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Truncation without Truncation?*

In this paper I explore a long-standing issue in Russian linguistics, viz. the relationship between the so-called One-Stem System (Jakobson 1948) and the more traditional Two-Stem System from the perspective of the Usage-Based Model (Langacker 1991, 1999; Kumashiro 2000). My aim is to show that this model facilitates a synthesis between the two systems for the description of Russian conjugation. After a brief presentation of the form-based generalizations of the One-Stem system in section 1, I show that these generalizations do not require abstract underlying representations and procedural rules, but can be captured by means of static schemas in the Usage-Based Model (section 2). In section 3 it is argued that a purely form-based analysis is incomplete, but that the schemas can be extended so as to accommodate the meaning-based generalizations implicit in the Two-Stem System. Since the Usage-Based Model captures the generalizations inherent in both systems, it is concluded in section 4 that the Usage-Based Model provides a synthesis of the two systems, which have often been considered antagonistic.

1. The One-Stem System: Form-Based Generalizations

Jakobson's "Russian Conjugation" (1948) is important for both empirical and theoretical reasons. As for the former, he observed that the shape of the Russian verbal stem depends on the shape of the following suffix. By way of illustration, consider the paradigms of *delat'* 'do' and *pisat'* 'write'.¹ As can be

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¹ Throughout the article, examples are given in transliterated orthography (italics) and – when necessary – in phonemic transcription (roman). In the text, phonemic transcription is marked by slashes (/.../), but slashes are omitted in tables and figures. Phonemic transcription as opposed to phonetic transcription is chosen in order to abstract away from irrelevant phe-

seen from table 1 (next page), both verbs have a consonant final stem, viz. /dʲelaj/ and /pʲisʲ/ whenever the following suffix begins with a vowel. However, in forms where the suffix starts with a consonant, the stem displays a vowel in final position. The generalizations can be stated as follows:

- (1) a. Before a V-initial suffix, the stem ends in a C (cf. /dʲelaj + ot/ and /pʲisʲ + ot/).
 b. Before a C-initial suffix, the stem ends in a V (cf. /dʲela + l/ and /pʲisa + l/).

Thus, of the four logical combinations of consonants and vowels, two are attested across the stem-suffix boundary in Russian verbs, viz. C+V and V+C. Consonant clusters (C+C) and hiatus (V+V) are generally avoided.²

Jakobson's generalizations about the relationship between the shape of the suffix and the shape of the stem provided an important contribution to the empirical study of Russian conjugation. At the same time, his article has also been of great theoretical importance since it contributed to the development of generative linguistics. In order to capture the generalizations in (1), Jakobson made two assumptions that anticipated classical generative phonology (e.g. Chomsky and Halle 1968). First, Jakobson (1948:156) proposed that each verb has one underlying stem which equals the longer of the two stems attested on the surface. Thus, *delat'* has the C-final underlying stem /dʲelaj/, while the V-final /pʲisa/ is the underlying stem of *pisat'*. Jakobson's second crucial assumption concerns rules. He devised rules that truncate the stem by deleting its final segment. Simplifying somewhat, a stem-final V is deleted before a V-initial suffix, while a stem-final C is deleted before a C-initial suffix. Mnemonically we may state the truncation rules as follows:

nomena such as vowel reduction. IPA is used all through the article. Morpheme boundaries are marked with the + sign, but only boundaries bearing on the argument will be marked in the examples.

² The only exception in table 1, the imperative plural /dʲelaj+tʲe/, will not be discussed in this study.

- (2) a. $V \square \emptyset / _ + V$ (“Delete stem-final V before V-initial suffix”)
 b. $C \square \emptyset / _ + C$ (“Delete stem-final C before C-initial suffix”)

By (2a) the underlying /p^jisa/ is shortened to /p^jiʂ/ before V-initial suffixes, while nothing happens before C-initial suffixes.³ In the case of /d^jelaj/ the final /j/ is deleted before a consonant by (2b), but retained before a vowel. Notice that (2) does not contain static constraints on representations, but rather procedures that applied to the underlying representations of the stems generate surface forms.

		‘do’	‘write’
Present tense	1. singular	d ^j elaj + u	p ^j iʂ + u
	2. singular	d ^j elaj + oʂ	p ^j iʂ + oʂ
	3. singular	d ^j elaj + ot	p ^j iʂ + ot
	1. plural	d ^j elaj + om	p ^j iʂ + om
	2. plural	d ^j elaj + ot ^j e	p ^j iʂ + ot ^j e
	3. plural	d ^j elaj + ut	p ^j iʂ + ut
	Passive participle	d ^j elaj + omij	—
	Active participle	d ^j elaj + uʂ ^j ij	p ^j iʂ + uʂ ^j ij
	Gerund	d ^j elaj + a	p ^j iʂ + a
Imperative	2.sg	d ^j elaj	p ^j iʂ + i
	2.pl	d ^j elaj + t ^j e	p ^j iʂ + it ^j e
Past tense	Masculine singular	d ^j ela + l	p ^j isa + l
	Feminine singular	d ^j ela + la	p ^j isa + la
	Neuter singular	d ^j ela + lo	p ^j isa + lo
	Plural	d ^j ela + l ^j i	p ^j isa + l ^j i
	Passive participle	(s)d ^j ela + n	(na)p ^j isa + n
	Active participle	d ^j ela + vʂij	p ^j isa + vʂij
	Gerund	(s) d ^j ela + v	(na)p ^j isa + v
Infinitive	d ^j ela + t ^j	p ^j isa + t ^j	

Table 1: The inflection of *delat* ‘do’ and *pisat* ‘write’

³ The so-called substitutive or transitive softening of /s/ to /ʂ/ will not be discussed in the following as it does not bear on the problem under scrutiny in the present paper.

By assuming underlying representations and procedural rules Jakobson's article paved the way for generative phonology. Jakobson's impact on the development is well documented. According to Anderson (1985:318), Morris Halle, who was Jakobson's student at Columbia and Harvard and later on his collaborator, was "greatly impressed and attracted" by "Russian conjugation". While Jakobson's paper did not receive much attention among American linguists at the time, it seems to have been pivotal in the development of Halle's ideas. In this sense, there is a direct line from Jakobson's paper to Halle's *The sound pattern of Russian* (1959) and Chomsky and Halle's *The sound pattern of English* (1968).

The representation of the generalizations in (1) by means of underlying representations and the rules in (2) is known as the One-Stem System. It has been widely discussed in Slavic linguistics and adapted for pedagogical use (cf. e.g. Levin 1978, Lipson 1981 and Townsend 1975). It is worth pointing out that as the term is often used, it subsumes both a set of descriptive generalizations and a linguistic model for the explication of these generalizations. However, I would like to suggest that the generalizations do not presuppose the model. In the following section I shall argue that the generalizations in (1) can be captured in a model with neither abstract underlying representations nor procedural rules – the Usage-Based Model.

2. Form-Based Generalizations in the Usage-Based Model

The Usage-Based Model is a family of largely compatible models within the broader framework of cognitive linguistics (cf. e.g. Barlow and Kemmer 2000, Bybee 2001). In the present paper, I will assume the version advanced in Langacker (1991, 1999) and further developed in Kumashiro (2000). An important principle is known as the "content requirement":

- (3) The only structures permitted in the grammar of a language [...] are (1) phonological, semantic or symbolic structures that actually occur in linguistic expressions; (2) schemas for such structures; and (3) categorizing relationships involving the elements in (1) and (2). (Langacker 1987: 53f.)

Needless to say, figure 1 is oversimplified and incomplete, but it suffices to illustrate one important point. Schemas and categorization relations are static in the sense that they represent generalizations about structures occurring in utterances and relationships holding between these structures. Unlike the Jakobsonian truncation rules in (2), they are not instructions about procedures transforming one representation into another. Given that all generalizations in the Usage-Based Model must be expressed by means of schemas and categorization relations, as stated in (3), the Usage-Based Model is incompatible with procedural rules. The question therefore arises as to whether and how the generalizations in (1) can be captured in the Usage-Based Model.

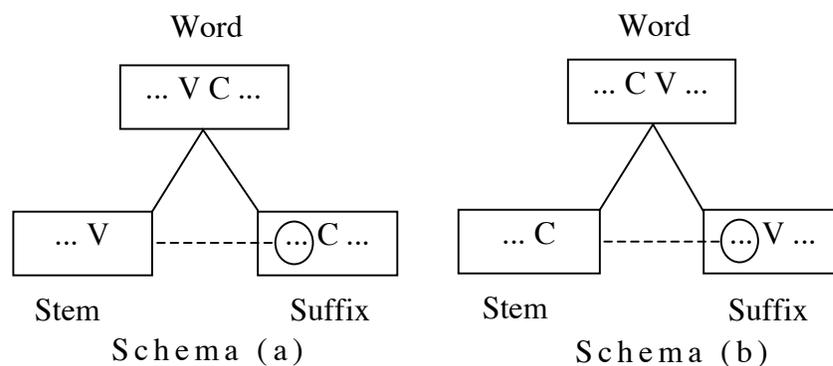


Fig 2: Schemas for verbs with C-initial (a) and V-initial suffix (b)

Consider the schemas in figure 2. Each schema involves one box for the stem and one for the suffix. The stem plus suffix constitute a word, also represented as a box. The solid lines symbolize part-whole relations (referred to as “integration” in Langacker 1987:75). They are not to be confused with the arrows in figure 1 that stand for categorization relationships. In schema (a) in figure 2, the suffix begins with a consonant. It is preceded by an empty space included in a circle, which Langacker refers to as an “elaboration site”. The elaboration site is filled in (“elaborated”) by some other structure – in our case the representation of the stem connected to the elaboration site by a dashed line. Since the schema specifies that the C-initial suffix is elaborated

by a V-final stem, it captures the generalization that C-initial suffixes select V-final stems. Notice that it is crucial that it is the suffix that contains the elaboration site. This enables us to accommodate the asymmetrical relationship between suffix and stem where the shape of the former determines the shape of the latter, but not vice versa. Schema (b) parallels (a), but here we are dealing with a V-initial suffix selecting a C-final stem.

Taken together, the two schemas in figure 2 capture the Jakobsonian generalizations in (1) about the relationship between the shape of the suffix and the stem. However, in order to simplify the expositions, I shall adopt the format in figure 3 for the remainder of this article. In figure 3, V+C stands for a C-initial suffix preceded by a V-final stem and C+V for the combination of a V-initial suffix and a C-final stem. The + sign marks the morphological boundary. While this format does not explicate that the shape of the stem depends on the shape of the suffix (and not vice versa), it is sufficiently precise for expository purposes.

In figure 3, the two schemas are included in a rectangle representing the relevant fragment of the grammar of Russian. Notice that the grammar only contains schemas specifying the combinations of consonants and vowels that are attested across the stem-suffix boundary. There are no statements in the grammar banning the non-occurring combinations of C+C and V+V. While negative constraints are central in Optimality Theory (Prince and Smolensky 1993), they are ruled out in the Usage-Based Model by the content requirement in (3). A prohibition of something non-existing cannot emerge as a schema over actually occurring utterances. In the Usage-Based Model, therefore, the prohibition of C+C and V+V follows from the fact that there are no schemas in the grammar of Russian verbs licensing these structures.

Figure 3 is designed to model a situation where a speaker wonders whether to choose a C-final or V-final stem before the masculine singular past tense suffix *-l*. The Usage-Based Model enables us to do that by including two potential candidates: /dʲelaj+l/ with a C-final stem and /dʲela+l/ with a V-final stem. The candidates are given as rectangles with rounded corners placed outside the grammar. Obviously, further candidates might be

considered, but the two candidates given in the figure are sufficient to shed light on the topic under scrutiny in the present study.

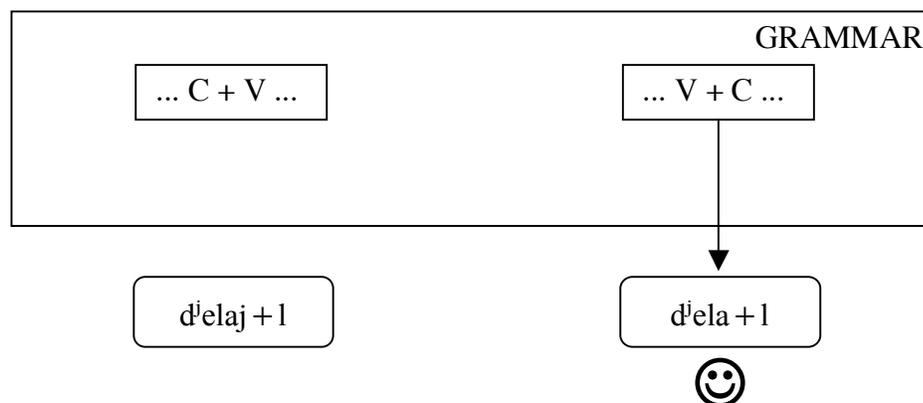


Fig 3: A usage-based analysis of a verb form with C-initial suffix

How does the speaker decide which candidate to select? Taking connectionism as his point of departure, Langacker (1991: 282, 1999: 105f.) argues that what he calls conceptual overlap is relevant. The rationale behind this factor is that a schema in the grammar is more easily activated if it shows a high degree of overlap with the candidate. Thus, the more features a candidate shares with the relevant schemas in the grammar, the better are the chances of that particular candidate to survive in the competition with other candidates. I represent conceptual overlap by means of instantiation arrows from schemas to candidates. In figure 3, an arrow leads from the rightmost schema to the rightmost candidate, since /a + l/ is an example of V+C. The candidate to the left, however, does not involve conceptual overlap with any schema since /j + l/ is a C+C cluster that is not sanctioned by the grammar. With regard to conceptual overlap, therefore, the rightmost candidate is favored.

A second factor mentioned by Langacker (1991: 282, 1999: 105f.) in addition to conceptual overlap is inherent ease of activation. This factor is assumed to correlate with what he calls entrenchment (Langacker 1999: 105), which in turn is a function of type frequency. Other things being equal, a

schema that covers a large class of items is more likely to be activated than a schema for a smaller class. Therefore, a candidate that is connected to the schema of a large class has an advantage in the competition with other schemas. In most cases to be discussed in the present study, however, inherent ease of activation does not bear on the selection of the winning candidate, because the relevant schemas cover classes of comparable sizes. For instance, the two schemas in figure 3 both describe productive patterns comprising open-ended sets of verbs, so they tie with regard to inherent ease of activation. Nevertheless, cases where conceptual overlap and inherent ease of activation favor different candidates are possible. A few such examples are discussed by Nessel (in press and to appear), who suggests that conceptual overlap overrides inherent ease of activation whenever the two factors pull in different directions. While this hypothesis deserves further testing, we shall not pursue it in the present study, since the division of labor between conceptual overlap and inherent ease of activation is tangential to the main topic of this paper, viz. the relationship between the One-Stem and Two-Stem Systems. For the purposes of this study, winning candidates will be selected on the basis of conceptual overlap. In figure 3, this factor favors the right-most candidate, which is therefore correctly predicted to be the winner. For the convenience of the reader, the winning candidate is marked with a smiling face, a practice that will be adopted throughout this paper.

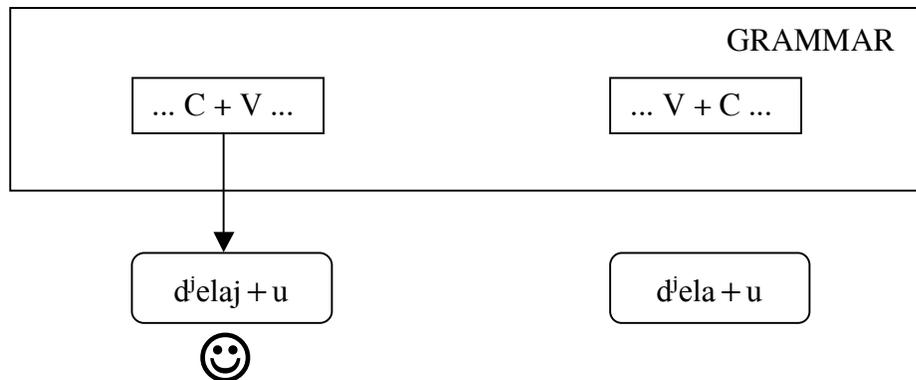


Fig 4: A usage-based analysis of a verb form with V-initial suffix

While figure 3 concerns a C-initial suffix, figure 4 models the choice of C- or V-final stem before the V-initial suffix $-u$ (1. singular present tense). Here, it is the leftmost candidate that displays conceptual overlap with the grammar since it involves a C+V combination ($/j + u/$). The $/a + u/$ combination in the rightmost candidate gains no support in the grammar, where no schema licenses hiatus. Therefore, the candidate to the right is predicted to be the winner – a prediction that is borne out by the facts.

In the beginning of this section I raised the question as to whether the generalizations in (1) could be captured in a model without underlying representations and procedural rules. We are now in a position to answer this question in the affirmative. Figures 3 and 4 show that the generalizations can be accounted for in the Usage-Based Model by means of static schemas representing the CV combinations attested on the surface. Thus, even if we adopt Jakobson's truncation *generalizations* in (1), we do not have to adopt the truncation *rules* in (3). In this way, the apparent paradox in the title is resolved; “truncation without truncation” is possible if we distinguish between descriptive generalizations and linguistic models.

At this point I emphasize that the exposition so far has been somewhat simplistic. First, I have only discussed productive patterns. Thus, the small and non-productive class of mono-morphemic stems ending in obstruents, e.g. *nesti* ‘carry’ with the stem $/n'os/$ and *peč'* ‘bake’ with the stem $/p'ok/$, has not been discussed, although such verbs do not comply with the truncation patterns described above. Clearly, verbs of this type would require additional schemas, as they would require additional rules in a rule-based analysis. While the analysis of the exceptional verbs poses interesting analytical problems in themselves, they do not bear on the problem addressed in the present study, viz. the relationship between the One-Stem and Two-Stem Systems. The analysis of exceptional verbs is therefore left for future research.

A second simplification in the discussion so far concerns the so-called problem of opacity (cf. McCarthy 2002:163ff. and references therein). Hitherto, we have only considered cases where the relationship between the shape of the stem and the suffix is readily seen in surface forms. Such cases can be referred to as “transparent”. However, there are also a few exceptional

cases where the relationship between the truncation phenomenon and its phonological motivation cannot be observed on the surface. A case in point is the imperative plural /dʲelaj + tʲe/ with a C+C cluster on the surface. Cases of this type are known as “opaque” (Kiparsky 1973:79). However, as the problem of phonological opacity is beyond the scope of the present study, the problematic imperatives will not be discussed in the following.

3. Synthesis: Meaning-Based Generalizations in the Usage-Based Model

Metaphorically speaking, what I did in section 2 was to operate out the generalizations of Jakobson’s One-Stem System and transplant them into the fairly different Usage-Based Model. As we have seen, the One-Stem System offers form-based generalizations about the shape of the stem, which depends on the shape of the suffix. What about the Two-Stem System? As suggested by the name, this approach assumes that each verb has two stems, a present tense stem and a past tense (or infinitive) stem. Instead of relating the shape of the stem to the shape of the suffix, the shape of the stem is implicitly related to meaningful features like “present tense” and “past tense”. In a broad sense, the Two-Stem System therefore implicitly offers generalizations in terms of meaning.⁴

In order to arrive at a more precise understanding of the generalizations implicit in the Two-Stem System, we must consider the inflectional paradigm of Russian verbs. In figure 5 the paradigm is given as a rectangle with four cells representing the subparadigms of present tense, imperative, past tense and infinitive. For each subparadigm I have given the CV-combination that is

⁴ Langacker’s (1987:53f.) “content requirement” cited in (3) in section 2 permits only three types of structures, viz. semantic, phonological and symbolic. Symbolic structures are essentially Saussurian signs, i.e. pairings of meaning (i.e. “semantic” information in Langacker’s terminology) and form (“phonology”). From this perspective, features like “imperative” and “singular” pertain to the semantic domain, constituting symbolic structures together with the strings of segments realizing the features. Notice, however, that the argument about a synthesis between the One-Stem and Two-Stem Systems can be maintained even if one regards “imperative” and “singular” as semantically empty morpho-syntactic features in an autonomous grammar.

found in this morphological environment. As can be seen from the figure, the C+V schema is characteristic of the present and imperative subparadigms, which are the forms that are created on the basis of the present tense stem in the terminology of the Two-Stem System. In the past tense and the infinitive, on the other hand, we find the V+C schema. In other words, the past tense (infinitive) stem ends in a vowel.

Present C+V	Imperative C+V
Past V+C	Infinitive V+C

Fig 5: Form and meaning – suffix shape and the paradigm: Well-behaved distribution (attested)

I refer to the situation in figure 5 as “well-behaved distribution” in order to highlight the fact that form and meaning neatly divides the paradigm into two parts. This well-behaved distribution suggests that we are dealing with a significant generalization that should be accommodated in an adequate analysis. The question now arises as to whether the schemas advanced in section 2 of the paper captures this well-behaved distribution. The answer is clearly in the negative. The schemas representing the truncation generalizations do not say anything about meaning at all; they only relate the shape of the stem to the shape of the suffix. Hence, they are compatible with any form-meaning distribution. I illustrate this by means of a hypothetical paradigm with a random distribution in figure 6. In this non-attested, very messy paradigm there is no simple relationship between form and meaning, but it is

nevertheless compatible with the schemas introduced in section 2 because all cells contain permitted CV-combinations. We find C+V and V+C, but no C+C or V+V clusters. I therefore conclude that an analysis in terms of form only is incomplete. It presents the form-meaning distribution as a coincidence, and thus fails to capture the generalization that the real Russian paradigms are of the nice and well-behaved type in figure 5, rather than messy and untidy like the hypothetical example in figure 6. In order to account for the generalization, we must somehow incorporate meaning in the analysis. The question is how.

C+V	V+C	C+V	C+V	V+C	C+V
Present				Imperative	
V+C	C+V	V+C	C+V		
V+C	C+V	V+C		Infinitive	
Past					
C+V		V+C	C+V	V+C	

**Fig 6: Form and meaning – suffix shape and the paradigm:
Random distribution (not attested)**

Let us to begin with focus on the present tense and imperative subparadigms where we have C-final stems and V-initial suffixes. The question now arises as to how we can add information about meaning to the C+V schema. Is there a feature or a set of features that all forms in these two subparadigms share? I would like to argue that there is, and take tense and time reference as my point of departure. It makes sense to divide the relevant forms into three groups:

- (4) Time reference in the present/imperative subparadigms:
- a. Present tense form (imperfective): $E = S$
(present, e.g. *pišu* ‘I write’)
 - b. Present tense form (perfective): $E > S$
(future, e.g. *napišu* ‘I will write’)
 - c. Imperative form: $E > S$
(future, e.g. *(na)piši!* ‘write!’)

A present tense form of an imperfective verb, say *pišu* in (4a), indicates overlap with the moment of speech, i.e. present tense. I represent this by means of the formula $E = S$, where E stands for event time and S for speech time. A corresponding form of a perfective verb, e.g. *napišu* in (4b), indicates that the event takes place after the moment of speech. In other words, we are dealing with future tense, which we can represent as $E > S$. Imperative forms like *piši* (imperfective) and *napiši* (perfective) in (4c) instruct the addressee to carry out an action. This action will by necessity take place after the moment of speech, so in this sense the imperative involves future time reference. Whether one chooses to analyze this as tense or not is an interesting theoretical question, but it does not bear on the topic of this study, so I shall not discuss it in the following.

The question now arises as to whether there is a schema that unites the three cases in (4). It seems clear that there is, because they all involve non-past tense, which we can state as $E \geq S$. This leads us to assume the combination of C+V and non-past tense as a schema for the present tense and imperative subparadigms:

(5)

$E \geq S$
... C + V ...

The discussion so far shows that the Usage-Based Model enables us not only to capture the form-based Jakobsonian generalizations, but also incorporates the generalizations implicit in the Two-Stem System. In this way, the Usage-Based Model facilitates a synthesis between the One-Stem and Two-

Stem Systems. However, we have only analyzed the present tense and imperative subparadigms. What about the past tense and the infinitive? Let us first consider the former subparadigm. By the same logic employed in the case of the present tense and the imperative there is a generalization to be captured about the form-meaning distribution in the past tense. All the past tense forms have C-initial suffixes preceded by V-final stems. A purely form-based schema does not accommodate this generalization, as it is compatible with the untidy, non-attested distribution given in figure 6. To remedy this, I propose to supplement the V+C schema with information about the past tense. Following the format in (4), I represent past tense as E < S in figure 7.

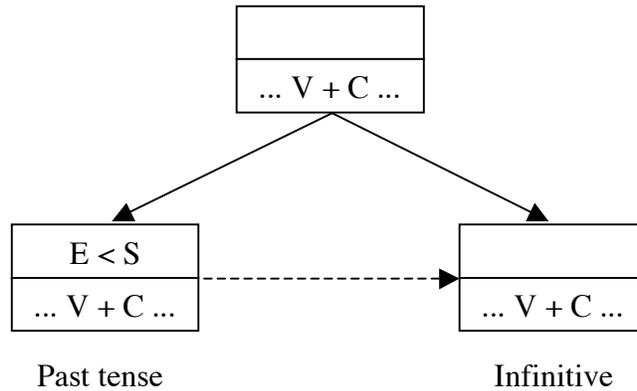


Fig 7: A radial category for the past tense/infinitive subparadigms

The infinitive does not have tense. It is difficult to see any straightforward way to connect the meanings of the past tense and the infinitive, so in figure 7 I have left the upper box of the schema for the infinitive blank. Accordingly, the topmost schema bringing the past tense and infinitive subparadigms together only refers to form. In spite of this, however, the radial category in figure 7 as a whole offers further support for the point I made above that a purely form-based analysis is incomplete. As argued above, reference to past tense is crucial in the analysis of this subparadigm. Notice that in the figure I connect the schemas for the past tense and the infinitive by means of an extension arrow pointing at the latter subcategory. While the infinitive is the citation form used in grammars and dictionaries, I speculate

that the more frequent past tense forms enjoy a more central status in speakers' and hearers' mental grammars. However, since nothing hinges on this assumption, I shall not discuss it in the following.

In figure 7, all schemas involve C-initial suffixes. This is, however, a slight simplification as the past passive participle (PPP) has three allomorphs. Two of them, *-t* and *-n* are C-initial as expected, but the third, *-on* is unexpectedly V-initial. As can be seen from (6), the two C-initial suffixes combine with V-final stems like the remaining suffixes in the past tense and infinitive subparadigms, while *-on* take a C-final stem:

- (6) a. *-t*: /pocinu + t/ 'abandoned'
 b. *-n*: /sd'ela + n/ 'done'
 c. *-on*: /progovor^j + on/ 'said'

On the face of it, this may appear to be a counterexample to the analysis presented above, insofar as the presence of PPP forms with *-on* seems to suggest that the relationship between past tense and V+C is less strong than suggested above. However, as pointed out by Nessel (1998:216ff.) a closer look at the meaning of the PPP reveals a more nuanced picture. Typically, the PPP signals perfect tense/aspect involving both an action in the past and a resulting state in the present. Thus a form like *pokinut* 'abandoned' in (6a) implies that something or somebody was abandoned in the past, but also that he/she/it is in the state of being abandoned at the moment of speech. If we take seriously the fact that the meaning of the PPP relates to both the past tense and present tense subparadigms, the analysis advanced above yields the prediction that the PPP displays both V+C and C+V. As shown in (6), this prediction is borne out by the facts. Rather than being a problematic counterexample, therefore, the PPP in fact lends additional support to the analysis proposed in this study.

4. Conclusion

In this paper I have presented an analysis of stem alternations in present day Russian verbs from the perspective of the Usage-Based Model. We first saw

that it is possible to explicate the form-based generalizations from the Jakobsonian One-Stem System as schemas in the Usage-Based Model. It was then argued that a purely form-based analysis involves the loss of a generalization pertaining to meaning. However, I showed that the Usage-Based Model enables us to supplement the schemas with generalizations about meaning from the Two-Stem System, and thus facilitates a synthesis of the two systems for the analysis of Russian conjugation.

References

- Anderson, S.R. (1985): *Phonology in the Twentieth Century*. Chicago and London: The University of Chicago Press.
- Barlow, M. and S. Kemmer (eds.) (2000): *Usage based Models of Language*. Stanford: CSLI Publications.
- Bybee, J. (2001): *Phonology and Language Use*. Cambridge: Cambridge University Press.
- Chomsky, N. and M. Halle (1968): *The Sound Pattern of English*. New York: Harper and Row.
- Halle, M. (1959): *The Sound Pattern of Russian*. The Hague: Mouton.
- Jakobson, R. (1948): Russian Conjugation, Word 4.3.
- Kiparsky, P. (1973): Phonological Representations. In O. Fujimura (ed.): *Three Dimensions of Linguistic Theory*. Tokyo: TEC Company, Ltd.
- Kumashiro, F. 2000: *Phonotactic Interactions: A Non-Reductionist Approach to Phonology*. Doctoral dissertation: University of California, San Diego.
- Langacker, R.W. (1987): *Foundations of Cognitive Grammar* (volume 1). Stanford CA: Stanford University Press.
- Langacker, R.W. (1991): *Concept, Image, and Symbol*. Berlin and New York: Mouton de Gruyter.
- Langacker, R.W. (1999): *Grammar and Conceptualization*. Berlin and New York: Mouton de Gruyter.
- Levin, M.I. (1978): *Russian Declension and Conjugation*. Columbus OH: Slavica Publishers.
- Lipson, A. (1981): *A Russian Course*. Columbus OH: Slavica Publishers.
- McCarthy, J.J. (2002): *A Thematic Guide to Optimality Theory*. Cambridge: Cambridge University Press.

- Nesset, T. (1998): *Russian Conjugation Revisited*. Oslo: Novus Press.
- Nesset, T. (in press): Allomorphy in the Usage-Based Model: The Russian Past Passive Participle, *Cognitive Linguistics* 16.1.
- Nesset, T. (to appear): Gender meets the Usage-Based Model: Four Principles of Rule Interaction in Gender Assignment. Ms. University of Tromsø.
- Prince, A and P. Smolensky (1993): Optimality Theory. Constraint Interaction in Generative Grammar. Technical report: Rutgers University Center for Cognitive Science, New Brunswick NJ.
- Townsend, C.E. (1975): *Russian Word Formation*. Columbus OH: Slavica Publishers.

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