

“Are Russian prefixes out of order?: Complexity-Based Ordering and position classes”
Robert Reynolds, The Ohio State University

In natural language, only a very small proportion of possible affix combinations are actually attested (e.g. *atomic~atomicity*, but **atomicness*; or *atomless~atomlessness*, but **atomlessity*). The last several decades have seen a number of attempts to identify general principles governing affix combinability (e.g. Kiparsky 1985, Fabb 1988, Plag 1996, Hay 2003, Plag & Baayen 2009). A relatively recent processing-based proposal, Complexity-Based Ordering (Hay 2003), has been supported in studies of canonical *derivational* affixes, e.g. English prefixes and suffixes, and Russian suffixes. However, a processing account should apply very broadly, and this study is a first effort at exploring how to interpret Complexity-Based Ordering with *inflectional* affixes. Various principles have been proposed for governing the order of inflectional affixes including syntax and semantic scope (Baker 1985, Rice 2000). In this presentation, I assume that in at least some languages, they are conditioned by language-specific position classes (Stump 1992). Based on data from Russian prefix combinations, I argue that the primary evidence which has been cited as evidence of Complexity-Based Ordering – acyclic ordering of affixes – is likely the result of both historical processes and cognitive processing. Historical factors are usually ignored in the corpus-based research of affix ordering, conflating possible cognitive effects with historical.

Hay (2003) proposed a processing approach to affix ordering, Complexity-Based Ordering, which claims that, in addition to selectional restrictions, affixal combinations are restricted by cognitive processing restrictions, and in particular, the parsability of the affix: an affix can only combine with affixes that are less parsable than itself. For example, in *addictiveness*, *-ness* is quantifiably more easily parsed than *-ive*, so the combination is allowed. This ordering principle leads to the prediction that affix combinations are acyclic (i.e. $A > B$, $B > C$, but not $C > A$), a prediction that has been supported by studies of English and Russian *derivational* affixes. However, by examining a range of possible inflectional scenarios, I demonstrate that Complexity-Based Ordering is unlikely to make accurate predictions for inflectional affixes, as well as other affixes associated with position classes.

Russian verbal prefixes have two position classes (e.g. Isačenko 1960), so the presence of an acyclic ordering in Russian prefixes is not expected. Some prefixes can appear in both positions, but with distinct meanings in each position. For example, in the internal position, *pere-* means ‘across’ (e.g. *perexodit* ‘to go across’), but in the external position, it means ‘excessively’ (e.g. *pere-vy-polnit* ‘to execute beyond expectations’). In order to measure the degree to which the order of Russian prefixes is acyclic, I examine the stacking of 32 Russian prefixes in Tixonov’s *Morpho-orthographic Dictionary of Russian* (Figure 1). By comparing these data with 100,000 randomly generated datasets, I show that Russian prefixes are significantly acyclic ($p < 0.01$). Since Complexity-Based Ordering is not a viable explanation of this acyclicity, I discuss alternative explanations, both cognitive and historical. For example, Plag & Baayen (2009) speculate that an acyclic ordering of affix combinations might arise because it maximizes the ability to predict the next affix, by ruling out ‘higher-ranking’ affixes.

Complexity-Based Ordering has hit upon a striking feature of affix stacking – acyclic ordering – which has, I argue, both historical and cognitive factors. Although historical factors of word structure are sometimes mentioned in the affix-stacking literature, corpus methodologies have not been adapted to disambiguate cognitive and historical effects. I discuss how the use of historical corpora can contribute to future processing-based research of affix stacking.

	u	raz	iz	pro	s	vy	na	za	v	o	vz	ot	pri	po	pod	pre	pere	bez	do	nad	pred	
u	---	3			1																	
raz	19	---		1	9					13				16								
iz	3	4	---				4															
pro			9	---	1			1			11											
s	2	6	3	11	3			1				7	9	6			2					
vy				6	2	---																
na					5	2	---						1		2							
za	1	3		6	2			---					2									
v		5						1	---													
o	8	2		6	20			4		---			3	8							189	
vz					5					5	---			5								
ot					5					1		---										
pri	28				13		9	2	12	13			4	---								
po	6	23	4	2	14	17	23	10	2	14	2	2	5	---							2	
pod		5			9	1	12	5				2	1	1	---							
pre	8			6						2	15				6	---						
pere	18	7	4		13	9	12	19	4	44	1				5		---					
bez	8	10	4	7	14	3	3			7	2	9	9	8		1	3	---				
do	3	2			3	4			4				2	1							---	
nad																	1				---	
pred	13	6	1		1	2		1		8	7	2		6								---

Figure 1. Type-frequency adjacency matrix of Russian prefixes in an approximated optimally acyclic order. Boxed cells indicate combinations that form reciprocal pairs. For example, both *u-raz-* (3 types) and *raz-u-* (19 types) are attested, so both cells are boxed.

References

- Baker, Mark. 1985. *The mirror principle and morphosyntactic explanation*. *Lingua* 16(3): 373-415.
- Fabb, N. 1988. "English suffixation is constrained only by selectional restrictions." *Natural Language & Linguistic Theory* 6 (4): 527-539.
- Hay, J. 2003. *Causes and consequences of word structure*. London: Routledge.
- Isačenko, A. 1960. *Grammaticeskij stroj ruskogo jazyka. Morfologija. Častj vtoraja [Grammatical composition of Russian. Morphology. Part 2]*. Bratislava: Vydavateľstvo Slovenskej Akadémie vied.
- Kiparsky, Paul. 1985. "Some Consequences of Lexical Phonology." *Phonology Yearbook* 2: 85-138.
- Plag, I. 1996. "Selectional restrictions in English suffixation revisited: a reply to Fabb (1988)." *Linguistics* 34 (4): 769-798.
- . 1999. *Morphological productivity: structural constraints in English derivation*. Berlin: Walter de Gruyter.
- Plag, I., and H. Baayen. 2009. "Suffix ordering and morphological processing." *Language* 85 (1): 109-152.
- Rice, K. 2000. *Morpheme Order and Semantic Scope: Word Formation in the Athapaskan Verb*. Cambridge University Press.
- Stump, G. T. 1992. "Position classes and morphological theory." *Yearbook of morphology* 80: 129-180.
- Svenonius, P. 2004. "Slavic prefixes and morphology. An Introduction to the Nordlyd volume." *Nordlyd* 32: 177-204.
- Tixonov, A. N. 2002. *Morfemno-orfografičeskij slovar': Okolo 100 000 slov*. Moscow: OOO Izdatel'stvo Astrel'. http://slovari.yandex.ru/~книги/Морфемно-орфографический_словарь/.