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## CYCLICITY AND RUSSIAN STRESS

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### 1 INTRODUCTION

In this paper I propose an analysis of stress in Russian nouns. I argue that a system of interacting morphological stress features and a cyclic rule of stress assignment provides a simple and principled account of a complicated body of data.

This paper addresses two important theoretical issues concerning the nature of the cycle and its role in lexical phonology.

One issue is the cyclic status of the so-called dominant class of suffixes. Dominant suffixes have the property that they delete previous stresses. Non-dominant suffixes do not. Halle and Mohanan (1985) and Halle and Vergnaud (1986) have argued from Sanskrit data that the property of dominance can be reduced to cyclicity -- that is, that stress-deleting suffixes are cyclic, while non-stress deleting suffixes are non-cyclic. I will argue against this reduction, showing that it is crucial to assume that all classes of suffixes in Russian are cyclic.

Another issue concerns conditions on the application of lexical rules. In Russian there is an important correlation between the derivational status of nouns and their stress properties. We will see that this correlation follows directly from the assumption that the cyclic stress rule applies only in derived environments. In other words, Russian stress provides evidence of the clearest sort for the Strict Cycle Condition.

The analysis of Russian stress presented here is based on an investigation of the properties of one lexical category: nouns. Although adjectives and verbs present certain complications, they seem to pose no serious challenge to the basic principles of the system formulated below. In work in progress I am extending my analysis to account for the stress properties of these lexical categories as well.

## 2 BASIC COMPONENTS OF THE SYSTEM

In their work on Proto-Indo-European stress, Kiparsky and Halle (1977) argued that the stress systems of Slavic, Lithuanian, Vedic, and Classical Greek share a number of important properties. First, morphemes in these languages may be stressed in their underlying representation (an idea due to Jakobson (1963, 1965)). Second, morphemes may be stress-deleting. That is, they may de-stress the stem to which they attach. As mentioned above, Kiparsky and Halle call this property dominance. Let us assume, then, that morphemes are marked in the lexicon as [±stressed, ±dominant].

Although polymorphemic words may underlyingly contain more than one stressed vowel, normally only one stress is phonetically realized. In all of these languages, the phonetic realization of stress is determined by the Indo-European Basic Accentuation Principle. This rule is given below:

### (1) BASIC ACCENTUATION PRINCIPLE (BAP)

If a word has more than one stressed vowel, assign stress to the first; if it contains no stressed vowel, assign stress to the initial vowel of the word.

## 3 STRESS IN NONDERIVED NOUNS

### 3.1 Data

Russian nouns are inflected for number and case. There are three major declensions. The declensions generally pattern according to gender: the first contains mainly masculine and neuter nouns; the second contains feminine-i nouns; and the third, feminine-ii nouns. Although the declensions share most of the same plural inflections, a different set of singular inflections is associated with each.

A table of inflections is given in (2) below. The star indicates lexical stress. The Ω symbol represents an underlying high lax vowel (jer) which surfaces as a mid-vowel in certain environments and otherwise deletes, including word-finally. When a stressed jer deletes, the preceding syllable receives the stress feature.<sup>1</sup>

(2) NOMINAL INFLECTION

DECL:	1	2	3	PL
	SG (M)/(N)	SG (F-i)	SG (F-ii)	
NOM	Ω / o	* a	Ω	* y / a / i
ACC	Ω / o	u	Ω	* y / a / i
GEN	a	* y	i	* * * ov / Ω / ej
DAT	u	* e	i	* am
INST	om	* oj	ju	* ami
LOC	e	* e	i	* ax

Next, we will examine the main stress paradigms of Russian nouns. These are given in (3).

(3) NOMINAL STRESS PARADIGMSCLASS I: FIXED STRESS

## (A) STEM THROUGHOUT

rabóta (2fem) 'work'

NOM	rabót + a	rabót + y
ACC	rabót + u	rabót + y
GEN	rabót + y	rabót + Ω
DAT	rabót + e	rabót + am
INST	rabót + oj	rabót + ami
LOC	rabót + e	rabót + ax

## (B) DESINENCE THROUGHOUT

čertá (2fem) 'line'

čert + á	čert + y
čert + ú	čert + y
čert + y	čert + Ω
čert + e	čert + am
čert + oj	čert + ami
čert + e	čert + ax

**CLASS II: SHIFTING STRESS**(A) INITIAL IN SG.  
DESINENCE IN PL.(B) INITIAL IN SG. & NOM. PL.  
DESINENCE ELSEWHEREzérkalo (1neu) 'mirror'vólos (1mas) 'hair'

NOM	zérkal + o	zerkal + á	vólos + Ω	vólos + y
ACC	zérkal + o	zerkal + á	vólos + Ω	vólos + y
GEN	zérkal + a	zerkál + Ω	vólos + a	volos + óv
DAT	zérkal + u	zerkal + ám	vólos + u	volos + ám
INST	zérkal + om	zerkal + ámi	vólos + om	volos + ámi
LOC	zérkal + e	zerkal + áx	vólos + e	volos + áx

(C) INITIAL IN ACC. SG., NOM./ACC.PL.  
DESINENCE ELSEWHEREborodá, (2fem), 'beard'

NOM	borod + á	bórod + y
ACC	bórod + u	bórod + y
GEN	borod + y	boród + Ω
DAT	borod + é	borod + ám
INST	borod + ój	borod + ámi
LOC	borod + é	borod + áx

The data indicate that there are two major categories of nouns: (1) those with fixed stress and (2) those with shifting stress. Both categories contain further subdivisions. I will discuss these subdivisions in more detail below.

There are two important observations we can make about these data:

- (i) Fixed stress may fall either on the stem or on the desinence (that is, on the inflectional ending).
- (ii) Shifting stress occurs only between the initial syllable and the desinence.

**3.2 Analysis**

To begin my analysis, I will limit my attention to stress assignment in nonderived nouns -- that is, nouns formed simply from a root and inflection.

Recall the BAP in (1), which I am assuming to hold for Russian. This rule assigns stress to the first stressed vowel; otherwise to the initial vowel.

Given the BAP, fixed stress is predicted whenever an inflection is attached to a [+stressed] root. This explains the existence of Class (I-A). Since the root is stressed, its stress wins in every form.

Now consider (I-B), in which stress falls on the desinence throughout. We know that some inflectional morphemes are lexically specified as [-stressed]. Therefore, we cannot account for this class simply by assuming that the root lacks an inherent stress. If that were true, then stress would fall on the desinence whenever the inflection is inherently stressed, and on the initial vowel whenever the inflection lacks an inherent stress.

We can account for these cases by positing a subclass of inherently stressed morphemes which I call post-stressing. These have the property of moving their inherent stress one syllable to the right. In fact, morphemes of this type are also attested in Lithuanian and Vedic (cf. Kiparsky 1982; there are a number of interesting similarities between the stress systems of Russian and Vedic, as analyzed by Kiparsky). In Russian, there is some evidence (not yet conclusive) that the post-stressing property of a morpheme is operative only in the environment of an inflection. Each post-stressing morpheme I have found so far retains the stress if the following syllable belongs to a derivational morpheme.

Sample derivations for nonderived nouns with fixed stress are given in (4) below. An asterisk is placed above a vowel which is lexically stressed. Since I assume that post-stressing morphemes are simply a subset of the class of inherently stressed morphemes, the BAP will apply regularly and then the post-accenting property will "adjust" the output by transferring the accent onto the adjacent syllable of the inflectional morpheme.

(4) DERIVATIONS OF NONDERIVED NOUNS WITH FIXED STRESS

	*	*	BAP	
(a)	[[RABOT]	[A]]	----->	rabóta (nom sg)
	*		BAP	
	[[RABOT]	[Y]]	----->	rabóty (nom pl)
	*	*	BAP	post*
(b)	[[CERT]	[A]]	----->	čérta -----> čertá (nom sg)
	*		BAP	post*
	[[CERT]	[Y]]	----->	čérty -----> čerty (nom pl)

Now consider Class II. The roots are lexically unstressed in all categories of Class II. We thus have a simple account of the fact that stress shifts back and forth depending on the stress property of the desinence. The BAP predicts that nouns with unstressed roots like these will have stress on the desinence when the inflectional morpheme is [+stressed] and on the first syllable when the inflection is [-stressed]. Sample derivations are given below.

(5) DERIVATIONS OF NONDERIVED NOUNS WITH SHIFTING STRESS

\* BAP  
[[ZERKAL] [A]] -----> zerkalá (nom pl)

BAP  
[[ZERKAL] [O]] -----> zérkalo (nom sg)

\* BAP  
[[BOROD] + [A]] -----> borodá (nom sg)

BAP  
[[BOROD] + [U]] -----> bórodu (acc sg)

Halle (1973) noted that each paradigm of shifting stress is generally confined to one gender of noun: (A) is mostly neuter; (B) is mostly masculine; and (C) mostly is mostly feminine. We can now explain this correlation as the result of the differences in the accentual properties of singular inflections assigned to each gender.

I now present an observation that is crucial to the present analysis, and provides the empirical basis for one of the main theoretical claims I want to make. The generalization is the following:

Non-derived Noun Generalization:

Shifting stress occurs only in morphologically simplex nouns (i.e. in underived nouns).<sup>2</sup>

Clearly, we want to explain why shifting stress is confined in this way to nonderived forms.

One false hypothesis worth considering is that all derivational morphemes are inherently stressed. If that were true, inflectional morphemes would never affect stress assignment in derived nouns. The BAP would determine that stress falls on the first stressed morpheme of the word. I will not argue directly against this straw man here. Still, it should become clear from the discussion below that derivational morphemes differ

in their lexical stress properties: some are lexically stressed, others are not.

We can easily explain this generalization if we make the following three assumptions: (i) all morphemes in Russian are cyclic; (ii) the BAP is a cyclic rule; and (iii) the BAP is subject to the Strict Cycle Condition.

Let us now see how the system will work. We begin with the first cycle. If the BAP applied on cycle #1, then the first cycle would always get stress -- either lexically or by the Default Clause of the BAP. Thus -- since shifting stress exists -- the BAP doesn't apply on the first cycle. This is, of course, the Strict Cycle condition in action. Now suppose we add a suffix of some kind -- for example, an inflectional morpheme --, creating a second cycle. On the second cycle, the BAP can apply. The first stress wins, or else the Default Clause applies, giving the patterns outlined in (2) above.

Now imagine we have a third cycle. For example, imagine we have a root, a derivational morpheme, and a desinence. Because the BAP on the second cycle had a Default Clause, a word cannot enter the third cycle without some stress already assigned to some syllable in the domain of the second cycle. Thus, since left-most wins, a third cycle suffix does not win. There is always some stress to the left. Hence, there is never shifting stress in words with three or more cycles, and we explain the Non-Derived Noun Generalization.

Before proceeding to look more closely at stress assignment in derived nouns, I will summarize the components of the system presented thus far:

1. Morphemes are lexically specified as [±stressed, ±dominant]
2. Some stressed morphemes are post-stressing. That is, they transfer their stress to an adjacent syllable, if that syllable is part of a desinence.
3. The BAP is a cyclic rule of stress assignment. This rule assigns stress to the first stressed vowel; if neither the stem nor the newly-added suffix morpheme contains a stress, stress is assigned to the initial vowel.
4. Stress assignment is subject to the Strict Cycle Condition.



#### 4 STRESS IN DERIVED NOUNS

The next task is to show how this system predicts stress assignment in derived nouns. Four classes of derivational morphemes will be presented:

- (i) [+stressed, -dominant]
- (ii) [-stressed, -dominant]
- (iii) [+stressed, +dominant]
- (iv) [-stressed, +dominant]

This section is divided into two parts: in the first, I will examine stress assignment in nouns derived from [-dominant] suffixes; in the second, stress assignment in nouns derived from [+dominant] suffixes.

##### 4.1 Nouns Derived From [-Dominant] Suffixes

Consider the productive nominal suffix  $\overset{Y}{I}\overset{Y}{S}\overset{C}$ . This suffix attaches to nominal and adjectival stems, forming first declension neuter nouns which either refer to a place or object or acquire an augmentative meaning. Several examples are given below.

- (6)  $\overset{Y}{I}\overset{Y}{S}\overset{C}$ : [+stressed, -dominant].

Forms 1st decl. neuter nouns from nominal or adjectival stems; refers to place or object, or has augmentative meaning.

NONDERIVED NOUN	STRESS	DERIVED NOUN	STRESS
zavó <sup>1</sup> d + ∅ 'factory'	fixed	zavó <sup>1</sup> d + išč + e	fixed
boló <sup>1</sup> t + o 'swamp'	fixed	boló <sup>1</sup> t + išč + e	fixed
sbó <sup>1</sup> r + ∅ 'collection'	fixed	sbó <sup>1</sup> r + išč + e	fixed
moró <sup>1</sup> z + ∅ 'frost'	fixed	moró <sup>1</sup> z + išč + e	fixed
gó <sup>1</sup> rod + ∅ 'city'	shifting	gorod + išč + e	fixed
xó <sup>1</sup> lod + ∅ 'cold'	shifting	xolod + išč + e	fixed
sne <sup>1</sup> g + ∅ 'snow'	shifting	snež + išč + e	fixed
glá <sup>1</sup> z + ∅ 'eye'	shifting	glaz + išč + e	fixed

Notice that stress may fall either on the root morpheme or on the derivational suffix, depending on the stress property of the root. Most important, notice that derived forms have fixed stress. These facts are predicted if we assume that ISC is specified as [+stressed]. To show this, I will present the derivations of zavódišče and gorodišče.

(7) DERIVATIONS:

* [[ZAVOD]] + [[ISC]]	* <sub>VV</sub> [ISC]	BAP	---	* [[ZAVODISC]] + [E]	BAP	---	zavódišče (nom sg)
* [[ZAVOD]] + [[ISC]]	* <sub>VV</sub> [ISC]	BAP	---	* [[ZAVODISC]] + [AM]	*	BAP	zavódiščam (dat pl)
[[GOROD]] + [[ISC]]	* <sub>VV</sub> [ISC]	BAP	---	* [[GORODISC]] + [E]	BAP	---	gorodišče (nom sg)
[[GOROD]] + [[ISC]]	* <sub>VV</sub> [ISC]	BAP	---	* [[GORODISC]] + [AM]	*	BAP	gorodiščam (dat pl)

Zavódišče contains an stressed root, as shown by the nonderived form, and a stressed derivational morpheme. The BAP assigns stress to the first stressed syllable. Gorodišče contains only one stressed morpheme-- the inflection. Shifting stress in the nonderived noun gorod, 'city', shows that the root is unstressed. The BAP assigns stress to the only stressed vowel.

Next consider nouns formed by the productive suffix ΩSTV. Examples are given in (8).

(8) ΩSTV: [-stressed, -dominant].

Forms 1st decl. neut. nouns from nominal stems; abstract or collective meaning.

NONDERIVED NOUN	STRESS	DERIVED NOUN	STRESS
otéc + ø 'father'	fixed	otéc + estv + o	fixed
sosed + ø 'neighbor'	fixed	sosed + østv + o	fixed
durák + ø 'fool'	fixed	durač + estv + o	fixed
baron + ø 'baron'	fixed	baron + østv + o	fixed
zver + ø 'wild animal'	shifting	zver + østv + o	fixed
knjaz + ø 'prince'	shifting	knjaz + estv + o	fixed
muž + ø 'man; husband'	shifting	muž + estv + o	fixed
drug + ø 'friend'	shifting	druž + estv + o	fixed

Recall that Ω represents a high lax vowel which either surfaces as a mid vowel or deletes. This morpheme forms first declension neuter nouns with an abstract or collective meaning. The data shows that,

regardless of the stress property of the root morpheme, stress always falls on the root.<sup>3</sup>

We have seen that the BAP assigns stress to the initial syllable when no inherently stressed vowel is present. Suppose we assume that the suffix ΩSTV is specified as [-stressed]. It would follow that if the root contains a stressed vowel, that vowel will receive stress; if the root is unstressed, stress will fall on the initial vowel. This is exactly what we find. Sosédstvo, 'neighborhood' is formed from a stressed root. Again, we know this by the fact that the nonderived noun soséd has fixed stress. Stress is assigned, as expected, to the lexically stressed root vowel. Zvérstvo is formed from an unstressed root. Stress is therefore assigned to the initial syllable.<sup>4</sup>

#### 4.2 Nouns Derived From [+Dominant] Suffixes

Now consider the data in (9). These data require an important complication in the analysis I have developed thus far. It is here that dominance becomes important.

(9) AC, AK: [+stressed, +dominant]

Forms 1st decl. masc. from various stems; denotes a person.

NONDERIVED NOUN	STRESS	DERIVED NOUN	STRESS
skrip + ø 'squeak'	fixed	skrip + ač + ø	fixed
sil + a 'strength'	fixed	sil + ač + ø	fixed
ryb + a 'fish'	fixed	ryb + ak + ø	fixed
borod + a 'beard'	shifting	borod + ač + ø	fixed
mórj + e 'sea'	shifting	morj + ak + ø	fixed

This list contains nouns derived with the suffixes AC and AK. Both of these suffixes form 1st declension masculine nouns denoting a person. The significant examples are the ones with an inherently stressed root. In each case, stress falls on the derivational morpheme. This is unexpected. Given the BAP, we expect stress to fall on the root, because the root is inherently stressed. These examples cannot be dismissed as exceptional, for there are many other nouns of a similar type.

What distinguishes this suffix, and others like it, is its ability to "override" the stem stress, in

apparent violation of the BAP. Or, to put it differently, it destresses the stem. As I noted earlier, morphemes of this type are found in other Slavic languages, and in Sanskrit as well. These are Kiparsky and Halle's dominant morphemes.

A sample derivation is given in (10). (It happens that, in addition to their [+dominant] property, both these suffixes belong to the subset of [+stressed] morphemes which transfer their stress onto an adjacent inflection (i.e. "post-stressing")). Adopting the grid formalism introduced by Prince (1983), I have represented the property of dominance by placing a level-two asterisk over the designated vowel.

(10) DERIVATION:

2	*									
1	*	*		*	BAP	*	*	BAP		
	[[RYB] + [AK] ---> [[RYB] + [AK]] ---> [[RYBAK] + [A]] --->									
		POST*								
	rybáka ---> rybaká (gen sg)									

The root is inherently stressed. The suffix AK, lexically specified as [+dominant, +stressed], wipes out the root stress. Then the BAP applies, assigning stress to the only remaining stressed vowel, which belongs to the derivational suffix. In the next cycle, a [+stressed, -dominant] inflectional morpheme is added. The BAP assigns stress to the stem vowel. Finally, the post-stressing property shifts stress onto the adjacent vowel of the inflection.

We have looked thus far at three types of derivational morphemes.

- (i) <sup>Y</sup>ISC: [-dominant, +stressed]
- (ii) ΩSTV: [-dominant, -stressed]
- (iii) <sup>X</sup>AC, AK: [+dominant, +stressed]

Our feature system provides for a fourth possibility: namely, [+dominant, -stressed] suffixes. What properties would we predict of such a morpheme? Since it is dominant, it wipes out a stem stress. Since it has no inherent stress, the BAP should assign stress to the initial syllable of a word whose stem-final morpheme is of this type.

Indeed, there are morphemes with precisely this property. One example is the semi-productive suffix ΩNJ. All words whose stem ends in this suffix have

stress on the initial syllable. Examples are given in (11).

(11) ΩNJ: [-stressed, + dominant]

Forms 1st decl. masc. nouns from various stems; meaning varies.

NONDERIVED NOUN	STRESS	DERIVED NOUN	STRESS
skovorod + á 'frying pan'	shifting	skóvorod + en + ø	fixed
oborót + ø 'turn'	fixed	óborot + en + ø	fixed
rasskáz + ø 'story'	fixed	rósskaz + øn + i	fixed

### 5 CONCLUSION

Stress-assignment in Russian is the product of rule-governed interactions between lexical properties of morphemes and word-formation processes. In this paper I have tried to uncover the precise nature of the rule system which produces the complex patterns of shifting and fixed nominal stress found in this language.

I adopted a two-feature system for classifying the stress properties of morphemes, which predicts the existence of four distinct types of derivational suffixes. Each type of suffix is attested in the language. In addition, I adopted the Indo-European Basic Accentuation Principle (BAP) as the rule assigning stress in Russian. This rule applies cyclically.

I observed that there is an important relation between the derivational status of nouns and their stress properties: namely, shifting stress is limited to non-derived nouns. My assumption that all morphemes are cyclic was crucial to explaining this generalization. My analysis therefore argues against identifying dominance with cyclicity. The fact that shifting stress does occur in non-derived nouns shows that the stress rule in Russian is subject to the Strict Cycle Condition.

## CYCLICITY AND RUSSIAN STRESS

FOOTNOTES

\*I wish to thank Ewa Higgins, David Pesetsky, and Donca Steriade for useful discussion of the analysis presented here, and especially Morris Halle for extensive help and discussion. In my ongoing research on this topic, I have benefited greatly from the careful and detailed work on Russian stress by Zaliznjak (1977; 1985). The author assumes sole responsibility for the contents of this paper, both factual and analytical.

1. Evidence for underlying iers is presented by Lightner (1972); for a cyclic analysis of ier-lowering and deletion, see Pesetsky (1979).
2. Shapiro (1964) comes close to making this generalization. In a discussion of stress shifts between singular and plural forms (which may be due to factors other than [ $\pm$ stress] roots and suffixes), he notes that "this opposition [between singular and plural] is not characteristic of derived substantives", and goes on to discuss a few counterexamples. I am grateful to W. Browne (personal communication) for bringing this reference to my attention. To the best of my knowledge, the non-derived noun generalization as stated here has not been previously noted in the literature.
3. I have found a few exceptions, in which stress falls on the desinence throughout. These include: božestvó, 'deity'; volšebstvó, 'magic'; and rodstvó, 'kinship'. It could be argued that their exceptional stress property correlates with an exceptional semantic property. The meanings of these derived nouns seem to be less transparent than the meanings of those which have predictable stress.
4. Another example of this type of morpheme is the suffix OST, which forms feminine nouns of the third declension. This is the most productive suffix for making abstract nouns of quality or state from adjectives. Adjectives are inflected for gender (masc., fem., and neut.) in the singular and have one plural inflection. What is important to notice in the examples below is that stress shifts between the initial syllable and desinence in the adjectival forms, but is fixed on the initial syllable in the derived nominal forms.

OST: [-stressed, -dominant] derivational suffix				
ADJECTIVE			NOUN	
(non-derived)			(derived)	
Fem.Sg.	Pl.		Nom.Sg.	Gen.Sg.
molodá	mólody	'young'	--> mólodost'	mólodosti
				'youthfulness'
slabá	sláby	'weak'	--> slábost'	slábosti
				'weakness'
živá	živy	'lively'	--> živost'	živosti
				'liveliness'

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