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The Russian Declension
An Illustration of the Theory of Distributed Morphology[1]

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1 Sketch of the Theory of Distributed Morphology

The formation of words by means of derivation, compounding and inflection has traditionally been regarded as the main subject matter of morphology. This characterization of morphology leaves open the relationship that exists between morphology and other major components of a grammar such as the Syntax, the Phonology and the Vocabulary/Lexicon. As a result, radically different views on this relationship have been espoused by different linguists. Thus, Lieber (1991) has argued – as did Lees (1960) – that morphology belongs in the syntax. Jensen (1990) by contrast believes that word formation belongs in the Vocabulary/Lexicon, whereas proponents of Lexical Phonology (for example, Kiparsky (1982)) have assumed that affixation processes, which constitute a large fraction of all morphological operations, must be interleaved with the rules of the phonology and are, therefore, part of the phonology.

These three approaches are in contrast with the more traditionalist view that the morphology constitutes a module of the grammar that is separate and distinct from the rest. A variant of this view is championed in the just published book *Autolexical Syntax* by J. Sadock (1991:101), who writes: "In answer to Stephen Anderson's (1982) question 'Where's Morphology?' I would not respond . . . that it is in the lexicon but rather 'It's in the morphological component, where it belongs'."

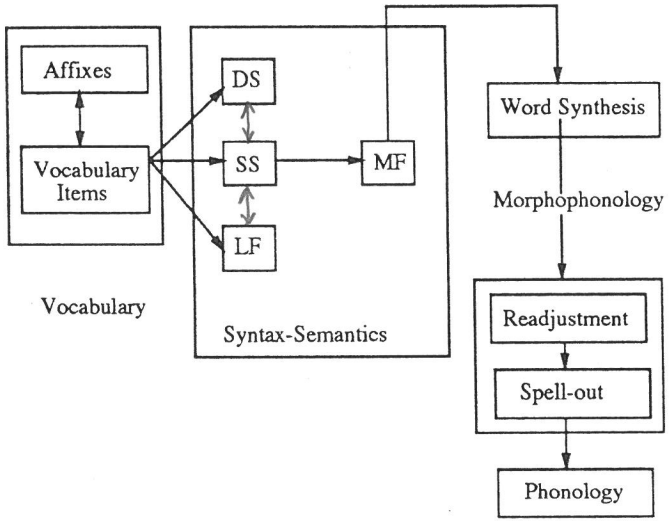
The work presented below does not assume that all morphological phenomena are accounted for in a single component of the grammar. Like Anderson (1992), we take it that "word structure can only be understood as the product of interacting principles from many parts of the grammar." We assume therefore that some morphological phenomena are accounted for in the Vocabulary module, others in the Syntax-Semantics module, and yet others in special modules, which have been dubbed here *Word Synthesis* and *Morphophonology.* On this view, then, morphology is distributed among the different components of a grammar, and it is this fact that has

[1]I am grateful to M. Kenstowicz, H. G. Lunt and A. Marantz for help in the preparation of this paper.

led us to suggest the phrase *distributed morphology* as the label for the theoretical framework about to be described.[2]

The five main modules of a grammar are the Vocabulary, Syntax-Semantics, Word Synthesis, Morphophonology and Phonology, and they are assumed to have the organization shown in (1).

(1)



The four blocks inside the Syntax-Semantics module in (1) express graphically the fact that this module is concerned with four distinct representations of a sentence. Three of these are the familiar: SS, DS, and LF. The fourth representation – Morphological Form (MF) – is the one that serves as input to the rules of the *Word Synthesis* module.

It is assumed here that for a given sentence the same Vocabulary items figure simultaneously in all four of these representations. Items selected from the Vocabulary are arranged in each of the four representations subject to various constraints and conditions. Thus, the relation that holds between the SS representation of a sentence and both its DS and LF counterparts is mediated by the "move alpha" or "affect alpha" transformation.

[2] An earlier version of the framework was presented in Halle 1990. The version of the theory presented below reflects my understanding of the issues as of May, 1991. Work done since that time in close collaboration with Alec Marantz has resulted in a number of modifications, of which the most important concerns the insertion of vocabulary items into sentences. For details see Marantz and Halle, 1993.

The relation SS:DS differs from the relation SS:LF with regard to the elements that are affected by "move alpha": in the relation SS:LF the affected elements are operators, whereas in the relation SS:DS they may be both operators and non-operators. The relation SS:MF is mediated by special principles to which we now turn.

In all four representations the formatives in the terminal sequence are organized into hierarchical constituents. Linear – left-to-right – order is imposed only on MF representations, but not on the other three. This left-to-right order is imposed primarily by placing the head of a constituent either at its beginning or at its end. Additional principles govern other aspects specific to MF representations. Among the principles that are responsible for the most important differences between SS and MF representations are the two given in (2), which have been adapted from Marantz 1988:

(2) a. A relation holding at SS between two elements X and Y may be expressed in the MF representation by the affixation of the lexical head of X to the lexical head of Y.

b. The relation of left- resp. right-adjacency between elements in a sequence is associative; that is, X*(Y*Z) = (X*Y)*Z, where A*B stands for "A is left-adjacent to B."

Head-to-head movement (2a) is the primary device responsible for the "mirror principle" that Baker (1988) has shown to hold between the order of certain morphemes in a word and the underlying syntactic structure of the clause in which the word figures. The associativity principle (2b), on the other hand, accounts for disparities between syntactic and morphological constituent structure (bracketing) such as in the English sentence *John's working*, where the auxiliary verb is phonetically attached to the subject although syntactically it is part of the Verb complex.[3]

It is to be noted that while the elements in the terminal strings of MF representations are linearly ordered and may differ more or less radically from those found in the Surface Structure, they do not necessarily form words. In particular, words often differ to various degrees from the units that appear in terminal strings of the representations in the Syntax-Semantics module and they may contain elements not present in MF. In the model represented in (1) words are formed in a special component labelled *Word Synthesis*.

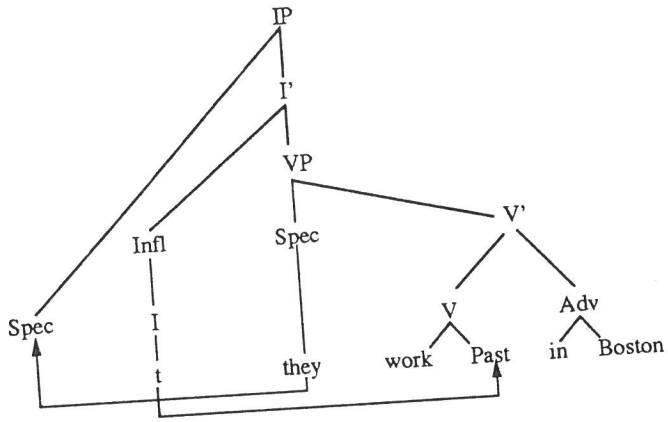
[3] Principles quite similar to those in (2) are central in Sadock's *Autolexical Syntax* (1991). In particular, Sadock's Incorporation Principle (IP) corresponds roughly to (2a) while his Cliticization Principle (CP) is the counterpart of (2b).

A simple example of the introduction of a formative by the Word Synthesis component is provided by the Present/Past tense forms of the English verb in (3a,b).

(3) a. They worked in Boston
b. They do not work in Boston

Following Pollock 1989 and Chomsky 1991 we assume that the Tense formative is generated under the INFL node of the top-most clause as illustrated in (3c).

(3) c.



Absent certain blocking conditions such as the presence of negation, the Tense formative is moved down next to the main verb with which it is merged into a single word in the Word Synthesis Component, (cf. (3a)). When the movement of the Verb into position next to Tense is blocked – for example, by the presence of negation in (3b) – the bare Verb surfaces by itself.

A further consequence of blocked Verb movement is that it prevents suffixation of the Tense formative to the verb stem. Since Tense in English is morphologically a suffix, it cannot surface without its stem. Therefore, when the Tense formative in MF has no Verb stem to which it may be suffixed – as for example in (3b) – a special rule of the Word Synthesis component inserts the auxiliary verb *do* next to the Tense formative. As the example (3b) shows insertion of the auxiliary *do* occurs even when the Tense formative is phonetically null; that is, *do* insertion is triggered by the presence of the Tense formative without regard to the latter's phonetic actualization: even a suffix that is phonetically zero is paired with a stem in the output.[4]

In English, in most instances Vocabulary items representing lexical categories – that is, nouns, verbs, adjectives and adverbs – may function as words in utterances. English Vocabulary items may thus directly serve as input to the Phonology without undergoing any modification by either Word Synthesis or the Morphophonology. By contrast, in many languages the bare stem is rarely the correct form to be used in the surface form of a sentence.

For example, the thematic affixes – also known as word or inflection class marker (Harris 1991) or verbalizing suffix (Halle 1973) – play a major role in the Morphophonology and Phonology of words, but are absent in the four levels of representations of the Syntax-Semantics. In the lapidary formulation of Harris (1991:59): "The class-marking suffixes have no meaning or function; they obey no higher semantic or syntactic authority. They are simply pieces of form that must be at the right place at the right time, by their own rules." As documented in detail by Harris, Spanish nouns, adjectives and adverbs do not surface without a thematic suffix. He writes (1991:56): "...*all* Spanish roots, stems, and affixes that belong to the major categories noun, adjective and adverb are in fact bound morphemes: such stems and affixes must always undergo (further) affixation in order to form a complete prosodic word... The only unaffixed words in Spanish, then, are *si* 'yes', *no* 'no', prepositions and other 'small change' items, mostly clitics."

Spanish is by no means unusual in not allowing bare, unadorned Vocabulary items to figure as words in utterances. This is all but self-evident in IE languages with rich inflectional systems such as Latin, Russian, or Latvian.[5]

[4] In a paper presented at the 1991 WCCFL meeting Pullum and Zwicky take issue with many of the proposals in Halle (1990). A special section of their criticism is aimed at the admission of zero morphemes like that of the English present tense illustrated in (3). They state (1991:5) that "a zero-inflected form is nothing more than the stem unaffected by any rule; *work* in *they work* will have no affixes at any level of analysis." If *work* in *they work* has "no affixes at any level of analysis," then there is no explanation for the fact that *do* support is triggered in *they do not work*, but not in *they had John not work today*. On the account presented above, the tense affix is present in *they do not work*, but not in *they had John not work today*, where *work* indeed appears without any affixes. Pullum and Zwicky do not discuss this obvious consequence of their proposal. It goes almost without saying that unless and until explained away the facts reviewed above undermine essential aspects of Zwicky and Pullum's case. For additional comments on Pullum and Zwicky (1991), see notes 6, 11 and 18 below.

[5] Carstens (1991) has argued that the word prefixes in Swahili and some other Bantu languages reflect the number – singular/plural – of the head noun and that the different classes represent an elaborate system of noun genders. On Carstens' view then the

It is obvious that formal account must be taken of this fundamental difference between languages. Like Harris, I propose to do this by postulating that in Russian, words – that is, the special units that are dealt with by the Morphophonology and Phonology – must conform to the template in (4).

(4) [[[VOCABULARY ITEM + Theme] + ({ Tense / Gerund / Part. / Inf. })] (Inflection)]

In part, this structure is already present in the MF representation and thus due to the operation of the Syntax-Semantics, but other parts, for example, the insertion of the Theme, the fusion of syntactically independent morphemes such as case and number into a single inflectional affix, or the establishment of noun-adjective concord, are implemented by special rules that together constitute the Word Synthesis component.

In addition to inserting syntactically inert morphemes such as the Thematic suffixes (=inflection class markers) of Spanish and Russian words or the English supporting verb *do*, the rules of the Word Synthesis component establish linear order and nesting among the morphemes. Moreover, Word Synthesis rules are responsible for various concord phenomena such as the Number-(Case-)Gender agreement between the head noun in a Russian or Spanish NP and the specifiers and adjectives that the noun governs (see, for example, (11), (12)). As noted below there is reason to suppose that the rules of the Word Synthesis component differ from those of the Morphophonology in that the Word Synthesis rules are pure redundancy rules in that they cannot change any of the features already present in the string, they can only add new elements to those already there.

The template (4) expresses the fact that in Russian, every word representing a major lexical category must be supplied with a Theme formative. The parenthesized material in (4) appears in verbs, adjectives and nouns, but not in adverbs. All three of these classes of words require an inflection. Finite forms of the verb include in addition the Tense formative, whereas infinitives, gerunds and participles – of which the former two are deverbal adverbs and the third, deverbal adjectives – have special suffixes of their own.[6]

Swahili prefix system is in essence a gender/number agreement system not unlike that found in the IE languages. The word in Swahili must always include this agreement marker: unlike the word in English, the Swahili word thus cannot be a bare Vocabulary item by itself.

[6]It is worthy of special note that as indicated in the passage quoted above, Harris (1991) has shown that Spanish words conform to the template (4) in spite of the fact that at least Spanish nouns and adjectives have only very rudimentary inflections.

In their criticism of Halle (1990), Pullum and Zwicky (1991) ask "which of the possible order of the morphemes in Latin *amo* 'I love' is the right one? LOVE + Ind + Act + Pres + 1P + Sg is one possibility; there are 6! - 1 = 719 others." As I have just tried to show, the linear order and nesting of morphemes such as Tense, Person, Number is determined in part by the syntax, in part by the rules of the Word Synthesis component. While much about this subject remains to be discovered, it is misleading of Pullum and Zwicky to suggest that so little is known about the problem that all combinatorially possible arrangements of morphemes need to be considered.

Turning to the Vocabulary module at the left side of (1), we observe that it is made up of two components. One of these is a list of items that in English – though, as just noted, not in all languages – are largely identical with the words that appear in sentences. The second list contains the affixes and the "bound" roots of the language. We need the latter list to account for the fact – among others – that speakers are able to analyze previously unheard words like those in (5a) into their component affixes and to reject as ill-formed words such as those in (5b). Since unimpeachable morpheme collocations such as those in (5c) do not constitute actual words of the language we need a formal device for ruling these out. The component in (1) labelled Vocabulary Items performs this function: it lists the items that are word stems in the language. As has often been noted in the past, another function of the list is to serve as the repository for the noncompositional semantics of words such as those in (5d).

(5)a. un+poison+ous+ness weather+li+ness organ+iz+at+ion+al+ize
b. *eat+ness *grammar+ness *usurp+ly *standard+ize+ly
c. *London+ian cf. Boston+ian *Shakespear+ic cf. Homer+ic
d. homi+cide vs. insecti+cide

Following an old tradition reflected, for example, in Saussure's treatment of the word as a sign consisting of a *signifiant* and a *signifie*, I assume that a morpheme is represented by a *complex symbol* consisting of two separate parts: an identifying index and a set of grammatical markers. Information about the morpheme's meaning and its syntactic and grammatical idiosyncrasies is conveyed by these markers. For the large majority of formatives the identifying index is a sequence of phonemes. This formally reflects the proposition that a morpheme's identifying index is directly related to its phonetic form. For a minority of morphemes this is not the case. The distinguishing feature of these morphemes is that their contextual variants are phonetically unrelated. Such morphemes are supplied with a special identifying index – represented here by the capital letter Q – whose phonetic reflexes are spelled out by a special block of rules in the Morphophonology.

I refer to morphemes with identifying indices composed of sequences of phonemes as *concrete morphemes* and distinguish them from *abstract morphemes*, whose identifying index is the capital letter Q. Most abstract morphemes are inflectional morphemes, such as Plural, Past, Possessive, but there also exist inflectional morphemes that are concrete, as well as noninflectional morphemes that are abstract. An example of a concrete inflectional morpheme is the English progressive aspect marker *+ing*, which has a unique phonological shape, whereas an example of an abstract noninflectional morpheme is the verb *be*, which both in English and in many other languages has surface reflexes of great variety that cannot be correlated by means of phonologically plausible rules.

In (6a) I illustrate the complex symbol of a noun recently added to the English Vocabulary and in (6b) the complex symbol of the English Past morpheme.

(6)	Identifying Index:	a. /skʌd/	b. Q
	Grammatical Markers:		
	Lexical Category	$\_\_]_N$	$]_V\_\_]_V$
	Meaning	'a surface-to-surface missile'	Past
	Morphological properties	stem	suffix
		etc.	

In (7a) I have illustrated some of the phonetic realizations of the English Past formative. I have given in (7b) the Spell-out rules of the Past morpheme that account for the different actualizations of the Past tense morpheme illustrated in (7a).

(7) a. i. mean+t, kep+t, bough+t
ii. hit, drove, began
iii. play+ed, pass+ed, wait+ed

b. i. Q → [t] in env. X′ + __, Past
where X′ = mean, keep, ...
ii. Q → 0 in env. X″ + __, Past
where X″ = hit, drive ...
iii. Q → [d] /__, Past

Spell-out rules like those in (7b) rewrite the abstract symbol Q as a sequence of one or more phonemes, or delete the symbol Q. Since Spell-out rules are also ordered, the application of a given Spell-out rule bleeds all Spell-out rules ordered below it for lack of a triggering Q. As a result the application of the first rule in (7b), which rewrites Q as /t/, bleeds the third Spell-out rule in (7b), which rewrites Q as /d/.[7] This bleeding property of the Spell-out rules accounts for the fact that in English doubly marked past forms such as *bough+t+ed, wrote+ed* are ungrammatical.[8]

The ordering of rule (7biii) after rules (7bi, ii) reflects the fact that Spell-out rules are ordered by the principle – traditionally attributed to Paṇini – that a less general rule takes precedence over a rule that is more general. This will be illustrated in greater detail in the discussion of the Readjustment and Spell-out rules of Russian in the second part of this paper.[9]

It is not unusual for affixation to be accompanied by modifications in the stem. I have illustrated in (8) two simple instances of such stem modification in the English Plural. The examples in (8a) illustrate stem final continuant voicing in the Plural, whereas the examples in (8b) illustrate vowel ablaut in verb stems.

(8) a. house+s shelve+s wive+s bath+s mouth+s
[+cont] → [+voice] in env. [X'__] + Q, Plural
where [X' [+cont]] = house, shelf, mouth, etc.

b. swam, ate, sang
[-cons] → [+low] in env. [Y __ Z] + Q, Past
where [Y [-cons] Z] = swim, eat, sing, etc.

Voicing by rule (8a) takes place only in a small number of English nouns. For instance, *house* is the only noun ending in /s/ that is subject to stem-final voicing (there is no voicing in, for example, *blous+es, spous+es,*

[7]It also bleeds the second Spell-out rule in (7b), but this is vacuous since the list of items to which the second rule applies is distinct from the list of those that are subject to the first rule.

[8]In languages such as Yiddish (Perlmutter 1988) and Breton (Stump 1989), where doubly marked plurals are grammatical, this is achieved with the help of a Readjustment rule that reduplicates the abstract Plural morpheme. For some discussion, see Bromberger and Halle 1989 and Halle 1989.

[9]Since the bleeding property of ordered rules can account for many instances where rules apply disjunctively I conjectured in Halle 1992b that there may be no need or role for a special principle of disjunctive rule order of the kind proposed by Chomsky and Halle (1968) (SPE), Kiparsky (1973), and Anderson (1986). I now think that this guess was incorrect. There are a number of examples arguing for a special principle of disjunctivity; specifically, the block of rules governing vowel quantity in English (the so-called Trisyllabic Shortening, Civ Lengthening, and Prevocalic Lengthening) (see Myers 1987, Halle and Vergnaud 1987); and the treatment of /r/ in Eastern Massachusetts English and vowel deletion/epenthesis in Lardil discussed by McCarthy (1991) under the heading of "rule inversion."

plac+es, buss+es, etc.); noun-final [f, θ] voice in the plural of a handful of nouns but remain voiceless in the plural of most nouns; for example, *coughs, cuffs, fourths, myths.*

Similarly, only a small number of verbs undergo vowel ablaut in the past tense by rule (8b). It might be noted that ablaut is not limited to verbs with a zero Past formative as shown by examples such as *flee fle+d, buy bough+t*; nor is every verb form with a zero Past formative subject to ablaut, as shown by Past forms such as *rid, beat, spread.*

The changes in the stem illustrated in (8) are implemented by the *Readjustment rules* that are part of the Morphophonology. Like the Spell-out rules Readjustment rules may be restricted to apply to particular lists of morphemes.

The Readjustment rules affect not only phonological properties of stems; they may also affect the grammatical information in the complex symbol. An example of this type of Readjustment rule is the rule that underlies some of the case syncretisms, widely attested in Indo-European noun and adjective declensions. A typical instance is the case syncretism of the Russian Accusative stated in (9).

(9) In the Plural and in the Singular of Declension Class II[10] the Accusative is identical with the Genitive if the stem is animate and with the Nominative, otherwise

As discussed in Sections 2.3.1 and 2.3.2, Russian nouns have several Nominative and Genitive Plural suffixes whose distribution is of considerable complexity. In view of this complexity it is essential not to have to state these distributions more than once in the grammar. A straightforward way of avoiding the nonfunctional repetition of the distribution of the different case suffixes is by postulating that under the conditions given in (9) Accusative is replaced by Genitive or Nominative. Formally we implement this by means of a Readjustment rule (cf. (30)) that rewrites Accusative as Genitive if the stem is animate, and as Nominative elsewhere. I illustrate the effects of applying this rule in (10).

(10)

/car'/ [+anim, Class II] 'tsar'	+	/o/ Theme	+	Q [Sing, Acc] ↓ Gen
/dolot/ [-anim, Class II] 'chisel'	+	/o/ Theme	+	Q [Plural, Acc] ↓ Nom

[10]The role of declension class is further explained below.

Like the nouns in Spanish, Latin, Latvian and other Indo-European languages, the nouns of Russian belong to different declension classes. Class membership determines both the Theme vowel and the spell-out of the Number-Case suffix for a given word. In Russian declension class is correlated in large measure, but not totally, with gender. Class I nouns are mainly feminine, but include a fair number of masculine nouns. Class II nouns are exclusively nonfeminine, whereas class III nouns are feminine with the single exception of the noun *put'* 'path', which is masculine. In addition there is a large fourth class of indeclinable nouns, all of which are borrowings from various languages and are unrestricted as to gender. Thus, *kofe* 'coffee' is masculine, but *kafe* 'coffee-house' is neuter, and *miss* 'Miss' is feminine but *boa* 'boa' is masculine. In sum, declension class is largely predictable from gender in the case of nouns belonging to classes I and II. Nouns of class III are all feminine with the exception of *put'*—that is, for nouns of this class, gender is predictable from declension class. For indeclinable nouns, gender is predictable for nouns with animate referents, but not predictable for the rest. (For some additional comments, see Halle 1990, notes 8, 9, 11.)

To formally capture these redundancies we postulate the rules in (11).

(11) a. [+fem] → Class I
b. [-fem] → Class II
c. Class III → [+fem]

The rules (11) are typical redundancy rules in that they supply features only in contexts where these are missing; they cannot replace a feature already present. They differ in this respect from the Readjustment rules illustrated in (8), (9) and (10), which typically change previously assigned features. This difference between what Kiparsky has called the "structure-building" and "structure-changing" effects of rules correlates with the difference between rules of Word Synthesis vs. those of the Morphophonology. All rules of Word Synthesis are "structure-building": they invariably add information, but leave previously specified features intact. By contrast, Readjustment and Spell-out rules are "structure-changing."

The fact that the rules in (11) are not structure-changing is exploited in the manner in which information about gender and declension class is supplied to Vocabulary items. In Russian, nouns of the indeclinable class are entered in the Vocabulary with both declension class and gender specified. Hence none of the rules in (11) will affect them. Nouns of declension class III will be specified for declension class but not for gender; they receive gender from (11c). The noun *put'*, which is the sole exception to rule (11c), will have both gender and declension class supplied in its Vocabulary entry.

Finally, rules (11a,b) will apply to nouns unspecified for declension class, whose gender is given. Exceptions to rule (11b) such as *mužčina* 'man' or *maxaradža* 'maharajah', which are masculine in gender yet belong to declension class I, are supplied with both gender and declension class in the Vocabulary and are therefore unaffected by rule (11).

Unlike nouns, adjectives are – universally – unspecified for gender and obtain their gender feature from the noun that they modify. Noun-adjective concord is formally implemented by special rules of Word Synthesis. The concord rules assign not only gender but also animacy, case and number to adjectives and also to other noun modifiers including numerals. Since like the rules in (11) concord rules are part of the Word Synthesis module, they cannot change previously assigned features. This fact plays an important role in the notoriously complex distribution of these grammatical markers in Russian numeral phrases, which I discussed in Halle 1990.[11]

I have stated the concord rules of Russian informally in (12).

(12) In an NP the gender, animacy, number and case of the head noun are copied onto the specifiers and adjectives that are in the head noun's domain.

Since the concord rule (12) copies gender from the head noun, it is necessary that the redundancy rule (11c) apply before (12). On the other hand, since rules (11a,b) apply to adjectives as well as to nouns it is necessary to order (11a,b) after (12). The rule of case syncretism (9) must obviously apply after both the concord rule (12) and the redundancy rules (11). Since the rule of case syncretism (9) is a Readjustment rule, this order is an automatic consequence of the organization of the different modules in (1).[12]

[11] Since theories are to be judged above all by their empirical consequences it is a serious shortcoming of Pullum and Zwicky's (1991) criticisms of the theory of Halle (1990) that no notice is taken of the main empirical result of that study: the distribution of Case in Russian numeral phrases.

[12] As we have seen above both declension class and gender are among the grammatical markers of nouns. It was observed by Aronoff (1992) that a fundamental difference between declension class and gender is that only gender, but never declension class is copied by concord rules such as (12). The inferences to be drawn from this observation remain to be elaborated.

2 The Declension of Russian Adjectives and Nouns

In the section below the theoretical framework that has been sketched in Section 1 is subjected to empirical test by utilizing it in the description of the declension of Russian adjectives and nouns.

2.1 Information about Russian Phonology

Russian has the vowel system shown in (13).

(13)

	i	y	u	e	o	a	E	O
back	−	+	+	−	+	+	−	+
round	−	−	+	−	+	−	−	+
high	+	+	+	−	−	−	−	−

The vowels E/O are the "abstract" vowels (Yers) of the Slavic languages, first introduced into the analysis of the modern Slavic languages by the late Theodore Lightner (1972). There have been several proposals as to how these vowels are to be represented in underlying representations, of which the most attractive one – to my mind – is that advanced by Kenstowicz and Rubach (1987). Since the issue is tangential to the main subject matter of this paper I assume without further discussion Kenstowicz and Rubach's proposal that the Slavic "abstract" vowels are represented as feature complexes without associated timing slot. It is the absence of a timing slot that distinguishes [E,O] from the "concrete" [e,o] with which they share all distinctive features.[13]

I have given in (14) an informal statement of the surface distribution of the abstract vowels.

(14) The abstract vowels /E/ /O/ merge with /e/ /o/ if they are followed in the next syllable by an abstract vowel, elsewhere they are deleted.

In view of (14) word final Yers are always deleted. For various reasons, many of them noted already by Lightner (1972), it is necessary to postulate that in their underlying representation (almost) all Russian words end in a vowel including in many instances a Yer. I adopt this proposal and assume below that words that phonetically end with a consonant have in

[13] This decision assumes that it will be possible to solve in a satisfactory manner the formal problems the Kenstowicz-Rubach proposal raises for the treatment of stress in the Slavic languages. The ultimate disposition of this problem is unlikely to impact crucially on the issues under discussion here.

their underlying representation a word final Yer. For example, the Sg-Nom masculine adjective pronounced in the standard literary pronunciation [prastój] is represented underlyingly as /prost+o+j+O/. The word final /O/ is deleted by rule (14) while the stem vowel /o/ is actualized as [a] by virtue of the neutralization process discussed directly below.[14]

The concrete vowels are pronounced as indicated in (13) only when bearing word stress. When unstressed they are subject to neutralization processes of various kinds, which differ from dialect to dialect. The effects of these processes, which are referred to in the literature as *akan'e, okan'e, ikan'e*, etc., are systematically omitted from consideration below.

I have given in (15) a chart of the Russian consonants. Consonants enclosed in parentheses do not appear in underlying representations.

(15)

labials	p	p'	b	b'	f	f'	(v	v')			m	m'							(w)
dorsals	k	(k')	g	(g')	x	(x')													
coronals																			
[+ant]	t	t'	d	d'	s	s'	z	z'	c		n	n'	l	l'	r	r'			
[-ant]					š	(š')	ž	(ž')	č'										j

The basic fact to be noted about the consonants is that they come in pairs traditionally designated as "hard vs. soft." The phonetic correlate of this distinction is that all consonants in Russian are pronounced with a raised tongue body: "hard" consonants are [+high, +back], "soft" consonants [+high, -back].

In representing the glide with the IPA symbol /j/ I am side-stepping the question as to the proper representation of glides and their role in the structure of the Russian syllable, which is in need of further investigation. My present guess is that in Russian the glide /j/ has the same feature composition as the vowel /i/ and like the latter is supplied with a single timing slot. (Mutatis mutandis, the same is true of the glide /w/ and the vowel /u/.) The difference between glides and vowels is therefore reflected by their different position in the syllable: vowels are found exclusively in the head of the rime, glides are to be found elsewhere. This is not necessarily true of glides everywhere. For example, I believe that in Semitic the glides /j,w/ are [-consonantal] segments whose major articulator is coronal, respectively labial. The Semitic glides thus differ from those of Russian and other IE languages, whose major articulator is dorsal. All four types of glides appear in the African language Fula. This is manifested in Fula consonant gradation, where certain [y,w] alternate with the dorsal consonants [Ng,g], whereas other [y,w] alternate with labials [mb,b] and coronals [nǰ,ǰ], respectively. Following Sagey (1986), I assume that in the former glides the major articulator is dorsal, while in the latter glides the major articulator is labial and coronal, respectively. For some additional discussion see Halle (1992a).

[14] Szpyra (1992) has argued that the correct way to account for the effects of the Yers described in (14) is by special treatment of the Yers in the syllabification rules. Since the matter is peripheral to the issues under discussion, I do not deal with Szpyra's proposals here beyond remarking that they seem to me to be on the right track.

The only other facts to be noted about Russian phonology here are the rules in (16).[15]

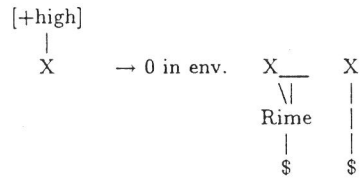
(16)
a. Before front vowels consonants are automatically "softened," that is, they become [-back].
b. After [-back] consonants the vowel /y/ surfaces as /i/.
c. The glides /j,w/ are deleted when followed by a consonant (syllable onset).
d. Vowels are deleted when followed by a vowel.

Rule (16a) accounts for the "softening" of /m/ in the Pl-Instr in (17) and elsewhere.

Rules (16c,d) are modernized versions of the truncation rules central to Jakobson's (1948) analysis of the Russian conjugation, which profoundly influenced the evolution of generative phonology in the 1960s.

Rules (16a,b) belong in the noncyclic (or post-cyclic) rule block of the phonology and are therefore not subject to the "strict cycle" condition (see Kiparsky 1982). Rules (16c,d) are cyclic rules of the language and are therefore subject to the "strict cycle" condition.[16]

[15] Rule (16c) might be written more formally as



[16] Since cyclic rules do not apply to the innermost constituent of a word, glide-consonant and vowel-vowel sequences are found in stems; for example, /ajv/ 'quince', /tajg/ 'taiga', and /pauk/ 'spider', /aist/ 'stork'.

2.2 The Adjective Declension

An example paradigm of the adjective declension is given in (17). The noun declensions are exemplified in (23).

(17)

Singular	I	II	
	'simple' f.	'simple' m.	'simple' n.
nom	prost+a+j+a	prost+o+j	prost+o+j+o
acc	prost+u+j+u	like nom. or gen. (see (9) and Sect. 2.4)	
gen	prost+o+j	prost+o+v+o	
dat	prost+o+j	prost+o+m+u	
prep	prost+o+j	prost+o+m	
instr	prost+o+j(+u)	prost+y+m	
Plural			
nom		prost+y+j+e	
acc		prost+y+j+e/y+x	
gen		prost+y+x	
dat		prost+y+m	
prep		prost+y+x	
inst		prost+y+m,+i	

2.2.1 The Spell-out of the Theme Morpheme

In Russian, like in many other languages, adjectives do not have inherent gender but obtain it by a special Word Synthesis rule from the noun that is the syntactic head of the phrase.

As noted in part I and as discussed in greater detail in Halle (1990) declension class rather than gender determines the inflections that a given word takes. In the adjectives this distinction plays only an indirect role, since all adjectives of feminine gender belong to class I whereas all adjectives of nonfeminine (that is, masculine or neuter) gender are class II. As can readily be seen in the paradigms in (17) the distinction between masculine and neuter adjectives is neutralized everywhere except in the Sg-Nom and Sg-Acc. Moreover, in the plural there is only a single paradigm: distinctions among different inflection classes are neutralized in the Plural.

Like the nouns and adjectives of Latvian Russian adjectives and nouns have the constituent structure (18).

(18) $[[[\text{Stem}] + \text{Q,Theme}]_{A,N} + \text{Q,Number-Case}]_{A,N}$

I shall assume the identifying index Q of the adjective Theme is spelled out as /oj/, whereas the identifying index of the noun Theme is /o/.

(19) a. $\text{Q} \rightarrow$ /o+j/ in env. $\_\text{,Theme}]_A$
b. $\text{Q} \rightarrow$ /o/ in env. $\_\text{,Theme}]_N$

The adjective Theme mirrors the historical evolution of the adjective inflection quite directly. The inflected forms of the modern adjective derive from forms in which the inflected adjective was followed by the inflected form of the 3. pers. pronoun /j/. The historical evolution is fairly transparent in such modern forms as the Class I Sg-Nom /prost+a+j+a/ or Sg-Acc /prost+u+j+u/, where the Number-Case endings appear twice: once after the adjective stem and again after the pronominal clitic. Historical processes have obscured the traces of this development in most of the other forms.

As is readily seen in (17), the Theme vowel does not always surface as /o/. It appears as /a/ in the Sg-Nom of class I adjectives, and as /u/ in the Sg-Acc of Class I adjectives, whereas the Theme vowel is /y/ in the Sg-Instr of Class II adjectives and throughout the Plural. These facts are captured by the Readjustment rules in (20).

(20)

$$/\text{o}/ \rightarrow \begin{cases} \text{[-round] (/a/) in env. [I] } \_\_ \text{ +j]}_A + \text{Q,Sg-Nom} \\ \text{[+high] (/u/) in env. [I] } \_\_ \text{ +j]}_A + \text{Q,Sg-Acc} \\ \text{[-round, +high] (/y/) in env. [II]} \begin{cases} \_\_ \text{ +j]}_A + \text{Q,Sg-Inst} \\ \_\_ \text{ +j]}_A + \text{Q, Pl} \end{cases} \end{cases}$$

Fundamental to the treatment proposed here is the assumption that both Readjustment and Spell-out rules apply cyclically and that all Readjustment rules are ordered before the Spell-out rules. The Spell-out rule for the Theme vowel must therefore be context-free, because the rule applies at a stage in the derivation where the Number-Case morpheme is still invisible (cf. (18)). As a consequence, the different manifestations of the Theme vowel must be accounted for by means of the Readjustment rules (20) that apply on the second pass through the rules of the Morphophonology.

It might be noted that the change which the Theme vowel undergoes in the last two contexts in (20) is the joint product of its changes in the first two contexts. More importantly, since both Readjustment and Spell-out rules apply cyclically the Readjustment rules (20) apply on the second pass through the cyclic rules as they require reference to the Number-Case information which is available only at that stage in the derivation (cf. (18)). Finally, the rules in (20), like all rules in the Morphophonology, have been ordered in conformity with the Panini-an principle mentioned above so that the more restricted rules precede those that are less restricted. It is by virtue of this principle that in (20) the vowel change in the Plural is ordered last, for unlike the other three rules in the block, this rule requires mention of neither declension class nor Case for its correct application, since in the Plural the Theme vowel is/y/ in all Cases.

2.2.2 Realization of the Number-case Morpheme

As an inspection of the forms in (17) readily shows, the Theme vowel is followed everywhere by a consonant, which in most cases is followed by a vowel in turn. It was remarked above that in their underlying representation – i.e., the representation that serves as input to the rules of the phonology – all Russian words end in a vowel, it will therefore be assumed that in the forms where no vowel surfaces after the consonant, the form ends with the abstract Yer vowel, which is deleted word finally by rule (14). The question that needs to be answered at this point is whether these post-Theme Consonant-Vowel sequences are spell-outs of the different Number-Case morphemes or whether they require a different treatment.

As noted by Jakobson (1958) "of the 33 non-syllabic phonemes of the Moscow norm of the Russian literary language, only four – /j/, /v/, /m/, and /x/ – occur in case endings." In order to capture this restriction formally it is necessary to assume that the spell out rules for the Number-Case morphemes of Russian adjectives and nouns supply vowels only and that the post-Theme consonants are inserted by a set of Readjustment rules (see (21) and (25) below) that are separate and distinct from the rules spelling out the Number-Case morpheme (see (22) and (26)). If we had assumed that the Number-Case suffixes are spelled as Consonant-Vowel sequences we should have had no way to capture the fact that the variety of consonants appearing in post-Theme position is severely restricted.

The Theme vowel is followed by [v] only in the Sg-Gen of class II adjectives. In Russian as well as in other Slavic languages [v] is a surface reflex of the glide /w/. It was noted by Flier (1972) that alternations between /j/ and /w/ are pervasive in Russian. I assume that all of these alternations including those in the Sg-Gen are handled by a single Readjustment rule that turns /j/ into /w/ in a variety of morphological contexts. The rule will be referred to as the j>w rule below, but because of its marginal relevance to the subject of primary interest here it will not be further discussed.

The Readjustment rules (21) and the Spell-out rules (22) together thus generate the Number-Case endings of the adjectives. The Readjustment rules insert /m/ or /x/ between the Adjective stem and the Number-case morpheme.

(21)

$$O \rightarrow \begin{cases} /\text{m}/ \begin{cases} \text{in env. [II]} \ldots]_A \ +\_\_ \ \text{Q, Sg-Prep} \\ \text{in env. [II]} \ldots]_A \ +\_\_ \ \text{Q, Sg} \\ \text{in env.} \quad\quad]_A \ +\_\_ \ \text{Q, Pl} \end{cases} \text{-Dat/Inst} \\ /\text{x}/ \quad \text{in env.} \quad\quad]_A \ +\_\_ \ \text{Q, Pl-Gen/Prep} \end{cases}$$

By virtue of (16c) the glide /j/ is deleted when the Number-Case morpheme begins with a consonant; i.e., wherever rule (21) applies. The process of glide deletion was noticed as central in the Russian verbal inflection in Jakobson (1948); its role in the adjective inflection was obscured by failure to understand the special role of /j/.

In view of the analysis that has been proposed here the Number-case suffixes are all vowels and they are spelled out by the rules in (22).[17]

(22)

$$Q \rightarrow \begin{cases} /\text{o}/ \quad \text{in env.} \quad \begin{cases} [\text{II, Neut}]_A \cdots\_\_, \text{Sg-Nom} \\ [\text{II}]_A \cdots\_\_, \text{Sg-Gen} \end{cases} \\ /\text{a}/ \quad \text{in env.} \quad\quad [\text{I}]_A \cdots\_\_, \text{Sg-Nom} \\ /\text{u}/ \quad \text{in env.} \quad \begin{cases} [\text{II}]_A \cdots\_\_, \text{Sg-Dat} \\ [\text{I}]_A \cdots\_\_, \text{Sg-Acc} \\ [\text{I}]_A \cdots\_\_, \text{Sg-Inst(opt)} \end{cases} \\ /\text{e}/ \quad \text{in env.} \quad\quad]_A \cdots\_\_, \text{Pl-Nom} \\ /\text{i}/ \quad \text{in env.} \quad\quad]_A \cdots\_\_, \text{Pl-Inst} \\ /\text{O}/ \quad \text{in env.} \quad\quad]_A \cdots\_\_ \end{cases}$$

[17] The rules (22) leave unaccounted for all accusative forms, except those of the singular of class I adjectives. This special problem of the Russian nominal inflection is taken up in sec. 2.4.

Since the Spell-out rules replace the abstract marker Q with a string of phonemes, the application of a given rule in (22) bleeds every later rule. As elsewhere in the Morphophonology, the rules in (22) are ordered by decreasing complexity, reflecting the Paṇini-an principle of rule precedence.

It is a consequence of ordering rules in this manner that the actual instances to which all but the earliest rule applies will be a subset of the complement of the earlier rules. The instances to which such a rule applies may therefore lack a common denominator. We see this with special clarity in the default rule, the rule ordered last in a set like (22). This rule, which spells out the Case-Number morpheme as Yer, applies where none of the earlier rules could apply; i.e., in an environment that has no positive defining features. In sum, in a grammar in which the Paṇini-an principle holds and rules are ordered by decreasing complexity, we should expect to find rules that apply in contexts for which there can in principle be no common denominator. Collins (1991) has made interesting use of this insight in his treatment of the instrumental case in Ewe, Russian and some other languages.

A second consequence of this property of ordered rules is that wherever an earlier optional rule fails to apply the default rule must be invoked. The prediction is borne out by the Spell-out rules (21), where the Sg-Instr suffix of Class I adjectives is spelled out as /O/ by the default rule, when the optional Spell-out rule failed to spell it out as /u/.[18]

[18] Pullum and Zwicky (1991) express strong reservations about extrinsic rule ordering. They state that from "a metatheoretical point of view, this is decidedly a retrograde move." It is difficult to extrapolate from their discussion how without recourse to rule ordering they propose to treat the phenomena captured by the default rule in (22) and elsewhere. Nor do Pullum and Zwicky inform the reader how they would deal with the rather different type of evidence for rule ordering reviewed in Bromberger and Halle (1989). Since "metatheoretical" considerations must not prevent us from dealing correctly with empirical issues, Pullum and Zwicky's reservations cannot be taken as compelling in light of these unanswered questions.

2.3 The Noun Declension

The paradigms of the Russian noun declension are illustrated in (23).

(23)

	I		II	
	'lip'	'reason'	'tsar'	'chisel'
Sg nom	gub+a	um	car,	dolot+o
acc	gub+u	um	car,+a	dolot+o
gen	gub+y	um+a	car,+a	dolot+a
dat	gub,+e	um+u	car,+u	dolot+u
prep	gub,+e	um,+e	car,+e	dolot,+e
inst	gub+o+j+(u)	um+o+m	car,+o+m	dolot+o+m
Pl nom	gub+y	um+y	car,+i	dolot+a
acc	gub+y	um+y	car,+e+j	dolot+a
gen	gub	um+o+v	car,+e+j	dolot
dat	gub+a+m	um+a+m	car,+a+m	dolot+a+m
prep	gub+a+x	um+a+x	car,+a+x	dolot+a+x
inst	gub+a+m,+i	um+a+m,+i	car,+a+m,+i	dolot+a+m,+i

	III
	'square'
Sg nom	ploščad,
acc	ploščad,
gen	ploščad,+i
dat	ploščad,+i
prep	ploščad,+i
inst	ploščad,+j+u
Pl nom	ploščad,+i
acc	ploščad,+i
gen	ploščad,+e+j
dat	ploščad,+a+m
prep	ploščad,+a+x
inst	ploščad,+am,+i

2.3.1 The Theme Vowel of Nouns

Nouns have exactly the same constituent structure as the adjectives; i.e., (18). Nouns differ from adjectives in that their Theme spell-out rule is (19b), rather than (19a). They also are subject to different Readjustment rules for the Theme and to different spell-out rules for the Number-Case

morphemes.[19] Like the Adjective Theme, the Noun Theme, which is spelled out as /o/ by rule (19b), is subject to the Readjustment rules (24).

(24)

$$/o/ \rightarrow \begin{cases} /e/ \quad \text{in env.} \quad \begin{bmatrix} \text{-back} \\ \text{+cons} \end{bmatrix} + \_\,]_N + \quad \text{Q,Pl-Gen (cond)} \\ /O/ \quad \text{in env.} \quad [\text{III}] \quad + \_\,]_N + \quad \begin{cases} \text{Q,Sg-Inst,} \\ \text{Q,Pl-Inst (list)} \end{cases} \\ /a/ \quad \text{in env.} \quad \_\,]_N + \quad \text{Q,Pl- Inst} \begin{cases} \text{Dat} \\ \text{Prep} \end{cases} \end{cases}$$

The Theme vowel becomes /e/ in the Pl-Gen of nouns whose stem ends in a "soft" consonant.[20] It becomes Yer in class III nouns: this occurs regularly in the Sg, in the Pl we get Yer only in the five Class III nouns: /lošad,+O+m,+i/ 'horses', /dver,+O+m,+i/ 'doors', /dočer,+O+m,+i/ 'daughters', /l,ud,+O+m,+i/ 'people', /det,+O+m,+i/ 'children'. The Theme vowel becomes /a/ in the Plural-Dative, Instrumental and Prepositional.

2.3.2 The Spell-out and Readjustment Rules of the Number-Case Morphemes in Nouns

Russian possesses a large number of indeclinable nouns. I assume that these nouns belong to a separate declension class designated by the feature [-D], whereas the other three declension classes are designated as [+D]. One of the peculiarities of the indeclinable nouns is that they are not subject to any of the insertion rules (25). This fact is reflected in (25) by the feature [+D] in certain rules.

(25)

$$0 \rightarrow \begin{cases} /j/ \quad \text{in env.} \quad \begin{cases} [\text{I}] \\ [\text{III}] \end{cases} \ldots]_N + \_ + \text{Q,Sg-Inst} \\ \qquad\qquad [+\text{D}] \ldots]_N + \_ + \text{Q,Pl-Gen (cond)} \\ /m/ \quad \text{in env.} \quad \begin{cases} [\text{II}] \quad \ldots]_N + \_ + \text{Q,Sg-Inst} \\ [+\text{D}] \quad \ldots]_N + \_ + \text{Q,Pl-Dat/Inst} \end{cases} \\ /x/ \quad \text{in env.} \quad [+\text{D}] \quad \ldots]_N + \_ + \text{Q,Pl-Prep} \end{cases}$$

[19] A special exception is constituted by the ten neuter nouns *bremja* 'burden,' *vremja* 'time,' *vymja* 'udder,' *znamja* 'banner,' *imja* 'name,' *plamja* 'flame,' *plemja* 'tribe,' *semja* 'seed,' *stremja* 'stirrup,' *temja* 'top of the head.' In the Sg-Nom these nouns are subject to neither of the two Spell-out rules (24) and (26) and surface with their bare stem. Because of the marginal character of this phenomenon I have not taken formal account of these exceptional forms below.

[20] Details on the fronting of /o/ to /e/ in the Plural Genitive as well as on the other rules applying in this Case are discussed separately in Section 2.3.1 below.

Like in the adjectives, a consonant (or glide) is inserted before certain Number-Case endings in the regularly declinable nouns as indicated in (25). As in the adjectives, the motivation for not treating these consonants as integral parts of the Number-Case suffix is that this is the only means of capturing formally the generalization that only /j/, /m/, or /x/ can figure in this position and that several different Number-Case suffixes begin with the same consonant or glide.

The rules (25) inserting /m/ and /x/ apply in a subset of the cases where these consonants are inserted in the adjective declension by the rules in (21). The main difference between (21) and (25) is the rule inserting the glide /j/. In the adjectives /j/ is part of the Theme. There is therefore no /j/ insertion rule in (21). In the nouns the glide is inserted in the Sg-Inst after all class I and III stems. The glide is inserted also in the Pl-Gen under special conditions that are discussed in Section 2.3.1 below.

The Number-Case morphemes of nouns are spelled out by the rules in (26). I have marked with an asterisk the rules that are identical with those for adjectives.

(26)

$$Q \rightarrow \begin{cases} /o/\text{in env.} \quad [\text{II,Neut}]_N + \ldots \_\text{,Sg-Nom}* \\ /a/\text{in env.} \begin{cases} [\text{II}]_N + \ldots \_\text{,Pl-Nom (cond)} \\ [\text{II}]_N + \ldots \_\text{,Sg-Gen} \\ [\text{I}]_N + \ldots \_\text{,Sg-Nom} \end{cases} \\ /u/\text{in env.} \begin{cases} [\text{I}]_N + \ldots \_\text{,Sg-Acc}* \\ [\text{I}]_N + \ldots \_\text{,Sg-Instr (opt)}* \\ [\text{III}]_N + \ldots \_\text{,Sg-Instr} \\ [\text{II}]_N + \ldots \_\text{,Sg-Dat}* \end{cases} \\ /i/\text{in env.} \begin{cases} [\text{II}]_N + \ldots \_\text{,Pl-Nom (cond)} \\ [\text{III}]_N + \ldots \_\text{,Sg-Gen/Dat/Prep} \\ [+\text{D}]_N + \ldots \_\text{,Pl-Inst}* \end{cases} \\ /e/\text{in env.} \begin{cases} [\text{II}]_N + \ldots \_\text{,Pl-Nom (cond)}* \\ [\text{I}]_N + \ldots \_\text{,Sg-Dat} \\ [+\text{D}]_N + \ldots \_\text{,Sg-Prep} \end{cases} \\ /y/\text{in env.} \begin{cases} [\text{I}]_N + \ldots \_\text{,Sg-Gen} \\ [+\text{D}]_N + \ldots \_\text{,Pl-Nom} \end{cases} \\ /O/\text{in env.}]_N + \ldots \_* \end{cases}$$

Like in the adjectives, the default Spell-out for the noun case endings is the abstract Yer vowel /O/. It should be noted that the final rule in the block (26) is not restricted to applying only after declinable nouns, but applies freely also to indeclinable nouns.

As readily seen by comparing (26) with (22), all six vowels figuring in (22) appear also in (26). In addition, the vowel /y/ figures in (26) but not in (22). Moreover, the Spell-out rules for the Pl-Nom realize this morpheme as /a, e, i, y/ depending mainly on the gender and declensional category of the noun, but include also a significant component of lexical idiosyncrasy. The details are discussed in Section 2.3.2.

It will be recalled that the phonological rule (16d) deletes vowels in position before vowels. As a consequence the Theme vowel will appear in the output only in those forms where a consonant or glide has been inserted by rule (25). Since (25) fails to insert a glide or consonant in a fair number of Cases, the Theme vowel does not surface in a great many Number-Case forms.

The Theme vowel however does not cause the deletion of a stem final vowel in indeclinable nouns. I assume that like all nouns and adjectives, indeclinable nouns are subject to the Theme spell-out rule (18). Since some indeclinable noun stems end in a vowel, we might expect the Theme vowel to trigger rule (16d) and thus cause deletion of the vowel ending the indeclinable noun stem. For example, the indeclinable noun /kofe/ undergoes Theme vowel spell-out, yielding the string /kofe+o/. This string could be subject to (16d) which would result in the incorrect deletion to the stem-final /e/. We prevent this from happening by postulating that the Theme is not a cyclic morpheme and therefore does not trigger the cyclic rule (16d). The Theme vowel itself is deleted by rule (16d) when followed by a vowel-initial Number-Case suffix. Since, as noted, all indeclinable nouns are subject to the default Spell-out rule for Number-Case the form under discussion enters the phonology as [[kofe+o]+O]. Since the Theme is not a cyclic suffix, the cyclic rule (16d) will apply to our form first on the second cycle; that is, to the string /kofe+o+O/. Here the Yer will trigger deletion of [o] by rule (16d), subsequent to which the Yer will itself be deleted by rule (14). This is illustrated in (27) where I have given examples of the derivation of a few Number-Case forms of nouns.

(27)

	gub+o (I, Pl-Inst)	um+o (II, Sg-Gen)	ploščad,+o (III, Sg-Inst)
(24)	gub+a		ploščad,+O
(25)	gub+a+m		ploščad,+O+j
(26)	gub+a+m+i	um+o+a	ploščad,+O+j+u
(14, 16)	gub+a+m,+i	um+a	ploščad,+j+u

	dolot+o (II, Sg-Inst)	car,+o (II, Pl-Nom)	kofe+o (indecl., Sg-Instr)
(24)		car,+a	
(25)	dolot+o+m		
(26)	dolot+o+m+O	car,+a+y	kofe+o+O
(14, 16)	dolot+o+m	car,+i	kofe

2.2.3.1 The Pl-Gen Forms of Nouns

As shown in (23) all Pl-Gen forms of nouns end with a consonant or glide (j/w>v). This implies that the Pl-Gen morpheme is spelled out everywhere with the abstract vowel /O/.

The central distinction among the Pl-Gen forms is whether in the output they terminate in their stem consonant, as in [gub, dolot], or whether they end with a glide that is part of the material added to the stem as in /um+o+v, car,+e+j, ploščad,+e+j/.[21]

In nouns of the first type, the Pl-Gen morpheme is added directly after the Theme vowel. The Theme vowel is then deleted by rule (16d). Subsequent application of the Yer rule (13) deletes the Yer resulting in a consonant final word. (Cf. (28).)

[21] Many of the ideas of the treatment below derive from Jakobson 1957. For additional details see Jakobson 1958, and Garde 1980, secs. 239-246.

In nouns of the second type, the Theme vowel surfaces in the Pl-Gen as either /o/ or /e/; for example, /um+o+v/ 'reason', /car,+e+j/ 'tsar', /ploščad,+e+j/ 'square'. The Theme vowel surfaces because of the insertion of the glide after the Theme vowel by rule (25). (Cf. (28).)

The main complexity of the Pl-Gen actualization lies in the conditions, detailed below, under which glide insertion takes place.

The glide is inserted after all class III stems.

After class I stems the glide is inserted after stems ending in clusters consisting of a consonant followed by a "soft" liquid /r, l,/ or by /č š ž/. It is inserted also after an arbitrary list of class I stems that – by and large – have desinential stress in the Plural.

After class II stems the glide is generally inserted only after masculine, but not after neuter stems. There are, however, exceptions in both directions. Thus, a small number of masculine nouns fail to insert the glide. Among these are measure words such as *gramm* 'gram', *amper* 'ampere', *vol't* 'volt'; names of nationalities such as *baškir* 'Bashkir', *rumyn* 'Romanian'; paired objects such as *glaz* 'eye' and *pogon* 'epaulette' as well as a set of listed items such as *raz* 'time', *volos* 'hair', and so forth. Neuter nouns after which the glide is inserted are *mor,e* 'sea', *pol,e* 'field', *oblako* 'cloud', plus a number of words formed with the suffixes /Oj/ and /Ec/ such as *plat'e* 'dress', and *okonce* 'window' (diminutive). There are a fair number of stems where native usage vacillates as regards glide insertion.

Glide insertion, which is implemented by rule (25), is, of course, separate and independent of Theme vowel fronting, which is implemented by rule (24). In contrast to glide insertion, the conditions under which the Theme vowel is fronted by rule (24) are quite simple. As observed by Jakobson (1957), rule (24) applies if the stem ends with a "soft" – that is, [-back] – consonant or with one of the palatal consonants, /č š ž/. It is plausible to assume that in Russian palatal consonants are underlyingly [-back]. It is therefore possible to restrict fronting by rule (24) to the position after [+cons, -back].

The glide inserted by rule (25) is /j/, and it is turned into /w/ after back vowels by the operation of the j>w rule; that is, in all instances where rule (24) did not turn /o/ into /e/.

Two consequences of the account above are worth noting especially: i. Theme vowel fronting by rule (24) never takes place after stems ending with the glide /j/. This follows directly from the fact that /j/ is not [+cons] but [-cons], whereas fronting of the Theme vowel /o/ to /e/ takes place only after [+cons, -back] segments. ii. Since vowels are deleted before vowels (cf. rule (16d)), the effects of the fronting rule are observable only in forms that undergo glide insertion by (25). In forms that do not undergo glide insertion, the Theme vowel will be invariably deleted by rule (16d).

We illustrate the derivations of Pl-Gen forms in (28) below. In examining these it should be recalled that the Plural-Genitive desinence is spelled out everywhere as the back Yer (by the default rule in (26)).

(28)

	gub+o	um+o	car,+o
(24)			car,+e
(25)		um+o+j	car,+e+j
j > w		um+o+w	
(26)	gub+o+O	umo+ow+O	car,+e+j+O
(16b, 14)	gub	um+o+w	car,+e+j

	dolot+o	ploščad,+o
(24)		ploščad,+e
(25)		ploščad,+e+j
j > w		
(26)	dolot+o+O	ploščad,+e+j+O
(16b, 14)	dolot	ploščad,+e+j

2.2.3.2 The Pl-Nom of Nouns

The Pl-Nom morpheme has a single Spell-out rule for nouns of Classes I and III, in both contexts Pl-Nom is spelled out as /y/. If the stem ends with a "soft" [-back] consonant, rule (16b) applies and fronts the /y/ to /i/. By contrast Pl-Nom has four different spell-outs for class II nouns. For Class II nouns the basic rule is that they take the suffix /a/ if they are neuter, whereas they take /y/ if they are masculine. There are however

numerous exceptions. In sketching these below I follow mainly the account in Jakobson 1957 and Garde 1980 (Sections 236-7, 243).

Nouns formed with the suffix /+in/ lose this suffix and take /e/ in the Pl-Nom. These nouns systematically delete the /+in/ suffix in the plural. For example, /angl,iCan,+in - angl,ičan,+e/ 'Englishman' (Sg/Pl-Nom). The only exception to this is /s,em,jan,+in - s,emjan,+in+y/ 'family man', which takes the regular /y/ ending and also fails to delete the /in/ suffix.[22]

A small number of neuter nouns take /i/ in the Pl-Nom; for example, /kol,en+o - kol,en,+i/ 'knee', /pl,eč+o - pl,eč+i/ 'shoulder', /ok+o - oč+i/ 'eye'. Other neuters take /y/; for example, /jablok+o - jablok+y > jablok,+i/ 'apple'. The distinction between /i/ and /y/ is reflected in the fact that /i/ triggers the /k-č/ alternation in /ok+o - oč+i/ 'eye', whereas /y/ does not, as in /jablok+y > jablok,+i/ 'apples'.

Masculine stems that in the plural are subject to a special rule "softening" their final consonant take the regular /y/ suffix, which is actualized as [i] by rule (16b); for example /čert - čert,+i/ 'devil', /sos,ed - sos,ed,+i/ 'neighbor'.

Numerous masculine stems take the /a/ ending in the Pl-Nom; for example, /l,es+a/ 'forests', /glaz+a/ 'eyes'. Nouns formed with the suffixes /or/ and /tor/, always take /a/; for example, /prof,es+or+a, konduk+tor+a/.

2.4 The Accusative Case

As noted in Part I the Russian Accusative Case has a distinct suffix only for class I stems in the Singular, everywhere else the Accusative is indistinguishable from either the Genitive or Nominative. This is true of nouns as well as of adjectives. We review the different instances of Case syncretism in order.

In Class III nouns the Accusative coincides with the Nominative. Both Case morphemes are actualized by the abstract vowel /O/. Since this vowel represents the default Case, it suffices not to include Class III nouns in any of the other Spell-out rules for the Sg. Acc. Case morpheme (cf. (26)).

This simple move is not available in the remaining instances. In the Plural, for both adjectives and nouns the Accusative is identical with the Genitive, if the stem is animate, and with the Nominative otherwise. And the same principle holds for class II nouns and adjectives in the Singular.

As we have seen in Sections 2.3.1 and 2.3.2 the rules governing the actualization of the Pl-Nom and Pl-Gen morphemes are of considerable complexity. In view of this it clearly would be undesirable to express ... that the Accusative is identical with the Nominative, respectively Genitive, by adding new environments to the Readjustment and Spell-out rules. In fact, the attempt to do so is fraught with so many technical problems that anyone undertaking it is likely to become discouraged almost at once.

The most straightforward account of the Plural facts is to postulate a Readjustment rule that changes the Accusative to Genitive or Nominative in the relevant instances. The rule would have the form (29a).

(29a)

$$\text{Acc} \rightarrow \left\{ \begin{array}{l} \text{Gen in env. } [+\text{animate}]_{A,N} \cdots \\ \text{Nom in env} \qquad\qquad \cdots \end{array} \right\} \text{Q, Pl} \_\_$$

Essentially the same rule applies to class II adjectives and nouns in the Singular as well. We need therefore in addition to (29a) a rule that has the effects of (29b).

(29b)

$$\text{Acc} \rightarrow \left\{ \begin{array}{l} \text{Gen in env. } [+\text{animate}]_{A,N} \cdots \\ \qquad\qquad [\text{Class II}] \\ \text{Nom in env. } [\text{Class II}] \quad \cdots \end{array} \right\} \text{Q, } \_\_$$

It is an open question at this time how two rules such as (29a) and (29b) are to be formally combined so as to express the fact that they are largely identical. What is beyond dispute is that the fact of their partial identity must be taken account of in the form of the rules. Utilizing the familiar notation employed in SPE these partial identities among the rules would be taken into account by rewriting the two rules above as in (30).

(30)

$$\text{Acc} \rightarrow \left\{ \begin{array}{l} \text{Gen in env. } [+\text{animate}]_{A,N} \cdots \\ \qquad\qquad < [\text{Class II}] >_a \\ \text{Nom in env. } < [\text{Class II}] >_a \quad \cdots \\ \qquad\qquad \text{Cond: if a, not b} \end{array} \right\} \text{Q, } < \text{Pl} >_b \_\_$$

[22] Since none of these nouns has stress on the Pl-Nom suffix it is in principle impossible to determine whether the suffix is /e/ or /i/ in the literary standard pronunciation, since these two vowels merge phonetically when unstressed. I have maintained the distinction here because it surfaces in certain other dialects. Nothing of any importance here hinges on this decision.

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Weight of CVC can be Determined by Context

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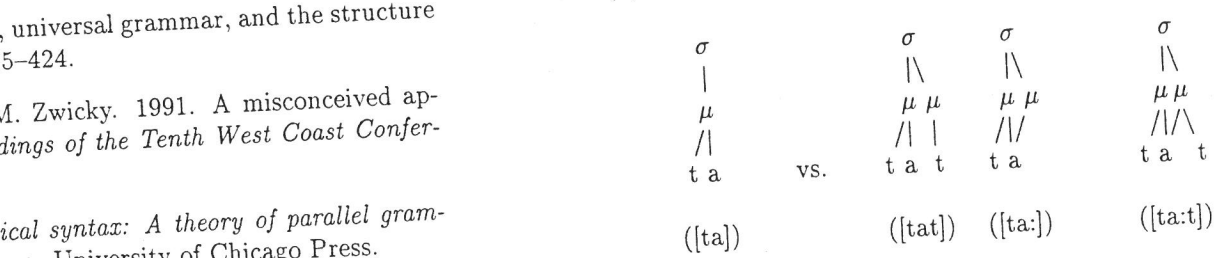
1 Introduction

The contrast of heavy vs. light syllables is central to the phonology of many languages. Typologically, we observe two patterns. In Latin and other languages, both long-voweled (CVV) and closed (CVC) syllables count as heavy, with CV syllables light. In Cahuilla (Seiler 1977) and various other languages, only CVV is heavy, with both CVC and CV light.

Moraic theory (Hyman 1985, McCarthy and Prince 1986, Hayes 1989, Ito 1989, Zec 1988) adapts and formalizes the traditional notion of mora to account for this. Heavy syllables in Latin contain two moras (formalized /μ/ below), light syllables one:

(1) **Latin: CV Light; CVC, CVV, CVVC Heavy**



In a language like Cahuilla, the structures are the same, except that CVC is assigned only one mora:

(2) **Cahuilla: CV, CVC Light; CVV, CVVC Heavy**