

“Constructional profiles: What grammatical constructions tell us about the meanings of words”
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Assumptions:

- Grammatical and lexical meaning observe the **same** principles
- **Polysemy** is common to both types of meaning
- **Radial categories** of relationships among meanings:
 - **prototype** based on physical experience
 - extension via **metonymy**
 - extension via **metaphor**
- Difference in **form** implies difference in **meaning**

A constructional profile is “the distribution of relative frequencies of constructions associated with a given word”.

The null hypothesis is that all nouns should have equal frequency in all constructions. But corpus data shows that distributions are strongly skewed.

Hypothesis: Each word has a unique constructional profile.

Corrolary: Words with similar meanings should have similar constructional profiles.

SADNESS nouns

	<i>pečal'</i>		<i>toska</i>		<i>xandra</i>		<i>melanxolija</i>		<i>grust'</i>		<i>unynie</i>	
v+Acc	16	5%	8	3%	30	21%	52	23%	6	2%	126	41%
v+Loc	22	7%	16	6%	10	7%	16	7%	6	2%	33	11%
Inst	32	10%	33	12%	10	7%	45	20%	27	9%	16	5%
s+Inst	49	16%	70	25%	19	14%	5	2%	160	55%	16	5%
ot+Gen	16	5%	39	14%	29	21%	20	9%	3	1%	14	4%
DO	128	41%	84	30%	20	14%	32	14%	50	17%	25	8%
other	52	17%	33	12%	22	16%	57	25%	38	13%	82	27%
Total	315	100%	283	100%	140	100%	227	100%	290	100%	304	100%

HAPPINESS nouns

	<i>naslaždenie</i>		<i>radost'</i>		<i>udovol'stvie</i>		<i>likovanie</i>		<i>vostorg</i>		<i>ščastie</i>	
v+Acc	0	0%	0	0%	0	0%	4	1%	42	14%	3	1%
v+Loc	3	1%	1	0%	4	1%	21	5%	35	12%	4	1%
Inst	12	4%	21	7%	4	1%	39	10%	18	6%	33	7%
s+Inst	117	40%	92	32%	165	41%	90	23%	58	19%	4	1%
ot+Gen	9	3%	41	14%	24	6%	8	2%	66	22%	89	19%
DO	111	38%	106	37%	171	42%	171	44%	67	22%	207	44%
other	39	13%	24	8%	39	10%	59	15%	18	6%	132	28%
Total	291	100%	285	100%	407	100%	392	100%	304	100%	472	100%

The following two tables are proximity matrices stating the squared Euclidian distances that establish the hierarchical clusters. The relevant values are bold-faced.

SADNESS nouns

Case	Squared Euclidean Distance (z scores)					
	1:grust'	2:melanx	3:pechal'	4:toska	5:unynie	6:xandra
1:grust'	0.000	14.235	11.705	12.762	27.415	13.662
2:melanx	14.235	0.000	8.041	8.226	12.798	11.715
3:pechal'	11.705	8.041	0.000	5.844	17.123	14.679
4:toska	12.762	8.226	5.844	0.000	23.880	7.968
5:unynie	27.415	12.798	17.123	23.880	0.000	19.949
6:xandra	13.662	11.715	14.679	7.968	19.949	0.000

5.844 joins *pečal'* with *toska*, **7.968** adds *xandra*, **8.041** adds *melanxolija*, **11.705** adds *grust'*, **12.798** adds *unynie*.

HAPPINESS nouns

Case	Squared Euclidean Distance (z scores)					
	1:likovani	2:naslazd	3:radost'	4:udovol's	5:vostorg	6:schastie
1:likovani	0.000	7.879	7.370	11.209	17.261	13.960
2:naslazd	7.879	0.000	1.812	2.687	17.219	21.301
3:radost'	7.370	1.812	0.000	5.501	14.124	16.121
4:udovol's	11.209	2.687	5.501	0.000	22.367	23.188
5:vostorg	17.261	17.219	14.124	22.367	0.000	28.001
6:schastie	13.960	21.301	16.121	23.188	28.001	0.000

1.812 joins *naslaždenie* and *radost'*, **2.687** adds *udovol'stvie*, **7.370** adds *likovanie*, **13.960** adds *ščastie*, **14.124** adds *vostorg*.

The results are statistically significant:

- For 'sadness' nouns: chi square = 730.35, and Cramer's V = 0.305 which qualifies as a moderate effect ($p < 0.0001$, $df=30$)
- For 'happiness' nouns: chi square = 774.6, Cramer's V = 0.268 which qualifies as a moderate effect ($p < 0.0001$, $df=30$)

Constructional profiles reveal that emotions such as happiness and sadness in Russian are understood as:

- **metaphorical** holes
- **metaphorical** agents
- **metaphorical** companions
- **metaphorical** diseases
- **metaphorical** sources

"Empty" prefixes?

In aspectual pairs such as *pisat'/napisat'*, *morozit'/zamorozit'*, *obedat'/poobedat'*, it is assumed that the prefixes *na-*, *za-*, *po-* are "empty" (have no meaning).

Some verbs have several "empty" prefixes: *gruzit'* has the perfectives *nagružit'*, *zagruzit'*, *pogruzit'*.

Constructional profiles show that the verbs have different meanings and the prefixes are not empty, since you cannot have three different "zeroes".

Data for constructional profiles of verbs

1920 examples extracted from Modern subcorpus (1950-2009) of the RNC

All non-passive forms	raw frequency	Passive participles	raw frequency
<i>gruzit'</i>	286	<i>gružen</i>	107
<i>nagružit'</i>	147	<i>nagružen</i>	221
<i>zagruzit'</i>	208	<i>zagrūžen</i>	248
<i>pogruzit'</i>	254	<i>pogrūžen</i>	449

Table 1: Raw frequencies for the forms of the verb *gruzit'* 'load' and its Natural Perfectives.

Logistic regression shows a highly significant correlation between the factors mentioned above and the choice of construction: LL-ratio χ^2 (the difference between the two deviance values, with and without predictors) is 1738.47, Nagelkerke's R^2 (correlational strength) is 0.796, C value (the coefficient of concordance which according to Gries (2009) should ideally be .8 or higher) is 0.964, Somer's D_{xy} (rank correlation between predicted and observed responses) is 0.928, $df = 8$,

overall p is 0. The optimal model has high classificatory power: 88.5 % constructions are predicted correctly.

The odds ratio, 95%-CI and p for the significant predictors VERB, REDUCED, PARTICIPLE, and VERB:PARTICIPLE are shown in Table 2:

Variable	Odds ratio	95%-Confidence Interval		p-value	
VERBna	0.097	5.928746e-02	1.549363e-01	< 2e-16	***
VERBpo	79.888	1.744470e+01	1.416632e+03	1.49e-05	***
VERBza	0.289	1.951300e-01	4.245384e-01	3.68e-10	***
REDUCEDyes	0.411	2.907612e-01	5.773928e-01	3.67e-07	***
PARTICIPLEyes	0.003	1.450705e-04	1.203072e-02	4.66e-09	***
VERB na:PARTICIPLEyes	5.881	2.244183e-01	1.541567e+02	0.219043	ns
VERB po:PARTICIPLEyes	289.170	9.203405e+00	9.763774e+03	0.000373	***
VERB za:PARTICIPLEyes	24.057	4.314377e+00	4.521877e+02	0.003034	**

Table 2: Statistical significance of the independent variables and their interactions.

For more details and references, see:

Janda, Laura A. and Valery Solovyev. 2009. "What Constructional Profiles Reveal About Synonymy: A Case Study of Russian Words for SADNESS and HAPPINESS". *Cognitive Linguistics* 20:2, 367-393.

Sokolova, Svetlana, Laura A. Janda and Olga Lyashevskaya. Forthcoming. "The Locative Alternation and the Russian 'empty' prefixes: A case study of the verb *gruzit* 'load'". In: D. Divjak & St. Th Gries (eds.). *Frequency effects in cognitive linguistics (Vol. 2): what statistical effects can(not) explain* (Trends in Linguistics Series). Berlin: Mouton de Gruyter.