

On Decomposing Inflection Class Features: Syncretism in Russian Noun Inflection

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1. Introduction

Inflection class features that assign noun stems to declensional classes are peculiar objects. On the one hand, nominal inflection class features seem to be indispensable in analyses of noun inflection systems in various Indo-European languages (like Spanish, Greek, and Russian). On the other hand, nominal inflection class features differ from other, well-established morphological features (like case, gender, and number features) in two important respects that (at least at first sight) shed doubt on their existence. First, inflection class features are much more abstract than, say, case, gender, or number features; they are not grounded in any way, and they are not independently motivated. Second, inflection class features do not seem to play any role in the syntax, again in contrast to features like case, gender, and number, which syntactic operations may refer to. In view of this state of affairs, one may try to avoid inflection class features in analyses of noun inflection altogether; but given the insurmountable difficulties that arise in such an enterprise, I take it that any such attempt is doomed to fail. Another option (the one that is standardly adopted) is to simply accept, as an imperfection in grammar design, the existence of inflection class features as irreducible objects.

Based on empirical evidence from noun inflection in Russian, I will pursue a third strategy in this article, which is to strengthen the role of inflection class features: If one cannot get rid of inflection class features, one may as well promote them to a more prominent position, and let them do more work in morphology than has previously been assumed. I will argue that inflection class features can be decomposed into more primitive features (as has been suggested for case features (see Jakobson (1962a)), Bierwisch (1967))

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and that doing so offers a straightforward explanation of instances of trans-paradigmatic syncretism, i.e., syncretism that holds across inflection classes. Trans-paradigmatic syncretism in Russian noun inflection has, to the best of my knowledge, not yet been derived in a principled way (in contrast to inner-paradigmatic syncretism, i.e., syncretism that holds within an inflection class, which has been accounted for by decomposing case features). Furthermore, I will argue that decomposed inflection class features play a role in morphology that is analogous to the role played by uninterpretable features in syntax in the system of Chomsky (1995), Chomsky (2000), and Chomsky (2001): Being uninterpretable in the syntactic component, inflection class features drive morphological operations that delete them before syntax is reached, and thus turn out not to be an imperfection after all. This reasoning will provide an argument against late insertion in a minimalist grammar.

I will proceed as follows. In section 2, I present the main paradigms of noun inflection in Russian and show that inflection class features are necessary to account for them. In section 3, I turn to the issue of syncretism in Russian noun inflection. I show that by decomposing both case and inflection class features into more primitive features, most instances of inner-paradigmatic and trans-paradigmatic syncretism (i.e., syncretism within and across inflection classes) can systematically be accounted for, in interaction with the Specificity Condition. In section 4, I address the general role of inflection class features in grammar, and argue that they can be conceived of as the sole triggers of inflection with portmanteau markers.

2. Noun Inflection in Russian

2.1. Data

Let me begin with the paradigms of Russian noun inflection, focussing on the singular for the time being.¹ I will assume that there are four noun inflection

¹Throughout this article, I adopt the view that paradigms do not exist as genuine objects that morphological operations can refer to, or that meta-constraints can be imposed on. Rather, paradigms will be considered to be pure epiphenomena, i.e., generalizations that can be derived from more basic assumptions. I take it that this view is directly supported by the system of Russian noun inflection, which has been argued to pose problems for meta-constraints that presuppose the existence of paradigms. For instance, Bobaljik (2001) shows that Russian noun inflection contradicts the Basic Instantiated Paradigm restriction suggested in Williams (1994), and Stump (2001, 224ff) argues that Russian noun inflection raises problems for the Paradigm Economy Principle proposed in Carstairs (1987) (also see Carstairs-McCarthy (1998)). – That

classes in Russian (I-IV), which give rise to the four paradigms in P_1 – P_4 .² The markers of noun inflection class I for the six cases of Russian (nominative, accusative, dative, genitive, instrumental, and locative) are shown in paradigm P_1 . All nouns that take markers from this class are masculine. There is some principled variation: Inanimate nouns have identical markers for nominative and accusative case (viz., a marker that is phonologically null, rendered here as \emptyset); animate nouns exhibit a syncretism of markers for accusative and genitive case (compare *zavod-* ('factory') and *student-* ('student')). Furthermore, in the instrumental there is a difference between nouns whose stems ends in a "hard" (i.e., [+back]) consonant and nouns whose stem ends in a "soft" (i.e., [–back]) consonant: The former have *om* as the instrumental case marker, the latter *em* (compare *student-om* with *tovarišč-em* ('comrade')).

P_1 : Inflection class I

	zavod ('factory')	student ('student')	tovarišč ('comrade')
nom	\emptyset	\emptyset	\emptyset
acc	\emptyset	a	a
dat	u	u	u
gen	a	a	a
inst	om	om	em
loc	e	e	e

The markers of inflection class II are listed in paradigm P_2 . Most of the nouns belonging to this inflection class are feminine. There is no animacy effect (in the accusative or elsewhere) in this paradigm (compare *komnat-* ('room'), *učitel'nic-* ('female teacher')). However, there is syncretism: The markers for dative and locative case are identical: *e*. Again, the noun stem may end in a hard ([+back]) or soft ([–back]) consonant (compare *komnat-* with *nedel'* ('week')), which leads to "palatalized" versions of what is clearly the same basic marker in the second case (note that *y* differs from *i* only in that the former is [+back], the latter [–back]).

said, most of what follows would be compatible with theories of inflectional morphology that rely on paradigms.

²Four inflection classes are also postulated by Corbett and Fraser (1993). In contrast, only three inflection classes are adopted by Halle (1994), Aronoff (1994), and others, who conflate inflection classes I and IV (paradigms P_1 and P_4) into a single inflection class that contains both masculine and neuter nouns. Such a move then requires additional stipulations for nominative singular and accusative singular contexts. Moreover, we will later see that there are syncretisms in the plural that are shared only by inflection class II and inflection class IV; an explanation for this kind of syncretism will crucially presuppose that inflection classes I and IV are separate.

P₂: Inflection class II

	komnat ('room')	učitel'nic ('female teacher')	nedel' ('week')
nom	a	a	ja
acc	u	u	ju
dat	e	e	e
gen	y	y	i
inst	oj(u)	ej(u)	ej(u)
loc	e	e	e

Consider next the markers of inflection class III in paradigm P₃. With only one exception (*put'* ('way'), which is masculine), all the nouns that inflect according to this class are feminine. Furthermore, all stems end in a soft ([–back]) consonant. As with class II members, there is no animacy effect (compare *tetrad'* ('notebook') with *myš'* ('mouse')); but there is massive syncretism: Nominative and accusative forms share a null marker \emptyset , and dative, genitive, and locative forms have a uniform *i* as a marker. A few (albeit highly frequent) nouns (*doč'* ('daughter'), *mat'* ('mother')) exhibit stem alternation; this must be lexically marked, and I will ignore it in what follows.

P₃: Inflection class III

	tetrad' ('notebook')	myš' ('mouse')	doč' ('daughter')
nom	\emptyset	\emptyset	\emptyset
acc	\emptyset	\emptyset	\emptyset
dat	i	i	(er)i
gen	i	i	(er)i
inst	ju	ju	(er')ju
loc	i	i	(er)i

The markers of inflection class IV are shown in paradigm P₄. All nouns that follow this paradigm are neuter. As already noted, this paradigm is similar to paradigm P₁, which contains only masculine nouns. The main difference in the singular is that the marker for nominative and accusative case is *o* throughout in inflection class IV. Further support for the distinction between class I and class IV (see footnote 2) comes from the observation that there is no animacy effect in paradigm P₄ (see Corbett and Fraser (1993)): A neuter noun in this class exhibits nominative/accusative syncretism rather than accusative/genitive syncretism even if it is animate; compare *syščestv-* ('being').

Most Russian nouns are in one of these four inflection classes. Many of those nouns that do not follow one of the patterns in P₁–P₄ are not part of the

*P*₄: Inflection class IV

	mest ('mesto')	jablok ('apple')	syščestv ('being')
nom	o	o	o
acc	o	o	o
dat	u	u	u
gen	a	a	a
inst	om	om	em
loc	e	e	e

native vocabulary and do not take any case marker whatsoever; these indeclinables (like *kofe* ('coffee')) are sometimes viewed as belonging to a separate inflection class. Finally, there are exceptional nouns which are not covered by the system sketched so far because they take unexpected markers, or because they exhibit stem alternation.³ Also, a comprehensive account of Russian noun inflection would also have to integrate the issue of variable vs. invariant stress in inflectional paradigms. Still, I take it that the core system of Russian noun inflection is adequately described by the four inflection classes documented in *P*₁–*P*₄, and I will now turn to the issue of how the generalizations embodied in *P*₁–*P*₄ can be derived.

2.2. Inflection Class Features

The task at hand is to predict the correct inflection marker for any Russian noun stem and any case specification in the singular; for instance, it must be ensured that the noun stem *zavod-* takes the marker *u* in dative singular contexts, and not, say, *e* or *i*, whereas the noun stem *komnat-* takes the marker *e* in dative singular contexts, and not *u* or *i*. Ideally, one might expect that independently motivated features of the stem suffice for this purpose, and that inflection class features can be dispensed with. Relevant inherent features of stems include gender features and phonological features; and it has indeed been proposed that inflectional markers can always be determined by taking into account only features of this type (see, e.g., Steins (1998) on such an approach to Old English noun inflection, and Wunderlich (1996) on the outlines of such an approach to Russian noun inflection).

However, closer inspection reveals that resorting to inherent (gender or phonological) features of noun stems is unlikely to yield an adequate sys-

³To name just one case where an unexpected marker occurs: Certain masculine nouns that follow the basic pattern of inflection class I can also have *u* instead of *a* as the genitive singular marker in certain syntactic environments, as in *ča-ju* vs. *ča-ja* ('tea').

tem (see Wurzel (1984), Corbett and Fraser (1993), Fraser and Corbett (1994), Aronoff (1994), and Halle (1994), among others). Consider first gender features. There is almost a one-to-one correspondence between the gender feature neuter and paradigm P_4 , i.e., all neuter stems inflect according to this paradigm, and all stems that inflect according to this paradigm are neuter.⁴ However, the correlation breaks down with the features masculine and feminine. Whereas most masculine noun stems follow paradigm P_1 , there are also some masculine noun stems that follow paradigm P_2 (e.g., *muščin-* ‘man’). What is worse, feminine noun stems may either inflect according to paradigm P_2 , or according to paradigm P_3 , and they predominate in both classes (the vast majority of noun stems inflecting according to P_2 are feminine, and, with the exception of the isolated noun stem *put’*, all noun stems that follow the pattern in P_3 are feminine). Thus, gender features alone do not reliably encode inflection class in Russian. Neither do phonological features of a stem, for obvious reasons. Not even a combination of gender and phonological features will suffice: Masculine noun stems inflecting according to P_1 do not differ systematically in any obvious way from masculine noun stems inflecting according to P_2 with respect to their phonological properties; and, even though feminine noun stems that obey P_3 are all marked [-back] on the last consonant, this combined information is not enough to conclude that a feminine, [-back] noun stem like *tetrad’-* must follow P_3 (and, e.g., take *i* rather than *e* in the dative singular) because feminine, [-back] noun stems may also follow P_2 ; compare *nedel’-*.

Other independently motivated features of noun stems (e.g., semantic features) also fail to correctly predict inflection class membership – and if it looks as though they succeed in this, this is invariably due to the fact that the features in question are not independently motivated after all since they do not designate anything except for inflection class. As a case in point, consider the status of “theme” vowels (and theme consonants). From a diachronic perspective, there is a relation between the phonological nature of the ending of a noun stem and the inflection class that it belongs to, and remnants of this system can still be found in Old Bulgarian, where a partition of inflection classes accord-

⁴Pejorative diminutives like *domišk-* (‘cottage’) and *gorodišk-* (‘little town’) might qualify as exceptions because they are masculine but inflect according to inflection class IV in the singular. However, their behaviour in the plural is non-homogeneous (mixing classes I and IV), so that additional lexical specifications are unavoidable anyway with these noun stems, and they might be taken to belong to inflection class I after all (with a lexical specification as taking *o* in the nominative singular).

ing to theme vowels and theme consonants is still synchronically motivated to some extent (see Leskien (1955), among others) – e.g., there is a theme consonant *n* that shows up with most forms in the paradigm of the *n*-stem inflection class, and that is distinct from the respective inflection marker. Thus, in Old Bulgarian, inflection class membership can at least partially be determined by phonological properties of the stem. However, this is certainly not the case anymore in modern Russian. Of course, we can in principle distinguish between, say, \emptyset -stems, *a*-stems, *i*-stems, and *o*-stems, corresponding to the four inflectional patterns in P₁–P₄. But the only thing that has been accomplished by this is that we now have names for inflection class features: The phonological properties of, e.g., an *a*-stem (viz., exhibiting an /a/ segment) are not manifest on the stem – they exclusively show up on an inflection marker of the paradigm (this point is emphasized in Wurzel (1984, 124)).

The only way out under the assumption that a theme vowel like *a* exists as part of a stem would be to stipulate that there is a null ending in nominative singular contexts, where the theme vowel shows up – thus, the nominative singular marker of a noun in inflection class II would be it \emptyset rather than *a* (e.g., *komnata- \emptyset* instead of *komnat-a*); and that there is an obligatory deletion rule in non-nominative singular contexts, where the theme vowel does not show up (e.g., *komnata-u* → *komnat-u* in accusative singular environments). However, such an analysis lacks independent justification, and arguably comes close to undermining the notion of theme vowel.⁵ All in all, it seems that an approach to Russian noun inflection that relies on theme vowels (and/or theme consonants) cannot make predictions that go beyond those of an approach that relies on arbitrary inflection class features (see Fraser and Corbett (1994)).⁶ As a

⁵Incidentally, an analysis along these lines might be implied in Wunderlich (1996)'s sketch of the noun inflection system of Russian, which invokes a "(floating) theme vowel" *a* to distinguish the two (predominantly) feminine inflection classes without recourse to inflection class features. Also see Wunderlich (2002).

⁶Note in passing that this does not necessarily imply that there can be no theme vowels in Russian nouns; the claim is merely that inflection class assignment does not proceed via theme vowels. Thus, Halle (1994, 50) suggests that there is always an underlying theme vowel between stem and inflection marker in Russian nouns, and that this theme vowel is uniformly an *o*. This theme vowel is assumed to emerge as such in some cases (with the instrumental inflection markers *m*, yielding *o-m*, and *j*, yielding *o-j*), to be changed to *e* or *a* in others (yielding composite endings like *e-j* or *a-m*), and to be deleted in the majority of cases. Crucially, the theme vowel that Halle (1994) postulates is independent of inflection class assignment. – I will not adopt this assumption in what follows, but it is worth noting that it could in principle be reconciled with the overall approach that I will suggest in the following section.

general result, I would like to conclude that a recourse to inflection class features is unavoidable in an account of noun inflection in Russian. The question then is what these features look like, and whether they play a role in an analysis of syncretism.

3. Inflection Class Features as a Source of Syncretism

3.1. Syncretism

Thus far, the focus was on syncretism within a given paradigm: Depending on the animacy status, the inflection markers for either nominative and accusative (\emptyset), or for genitive and accusative (a) are identical in the singular paradigm P_1 of inflection class I; the inflection markers for dative and locative (e) have the same form in the singular paradigm P_2 of inflection class II; the inflection markers for nominative and accusative (\emptyset), and those for dative, genitive, and locative (i), are indistinguishable in the singular paradigm P_3 of inflection class III; and the inflection markers for nominative and accusative (o) are identical in the singular paradigm P_4 of inflection class IV. However, this does not exhaust the instances of syncretism in Russian noun inflection. In addition to inner-paradigmatic syncretism, there is trans-paradigmatic syncretism in abundance, and it is by no means confined to common markers shared by inflection classes I and IV (which does not come as a surprise, given that these classes are often viewed as one). Thus, for instance, \emptyset shows up in nominative and accusative contexts of inflection class I and inflection class III; i is a marker shared by inflection class II (in the genitive) and inflection class III (in the dative, genitive, and locative); and the inflection marker a occurs in inflection class I (in the genitive, and in the accusative with animates), in inflection class II (in the nominative), and in inflection class IV (in the genitive). The occurrences of both inner- and trans-paradigmatic syncretism are shown in the simplified meta-paradigm in P_5 that combines the gist of P_1 – P_4 .

A common assumption is that at least some instances of syncretism in inflectional paradigms are not accidental, but systematic in the sense that they should follow from the morphological analysis. I will adhere to this view in what follows; in fact, I will adopt an even stronger assumption, viz., that all instances of syncretism should be considered to be systematic whenever possible. This follows from the much more general strategy in (1).

(1) Assume that identity of form implies identity of function (unless there is

P₅: Syncretism within and across inflection classes

	I	II	III	IV
nom	∅	a	∅	o
acc	∅/a	u	∅	o
dat	u	e	i	u
gen	a	i	i	a
inst	om	oj	ju	om
loc	e	e	i	e

evidence to the contrary).

(1) can be viewed both as a learning strategy for the child acquiring a language, and as a linguistic research strategy (and as such, it has often been pursued in semantics, syntax, and morphology). For the case at hand, (1) states that ideally, there should be a single source for all occurrences (however distinct they may look at first sight) of a single inflection marker – unless, that is, there are good independent reasons to assume different sources for one and the same marker, i.e., truly accidental syncretism.⁷

Thus, in line with (1), in what follows the goal will be to develop an analysis that accounts for both inner-paradigmatic and trans-paradigmatic syncretism in Russian noun inflection as much as possible. In doing so, I will rely on three basic assumptions: (i) Cases are decomposed into primitive features. (ii) Inflection class features are also decomposed into primitive features. (iii) The notion of competition plays a role in inflectional morphology, in the form of the Specificity Condition. Whereas assumptions (i) and (iii) have been adopted before in analyses of noun inflection in Russian (and other inflecting languages), assumption (ii) is, to the best of my knowledge, new. It is assumption (ii) that will turn out to make it possible to account for trans-paradigmatic syncretism in the same way that inner-paradigmatic syncretism is accounted for via assumption (i), and it is the absence of assumption (ii) in previous

⁷I would like to contend, though, that such independent reasons for distinguishing two (or more) functions for the same form are by no means as widespread as is sometimes made out (see, e.g., Zwicky (1991), Williams (1994)). For instance, there is a commonplace view according to which only few of the syncretisms in German pronominal inflection are systematic because the morphological syncretisms can often be resolved when larger syntactic units (e.g., the NP) are taken into account; see Wunderlich (1997), Wiese (1996), Eisenberg (2000), and Zifonun (2001), among others. This kind of reasoning is argued to be untenable in Müller (2002a), Müller (2002b). More generally, it seems that a hasty classification of some syncretism as non-systematic may often indicate little more than the fact that the morphological analysis cannot account for it in a systematic way.

analyses that has so far made it impossible to account for trans-paradigmatic syncretism in a non-stipulative way (see 3.5. below).

3.2. Analysis

3.2.1. Background Assumptions

I will make the following assumptions about the nature of inflectional morphology and its place in grammar. The lexicon is a mere list of exceptions without rules or constraints. The morphological component follows the lexicon but precedes the syntactic component – the inputs of morphology are members of the list of lexical items of a given language, and the outputs of morphology are fully inflected word forms that then enter syntactic derivations (or lexical arrays, in the system of Chomsky (2000), Chomsky (2001)). Noun stems and inflection markers are listed in the lexicon; thus, inflection markers have morpheme status. I assume that the features that noun stems bear in the lexicon include (inherent) categorial and gender features, but not (variable) case or number features; these latter features are added when the noun stem enters the morphological component. In contrast, inflection markers bear case (and other morpho-syntactic) features in the lexicon. A noun stem and an inflection marker can be combined in the morphological component if the two items do not have contradictory features or features values (only the latter case will be relevant in what follows).⁸

⁸Stump (2001) introduces two general dichotomies for inflectional theories: An inflectional theory may be lexical (inflection markers are – possibly abstract – lexical items) or inferential (inflection markers are not separate lexical items); and it may be incremental (inflection markers add information) or realizational (inflection markers do not add information). According to this classification, the approach to be developed below qualifies as lexical (since inflection markers have morpheme status) and realizational (since inflection markers do not contribute any information that is not present on the noun stem already), just like distributed morphology (see Halle and Marantz (1993), Halle (1994), and Harley and Noyer (1999) for an overview); however, it crucially differs from distributed morphology in not postulating empty Q-morphemes (or *f*-morphemes) that are then realized by spell-out rules which produce inflection markers of the type in P₅. That said, I would like to emphasize that the gist of the approach to syncretism in Russian noun inflection to be developed below could be transferred without much ado into many existing inflectional theories, be they lexical-realizational (like distributed morphology), lexical-incremental (like the lexical theories of Lieber (1992), Wunderlich (1996), Wunderlich (1997), among others), or inferential-realizational (like, in particular, the word-and-paradigm approaches developed by Anderson (1992), Corbett and Fraser (1993), Aronoff (1994), and Stump (2001), and others cited in these works). The only relevant properties that an inflectional theory must have are (i) that it permits feature decomposition, and (ii) that it acknowledges a

Let me now address in turn the status of case features, inflection class features, and the Specificity Condition.

3.2.2. *Decomposition of Case Features*

The idea to decompose the cases of Russian into combinations of more primitive features goes back to Jakobson (1962a) (which first appeared in 1936) and Jakobson (1962b). His original system that relies on three semantically-based features has been subject to various extensions and modifications throughout the last decades (see Neidle (1988), Franks (1995), and Gvozdanović (1991), among others). In his account of pronominal inflection in German, Bierwisch (1967) assumes a syntactic rather than semantic basis for the primitive features that characterize the four German cases. Bierwisch's system is adopted in Wiese (1999), and extended so as to cover the six cases of Latin in Wiese (2001). Following Bierwisch and Wiese, I will assume as basic the three binary features $[\pm\text{subj(ect)}]$, $[\pm\text{obj(ect)}]$, $[\pm\text{obl(ique)}]$. The six Russian cases can then be decomposed as in (2).⁹

(2) *Decomposition of cases in Russian:*

nominative:	$[\text{+subj, -obj, -obl}]$
accusative:	$[\text{-subj, +obj, -obl}]$
dative:	$[\text{-subj, +obj, +obl}]$
genitive:	$[\text{+subj, +obj, +obl}]$
instrumental:	$[\text{+subj, -obj, +obl}]$
locative:	$[\text{-subj, -obj, +obl}]$

A few remarks are in order here concerning the three features and their role in determining the cases of Russian. First, $[\text{+subj}]$ cases differ from $[\text{-subj}]$ cases in being able to show up on prototypical subjects. This is uncontroversial for the nominative; the genitive occurs on NP-internal subjects; and the instrumental is assigned to subject arguments in passive clauses (and also to NPs

notion of competition. The specific version of a lexical-incremental approach adopted here will become relevant only in section 4.

⁹As it stands, the combinations $[\text{+subj, +obj, -obl}]$, $[\text{-subj, -obj, -obl}]$ do not correspond to any case in Russian, an inevitable consequence of cross-classifying three binary features. Following the reasoning in Jakobson and much subsequent literature, one might try to close the gap by postulating alternative feature combinations for two of the cases (usually, genitive and locative are then treated this way), or by assuming abstract cases that are not morphologically manifest (e.g., an abstract vocative comes to mind for the feature specification $[\text{-subj, -obj, -obl}]$; see Wiese (2001) on Latin. However, I will refrain from pursuing these options here.

in predicative constructions). Second, [+obj] cases differ from [−obj] cases in being the prototypical cases governed by verbs. And third, [+obl] cases differ from [−obl] cases in that only the latter are structural (in the sense of Chomsky (1981)). The fundamental insight behind case decomposition is that *natural classes* of cases can thus be formed, and such a natural class of cases can then be what an inflection marker is characterized by. In other words, an inflection marker does not necessarily have a full [\pm subj, \pm obj, \pm obl] specification; it may be *underspecified* with respect to (decomposed) case features, in which case it designates a natural class of cases rather than a single case. For instance, as we will see in a moment, the inflection marker *i* is characterized not by a full set of case features in the present approach, but by an underspecified set of case features [+obl], which makes it compatible with the natural class of oblique cases (dative, genitive, instrumental, and locative) and, thereby, contributes to an explanation of (inner-paradigmatic as well as trans-paradigmatic) *i* syncretism in the oblique domain. Similarly, the inflection marker *u* is assumed to be underspecified as [−subj,+obj], which plays an important role in deriving the instances of (trans-paradigmatic) *u* syncretism in the natural class of cases so defined (viz., accusative and dative).

3.2.3. *Decomposition of Inflection Class Features*

In the same way that inner-paradigmatic syncretism has been shown to be accountable for by decomposing case features, I would like to suggest that trans-paradigmatic syncretism can fruitfully be addressed by decomposing inflection class features; i.e., I take it that the existence of trans-paradigmatic syncretism suggests that inflection classes can form natural classes, just like cases do. For concreteness, suppose that inflection classes are decomposed into more primitive features as in (3).¹⁰

¹⁰There are predecessors of this idea. Corbett and Fraser (1993) suggest a common additional inflection class feature 0 that is present with inflection class features I and IV. This “meta-inflection class feature” contributes to an account of trans-paradigmatic syncretisms affecting inflection classes I and IV. However, this approach does not extend to other instances of trans-paradigmatic syncretism; moreover, the existence of a natural class comprising the inflection classes I and IV is simply stipulated this way (by assigning an additional feature 0), and not derived (by feature decomposition). An analysis that is arguably more similar in spirit to the present proposal is the approach to trans-paradigmatic syncretism along gender/number categorizations with pronominal inflection in German developed in Wiese (1996), Wiese (1999), and adopted in one way or another in Eisenberg (2000), Zifonun (2001), and Müller (2002a). This approach relies on a decomposition of the (combined) categories gender and plural; this

(3) *Decomposition of Inflection Classes in Russian:*

- I: $[+\alpha, -\gamma]$
- II: $[-\alpha, +\gamma]$
- III: $[-\alpha, -\gamma]$
- IV: $[+\alpha, +\gamma]$

Here, α and γ are purely formal features that do not stand for anything else; but this state of affairs is not particularly worrisome when we take into account that the situation is not different with the original inflection class features I-IV (if anything, the situation has improved because there are now two binary features instead of four privative features). The decomposition in (3) predicts (not surprisingly) that inflection classes I and IV form a natural class (characterized by $[+\alpha]$); but it also implies that natural classes are formed by (the predominantly feminine) inflection classes II and III (characterized by $[-\alpha]$), by inflection classes II and IV (characterized by $[+\gamma]$), and by inflection classes I and III (characterized by $[-\gamma]$). As a result, the system now permits inflection markers to be underspecified with respect to inflection class; for instance, the inflection marker *i* has only the inflection class feature $[-\alpha]$, which makes it suitable for noun stems with either inflection class II ($[-\alpha, +\gamma]$) or inflection class III ($[-\alpha, -\gamma]$) specifications, but not for other noun stems.

With these assumptions in mind, we can now look at the lexical entries for the singular inflection markers that attach to Russian nouns:

(4) *Inflection markers for nouns in Russian:*

- a. /oj/: $\{[+N], [-\alpha, +\gamma], [+subj, -obj, +obl]\}$
- b. /ju/: $\{[+N], [-\alpha, -\gamma], [+subj, -obj, +obl]\}$
- c. /om/: $\{[+N], [+ \alpha], [+subj, -obj, +obl]\}$
- d. /e/: $\{[+N], [-\alpha, +\gamma], [-subj, +obj, +obl]\}$
- e. /e/: $\{[+N], [-(\alpha, -\gamma)], [-obj, +obl]\}$

proposal and the present one converge if one is willing to make the (admittedly somewhat unusual) assumption that different gender/number categorizations in German are in fact different inflection classes. On this view, inflection class features, while without inherent meaning as such, may in some languages be interpreted along the gender/number distinction. Furthermore, there are approaches to transparadigmatic syncretism in Russian noun inflection that do not rely on inflection class feature decomposition; see McCreight and Chvany (1991), Wiese (2003). – Finally, essentially the same kind of decomposition of inflection class features as suggested here is proposed by Massuet (1999) in her approach to Catalan verbal morphology, which I only got to know after the first draft of this paper was completed.

f.	/o/:	{[+N],[+α,+γ],[−obl]}
g.	/O/:	{[+N],[−γ],[−obl]}
h.	/i/:	{[+N],[−α],[+obl]}
i.	/u/:	{[+N],[−subj,+obj]}
j.	/a/:	{[+N]}

These inflection markers, as lexical items, have the status of underlying representations; they are abstract elements that may undergo further phonological or morphological changes (hence, the // notation which will be adopted from now on). Thus, I assume that the actual inflection marker realizations *om* and *em* both go back to underlying /om/; there is a morphonological rule that realizes /om/ as *em* after a soft ([−back]) consonant. Similarly, underlying /oj/ is realized as *ej* after a [−back] consonant, and as *oj* otherwise. Furthermore, I postulate that there is a morphonological rule that realizes underlying /i/ as *y* after a hard ([+back]) consonant (and as *i* otherwise). In addition to these morphonological rules, and perhaps somewhat more controversially, I assume that a general phonological rule is responsible for the realization of the underlying inflection marker /O/, which has extensively been argued to have inflection marker status by Halle (1994). /O/ is an abstract vowel (a ‘yer’) that Halle otherwise assumes to have the same features as /o/; there is a general rule that deletes abstract vowels unless they immediately precede a syllable with another abstract vowel (which, of course, they never do if they are inflection markers at the end of a word). Thus, /O/ replaces the null marker ∅ assumed in the above paradigms.¹¹ One advantage of adopting /O/ as an inflection marker is that it makes it possible to avoid positing null morphemes as inflection markers (this is a domain where inferential approaches to inflection may have an initial advantage over lexical approaches). A second advantage is that /O/, unlike a null morpheme, will be shown to fit very well into a system of form/function correlations that can be derived naturally from (4); see 3.3. below.

Note now that (4) comes close to a maximally successful execution of the program in (1): Except for /e/, which has two lexical entries, there are no

¹¹/O/ surfaces in words like /ókOnΘ/ → *okon* (‘window’, genitive plural), where the inflection marker /O/ is deleted (see 3.4. below), whereas the stem vowel /O/ survives (and is realized as *o*); compare the nominative singular form /okΘnó/ → *okn-o*, where /O/ in the stem is deleted because it does not precede an abstract vowel itself. See Kenstowicz and Rubach (1987) (and literature cited there) for more on yers in Slavic.

homophonous inflection markers in the singular. There is only one feature set for a given inflection marker; this feature set is underspecified in most cases. Thus, if (4) can be shown to correctly predict the paradigms in P_1 – P_4 , we can conclude that syncretism in Russian noun inflection in the singular has been accounted for (almost, given /e/) in its entirety. However, due to the very fact that most of the inflection markers are underspecified with respect to case and inflection class features, the system developed so far is not yet constrained enough. It overgenerates in the sense that, in many cases, there are two or more inflection markers that would be compatible with a given fully specified feature set on a noun stem. To see this, suppose that a noun stem like *komnat-* is taken from the lexicon, and enriched by dative and singular features, so that its specification includes the set $\{[+N],[-\alpha,+ \gamma],[-\text{subj},+\text{obj},+\text{obl}],[-\text{pl}]\}$. The task now is to find an inflection marker with a compatible feature specification; and the problem is that, as things stand, we do not find one but four, viz.: /e/ (in (4-d)), /i/ (in (4-h)), /u/ (in (4-i)), and /a/ (in (4-j)). These markers compete for $\{[-\alpha,+ \gamma],[-\text{subj},+\text{obj},+\text{obl}]\}$ contexts. The situation is similar with nearly all other contexts characterized by combinations of fully specified inflection class features and case features that show up on noun stems. Thus, what is needed is a general principle that decides the competition of inflection markers and selects a winner among the competing markers that is the only grammatical form in any given context. A principle that has this effect is the Specificity Condition.¹²

3.2.4. *The Specificity Condition*

For present purposes, the Specificity Condition can be formulated as in (5):

¹²One might try to avoid all instances of competition among inflection markers by revising the lexical entries for these markers in such a way that only one marker can be appropriate for any given full specification of case and inflection class features in the first place. However, such a move would necessarily conflict with (1), and would thus make a systematic account of syncretism impossible. To see this, consider a simple example. The inflection marker /i/ shows up in the dative, genitive, and locative of inflection class III, and with the genitive only in inflection class II. Clearly, there is no way how the four feature specifications that characterize these four environments can form a natural class; the minimal set of specifications that includes these four will invariably also have to include the specifications for dative and locative of inflection class II, which have different markers. Thus, in a nutshell, competition of markers (and a strategy to resolve it) is necessary to explain syncretism in cases where underspecification alone does not suffice.

(5) *Specificity Condition:*

If two competing forms F_i , F_j satisfy all local constraints on operations, and F_i is more specific than F_j , then F_i is to be preferred over F_j .

Applying this general condition to the case at hand, the competing forms are different inflection markers that can be attached to a given noun stem. An operation in the sense of (5) is the concatenation of a noun stem and its inflection marker in the singular. The relevant local constraint is that stem and marker do not have incompatible values for case and inflection class features (this ensures that highly specific inflection markers that are incompatible with a given stem cannot be chosen as the optimal (according to (5)) marker for this stem). This analysis presupposes the existence of two different types of constraints in grammar, viz., local constraints and translocal constraints (typical translocal constraints in syntax are transderivational constraints). To find out whether a local constraint is satisfied by some form, it suffices to consider only the properties of this form; in contrast, to find out whether a translocal constraint is satisfied by some form, the properties of competing forms also have to be taken into account. The Specificity Condition is a translocal constraint.¹³ The question then is how specificity can be defined. A simple assumption would be that an inflection marker F_i is more specific than another marker F_j if F_i has more morpho-syntactic (case and inflection) features (alternatively, if F_j 's feature specification is a proper subset of that of the feature specification of F_i); on this view, the maximally underspecified inflection marker /a/ will emerge as least specific, and fully specified forms like /oj/, /ju/, and /om/ as most specific. However, it has often been argued that such a notion of specificity is not yet fine-grained enough, and must be supplemented by recourse to a general hierarchy of features; see Lumsden (1992), Noyer (1997), Wiese (1999), Gunkel

¹³The effects of the Specificity Condition on nominal inflection markers can also be derived in what is arguably a somewhat less insightful way by extrinsic ordering; this is most common for those morphological approaches that rely on rules; see, e.g., Bierwisch (1967), Wurzel (1984), Wurzel (1998), and Halle (1994). Similarly, optimality theory (see Prince and Smolensky (1993)) can account for all specificity effects, in phonology and morphology (see Prince (1996)) as well as in syntax (see Müller (2000)); this is so for the simple reason that optimality theory has a much more variable concept of competition, and is a much more powerful (and hence, less constrained) competition-based approach than one that only relies on the Specificity Condition. Finally, versions of the Specificity Condition are variously known as the Blocking Principle, the Subset Principle, the Elsewhere Condition, the Proper Inclusion Principle, and so on. Analyses that employ this kind of constraint include Kiparsky (1973), Kiparsky (1982), Aronoff (1976), DiSciullo and Williams (1987), Williams (1994), Williams (1997), and Fanselow (1991). Also compare the literature on specificity given in the text below.

(2002), and Zifonun (2002), among others. In line with this, I would like to propose that inflection class features are always more specific than (i.e., out-rank) case features; and I will adopt the following notion of specificity of an inflection marker.¹⁴

(6) *Specificity of inflection markers:*

- a. If two inflection markers F_i, F_j differ with respect to the rank of their features, F_i is more specific than F_j if it has a higher-ranked feature.
- b. If two inflection markers F_i, F_j do not differ with respect to the rank of their features, F_i is more specific than F_j if it has more features.

Paradigm P_6 then shows how the Specificity Condition interacts with the assumptions about underspecification of inflection markers (with respect to case and inflection class features) made above to predict the system of inflection marking of Russian singular nouns.¹⁵

P_6 : *The interaction of inflection markers in the singular*

	I: [+ $\alpha, -\gamma$]	II: [- $\alpha, +\gamma$]	III: [- $\alpha, -\gamma$]	IV: [+ $\alpha, +\gamma$]
nom: [+subj, -obj, -obl]	/O/ ^g (/a/ ^j)	/a/ ^j	/O/ ^g (/a/ ^j)	/o/ ^f (/a/ ^j)
acc: [-subj, +obj, -obl]	/O/ ^g (/u/ ⁱ , /a/ ^j)	/u/ ⁱ (/a/ ^j)	/O/ ^g (/u/ ⁱ , /a/ ^j)	/o/ ^f (/u/ ⁱ , /a/ ^j)
dat: [-subj, +obj, +obl]	/u/ ^e (/a/ ^j)	/e/ ^d (/i/ ^h , /u/ ⁱ , /a/ ^j)	/i/ ^h (/u/ ⁱ , /a/ ^j)	/u/ ^e (/a/ ^j)
gen: [+subj, +obj, +obl]	/a/ ^j	/i/ ^h (/a/ ^j)	/i/ ^h (/a/ ^j)	/a/ ^j
inst: [+subj, -obj, +obl]	/om/ ^c (/e/ ^e , /a/ ^j)	/oj/ ^a (/e/ ^e , /i/ ^h , /a/ ^j)	/ju/ ^b (/i/ ^h , /a/ ^j)	/om/ ^c (/e/ ^e , /a/ ^j)
loc: [-subj, -obj, +obl]	/e/ ^e (/a/ ^j)	/e/ ^e (/i/ ^h , /a/ ^j)	/i/ ^h (/a/ ^j)	/e/ ^e (/a/ ^j)

The most underspecified inflection marker /a/ would in principle fit everywhere; but given the Specificity Condition, it can only survive in the few con-

¹⁴A theory-internal reason for invoking the hierarchy of features in the definition of specificity is the distribution of /u/, which has two case features but no inflection class features and must qualify as less specific than the markers /o/, /O/, and /i/. The latter are restricted to inflection classes but have fewer case specifications, and may thus (in the case of /O/ and /i/) end up with an identical number of morpho-syntactic case and inflection class specifications overall.

¹⁵The markers chosen by the Specificity Condition are in bold face; compatible, but less specific markers are shown for each combination of case/inflection class in a second line in parentheses. The superscripts on the markers refer back to the list in (4).

texts where there is no alternative, more specific inflection marker that is compatible with the morpho-syntactic feature specification of the noun stem. Thus, /a/ emerges as the unmarked inflection marker for Russian singular nouns, and this way, the analysis provides a uniform account of /a/ syncretism even though the morpho-syntactic feature specifications of its occurrence contexts (nominative of inflection class II, genitive of inflection classes I and IV) are radically different.

The next least specified inflection marker is /u/, which emerges as the general accusative/dative inflection marker, without any inflection class restriction. However, due to the Specificity Condition, /u/ actually shows up only in few of the accusative/dative cells of paradigm P₆, where more specific markers are not available (still, /u/ blocks less specific /a/ here): /u/ is selected in the accusative of inflection class II, and in the dative of inflection classes I and IV.

The markers /i/, /O/, and /o/ are more specific than /u/ but still qualify as substantially underspecified forms: /i/ is the general obliqueness marker for inflection classes II and III; /O/ is the general non-obliqueness marker for inflection classes I and III; and /o/ is the general non-obliqueness marker for inflection class IV. However, the uniform, homogeneous distribution that one might expect under these classifications is severely disturbed by the existence of more specific forms. For instance, /i/ is blocked by various more specific markers in four of the eight paradigm cells in which it would be compatible with the morpho-syntactic feature specification of the noun stem. In two of these cases, the blocking marker is /e/.

In contrast to what is the case with the other inflection markers, the syncretism with /e/ is not resolved in the present analysis. As it stands, there are two lexical entries for /e/ in (4).¹⁶ This correlates with the fact that both /e/ markers are more specific (in fact, /e/^d is fully specified). (See 3.3. below for more on the special status of /e/.)

¹⁶What is more, the entry for /e/^e differs from all other specifications assumed here in involving the complement of a natural class, viz. $[-(-\alpha, -\gamma)]$: /e/^e is compatible with all inflection classes except for inflection class III. Given deMorgan's laws, this can be reformulated as a disjunction. There is some disagreement about whether or not disjunctions should be avoided in feature specifications of the type at hand (see, e.g., Blevins (1995) vs. Wunderlich (1997)). It seems to me that the use of low-level disjunctions of the type at hand (which could always be undone by introducing an additional feature) is harmless and linguistically motivated (see Müller (2002a)) – the basic idea here is that complements of natural classes can also function as natural classes, as has been suggested by Zwicky (1970). However, if one chooses not to draw this conclusion, the disjunction implicit in $[-(-\alpha, -\gamma)]$ might have to be resolved in favour of two separate feature specifications ($[+\alpha]$ and $[+\gamma]$), which would result in three entries for /e/.

Finally, the instrumental case marker /om/ is minimally underspecified with respect to inflection class features so as to be compatible with the demands of inflection classes I and IV; and the instrumental case markers /oj/, /ju/ for inflection classes II and III are not underspecified at all. The reason is that they do not participate in syncretism.

Thus, most of the inner- and transparadigmatic instances of syncretism in Russian noun inflection are accounted for in a systematic way. Still, there is one important exception: The animacy effect with inflection class I (animates in this class exhibit accusative/genitive syncretism) is not yet systematically accounted for; in fact, so far it is not accounted for at all. It is indeed hard to see how a minor modification of feature specifications of inflection markers could derive the accusative/genitive syncretism with animates of inflection class I. A first problem is that the inflection marker that triggers the syncretism is /a/, which we have seen to be radically underspecified. Hence, /a/ can only show up if there is no other suitable inflection marker; but there are already two other inflection markers that are compatible with accusative singular specifications in inflection class I (/O/ and /u/). A second problem is that, as things stand, accusative and genitive do not form a natural class in the present proposal ([–subj,+obj,–obl] vs. [+subj,+obj,+obl]). None of these problems strikes me as truly insurmountable.¹⁷ Still, I will not pursue the strategy of accounting for this syncretism in terms of decomposition and specificity here.¹⁸ The main reason for not attempting this is that exactly the same pattern shows up with the plural (see below), and this is unlikely to be accidental (as it would be expected to be under an approach via decomposition and specificity). For the sake of concreteness, I would like to suggest that this syncretism is handled by a rule of referral (see Zwicky (1985)), i.e., a rule that explicitly states (and does not derive) the fact that the marker for a given morpho-syntactic context is identical to the marker of some other morpho-syntactic context; such a rule may thus override the results of the core system based on decomposition and specificity.

¹⁷For instance, one might devise a system in which the markers /O/ and /u/ are in fact incompatible with an accusative specification of a noun that belongs to inflection class I and contains the feature [+animate]. It is also worth noting that there is a surplus case characterization [+subj,+obj,–obl] that might be considered a second version of the genitive, and that does form a natural class with the accusative ([+obj,–obl]); recall footnote 9.

¹⁸Such a strategy is adopted, in one way or another, in Neidle (1988), Franks (1995), Gunkel (2002) (for Polish), and Wunderlich (2002). In doing so, Neidle, Franks, and Gunkel rely on the idea that [+animate] and [–animate] noun stems give rise to different paradigms (i.e., inflection classes); Wunderlich's solution involves a version of the impoverishment operation of distributed morphology.

The following rule of referral is based on similar rules in Corbett and Fraser (1993, 135) and Stump (2001, 229); the suspension of the decomposition- and specificity-based outcome by this rule is reflected in the formulation of the rule (where “ $I_{\{\dots\}}$ ” stands for “the inflection marker determined by the Specificity Condition for context $\{\dots\}$ ”, and “ \rightarrow ” stands for “is replaced by”); essentially, (7) triggers differential object marking (see Aissen (2000) and literature cited there), which overrides the basic morphological outcome (Comrie (1978)).¹⁹

(7) *A rule of referral for accusative/genitive syncretism in the singular:*

$$I_{\{[+\alpha, -\gamma], [-\text{subj}, +\text{obj}, -\text{obl}]\}} \rightarrow I_{\{[+\alpha, -\gamma], [+ \text{subj}, +\text{obj}, +\text{obl}]\}}/[+\text{animate}]_{_}$$

3.3. On Form and Function

At first sight, the system of inflection markers in (4) may seem arbitrary. However, closer inspection reveals that there is an interesting correlation of marker form and marker function that suggests that a notion like optimal grammar design plays a role in inflectional morphology.

The inflection markers in (4) are ordered according to a property of their function: From top to bottom, specificity decreases. However, this order goes hand in hand with an independent order that concerns a property of the inflection markers’ form: From top to bottom, the rank of a marker on the sonority hierarchy (see Hankamer and Aissen (1974)) increases. Thus, the consonantal markers are at one end of the hierarchy, the most sonorous marker /a/ is at the other end, and the other vocalic markers show up in between, with /u/ being more sonorous than /i/, /O/, and /o/, and these being more sonorous than /e/.²⁰ Thus, the hierarchy in (8) reflects both the morphological function and

¹⁹Both Corbett and Fraser (1993) and Stump (2001) maximize the use of rules of referral in the account of syncretism, and also extend it to inner-paradigmatic syncretism. See 3.5. below.

²⁰Three remarks: one on /e/, one on /O/, and one on /u/. First, there is an independent reason why /e/ should differ from vocalic markers like /i/ and /o/. /e/ is in fact usually (except after consonants like /c/, /š/, /ž/) realized as *je*, which makes this marker quasi-consonantal. Thus, the high degree of specificity of /e/’s function (and the fact that the /e/ syncretism is not fully resolvable under present assumptions) directly corresponds to the fact that /e/ is less sonorous than purely vocalic markers.

Second, we are now in a position to formulate the second of the arguments for assuming the null ending in the nominative and accusative of inflection classes I and III to be an abstract vowel /O/ (that has otherwise the same features as /o/ and is deleted in word-final position), and not a genuine null morpheme: The marker in question has a similar function (degree of specificity) as /o/. Hence, given that optimal grammar design maximizes form/function correspondence, we expect it to have a similar form as well. This is the case if the marker is /O/, but not if the

the phonological form of the markers.²¹

(8) /oj/, /ju/, /om/ > /e/ > /o/, /O/, /i/ > /u/ > /a/

3.4. Plural

Thus far, I have been exclusively concerned with singular paradigms. The plural paradigms of Russian noun inflection are indeed much less interesting than the singular paradigms from the point of view of syncretism. Still, mainly for the sake of completeness (but also to provide a further argument for decomposing inflection class features), I will now address plural paradigms. (9) is a (slightly simplified) list of lexical entries for plural inflection markers in Russian.

(9) *Plural inflection markers for nouns in Russian:*

a. /ax/:	{[+N],[+pl],[−subj,−obj,−obl]}
b. /ami/:	{[+N],[+pl],[+subj,−obj,+obl]}
c. /am/:	{[+N],[+pl],[−subj,+obj,+obl]}
d. /ov/:	{[+N],[+pl],[−γ],[+subj,+obj,+obl]}
e. /O/:	{[+N],[+pl],[+γ],[+subj,+obj,+obl]}
f. /i/:	{[+N],[+pl],[−(+α,+γ)],[−obl]}
g. /a/:	{[+N],[+pl],[−obl]}

marker is a null morpheme \emptyset devoid of phonological features.

Third, the classification of /u/ as being more sonorous than /o/ is not compatible with evidence from external sandhi in Greek (see Matthews (1974, 113-114)), which presupposes the order /i/ > /e/ > /u/ > /o/ > /a/ of increasing sonority; and evidence from binomial formation in German (see Ross (1980, 42), Müller (1997, 33)), which presupposes the order /i/ > /u/ > /e/ > /o/ > /a/; this may indicate some language-particular variability, or minor imperfections of some of the systems involved here.

²¹An even more systematic correlation of marker form and (underspecified) marker function has been discovered for the system of pronominal inflection in German in Wiese (1996) and Wiese (1999), on which the present discussion draws (as does the sonority-based approach to German pronominal inflection in Müller (2002a)). As concerns the Russian system of noun inflection, it has not gone unnoticed either in the literature that there might be a correlation of form and function. Thus, Shapiro (1969, 14) and Plank (1979, 143) correlate a Jakobsonian hierarchy of cases H_c (nom > inst > gen₂ > loc₂ > acc > dat > gen₁ > loc₁) and a sonority hierarchy H_s (a > o, e, u, i > v, j, m > x); Plank states the following generalization: “The higher-ranked a case is in [H_c], the more sonorous is the set of phonological segments used for its expression.” I would argue that replacing this hierarchy of cases with a hierarchy of specifications of decomposed case and inflection class features permits a more articulate (and verifiable) account that nevertheless preserves Plank’s and Shapiro’s basic insight.

Let us consider the dative, instrumental, and locative markers in (9-abc) first. These markers are invariant across inflection classes (and genders), and generally seem to behave very differently from the singular markers discussed above – they resemble truly agglutinative markers. Even though underspecification of case features is technically possible in these cases, there is no evidence for doing this; and despite the fact that there is no reason for specifying inflection class features for these markers, we can assume that they are maximally specific, and can never be blocked in favour of other markers by the Specificity Condition. (As a matter of fact, it is questionable whether they should be subsumed under a decomposition/specificity-based approach in the first place, given that there is no interaction with other markers.) Next, there are two genitive markers in the plural: /O/ (i.e., the null ending) shows up with inflection classes II and IV, and /ov/ occurs with inflection classes I and III (/ov/ is realized as *ej* rather than as *ov* after a [–back] consonant as the result of a morphonological rule; see Halle (1994, 50)). This instance of trans-paradigmatic syncretism provides further evidence for decomposing inflection class features (the inflection classes II and IV form a natural class characterized by the feature [+ γ], the inflection classes I and III form a natural class characterized by the feature [– γ]); but (even though it would again be technically possible) there is no need to underspecify case features and invoke the Specificity Condition with these two markers.

There are only two instances of inner-paradigmatic syncretism in the plural: Nominative and accusative are identical in the presence of the feature [–animate], and accusative and genitive are identical in the presence of the feature [+animate]. Thus, the pattern of inflection class I shows up in general form in the plural. Accordingly, the analysis given here will be of the same type: nominative/accusative syncretism is viewed as the unmarked case predicted by decomposition and specificity, and accusative/genitive syncretism with animates is stated by a rule of referral. Turning to nominative/accusative syncretism with inanimate nouns first, this is the only case where it makes sense to underspecify case features on inflection markers in the plural. For concreteness, I assume that the only case information that /i/ and /a/ bear as plural markers is the feature [–obl]; and that /a/ is not specified with respect to inflection class whereas /i/ is characterized as being compatible with all inflection classes except class IV. Consequently, /i/ is more specific than /a/ in the nominative and accusative of inflection classes I, II, and III, and this is why /a/ is blocked here via the Specificity Condition. Thus, /a/ is the unmarked

inflection marker in the plural as it is the unmarked inflection marker in the singular.²²

The plural markers in (9) are marked [+pl], whereas the singular markers in (4) are not specified for number features. Suppose that number features are inherently more specific than inflection class features (which in turn are more specific than case features, see above). Then, the Specificity Condition will ensure that plural markers always block singular markers in any given plural context; conversely, plural markers (marked [+pl]) are always incompatible with fully specified singular noun stems (marked [-pl]), so they can never block the less specific singular markers in singular contexts.²³ The resulting plural paradigm is shown in P₇.

P₇: Minimal interaction of inflection markers in the plural

	I: [+α,-γ]	II: [-α,+γ]	III: [-α,-γ]	IV: [+α,+γ]
nom: [+subj,-obj,-obl]	/i/ ^f (/a/ ^g)	/i/ ^f (/a/ ^g)	/i/ ^f (/a/ ^g)	/a/ ^g
acc: [-subj,+obj,-obl]	/i/ ^f (/a/ ^g)	/i/ ^f (/a/ ^g)	/i/ ^f (/a/ ^g)	/a/ ^g
dat: [-subj,+obj,+obl]	/am/ ^c	/am/ ^c	/am/ ^c	/am/ ^c
gen: [+subj,+obj,+obl]	/ov/ ^d	/O/ ^e	/ov/ ^d	/O/ ^e
inst: [+subj,-obj,+obl]	/ami/ ^b	/ami/ ^b	/ami/ ^b	/ami/ ^b
loc: [-subj,-obj,+obl]	/ax/ ^a	/ax/ ^a	/ax/ ^a	/ax/ ^a

Finally, a rule of referral needs to be formulated that covers the accusative/genitive syncretism with animate nouns in the plural; the rule is a version of the rule of referral for the same syncretism with inflection class I members in the singular (see (7)), with inflection class features replaced by a number feature. Thus, the two rules can be viewed as different instantiations

²²The marker /a/ also occurs when the marker /i/ is avoided, which is a productive option with a large number of noun stems of inflection class I in colloquial Russian; see Isačenko (1975, 97). – Conversely, /i/ replaces /a/ in neuter contexts in various Russian dialects; see Cubberley (2002, 325).

²³Thus, no attempt is made here to account for instances of singular/plural syncretism. Even the two /a/ markers must be distinguished – the “singular” marker /a/ (i.e., the one unspecified for number) is blocked by /O/ in nominative/accusative plural contexts of inflection class IV, and only the presence of the more specific plural marker /a/ (marked [+pl]) can ensure the correct outcome.

of a single general rule scheme.

(10) *A rule of referral for accusative/genitive syncretism in the plural:*

$$I_{\{[+p],[-subj,+obj,-obl]\}} \rightarrow I_{\{[+p],[+subj,+obj,+obl]\}}/[+animate]_{\underline{\quad}}$$

3.5. Interim Conclusion

To sum up so far, the decomposition of case and inflection class features into more primitive features, and the reliance on the Specificity Condition (a translocal constraint that picks out the most specific inflection marker among a set of inflection markers that are compatible with a noun stem), make it possible to account for many instances of both inner-paradigmatic and trans-paradigmatic syncretism in Russian noun inflection. As far as I am aware, a systematic analysis that derives (rather than simply states) this latter type of syncretism has so far been outstanding, even though there are many analyses of syncretism in Russian noun inflection. A brief overview may illustrate this.

The original system of case feature decomposition into three semantically based primitives ($[\pm\text{mar}(\text{ginal})]$, $[\pm\text{quant}(\text{ified})]$, and $[\pm\text{dir}(\text{ectional})]$) in Jakobson (1962b) is modified and extended to systems based on four primitive features by Neidle (1988) (who adopts the features $[\pm\text{locational}]$, $[\pm\text{quantifying}]$, $[\pm\text{directional}]$, and $[\pm\text{partial}]$) and Franks (1995) (who suggests the features $[\pm\text{oblique}]$, $[\pm\text{marginal}]$, $[\pm\text{nonascriptive}]$, and $[\pm\text{phrasal}]$). Both approaches have considerable success in accounting for inner-paradigmatic syncretism. However, these analyses significantly overgenerate cases (a cross-classification of four binary features yields sixteen possible cases). More importantly, trans-paradigmatic syncretism cannot be accounted for because inflection classes are taken as basic and do not form natural classes. Wunderlich (1996), Wunderlich (2002), and Gunkel (2002) (for Polish) suggest analyses that rely on case feature decomposition and the Specificity Condition. The use of this latter constraint makes it possible to account for inner-paradigmatic syncretism in a simple way; but again, an account of trans-paradigmatic syncretism is out of reach.

In contrast to all of these approaches, the analysis in Halle (1994) captures instances of inner-paradigmatic as well as trans-paradigmatic syncretism. However, it does so only by having disjunctive application contexts in spell-out rules for an abstract Q-morpheme that represents the inflection marker for nouns. Thus, it seems fair to say that syncretism is stated but not derived in

this approach.²⁴ The situation is similar with the approaches in Corbett and Fraser (1993) and Stump (2001). These analyses manage to account for various kinds of inner-paradigmatic and, more importantly from the present perspective, trans-paradigmatic syncretism, but since they almost exclusively rely on rules of referral to achieve this, instances of syncretism are stated but not explained.²⁵

The specific lexical-realizational framework of inflectional morphology that I have adopted throughout has not been crucial so far. Given some obvious adjustments, the gist of the above analysis can also be formulated in other approaches (including word-and-paradigm approaches, distributed morphology approaches, and classical lexical-incremental approaches), as long as they permit a reference to natural classes created by feature decomposition and incorporate a translocal constraint like the Specificity Condition. This translatability disappears when I discuss the role of inflection class features in the following section. The argument to be given there supports an approach that is both lexical (the inflection marker is a lexical item) and realizational (all morpho-syntactic features that are needed in syntax are present on the noun stem already).

4. Inflection Class Features as Triggers of Inflection

4.1. Features in Morphology and Syntax

The features that play a role in inflectional morphology are generally considered *morpho-syntactic*, in the sense that they are visible in both morphology and syntax and mediate between the two components. Against this background, inflection class features (whether decomposed or not) are peculiar because they do not seem to be visible in syntax. Thus, whereas syntactic opera-

²⁴For instance, Halle (1994, 51) accounts for all three occurrences of /a/ as a noun inflection marker in Russian (genitive singular of inflection classes I and IV, nominative singular of inflection class II, nominative/accusative plural of inflection class IV) by a single rule. This rule does not identify these distinct contexts as a natural class, though – rather, the three environments are simply listed as possible application contexts: $Q \rightarrow /a/$ in the environments $\{ [+N], [ClassI(IV)], [Sg-Gen] \}$, $\{ [+N], [ClassII], [Sg-Nom] \}$, and $\{ [+N], [ClassI(IV)], [Pl-Nom] \}$ (under certain conditions, in the last case).

²⁵For instance, Corbett and Fraser (1993, 137) account for the /i/ syncretism in inflection classes II and III by assuming that /i/ is basic with a genitive singular specification of inflection class II, and rules of referral ensure that the genitive, dative, and locative singular markers of inflection class III are identical to it.

tions refer to case, gender, and number features, they completely ignore inflection class features. To see this, suppose, counterfactually, that inflection class features were relevant in syntax. Then, we might expect there to be verbs that select inflection class features such that, e.g., only inflection class III members were available as objects of these verbs in Russian; or we might expect subject-verb agreement with respect to inflection class (i.e., a designated morphological reflex of the subject's inflection class on the verb). Things like these do not seem to occur.²⁶ So, I would like to conclude that inflection class features are of no use in syntax; they are not interpretable in this component. Assuming a general Legibility Condition (see Chomsky (1986), Chomsky (2000), Chomsky (2001)) according to which all material present at a given level of grammar must be interpretable at that level, the presence of inflection class features on nouns in the syntax is a problem.

Given the assumptions of section 3., this problem is much more general, though: Case, number, and gender features are (or, at least, can be) present on both a noun stem and its inflection marker. A well-established generalization for inflecting languages is that the head of a word (with respect to some feature) in syntax is typically the rightmost element (that bears this feature); compare the notion of “relativized head” in DiSciullo and Williams (1987). If both a noun stem and an inflection marker have case features, the inflection marker is predicted to be the relativized head of the word with respect to case in Russian, for the simple reason that inflection is suffixal in this language. However, this leads to a dilemma, given that inflection markers can be underspecified with respect to case features: Underspecified case features of an inflection marker should at best be visible in syntax, and at worst also block the visibility of fully specified case features on the noun stem.²⁷ But if the underspecified case information of an inflection marker is visible in syntax, predictions are made which are not borne out. For instance, we would expect that there are verbs that select underspecified cases like [-subj,+obj], which is clearly not the case.²⁸ Independently of these empirical problems, I take the redundant proliferation of morpho-syntactic features on noun stem and inflection markers to be conceptually unwarranted.

²⁶Bernstein (1993) argues that inflection class is visible as a functional head in syntax; but see Alexiadou (2002) for a refutation of this assumption.

²⁷It should be noted that this problem does not arise in inferential-realizational approaches in which inflection markers do not bear features as such.

²⁸The present system would predict an inflection class-invariant marker /u/ on all nouns selected by such a verb.

Taking these two problems together, I conclude that all inflection class features, and all morpho-syntactic features of an inflection marker, are uninterpretable in syntax and not visible in this component. These features are underlined in (11) for two nouns, *tetradī* ('notebook', dative singular, inflection class III) and *komnatu* ('room', accusative singular, inflection class II).

- (11) a. /tetrad'/ $\{[+N],[-\text{anim}],[-\text{pl}],[\underline{-\alpha,-\gamma}],[-\text{subj},+\text{obj},+\text{obl}]\}$
 -/i/ $\{[+N],[-\alpha],[+\text{obl}]\}$
 b. /komnat'/ $\{[+N],[-\text{anim}],[-\text{pl}],[\underline{+\alpha,+\gamma}],[-\text{subj},+\text{obj},-\text{obl}]\}$
 -/u/ $\{[+N],[-\text{subj},+\text{obj}]\}$

Thus, we face the following situation: First, there are features that are necessary in morphology but uninterpretable in syntax; this looks like an imperfection (from the point of view of optimal grammar design). Second, the existence of inflection class-based noun inflection as such already looks like an imperfection – it is “uneconomical and dysfunctional”, as Plank (2002) puts it. Interestingly, the co-occurrence of these two imperfections is strongly reminiscent of a situation arising in minimalist syntax.

4.2. Features in Syntax and Logical Form

Recent versions of the minimalist program (see Chomsky (1995), Chomsky (2000), and Chomsky (2001)) recognize two fundamental operations in syntax. First, the operation Merge puts together two constituents α , β . Merge applies freely, but the successful cases are typically restricted to contexts where there is a selectional relation between α and β . Second, the operation Move re-merges some subconstituent α of a larger constituent β (which has undergone Merge earlier in the derivation) with β . Simplifying a bit, Move is subject to the restriction that there are identical features on the head of the target (the probe) and on the head of the moved item (the goal) and, crucially, that there are semantically uninterpretable features on both the probe and the goal, i.e., features that cannot be interpreted in the component of logical form (LF) that follows the syntactic component. Chomsky assumes that LF does not tolerate syntactic features that it cannot interpret; hence, these features have to be deleted in syntax. Generalizing this assumption, we obtain the following restriction on feature interpretability, forced by the Legibility Condition:

- (12) *Feature interpretability:*

Features that are uninterpretable at level L_i must be deleted at level L_{i-1} .

Furthermore, Chomsky postulates that the operation Move, which can only apply in the presence of LF-uninterpretable features on the probe, deletes all these features on the probe and the goal. Features that are uninterpretable at LF include case features of nouns (but not, e.g., category, gender, number, person and animacy features of nouns) and gender, number, and person features on verbs. Chomsky notes that the existence of LF-uninterpretable features looks like an imperfection of grammar design. The same, so he argues, goes for the existence of the operation Move (the “displacement property” of natural languages), which, e.g., removes argument NPs from the domain of verbs that they are arguments of.

4.3. Inflection in Morphology is like Movement in Syntax

In view of this evident convergence of morphological inflection and syntactic movement, I think the hypothesis is worth pursuing that inflection (of the type considered in this article, i.e., by fusional, portmanteau markers) has the same status in morphology as movement in syntax: In both cases, the operation is triggered by features that are not interpretable in the next component, and as a result all uninterpretable features are deleted on the two items that participate in the operation. More specifically, I would like to suggest that the noun stem acts as the probe of an inflection operation, and the inflection marker as the goal. Thus, it must be a syntactically uninterpretable feature on the noun stem that triggers the operation; and the only candidate for this is an inflection class feature. Having triggered the inflection operation (in Russian, the suffixation of the noun stem by the inflection marker), the inflection class feature and the morpho-syntactic features of the inflection marker are deleted. Consequently, the inflected nouns that the morphological component delivers to the syntax do not look as in (11), but as in (13):

- (13) a. /tetrad’/ $\{[+N],[\text{-anim}],[\text{-pl}],[\text{-subj}],[\text{+obj}],[\text{+obl}]\}$
 -/i/
 b. /komnat/ $\{[+N],[\text{-anim}],[\text{-pl}],[\text{-subj}],[\text{+obj}],[\text{-obl}]\}$
 -/u/

This approach offers a straightforward account of indeclinable noun stems like *kofe* (‘coffee’). One does not have to make special assumptions for this case (like the stipulation that these noun stems belong to an additional inflection class, as it is assumed in Corbett and Fraser (1993)). The only assumption that is needed is that these noun stems do not have an inflection class feature:

If there is no such feature on the noun stem, no inflection operation will be triggered because there is no need to get rid of uninterpretable features by applying inflection. As a result, the noun stem enters the syntax in its bare form.

The analogy of morphology and syntax could be extended even further. E.g., one might argue that morphological operations like derivation and agglutinative inflection are similar to Merge operations in syntax, in the sense that the operation typically goes hand in hand with a selection relation (or can easily be conceived of as doing so). Furthermore, the Specificity Condition that has played an essential role in the analysis of inflection above can arguably be reinterpreted as a subcase of the constraint Maximize Matching Effects that Chomsky (2001, 15) proposes for syntax.²⁹ However, for reasons of space and coherence, I will not pursue these matters here;³⁰ neither will I pursue the many questions that the present approach raises.³¹

I would like to conclude with two general remarks. First, the above reasoning supports the organization of grammar that I have adopted throughout this paper: Morphology precedes syntax (so features that play a role in morphology but are uninterpretable in syntax can be deleted before this level is reached), and syntax precedes LF. The main hypothesis in this context is that inflection class features are uninterpretable in syntax and must be deleted by an inflection operation before the syntactic component; and I would like to contend that to the extent that this hypothesis is tenable (and plausible under minimalist assumptions), it argues against a late insertion (i.e., post-syntactic) approach to inflectional morphology (as it is standardly assumed in distributed morphology): At the point where a late insertion approach needs an inflection

²⁹This constraint demands the deletion of as many uninterpretable features by an operation as is possible. Note that the more specific an inflection marker is, the more uninterpretable features will be deleted by applying the inflection operation.

³⁰See Alexiadou and Müller (2003) for further elaboration, and for a more general discussion of the issues in this section.

³¹To name just one open question: The approach sketched in this section predicts that all kinds of (fusional) inflection are brought about by inflection class features. That is, even in those cases where invoking, say, gender features seems to suffice to determine the appropriate inflection marker for a given noun stem, the present approach will have to postulate inflection class features (that, in the simplest case, may co-vary with (and be parasitic on) the gender features) because gender features of nouns stems, being interpretable in syntax, cannot force inflection with a portmanteau marker.

class feature, the feature has long been deleted.³²

Second, in discussing the two properties identified as basic imperfections in syntax – (i) uninterpretability of syntactic features at LF, and (ii) displacement –, Chomsky suggests that (i) might not be an imperfection after all because it is the only device that makes (ii) possible; and (ii) might not be an imperfection upon closer inspection because there is an independent, functional motivation for displacement based on topic/focus structure and the like (see Chomsky (2000), Chomsky (2001)). The same reasoning can be applied to the case at hand. There are two imperfections: (iii) uninterpretability of morphological inflection class features in syntax, and (iv) inflection by fusional markers. As argued above, (iii) is the only device that makes (iv) possible (Plank (2002, 4) speculates that inflection class features “can ... be made sense of as the (regrettable, but inevitable) byproduct of something other really intended”), so it may not be an imperfection after all; and (iv) may perhaps not be an imperfection either, given that inflection via fusional markers looks like a good compromise between explicitness (permitting a simple detection of an NP’s grammatical function in syntax) and economy (inflection via agglutinative markers needs more lexical items and creates more complex words).

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³²It seems that the only way out in a late insertion approach would be to invoke a dissociation operation that inserts inflection class features post-syntactically (see Embick (1998) for the concept of dissociation). However, dissociation is at variance with the Inclusiveness Condition (see, e.g., Chomsky (2001)) and, more generally, does not seem to be a sufficiently restricted operation as it stands.

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