



Conceptual Overlap and the Illusion of Semantic Emptiness

Laura A. Janda

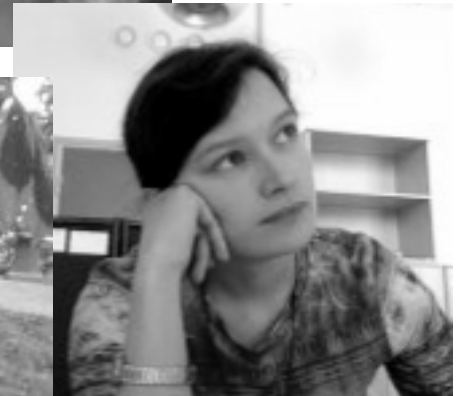
Tore Nessel

and the CLEAR group at the
University of Tromsø

Who is CLEAR?

- Laura A. Janda, Tore Nessel
- Olga Lyashevskaya
- Svetlana Sokolova
- Julia Kuznetsova
- Anna Baydimirova
- Anastasia Makarova

CLEAR:
Cognitive Linguistics:
Empirical Approaches
to Russian



Why use quantitative approaches in cognitive linguistics?

- Usage-based approaches:
 - Language system and language use are not separate:
 - Generalizations grow out of language use
 - Linguists must study actual language use
- Categorization:
 - Not all categories have clear-cut boundaries
 - Gradient phenomena are acknowledged
- The information revolution:
 - Large electronic corpora available
 - Tools for handling large amounts of data needed

Cognitive linguistics needs statistical methods.

Pioneers: Collostructional analysis

- Which words fit into a construction?
- Example: NP *waiting to happen*
- Whether a word fits is a matter of degree of (repulsion or attraction)
 - E.g. *disaster, accident* are attracted to the construction
- Stefanowitsch and Gries (2003, 2004 etc.) developed statistical methods for the analysis of repulsion and attraction
- Objective description of a word's relationship to a construction



Behavioral profiles

- Are near synonyms really different?
- Divjak & Gries studied 1585 sentences with 9 verbs of trying in Russian
- Each sentence tagged manually for 87 variables (aspect, clause structure ...)
- Each verb receives percentage for each variable
- Each verb has a “behavioral profile” defined by its values for the variables
- Behavioral profiles can be analyzed statistically
- Objective description of differences and similarities among near synonyms



Constructional profiles

- Janda & Solovyev (2008) studied
 - Nouns for sadness/happiness in Russian (near synonyms)
 - 70 constructions: (Prep) + Noun_{CASE}
- Constructional profile:
 - “The distribution of relative frequencies of constructions associated with a given word”
- Constructional profiles can be compared by means of statistical analysis
- Objective description of syntactic similarities and differences between near synonyms

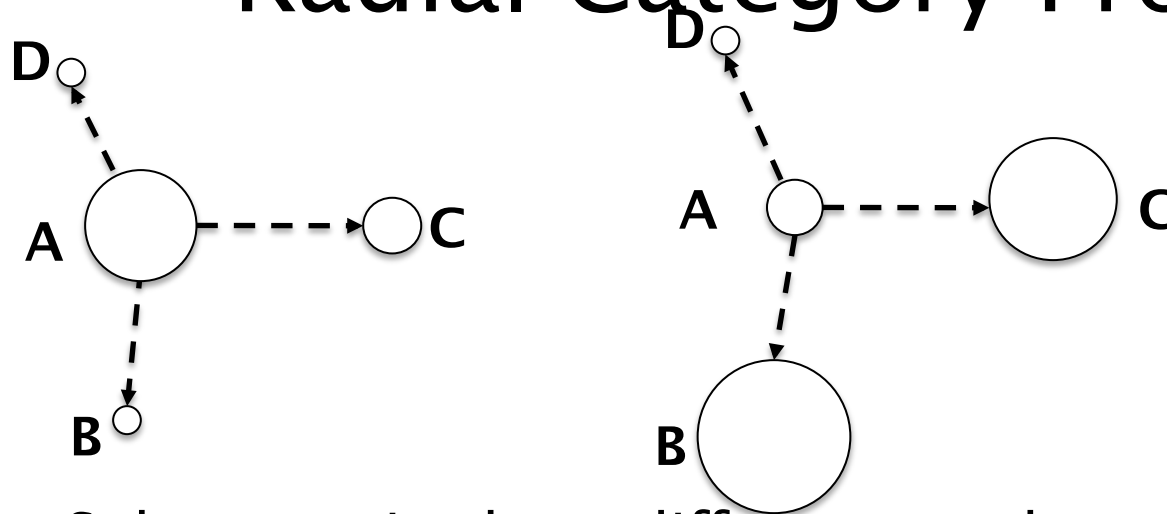


Grammatical profiles

- Janda & Lyashevskaya (to appear) study token frequencies of inflected forms of Russian verbs (nearly 6 millions)
- Verbs show remarkably different behavior
- Grammatical profile:
 - “Relative frequency distribution of the inflected forms of a word in a corpus”
- Grammatical profiles can be compared by means of statistical analysis
- Grammatical profiles shed light on the nature of aspectual pairs in Russian



Radial Category Profiling



- Subcategories have different numbers of members (type frequencies)
- Radial Category Profile: The relative frequency distribution of the subcategories of a radial category
- Profiles of different categories can be compared with simple statistical methods
- Case study: Janda, Nessel & Baydimirova (in press)



Semantic profiles

- Janda & Lyashevskaya (to appear) study attraction and repulsion between
 - Russian aspectual prefixes and
 - Semantic classes of verbs (tagged in the Russian National Corpus)
- Prefixes show remarkably different behavior
- Semantic profile of a prefix:
 - Relative frequency distribution of the semantic classes of verbs in a corpus that combine with a prefix
- Semantic profiles can be compared by means of statistical analysis



Conceptual Overlap

- Is a linguistic unit ever semantically “empty”?
- If a linguistic unit, like a prefix, never appears in isolation, it can be hard to say what its meaning is
- Though some claim that such bound morphemes are “empty”, they may instead show **conceptual overlap**
- Methods for exploring meaning in situations of conceptual overlap:
 - **Radial Category Profiling**
 - **Semantic Profiling**

Conceptual Overlap

- “Redundancy is not to be disparaged, for in one way or another every language makes extensive use of it” (Langacker 2008, 188)
- Conceptual overlap is found in common collocations such as *added bonus* and *physical exercise*
- Hypothesis: The meaning of a bound morpheme and the lexical morphemes it attaches to show conceptual overlap

Are Russian prefixes empty?

- Conventional wisdom:
 - Purely aspectual prefixes are semantically “empty”



- Our alternative Hypothesis:
 - Conceptual overlap
- How can this be tested empirically?
 - **Radial Category and Semantic Profiling:**
 - Corpus data
 - Statistical analysis

Overview

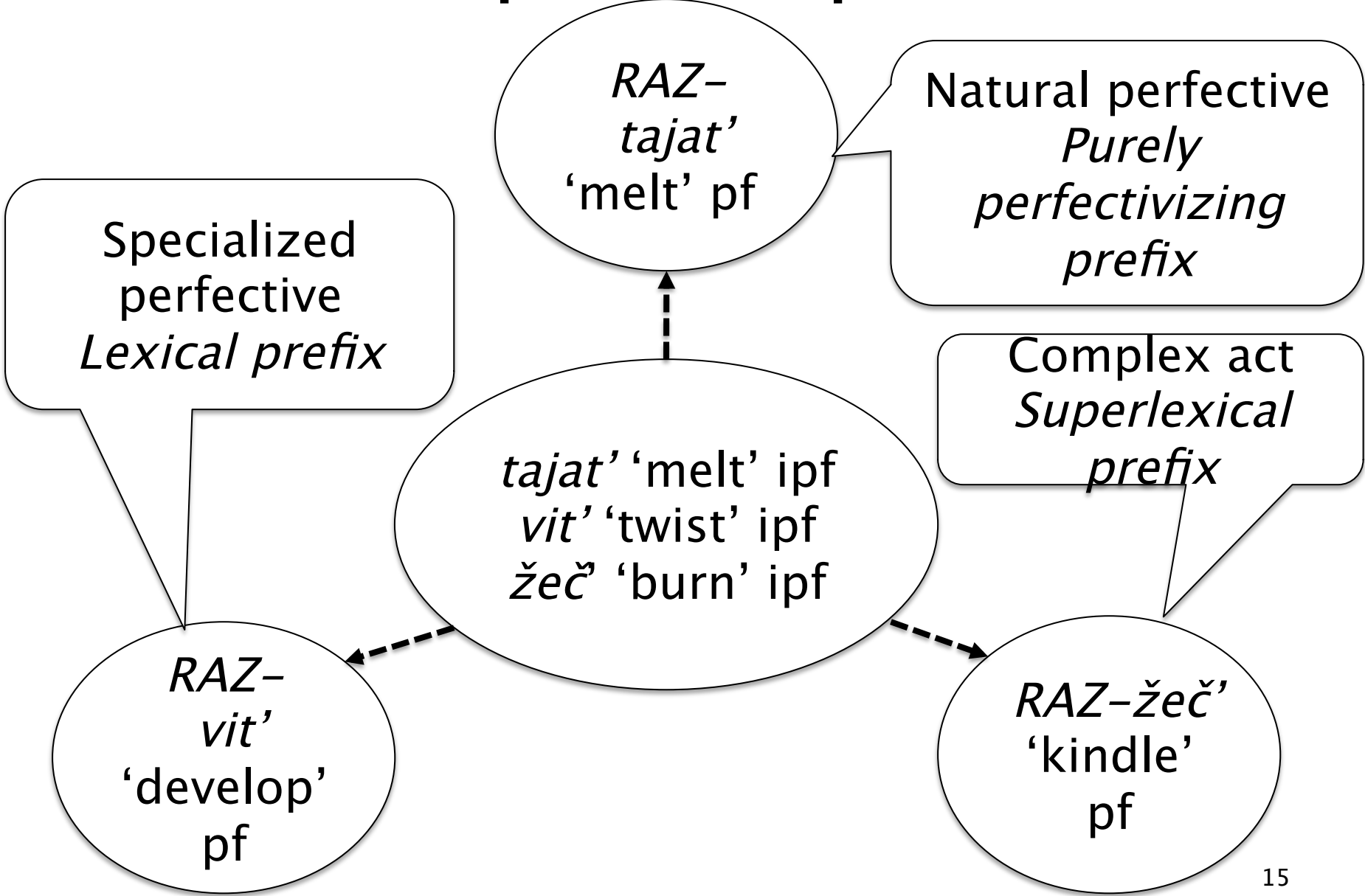
- General arguments why prefixes aren't empty
 - Number and distribution of prefixes
 - Borrowings
 - Prefix variation
- Case study of the *raz-* prefix
 - Used in some types of perfectives with spatial meaning
 - Claimed to be “empty”
- Remaining prefixes and methodology
 - **Radial Category Profiling** for “small prefixes”
 - **Semantic Profiling** for “big” prefixes

RAZojtis' 'walk in different directions'

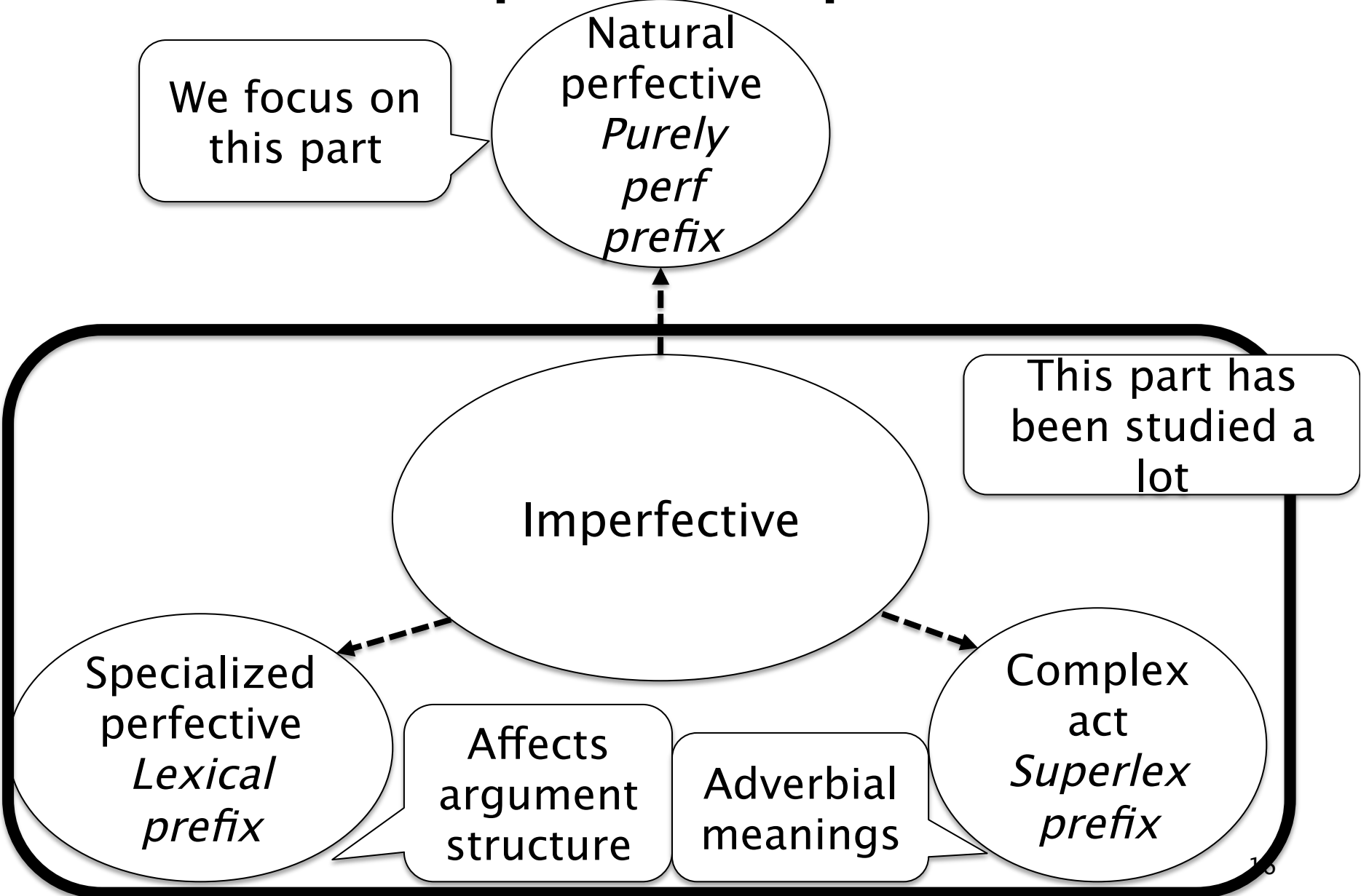


John Cleese in the Monty Python sketch "Ministry of silly walks"

Russian aspectual prefixation



Russian aspectual prefixation



Why purely perfectivizing prefixes aren't empty (1)

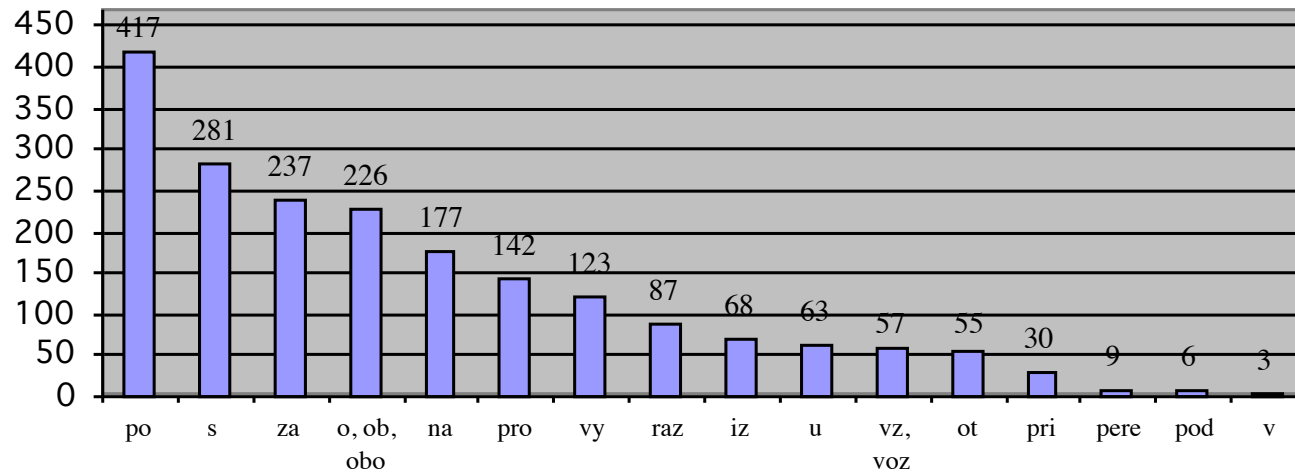
- Assume:
 - Only purpose of prefixes is to mark perfective aspect
- How many prefixes are needed?
 - Reasonable answer: ONE
- Russian has 19 relevant prefixes (Krongauz 1998)



M.A. Krongauz

The number of prefixes suggests that they are not pure markers of aspect.

Why purely perfectivizing prefixes aren't empty (2)



- Assume
 - Prefixes are pure aspectual markers
- Prediction
 - Even distribution of prefixes across base verbs

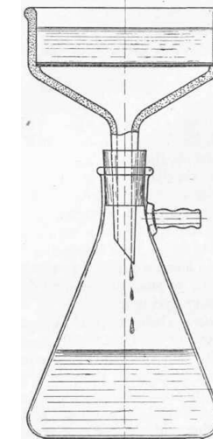
The UNeven distribution suggests that the prefixes do different jobs.

Why purely perfectivizing prefixes aren't empty (3)

- Assume
 - Prefixes are pure aspectual markers
- Prediction
 - Prefixes are assigned to borrowings in random fashion
- But
 - Native speakers have intuitions
 - Borrowings are assigned prefixes in a consistent way.



ZA-asfal'tirovat' COVER



PRO-fil'trovat'
MOVE
THROUGH

The consistent assignment of prefixes to borrowings suggests that prefixes are not semantically empty.

Structure of the argument

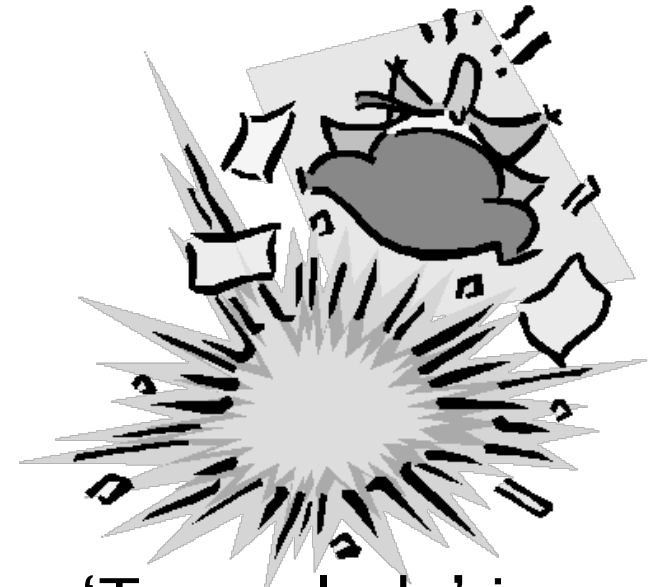
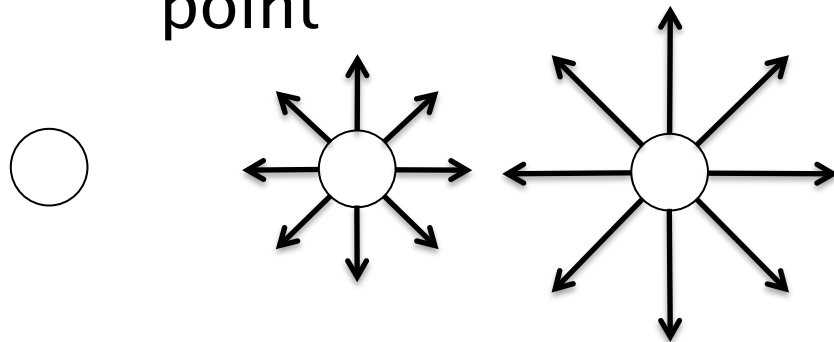
1. Explore meaning of *raz-* in verbs where its meaning is UNcontroversial:
 - Specialized perfectives (lexical prefixes)
 - Complex act perfectives (superlexical prefixes)
2. Compare with the use of *raz-* in verbs where its meaning is controversial:
 - Natural perfectives (purely aspectual prefixes)
3. The same meaning attested in (1) and (2).
4. *Raz-* has the same meaning in all types of perfectives.
5. There is no semantically empty *raz-* in Russian.

Meaning: A network model

- Category:
 - Network of related subcategories
- Prototype:
 - Central subcategory that is the best example of the category as a whole
- Extension relations:
 - Subcategories relate to the prototype via e.g. metaphor and metonymy.
- Schema:
 - Categories may have a general schema that covers all subcategories.

General schema and prototype for *raz-*

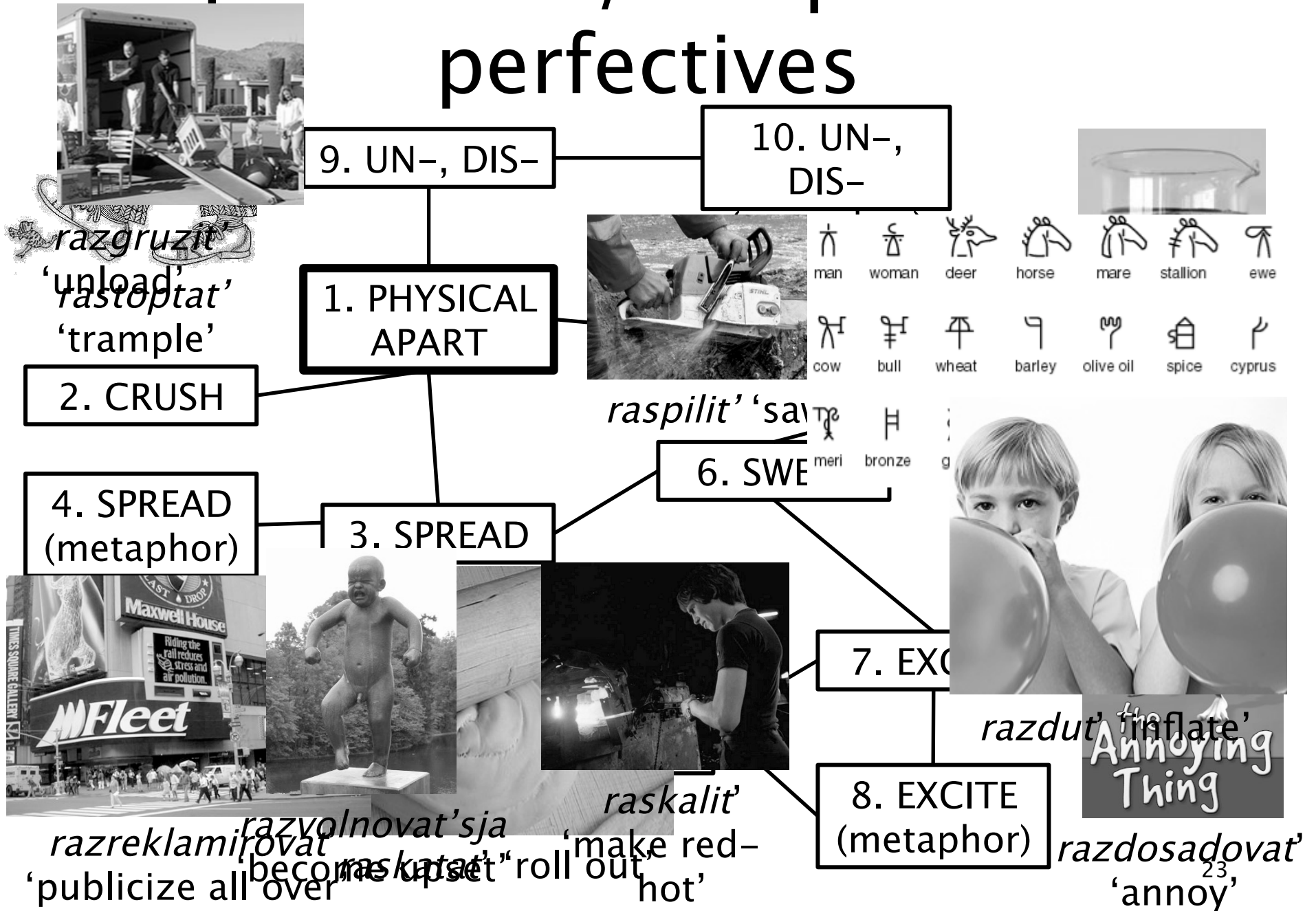
- “APART”:
 - Outward movement in various directions from a point



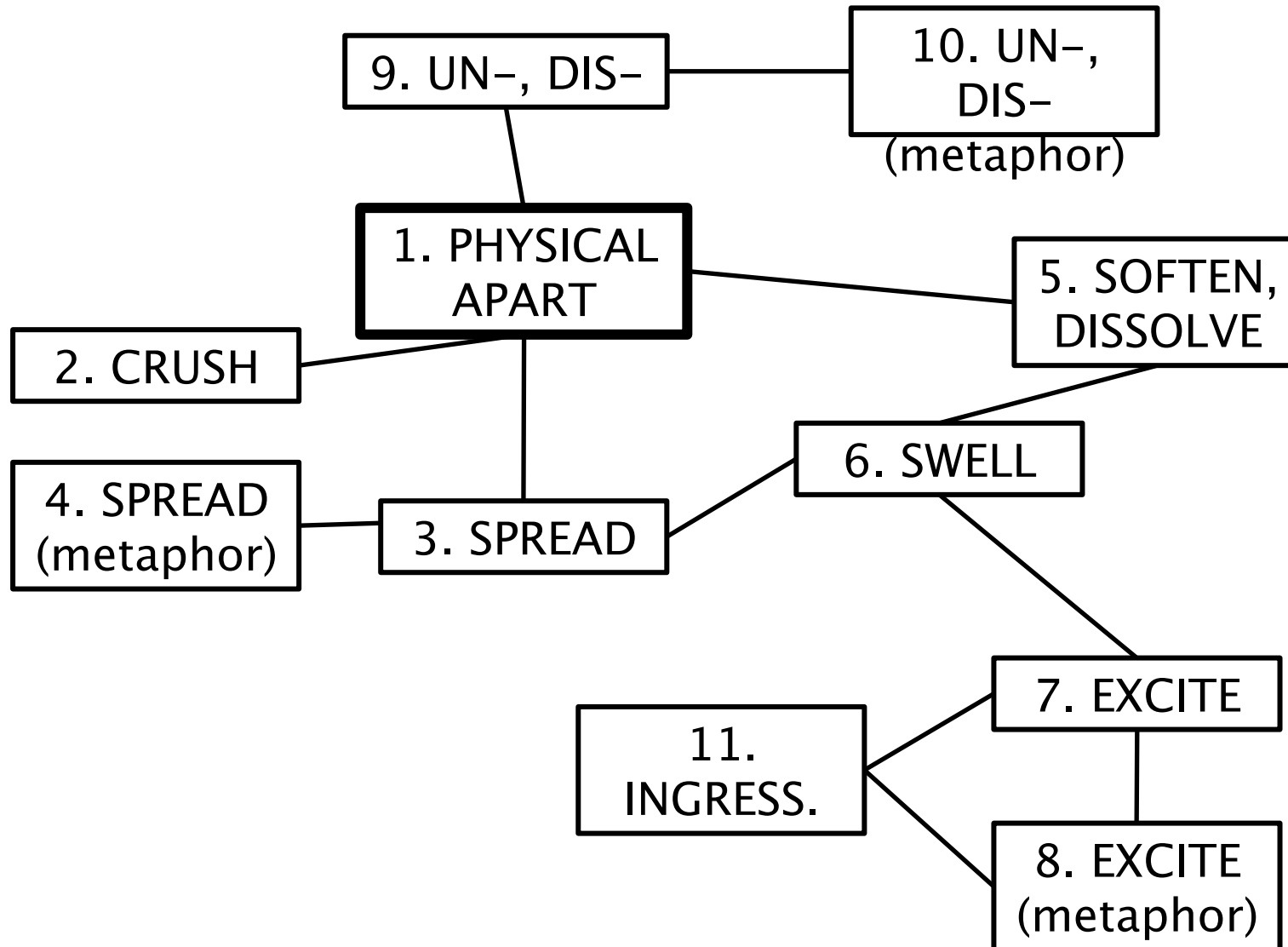
‘To explode’ is
RAZorvat’sja

- The general schema is instantiated in a variety of subcategories
- Prototype = “PHYSICAL APART”
 - Physical object divided in pieces

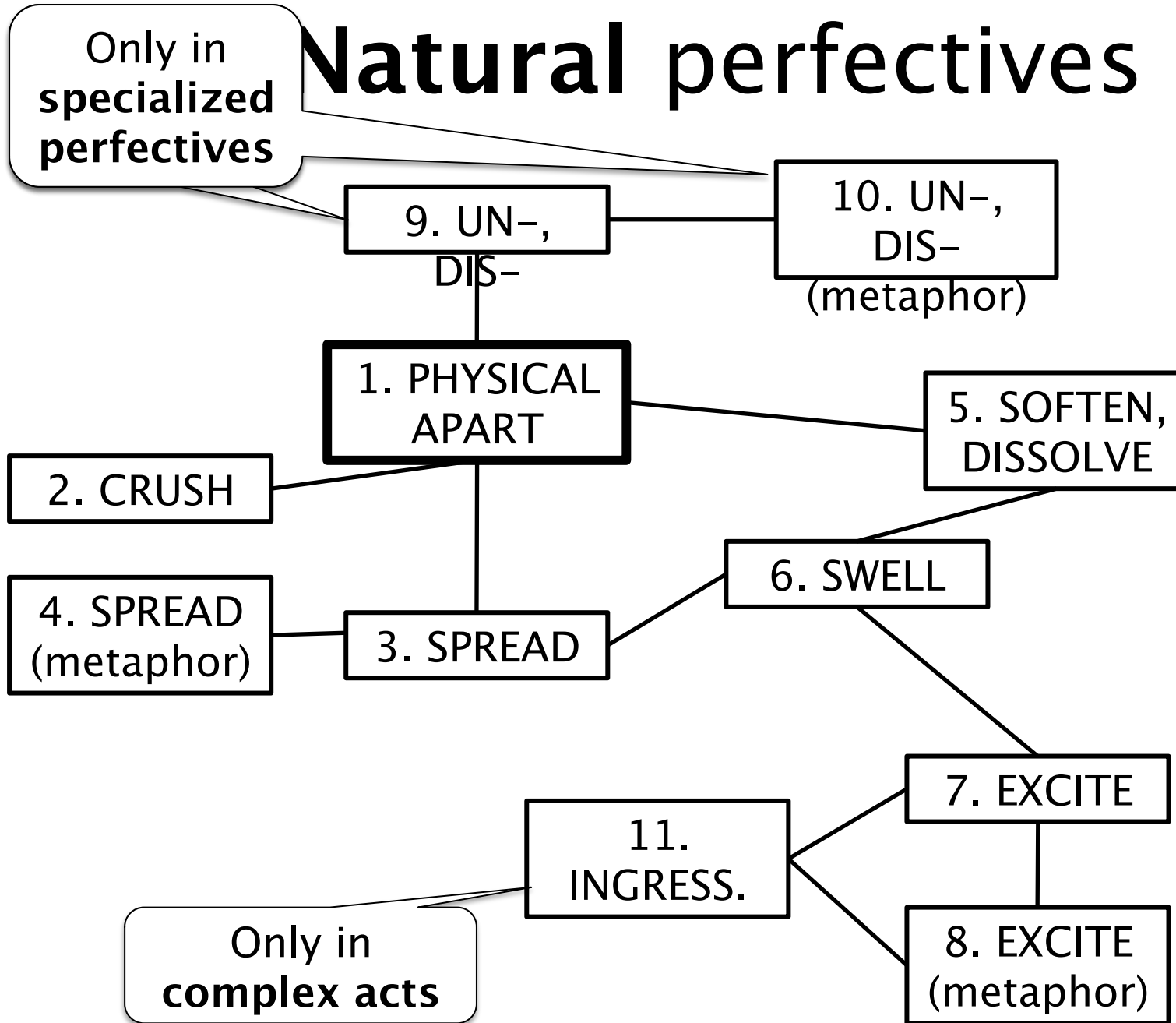
Specialized/complex act perfectives



Natural perfectives

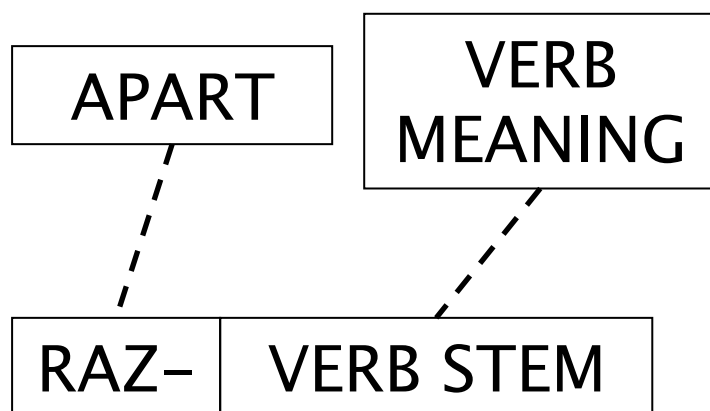


Natural perfectives



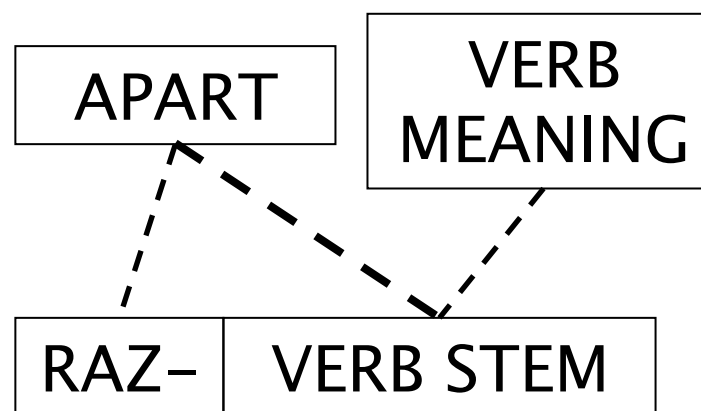
Semantic overlap and the illusion of emptiness

Specialized perfectives & complex acts



- Prefix and verb have **different** meanings
- The meaning of the prefix stands out

Natural perfectives:



- Prefix and verb have **overlapping** meanings
- The meaning of the prefix is “invisible”
- An illusion of semantic emptiness is created

Radial Category Profiling

- A method for comparing meanings
 - Radial category for Specialized & Complex Act Perfectives
 - Radial category for Natural Perfectives
 - We see that the base verbs of the Natural Perfectives have the **same range** of meanings as posited for the prefixes in Specialized & Complex Act Perfectives
 - Radial Category Profiling reveals conceptual overlap between verbs and prefixes

Further use of Radial Category Profiling

- The “small” prefixes (entire CLEAR group)
 - *u-*, *ot-*, *pri-*, *v-*, *raz-*, *vz-/voz-*, *vy-*, *iz-*, *pere-*, and *pod-* (over 1300 verbs analyzed)
 - For all 10, the two radial categories coincide
 - 3 have 100% overlap, 5 majority overlap, 3 minority (contiguous) overlap
 - Meanings not among NPs are phasal, annulment, quantitative comparison, repetition
- Related prefixes: *vy-*, *iz-*; *o-/ob-/obo-*

Semantic Profiles

- The “big” prefixes: *po-*, *s-*, *za-*, *na-*, *pro-*
 - Thousands of verbs and diffuse meanings make Radial Category Profiling problematic
 - Analysis of semantic tags assigned to verbs in Russian National Corpus
 - Moscow semantic school
 - independent, objective measure
 - focused on these tags: IMPACT, CHANGE STATE, BEHAVIOR, SOUND&SPEECH
 - 382 verbs analyzed (all existing NPs with these prefixes, single prefix and single tag)

Semantic Profiles: Results

- **Each prefix does have a unique semantic profile**
- Chi-square analysis shows that there are significant differences (chi-square = 248, df = 12, $p = 2.2e-16$, effect size, Cramer's $V = 0.81$)
- Additional calculation of Expected Values and Fisher Test determine which semantic tags each prefix is attracted to and repulsed from

Semantic Profiles

- *pro-*
 - Attracted to SOUND&SPEECH (sounds that carry through space or time)
 - Neutral to IMPACT (penetration)
 - Repulsed from BEHAVIOR, CHANGE STATE
- *po-*
 - Attracted to CHANGE STATE, SOUND&SPEECH (increase along a scale, duration)
 - Neutral to IMPACT
 - Repulsed from BEHAVIOR

Semantic Profiles

- *za-*
 - Attracted to IMPACT, CHANGE STATE (covering, filling, fixing)
 - Repulsed from BEHAVIOR, SOUND&SPEECH
- *s-*
 - Attracted to BEHAVIOR (semelfactive)
 - Neutral to CHANGE STATE, SOUND&SPEECH, IMPACT

Semantic Profiles

- *na-*
 - Attracted to IMPACT, BEHAVIOR (accumulate on a surface, large quantity)
 - Neutral to SOUND&SPEECH
 - Repulsed from CHANGE STATE

Semantic Profiles

- Summary of results
 - The meanings of the **verbs** with “empty” prefixes (Natural Perfectives) as classified by their semantic tags correspond to the meanings of the **prefixes** in their “non-empty” uses as previously described by scholars
 - **Conceptual overlap**: each verb selects the prefix that conforms best to the verb’s meaning