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# Does historical linguistics need the Cognitive Commitment? Prosodic change in East Slavic

DOI 10.1515/cog-2016-0026

Received March 17, 2016; revised August 19, 2016; accepted August 19, 2016

**Abstract:** On the basis of a case study of the so-called *jer* shift in Slavic, I argue that the Cognitive Commitment is essential for an adequate analysis of language change. While the “social turn” and the “quantitative turn” open up important perspectives and provide new opportunities for cognitive historical linguistics, the Cognitive Commitment remains essential because it facilitates elegant and insightful analyses and paves the way for more general hypotheses about language change. The *jer* shift is a prosodic change that originated in Late Common Slavic and spread to Old East Slavic in the twelfth century. This sound change involved the lax vowels /i, ŭ/ (often referred to as *jers* or *yers*), which either disappeared or merged with /e, o/ depending on the prosodic environment. Contrary to traditional practice, I argue that the *jer* shift should be analyzed in terms of trochaic feet, i. e., rhythmic groups of two syllables, where the leftmost syllable is prominent. This account is psychologically realistic, as dictated by the Cognitive Commitment, since rhythmic grouping is a fundamental property of human cognition (Nathan 2015. Phonology. In Ewa Dąbrowska & Dagmar Divjak (eds.), *Handbook of cognitive linguistics*, 253–273. Berlin & Boston: De Gruyter Mouton and Ding et al. 2016. Cortical tracking of hierarchical linguistic structures in connected speech. *Nature Neuroscience* 19. 158–164). While the Cognitive Commitment is essential for historical linguistics, one important limitation deserves mention. Historical changes such as the *jer* shift can be represented as “sound laws”, i. e., statements that summarize changes that span over many generations. Such statements are not about processes in the minds of individual speakers or speech communities at any point in time. They are therefore not directly relevant for the Cognitive Commitment, but are nevertheless among the most valuable tools historical linguists have at their disposal.

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**Keywords:** historical linguistics, language change, Cognitive Linguistics, Cognitive Commitment, social turn, quantitative turn, empirical, sound law, Slavic, *jer*

## 1 The Cognitive Commitment, historical linguistics and the social turn

The Cognitive Commitment, the idea that language is best analyzed in terms of general cognitive principles, has been a cornerstone of Cognitive Linguistics ever since the framework emerged in the 1970s and 1980s. However, the world is changing. Does the “social turn” with its strong focus on the speech community present a challenge to a theory where the mind of individual speakers has played first violin? And how should Cognitive Linguistics meet the “quantitative turn”, whereby linguistic investigation has become increasingly dependent on statistical analysis of large bodies of data? In this article, I will explore these questions from the perspective of historical linguistics. After brief discussions of the social and quantitative turns in Sections 1 and 2, I present a case study from the history of the Slavic languages in Section 3, which illustrates the importance of the Cognitive Commitment for historical linguistics. Section 4 discusses the advantages and limitations, before conclusions are offered in Section 5.

Does Cognitive Linguistics neglect the social dimension of language? There are two versions of this question that merit discussion. First, with regard to linguistic *principles*, one may ask whether there is anything in the fundamental concepts of Cognitive Linguistics that stands in the way of studying the social dimension of language. The answer to this question is clearly “no”. If we analyze language as radial category networks of constructional schemas that are connected by means of e. g., metaphorical extensions, we regard the nodes and connections in the network as linguistic units to the extent that they are (a) entrenched in the minds of individual speakers and (b) conventionalized in the speech community. The social dimension is therefore deeply integrated in Cognitive Linguistics, as has been made explicit in the literature (see e. g., Langacker 2008: 38).

A second version of the question about Cognitive Linguistics’ putative neglect of the social dimension of language relates to linguistic *practice*. Have cognitive linguists only paid lip service to the social dimension while neglecting it in actual practice? This question is harder to dismiss. To be sure, serious sociolinguistic work has been carried out within the framework of Cognitive Linguistics. For one thing, cognitive linguists have been interested

in the relationship between language and ideology in society (see e. g., Lakoff 1996 and Dirven et al. 2001), and it is also not hard to find other examples of cognitive sociolinguistics (Geeraerts et al. 2010 and Hilpert 2015: 357–359). Nevertheless, it seems likely that Cognitive Linguistics could benefit from a more integrated view of both cognitive and social processes, as Schmid (2015) has argued.

Historical linguistics neatly illustrates how intertwined the cognitive and social dimensions of language are. As traditionally analyzed, language change consists of two phases: innovation and spread. While innovation could be portrayed as a new linguistic trait appearing in the mind of an individual speaker, spread involves the dispersion of linguistic traits through speech communities. However, this is clearly simplistic, insofar as innovation is not a purely cognitive phenomenon and spread may not be exclusively social. Even if innovations may take place in individual minds, they are only real innovations as long as they represent something new to the other members of a linguistic community. As Schmid (2015: 12) notes, “[i]f someone comes up with a witty and original new word and finds out that this word already exists [in the linguistic community], then they would no longer think of themselves as having produced an innovation”. In other words, innovation presupposes linguistic conventions, and conventionality is a social phenomenon. Although spread is a social process in a speech community, speech communities consist of speakers and speakers have minds, so it seems clear that spread to some extent depends on how the mind works. In sum, while cognitive historical linguistics may benefit from more focus on social factors, this does not mean we should stop paying attention to cognition. In order to understand language change, we need an integrated theory of the mind and speech communities, a point that has been forcefully argued by Keller (1994, see also Hilpert 2015: 357–359).

## 2 The Cognitive Commitment, historical linguistics and the quantitative turn

As documented by Janda (2013), in recent years Cognitive Linguistics has become increasingly dependent on quantitative analysis of data from experiments and corpora – a development for which she coined the term “quantitative turn”. For instance, since 2008 more than 50% of the articles in the journal

*Cognitive Linguistics* involve some sort of quantitative analysis (Janda 2013: 4–5). What are the implications for historical linguistics?

Before we can discuss the consequences of the quantitative turn, it is important to distinguish between two concepts that are often confused: quantitative and empirical. While Cognitive Linguistics has become increasingly quantitative in the sense that statistical analysis involving number crunching has gained importance, it is arguable that Cognitive Linguistics has always been empirical. Cognitive linguists never were mere “armchair linguists” using introspection as their only source of data, but have always adopted a usage-based approach and studied a wide variety of data. It is exactly the strong emphasis on data from linguistic usage that has paved the way for corpus studies in Cognitive Linguistics – and thus for the use of quantitative methods.

Although the influx of new methods may influence the questions we ask and hence over time change the theory, it is important to keep in mind that there is no inherent conflict between the fundamental concepts of Cognitive Linguistics and the application of the quantitative methods. On the contrary, the usage-based approach entails tendencies rather than categorical distinctions, and such tendencies are best analyzed by means of large data samples that require statistical analysis. At the same time, quantitative studies do not automatically belong to Cognitive Linguistics just by virtue of being quantitative. An experimental investigation of metaphorical language or a corpus study of a radial category belong to Cognitive Linguistics because they engage fundamental theoretical concepts in Cognitive Linguistics (metaphors and radial categories), not because they apply quantitative methods.

Where does historical linguistics stand in this picture? The quantitative turn is to a large degree a product of the information age, where the advent of large electronic corpora has facilitated quantitative studies of large bodies of data. However, while the importance of the information revolution can hardly be overestimated, it should be pointed out that it only applies to a small minority of the world’s languages. Importantly, in the context of this article, corpora documenting languages from earlier times are fewer and smaller than those documenting the languages of today. Thus, the problem facing the historical linguist is still mostly scarcity of data, not abundance. However, historical corpora are being developed. For instance, the Russian National Corpus includes a historical corpus, and the PROIEL (Pragmatic Resources in Old Indo-European Languages) and TOROT (The Tromsø Old Russian and OCS Treebank) resources are valuable for historical linguists working in my own field, Slavic linguistics. Historical corpora exist for a number of languages, such as English (The Corpus of Historical American English, COHA), Spanish

(Corpus del Español), and Welsh (A Historical Corpus of the Welsh Language 1500–1850), just to mention a few.<sup>1</sup>

Will the development of more historical corpora force the historical linguist to reconsider the Cognitive Commitment? Clearly not. While it is likely that new questions will emerge and old questions can be investigated in new ways when more data become available, historical linguistics is still unthinkable without a theory of linguistic cognition, as argued in the preceding section. Ignoring the Cognitive Commitment would amount to throwing the baby out with the bath-water – a much unwanted example of infanticide.

### 3 The Cognitive Commitment and the *jer* shift in East Slavic

The discussion in the preceding sections suggests that historical linguistics and Cognitive Linguistics can be fruitfully combined, and indeed there exists a substantial body of research that testifies to this happy marriage (see Bybee 2007 and Hilpert 2015 for excellent overviews). Advances in Cognitive Linguistics have changed our understanding of key concepts in historical linguistics, such as sound law and analogy (Bybee 2001: 57 – 60 and Bybee 2007: 946–964), and fundamental notions in Cognitive Linguistics such as metaphor and metonymy are crucial in the analysis of semantic change (Sweetser 1990 and Hilpert 2015: 351–353). However, instead of cataloging the synergy effects between cognitive and historical linguistics, I will explore a concrete example that illustrates the importance of the Cognitive Commitment for historical linguistics.

The *jer* shift is a prosodic change that originated in Late Common Slavic and spread to Old East Slavic in the twelfth century.<sup>2</sup> This sound change, traditionally referred to as “Havlik’s law”, involved the lax vowels /ĩ, ů/ (often referred to as *yers* or *yers*), which either disappeared or merged with /e, o/ depending on the prosodic environment. Traditionally, the environment has been described in

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<sup>1</sup> These resources are available at [www.ruscorpora.ru](http://www.ruscorpora.ru) (Russian National Corpus), <http://foni.uio.no:3000> (PROIEL), <http://nestor.uit.no> (TOROT), <http://corpus.byu.edu/coha/> (COHA), <http://www.corpusdelespanol.org/> (Corpus del Español), and <http://people.ds.cam.ac.uk/dwew2/hcwl/menu.htm> (A Historical Corpus of the Welsh Language 1500–1850).

<sup>2</sup> For the purposes of this article I use the term “Old East Slavic” instead of the more entrenched and conventionalized “Old Russian”, since we are dealing with the ancestor of all the modern East Slavic languages, not just Russian.

terms of a counting procedure, whereby consecutive *jers* are counted from right to left in the word (Kiparsky 1963: 93):

- (1) CŮ<sub>3</sub>CŮ<sub>2</sub>CŮ<sub>1</sub> → CCOC, where C = consonant, Ů = lax vowel (*jer*: /ĩ, ů/),  
O = /o, e/

As can be seen from (1), *jers* with odd numbers disappear, while *jers* with even numbers merge with non-*jer* vowels. Let us consider some real examples (from Kiparsky 1963):

- (2) a. lĩ<sub>3</sub>stĩ<sub>2</sub>cĩ<sub>1</sub> → l'st'ec 'flatterer'  
b. otũ<sub>1</sub>xodĩ<sub>1</sub>niku → otxodn'iku 'hermit (dative sg)'  
c. sũ<sub>2</sub>žĩ<sub>1</sub>gla → sožgla 'she burned'

Example (2a) illustrates the disappearance of the *jers* with odd numbers, while *jer* number two survives and turns into /e/. Examples (2b–c) are more complicated, since they involve combinations of *jers* and non-*jer* vowels. Of particular importance is (2b), which shows that in order to predict the right outcome we have to restart the counting of *jers* after non-*jer* vowels. Since in (2b) both *jers* have been assigned the number “1”, they are both correctly predicted to disappear.

The traditional account of the *jer* shift can be summarized as follows:

- (3) a. Number consecutive *jers* from right to left.  
b. Restart the numbering from non-*jer* vowels.  
c. *Jers* with odd numbers are in weak position and disappear.  
d. *Jers* with even numbers are in strong position and vocalize to /e, o/.

Although (3) works well as a descriptive summary, it is not hard to discover its limitations. While little is known about what was going on in the minds of the speakers of Old East Slavic, we can be quite sure that they were not counting *jers* from right to left. In this sense, the account in (3) is far from psychologically realistic, and hence has limited explanatory power. In addition, the statement in (3b) stands out as an unmotivated stipulation.

Two questions arise. Is it possible to come up with a cognitively more realistic analysis, and is it possible to design an analysis without the *ad hoc* stipulation in (3b)? I argue that these questions are connected, and that a psychologically plausible analysis obviates the need for the stipulation in (3b). In order to show this, I will explore an account in terms of trochaic feet (discussed in more detail in Nessel to appear, see also Nessel 2015: 246–251).

Trochaic feet are rhythmic groups of two syllables, where the leftmost syllable is prominent (“head”). I argue that Old East Slavic had right-aligned trochees, i. e., that trochees were built from the right edge of the word:

- (4) CŮ(CVCŮ) → CCVC, where parentheses mark feet

As shown in (4), the last two syllables of the word constitute a foot. The *jer* at the left edge of the foot is the head, while the rightmost *jer* is the non-head member of the trochee. The first syllable of the word is not part of a foot, since you need two syllables to build a trochee. The formula in (4) facilitates a simple reformulation of the *jer* shift:

- (5) a. A *jer* undergoes vocalization if it is the head of a foot.  
b. All other *gers* disappear.

What was the inventory of legitimate feet in Old East Slavic? We need to consider the four logically possible combinations of *gers* and non-*ger* vowels:

- (6) a. VŮ (e.g., *domŮ* ‘house’)  
b. \*ŮV (not attested)  
c. ŮŮ (e.g., two last syllables in *lišťiči* ‘flatterer’)  
d. VV (e.g., two last syllables in *otŮxodŮniku* ‘hermit (dative sg)’)

I propose that all combinations yield legitimate feet, except ŮV, which is therefore marked with an asterisk in (6b). Importantly, the ban on ŮV feet is not a mere *ad hoc* stipulation, but follows as a natural consequence of the assumption that Old East Slavic had trochaic feet. Assuming the *gers* were reduced, lax vowels, it would be unnatural for a reduced vowel to head a foot where the other syllable was an unreduced non-*ger* vowel. Such a foot would be typologically very marked, since a reduced vowel would occupy a prosodically more prominent position than a full vowel.<sup>3</sup> In other words, what I suggest is that a *ger* could only be the head of a foot if the other syllable also was a *ger*, as in (6c).

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<sup>3</sup> Typological evidence for the idea that certain vowels (in our case the *gers*) are less optimal prosodic heads than other vowels can be found in languages with so-called quality-sensitive stress. Kenstowicz (1997: 158) demonstrates that for many languages “lower vowels are more optimal stress-bearing units than higher vowels [...] and peripheral vowels are more optimal than central vowels”. Crosswhite (2001: 39) has applied this idea to vowel reduction in Slavic. See also Gouskova 2003 for relevant discussion.

Let us see how this works for the examples in (2):

- (7) a. lí(stíci) → l'st'ec 'flatterer'  
 b. (otü)(xodī)(niku) → otxodn'iku 'hermit (dative sg)'  
 c. (süži)gla → sožgla 'she burned'

In (7a), we build a trochee from the right, and this enables us to predict the correct outcome. In (7b), we build three feet from the right, all of which are of the legitimate types described in (6). Importantly, the two *gers* are in non-head position, and we therefore correctly predict that they disappear. Example (7c) is more complex. Here it is impossible to build a trochaic foot based on the last two syllables, because that would yield the illegitimate ŨV foot. The only way to avoid this is to skip the last syllable and build a foot comprising the *first* two syllables. This analysis yields the correct prediction that the first *ger* in the word, which is the head of the foot, survives and vocalizes to /o/, while the other *ger*, which is in the non-head position, disappears.

I criticized the traditional account for involving an *ad hoc* stipulation. Does the foot-based approach I advocate fare better? Comparison of (7c) with (3c) reveals that the avoidance of ŨV in the foot-based analysis does the same job as the stipulation that the count be restarted after non-*ger* vowels. However, while the assumption about restarting the count comes out of the blue and has no other motivation than to save the analysis from collapsing, the assumption about the illegitimacy of ŨV feet is based on cross-linguistic evidence (Kenstowicz 1997). As mentioned, feet of this type are typologically marked and unnatural since a reduced vowel would occupy a prosodically more prominent position than a full vowel. In other words, the foot-based analysis is a real improvement over the traditional counting procedure. It enables us to get rid of an *ad hoc* stipulation, while at the same time being able to predict the right outcomes in the relevant examples.

At this point, the reader may ask where the Cognitive Commitment enters the picture. As mentioned, feet are rhythmic groupings of syllables. An account in terms of prosodic feet is psychologically plausible, since rhythmic grouping is a fundamental property of human cognition (Ding et al. 2016). Thus, Nathan (2015: 266) argues that the rhythmic organization of prosodic properties “simply is human rhythmic behavior to which strings of segments are mapped, much as hand-clapping and foot-tapping is mapped to internally generated or externally perceived rhythms.” Such rhythmic grouping is of fundamental importance in language acquisition, as argued by MacNeilage (2008: 108), who shows that infants’ babbling, which is an important step towards the acquisition of language, is inherently rhythmic “from the very outset”. Importantly, this early rhythmic behavior is not restricted to language alone, but is rather part of a wide variety of



repetitive body movements (e. g., kicking, rocking, waving, bouncing, banging, rubbing, scratching, and swaying) that are characteristic of infants and that Thelen (1981) refers to as “rhythmical stereotypies”. Rhythmic grouping is furthermore an essential feature of music, and although there are differences between the rhythmic organization of language and music (London 2012), there is a significant body of evidence suggesting that “language and music may result from general perceptual mechanisms that are neither music- nor language-specific” (Goswami 2012: 60, see also Trehub and Hannon 2006 for discussion).

What are the implications of these observations about rhythm in language and cognition for the analysis of the linguistic phenomenon discussed in the present article, viz. the *jer* shift in Slavic? Simply put, these observations imply that an analysis in terms of rhythmic groupings (prosodic feet) receives support from what we know about human cognition, whereas an alternative analysis in terms of an obscure counting mechanism (as in (3) above) has no basis in human cognition. An analysis in terms of prosodic feet is psychologically plausible, while the counting mechanism in (3) is not.

A critical reader might object that Cognitive Linguistics does not have a monopoly on prosodic feet. While it is true that prosodic feet are widely employed in generative linguistics and a similar foot-based analysis could be couched in, say, Optimality Theory, it is important to keep in mind that the rhythmic grouping that underlies prosodic feet is not unique to linguistic cognition, but as we have seen is part of a more general cognitive capacity that also underlies e. g. music (Goswami 2012 and Trehub and Hannon 2006). A theory that assumes a modular mind with an insular language faculty misses the point that we are dealing with a general cognitive phenomenon (rhythmic grouping). A Cognitive Linguistics approach, on the other hand is more explanatory, since it enables us to relate the linguistic facts directly to general cognition. As dictated by the Cognitive Commitment, the cognitive linguist applies a general cognitive phenomenon (rhythmic grouping) to the linguistic problem at hand, and the result is a more adequate analysis. Or stated differently: the Cognitive Commitment facilitates elegant and insightful analyses in historical linguistics.

## 4 The Cognitive Commitment: an empirical advantage and a limitation

In addition to yielding an improvement in our understanding of the *jer* shift as such, the Cognitive Commitment also enables us to formulate a general

hypothesis about the prosodic development from Old East Slavic to Contemporary Standard Russian. At the same time, the proposed analysis illustrates an important limitation.

While the traditional counting-based account is idiosyncratic and therefore does not facilitate comparison with other languages, grouping of syllables in prosodic feet is ubiquitous in the languages of the world. The foot-based analysis therefore makes it possible to compare the Old East Slavic foot system to the corresponding systems in other languages, past and present. A particularly interesting target of comparison is Contemporary Standard Russian, one of the present-day descendants of Old East Slavic.

Contemporary Standard Russian arguably has an iambic system for vowel reduction, i. e., a system with disyllabic feet where the rightmost syllable is the head of the foot. By way of illustration, consider the /o/ phoneme, which is pronounced in three different ways according to its position in the word. In words like *gorodók* ‘small town’, /o/ in the first syllable is realized as [ə], the second /o/ as [ʌ], and the third, stressed /o/ as [o]: [gəɾʌdók]. In other words, in order to accommodate this vowel reduction pattern, we need to distinguish between three positions in the word:

- (8) a. Stressed syllable (where /o/ is realized as [o])
- b. First pretonic syllable (where /o/ is realized as [ʌ])
- c. Other unstressed syllables (where /o/ is realized as [ə])

Since the vowel in the first pretonic syllable (the one immediately preceding the stressed syllable) is less reduced than other unstressed vowels and hence more similar to stressed vowels, the first pretonic and the stressed syllable constitute a prosodic domain. We may analyze *gorodók* as follows:

- (9) gə(ɾʌdók)

Parentheses represent the domain we are interested in. Since the domain is disyllabic and its head (the stressed syllable) is at the right margin, we may refer to it as an “iambic foot” (see e. g., Alderete 1995, Crosswhite 2001, Gouskova 2010). With the iambic foot in place, rules for vowel reduction in words like *gorodók* can be formulated straightforwardly:

- (10) Unstressed /o/ is realized as [ʌ] inside the foot, but as [ə] outside it.

If we accept the argument above, it appears that Contemporary Standard Russian deals with vowel reduction in terms of iambic feet, whereas Old East Slavic had trochees. Thus, the following hypothesis can be formulated:

- (11) The trochee-iamb shift hypothesis: Russian has undergone a shift from trochaic to iambic feet with regard to vowel reduction.

The merits of this hypothesis are discussed in detail in Nessel (to appear). What is relevant in the present context is the fact that the hypothesis could not have been formulated in terms of the traditional counting-based approach to reduced vowels in Old East Slavic. As we have seen, the traditional account does not involve prosodic feet at all and therefore does not facilitate comparison with the prosodic feet in Contemporary Standard Russian. Whether the hypothesis in (11) turns out to be correct remains to be seen. The simple point I would like to make here is that the Cognitive Commitment facilitates an insightful analysis of the *jer* shift, and that analysis in turn paves the way for more general hypotheses about the development of Russian prosody.

At this point the reader might be getting the impression that the Cognitive Commitment is all you need in historical linguistics. A discussion of an important limitation is therefore in place. The *jer* shift is an example of sound change where the fate of the reduced vowels depends on their position in the prosodic word. I have argued that the analysis of how this sound change came about can benefit from the Cognitive Commitment. However, at the same time it is helpful to summarize sound change in terms of what is traditionally called “sound laws”:

- (12) X (stage 1) → Y (stage 2)/\_\_ Z

This format is traditionally read “X at stage 1 becomes Y at stage 2 in the environment Z”. However, as pointed out by Andersen (1972: 11–12f.), sound laws do not necessarily represent natural processes, but are instead correspondences between different stages in the historical development of a language. Such stages may be centuries apart, as when we compare Old East Slavic /l'ist'ici/ ‘flatterer’ to Contemporary Standard Russian /l'st'ec/ with the same meaning. Sound laws (understood as correspondences between different stages in development) are generalizations made by linguists for linguists. As such sound laws are indispensable in historical linguistics, but they are not part of the generalizations native speakers make about their mother tongue, since no native speakers of modern Russian are also native speakers of Old East Slavic. In this sense, sound laws are examples of valuable linguistic representations that are not

psychologically realistic. The Cognitive Commitment is important, but it is not the whole story – at least not in historical linguistics.

## 5 Conclusion

What is the worst thing that can happen to Cognitive Linguistics? My answer would be: endless and pointless scholastic discussions of language as a social vs. mental phenomenon and of the relative merits of quantitative vs. qualitative analysis. Language is clearly both a social and a mental phenomenon, and we need both quantitative and qualitative analysis in order to shed light on it. Instead we need to take the Cognitive Commitment seriously, and continue to integrate the cognitive and social dimensions into one overarching theory that can serve as the basis for hypotheses that can be tested against all kinds of data – quantitative as well as qualitative.

Although the Cognitive Commitment is not all we need, my analysis of the *jer* shift in East Slavic has shown how important the Cognitive Commitment is for historical linguistics. The Cognitive Commitment brings about elegant and insightful analyses and facilitates the advancement of new hypotheses about language change. With the advent of larger and better historical corpora, a quantitative turn in historical linguistics may be just around the corner. However, while more and more easily available data are most welcome in a field where scarcity of data has been the rule, a quantitative turn will not make the Cognitive Commitment superfluous – not in historical linguistics, and not in Cognitive Linguistics in general.

**Acknowledgments:** I would like to thank members of the CLEAR (Cognitive Linguistics: Empirical Approaches to Russian) group at UiT The Arctic University of Norway for discussing an earlier version of this article with me. Thanks also to two anonymous reviewers and the editors of Cognitive Linguistics for valuable feedback.

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