [ei̯] | póli-s 'city' |
| -(ĕ̆)u̯- | u-s | u-Ø | u-n | ēu̯-os [eōs] | eu̯-i [ei̯] | pêkʰu-s 'forearm' |
| -au̯- | au̯-s | au̯-Ø | au̯-n | āu̯-os [ā.os] | āu̯-i [ā.i] | gráù̯-s 'old woman' |
| -I(T)- | I-s | I-Ø | I-n | IT-os | IT-i | órnī-s 'bird' |

(39)  Oxytones in *-ĕ̆́-, -ÍT-*

| type | nom.sg. | voc.sg. | acc.sg. | gen.sg. | dat.sg. | example |
|------|---------|---------|---------|---------|---------|---------|
| -ĕ̆́u̯- | éu̯-s | éū-Ø | é-ā | é-ōs | é-i | basiléu̯-s 'emperor' |
| -ÍT- | ÍT-s [Í-s] | ÍT-Ø [Í] | ÍT-a | ÍT-os | ÍT-i | elpí(d)-s 'hope' |

Returning to the *es-stems, it should now be clear why the innovated acc.sg. of *es-stems has a long predesinential vowel. The reason is *not* a wholesale borrowing of the class II theme vowel, as traditionally believed. Rather, the predesinential -*ē* is borrowed from the nom.sg. of the same inflectional class by a change in the stem allomorphy rule from (37a) to (37b) so as to conform to the pattern of other barytone vowel-final athematic stems as in (38), in which the acc. and nom.sg. have identical stem allomorphs.

Likewise, desinential -*n* is not borrowed from class II masc. stems *per se*, but is in fact simply the default desinence for the direct cases. One might equally well assert that desinential -*n* in the *es-stems was borrowed from pre-existing barytone athematic acc.sg. forms such as *póli-n* or *ōrnī-n*.

Finally, we can now explain why the gen.sg. does not change from *ōs ← e-os* to **-*ē-os*. This change would require long predesinential -*ē* to be extended to all the cases, not merely the [+direct] cases. But there is no pressure to do so, since allomorphy of stems conditioned by [±direct] remains abundantly visible to the learner in the behavior of other stem types. Only later, given the phonological merger of the two dat.sg. endings, the reanalysis of the gen.sg. as -*ǭ* signals a complete transfer into class I for these stems.

In Aeolic, which lacked the masc. *a-stem gen.sg. impoverishment rule, this transfer eventuated as expected in gen.sg. forms in -*ē-Ø* (gsg. -*Ø* < -*o*-) with the class II desinence but class I theme vowel (Lesbian gsg. *Tʰeogenē* 'Theogenes' (Chantraine 1945: 62)).

## 3.6.  Reanalysis of *ō-stems

A final argument for default -*n* comes from the reanalysis of athematic *ō-stems such as *ʰéᵣ̄ō-s* m. 'hero', usually assumed to originate from historical *ōu̯-stems.

Like *s, *u̯ was deleted intervocalically by regular sound change, so that while such stems originally ended in a high vocoid they came to be vowel-final in *-ō*:

(40)   Class II Stems in *ōu̯

| | |
|---|---|
| nom.voc.sg. | -ōu̯-s [-ōs] ≫ -ō-s |
| acc.sg. | -ōu̯-a [-ō.a] ≫ Hdt. -ō-n ~ -ō-a, Att. -ō |
| gen.sg. | -ōu̯-os [-ō.os] ≫ Att. -ō-o [-ō]) |
| dat.sg. | -ōu̯-i [-ō.i] > -ōi̯ |

Plural forms of such stems are consistently declined as class III stems, hence *hḗrōsi* (instead of a class II form such as **hḗrōis) is the only form of the dat.pl. in inscriptions and is normal in all classical texts.

Analysis of this change is vexed by a number of complications. First, the number of such stems in use in prose is very limited: aside from *hḗrō-s* 'hero' there are only *pátrō-s* 'father's brother' and *mḗtrō-s* 'mother's brother,' and all are quite rare after 300 BC. Second, our texts of Herodotus (mid-5th cent. BC) have some instances of acc.sg. in *-n*, but variants in *-a* also occur.[36] The asg. occurs once Attic inscriptions as *hḗrō*, but never as *hḗrō-n* (Threatte 1996: 268 ff.), and I know of no instances of *hḗrō-n* in Attic literary texts. Third, Herodotus does not reanalyze the gen.sg.; the two instances (6.69, 9.25) are both *hḗrō-os*. However, although the data is scant, it appears that *hḗrō* was the normal Attic form of the gen.sg., being attested four or five times in inscriptions, the earliest probably 5th cent. BC (and also from Demosthenes 19.248, mid-4th cent.) while artifically archaic *hḗrō-os* appears in inscriptions only from 350 BC, with most instances from over a century later (Threatte 1996: 270).[37]

For Herodotus – to the extent that our texts are reliable – we can attribute the innovative asg. *hḗrō-n*, *pátrō-n* to extension of the desinence *-n* just as in the masc. *es-stems. Because the gsg. remains unchanged, as well as the plural forms, there is no evidence for a shift in class membership. This provides further evidence for a default desinence *-n* for the direct cases.

In Attic the situation is more complicated. Threatte (1996: 269) concludes that prior to 350 BC *hḗrō-s* is truly heteroclitic in Attic, showing the class I gsg. in *-o* (← *-ō-o*) but the class III asg. in *-ō* ← *-ō-a*. This is unexpected, so it would seem, given that the acc.sg. in *-n* spreads to class III *es-stems much earlier than the gen.sg. in *-o*. But the Attic data are complicated by another change affecting class I nouns with Quantitative Metathesis, such as *nē-ó-s* → *neṓ-s* 'temple' (the so-called 'Attic declension'). On the authority of the grammarians such nouns are usually said to have asg. *-n*, as expected for class I: *neṓ-n*. But according to Threatte (1996: 39), in Attic inscriptions the acc.sg. with *-n* is 'poorly attested' for nouns of this type, while the acc.sg. without *-n* has eclipsed the older form by 350 BC, perhaps on the model of the s-stem asg. *héō* < *ḗe-os-a* 'dawn.' To this may be added a number of other instances of asg. *-a* (→ -Ø by contraction) after

final surface -*ō*: (1) the asg. *s-stem variants of class III n-stems such as *Apóllō* < *-os-a 'Apollo'; (2) comparative adjectives such as m.f. asg. *beltī̃-ō* < *-os-a 'better', always the normal form in early Attic inscriptions (Threatte 1996: 311); and (3) numerous feminine personal names in *ŏ̆i̯, occuring in inscriptions almost universally with asg. -*ó̄* ← *o-a* (Threatte 1996: 261). In all these forms the acc.sg. has -*a*, which was later reanalyzed as a zero desinence owing to its disappearance through surface contraction. The early extension of this n-less acc.sg. to even class I nouns such as *ne-ó̄-s* in the inscriptions shows that the asg. *hḗrō* was not in fact irregular; rather a new phonologically conditioned allomorphy had developed according to which stems in -*o* – whatever their historical source – conditioned acc.sg. in -*a* > -*Ø*.

   In sum, in Herodotus the asg. desinence -*n* appears sometimes in *ō̆u̯-stems, as we expect if -*n* is the default for the [+direct] cases and -*a* is limited to post-consonantal position. However, in Attic there is evidence that while -*n* remained the default desinence, -*a* or its zero reflex by contraction became the norm for stems in -*ō*, thus ousting -*n* from some class I stems (the 'Attic declension') as well as from *hḗrō*-.


## 4. CONCLUSION

A detailed comparison of the present approach and that of other studies cannot be offered here. However, before concluding it will be instructive to consider points of contact between the Interclass Syncretism Constraint proposed here and the NO BLUR PRINCIPLE of Carstairs-McCarthy (1994) and related work.


### 4.1. The No Blur Principle

The No Blur Principle requires every affix that expresses a particular group of morphosyntactic properties to be either a CLASS-IDENTIFIER or a general default for that group of properties. A class-identifying affix is limited to a single inflectional class (or subclass of that class determined by a property such as gender) and is therefore diagnostic of that class. Class-identifiers are very useful for learning a system of arbitrary inflectional classes, because whenever the learner encounters a novel stem with a class-identifying affix, the inflectional class of the stem can immediately be recognized. Returning to the Greek gen.sg., one can see below that the forms comply with No Blur because -*s* uniquely identifies feminines of class I, -*os* uniquely identifies class III, and -*o* is a general default.

(41)            I f.   I m.   II mfn.   III mfn.
      gen.sg.   s     o      o         os

On the analysis of the gen.sg. forms in this paper, the sharing of *-o* by class II and the masculine subclass of class I arises in two different ways depending on the dialect of Greek considered. Those dialects preserving *-ā-o* (or its reflex) for masculines of class I treat *-o* as the general default (30c); in this way the analysis converges with that required by No Blur. For Attic, however, I have proposed that masculines of class I are impoverished in the gen.sg. and thereby mapped to the default class for masculine stems, class II. In this case the Interclass Syncretism Constraint does not require that *-o* necessarily be a default affix (although it may be); *-o* may instead represent the spell-out of the default inflectional CLASS.

It is here that one important distinction emerges between No Blur and the Interclass Syncretism Constraint. The Old Russian instrumental plural provides a clear example of this difference:

(42)         *o mn.   *u m.   *ā mf.   *i mf.   *C mf.   *C n.
   inst.sg.  y         ъ-mi    a-mi     ь-mi     ь-mi     y

Because the desinence *-mi* is the general default for the Old Russian inst.pl., *-y* must be a class-identifier by No Blur. Yet because *-y* appears both for masc. and neut. *o-stems and for neut. *C-stems, it is not a class-identifier and so No Blur is violated.

The Interclass Syncretism Constraint, however, does not rule out this distribution because although *-y* is not the general default, it is the spell-out of the default inflectional class for neuters, that is, class O (the *o-stems). Imagine instead, for example, a different grammar in which the neuter *C-stems happen to syncretize only with an allomorph particular to the feminine *i-stems. Such a grammar would be equally in violation of No Blur, but would differ from actual Old Russian in also violating the ISC.[38]

From this example it can be seen that the ISC is more selective than No Blur, that is, it rules out fewer languages. Prima facie this might appear to suggest that the ISC is somehow otiose, given No Blur. In comparing the two approaches, however, it is essential to consider their differing theoretical status, and what precisely is meant by 'violation' of the constraint in each case.

No Blur is not intended to be an inviolable constraint on grammars per se; rather, it is an empirical claim about a strong tendency of patterning seen in the observed sample of languages. An explanation for this tendency is referred to general principles of learnability which shape the range of grammars which are most typically seen observationally (Carstairs-McCarthy 1998b). One consequence of this approach is that No Blur does not in fact categorically rule out any particular grammar; put simply, it is not intended as a constraint on grammars as generative devices. Thus, when speaking of a grammar which generates a language with a 'violation' of No Blur we are speaking of a grammar which, while formally possible, is unlikely to appear observationally. Put differently,

when evidence is sufficiently robust the learner can acquire a grammar which generates a moderate amount of blur, but because such an organization of inflectional classes is not supported by as much informational redundancy (in the form of class-identifiers) it should be more susceptible to change. In this way, it may be more felicitous to view No Blur as a kind of evaluator of markedness: grammars which produce violations of No Blur are unexpected, difficult to learn, and unstable historically.

The ISC on the other hand is not concerned with markedness or tendency; rather it follows automatically from a fundamental constraint on grammars as generative devices, namely the interaction of impoverishment and redundancy rules. In other words, the ISC does not restrict (extensional) languages directly, but rather indirectly by controlling the types of rule systems which are available for generating languages in the first place. Thus, among all possible surface structural descriptions evaluated as marked by No Blur, the ISC asserts that some are ungenerable while others are generable.[39]

So while No Blur and the Interclass Syncretism Constraint are both concerned with the distribution of defaults, they differ in important respects: the former represents an evaluation of markedness while the latter expresses the consquences of a formal restriction on grammars. Logically conceivable surface distributions can accordingly be divided into three categories: (a) generable and not contravening No Blur, (b) generable and contravening No Blur, and (c) ungenerable and (moreover) contravening No Blur. The contribution of No Blur is to divide (a) from (b, c), while that of the ISC is to divide (c) from (a, b). While a language in (b) represents a marked option, a language in (c) – to the extent that any occur at all – represents a truly exceptional state of affairs and invites carefuly scrutiny of the grammar involved.[40]

## 4.2. Closing Remarks

The examples discussed in this paper make clear that inflection class systems which show the effects of 'analogy', 'blur', or 'borrowing' by one class from another are quite heterogeneous. Among cases of true systematic mixed inflection, I have identified three types: phonologically-conditioned allomorphy, as in the Greek asg. *-n ∼ -a*; default spell-out, as in Aeolic Greek gsg. *-o*; and finally impoverishment, in which the borrowed affix need not be the general default, as in the Old Russian isg. *-mъ* or ipl. *-y*.

Finally I should again stress that the Interclass Syncretism Constraint is not an axiom of the theory, but follows automatically from the more general formal restriction that impoverishment rules can never insert feature values, although by deleting marked values they can permit independently required default rules to apply, moving a representation to a less marked state. To the extent that this

hypothesis can be maintained, it shows that even though inflection classes partition the vocabulary of a language arbitrarily, learners nevertheless extract from this partition a set of rules which define certain inflection classes as defaults and others as marked. These rules not only assign class to those morphemes which have none underlyingly (including adjectives in some languages) but also restrict the range of systematic homonymies across inflection classes.

## NOTES

[1]  The term *syncretism* is used here to denote identity of inflectional affixes, rather than coincidence of whole words, as occurs when two or more morphosyntactic categories show the same expression within an inflectional class, as in Latin *nautae* 'sailor', ambiguously gen.sg., dat.sg., nom.pl. or voc.pl.

[2]  Instances of the o-stem dpl. *déndrois* are not unknown in Attic and later Greek (Schmid 1964: 584), but are never very common.

[3]  In this paper I discuss only the partitioning of the vocabulary into classes based specifically on affixal allomorphy. Following Carstairs (1988) I will assume that allomorphy of affixes and that of stems form at least partly distinct subsystems in the morphology and that constraints on the distribution of the former do not necessarily carry over to the latter. See also Marantz (1993) and Noyer (1997) for discussion of the distinction between 'pieces' and stem readjustment rules.

[4]  I do not offer in the present paper any conjectures about the specific threshold of evidence required for the learner to postulate an inflectional class property, as distinct from a set of listed forms. However, I take it as fairly uncontroversial that a distinction does exist between facts which are encoded by rules referring to inflection class features and those which make reference to lists of items. The historical development and disintegration of inflection classes, as well as studies of learnability, may offer some evidence on this matter, but I leave such concerns aside for now.

[5]  The distinction between 'class-default affixes' and 'default classes' is also made explicit in, for example, Carstairs-McCarthy (1994).

[6]  Crucially, of course, it must be the case that classes II and III do not share some common featural property. In general I will assume that inflection classes are atomic, although non-class properties such as gender or phonological form may in some instances structure the set of inflectional classes; compare the discussion of 'macroclasses' in Carstairs (1988).

[7]  Gender and inflection class are often closely correlated, meaning that many stems do not require underlying specification for both properties. In such cases there are clearly two alternatives: either declension class is derived from underlying gender – as suggested here – or gender is derived from underlying declension class. Within the model of grammar assumed here, adjectives cannot have underlying gender; rather, they are assigned gender by syntactic agreement rules and are then (in the default instance) assigned to a declension class on that basis. Because such rules deriving declension class are thus independently required in the grammar, they are free to apply for nouns as well. A grammar in which gender is derived from inflection class for nouns would require additional rules and would be more complex. For this reason, rules deriving declension class from gender are typically postulated in DM analyses, as for example in Halle (1991, 1992) for Latvian and modern Russian and by Harris (1992,

1994, 1995) for Spanish and Catalan. Nevertheless, if different assumptions are made about the nature of adjectival agreement, the above argument loses some of its force. For example, Fraser and Corbett (1995) argue for formal rules in Russian which derive gender from declensional class.

[8]    Masculine adjectives in Gothic inflect as class O only when definite; the default class for indefinite adjectives is that of the earlier *n-stems. In addition, certain innovations have occurred in the declension of definite adjectives, but these do not affect the general point made here.

[9]    One might imagine a rule which makes class A the default inflectional class for masculine *nouns*, while still maintaining rule (6b) for masculine adjectives. But such a rule is clearly spurious inasmuch as no independent evidence exists in the grammar to support it; in particular one may note that in 'pseudo-Gothic' there are no masculine stems which inflect like class A feminines except those in class I.

[10]    For example, the consonantal stems are formed with a suffix such as *-en*, *-es*, *-er*, which is deleted in the nom.sg., hence: *kam-y* 'stone', *slow-o* 'word' and *mat-i* 'mother'. (Alternatively, as an anonymous reviewer points out, these suffixes could be treated as stem-extensions inserted by stem allomorphy rules in all cases except the nom.sg.) The *i/*u-stems have no such suffixes, although there are some instances of allomorphy of the theme itself (e.g. thematic *-ow-* in the nom.pl. of *u-stems). One possibility, then, is that the consonant-stem forming suffixes contain an additional diacritic property that singles them out as a 'special' species of yer-stem.

[11]    Masculine *ā-stems occur in other Indo-European languages, including Lithuanian (*dė̃d-ė* 'uncle', *vaidil-à* 'heathen priest') as well as Latin and Greek (see section 3), and are probably of pre-Slavic origin.

[12]As an anonymous reviewer has pointed out, the argument advanced here depends crucially on the assumption that disjunctive conditions of the type 'class Y feminines or class A stems' are to be avoided. Carstairs-McCarthy (1998a) however has proposed that certain types of disjunctive conditions are permitted while others are not; moreover, he argues that admitting such disjunctive descriptions renders the mechanism of impoverishment superfluous. There are in fact certain similarities between these approaches: both are designed to limit the types of affix distributions which are not natural classes. I leave a detailed comparison of these approaches for another occasion; for further details, see also Carstairs-McCarthy (2001).

[13]    This problem is all the more complicated by the fact that *ъ-mь* and *o-mь* have the same outcome in modern Russian, since *ъ* lowers to *-o-* when the following syllable contains a yer. The same is true for *-ь-mь* , *-e-mь* . Final *-mь* is replaced by *-mъ* beginning as early as the end of the 13th cent. (Matthews 1960: 163), giving the modern Russian form *o(e)-mъ* .

[14]    The relation of natural gender to semantic gender is also frequently an important source of informational redundancy. For example, Harris (1991: 51) includes in his analysis of Spanish a rule supplying the grammatical gender 'f' (feminine) to female humans in the default instance; for extensive discussion of the Slavic situation as well as that in other languages, see Corbett (1991).

[15]    The following coventions will be used for transcription of Greek vowels, where ambiguity may arise: $ε=e, o=o, η=\bar{e}, ω=\bar{o}$; the long tense mid vowels arising from contractions and spelled as diphthongs will be represented: $ει=\bar{e}$ *(← e + e)*, $ου=\bar{o}$ *(← o + o, e + o)*. The following contractions also arise by phonology: *e + a, a + e, a + ē* $(η)$*, o + a, a + o, a + ō → ō* $(ω)$. Vowels (unless part of a diphthong) that are marked with circumflex accent are to be understood as necessarily long.

[16] In Attic *ā has normally fronted to *ē* unless preceded by [a, i, r], with some exceptions. Class I stems with a fronted theme show a morphologically conditioned alternation in the theme vowel: *ē* in the singular and *a* in the plural.

[17] Final obstruents except *s* are deleted phonologically.

[18] Underlying *-es* in the apl. is historically *ns. By the 5th cent. in Attic the nasal origin of this suffix had become synchronically opaque; the learner was then free to reanalyze apl. *-ǭs* as arising from underlying *-o-es*. A distinct apl. in *-as* for class III stems continued in Attic in the classical period, but in Hellenistic Greek was eventually eliminated in favor of *-es*, the default plural for all declensions.

[19] Certain inessential details are set aside here. The stem *krit-* is very likely bipartite, consisting of the root *krĭ-* 'judge' followed by the nominalizing suffix *-t-(ē-s)*. Underlying indications of accent have also been suppressed.

[20] Compound adjectives such as *á-log-o-s* 'not-rational', i.e. 'irrational,' are nearly always two-termination adjectives. The manner in which this generalization is expressed in the grammar is not clear, but presumably the inherent specification of class II is supplied in the derivation of the compound stem.

[21] Historically adjectives of this type did not have specific fem. forms. The corresponding *i- and *u-stems of Sanskrit show clear evidence of having innovated a specialized feminine form (Mayrhofer 1978: 38); the Greek fem.adj. stem was derived by the class I suffix *-i̯(-ā)-; loss of *u̯ in *-eu̯-i̯-ā- led to the Attic situation in which the fem. has stem allomorph in *-ęi-*. Suffixation of *-i̯-ā to stems in *nt (some participles and a small set of adjectives) yielded a pattern of stem alternation with the same distribution as in (25).

[22] The voc.sg. ending *-ă-Ø* occurs with (1) masc. class I stems which otherwise retain theme *-ā* in the singular; (2) compound stems; and (3) stems formed with the nominalizing suffix *-t-(ē-s)*, including *kritḗs* (Smyth 1920: 52). Otherwise, the voc.sg. is either identical to the nominative or, for certain athematic nouns, the same as the 'bare stem', i.e. the stem followed by desinence *-Ø*. (See footnote 28 for details.) Neuter stems of class II have voc.sg. *-n*, owing to a general syncretism of all direct cases. (This rule deletes the values of [accusative] and [vocative] in neuters, with the result that they exhibit an identical form for all the [+direct] cases.)

[23] In a fuller treatment, the vocative theme *a* in certain class I masculines presents an exception to the rules in (28); see also fn. 22. The voc.sg. of such stems exhibits a shortened theme vowel; when *ā > Att. *ē* the alternation *ă ∼ ē* resulted. Either a special voc.sg. theme *-a-* must be introduced into (28) or else the synchronic phonology must include a fronting rule [ā]→[ē] applying after a morphophonological shortening of the theme vowel in the voc.sg. The choice among the various synchronic analyses that might be offered does not however bear on our central concern here.

[24] According to Szemerényi (1956: 200) the older gen.sg. in *-ā-s* is a relic of the language of the 'post-Mycenean invaders' who eventually adopted the innovative Mycenean *-ā-o*.

[25] Of course, this rule is not impossible in Attic as well, it is simply that the restriction of *-s* to [fem] is not required given the rule of impoverishment. Interestingly, as Seiler (1958: 52 ff.) shows, beginning in the Roman period *-s* came to be reanalyzed as the gen.sg. of feminines in general, while zero became the marker of masculines. Thus there emerged gen.sg. forms in *-ē-Ø* for masc. *ā-stems with nsg. *-ēs*, such as *Pasikrát-ē* (Roman period), while new fem. gsg. forms with *-s* are also encountered in the later Roman period. In Modern Greek this became the norm: nsg. *fíl-o-s* m. 'friend', gsg. *fíl-u*, but nsg. *mitér-a* f. 'mother', gsg. *mitér-a-s*.

[26] I would like to thank Don Ringe for pointing out the relevance of the Ionic form.

[27] The inflection of masculine foreign names in *-ās* is frequently seen with *-ā* as a Doricism

in later Attic, but as Threatte (1996: 82–83) makes clear, prior to 150 BC when such names became more common among Athenians the norm in Attic inscriptions is -*ǭ* even for foreign names.

[28] An anonymous reviewer objects to the presence of three zero affixes in the spell-out rules for the direct case desinences, in particular, the Ø suffix of the vocative. The alternative is to view Ø as the default desinence, a move which is impossible on the current analysis, which requires that -*n* be the default [+direct] desinence.

However, I find further evidence in favor of a special Ø suffix for the vocative. Aside from neuters, whose vocative is never distinct (see footnote 22), and participles, which never have a specific vocative form, the conditions for the -Ø ∼ -*s* allomorphy in the vocative are largely phonological, with a few exceptions. The -Ø desinence occurs in a particular set of environments, while the -*s* desinence for the voc.sg. occurs elsewhere. Specifically, 'bare stem' or -Ø vocative occurs (1) after [−cons] segments, including (a) all thematic stems and (b) athematic stems ending in high vocoids (-*i, -u*), such as *póli-* 'city', *basileû-* 'king', *ikʰtʰû-* 'fish', *Sappʰoî-* 'Sappho' (except for monosyllabic stems ending in -*ī̄*: *kî̄* 'weevil'), and (2) for four other classes of athematic nouns, as follows: A. Barytone stems ending in a short vowel plus sonorant consonant, e.g., *rʰêtor-* 'rhetor', *daîmon-* 'spirit', *tálan-* 'suffering', *mákar-* 'blessed', *ékʰtʰion-* 'hostile'; and, exceptionally, in four oxytone stems of the same shape and three stems ending in a long vowel plus sonorant (with shortening of the vowel in the voc.sg.). All these exceptions become barytone in the voc.sg.: *patḗr, pâter* (nom., voc.) 'father', *anḗr, áner* 'man', *dāḗr, dâer* 'brother-in-law', *Poseidôn, Póseidon* 'Poseidon', *Apóllōn, Ápollon* 'Apollo', *sotḗr, sôter* 'savior'. B. Stems ending in -*iT* (T = a coronal obstruent), including: (a) oxytone stems in -*íT* (underlying stem in parentheses): *turanní* (*turanníd-*) 'monarchy', *elpí* (*eplíd-*) 'hope', *paî* (*paid-*) 'slave, boy'; and (b) barytone stems in -*iT*, where the stem-final consonant is deleted by a general stem allomorphy rule in the direct cases of the singular: *Ártemi-* 'Artemis' (cf. acc.sg. *Ártemi-n*, but oblique stem *Artemid-*); similarly, *neâni-* (*neānid-*) 'maiden', *órnī* (*órnū̄tʰ-*) 'bird'. C. Barytone stems ending in sonorant plus coronal obstruent (in practice -*nt*, -*rt*). The final coronal is deleted word-finally: *géron* (*géront-*) 'old man', *Aîan* (*Aiant-*) 'Ajax', *kʰaríen* (*kʰarient-*) 'graceful, beautiful', *dámar* (*damart-*) 'lady, wife' (voc. sg. at Eur. Hipp. 339). D. Stems in -*es*: *Sṓkrates-* 'Socrates', *alētʰés-* 'true'.

The voc.sg. is identical to the nominative in all remaining cases: 1. Stems ending in a long vowel plus sonorant: *tʰḗr* (< *tʰḗr-s*) 'beast', *Salamî̄-s* (< *Salamî̄n-s*) 'Salamis'. 2. Oxytone stems ending in a short vowel plus sonorant: *poimḗn* (*poimén-*) 'shepherd'. 3. Stems ending in -*VT*, where V is any vowel except *i* and T is a coronal obstruent (voc. examples where V = *u* are unattested): *tʰḗ-s* (*tʰḗt-*) 'serf', *érō-s* (*erōt-*) 'love' (voc. at Plat. Phaed. 257a), *pʰṓ-s* (*pʰōt-*) 'man', *pṓs* (*pod-*) 'foot'. 4. Stems ending in non-coronal obstruents, i.e. (a) labial obstruents, *klṓp-s* 'thief', and (b) dorsal obstruents, *sark-s* 'flesh', *aík-s* (*aig-*) 'goat'. (Exception: occasionally in poetry *ána* 'lord' voc.sg., cf. nom.sg. *ának-s*.) 5. Oxytone stems ending in a sonorant plus coronal obstruent: *odṓs* (*odónt-*) 'tooth'.

Note that of the 'remaining cases' all are clearly 'elsewhere' in nature. Conditions 1 and 2 represent the class of stems ending in a sonorant consonant once the more specific set in A is removed. Likewise, conditions 3 and 4 refer to stems which are not covered by the more specific conditions B, C and D for the -Ø desinence. If the -Ø vocative is not treated as a special case, but rather construed as exhibiting the default lack of -*s*, then the (elsewhere) -*s* vocatives must be picked out specifically in order to be impoverished into the nominative (by deletion of [+vocative], for example). On the present analysis, the opposite holds: the bare

stem vocatives are picked out as the special class, while the remaining vocatives automatically obtain the default [−accusative+direct] desinence *-s.*

[29]  Rosén (1962: 71–74) discusses in some detail a group of masculine *\*ā-stems which in Herodotus vaccilate between declension in class I and declension in class III, e.g. *Pérs-ē-s* '(a) Persian', *akinák-ēs* 'type of Persian sword.' By undergoing a transfer into class III, a non-default class, such forms appear to counterexemplify the Interclass Syncretism Constraint. However, this is a sporadic change, largely confined to Herodotus and not attested in all manuscripts. For the Attic dialect, Threatte (1996: 23) shows that almost all transfers into class III of this type are based on misinterpretations of the epigraphic evidence.

[30]  In the Roman period there was considerable confusion about the 'correct' acc.sg. form for the *\*es-stems. Schmid (1964: 582–83) observes that among the Atticizing writers of the 2nd cent. AD, Flavius Philostratus, Dio Chrysostomus and Lucian almost always use *-ēn.* But second century grammarians were not sure which form was truly Attic, and Aristides, Strabo (except once) and Polybius always use *-ē.* Still later grammarians surmised that *-ēn* was properly Attic. Under such circumstances corruption of the texts must have been nearly inevitable.

[31]  Schwyzer (1900: 256) notes six instances of asg. *-ē* in Attic defixiones dating up to 200 BC, as against four instances of *-ēn.* But Threatte (1996: 174–75) concludes that nearly all of these involve abbreviatory absence of final *-n,* as Schwyzer had originally surmised.

[32]  See Bubeník (1989: 247–48) for discussion of the Atticizing influence on the royal chancellery at Pergamon. Magnesian documents do not in general contain Atticisms. Bubeník suggests that the influence of literary Attic was also greater on the Koine of Pergamon than on the Koine of Magnesia. In this regard it is interesting to note that the first example of gsg. *-ǭ* in Magnesia, from the 4th cent. BC Nachmanson (1904: 136), predates the first in Pergamon by over a century.

[33]  For Attic Threatte (1996: 173) hesitates to make a firm conclusion for the dat.sg. change, but does note that *-ēi* is attested in two inscriptions from ca. 400–410, perhaps indicating an early change for the dat.sg. as well as for the acc.sg. But other data are contradictory and ambiguous inasmuch as *ēi* is sometimes written for *ei* = [ẹ̄] in general, so no firm conclusion can be drawn.

[34]  This point of view is also adopted by Seiler (1958: 49 ff.), who also discusses the extension of *-n* to class III forms already marked for acc.sg. by *-a,* as in *ándr-a-n* 'man'; cf. also Rix (1976: 152). But such forms are on the whole much later, and common in Attic only in the later Roman period. They signal the final breakdown of the thematic/athematic distinction and are outside the scope of discussion here.

[35]  Stems in *-ḗu̯-* such as *basiléu̯-s* 'emperor' have Quantitative Metathesis in the gen.sg. and acc.sg., hence asg. *basiléu̯-a* 'king' surfaces as [basiléā], while in the nom.sg. they undergo closed syllable shortening before coda *-s* but retain the underlying glide.

[36]  The forms from Herodotus are: *ʰḗrō-a* 2.143, 6.69, but *ʰḗrō-n* 1.167; *pátrō-n* 4.76, 9.78; *mḗtrō-a* 4.80.

[37]  Writers of the Roman period normally have gsg. *ʰḗrō-os,* e.g. Strabo Geog. 6.3.2, 6.3.9, 10.1.3, 10.3.6 (late 1st cent. BC to early 1st cent. AD), Plutarch Thes. 26.5 (early 2nd cent. AD). Pausanias (c. 150 AD) has both forms of the gen.sg., *ʰḗrō* (10.4.10), but *ʰḗrōos* (1.3.1).

[38]  By the same token, the Old Russian inst.sg. desinences also violate No Blur: neither *-(ъ)mь* nor *-ju* is a class identifier, and neither has the surface distribution of a general default.

As explained in section 2.1, however, this pattern is entirely consistent with the ISC because *-(ъ)mь* is the allomorph of the default class for masculines.

[39]   The term 'structural description' is included here intentionally. Clearly any surface pattern whatsoever within a finite system can be generated simply by listing; even to compare the predictions of No Blur and the ISC one must make certain assumptions as to structural description, such as for example whether two affixes are to be construed as accidentally or systematically homophonous.

[40]   An anonymous reviewer has drawn my attention to an interesting potential example of type (c) in the inflection of dual direct case forms in Vedic and classical Sanskrit (Mayrhofer 1978). Leaving inessential details aside, we can divide Vedic noun stems into three basic classes much as in Old Russian: historical *o-stems, (non-root) *ā-stems, and athematics, consisting of *i/*u-stems and the remaining athematics:

|          | *o masc.        | *o neut.       | *ā fem.       | *i/*u m.f. | *i/*u neut. | athematic m.f.   | athematic neut.    |
|----------|-----------------|----------------|---------------|------------|-------------|------------------|--------------------|
| nom.sg.  | *-a-s*          | *-a-m*         | *-ā-Ø*        | *-s*       | *-Ø*        | *-s ∼ -Ø*        | *-Ø*               |
| dir. dual| *-āu < -a-āu*   | *-e < -a-iH*   | *-e < -ā-iH*  | *-V*       | *-iH*       | *-āu*            | *-ī < -iH*         |

First it should be observed that this pattern violates No Blur, since the desinence *-iH* along with neuter gender is not a class-identifier (such a stem could be either athematic or an *o-stem), implying that *-iH* must be the default. Yet desinence *-āu* along with masculine gender is also not a class-identifier (such a stem could also be either athematic or an *o-stem).

The peculiarity of this pattern appears to lie with the dual *-iH* of the (feminine) ā-stems, which in all respects appears to be the same as that of the neuters in general (that is, both *o-stem and athematic neuters). There appears to be a violation of the ISC: *-iH* of the feminine *ā-stems is not a general default (provided that *-āu* is the default); moreover *-iH* does not express the dual in the default class for feminines, provided that this class is the athematics.

On the other hand, the problematic distribution can instead be approached by asking not "why do the feminine *ā-stems share dual *-iH* with the neuters?" but rather "why do the feminine athematics share *-āu* with the masculines?" Here the historical development of the Vedic pattern becomes quite relevant. It is commonly assumed that early Proto-Indo-European did not have a three-way inflectional opposition for nominal gender; rather, the original system opposed masculine and feminine on the one hand and neuter on the other (Brugmann 1897, 1904). This state of affairs is reflected in later attested languages such as Greek in which masculine and feminine athematics decline alike. (Where differences do exist, as in for example the Vedic *i-stems, they represent an innovation.) Specific feminine FORMS produced by suffixation of *-eh₂ (> -ā) originally denoted various abstractions and were formally similar or identical to neuter collectives also in *-eh₂ (> Ved. neut. nom.acc. pl. -ā), which, while originally agreeing as singulars, ultimately came to represent the plurals of neuter *o-stems. Although precise details of the development remain uncertain, the appearance of dual *-iH* for both these stems types surely reflects this earlier more intimate connection between the stem types.

Suppose then that *-iH* is not specifically a neuter dual desinence per se, but rather a [−masculine] dual desinence. On this view, the problematic case is the unexpected appearance of *-āu* in the feminine athematics (and *-V* in the feminine *i/*u-stems) Here the archaic lack of opposition between masculine and feminine in the athematics survives. Grammatically this can be expressed by impoverishing [masculine] in the dual of athematic stems, leaving only

the opposition between neuter and non-neuters. The following spell-out rules complete the analysis:

(1)   a.   *iH*   ↔   [dual]   /   [−masculine]   +   ____
       b.   *V*   ↔   [dual]   /   *i- and u-stems*   +   ___
       c.   *āu*   ↔   [dual]   /   *elsewhere*

Feminine ā-stems, on this view, inflect with dual *-iH* because such stems are in fact opposed to masculine thematics and in this sense merit the value [−masculine]. The athematic feminines – in the dual at least, and originally everywhere – are not formally opposed to the masculines, and have their value for [masculine] deleted; they then escape insertion of *-iH* and receive the default dual desinence *-V* or *-āu* instead.

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