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## A Binary Feature Approach to Russian Nominal Declension

### Russian Abstract

#### Бинарные признаки сонорности в области русского именного склонения

Лингвисты часто спорят о том, сколько именных склонений в русском языке. Ивич, в статье 1972<sup>ого</sup> года, предложил, что в сербо-хорватском и в остальных, аналогичных ему славянских языках, есть два склонения. В одном склонении именительный падеж единственного числа принимает окончание *-a*, а во втором, окончание колеблется, но его можно охарактеризовать как «не *-a*». Цель настоящего доклада состоит в том, чтобы показать, что бинарное противопоставление классов склонения принимает разные формы и проявляется не только в именительном падеже.

Целесообразно разделить падежи русского языка на три крупные категории, в зависимости от того, как они проявляют бинарное противопоставление именных окончаний. Можно отметить, что эти категории соотносятся с семантическими падежными признаками, предложенным Р.О. Якобсоном. А именно:

1. Те падежи, которые одновременно являются ненаправленными непериферийными (т.е. именительный и родительный падежи) бинарно противопоставляют окончания по признаку сонорности ( $\pm a$  и/или  $\pm \emptyset$ , т.е.  $\pm$ ноль). Только в случае именительного падежа одновременно использованы оба бинарных признака  $\pm a$  и  $\pm \emptyset$ . В родительном падеже единственного числа и в именительном падеже множественного числа выступает одно лишь противопоставление  $\pm a$  (конкретное положительное значение: окончание *-a*, а отрицательное значение:

окончание *-i*). В родительном падеже множественного числа отсутствует признак  $\pm a$ , но выступает  $\pm \emptyset$ .

2. В блоке падежей, названных Якобсоном «направленными», т.е. в винительном и дательном, положение совсем другое. Здесь бинарное противопоставление вне пределов сонорности и проявляется в виде присутствия или отсутствия синкретизма, что обозначается признаком  $\pm$ синкретизм. Признак сонорности закономерно соотносится с признаком синкретизма. Присутствие положительного признака сонорности обязательно сопровождается отсутствием синкретизма в соответствующем подмножестве падежей. Например, в области прямых падежей (именительного и винительного), если окончание именительного падежа обладает признаком высокой сонорности (нр. *книг-а*), предполагается, что в парном, направленном прямом падеже (т.е. в винительном) будет отрицательный признак синкретизма (нр. *книг-у*); по обратному соотношению слово *стол-∅* лишено признака сонорности, но получает положительный признак синкретизма в винительном. В паре косвенных падежей (в родительном и дательном) встречается то же самое закономерное соотношение. Если в родительном окончании проявляет высокую или, соответственно, низкую сонорность (нр. *стол-а*, *книг-и*), то в направленном парном падеже (т.е. в дательном) встречается несинкретизм/синкретизм, а именно *стол-у/книг-е*. В то время как первый блок падежей проявляет противопоставление по сонорности в обоих числах, бинарное противопоставление по синкретизму нейтрализуется во множественном.

3. Третья категория падежей--предложный и творительный--еще реже проявляет противопоставление. Гласные в этих окончаниях не противопоставлены, а только согласные противопоставлены в творительном падеже единственного числа (ср. *слов-ом*, *книг-ой*).

Итак, конкретное множество бинарных признаков по сонорности/синкретизму составляет суть каждого образца именного склонения. Однако, этим не исчерпываются закономерные отношения между окончаниями.

Фонетическая тональность, в виде огубления (-у) тоже играет определенную роль в системе, указывая на отсутствие синкретизма (ср. вин. *книг-у/дат. стол-у*), в отличие от синкретичных форм, которые оканчиваются на другие гласные. Употребление окончания -у и во втором родительном и предложном падежах тоже указывает на отсутствие синкретизма; когда выступает одно нейтрализованное окончание родительного или предложного падежа, исключен фонетический облик -у (ср. *в снег-у/о снег-е*, но нейтрализованное *в книг-е/о книг-е*), т.е. -у указывает на то, что выражение двух значений родительного/предложного фонетически не совпадают.

Кроме парадигматического противопоставления по сонорности, есть еще синтагматическое (ср. различную сонорность окончаний прилагательного в примерах *новая бумага, новый судья*). При адъективном определении существительных на -а, различная сонорность двух окончаний указывает на грамматический род. Таким образом, в какой-то степени можно сказать, что парадигматическая сонорность связана в выделением типов склонения, в то время как синтагматическая сонорность связана с грамматическим родом. Признак сонорности объединяет оба типа.

Доклад кончается перечнем различных маркировок по сонорности. Можно прийти к выводу, что каждое множество плюсов и минусов определяет тип склонения. Хотя основа каждого противопоставления бинарная, в общей сложности насчитывается больше двух типов склонения, потому что бинарные противопоставления выступают не только в одном падеже.

## I. Introduction.

Ivić (1972:108), in a paper devoted to the classification of the Serbo-Croatian declensional system, but with implications for all Slavic declension,<sup>1</sup> observed that Slavic

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<sup>1</sup> "С целью выяснения возможностей более рационального...описания сербохорватского (и вообще славянского) склонения."

grammars usually classify nouns into three, four or five declension types. The author then proceeded to propose that a 2-way classification was all that was needed, but with the important proviso that the syntagmatic (agreement) gender had to be known in advance. In fact, two pieces of information were critical to a prediction of the entire declensional paradigm: the gender (masculine, feminine, or neuter), plus information about whether the nominative singular ended in an *-a* or not. If we substitute Russian (instead of Serbo-Croatian) examples for his two basic classes, Declension I (defined by having a non-*a* nominative singular ending) would include such instances as masc. *закон*, neuter *слово*, and feminine *кость*. In other words, the gender would predict the differences between these members of Declension I. Declension II (defined by the fact that its nominative singular does use the *-a* ending) consists of the typical feminine nouns, such as *книга*, plus masculine nouns which refer to male persons (such as *судья*).

Ivić further demonstrates the interesting concept of a binary division of declensional classes, based on the presence of one predominant ending in one group of nouns, as opposed to others which lack that ending. If one observes the pattern of Russian declension, it turns out that several cases have their own particular sort of binary opposition, not just the nominative case, which was treated this way by Ivić. There is also a degree in the formal predictability of gender, which Ivić did not establish, since he took gender as a given. Furthermore, one can establish a definite correlation between the various types of binary opposition and the system of Jakobsonian case features that were assigned in Jakobson (1958/1985:179). This paper is an attempt to characterize the nature of such binary oppositions which oppose the Russian declensional classes. Examples will be selected from the classes of noun morphology that can be found in Zaliznjak (1977).

## II. Jakobson's case features and the three major case groupings.

I will attempt to show that the six primary Russian cases can be divided into three major groups on the basis of their behavior with respect to binary features. These three groups are as follows:

1. nominative and genitive (N/G)
2. accusative and dative (A/D)
3. locative and instrumental (L/I)

As will be shown in more detail, the N/G group tends to oppose declensional classes based on an opposition of vocalic sonority in the desinence. The A/D group splits the declensional classes according to the binary characteristic of whether or not the accusative or dative case ending is syncretic. The L/I group generally does not oppose declension classes on the basis of either vocalic sonority or syncretism. The instrumental opposition can only be based on a difference of desinential consonant, while the locative is characterized by the absence of declensional class opposition. I would suggest that two features seem to be of the greatest importance in classifying the behavior of these three different groups of cases. They are the notions of *направленность*/directionality and *периферийность*/marginality (1958/1984:180). I will consider the N/G and L/I groups (one and three above) to be non-directional,<sup>2</sup> in contrast to directional group two (A/D). This leads to the following grid:

	N	G	A	D	L	I
Directionality	–	–	+	+	–	–
Marginality	–	–	–	+	+	+

Based on these features, the N/G group is united by negative features of both directionality and marginality, while A/D and L/I can each be characterized by their positive features for directionality and marginality, respectively. The marginality feature internally differentiates the A/D set, while the internal differentiation of the N/G group is

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<sup>2</sup> Jakobson's assignment of a directionality feature to the genitive case is a bit complicated. As detailed by Worth (1984:298), Jakobson first considered the genitive to be non-directional, but later proposed that the genitive-1 had the feature of "ascription," which was treated as a type of directionality in order to produce the geometric symmetry required to plot all of the Russian cases on a cube. However, Worth provides many convincing arguments in favor of Jakobson's original concept of treating the genitive as non-directional. In fact, even in Jakobson's later work on the subject (1958/1984:179), he overtly refers to accusative and dative as "directional cases" ("назовем В. и Д. направленными падежами"). This label will be accepted in this paper since it appears to provide the best explanation of the facts. For further discussion of the controversial nature of the features of the second locative and dative, see Chvany (84/96:201-2).

on the basis of direct vs. oblique case, and that of L/I is based on the fact that the locative has the Jakobsonian feature of quantification, which is absent in the instrumental.

I will now review the binary oppositional nature of the various case groupings (N/G, A/D, and L/I) to demonstrate their binary nature and to exemplify how these oppositions are realized in the singular and plural.

#### A. Nominative/Genitive case set.

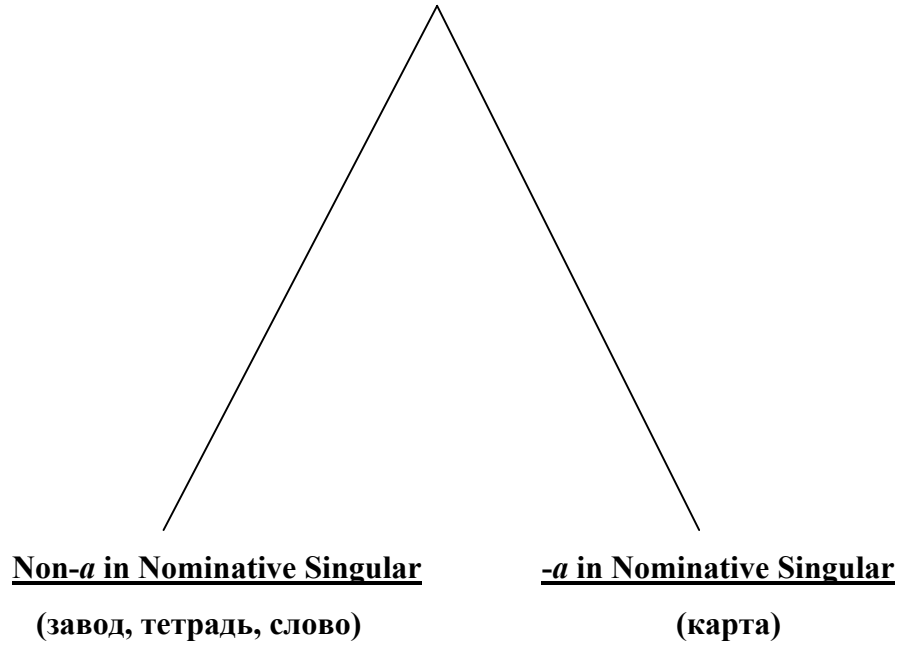
This group of cases, in both singular and plural numbers, manifests binary sonority oppositions of its desinential vowels. One sort of opposition, used as the basis of Ivić's classification, is that of  $\pm a$ , as introduced by Ivić for the nominative singular. However, it is not only found in the nominative singular. It also plays a major role in both the genitive singular and nominative plural (where  $-a$  is opposed to  $-i$ ). The other binary opposition is that of  $\pm \emptyset$ , which occurs in the Russian genitive plural. (Interestingly, in Serbo-Croatian, the genitive plural has also generalized the  $\pm a$  feature instead of the zero/non-zero opposition found in Russian and other Slavic languages). The significance of binary sonority oppositions based on  $\pm a$  or  $\pm \emptyset$  is that the  $-a$  and  $-\emptyset$  desinences represent the two extremes of sonority: the most sonorous low vowel and the total absence of sonority, respectively.

In terms of Jakobson's semantic features, the nominative and genitive are both non-marginal cases which are opposed to the strictly "directional" accusative and dative cases. Jakobson (1957/1984) demonstrated the relationship of the nominative and genitive cases of Russian in both singular and plural, but it concentrated on how the various cases are opposed to each other, rather than the opposition of declensional classes within each of these case slots. The goal of this paper is to show how sonority is used to oppose the declension classes within each of these cases in both the singular and plural. Although the Russian nominative and genitive cases each manifest opposing poles of sonority, there are important differences between the sonority opposition in the four case slots represented by the nominative and genitive in singular and plural numbers. The

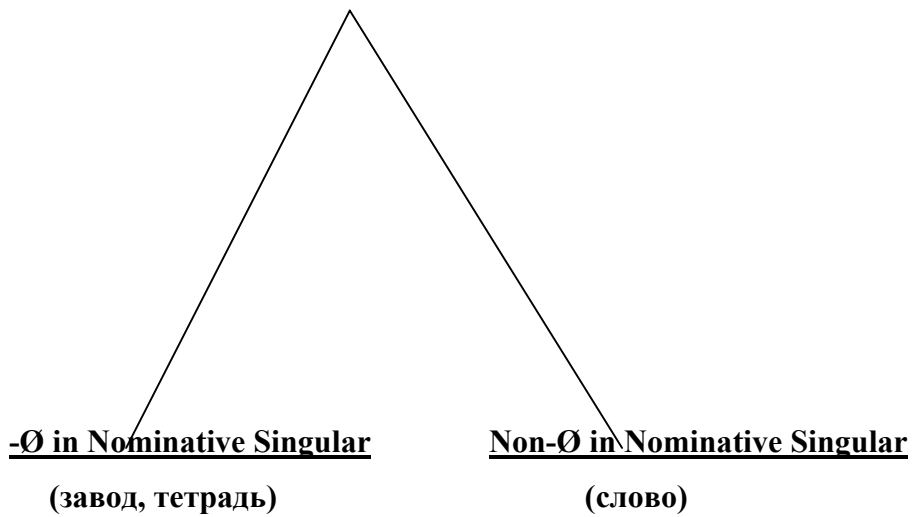
nominative singular really contains a double sonority opposition; at the first hierarchical level there is a division into +a and !a, but the non-a endings are subject to a secondary binary split into zero and non-zero (e.g. *книга* vs. *стол/слово* at the first level and *стол* vs. *слово* at the second level). This unique two-level binary opposition explains the special role of the nominative singular in identifying declensional classes and why it is used as the dictionary form. It can be depicted as in the following diagram:

**Primary and Secondary Sonority Division in Nominative Singular:  
3 endings types (-Ø, -o, -a) are based on two binary features**

**First Division into -a and Non-a Endings**



**Second Division into -Ø and non-Ø endings**





Other than the nominative singular, only the genitive plural also makes use of the zero/non-zero opposition. However, it is only a single-level opposition in the genitive plural. The presence of a binary sonority opposition without the use of *-a* marks the special nature of the genitive plural. The remaining case slots, genitive singular and nominative plural, each have a similar use of a single  $\pm a$  opposition, differing from the other two by their lack of a zero.

The place of the nominative and genitive in the declension system can be further defined by stating that each functions as the primary case for desinential sonority opposition within the direct and oblique case sets, respectively. In this way, the nominative forms a pair with the accusative and the genitive with the dative. The leading, but opposed role of nominative and genitive cases is clearly demarcated by the fact that binary sonority distinctions apply to both, but also by the fact that the sonority values tend to be opposite to one another in the vast majority of nouns. I.e. a given noun tends to have one *-a* desinence and one non-*a* across the nominative and genitive (with the exception of zero feminines, such as *мемрадъ*). This can be easily seen by glancing at the nominative and genitive values for either singular or plural and noting how many have differing plus and minus values for sonority in the chart of noun types in the appendix, section A. Section B. of the appendix generalizes the *-a* and  $-\emptyset$  features into a single chart, based on sonority.

#### B. Accusative and dative case set.

The accusative and dative can be considered as united by the Jakobsonian feature of directionality. While the binary feature of vocalic sonority, as presented above, is used to oppose declensional classes in the nominative and genitive, I would suggest that the binary distinction that applies to the accusative/dative block is that of  $\pm$ syncretic.<sup>3</sup> If syncretic, the accusative matches either the nominative or genitive, a secondary split related to animacy. The dative matches the locative when syncretic. However, this binary

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<sup>3</sup> The feature of syncretism plays a prominent role in Orzechowska's 1984 system of Polish declensional classes (Orzechowska 1984:225-7).

opposition of  $\pm$ syncretic only occurs in the singular, and even there it appears to be a redundant feature of the binary sonority features of the nominative and genitive cases. Thus, a non-*a* nominative marking (e.g. *закон/слово*) implies the direct case +syncretic feature in the paired directional case (accusative), while a +*a* nominative marking implies a syncretic feature in the accusative (e.g. *книгу*). Likewise, a genitive non-*a* implies +syncretic in the oblique directional (dative), while a +*a* genitive implies a -syncretic value in the dative. In other words, if we hold direct and oblique cases constant, positive or negative sonority in the nominative/genitive has a negative correlation with syncretism in the accusative/dative, respectively. Examples of values for  $\pm$ syncretic can be found in section C. of the appendix.

Curiously the high rounded -*u* desinence seems to play a special role as a designator of non-syncretism, since it appears in both the non-syncretic accusative (e.g. *книгу*) and the non-syncretic dative (*столу/слову*). The only other use of -*u* occurs in the special genitive-2 and locative-2 forms, which seems to indicate that whenever this -*u* occurs, the genitive-1 and genitive-2 (and, correspondingly, locative-1 and locative-2) are not syncretic, in contrast to the absence of -*u* in nouns which syncretically unite the desinences for both meanings of the genitive and/or locative.<sup>4</sup>

The secondary, redundant role of the accusative/dative block is underscored by its lack of a  $\pm$ syncretic opposition in the plural. In the only direct plural case which undergoes syncretism (the accusative plural), syncretism is generalized to all declensional classes. Conversely, in the oblique plural case of the A/D block—the dative—the opposite generalization occurs, and there is no syncretism with the locative at all.

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<sup>4</sup> This observation is not negated by the fact that locative-2 can also be realized by a stressed -*i* desinence, as in *в печи́*. The -*u* still is the mark of non-syncretism when it does occur. In addition, the desinence non-initial -*u* vowel, which occurs after -*j*- in such instrumentals as *тетрадью*, has an -*u*- which points to the fact that all other declension types have a unified -*o*- as their desinential vowel.

### C. Locative and instrumental case set.

As one proceeds from the N/G to the A/D and L/I case sets, there is a gradual loss of the ability to oppose the various declensional types by means of desinential vocalic oppositions. As noted above, the N/G have this opposition in all four of the relevant slots, i.e. in both singular and plural. The A/D set has this opposition only in the singular, while the plural has uniform +syncretic (accusative) or -syncretic (dative). However, the locative and instrumental lack this vowel opposition in both singular and plural. The only sort of binary opposition occurs in the desinential consonant of the instrumental (-*m*- vs. -*j*-) and the locative-2, for the small set of nouns, where -*u* signals non-syncretism in the locative-2.

The full hierarchy of opposition potential might be tentatively sketched as follows, from greater to lesser:

1. Nominative singular. Double sonority opposition of  $\pm a$  and  $\pm \emptyset$ , effectively opposing three entities on two levels.
2. Genitive singular, nominative plural, and genitive plural. Single sonority opposition of either  $\pm a$  or  $\pm \emptyset$ .
3. Accusative singular and dative singular. Single opposition of  $\pm$ syncretic, redundantly correlated to the sonority features of the paired non-directional case (accusative paired to nominative and dative paired to genitive).
4. Instrumental singular. Desinential opposition on the basis of consonantal features, rather than vocalic.
5. a. Accusative and dative plural. Neutralized positive or negative syncretism for all declensional classes of the given case.

b. Locative singular and plural and instrumental plural. No opposition.

III. Generalizations about the pattern of nominative/genitive features, especially in relation to gender.

The grouping of the major noun classes into their sonority oppositions in the nominative and genitive cases provides us with a binary classification that shows how nouns are set off from each other. It also permits certain statements of general patterns which might otherwise go unnoticed. Among these are patterns which are correlated with a particular gender or meaning, such as the animate/inanimate or personal/non-personal<sup>5</sup> oppositions.

A glance at the features in the appendix, part A, shows that only a single noun type—the zero feminines—have minus specifications in all of the cases other than the genitive plural, i.e. every time there is an opposition of an -a desinence and a less sonorous one, the zero feminines opt for the less sonorous choice (e.g. *кость/кости/костю*). It appears that this negative specification for the high sonority -a desinence in the three morphological slots (of nom. sg., gen. sg. and nom. plur.) is correlated with the non-personal semantic property of these nouns (e.g. *тетрадь/кость*), but only in non-alternating stems (the two anomalous alternating stems with the -er- extension--*мать/дочь*--represent a stark contrast to the generally<sup>6</sup> non-human remainder of the category). However, the semantic anomaly of the nouns *мать/дочь* has led to their frequent substitution by nouns of the more usual feminine category, with nom. sg. in -a, e.g. *мама/дочка*. Many Slavic languages have, in fact, removed the nouns for 'mother' and 'daughter' from this declensional class, as has happened in Polish with substitution of -a nouns *matka* and *córka* for the original feminine zero-nouns.

<sup>5</sup> By “personal,” I am referring to nouns which often refer to a human being or other personified entity.

<sup>6</sup> Other than the special morphological exceptions of *мать/дочь*, there is the emotively used expletive *блядь*, which has unusual syntactic properties and stands apart from the rest of its class.

The very same zero feminine class also represents the only pattern in which the nominative and genitive singulars do not contrast in sonority and, therefore, the only class that avoids *-a* in both nominative and genitive singular. This helps retain the non-redundant property of the genitive ending, which otherwise would have been fully predictable on the basis of the nominative. I.e., if not for this class, a low sonority non-*a* nominative would predict a genitive *-a* and high sonority *-a* nominative would predict a low sonority *-i* genitive.

## VII. Redundancy and semantic features of animacy.

It is well-known that the syncretic accusative, in both singular and plural, serves to signal the subgender of animacy. Based on the use of binary features of sonority, I have shown that the presence or absence of accusative case syncretism is redundant, based on whether the nominative singular uses an *a* or non-*a* ending. Thus, it appears that certain features, which are redundant in the basic signalling of the primary declensional classes, take on a new semantic role in the subgender of animacy, due to the secondary split of the nouns positively marked for syncretism. In fact, the secondary split of +syncretic nouns in the singular is a mirror image of the basic sonority distinction of  $\pm a$ , since nouns with *-a* in the accusative are the animate subset of +syncretic nouns, while +syncretic nouns with accusative singulars that use a non-*a* are the inanimate class. Thus, the subcategorical split of syncretic accusatives recapitulates the same sonority opposition found as the primary division of the nominative singular, where the animates take the opposite accusative ending of their nominative singular. These nouns all are united by being the non-*a* nouns of the nominative singular. E.g. *вижу мальчика* vs. *вижу стол* displays an *-a* vs. non-*a* opposition, which is phonologically analogous to the nominative case *книга* vs. *стол*.

Likewise, the +*a* nouns of the nominative singular signal animacy in the genitive plural by means of the desinence opposite to their nominative singular *-a*, namely zero. The zero vs. non-zero opposition of the accusative plural can be seen in *вижу жен* vs. *вижу книги*, in other words zero vs. non-zero.

## VIII. Paradigmatic vs. syntagmatic sonority features.

The sonority features of individual nouns can be considered paradigmatic since they are based on a sonority opposition within each of the case slots. Syntagmatic sonority contrast occurs either attributively or predicatively and has taken on the meaning of personal, usually involving reference to a human being. Sonority may agree as either *-a* or zero in both syntagmatic positions when the personal meaning is of an unmarked gender. When syntagmatic sonority does contrast, it can signal a marked gender and the personal feature, as follows:

1. Adjectival desinence in *+a*, noun desinence non-*a*: e.g. *большая кость*, signals non-personal meaning, as noted above.
2. Adjectival desinence in non-*a*, noun desinence *+a*: e.g. *большой Саша*, signals personal meaning.
3. Subject noun in non-*a* plus past-tense verb in *+a*: e.g. *врач вошла*, sonority contrast signals personal meaning.

## IX. General observations based on the pattern of sonority opposition.

A general thesis of this paper is that a consideration of binary features of desinential sonority, as represented in sections A and B of the appendix, might shed light on Russian linguistic patterns that might otherwise go unnoticed. For example, one can establish which patterns invariably occur and which are excluded from the inventory.

In terms of the grid shown in part B of the appendix, one can see that no noun can be marked with all pluses or all minuses in the four slots representing N/G cases in the two numbers. That is, no noun can consistently opt for higher or lower sonority in all four of the relevant slots. In fact, with the exception of the feminine zero *тетрадь* type, all

nouns have opposite sonority values for the nominative and genitive singular. However, since the *тетрадь* type does have opposite sonority values for the nominative singular and plural, which is not true of all nouns (e.g. *город*: *города́/городо́в*, it is possible to make the general statement that all Russian nouns must have differing sonority values for the nominative and genitive cases in at least one of the two numbers.

Although nouns with nominative singular *-o* are usually differentiated from zero nouns in several cases (typically all of the nominative and genitive forms except the genitive singular, as in the case of *стол/слово*, four sets of such pairs agree in all of their nominative and genitive forms except for the zero/non-zero opposition of the nominative singular. As shown in section B of the appendix, such sonority equivalence outside the nominative singular applies to the pairs representing *слово/глаз*, *грузин/яблоко*, *город/облако*, and *завод/личико*. This underscores the fact that the nominative singular, with its double hierarchy of sonority differentiation, is the basic differentiator of the *-o* and zero noun classes. In a similar way, the genitive singular functions as the main differentiator of nouns with *-a* in the nominative singular and feminine zero-nouns from all others.

## IX. Conclusion.

This paper has presented the outlines of a Russian declensional classification that recognizes two important groups of cases in which a binary opposition can be said to occur. The non-directional block of cases (nominative and genitive) uses vowel sonority as a binary feature, while the directional block of cases (accusative and dative) uses binary features of syncretism. There are many relationships of redundancy that apply between these two blocks of cases and the features of syncretism are largely predictable on the basis of the binary sonority values of the nominative and genitive singular. While paradigmatic sonority is employed for the purpose of setting forth the distinctions of declensional class, syntagmatic sonority is utilized for the distinction of gender. Secondary genders, such as the so-called gender of animacy, rely on selections made within the subset of syncretic cases, such as the accusative. Thus, the binary feature

+syncretic can simultaneously play a unifying role and a differentiating one. The vexing questions of whether there are two, three, or more declensional classes can ultimately be resolved on basis of establishing the number of feature sets that oppose sonority in the nominative and genitive cases, particularly of the singular, as represented in section B of the appendix.



## Appendix

A. Binary paradigmatic oppositions of sonority in Russian nominative and genitive cases. (Based on whether they realize an *-a* or non-*a* in nom. sg., gen. sg., and nom. pl., and zero or non-zero in gen. pl.)

	<b>завод</b>	<b>город</b>	<b>грузин</b>	<b>глаз</b>
Nom. Sg.	non- <i>a</i>	non- <i>a</i>	non- <i>a</i>	non- <i>a</i>
Gen. Sg.	+ <i>a</i>	+ <i>a</i>	+ <i>a</i>	+ <i>a</i>
Nom. Pl.	non- <i>a</i>	+ <i>a</i>	non- <i>a</i>	+ <i>a</i>
Gen. Pl.	non- $\emptyset$	non- $\emptyset$	+ $\emptyset$	+ $\emptyset$

	<b>тетрадь</b>
Nom. Sg.	non- <i>a</i>
Gen. Sg.	non- <i>a</i>
Nom. Pl.	non- <i>a</i>
Gen. Pl.	non- $\emptyset$

	<b>слово</b>	<b>яблоко</b>	<b>облако</b>	<b>личико</b>	<b>имя</b>
Nom. Sg.	non- <i>a</i>	non- <i>a</i>	non- <i>a</i>	non- <i>a</i>	+ <i>a</i>
Gen. Sg.	+ <i>a</i>	+ <i>a</i>	+ <i>a</i>	+ <i>a</i>	non- <i>a</i>
Nom. Pl.	+ <i>a</i>	non- <i>a</i>	+ <i>a</i>	non- <i>a</i>	+ <i>a</i>
Gen. Pl.	+ $\emptyset$	+ $\emptyset$	non- $\emptyset$	non- $\emptyset$	+ $\emptyset$

	<b>карта</b>	<b>доля</b>	<b>дядя (with -<i>j</i>-extension)</b>
Nom. Sg.	+ <i>a</i>	+ <i>a</i>	+ <i>a</i>
Gen. Sg.	non- <i>a</i>	non- <i>a</i>	non- <i>a</i>
Nom. Pl.	non- <i>a</i>	non- <i>a</i>	+ <i>a</i>
Gen. Pl.	+ $\emptyset$	non- $\emptyset$	non- $\emptyset$

B. The chart may be made more uniform by simply writing binary symbols for higher and lower sonority values: plus (+) for an -a or non-zero ending, and minus (-) for a non-a or zero ending.

	<b>завод</b>	<b>город</b>	<b>грузин</b>	<b>глаз</b>
Nom. Sg.	-	-	-	- (Realized as -a vs. non-a)
Gen. Sg.	+	+	+	+
Nom. Pl.	-	+	-	+
Gen. Pl.	+	+	-	- (Realized as Ø vs. non-Ø)

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	<b>тетрадь</b>
Nom. Sg.	-
Gen. Sg.	-
Nom. Pl.	-
Gen. Pl.	+

	<b>слово</b>	<b>яблоко</b>	<b>облако</b>	<b>личико</b>	<b>имя/(теля́)</b>
Nom. Sg.	-	-	-	-	+
Gen. Sg.	+	+	+	+	-
Nom. Pl.	+	-	+	-	+
Gen. Pl.	-	-	+	+	-

	<b>карта</b>	<b>доля</b>	<b>дядя (with -j-extension)</b>
Nom. Sg.	+	+	+
Gen. Sg.	-	-	-
Nom. Pl.	-	-	+
Gen. Pl.	-	+	+

C. Binary specifications of syncretism in the accusative and dative singular. (Note negative correlation to sonority markings for  $\pm a$ -ending of direct cases (nominative/accusative) and oblique (genitive/dative)).

	<b>завод</b>	<b>город</b>	<b>грузин</b>	<b>глаз</b>	<b>слово</b>	<b>яблоко</b>	<b>тетрадь</b>
Acc.	+	+	+	+	+	+	+
Sync.							

Dat.	-	-	-	-	-	-	-
Sync.							

	<b>облако</b>	<b>личико</b>	<b>имя</b>	<b>карта</b>	<b>доля</b>	<b>дядя</b>
Acc.	+	+	+	-	-	-
Sync.						
Dat.	-	-	-	+	+	+
Sync.						

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