Constructional profiles: What constructions tell us about the meanings of words

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in collaboration with

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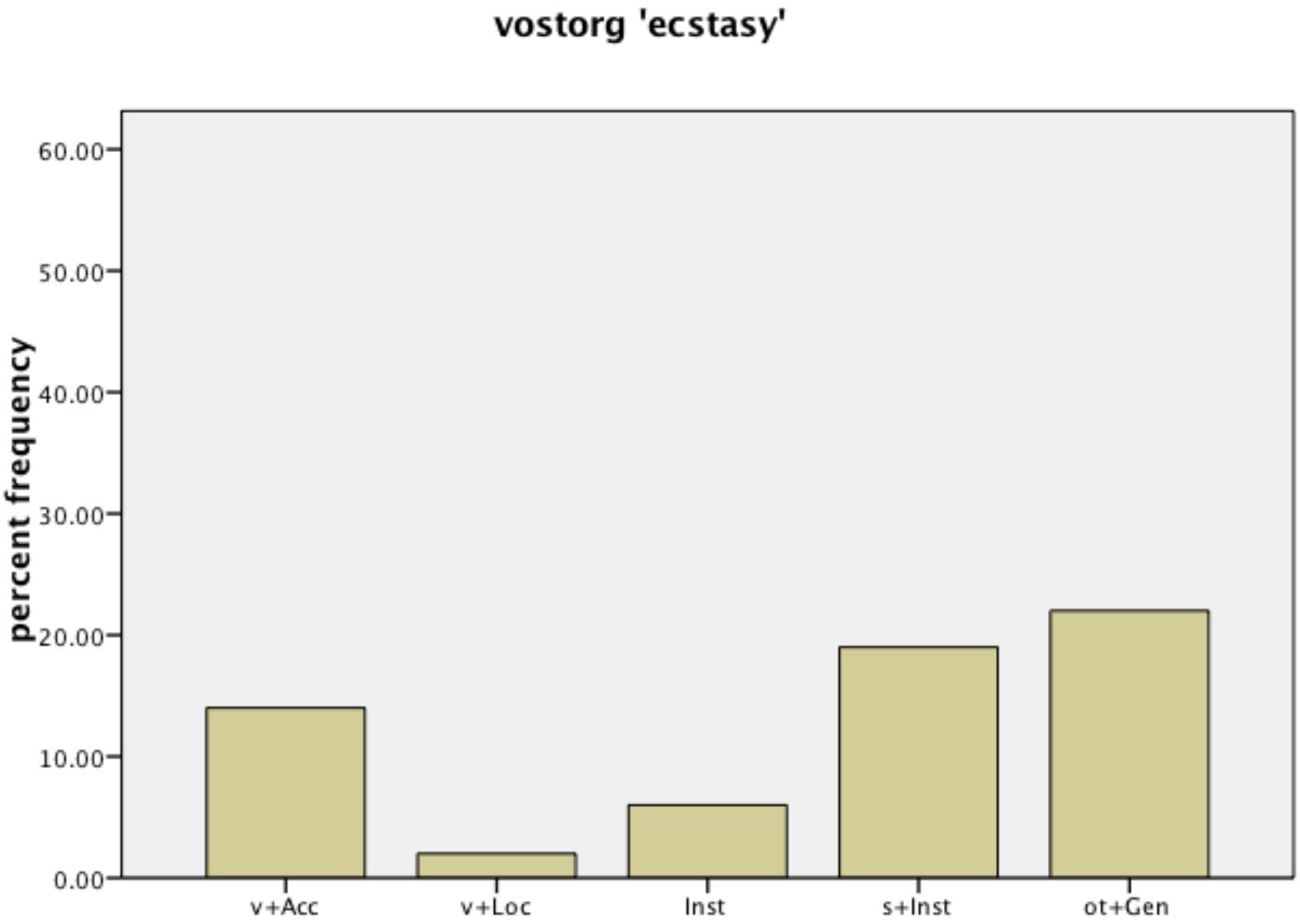
Constructional Profiles

- A constructional profile is "the distribution of relative frequencies of constructions associated with a given word"
- There are about 70 constructions of the form "*[(preposition) [noun]$_{case}$]*" in Russian
- The null hypothesis is that all nouns should have equal frequency in all constructions
- But only about 6 (or fewer) constructions are needed to characterize a given noun
- (cf. similar findings by Karlsson 1985, 1986 and Arppe 2001, 2005)
- Example of constructional profile of *vostorg* 'ecstasy'


vostorg 'ecstasy'
percent frequency
60.00
50.00
40.00
30.00
20.00
10.00
0.00
v+Acc
v+Loc
Inst
s+Inst
ot+Gen
constructions
‘into’
‘in’
‘agent’
‘with’
‘from’

Where the data come from

- Russian National Corpus (http://www.ruscorpora.ru) >120M words
- Biblioteka Maksima Moškova (http://lib.ru/) >600M words
- 500 sentences extracted and coded for use of preposition & case

Synonymy

- Hypothesis: Each word has a unique constructional profile
- Corollary: Words with similar meanings should have similar constructional profiles
- Hierarchical cluster analysis shows which constructional profiles are closest (closer synonyms) and which are further apart, using squared Euclidean distances based on constructional profile data

‘Sadness’ in Russian

- *grust’, melanxolija, pečal’, toska, unynie, xandra*
- The constructions they appear in:
  - *v* + Acc ‘into’
  - *v* + Loc ‘in’
  - Inst: Agent
  - *s* + Inst ‘with’
  - *ot* + Gen ‘from’
  - (Direct Object)
  - (Other Constructions)

Graphs will show only these five, as percentages

Hierarchical Cluster Analysis is computed from all data

The ‘sadness’ nouns

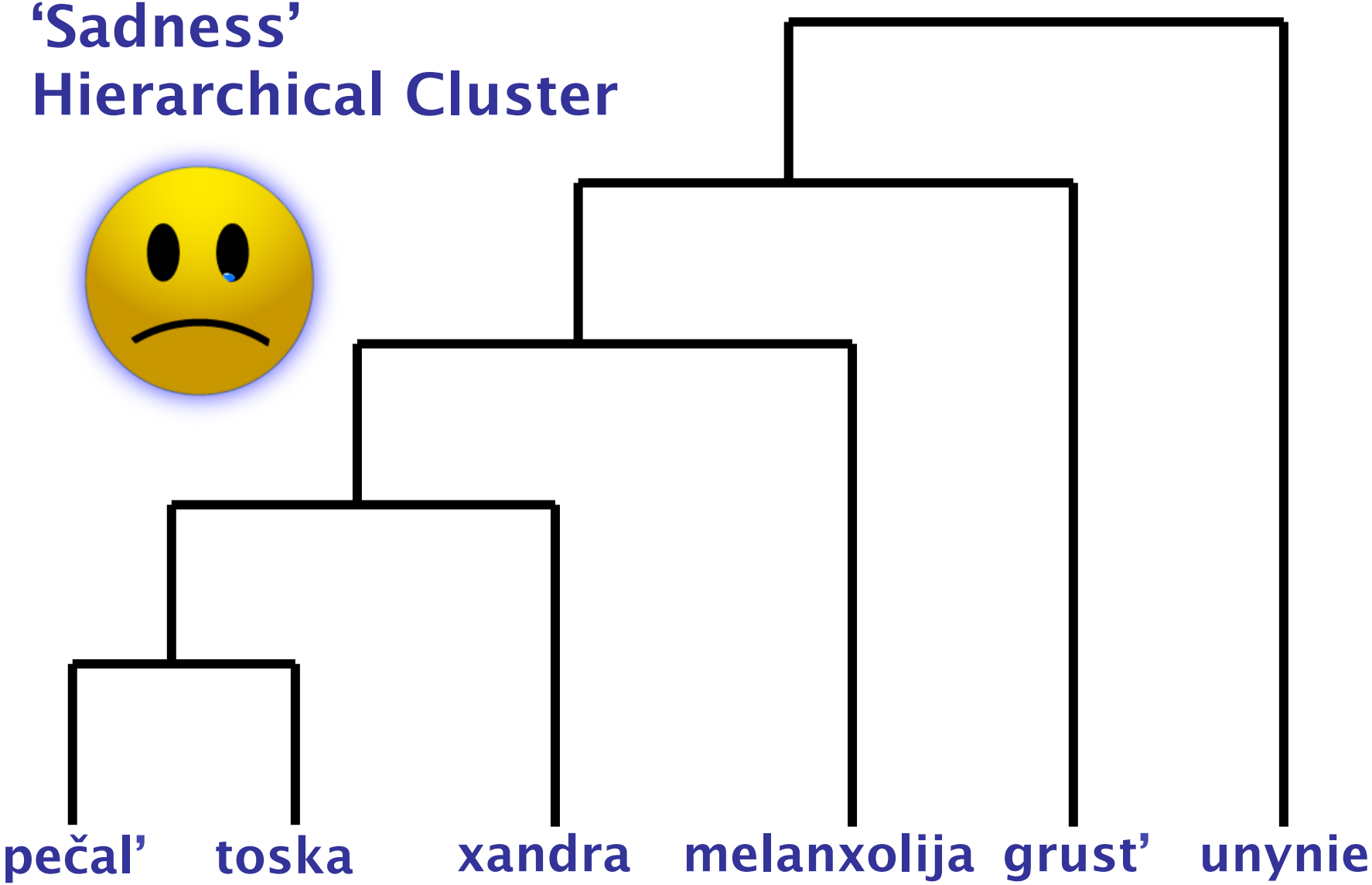
- They can’t all be the same:

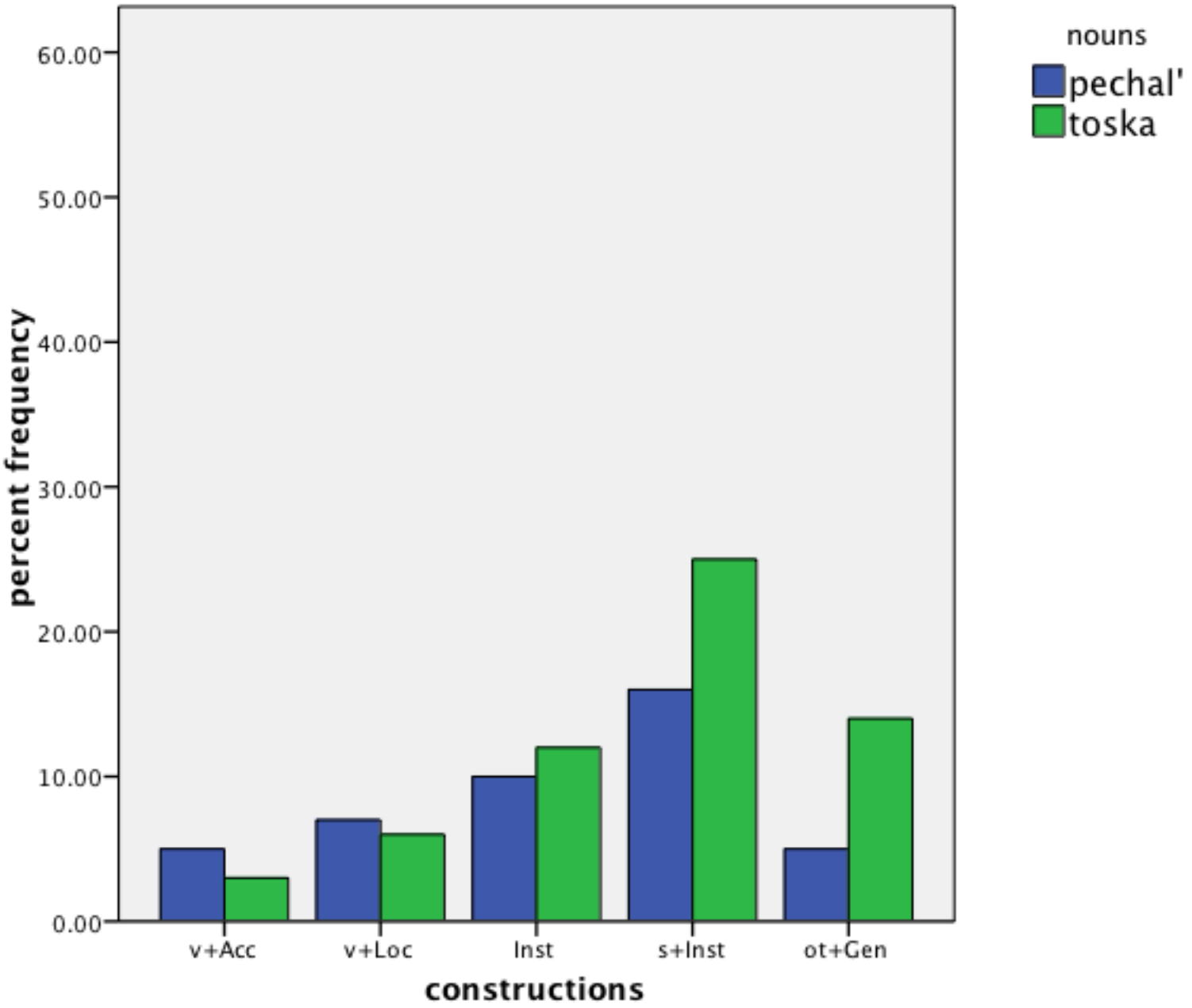
  Uxodiš’, i ja gljažu vsled tebe s grust’ju, no bez toski.

  ‘You leave and I watch you go with sadness$_{grust’}$, but without sadness$_{toska}$.’

- Dictionaries differ on how synonyms are grouped

‘Sadness’ Hierarchical Cluster




nouns
pechal'
toska
60.00
50.00
40.00
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20.00
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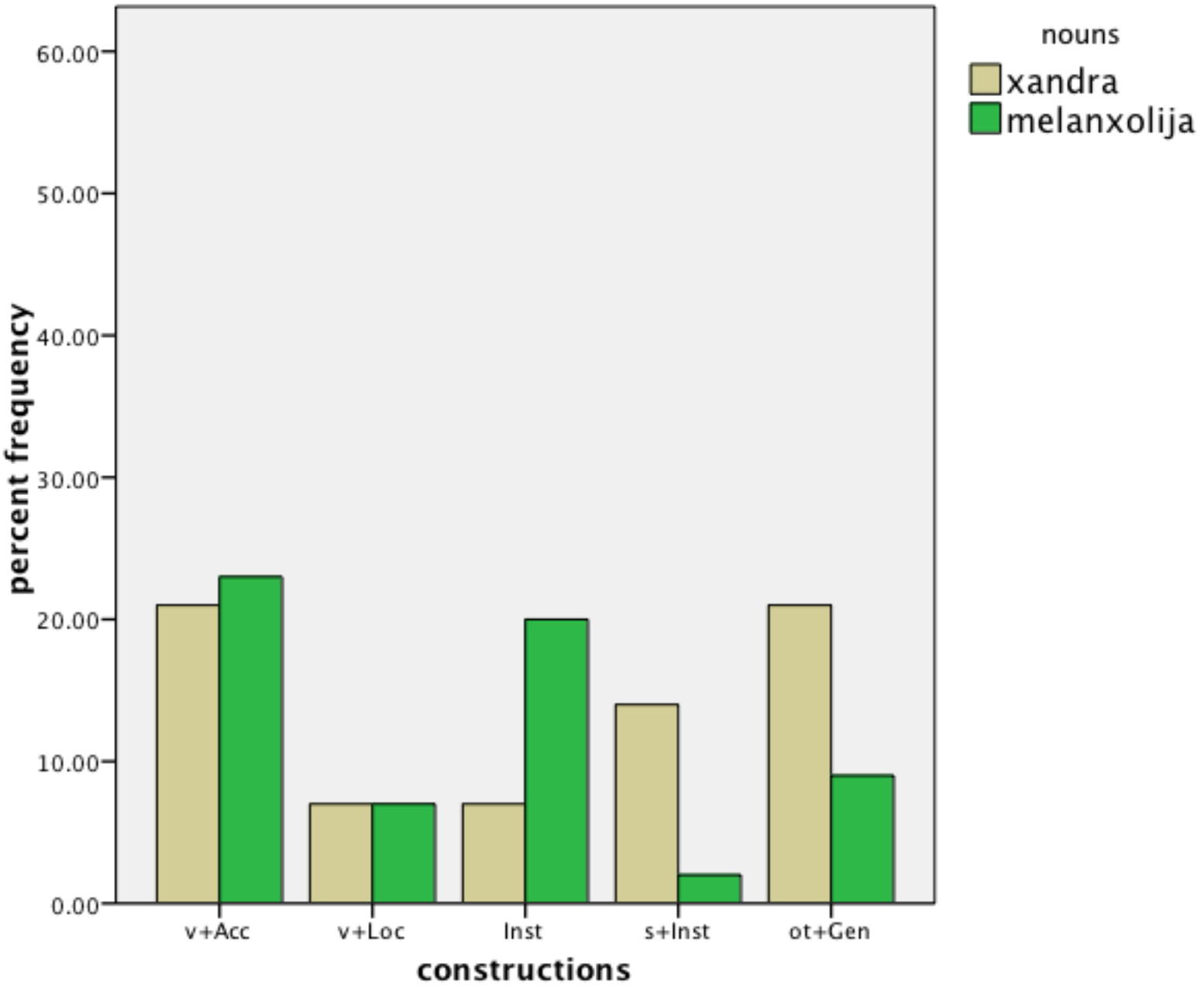
0.00
percent frequency
v+Acc
v+Loc
Inst
s+Inst
ot+Gen
constructions


nouns
xandra
melanxolija
60.00
50.00
40.00
30.00
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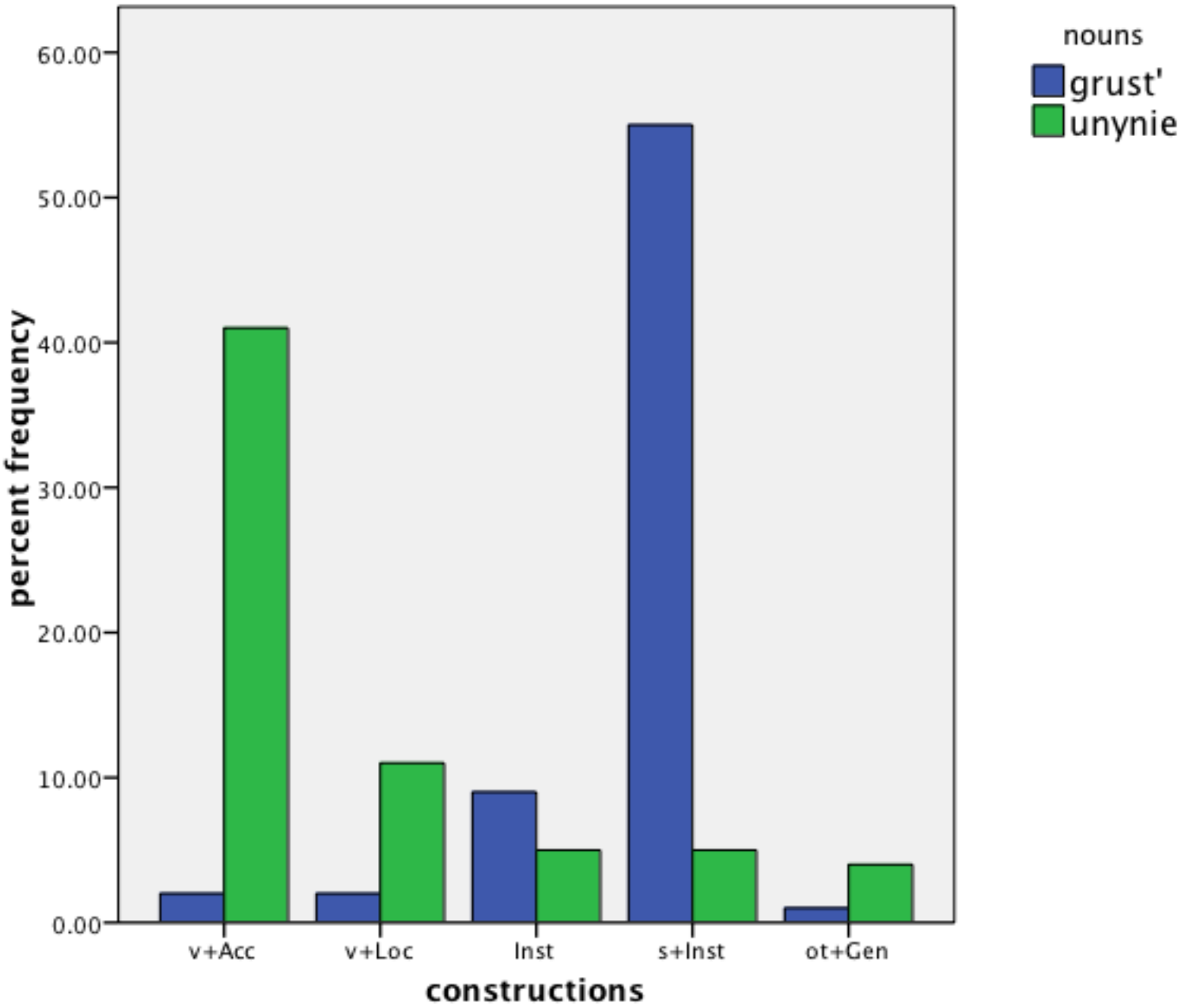
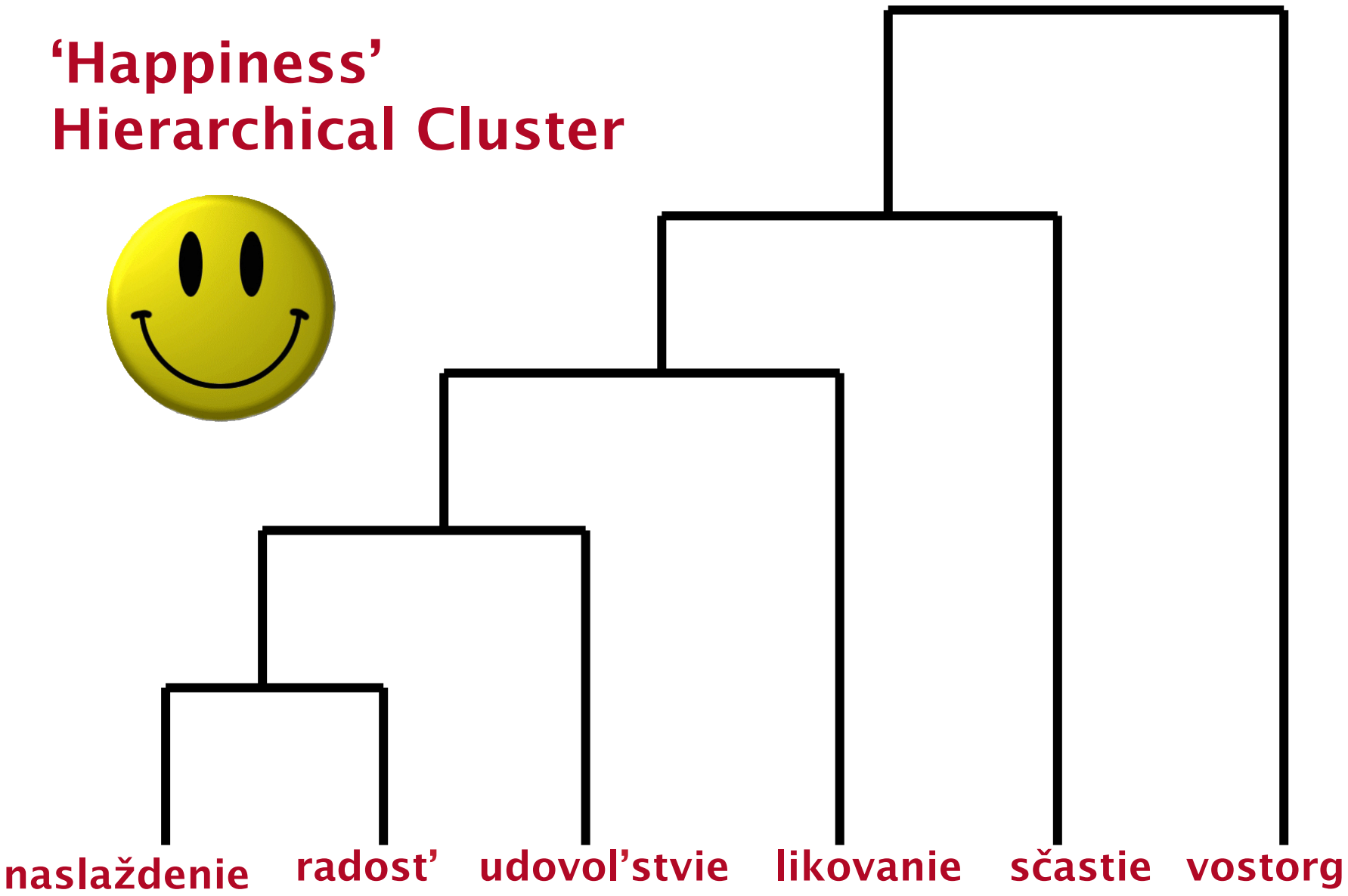
percent frequency
v+Acc
v+Loc
Inst
s+Inst
ot+Gen
constructions

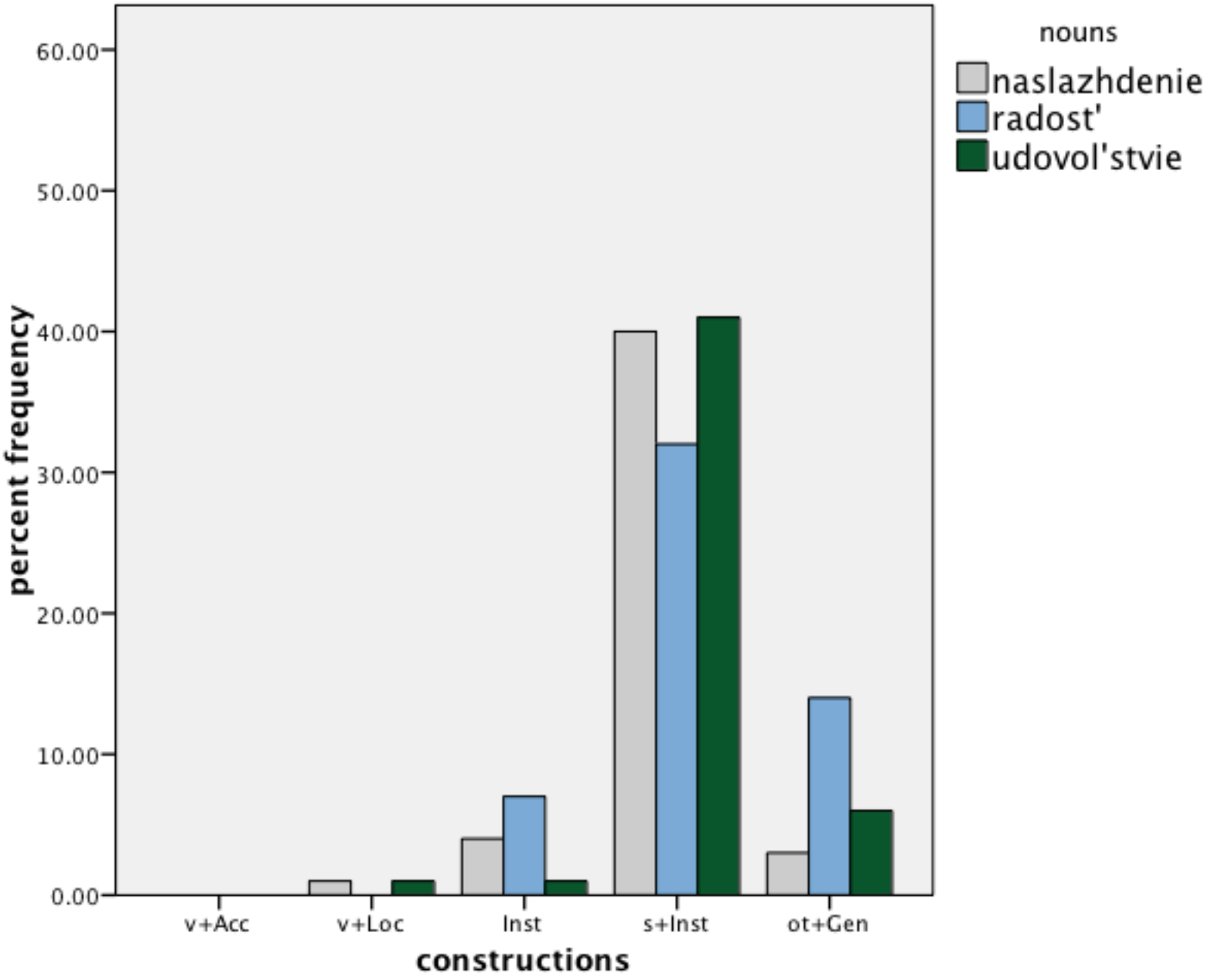

nouns
grust'
unynie
60.00
50.00
40.00
30.00
20.00
10.00
0.00
percent frequency
v+Acc
v+Loc
Inst
s+Inst
ot+Gen
constructions

‘Happiness’ in Russian

- *likovanie*, *naslaždenie*, *radost’*, *sčastie*, *udovol’stvie*, *vostorg*
- Antonyms are words that are virtually identical, but differ in one value
- ‘Happiness’ nouns focus on the **same** constructions in their constructional profiles as ‘sadness’ nouns
- Dictionaries differ widely in grouping of ‘happiness’ synonyms

‘Happiness’ Hierarchical Cluster




nouns
naslazhdenie
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percent frequency
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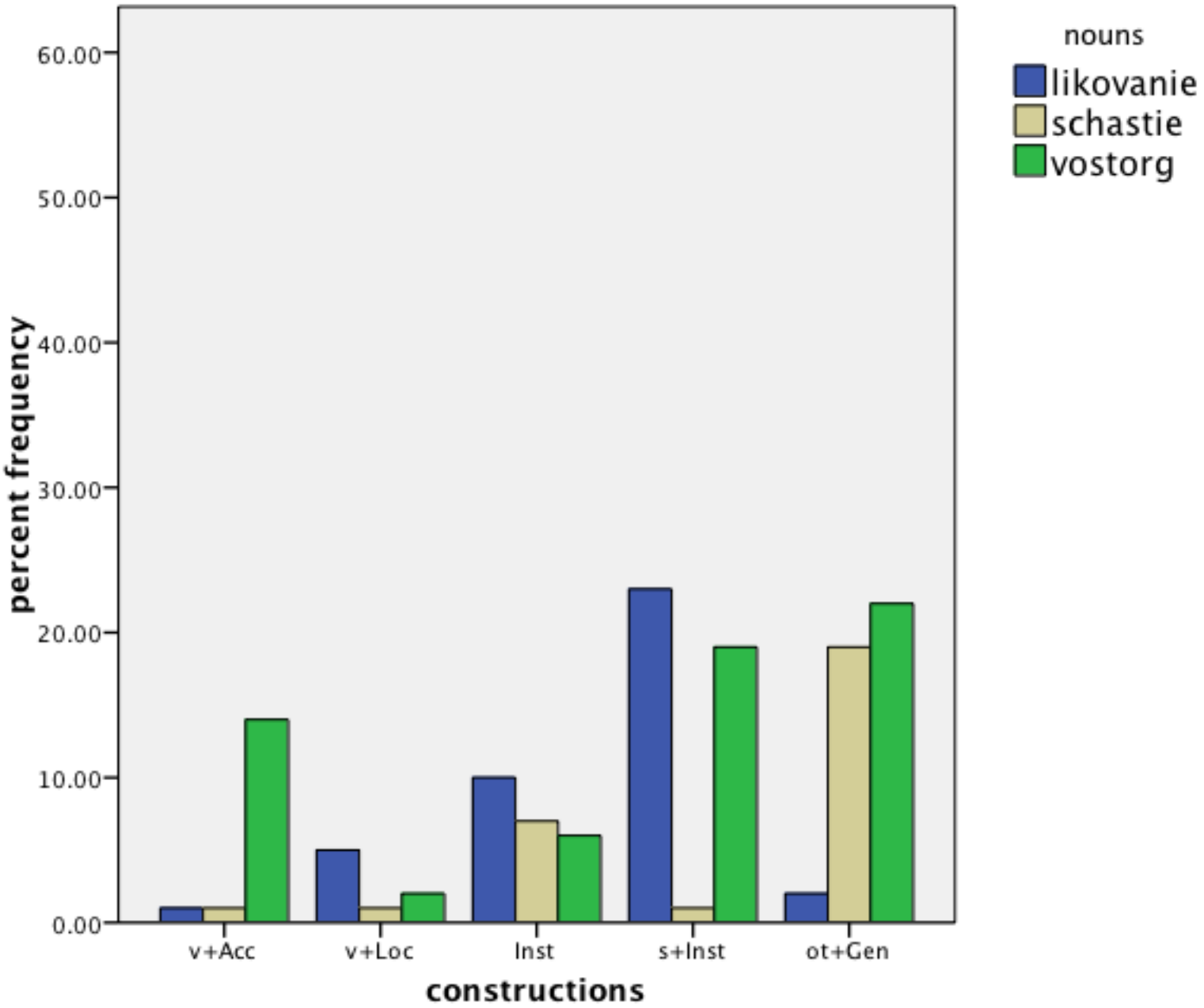
constructions


nouns
likovanie
schastie
vostorg
percent frequency
60.00
50.00
40.00
30.00
20.00
10.00
0.00
v+Acc
v+Loc
Inst
s+Inst
ot+Gen
constructions

About the results...

- 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 ($p<0.0001$, $df=30$)

Metaphor

- Constructional profiles reveal that emotions such as happiness and sadness in Russian are understood as
  - **metaphorical** holes or mires
  - **metaphorical** agents
  - **metaphorical** accessories (gestures)
  - **metaphorical** diseases
  - **metaphorical** sources

v + Acc ‘into’

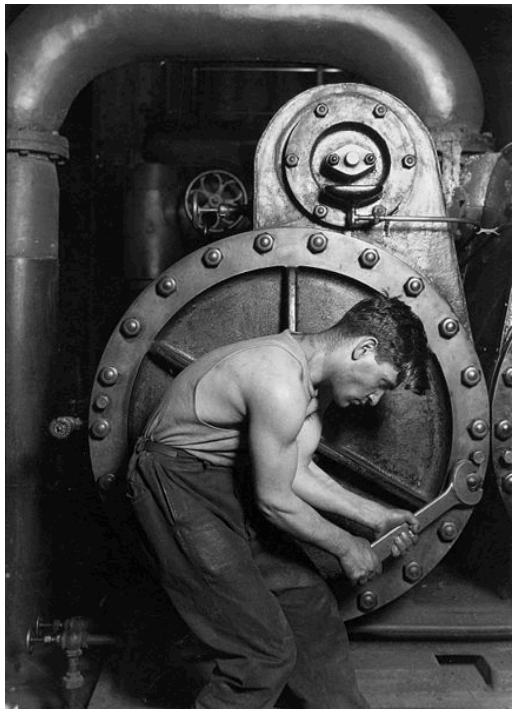
Ja že živoj čelovek i, konečno, inogda vpadaju v unynie.

‘I am a living person, and, of course, occasionally fall into sadness.’

v + Loc ‘in’

Ej na um ne pridet, čto suprug iznyvaet v toske o poterjannyx minutax truda i vdoxnovenija.

‘It doesn’t occur to her that her spouse is suffering in sadness over the minutes of work and inspiration that he has lost.’



Inst: Agent

Kto iz živuščix, tomimyj <u>unyniem,</u>
ne predavalsja takomu
pereboru ne sostojavšixsja
žiznennyx variantov?

‘Who among mortals tormented
<u>by sadness</u>, has not indulged in
an inventory of all the things
that didn’t happen in their life?’

s + Inst ‘with’

–Kušaeš’ ty, kak svin’ja, – <u>s grust’ju</u> skazal kapitan.

‘––You eat like a pig’–– said the captain <u>with sadness</u>.’

ot + Gen ‘from’: Healing from disease

Samoe lučšee lekarstvo ot xandry -- èto čtenie.

‘The best cure for sadness is reading.’

ot + Gen
'from':
Cause

Podumajte, ètot čelovek umer <u>ot melanxolii!</u>

'Just imagine, that person died <u>of sadness</u>!'

Constructional Profiles of Verbs

- The distribution of relative frequencies of constructions associated with verbs
- Constructional profiles show that near-synonyms can behave very differently
- Constructional profiles can show that the “empty” prefixes are not really empty

“Empty” prefixes?

When we have aspectual pairs such as *pisat’/napisat’* ‘write’, *morozit’/zamorozit’* ‘freeze’, *obedat’/poobedat’* ‘eat lunch’, it is assumed that the prefixes *na-*, *za-*, *po-* are “empty” (have no meaning)

Some verbs have several “empty” prefixes: *gruzit’* ‘load’ has the perfectives *nagruzit’*, *zagruzit’*, *pogruzit’* – are they synonyms?

Constructional profiles show that the verbs have different meanings and the prefixes are not empty

Relevant constructions

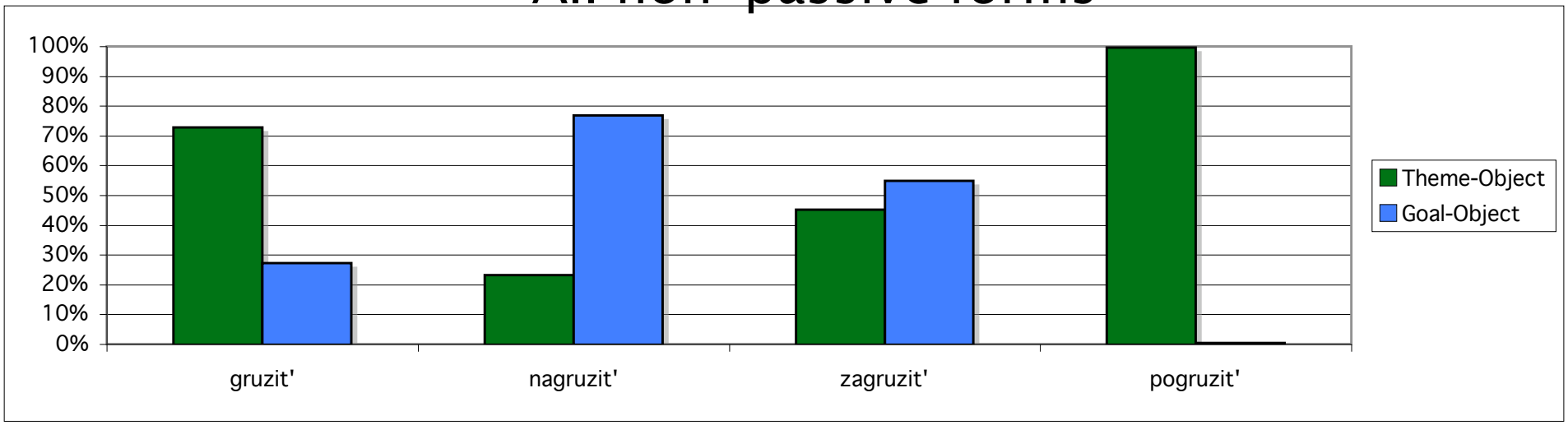
- Acc names **load (theme-object)**

  Acc + *na/v* + Acc (*nagruzit' jaščiki na teležku* 'load the boxes onto the cart')

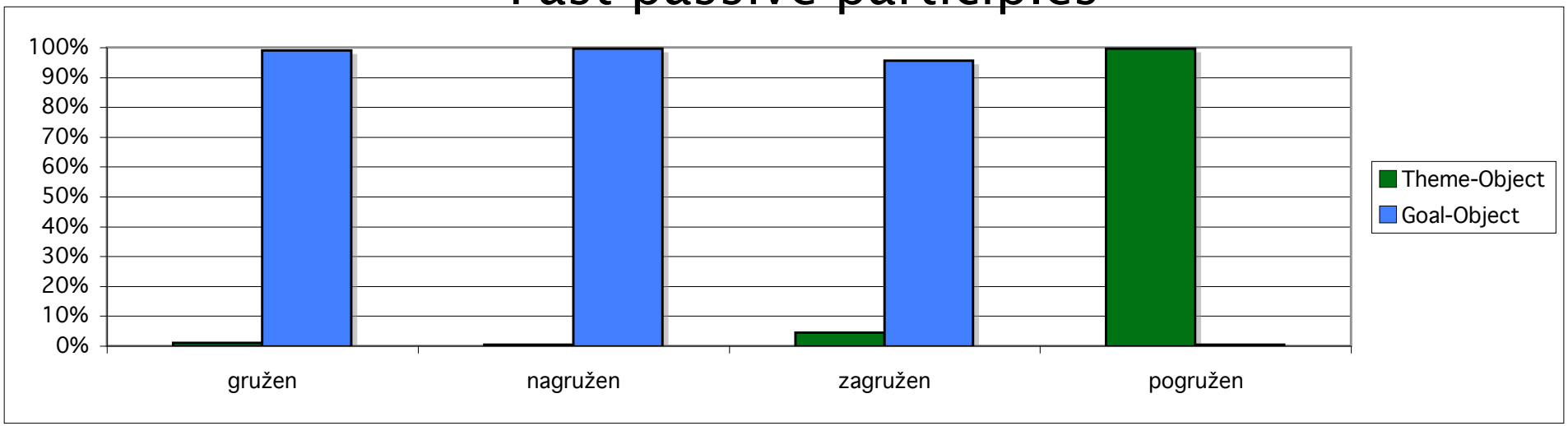
  Acc (*zagruzit' ugol' budet problematično* 'it will be difficult to load the coal')

- Acc names **container (goal-object)**
  - Acc + Inst (*on nagruzil sanki proviziej* 'he loaded the sleds with provisions')
  - Acc (*nagruzili telegi i uexali v gorod* 'they loaded the carts and rode into town')
- Data from Russian National Corpus

All non-passive forms



Past passive participles



About the results...

- Logistic regression shows a highly significant relationship between the construction and the following factors:
  - prefix
  - passive vs. active
  - reduced vs. full
- Correlational strength is 0.796
- Classificatory power: 88.5 % constructions are predicted correctly