

# Russian nominal declension revisited

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## 1. Introduction

Directional syncretism is a type of syncretism where it seems that one member of the syncretic pair has taken over the form of the other member (Carstairs 1987, Stump 2001). There are two basic strategies in the literature to derive this phenomenon. In paradigm-based approaches of morphology it is generally handled by means of directional rules, most commonly implemented as rules of referral (Zwicky 1985), that for a given context instruct the system to use the form that it would output for another context (Stump 1993, 2001, Baerman 2004, Baerman et al. 2005). In syntactico-centric theories, like Distributed Morphology (DM, Halle & Marantz 1993, 1994), it is treated as the result of the manipulation of feature bundles. Commonly, this is achieved by impoverishment rules that delete features from a given feature bundle thereby leading to the insertion of a less-specific more underspecified exponent, as so-called ‘retreat to the general case’ (Bonet 1991, Noyer 1998, Bobaljik 2002). Directional rules are less restricted and therefore more powerful than standard impoverishment rules. They can effectively equate any two cells in a paradigm whereas standard impoverishment only deletes features. All else being equal, an approach that eschews these rules is therefore preferred because it is more restrictive (Noyer 1998, Bobaljik 2002). It has, however, been argued that cases of bidirectional syncretism, where there are two take-overs in opposite directions, cannot be handled by impoverishment and underspecification, and therefore require the power of directional rules (Stump 2001, Baerman 2004, Baerman et al. 2005, Spencer 2019).

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\*Many thanks to Gereon, who through his work on syncretism and inflection classes (I recall ICE-T being a hot topic back in 2007) sparked in me an enduring interest in morphological systems and whose various different approaches to the topic have shaped my thinking about morphology. Herzlichen Glückwunsch zum Geburtstag!

One much discussed instance of bidirectional syncretism is found in the Russian nominal declension, where the accusative takes the form of the nominative with inanimate nouns but borrows the form of the genitive with animates. In his DM analysis of Russian declension, Müller (2004a) indeed adopts rules of referral to account for this particular syncretism pattern, thereby lending support to these claims.

Recently, however, Hein & Murphy (2023a,b) have shown that bidirectional syncretisms can be handled by impoverishment, if one adopts a proposal by Noyer (1998). He suggests that impoverishment may trigger so-called redundancy rules which insert the unmarked value of the deleted feature if the latter has had the marked value. Crucially, they do not insert marked features, or re-insert unmarked features once deleted. This allows impoverishment to have two outcomes: deletion of a feature or change of a marked into an unmarked feature. As discussed by Hein & Murphy (2023a,b) this can capture bidirectional syncretisms while retaining at least some of the original restrictiveness of impoverishment. While directional rules can effect any feature change, impoverishment plus redundancy rules may only lead to a change towards a lesser marked feature combination.

In what follows, I will revisit the DM analysis of Russian presented in Müller (2004a,b) and apply Hein & Murphy's rationale to the bidirectional syncretisms showing that rules of referral are not required. This will allow for considerable changes in the analysis that avoid some controversial issues of the original analysis. In a second step, as Noyer-type feature-changing is required to capture bidirectional syncretisms in DM anyway, I will demonstrate that by exploiting it to the fullest it is possible to resolve all syncretisms and a modularity issue pertaining to the encoding of inflection class as morpho-syntactic features.

## **2. Müller's (2004a,b) DM analysis of the Russian declension**

Russian nominal inflection shows a number of syncretisms both within and across inflection classes. For this reason it has early on and recurrently attracted the attention of researchers interested in this phenomenon (e.g. Jakobson 1962, Comrie 1991, Corbett & Fraser 1993, Stump 1993, 2001, Aronoff 1994, Halle 1994, Wiese 2004, Müller 2004a,b, Caha 2009, 2021). Focussing on the core system one can distinguish four inflection classes

(Karcevskij 1932, Timberlake 2004). Although these clearly correlate with gender, none of the two can be entirely predicted by the other (Privizentseva 2023). Generally, class I contains only masculine nouns, while class III contains only feminine nouns (abstracting away from the very few exceptions). All and only neuter nouns are found in class IV. Class II, though mainly made up of feminine nouns, also contains some masculines. One salient feature of Russian nominal inflection is the differential marking of the accusative in the plural and in class I singular. While it takes the form of the nominative for inanimates, it borrows the form of the genitive for nouns with animate referents (indicated by the arrows). This pattern constitutes an instance of convergent bidirectional syncretism (Stump 1993, 2001, Baerman 2004). In this paper, the inanimate form will always be presented first, i.e. on the left, and the animate form last, i.e. on the right. Abstracting away from regular morphophonological alternations (see Müller 2004a, §2) the inflectional suffixes and two representative stems for each inflection class are given in (1). Note that this representation diverges from the one in Müller (2004a,b): following McCreight & Chvany (1991), Johnston (1996), Caha (2009) I will use the term ‘prepositional’ instead of ‘locative’ for the case that appears after prepositions and place it between genitive and dative in the sequence of cases.

(1) *Russian nominal inflection*

	I	II	III	IV
	<i>zavod</i> ‘factory’	<i>komnat</i> ‘room’	<i>myš’j</i> ‘mouse’	<i>mest</i> ‘place’
	<i>žitel</i> ‘inhabitant’	<i>mužč’in</i> ‘man’	<i>doč’j</i> ‘daughter’	<i>suščestv</i> ‘creature’
<b>Singular</b>				
NOMINATIVE	-∅	-a	-∅	-o
ACCUSATIVE	↙ -∅/-a ↘	-u	-∅	-o
GENITIVE	-a ↘	-i	-i	-a
PREPOSITIONAL	-e	-e	-i	-e
DATIVE	-u	-e	-i	-u
INSTRUMENTAL	-om	-oj	-ju	-om
<b>Plural</b>				
NOMINATIVE	↙ -i ↘	↙ -i ↘	↙ -i ↘	↙ -a ↘
ACCUSATIVE	↙ -i/-ov ↘	↙ -i/-∅ ↘	↙ -i/ov ↘	↙ -i/-∅ ↘
GENITIVE	-ov ↘	-∅ ↘	-ov ↘	-∅ ↘
PREPOSITIONAL	-ax	-ax	-ax	-ax
DATIVE	-am	-am	-am	-am
INSTRUMENTAL	-ami	-ami	-ami	-ami

In DM, syncretism is typically resolved by decomposing inflectional categories into smaller sub-features (Jakobson 1962, Bierwisch 1967) and underspecification of inflectional markers. Following Bierwisch (1967) and Wiese (1999, 2001), Müller (2004a,b) adopts three syntactically-based binary features,  $[\pm\text{sub}(\text{ject})]$ ,  $[\pm\text{gov}(\text{erned})]$  and  $[\pm\text{obl}(\text{ique})]$ , for the decomposition of Russian cases in (2). Müller (2004a,b) argues that the same approach is available for transparadigmatic (i.e. class) syncretism by decomposing inflection class features (also see Alexiadou & Müller 2008). He suggests the decomposition into the purely formal sub-features  $[\pm\alpha]$  and  $[\pm\beta]$  in (3).

(2) <i>Case decomposition</i>	(3) <i>Class decomposition</i>
NOM $[\text{+sub}, \text{-gov}, \text{-obl}]$	I $[\text{+}\alpha, \text{-}\beta]$
ACC $[\text{-sub}, \text{+gov}, \text{-obl}]$	II $[\text{-}\alpha, \text{+}\beta]$
GEN $[\text{+sub}, \text{+gov}, \text{+obl}]$	III $[\text{-}\alpha, \text{-}\beta]$
PREP $[\text{-sub}, \text{-gov}, \text{+obl}]$	IV $[\text{+}\alpha, \text{+}\beta]$
DAT $[\text{-sub}, \text{+gov}, \text{+obl}]$	
INS $[\text{+sub}, \text{-gov}, \text{+obl}]$	

With these decompositions in place, his vocabulary entries for the inflectional suffixes in the singular are given in (4).

(4) <i>VIs for the singular ordered by specificity</i> (Müller 2004b)
a. <i>-oj</i> $\leftrightarrow$ $[\text{-}\alpha, \text{+}\beta, \text{+sub} \text{-gov}, \text{+obl}]$
b. <i>-ju</i> $\leftrightarrow$ $[\text{-}\alpha, \text{-}\beta, \text{+sub} \text{-gov}, \text{+obl}]$
c. <i>-e<sub>1</sub></i> $\leftrightarrow$ $[\text{-}\alpha, \text{+}\beta, \text{-sub}, \text{+obl}]$
d. <i>-o</i> $\leftrightarrow$ $[\text{+}\alpha, \text{+}\beta, \text{-obl}]$
e. <i>-om</i> $\leftrightarrow$ $[\text{+}\alpha, \text{+sub}, \text{-gov}, \text{+obl}]$
f. <i>-e<sub>2</sub></i> $\leftrightarrow$ $[\text{+}\alpha, \text{-sub}, \text{-gov}, \text{+obl}]$
g. <i>-∅<sub>1</sub></i> $\leftrightarrow$ $[\text{-}\beta, \text{-obl}]$
h. <i>-i<sub>1</sub></i> $\leftrightarrow$ $[\text{-}\alpha, \text{+obl}]$
i. <i>-u</i> $\leftrightarrow$ $[\text{-sub}, \text{+gov}]$
j. <i>-a<sub>1</sub></i> $\leftrightarrow$ $[ \ ]$

Here, the specificity of markers cannot solely be determined by the number of features they realise. To see this, consider the markers *-∅* and *-u* for instance. Both are specified for two features each and therefore equally specific. This leads to an indeterminacy in the accusative (singular) of classes I and III,

where both markers realize a subset of the features of the insertion context. In order to resolve this, Müller (2004a,b) has to supplement the Subset Principle by the hierarchy of feature classes in (5).

- (5) *Hierarchy of feature classes*  
 INFLECTION CLASS  $\prec$  CASE

When two markers compete for insertion, this hierarchy effectively prefers the one that realises more features of a higher feature class independent of whether the other one realizes more features in total. Thus, if one marker realizes more inflection class features, e.g.  $-\emptyset$  in (4g), but the other more case features, e.g.  $-u$  in (4i), then the former will be preferred over the latter.

Turning to the plural, Müller provides the vocabulary entries in (6).

- (6) *VIs for the plural ordered by specificity* (Müller 2004b)
- a.  $-ov \leftrightarrow [+pl, -\beta, +sub, +gov, +obl]$
  - b.  $-\emptyset_2 \leftrightarrow [+pl, +\beta, +sub, +gov, +obl]$
  - c.  $-i_2 \leftrightarrow [+pl, \neg(+\alpha, +\beta), -obl]$
  - d.  $-ami \leftrightarrow [+pl, +sub, -gov, +obl]$
  - e.  $-am \leftrightarrow [+pl, -sub, +gov, +obl]$
  - f.  $-ax \leftrightarrow [+pl, -gov, +obl]$
  - g.  $-a_2 \leftrightarrow [+pl, -obl]$

As all of them are equipped with a  $[+pl]$  feature, they are restricted to plural contexts and hence never compete with any of the markers in (4) in singular contexts (Müller 2004b: fn. 15). Therefore, none of the number syncretisms come out as systematic syncretism under this analysis (Müller 2004a: fn. 27). Müller (2004a: 198) tentatively links this to the difference between features that, like number, carry semantic information, and features like case and inflection class, which do not.

Note further that the entry for the marker  $-i$  (6c) makes reference to the complement of class IV, which Müller (2004a,b) following Zwicky (1970) assumes to constitute a natural class itself.

At this point, the analysis derives the accusative in class I singular and in the plural of all classes as consistently being syncretic with the nominative ( $-\emptyset$  in I.SG;  $-i$  in I.PL, II.PL, III.PL; and  $-a$  in IV.PL). In order to account for the bidirectional syncretism in the plural and in class I singular, i.e. the take-over

of the genitive forms *-a*, *-∅*, and *-ov* into the accusative with animate nouns, Müller (2004a) postulates the two rules of referral in (7) which state that in the context of an animate noun, the form I that the system determines for the accusative is replaced by the one that it outputs for the genitive.

(7) *Rules of referral* (Müller 2004a: 211, 216)

- a.  $I_{[+\alpha, -\beta], [-\text{sub}, +\text{gov}, -\text{obl}]} \rightarrow I_{[+\alpha, -\beta], [+ \text{sub}, +\text{gov}, +\text{obl}]} / [+ \text{animate}]$
- b.  $I_{[+\text{pl}], [-\text{sub}, +\text{gov}, -\text{obl}]} \rightarrow I_{[+\text{pl}], [+ \text{sub}, +\text{gov}, +\text{obl}]} / [+ \text{animate}]$

As already mentioned in section 1, the use of this type of rule undermines DM's virtue of being more restrictive than competing approaches. A slightly different take is presented in Müller (2004b) where, with reference to Noyer (1998), he proposes the two feature-changing rules in (8) which turn an underlying accusative feature combination into a genitive one.

(8) *Feature-changing rules* (Müller 2004b: 369)

- a.  $[-\text{sub}, -\text{obl}] \rightarrow [+ \text{sub}, +\text{obl}] / [+ \alpha, -\beta, +\text{anim}]$
- b.  $[-\text{sub}, -\text{obj}] \rightarrow [+ \text{sub}, +\text{obl}] / [+ \text{pl}, +\text{anim}]$

While this gives the impression of avoiding the use of rules of referral, this is not actually the case. In Noyer's original proposal, the feature-changing effect of impoverishment is restricted to be markedness-decreasing (also see Harbour 2003). For him, this follows from the fact that feature change is the result of impoverishment followed by application of persistent redundancy rules which can only supply the unmarked feature. As discussed in Hein & Murphy (2023a,b), it is this constraint that maintains at least some of the original restrictive virtue of impoverishment rules. In order to achieve the same result in an implementation as direct feature-changing (or re-write) rules, such as (8), one would have to impose a markedness restriction that requires features to only be changed into their less marked counterparts. The rules in (8), however, do not adhere to this restriction. As Hein & Murphy (2023a,b) argue, markedness of sub-features is determined contextually in relation to other sub-features in a feature bundle. This means that the combination of all subfeatures resulting from a feature change must constitute a less marked category in order to obey the abovementioned markedness restriction. Following work on the case hierarchy in Russian (Blake 2001, Caha 2009), nominative is

the most unmarked case, followed by the accusative. The genitive is in turn more marked than both nominative and accusative. Hence, the feature change effected by (8) is markedness-increasing because it turns an accusative into a genitive specification. As they are missing a markedness restriction, these rules are therefore equally powerful as, though perhaps conceptually different from, rules of referral like those in (7), which may effectively turn a cell in a paradigm into any other cell in that paradigm.

In the following, I will show how markedness-restricted feature-changing rules may account for the bidirectional syncretism in the Russian declension.

### **3. Restricted feature-change in the Russian declension**

Before turning to the bidirectional syncretism, note that I adopt the decomposition of inflection classes proposed in Privizentseva (2023). In her work on semantic agreement in Russian, Privizentseva (2023) recently suggested that inflection classes in Russian arise through the interplay between the gender sub-feature [ $\pm\text{fem}(\text{inine})$ ], essentially replacing [ $\pm\beta$ ], and a formal class feature [ $\pm\alpha$ ] (10). Importantly, her decomposition provides the same natural classes as the one in Müller (2004a,b). The decomposition of cases I adopt is identical to the one in Müller's analysis.

Turning to the bidirectional syncretism in the plural first, recall that the accusative takes the form of the nominative for animate nouns, but that of the genitive for inanimates. These syncretisms hold independently of the actual exponents involved. It therefore constitutes a (convergent) bidirectional metasyncretism. As argued by Hein & Murphy (2023a,b), this type of syncretism is readily analysed under Noyer's view of feature-changing impoverishment. One marker has to be compatible with two cases while the other is restricted to a single case only. The latter then spreads into a neighbouring case in one environment, but not the other. This spreading is effected by changing the featural make-up of the context that is spread to (target) into that of the context that is spread from (source). Since feature-changing has to reduce markedness, in the Russian case the accusative specification on an inanimate noun has to be changed into a nominative one. As argued above, turning it into a genitive specification violates the markedness restriction. In turn, this means that the markers *-i* and *-a* appearing in the nominative have to be specified exclusively for nominative, i.e. they are not general non-oblique exponents (13k,n). The

genitive markers  $-\emptyset$  and  $-ov$  must then be compatible with both genitive and accusative (13m,p). The feature-changing rule can be formulated as in (9).

- (9) *Feature-changing rule* ACC.PL.INAN  $\rightarrow$  NOM.PL  
 $[-\text{sub}, +\text{gov}] \rightarrow [+ \text{sub}, -\text{gov}] / [+ \text{pl}, -\text{obl}, -\text{anim}]$

Ideally, one would want to apply the same logic to the bidirectional syncretism in the singular of class I. This would mean that  $-\emptyset$  is a pure nominative marker that spreads into the accusative whereas  $-a$  is underspecified such that it fits both accusative and genitive. However, as we have already established based on the plural,  $-a$  should be a pure nominative marker and  $-\emptyset$  a genitive/accusative marker. If we underspecify both of them such that they are compatible with all three cases it becomes impossible to generate the two distributions in singular and plural.

This impasse can be resolved once a less-noted third pattern is taken into account. Stump (1993) identifies a further bidirectional syncretism, one that crosses number and case (though see Caha 2016 who argues against this being a non-accidental bidirectional syncretism). In class I, the genitive singular marker is  $-a$  and the nominative plural marker is  $-i$ . Looking at classes II and III it seems that the genitive singular takes the form  $-i$  of the nominative plural while the nominative plural borrows the form  $-a$  associated with the genitive singular. This constitutes a pattern of divergent bidirectional syncretism.

- (10) *Bidirectional syncretism across number and case* (Stump 1993)

	II [- $\alpha$ +fem]	III [+ $\alpha$ +fem]	I [+ $\alpha$ -fem]	IV [- $\alpha$ -fem]
GEN.SG	-i	-i	-a	-a
NOM.PL	-i	-i	-i	-a

One way to account for this syncretism is by postulating a re-write rule that turns a genitive singular context into a nominative plural one (11).

- (11) *Feature-changing rule* GEN.SG  $\rightarrow$  NOM.PL  
 $[+\text{gov}, +\text{obl}, -\text{pl}] \rightarrow [-\text{gov}, -\text{obl}, +\text{pl}] / [+ \text{sub}]$

On this view,  $-a$  and  $-i$  spread into the genitive singular from the nominative plural. This allows us to retain  $-a$  as a pure nominative marker (underspecified



for number). I will turn to the absence of *-a* in the nominative singular and plural of class I momentarily. At this point, one might object that this change violates the markedness restriction because it involves turning a relatively less marked singular into a more marked plural configuration. Note, however, that at the same time, the change in case is markedness-reducing (from genitive to nominative). Since the changes in each dimension are in opposite directions with regard to markedness, it is a priori unclear whether the overall change is markedness-increasing or -decreasing. I would like to suggest that this indeterminacy is resolved by a hierarchy to the effect that the markedness reduction for case outweighs the markedness increase for number.<sup>1</sup>

Since under this approach the *-a* exponent in the genitive singular is actually a nominative marker, the syncretism between genitive and accusative with animate singulars of class I is only apparent. Instead, we can derive the accusative singular form with an additional feature-changing rule that turns an accusative singular into a nominative singular context (12).

- (12) *Feature-changing rule* ACC.SG.I.ANIM → NOM.SG.I  
 [−sub, +gov] → [+sub, −gov] / [−obl, −pl, +anim, +α, −fem]

The necessary specifications of the markers are then listed in (13).<sup>2</sup>

- (13) *VIs in order of specificity*
- a. *-oj* ↔ [−pl, +sub, −gov, +obl, −α, +fem]
  - b. *-ju* ↔ [−pl, +sub, −gov, +obl, +α, +fem]
  - c. *-a<sub>1</sub>* ↔ [−pl, +sub, −gov, −obl, −α, +fem]
  - d. *-om* ↔ [−pl, +sub, −gov, +obl, −fem]

<sup>1</sup>This is reminiscent of multidimensional scale effects in Hayu, where in case of conflict one scale outranks the other (Georgi 2019). Alternatively, one could invoke Richards' (2010) *Principle of Minimal Compliance* which has it that a violation of one constraint (e.g. DECREASE NUMBER-MARKEDNESS) is neutralized by fulfilling another (e.g. DECREASE CASE-MARKEDNESS). In contrast to the approach pursued in the main text, this option would also tolerate a feature change where markedness increases for case but decreases for number.

<sup>2</sup>The entry for *-o* in (13g) makes reference to [−masc(uline)] in addition to [−fem], thereby restricting *-o* to neuter nouns. As class IV contains all and only neuter nouns and *-o* is already restricted to that class by being specified for [−α, −fem], this seems redundant. However, it is necessary to resolve an indeterminacy between *-o* and *-a<sub>2</sub>* in the nominative singular of that class. Alternatively, one could assume an impoverishment rule that deletes [±sub, ±gov] for non-oblique neuters. This rule receives some independent motivation from the fact that non-oblique cases are neutralised with neuters throughout the Indo-European languages.

e.	$-i_1$	$\leftrightarrow$	$[-\text{pl}, -\text{sub}, +\text{obl}, +\alpha, +\text{fem}]$
f.	$-e_1$	$\leftrightarrow$	$[-\text{pl}, -\text{sub}, +\text{obl}, -\alpha, +\text{fem}]$
g.	$-o$	$\leftrightarrow$	$[-\text{pl}, -\text{obl}, -\alpha, -\text{fem}, -\text{masc}]$
h.	$-ami$	$\leftrightarrow$	$[+\text{pl}, +\text{sub}, -\text{gov}, +\text{obl}]$
i.	$-ax$	$\leftrightarrow$	$[+\text{pl}, -\text{sub}, -\text{gov}, +\text{obl}]$
j.	$-am$	$\leftrightarrow$	$[+\text{pl}, -\text{sub}, +\text{gov}, +\text{obl}]$
k.	$-a_2$	$\leftrightarrow$	$[+\text{sub}, -\text{gov}, -\text{obl}, -\text{fem}]$
l.	$-e_2$	$\leftrightarrow$	$[-\text{sub}, -\text{gov}, +\text{obl}]$
m.	$-ov$	$\leftrightarrow$	$[+\text{pl}, +\text{gov}, +\alpha]$
n.	$-i_2$	$\leftrightarrow$	$[+\text{sub}, -\text{obl}, +\text{pl}]$
o.	$-u$	$\leftrightarrow$	$[-\text{pl}, +\text{gov}]$
p.	$-\emptyset$	$\leftrightarrow$	$[ ]$

In order to block  $-a_2$  from appearing in the actual nominative of both numbers in class I, an additional impoverishment rule bleeds its insertion by deleting  $[-\text{gov}]$  (14). This leads to the insertion of  $\emptyset$  in the singular and  $-i_2$  in the plural. Since  $-a_2$  does, however, appear in the nominative that is derived by the re-write rule in (11) (given in 14c) as well as in the one which is derived by the rule in (12) (given in 14d), this impoverishment rule (given in 14b) must apply before them in order to establish a counter-feeding relation. As  $-a_2$  is blocked in the nominative that is derived by the rule for the plural bidirectional syncretism in (9) (given in 14a), rule (14b) must be fed by it. Now, we only need to ensure that  $-u$  does not appear in the accusative singular of classes I (animate) and III. This is achieved by an impoverishment rule that deletes  $[+\text{gov}]$  (14e). This rule has to apply after (12) (given in 14d) as it would otherwise bleed its application. That is, the two rules must stand in a counter-bleeding relation.

(14) *Impoverishment and feature-changing rules*

- a.  $[-\text{sub}, +\text{gov}] \rightarrow [+\text{sub}, -\text{gov}] / [-\text{obl}, +\text{pl}, -\text{anim}]$   
(ACC.PL  $\rightarrow$  NOM.PL with inanimates)
- b.  $[-\text{gov}] \rightarrow \emptyset / [-\text{obl}, +\alpha]$  (blocks  $-a_2$  in class I NOM)
- c.  $[+\text{gov}, +\text{obl}, -\text{pl}] \rightarrow [-\text{gov}, -\text{obl}, +\text{pl}] / [+\text{sub}](\text{GEN.SG} \rightarrow \text{NOM.PL})$
- d.  $[-\text{sub}, +\text{gov}] \rightarrow [+\text{sub}, -\text{gov}] / [-\text{obl}, -\text{pl}, +\text{anim}, +\alpha, -\text{fem}]$   
(ACC.SG  $\rightarrow$  NOM.SG with class I animates)

e. [+gov] → ∅ / [-obl, +α, -pl] (blocks -u in class I & III ACC.SG)

The effect that the rules have on insertion is given in (15). Downarrows indicate a rule application and rightarrows Vocabulary Insertion.

(15) *Result of morphological rules and vocabulary insertion*

	II [-α +fem]	III [+α +fem]	I [+α -fem]	IV [-α -fem]
NOM [+s-g-o]	-a	[+s-g-o] ↓ (14b) [+s -o]⇒∅	[+s-g-o] ↓ (14b) [+s -o]⇒∅	-o
ACC [-s-g-o]	-u	[-s-g-o] ↓ (14e) [-s -o]⇒∅	[-s-g-o]   [-s-g-o] ↓ (14e)   ↓ (14d) [-s -o]⇒∅   [+s-g-o]⇒-a	-o
GEN [+s+g+o]	[+s+g+o-pl] ↓ (14c) [+s-g-o+pl]⇒-i	[+s+g+o-pl] ↓ (14c) [+s-g-o+pl]⇒-i	[+s+g+o-pl] ↓ (14c) [+s-g-o+pl]⇒-a	[+s+g+o-pl] ↓ (14c) [+s-g-o+pl]⇒-a
PREP [-s-g+o]	-e	-i	-e	-e
DAT [-s+g+o]	-e	-i	-u	-u
INS [+s-g+o]	-oj	-ju	-om	-om
NOM [+s-g-o]	-i	[+s-g-o] ↓ (14b) [+s -o]⇒-i	[+s-g-o] ↓ (14b) [+s -o]⇒-i	-a
ACC [-s+g-o]	[-s+g-o] ↓ (14a) [+s-g-o]⇒-i	[-s+g-o] ↓ (14a) [+s-g-o] ↓ (14b) [+s -o]⇒-i	[-s+g-o] ↓ (14a) [+s-g-o] ↓ (14b) [+s -o]⇒-i	[-s+g-o] ↓ (14a) [+s-g-o]⇒-a
GEN [+s+g+o]	-∅	-ov	-ov	-∅
PREP [-s-g+o]	-ax	-ax	-ax	-ax
DAT [-s+g+o]	-am	-am	-am	-am
INS [+s-g+o]	-ami	-ami	-ami	-ami

Note that this analysis exhibits one fewer homophony than the one in Müller (2004a,b): there are two -a exponents, two -i exponents and two -e exponents but only one ∅ exponent. It adheres to the markedness restriction on feature-change suggested by Noyer (1998). Furthermore, it does not

make reference to complements of inflection classes, which I take to be a welcome result.<sup>3</sup> In addition, it does not treat cross-number syncretism as *prima facie* non-systematic. This assumption was linked to the semantic import of number as opposed to case and inflection class. However, note that observations about the relative typological rarity of certain syncretisms within the semantically contentful categories of number and person have been explained by the underlying structure of these categories (e.g. Ackema & Neeleman 2013, Smith et al. 2019). This explanation only holds if at least some of the syncretisms across number and person are systematic, in line with the current analysis. The resolution of cross-number syncretisms comes at the cost of missing some trans-paradigmatic and cross-case syncretisms. That is, the *-a* in class II nominative singular is different from all other occurrences of *-a*, the *-i* in class III dative and prepositional is distinct from other occurrences of *-i*, and the same is true for *-e* in class II dative and prepositional. The latter, however, might actually be a welcome result. As mentioned by Privizentseva (2023), the *-e* in class II is underlyingly stressed while the other *-e*-markers are not. Assuming that such idiosyncratic stress-properties must be part of the lexical entry of an element, there must independently be two homophonous entries for *-e* in the lexicon. Lastly, the specificity of markers can be determined without reference to a hierarchy of feature classes. It is solely based on the number of features that they realize.

#### 4. Restricted feature-change all the way through

Since the power of markedness-restricted feature-changing rules is empirically necessary to account for bidirectional syncretisms anyway (Hein & Murphy 2023a,b), in this section I will fully embrace them as a tool in the derivation of any syncretism.

As mentioned before, the current analysis does not resolve all syncretisms.

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<sup>3</sup>As Müller (2004a: fn. 20) remarks, by deMorgan's law, they are equivalent to a disjunction ( $[\neg(+\alpha, +\beta)] = [-\alpha] \vee [-\beta]$ ), which raise suspicion as they collapse two separate entries, one for each disjunct. Alternatively, maintaining the view that natural classes can only be defined by (sets of) sub-features, the specification of *-i* in (6c) is tantamount to adding a third feature  $[\pm\gamma]$  to the decomposition which singles out a natural class of I, II and III to the exclusion of IV. This third sub-feature, however, is not justified by the four inflection classes. These issues might ultimately not be regarded as fatal, but they are reason enough to avoid negation in vocabulary entries if possible.

In particular, it was necessary to postulate two entries for *-a*, *-e* and *-i*. In the case of *-e*, it is interesting to note that it has the distribution of a unidirectional syncretism. Ignoring class III for the moment, *-e* seems to be a general prepositional case marker in the singular that spreads into the dative in class II. As we have already seen, *-a* in the genitive singular can be understood to be a nominative marker (as is evident from class II nominative singular and class IV nominative plural) that spreads into the genitive and is blocked from appearing (indicated by strikethrough) in the actual nominative singular of classes I and IV. In terms of markedness-restricted feature-change, this means that the relevant genitive contexts are turned into nominative contexts. Similarly, one can conceive of *-u* as an accusative marker (as observed in class II) that is blocked in classes I and IV but spreads into the dative in these classes before the blocking takes effect. In the current system, this entails that the relevant dative contexts are turned into accusative ones. This change crucially has to counterfeed whichever mechanism is responsible for the blocking of *-u* in the accusative. These take-overs are presented in (16).

(16) *Directional patterns of -a, -e, -i and -u*

	II [-α +fem]	III [+α +fem]	I [+α -fem]	IV [-α -fem]
NOM.PL	-i	-i	-i	-a
NOM	-a	<del>-a</del> <sup>-∅</sup>	<del>-a</del> <sup>-∅</sup>	<del>-a</del> <sup>-o</sup>
ACC	-u	<del>-u</del> <sup>-∅</sup>	<del>-u</del> <sup>-∅/-a</sup>	<del>-u</del> <sup>-o</sup>
GEN	-i	-i	-a	-a
PREP	-e	-i	-e	-e
DAT	-e	-i	-u	-u

Following this line of thought with regard to the distribution of *-i*, it seems like in class III a dative is turned into a prepositional context, which is in turn altered into a genitive one, and as assumed before, genitive singular contexts in all classes are turned into nominative plural ones. In such a system, *-i* can be a pure nominative (plural) marker that spreads into genitive, dative and prepositional singular in class III because these contexts are all rewritten to eventually become a nominative plural.

In fact, one can generalize this approach to all exponents such that each one is specified for that case which is the most unmarked one of all cases

in which the exponent appears in the paradigm. For all more marked cases that the marker appears in there is then a feature-changing rule that alters the underlying feature context such that the originally expected marker is bled and the observed marker is fed. This approach is very much in the spirit of Halle & Marantz's (2008) analysis of Polish declension, where each marker encodes a single case and a (traditional) impoverishment rule may bleed it. This then leads to the insertion of the elsewhere marker *-u* (retreat to the general case). None of the exponents directly realizes a class feature, rather class features on a noun are only employed to determine which impoverishments are triggered.<sup>4</sup> Like in their approach, in the current analysis no vocabulary entry needs to make reference to the class feature  $[\pm\alpha]$ . It is only used to trigger impoverishment and feature-changing rules. The vocabulary entries for the suffixes are only specified for number, case and sometimes also gender (17).

(17) *VIs for Russian*

- a. *-o* ↔ [-pl, +sub, -gov, -obl, -masc, -fem]
- b. *-oj* ↔ [-pl, +sub, -gov, +obl, +fem]
- c. *-om* ↔ [-pl, +sub, -gov, +obl, -fem]
- d. *-ju* ↔ [-pl, +sub, -gov, +obl]
- e. *-ami* ↔ [+pl, +sub, -gov, +obl]
- f. *-ax* ↔ [+pl, -sub, -gov, +obl]
- g. *-am* ↔ [+pl, -sub, +gov, +obl]
- h. *-ov* ↔ [+pl, -sub, +gov, -obl]
- i. *-e* ↔ [-pl, -sub, -gov, +obl]
- j. *-u* ↔ [-pl, -sub, +gov, -obl]
- k. *-a* ↔ [-pl, +sub, -gov, -obl]
- l. *-i* ↔ [+pl, +sub, -obl]
- m.  $-\emptyset$  ↔ [ ]

The difference to Halle & Marantz's (2008) analysis lies in the fact that rule application does not necessarily lead to the insertion of the elsewhere exponent but may also result in the occurrence of a marker for a less marked case.

<sup>4</sup>Strictly speaking, for Halle & Marantz (2008) each impoverishment rule has its own triggering-feature. A noun in Polish may then bear several of these triggering-features, with some implicational relations holding over possible combinations thereof. Thus, a given noun's inflection class is not encoded by some class feature like  $[\pm\alpha]$  but rather by the set of impoverishment-triggering features that this noun has.

Moreover, the rules in the current approach crucially interact in several ways. The feature-changing rules are given (18) in their order of application.

(18) *Impoverishment and feature-changing rules*

- a.  $[-\text{sub}, +\text{gov}] \rightarrow [+ \text{sub}, -\text{gov}] / [+ \text{pl}, -\text{obl}, +\text{anim}]$   
(ACC.PL $\rightarrow$ NOM.PL with animates)
- b.  $[-\text{gov}] \rightarrow \emptyset / [-\text{obl}, +\alpha]$  (blocks *-a* in class I & III NOM)
- c.  $[-\text{sub}, +\text{gov}] \rightarrow [+ \text{sub}, -\text{gov}] / [-\text{pl}, -\text{obl}, -\text{anim}, +\alpha, -\text{fem}]$   
(ACC.SG $\rightarrow$ NOM.SG with class I inanimates)
- d.  $[+\text{gov}] \rightarrow \emptyset / [-\text{pl}, -\text{obl}, +\alpha]$  (blocks *-u* in class I & III ACC.SG)
- e.  $[-\text{sub}, +\text{gov}] \rightarrow [+ \text{sub}, -\text{gov}] / [-\text{pl}, -\text{obl}, -\text{fem}]$   
(ACC.SG $\rightarrow$ NOM.SG in class IV)
- f.  $[+\text{obl}] \rightarrow [-\text{obl}] / [-\text{pl}, -\text{sub}, +\text{gov}, -\text{fem}]$   
(DAT.SG $\rightarrow$ ACC.SG in class I & IV)
- g.  $[+\text{gov}] \rightarrow [-\text{gov}] / [-\text{pl}, -\text{sub}, +\text{obl}]$  (DAT.SG $\rightarrow$ PREP.SG)
- h.  $[-\text{sub}, -\text{gov}] \rightarrow [+ \text{sub}, +\text{gov}] / [-\text{pl}, +\text{obl}, +\alpha, +\text{fem}]$   
(PREP.SG $\rightarrow$ GEN.SG in class III)
- i.  $[+\text{gov}, +\text{obl}, -\text{pl}] \rightarrow [-\text{gov}, -\text{obl}, +\text{pl}] / [+ \text{sub}]$   
(GEN.SG $\rightarrow$ NOM.PL)
- j.  $[-\text{masc}] \rightarrow \emptyset / [+ \text{pl}, +\text{sub}, -\text{gov}, -\text{obl}, -\alpha, -\text{fem}]$   
(blocks *-o* in class IV GEN.SG (derived NOM.SG))
- k.  $[+\text{pl}] \rightarrow [-\text{pl}] / [+ \text{sub}, -\text{gov}, -\text{obl}, -\text{fem}]$   
(blocks *-i* in class IV NOM.PL)
- l.  $[+\text{sub}, +\text{obl}] \rightarrow [-\text{sub}, -\text{obl}] / [+ \text{pl}, +\text{gov}]$  (GEN.PL $\rightarrow$ ACC.PL)
- m.  $[+\text{gov}] \rightarrow \emptyset / [-\alpha, -\text{obl}, +\text{pl}]$   
(blocks *-ov* in class II & IV ACC.PL)
- n.  $[+\text{fem}] \rightarrow \emptyset / [+ \text{sub}, -\text{gov}, +\text{obl}, +\alpha]$   
(blocks *-oj* in class III INS.SG)

The effects of these rules on insertion are visualized in (19) and (20).<sup>5</sup>

(19) *Effects of the rules in the singular*

	II [-α +fem]	III [+α +fem]	I [+α -fem]	IV [-α -fem]
NOM [+s-g-o]	-a	[+s-g-o] ↓ (18b) [+s -o]⇒-∅	[+s-g-o] ↓ (18b) [+s -o]⇒-∅	-o
ACC [-s+g-o]	-u	[-s+g-o] ↓ (18d) [-s -o]⇒-∅	[-s+g-o] ↓ (18d) [-s -o]⇒-∅	[-s+g-o] ↓ (18e) [+s-g-o]⇒-o
GEN [+s+g+o]	[+s+g+o-pl] ↓ (18i) [+s-g-o+pl]⇒-i	[+s+g+o-pl] ↓ (18i) [+s-g-o+pl]⇒-i	[+s+g+o-pl] ↓ (18i) [+s-g-o+pl] ↓ (18k) [+s-g-o-pl]⇒-a	[+s+g+o-pl-masc] ↓ (18i) [+s-g-o+pl-masc] ↓ (18j) [+s-g-o+pl ] ↓ (18k) [+s-g-o-pl ]⇒-a
PREP [-s-g+o]	-e	[-s-g+o-pl] ↓ (18h) [+s+g+o-pl] ↓ (18i) [+s-g-o+pl]⇒-i	-e	-e
DAT [-s+g+o]	[-s+g+o] ↓ (18g) [-s-g+o]⇒-e	[-s+g+o-pl] ↓ (18g) [-s-g+o-pl] ↓ (18h) [+s+g+o-pl] ↓ (18i) [+s-g-o+pl]⇒-i	[-s+g+o] ↓ (18f) [-s+g-o]⇒-u	[-s+g+o] ↓ (18f) [-s+g-o]⇒-u
INS [+s-g+o]	-oj	[+s-g+o+fem] ↓ (18n) [+s-g+o ]⇒-ju	-om	-om

<sup>5</sup>The interactions are: (18a) feeds (18b). (18c) counterfeeds (18b). (18b) bleeds (18k) in class I. (18c) bleeds (18e) in class I. (18d) bleeds (18e) in class I. (18f) counterfeeds (18c). (18c) bleeds (18d) for animates. (18g) counterfeeds (18f) in class I & IV and feeds (18h) in class III. (18h) feeds (18i) in class III. (18i) counterfeeds (18b), and feeds (18j) in class IV & II and (18k) in class IV. (18l) counterfeeds (18a) and feeds (18m).



(20) *Effects of the rules in the plural*

		II [-α +fem]	III [+α +fem]	I [+α -fem]	IV [-α -fem]	
NOM [+s-g-o]	-i		[+s-g-o] ↓ (18b) [+s -o]⇒-i	[+s-g-o] ↓ (18b) [+s -o]⇒-i	[+s-g-o+pl-masc] ↓ (18j) [+s-g-o+pl ] ↓ (18k) [+s-g-o-pl]⇒-a	
ACC [-s+g-o]	[-s+g-o] ↓ (18a) [+s-g-o]⇒-i	[-s+g-o] ↓ (18m) [+s-g-o]⇒-∅	[-s+g-o] ↓ (18a) [+s-g-o] ↓ (18b) [+s -o]⇒-i	-OV [-s+g-o] ↓ (18a) [+s-g-o] ↓ (18b) [+s -o]⇒-i	-OV [-s+g-o+pl+masc] ↓ (18a) [+s-g-o+pl+masc] ↓ (18j) [+s-g-o+pl ] ↓ (18k) [+s-g-o-pl]⇒-a	[-s+g-o] ↓ (18m) [+s -o]⇒-∅
GEN [+s+g+o]	[+s+g+o] ↓ (18l) [-s+g-o] ↓ (18m) [-s -o]⇒-∅	[+s+g+o] ↓ (18l) [-s+g-o]⇒-OV	[+s+g+o] ↓ (18l) [-s+g-o]⇒-OV	[+s+g+o] ↓ (18l) [-s+g-o]⇒-OV	[+s+g+o] ↓ (18l) [-s+g-o] ↓ (18m) [-s -o]⇒-∅	
PREP [-s-g+o]	-ax	-ax	-ax	-ax	-ax	
DAT [-s+g+o]	-am	-am	-am	-am	-am	
INS [+s-g+o]	-ami	-ami	-ami	-ami	-ami	

This approach further shows some relatedness to accounts of inflection that make use of so-called ‘leading forms’ or ‘principal parts’ (e.g. Wurzel 1984, Blevins 2004, Finkel & Stump 2007, Stump & Finkel 2013, Müller 2011). Intriguingly, it might solve yet another issue created by encoding inflection classes as morphosyntactic features. As discussed in Müller (2004a: §4), features that are present in one module of grammar should also be legible in that module. In a post-syntactic approach to morphology, such as DM, they are present in the syntax. However, they never take part in any syntactic operations. For this reason, Müller (2004a) is forced to adopt a pre-syntactic view of morphology, where inflection class features serve the purpose of triggering the combination of noun stems with inflectional affixes whereafter they are deleted and hence not present (and not legible) in the syntactic component. The present approach allows to maintain a post-syntactic morphological component (as in Müller 2004b) since inflection class features play no role in the morphological process of vocabulary insertion itself. Under the view that impoverishment (and by extension also feature-changing rules) are syntactic operations (cf. Keine 2010, Bárány & Sheehan 2024), they can be viewed as purely syntactic

features triggering syntactic operations. This, of course, raises the expectation of possible interactions between feature changes and other syntactic operations, like Agree. For reasons of space, I will leave this issue open here.

## 5. Conclusion

The three bidirectional syncretism patterns in the Russian nominal declension previously seemed to require the full power of unrestricted directional rules, thereby undermining the more restrictive nature of DM in comparison to other frameworks. In this paper, I have proposed two analyses in terms of markedness-decreasing feature-change (Noyer 1998), which has been argued to retain at least some of the original restrictiveness of impoverishment (Hein & Murphy 2023a,b). These analyses both avoid two minor potentially controversial issues found in Müller (2004a,b), namely complements of natural classes and general non-systematicity of syncretism in semantically contentful categories. The one that makes exuberant use of feature-change further provides a potential solution to the issue of syntactic inertness of inflection class features. These benefits, as usual, come at a cost. Here, this takes the form of an increase in the number of feature-manipulating rules required to capture the inflectional system. While Müller's account makes do with two, the more conservative feature-change approach needs five of them. The profligate one further inflates that number to fourteen. It remains to be determined whether the gains are worth this cost.

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