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Conflict in Russian Genitive Plural Assignment: a Solution Represented in DATR

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Dunstan P. Brown and Andrew R. Hippisley

Abstract. Inflectional endings are assigned in languages by general principles, but these can come into conflict. We address the question of how such conflict is resolved. A particularly complex example is the Russian genitive plural, where we find that with soft-stem nouns there is a conflict between exponent assignment according to declension class and a default exponent assignment for soft-stem nouns. What is specially interesting is that the conflict here can be resolved by reference to subsystems over and above the paradigm, such as stress. We present an explicit account of the conflict and its mediation by basing our study on default inheritance. For this purpose we make use of the lexical knowledge representation language DATR. This allows us to demonstrate in the output provided that the correct forms are indeed predicted by our theory.

1. Introduction

In every language generalizations can be made about the assignment of values for inflectional endings, but there are instances where the principles at work assigning the correct value come into conflict. It seems that subsystems over and above the paradigm resolve such conflicts. Using the lexical knowledge representation language DATR we show how the morphology of Russian copes with such clashes, illustrating this using the problematic case of the genitive plural (gen pl). In nouns which have a soft stem, there may be a conflict in the gen pl between assignment of the ending by declensional class and a default assignment for nouns which have a soft stem. This conflict is reflected in the apparently confusing data. We account for exceptions to Jakobson's (1984: 120) generalization about the form of the gen pl by showing the mechanisms by which Russian deals with such conflicts.

We first discuss the data (section 2) together with the problematic examples, and go on to introduce the idea of inheritance and default inheritance networks and the DATR notation (section 3). Section 4 accounts for the problematic examples from soft-stem nouns in

declensions II and IV and forms in declensions I and IV which have a jot suffix in the plural. The account is based on default inheritance and the mediation of conflict. We then show how our analysis is represented in DATR (section 5 and Appendix).

2. The Data

In the plural Russian has almost no distinction between declension classes. The dative, instrumental, and locative cases are the same across all classes. In fact, it is only the nominative and accusative and, to a limited degree, the genitive that maintain any kind of paradigm distinction in the plural. Although Stepanov (1968: 39) claims the gen pl can differentiate declension class, it does so only partially; and yet it has not gone as far as the other oblique cases in eliminating such distinction.

Jakobson (1984: 120) observes: "If there is a zero ending in one of the paradigms of either the singular or plural, then no zero ending occurs in the other paradigm of the same word..." This is shown in Table 1. Note that the forms are given in morphophonemic transcription.

Table 1

	I	II	III	IV
Nom Sg	zakon–Ø	komnat–a	kost'–Ø	v'in–o
Gen Pl	zakon–ov	komnat–Ø	kost'–ej	v'in–Ø

The zero ending elsewhere is referred to as "negative",[1] and the non-zero as "positive". Using these terms, the schema is as in Table 2.

Table 2

I	II	III	IV
–	+	–	+
+	–	+	–

There are a number of nouns which fall outside Jakobson's observation (i.e., the gen pl ending is assigned for other than paradigmatic reasons). As we later demonstrate, the counter-examples can be accounted for if we understand that a conflict of inflectional ending assignment may arise when nouns must "choose" between the paradigm and a more general group, namely, the group of nouns whose stem ends in a soft consonant (soft-stem nouns). The declensions are given in Table 3.

Table 3

	I	II	III	IV
	zakon 'law'	komnata 'room'	kost' 'bone'	vino 'wine'
Singular				
Nom	zakon–Ø	komnat–a	kost'–Ø	v'in–o
Acc	zakon–Ø	komnat–u	kost'–Ø	v'in–o
Gen	zakon–a	komnat–i	kost'–i	v'in–a
Dat	zakon–u	komnat–e	kost'–i	v'in–u
Loc	zakon–e	komnat–e	kost'–i	v'in–e
Inst	zakon–om	komnat–oj	kost'–ju	v'in–om
Plural				
Nom	zakon–i	komnat–i	kost'–i	v'in–a
Acc	zakon–i	komnat–i	kost'–i	v'in–a
Gen	zakon–ov	komnat–Ø	kost'–ej	v'in–Ø
Dat	zakon–am	komnat–am	kost'–am	v'in–am
Loc	zakon–ax	komnat–ax	kost'–ax	v'in–ax
Inst	zakon–am'i	komnat–am'i	kost'–am'i	v'in–am'i

As in Corbett and Fraser (1993), we have four noun paradigms. However, the number of paradigms in Russian is a matter of controversy. Most descriptions treat *v'in-ó* and *zakón* as part of the same paradigm (Vinogradov, Istrina, and Barxudarov 1952; Unbegaun 1957; Stankiewicz 1968). Corbett's (1982) main argument for adopting four declension classes is that gender can then be derived from a combination of semantic and morphological information required within the lexical characterization of nouns for other reasons. It can be seen from Table 3 that Russian has a fusional system of inflection, where the endings indicate case and number. In the plural the dative, instrumental, and locative do not distinguish declension class. With the genitive, however, there are three different exponents which

distinguish the four different classes: class I takes -*ov*, classes II and IV take the bare stem; and class III takes -*ej*. In terms of negative and positive endings we see classes I and III opposed to II and IV, where the former have a negative nominative singular (nom sg) and positive gen pl.

The situation is not quite so straightforward when we consider other examples of the gen pl. In class II we find nouns like *dol'-éj* 'portions' (gen pl), and in class IV nouns like *mor'-éj* 'seas' (gen pl) and *kolén'j-ov* 'mechanical joints' (gen pl). Clearly these nouns (Table 4) do not fit into Jakobson's (1984: 120) generalization (cf. Tables 1 and 2):

Table 4

	II	IV
Nom Sg	dól'–a	mór'–o, kolén–o
	(+)	(+)
Gen Pl	(+)	(+)
	dol'–éj	mor'–éj, kolén'j–ov

We will show how these counter-examples can be accounted for in terms of their membership of two particular groups which have differing values for the gen pl exponent: the group of soft-stem nouns and the group of declension class II and class IV nouns. A conflict of gen pl assignment arises; we will show how a default inheritance approach can deal with the resolution of such conflicts.

3. Default Inheritance and DATR

We can represent the data in terms of default inheritance relationships. For this we use the lexical knowledge representation formalism DATR.

3.1. Default Inheritance

Russian noun classes can be described in terms of hierarchies where values are inherited by default unless otherwise stated (Corbett and Fraser, 1993). Default inheritance has been widely used in knowledge representation in artificial intelligence (Fahlman 1979; Brachman 1985) and in Word Grammar (Hudson 1990; Fraser and Hudson 1992). For a comprehensive overview of inheritance networks and their use in linguistics, see Daelemans et al. (1992).
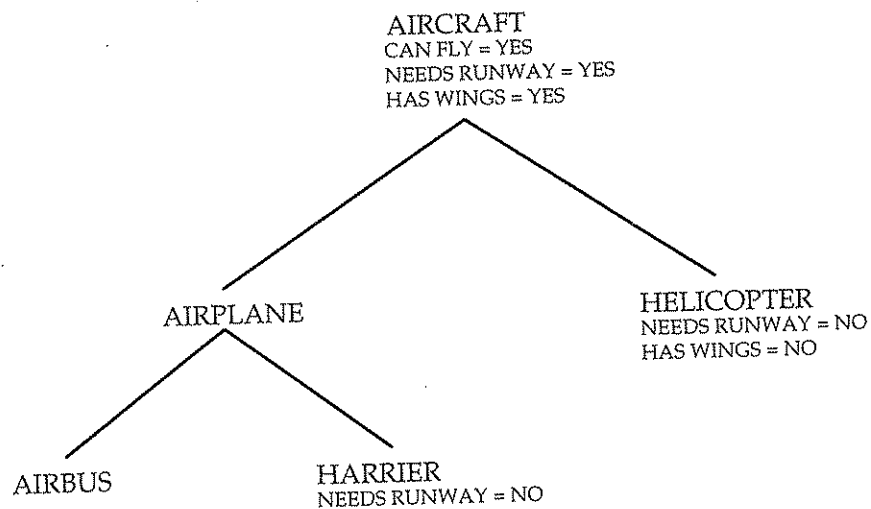
Figure 1

Figure 2

In order to introduce what is meant by default inheritance, it has been common practice to illustrate with non-linguistic examples. We consider a small inheritance network for aircraft in Figure 1 above.

In our example in Figure 1, the node AIRBUS inherits the generalizations about aircraft—that they fly, have wings, and need runways—from the top node AIRCRAFT via the node AIRPLANE.

Default inheritance allows for exceptions by letting facts stated lower down override those stated further up. In our example, HELICOPTER inherits from the node AIRCRAFT the fact that helicopters fly, but overrides the facts that aircraft need runways and have wings with the information already available locally. HARRIER inherits the fact that aircraft have wings, but overrides the general fact that they, and, more specifically, planes need runways.

Corbett and Fraser (1993) use the lexical knowledge representation language DATR, developed by Evans and Gazdar (1989a; 1989b), to describe Russian noun declensions. Lexical items inherit general facts about Russian nouns which are stated in the hierarchy. Where lexical items are exceptional in any way, these general facts are overridden. Their declension class hierarchy is represented in Figure 2 opposite.

Here, general statements about nominals are inherited by default for nouns at the node NOUN: for example, the final segments of the dative, instrumental, and locative plural (-*m*, -*m'i*, -*x*). And so in turn the nodes N_I, N_II, N_III and N_IV, representing the four noun
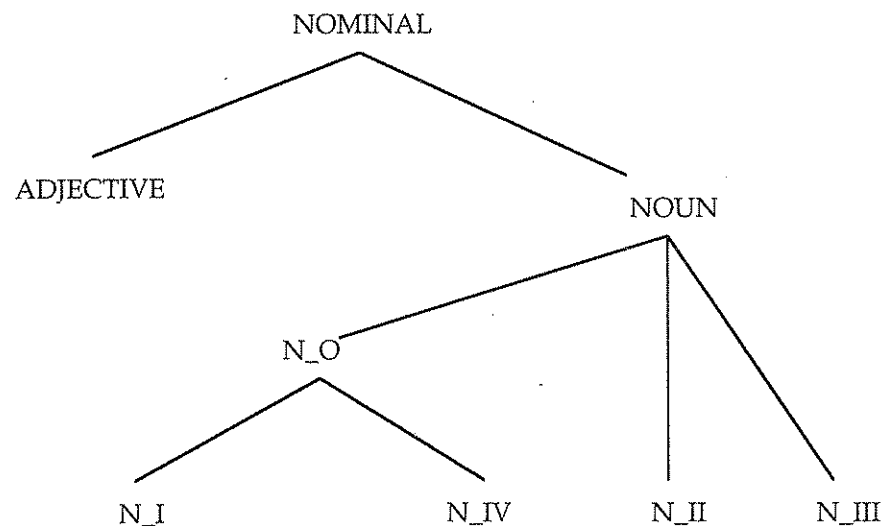
classes, inherit these same properties by default. This means there is no need to specify at each declensional class those properties which are the same for every declensional class. Furthermore, these same properties will be inherited from NOMINAL by ADJECTIVE. Nouns and adjectives are distinguished by the theme vowel that precedes the dative, instrumental and locative plural endings—the vowel *a* is used for nouns and *i* for adjectives—and these are specified at the nodes NOUN and ADJECTIVE.

The use of default inheritance not only captures the similarities between declensions (paradigms), it also maintains the differences. The controversy surrounding the number of noun paradigms in Russian has been mentioned above. By using default inheritance, Corbett and Fraser (1993) are able to separate *zakón* and *v'in-ó* into two classes, thus having four classes overall, and at the same time capture the fact that *v'inó* and *zakón* share many properties. This is achieved by introducing a shared node from which the two classes inherit. This node, N_O, stores the oblique cases in the singular, which is the same for both classes. And so in Corbett and Fraser (1993: 129): "Looking down from the top, Russian has three noun declensional classes... looking up from the bottom it has four..."

In addition to straightforward default inheritance, the DATR language also allows for multiple inheritance. In such cases the relationship between nodes cannot be understood in terms of a directed

tree, since a node can inherit properties from more than one parent. In the network of Corbett and Fraser, and in ours, certain properties are inherited from nodes other than in the way represented in Figure 2. More specifically, declension class IV inherits the value for gen pl from declension class II, and declension class III inherits its nom sg from class I and its genitive singular (gen sg) from class II (the syncretism between the genitive, dative, and locative singular in class III is dealt with by referrals to the value for the gen sg at this node). Issues arising from the simultaneous use of multiple inheritance and defaults are discussed in Daelemans et al. (1992: 207–08).

3.2. DATR

DATR makes use of default inheritance to express generalizations about lexical items. The DATR notation uses path equations to express information. The angled brackets denote paths. A path is a sequence, possibly null, of attributes. For example, in the appendix the equation N_O:<mor gen sg> == "<stem sg>" _a has a path on its left-hand side whose attributes are represented by the sequence of prefixes mor, gen, and sg, meaning 'morphological genitive singular'. N_O is the node at which this information is found.

In this paper we make use of the following equation types to express hierarchical information relating to Russian declensions. They appear in section 5, on the DATR implementation.

(1)   a.   Node1: <> == Node2
         b.   Node1: <Path1> == Value1
         c.   Node1: <Path1> == "<Path2>"
         d.   Node1: <Path1> == "<Path2>" Value1
         e.   Node1: <Path1> == Node2: <Path2>
         f.   Node1: <Path1> == Node2
         g.   Node1: <Path1> == Node2:<"<Path2>">

In (1a) the path at Node1 is empty (i.e., there are no attributes specified), and this means that Node1 inherits all available values from Node2, except those that are explicitly overridden at Node1. The second type of equation shown, in (1b), is for the assignment of a value to a path; for instance, in the lexical entry for *zakon* there is an equation <infl_root> == zakon. The quotes round Path2 in (1c) mean that this path is globally inherited. This means that the value for the path is determined at the original query node, and is not found at Node1. For instance, in our DATR representation the value for nom sg at the node N_I is the stem (N_I: <mor nom sg> == "<stem sg>"), which is evaluated at the lexical entry. In (1d) we have an example of a DATR sequence,

which can consist of an arbitrary number of DATR descriptors. In this case, the sequence is the concatenation of the value for Path2 at the original query node and the value Value1. This is used, for example, to concatenate a stem, evaluated at the lexical entry, with an ending. It can, of course, be used to concatenate other values. In (1e) we have an equation which states that the value of Path1 at Node1 can be found by looking for the value of Path2 at Node2. The equation in (1f) is similar to (1e) in that it states that the value for a path, namely Path1 at Node1, can be found by looking at Node2. In (1f) the path need not be stated, as it has the same attributes and ordering as Path1 at Node1. In other words, (1f) is entirely equivalent to the equation Node1: <Path1> == Node2: <Path1>. Equation types (1e) and (1f) can be used for multiple inheritance: a particular path at one node inherits via a particular path at another node. Finally, we have an example of an evaluable path in (1g). This allows us to determine the value of Path1 at Node1 by evaluating a particular path at Node2.

In the next section we account for the data. In section 5, we discuss the DATR representation of our account.

4. Explaining the Data

In our hierarchy the gen pl is specified in three places: at nodes N_I (-*ov*), N_II (stem) and MGP (morphological gen pl) (-*ej*). N_IV inherits its gen pl from N_II. This is illustrated in Figure 3, where the dashed lines indicate multiple inheritance.
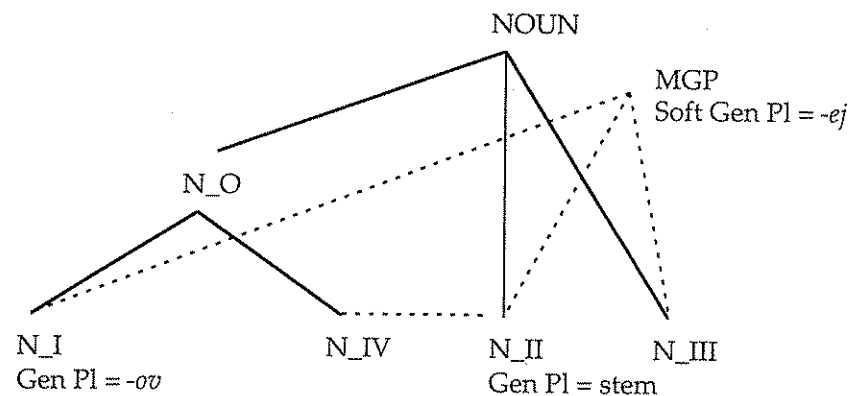

Figure 3

In the following sections we show how other parts of the system, such as stress, can help to establish which grouping takes precedence in determining the exponent.

4.1. Declension Classes II and IV

It is interesting that the counter-examples to Jakobson's observations on the gen pl cited above are nouns whose stem ends in a soft consonant. As is well known, Russian has a phonological opposition between palatalized (soft) and non-palatalized (hard) consonants. That is, we can find minimal pairs which are opposed solely on the basis of whether or not a consonant is soft. Noun stems can end in either a hard or soft consonant. There are also stems which end in functionally hard or soft consonant. There are also stems which end in functionally soft consonants, i.e., consonants which are not palatalized, but act as if they were: /š/ and /ž/. It is only when we get to the genitive that the distinction between soft and hard consonants affects the paradigm, in that the gen pl ending depends in part on the hardness of the stem.

This fact is captured by the way Corbett and Fraser (1993) deal with the gen pl for class III nouns. In short, they say that all nouns whose stem ends in a soft consonant will, by default, take the gen pl ending -*ej*. Because this is a generalization over Russian nouns as a whole, this information, in their representation, is stored at node NOUN, where the values for nom pl and loc sg are also found. Since class III is made up exclusively of soft- and functionally soft-stem nouns, the value for the gen pl need not be mentioned at N_III. By default this information will be inherited from NOUN. This analysis accounts for soft-stem class I nouns such as *žítel'* 'inhabitant', whose gen pl is *žítel'-ej*. More significantly, it seems to account for our counter-examples in classes II and IV, since they have a soft stem and indeed take the gen pl ending -*ej*. So the correct ending is generated: the gen pl of the class II noun *dól'-a* is *dol'-éj*; and of class IV *mór'-o* is *mor'-éj*.

However, this generalization does not always apply for classes II and IV, since the overwhelming majority of soft-stem nouns for these classes do not take the soft gen pl -*ej* ending.[2] Thus, for class II we have in the gen pl not only soft-stem examples such as *dol'-éj*, but also such as *nedél'-Ø*. We will introduce a framework to deal with nouns like *nedél'-a*.

The pattern for soft-stem nouns of classes II and IV is shown in Table 5.

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2 Mahota (1993: 326) notes that there are very few nouns in class IV of the *mór'-o* ~ *mor'-éj* type. In our analysis this fact is accounted for, in that there are very few nouns of this class with stress patterns where stress falls on the ending in the oblique cases.

Table 5

	II	IV
Nom Sg	+	+
Gen Pl	– / +	– / +

The problem of *dol'-éj* vs. *nedél'-Ø* has not been overlooked in the literature. It has been observed that stress placement determines the gen pl ending of class II soft-stem nouns: if in the gen pl stress is on the stem, then the ending (exponent) is the one expected for the paradigm, i.e., just the stem itself; if it is on the ending, then we get -*ej*. This observation is explicit in Stankiewicz (1968: 49), and implicit in Popova (1987: 21). It is explicit in Zaliznjak's (1977: 49) dictionary in that he marks forms which have the overt soft ending and stem stress as "irregular". From our examples *dol'-éj* would represent a noun with stress on the ending.

Thus, the soft gen pl for class II nouns is determined by stress: if the stress is on the stem, then the value is the same as that for the gen pl of hard-stem nouns; if it is on the ending, then the value is that specified for soft-stem nouns in general.[3] This will give the correct forms of *nedél'-Ø* and *dol'-éj*. In fact, by default, stress is on the stem and immobile. This is a generalization for Russian nominals since, in Russian, stress is on the stem throughout the paradigm (cf. Ilola and Mustajoki 1989: 49, where 91.6% of nouns follow this pattern). The default value for stress therefore means that we would predict more

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3 One of the assumptions made here is that stress is accessed by the morphological component. For our purposes, the morphology accesses stress patterns of only four basic types. These are the four alternants you get if stress is on the ending or stem in each number. In our implementation there are also sub-patterns where the stress may appear on the stem in the acc sg or nom pl. These sub-patterns may only occur where stress would appear on the ending in the singular or plural. Thus, those patterns where stress would appear on the ending in only one number can have only one sub-pattern. In the one pattern where it would appear on the ending in both numbers, there are three possible sub-patterns (stress on the stem in the nom pl, stress on the stem in the nom pl and acc sg, and stress on the stem in the acc sg). However, only two sub-patterns are to be found in this instance: stress never occurs on the acc sg alone in the pattern where stress would fall on the ending in all other cases. These sub-patterns, we contend, are of no interest for the conflict-mediating role of the stress system, and it is significant that such patterns only permit deviation in the nom pl and acc sg, leaving the morphological stress system open to mediate in determining the exponent for classes II and IV. Our approach basically follows that of Zaliznjak (1977: 31), in that stress patterns are classified according to the position of stress (stem or ending) in each number.

class II nouns whose stem ends in a soft consonant to be assigned the declension class ending (i.e., a zero ending, or the stem itself).

The literature does not appear to deal explicitly with the problem posed by soft class IV gen pl *mor'-éj* vs. *žil'íšč'-Ø*.[4] However, there appears to be a relationship between class II and class IV nouns. For class IV, as with class II, it is stress that determines the gen pl exponent: if stress is on the stem, then the exponent is the same as for hard-stem nouns; if stress falls on the ending in the oblique cases, the ending is that of soft-stem nouns in general. This means that class IV nouns select the same gen pl exponent as class II nouns, regardless of the hardness of the stem.

The reason why this conflict of assignment should arise in class II and IV nouns alone is that the exponent of the gen pl for these paradigms is the stem itself. A noun in a soft stem cannot therefore be ruled out from co-occurring with the gen pl exponent for the paradigm, as there can be no morphonological restrictions on nothing. This contrasts with declension classes I and III. In class III, all nouns have soft or functionally soft stems and will therefore always take the default soft ending *-ej*. In class I, the gen pl ending *-ov* is reserved for nouns with a hard stem, and nouns whose stem ends in a soft consonant in this class will therefore have to take the default ending *-ej*.

It should be noted that class II nouns whose stem ends in the soft consonant jot behave as hard-stem nouns. For example, the gen pl of *stat'j-á* 'article' is *stat'éj-Ø*, where the vowel proceeding the jot is inserted for syllabification. Reformatskij (1975: 85) points out that nouns with a stem which ends in jot will pattern with nouns with a hard stem. This is achieved in our analysis by switching the morphological hardness of jot and giving it the value 'hard'. Any declension II or IV nouns that have a stem ending in jot which is not the result of suffixation will take the standard paradigm ending. In other words, the conflict here is avoided by switching the morphological hardness of the stem. This is an option which is open for jot because it is not paired. In other words, there is no phoneme to which it is opposed solely on the basis of phonological hardness.

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[4] Zaliznjak (1977: 54) does mark the gen pl of *pleč-ó* with a superscript that indicates that it is "morphologically irregular", presumably because it does not follow the generalization about stress and the gen pl ending. Note that the form *pleč-éj* for the gen pl is to be found in *SRJ*, although it is marked as "archaic". The only other exception to our analysis which we can find for class IV nouns is the gen pl of *kolén-o* when it means 'knee'. It has an unexpected *-ej* ending when the stem is stressed. As the whole of the plural is suppletive for this noun (nom pl is *kolen'-i*), the superscript applies to the other forms as well. The "morphological irregularity" is therefore not limited to the gen pl.

Given our view of Russian nominal inflection in terms of an inheritance hierarchy, it would seem that the stress system is used as a means of resolving the conflict of group membership that arises with soft-stem nouns in classes II and IV. The use of this system is a property which these two classes alone share, and is further justification for the multiple inheritance approach to gen pl assignment in class IV nouns, since these nouns resolve this conflict in the same way as class II nouns.

The paradigmatic role of stress has been mentioned elsewhere (Jakobson 1971b: 151), and it has also been dealt with in terms of the markedness of the genitive and plural (Shapiro 1969). Although the regularity of the relationship is either explicit or implicit in other works, as mentioned earlier, this mediating role has nowhere been articulated or formally analyzed.

4.2. Class I and IV Nouns with a Jot Suffix in the Plural

In the plural *kolén-o*, when it means 'mechanical joint', has its stem augmented by the palatal glide (jot). As exceptions to his rule, Jakobson (1971b: 150) recognizes nouns of this type as having "a special stem suffix" and makes the observation that "the collective suffix *-#j-* is ordinarily followed in gen pl by the desinence *-ov*...". Although jot is phonologically soft, in the example *kolen-o* it behaves morphologically as though it were hard. Jot also acts morphologically hard in class I nouns such as *brat* 'brother', whose stem is augmented by a jot in the plural. The gen pl is not **brát'j-ej*, as predicted for a soft-stem noun, but *brát'j-ov*. Class I nouns such as *brat* are distinguished by selecting the nominative plural (nom pl) typical of class IV nouns, i.e., *brát'j-a*.

All this suggests that when a jot is introduced into the stem in the plural, this signals that the genitive will inherit from class I and the nominative will inherit from class IV. This can be viewed as an instance of multiple inheritance (see (1e) and (1f) in section 3.2 for multiple inheritance in DATR). The entry for *brat* would have the same amount of information as that for *kolén-o*.

5. DATR Representation of the Analysis

In this section we present a formal account in DATR of the analysis in section 4. The DATR fragment is given in full in the appendix. For an explanation of the DATR syntax, refer to section 3.2. Note that ellipses are not part of the DATR syntax, but are used to represent material that has been omitted from the full version.

5.1. The Oblique Cases in the Plural

In the plural the dative, instrumental, and locative cases take the same form for all declension classes. In (2) the oblique case plural forms, except the genitive, are generalized for all the declension classes of nouns and adjectives. They are analyzed as consisting of the plural stem plus the vowel characteristic of the word class (theme vowel), plus the ending. We see in (3a) that the value for "<mor theme_vowel>" is *a* for nouns, and is found at the NOUN node.

```
(2)  NOMINAL:
        <mor dat pl> == "<stem pl>" "<mor theme_vowel>" _m
        <mor inst pl> == "<stem pl>" "<mor theme_vowel>" _m1
        <mor loc pl> == "<stem pl>" "<mor theme_vowel>" _x
        ...

(3)  NOUN:
        <> == NOMINAL
     a.  <mor theme vowel> == _a
        ...
```

5.2. The Gen Pl of Classes I, II, and IV (Hard)

In the plural the genitive case is assigned paradigmatically for hard-stem nouns. Classes II and IV share the gen pl exponent which is the stem itself (see Figure 3). Equation (4a) represents the fact that for hard-stem nouns with no suffix the class I gen pl is the plural stem plus -*ov*. The value for the plural stem is found in the lexical entry. This is an example of global inheritance (see (1c) in section 3.2). And in (5a) the gen pl for hard-stem class II nouns is the bare plural stem. Finally, in (6a) class IV nouns inherit the gen pl from class II. This is an example of multiple inheritance (see (1f) in section 3.2).

```
(4)  N_I:
        <> == N_O
     a.  <hard none> == "<stem pl>" _ov
        ...

(5)  N_II:
        <> == NOUN
     a.  <hard> == "<stem pl>"
        ...
```

```
(6)  N_IV:
        <> == N_O
     a.  <hard> == N_II
        ...
```

5.3. The Gen Pl of Soft-Stem Nouns

The gen pl for stems ending in a soft consonant is -*ej*. This is how we capture the fact that there is a co-occurrence restriction between the stem and the ending, so that soft-stem class I nouns such as *žitel'* 'inhabitant' do not select the gen pl ending typical for class I nouns, but rather a default gen pl ending for soft-stem nouns. Thus, the gen pl is *žitel'-ej* and not **žitel'-ov* (see section 4.1 above).

In (7a) at the node NOUN the path for the hard gen pl inherits from a node MGP ("morphological gen pl") using an evaluable path (see (1g) in section 3.2 for evaluable paths), and so does the soft gen pl (7b). The path that the gen pl inherits from at MGP is defined as whatever the morphological hardness of the stem is plus whatever the plural suffix is. Morphological hardness is distinguished from phonological hardness for the instances where the two do not correlate (see section 5.7 below). Thus, information about the suffix and morphological hardness is required in evaluating the gen pl. We can see that in (8a) if the stem is not specified for morphological hardness, the gen pl inherits the paradigmatic gen pl ending. However, if the stem is specified as soft in (8b), then the value for the gen pl ending is -*ej*. This is the default value for the gen pl of nouns whose stem ends in a morphologically soft consonant. Finally, in our treatment (9a) ensures that all class III nouns are morphologically soft. The gen pl ending for this class will be the default for soft-stem nouns (i.e., -*ej*).

```
(7)  NOUN:
        <> == NOMINAL
     a.  <mor gen pl hard> == MGP:<"<mor stem hardness>" "<suffix pl>">
     b.  <mor gen pl soft> == <mor gen pl hard>
        ...

(8)  MGP:
     a.  <> == "<>"
     b.  <soft> == "<stem pl>" _ej.
        ...

(9)  N_III:
        <> == NOUN
     a.  <mor stem hardness> == soft
        ...
```

5.4. The Gen Pl of Soft-Stem Class II Nouns

In section 4.1 we claimed that the stress system was used to mediate in the conflict of exponent assignment in nouns belonging to declension class II. In (10a) class II soft-stem nouns are evaluated at a node STEMSTRESS for stress assignment in the plural; in (11a) at that node nouns with stress on the stem inherit the gen pl schema from the hard gen pl of the declension class of the noun that is being queried (i.e., the paradigmatic gen pl). Equation (11b) states that if stress is on the ending then the gen pl is the default gen pl ending for soft-stem nouns, found at the MGP node. (12) shows how stress is generalized for nominals. At the node STRESS (not given here) the default is that stress is on the stem and is fixed. When this stress default is overridden, the stress pattern is specified in the lexical entry that overrides the default.

(10)　N_II:
　　　　<> == NOUN
　　　　<default gender> == feminine
　　　　<mor nom sg> == "<stem sg>" _a
　　　　<mor acc sg> == "<stem sg>" _u
　　　　<mor gen sg> == "<stem sg>" _i
　　　　<mor dat sg> == "<stem sg>" _e
　　　　<mor inst sg> == "<stem sg>" _oj
　　　　<hard> == "<stem pl>"
　　a.　<mor gen pl soft> == STEMSTRESS:<"<stress pl>">.

(11)　STEMSTRESS:
　　a.　<> == "<hard>"
　　b.　<ending> == MGP:<soft>.

(12)　NOMINAL:
　　　　<> == STRESS
　　　　...

The lexical entries for the soft-stem class II nouns *dól'-a* and *nedél'-a* are given in (13) and (14). They differ in terms of plural stress, and this affects the assignment of the gen pl: stem-stressed *nedél'-Ø* (gen pl) receives the same exponent as for hard-stem class II nouns (the bare stem); end-stressed *dol'-éj* (gen pl) receives the default gen pl ending for soft-stem nouns (*-ej*). Example (13) shows the class II noun *nedél'-a*; (13a) states that the final consonant of the root is a soft *l* and

(13b) that it is phonologically soft.[5] Stress need not be mentioned in the lexical entry, as stress for Russian nouns falls by default on the stem. However, in (14a) we have the class II noun *dól-a* specified for pattern 3*i* stress.[6] In this pattern, stress falls on the ending in the oblique cases of the plural.

(13)　Nedel'a:
　　　　<> == N_II
　　　　<gloss> == week
　　　　<infl_root> == nedel'
　　a.　<infl_root final> == l'
　　b.　<phon stem hardness> == soft
　　　　<sem animacy> == inanimate.

(14)　Dol'a:
　　　　<> == N_II
　　　　<gloss> == portion
　　　　<infl_root> == dol'
　　　　<infl_root final> == l'
　　a.　<stress> == Stress_3i
　　　　<phon stem hardness> == soft
　　　　<sem animacy> == inanimate.

In (15) and (16) we have all the case forms for *nedél'-a* and *dól'-a*, which can be derived as theorems, given our analysis of Russian declensions and the DATR rules of inference. Lines (15a) and (16a) show the correct gen pl forms for *nedél'-a* and *dól'-a*, respectively.

---

[5] Note the redundancy in the lexical entry as it now stands. The information <infl_root final> == l' could ultimately be extracted from information about the root, and this in turn would mean that we would not need to specify the phonological hardness of the final segment. It is not our purpose here to go deeply into modeling the phonology of Russian. For an account which demonstrates maximal use of DATR to encode phonological information, see Gibbon (1992).

[6] This pattern translates directly to Zaliznjak's (1977: 31) pattern *e*. However, we use this notation as we consider this to be a subpattern of pattern *c* (our pattern 3). This is because stress can alter only in a highly constrained way: in the nom pl and acc sing only. Stress can be represented hierarchically, and 3*i* (Zaliznjak's pattern *e*) inherits from 3 (Zaliznjak's pattern *c*).

(15) Nedel'a: \<gloss\> = week.
      Nedel'a: \<mor nom sg\> = nedel'_a.
      Nedel'a: \<mor acc sg\> = nedel'_u.
      Nedel'a: \<mor gen sg\> = nedel'_i.
      Nedel'a: \<mor dat sg\> = nedel'_e.
      Nedel'a: \<mor inst sg\> = nedel'_oj.
      Nedel'a: \<mor loc sg\> = nedel'_e.
      Nedel'a: \<mor nom pl\> = nedel'_i.
      Nedel'a: \<mor acc pl\> = nedel'_i.
  a. Nedel'a: \<mor gen pl\> = nedel'.
      Nedel'a: \<mor dat pl\> = nedel'_a_m.
      Nedel'a: \<mor inst pl\> = nedel'_a_m'i.
      Nedel'a: \<mor loc pl\> = nedel'_a_x.
      Nedel'a: \<syn gender\> = fem.
      Nedel'a: \<syn animacy\> = inanimate.

(16) Dol'a: \<gloss\> = portion.
      Dol'a: \<mor nom sg\> = dol'_a.
      Dol'a: \<mor acc sg\> = dol'_u.
      Dol'a: \<mor gen sg\> = dol'_i.
      Dol'a: \<mor dat sg\> = dol'_e.
      Dol'a: \<mor inst sg\> = dol'_oj.
      Dol'a: \<mor loc sg\> = dol'_e.
      Dol'a: \<mor nom pl\> = dol'_i.
      Dol'a: \<mor acc pl\> = dol'_i.
  a. Dol'a: \<mor gen pl\> = dol'_ej.
      Dol'a: \<mor dat pl\> = dol'_a_m.
      Dol'a: \<mor inst pl\> = dol'_a_m'i.
      Dol'a: \<mor loc pl\> = dol'_a_x.
      Dol'a: \<syn gender\> = fem.
      Dol'a: \<syn animacy\> = inanimate.

5.5. The Gen Pl of Class IV Hard and Soft Nouns with No Suffix

In section 4.1 we made the claim that class II and class IV soft-stem nouns are evaluated in the same way. In (17a) hard-stem nouns of class IV inherit from class II for the gen pl ending. In (17b) all class IV soft-stem nouns inherit from class II. This means that lexical entries that have a soft stem and end stress in the plural will be evaluated at STEMSTRESS via N_II and receive the default soft gen pl ending -*ej* (see section 5.4 above).

(17) N_IV:
      \<\> == N_O
  a. \<hard\> == N_II
  b. \<mor gen pl soft\> == N_II
      ...

The lexical entry for the phonologically soft class IV noun *mór'-o* 'sea' is shown in (18). In (18a) we see that the stem is phonologically soft, while (18b) shows the stress assignment pattern for *mór'-o*. In pattern 3, stress falls on the stem in the singular but shifts to the ending in the plural.

(18) Mor'o:
      \<\> == N_IV
      \<gloss\> == sea
      \<infl_root\> == mor'
      \<infl_root final\> == r'
  a. \<phon stem hardness\> == soft
  b. \<stress\> == Stress_3
      \<sem animacy\> == animate.

5.6. Class I and IV Nouns with Plural Stem in Jot

The introduction of a jot suffix, it was claimed in section 4.2, brought about multiple inheritance between classes I and IV. Class I nouns then inherit the nom pl from class IV, and class IV nouns inherit the gen pl from class I. However, it is only when jot is a suffix that we find this relationship between classes I and IV. If the jot is simply the final stem consonant in a noun, the noun is assigned the nom and gen pl endings typical of its class. So, for example, the nom pl of the class I noun *tramvaj* 'tram' is *tramvaj-i*.

Example (19) shows the default nom pl for nouns: (19a) states that the nom pl is evaluated in terms of the suffix in the plural; in (19b) we see that if there is no suffix, then the nom pl ending -*i* is attached to the stem of the lexical entry queried. In (19c) the gen pl is defined in terms of the morphological hardness of the stem and the suffix (if any) in the plural. In (20a) for class I nouns the nom pl of nouns with the jot suffix in the plural inherits from class IV. Equation (20b) represents the fact that class I nouns which are morphologically hard and have the jot suffix in the plural inherit the gen pl ending from morphologically hard-stem nouns without a suffix (i.e., they take the paradigmatic gen pl ending). In (21a) class IV nouns override the default nom pl ending for nouns found at NOUN and take the ending -*a*. Finally, in (21b)

morphologically hard-stem class IV nouns with the jot suffix in the plural inherit the gen pl ending from class I.

(19) NOUN:
      <> == NOMINAL
   a. <mor nom pl> == "<mor nom pl "<suffix pl>">"
   b. <mor nom pl none> == "<stem pl>" _j
   c. <mor gen pl hard> == MGP:<"<mor stem hardness>" "<suffix pl>">
      ...

(20) N_I:
      <> == N_O
      <default gender> == masc
   a. <mor nom pl j> == N_IV
      <mor nom sg> == "<stem sg>"
      <hard none> == "<stem pl>" _ov
   b. <hard j> == <hard none>.

(21) N_IV:
      <> == N_O
      <default gender> == neuter
      <mor nom sg> == "<stem sg>" _o
   a. <mor nom pl> == "<stem pl>" _a
   b. <hard j> == N_I
      <hard> == N_II
      <mor gen pl soft> == N_II.

Examples (22) and (23) show the lexical entries *brat* 'brother' and *kolén-o* 'knee-joint'. Equation (22a) states that *brat* takes the jot suffix in the plural. In (23a) *kolen-o*, like *brat*, has the jot suffix in the plural.

(22) Brat:
      <> == N_I
      <gloss> == brother
      <infl_root> == brat
      <infl_root final> == t
   a. <suffix pl> == j
      <sem animacy> == animate
      <sem sex> == male.

(23) Koleno:
      <> == N_IV
      <gloss> == mechanical_joint
      <infl_root> == kolen
      <infl_root final> == n
   a. <suffix pl> == j
      <sem animacy> == inanimate.

5.7. Phonological and Morphological Hardness

In (24) phonological and morphological hardness are distinguished for nouns. In (24a) the phonological hardness inherits from the node PHONHARD where it is assessed for <suffix>. In (24b) the morphological hardness inherits from the node MORPHARD, where it is assessed for phonological hardness, the plural suffix, and the root-final consonant. In (25) we have the node PHONHARD, where in (25a) the value for hardness is given as 'hard' if there is no suffix, and in (25b) 'soft' if the suffix is a jot. Equation (25c) states that if there is no suffix in the plural, then the value for hardness will be the same as that for stems with no suffix in the singular (i.e., 'hard'). Example (26) shows the node MORPHARD. In (26a) stems which are phonologically soft receive the morphological value 'soft'. In (26b) phonologically soft stems with the suffix jot receive the morphological value 'hard', and in (26c) phonologically soft stems with no suffix and root-final consonant jot receive the morphological value 'hard'. This accounts for the fact that jot, though phonologically soft, behaves morphologically hard when it appears as the stem-final consonant. Thus, for *statj-á* we get gen pl *statéj-Ø*, rather than the expected gen pl for soft-stem nouns with end stress (i.e., -*ej*). In (26d) phonologically hard-stem nouns receive the morphological value 'hard'. Finally, (26e) and (26f) show that stems that are phonologically hard and have no suffix and whose final root consonant is *š* or *ž* select the morphological value 'soft'. These consonants are described as "functionally" soft. Thus, the gen pl of the class I noun *nož* 'knife' is *nož-éj*, i.e., it selects the default gen pl ending for soft-stem nouns.

(24) NOUN:
      <> == NOMINAL
   a. <phon stem hardness> == PHONHARD:<"<suffix>">
   b. <mor stem hardness> == MORPHARD:<"<phon stem hardness>"
                               "<suffix pl>" "<infl_root final>">
      ...

(25) PHONHARD:
    a.   <none> == hard
    b.   <j> == soft
    c.   <none pl> == "<phon stem hardness none sg>".

(26) MORPHARD:
    a.   <soft> == soft
    b.   <soft j> == hard
    c.   <soft none j> == hard
    d.   <hard> == hard
    e.   <hard none š> == soft
    f.   <hard none ž)> == soft.

5.8. Noun Stems

In (27a) noun stems inherit from the node STEM where they are
assessed for <suffix>, if any. In (28a) stems with no suffixes inherit the
inflectional root of the lexical entry being queried. Equation (28b) states
that stems with the jot suffix inherit the inflectional root plus jot, and
(28c) indicates that stems with the suffix -*in* inherit the inflectional root
plus -*in*.

(27) NOUN:
        <> == NOMINAL
    a.   <stem> == STEM:<"<suffix>">
        ...

(28) STEM:
    a.   <none> == "<infl_root>"
    b.   <j> == "<infl_root>" _j
    c.   <in> == "<infl_root>" _in.

6. Conclusion

The gen pl ending in Russian distinguishes declension class only to a
limited degree: a positive ending in the nom sg corresponds to no
ending in the gen pl, and vice versa (Jakobson 1984: 120). For the gen pl
the positive ending surfaces as -*ov* if the noun has a hard stem and -*ej*
if the noun has a soft stem (Jakobson 1984: 121). However, this analysis
goes only so far in explaining the data.

    Plural stems in declension classes I and IV which have been
augmented by the palatal glide (jot) go against Jakobson's
generalization. We view the phonologically soft unpaired consonant
jot as morphologically hard, which accounts for the fact that nouns of

all classes whose stem ends in a jot will inherit the gen pl ending
typical for hard-stem nouns. The ending is -*ov* for class I nouns and the
stem itself for nouns belonging to classes II and IV. We then state that
in the particular instances where the jot is a suffix, class IV nouns will
inherit the gen pl from class I.

    The assignment of the gen pl ending in classes II and IV is
morphophonemically unrestricted since the exponent of the gen pl is
no more than the stem itself. This brings about a conflict between the
paradigm and default assignment for soft-stem nouns, and the counter-
examples to Jakobson's generalization can be understood in terms of
this conflict and its mediation. The stress system is used to mediate
when there is a conflict of assignment of ending in classes II and IV.

    We have shown how an analysis based on default inheritance,
expressed in the lexical knowledge representation language DATR,
presents an elegant account of why the conflict arises and how it can be
resolved: it arises because more than one value can be inherited; it can
be resolved by having access to information from another area.

APPENDIX

```
% % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % %
%
%   AUTHORS:      Dunstan Brown and Andrew Hippisley
%
%   DATE:         6/10/93
%
%   VERSION:      genpl9e3.dtr
%
%   DESCRIPTION:  A DATR fragment for genitive plural assignment in Russian
%                 nouns.
%
%   NOTE:         Morphophonemic transcription and not in standard
%                 orthography.
%
% % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % % %

#vars $number: sg pl.

#load 'stressa.dtr'.     %  This loads a fragment containing a network of
                         %  stress patterns (not given here).

%  The node PHONHARD: the hardness of the stem is assessed by accessing
%  information about the suffix.
```

PHONHARD:
```
    <none> == hard
    <j> == soft
    <none pl> == "<phon stem hardness none sg>".
```

```
%   The node STEM: the left-hand side corresponds to the suffix (see the path
%   <stem> at NOUN). Thus, the stem is defined as the inflectional root, plus the
%   suffix, if there is any.
```

STEM:
```
    <none> == "<infl_root>"
    <j> == "<infl_root>" _j
    <in> == "<infl_root>" _in.
```

```
%   The node MORPHARD: the left-hand side corresponds to the evaluable
%   paths <"<phon stem hardness>" "<suffix pl>" "<infl_root final>"> pointed to
%   at NOUN: <mor stem hardness>. This means that if the final consonant of the
%   stem is phonologically soft, then it will be morphologically soft; if it is
%   soft because it is a jot and the jot is the plural suffix, then it will be
%   morphologically hard. It will also be morphologically hard if jot is the final
%   consonant and not a suffix. If the final consonant is phonologically hard then it
%   will also be morphologically hard. However if it is phonologically hard
%   because the consonant is a š or a ž then morphologically it will be soft.
```

MORPHARD:
```
    <soft> == soft
    <soft j> == hard
    <soft none j> == hard
    <hard> == hard
    <hard none š> == soft
    <hard none ž> == soft.
```

```
%   The node MGP: the left-hand side corresponds to the right side of the path
%   equation NOUN:<mor gen pl> == MGP:<"<mor stem hardness>" "<suffix
%   pl>">. Where the hardness of the stem is not specified, then the value for the
%   gen pl will be found at the declension class that is being queried. This
%   quoted path is the left side of the equation at N_I, N_II and N_IV. The path
%   <soft> gives the default for soft-stem nouns.
```

MGP:
```
    <> == "<>"
    <soft> == "<stem pl>" _ej.
```

```
%   The node STEMSTRESS: deals with the gen pl of class II and class IV nouns. If
%   the stress is on the ending, then the gen pl for soft-stem nouns is the default
%   given at MGP; otherwise it will be the same as the gen pl for hard-stem nouns
%   specified at the declension class nodes.
```

STEMSTRESS:
```
    <> == "<hard>"
    <ending> == MGP:<soft>.
```

```
%   The node ACCFORM: this node deals with the accusative form of Russian
%   nouns. A special node has to be set up because the accusative in Russian
%   is dependent on the animacy of the noun.
```

ACCFORM:
```
    <$number inanimate> == "<mor nom $number>"
    <pl animate> == "<mor gen pl>"
    <sg animate masc> == "<mor gen sg>"
    <sg animate fem> == <sg inanimate>.
```

```
%   The node GENDER: this node deals with syntactic gender and semantic sex.
```

GENDER:
```
    <male> == masc
    <female> == fem
    <undifferentiated> == "<default gender>".
```

NOMINAL:
```
    <> == STRESS
    <suffix> == none
    <suffix sg> == "<suffix>"
    <suffix pl> == "<suffix sg>"
    <mor acc $number> == ACCFORM:<$number "<syn animacy>"
                                          "<syn gender>">
    <mor dat pl> == "<stem pl>" "<mor theme_vowel>" _m
    <mor inst pl> == "<stem pl>" "<mor theme_vowel>" _m1
    <mor loc pl> == "<stem pl>" "<mor theme_vowel>" _x.
```

NOUN:
```
    <> == NOMINAL
    <stem> == STEM:<"<suffix>">
    <phon stem hardness> == PHONHARD:<"<suffix>">
    <mor stem hardness> == MORPHARD: <"<phon stem hardness>"
                        "<suffix pl>" "<infl_root final>">
    <mor loc sg> == "<stem sg>" _e
    <mor nom pl> == "<mor nom pl "<suffix pl>">"
    <mor nom pl none> == "<stem pl>"_i
    <mor gen pl> == "<mor gen pl "<mor stem hardness>">"
    <mor gen pl hard> == MGP:<"<mor stem hardness>" "<suffix pl>">
    <mor gen pl soft> == <mor gen pl hard>
    <mor theme_vowel> == _a
    <syn cat> == n
    <syn animacy> == "<sem animacy>"
    <syn gender> == GENDER:< "<sem sex>" >
    <sem sex> == undifferentiated.
```

N_O:
```
    <> == NOUN
    <mor gen sg> == "<stem sg>"_a
    <mor dat sg> == "<stem sg>"_u
    <mor inst sg> == "<stem sg>"_om.
```

N_I:
    <> == N_O
    <default gender> == masc
    <mor nom pl j> == N_IV
    <mor nom sg> == "<stem sg>"
    <hard none> == "<stem pl>" _ov
    <hard j> == <hard none>.

N_II:
    <> == NOUN
    <default gender> == fem
    <mor nom sg> == "<stem sg>"_a
    <mor acc sg> == "<stem sg>"_u
    <mor gen sg> == "<stem sg>"_i
    <mor dat sg> == "<stem sg>"_e
    <mor inst sg> == "<stem sg>"_oj
    <hard> == "<stem pl>"
    <mor gen pl soft> == STEMSTRESS:<"<stress pl>">.

N_III:
    <> == NOUN
    <default gender> == fem
    <mor stem hardness> == soft
    <mor nom sg> == N_I
    <mor gen sg> == N_II
    <mor dat sg> == <mor gen sg>
    <mor inst sg> == "<stem sg>" _ju
    <mor loc sg> == <mor dat sg>.

N_IV:
    <> == N_O
    <default gender> == neut
    <mor nom sg> == "<stem sg>"_o
    <mor nom pl> == "<stem pl>"_a
    <hard j> == N_I
    <hard> == N_II
    <mor gen pl soft> == N_II.

%   Example lexical entries.

%   The labels given to nodes correspond to morphophonemic transcription.
%   Here, č' is written with a following acute mark to indicate that it is soft.
%   Although it is unpaired, softness is given redundant marking for clarity of
%   exposition. The symbol /o/ also corresponds to orthographic <e> when the
%   ending is unstressed.

Zakon:
    <> == N_I
    <gloss> == law
    <infl_root> == zakon
    <infl_root final> == n
    <sem animacy> == inanimate.

Komnata:
    <> == N_II
    <gloss> == room
    <infl_root> == komnat
    <infl_root final> == t
    <sem animacy> == inanimate.

Kost':
    <> == N_III
    <gloss> == bone
    <infl_root> == kost'
    <infl_root final> == t'
    <stress> == Stress_3i
    <phon stem hardness> == soft
    <sem animacy> == inanimate.

V'ino:
    <> == N_IV
    <gloss> == wine
    <infl_root> == v'in
    <infl_root final> == n
    <stress> == Stress_3i
    <sem animacy> == inanimate.

Nož:
    <> == N_I
    <gloss> == knife
    <infl_root> == nož
    <infl_root final> == ž
    <stress> == Stress_2
    <sem animacy> == inanimate.

Mor'o:
    <> == N_IV
    <gloss> == sea
    <infl_root> == mor'
    <infl_root final> == r'
    <phon stem hardness> == soft
    <stress> == Stress_3
    <sem animacy> == inanimate.

```
Nedel'a:
    <> == N_II
    <gloss> == week
    <infl_root> == nedel'
    <infl_root final> == l'
    <phon stem hardness> == soft
    <sem animacy> == inanimate.

Dol'a:
    <>== N_II
    <gloss> == portion
    <infl_root> == dol'
    <infl_root final> == l'
    <stress> == Stress_3i
    <phon stem hardness> == soft
    <sem animacy> == inanimate.

Žil'išč'o:
    <> == N_IV
    <gloss> == habitation
    <infl_root> == žil'išč'
    <infl_root final> == č'
    <phon stem hardness> == soft
    <sem animacy> == inanimate.

Koleno:
    <> == N_IV
    <gloss> == mechanical_joint
    <infl_root> == kolen
    <infl_root final> == n
    <suffix pl> == j
    <sem animacy> == inanimate.

Brat:
    <> == N_I
    <gloss> == brother
    <infl_root> == brat
    <infl_root final> == t
    <suffix pl> == j
    <sem animacy> == animate
    <sem sex> == male.
```

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The Phonological Influence of Altaic on Slavic

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Abstract. Slavic, as represented by Old Church Slavonic, exhibits a curious parallelism of "hard" and "soft" declensions based on the final consonant of the stem, which may be neutral or palatal. Many endings then begin with back versus front vowels. This is a most un-Indo-European feature, for IE is supposed to have had only one set of endings per declensional type, and suggests some strong phonetic influence on the emerging Slavic language, which is most likely to have come from the Huns or Avars, probably Turkic-speaking peoples, who dominated the Slavs between ca. 400–800 A.D. In their agglutinative language, front or back vowels in the stem require corresponding front or back vowels in all suffixes, and the process of attachment also affects the intervening consonants. In some consonants, such as velars and laterals, this effect is particularly marked, and there is a curious back counterpart of front /i/, a vowel like the Russian /y/, which is quite un-Indo-European. Its source as well as that of the three successive palatalizations which set off Slavic from its Baltic matrix is probably to be sought in an Altaic influence which asserted itself in Slavs seeking to imitate the speech habits of their Altaic masters and military commanders. The grammatical system was not imitated on anything like this scale, but more words than commonly realized were borrowed, including the very name of the Slavs.

When we study the declensional patterns in the *Altkirchenslavische Grammatik* of my teacher at the University of Vienna, Nikolaus Sergeevič Trubetzkoy (1954: 118–ff)—whose phonological scheme for the original first literary language of the Slavs (*Urkirchenslavisch*) is by and large followed in this essay, though not in every detail—we are immediately struck by a very un-Indo-European fact: the opposing series of back versus front vowels according to the nature (non-palatal vs. palatal) of the final consonant of the stem. As far as is known, IE flexional endings do not seem to have shifted from back to front along the same level of tongue elevation, in accordance with the hard or neutral, or perhaps labiovelarized as against palatalized or palatal, pronunciation of the stem-final consonant. The last two should be distinguished, of course, in that palatality involves a single articulation in the medio-palatal area of the roof of the mouth, whereas palatalization is a double movement, whereby a labial, dental (alveolar), or velar articulation is accompanied by a raising of the center of the tongue, resulting in additional higher frequencies (Lunt 1955: 619; Keating and Lahiri 1993: 73–ff). Trubetzkoy's different stem endings refer to palatal (*hocheigentonig*), not merely palatalized consonants.

Not even Lithuanian, closely related to Slavic, exhibits two sets of endings, although it now does have phonologically softened