

The Paradigm as a Radial Category

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Overview

- Russian suffix shift
- The status of the paradigm
- The structure of the paradigm
- What structure do we expect for Russian verbal paradigms?
- Does Russian suffix shift conform to the expected structure?
- What about frequency?

Suffix shift in Russian verbs

- An ongoing language change:
- Unproductive suffix *-a* is replaced by productive *-aj*
 - *kapljut* (with *-a*) → *kapajut* ‘(they) drip’
 - *Slezy kapljut odna za drugoj na klaviši.* ‘The tears drip one after another onto the keyboard.’
 - *Slezy v šči kapajut.* ‘The tears drip into the cabbage soup.’
 - Well-known, described in the scholarly literature
- We examine a database of ca. 20,000 examples from the Russian National Corpus
- Suffix shift progresses **unevenly** through the paradigm



More about Russian suffix shift: –*a* suffixed vs. –*aj* suffixed forms

- –*aj* is the productive pattern
- –*aj* eliminates a consonant alternation (*p* ~ *p/* in *kapat'*)
- –*a* vs. –*aj* forms differ (see handout):
 - all Non–Past tense forms
 - Present Active Participle
 - Gerund

–*a* and –*aj* forms are the same:

- Infinitive
- all Past tense forms

**These will
be ignored**

The status of the paradigm

- Paradigms are a legacy from classical grammarians of Greece and Rome
- Some contemporary linguistic theories reject the paradigm altogether:
 - Item & Arrangement/Item & Process (Hockett 1958)
 - Distributed Morphology (Halle & Marantz 1993)
 - in such theories, the lexicon contains morphemes, the grammar specifies rules for combining them

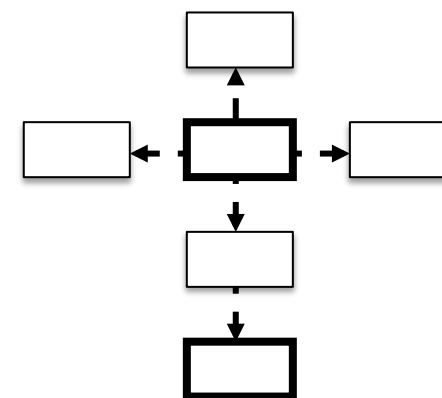
Evidence for paradigms

- McCreight & Chvany (1991) show that paradigms facilitate better descriptions of syncretism than syntactic features
- Milin et al. (2008) report that increased complexity of paradigms yields longer response times in psycholinguistic experiments

The structure of the paradigm

- Aristotelian category
 - An unordered list of inflected forms
 - All forms have the same status
 - Paradigms lack internal structure
 - Word & Paradigm (Matthews 1972)
- Radial category (Lakoff 1987)
 - Paradigms have internal structure
 - Prototypical vs. peripheral forms

	Sg	Pl
1		
2		
3		

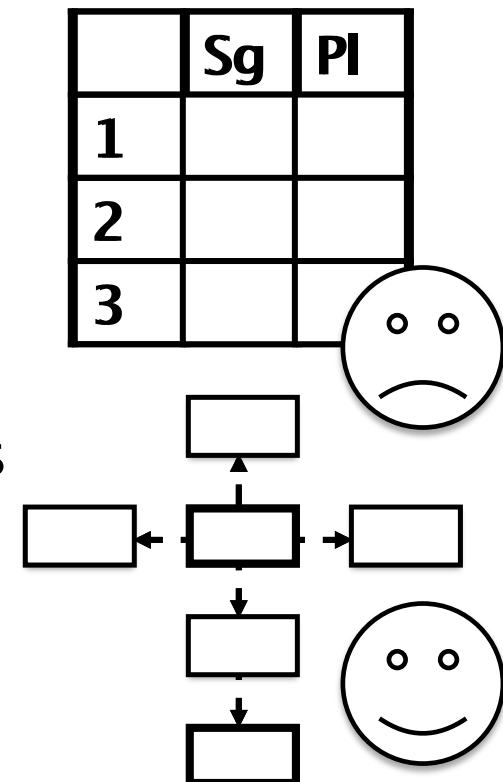


Can the question of paradigm structure be investigated empirically?

Our approach

- Language change: empirical predictions
 - Paradigm = aristotelian category
 - All forms affected to same degree
 - Paradigm = radial category
 - Peripheral forms affected most
- Statistical analysis
 - Logistic Mixed Effects Modeling
 - Systematic analysis of various factors
 - Thanks to R. Harald Baayen

Our analysis indicates that paradigms have structure.



What structure do we expect for Russian verbal paradigms?

- What parts of the paradigm should be prototypical vs. peripheral?
- What categories are expressed in the Russian verbal paradigm?
 - finite vs. non-finite
 - indicative vs. imperative
 - person
 - number

finite vs. non-finite

- In Russian, gerunds and participles are non-finite because they cannot express mood
- Finite forms are more prototypical than non-finite forms (Bybee 1985, Joseph 1983)

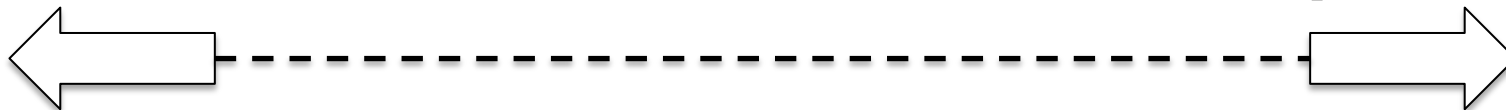


indicative vs. imperative

- Indicative is more prototypical since it represents the simple relationship of a situation to reality
- Typologically verbs rarely lack indicative forms, but there are often verbs that lack imperative forms (modals, perception verbs)
- Imperatives have reduced person opposition and clitic placement (Joseph 1983)

all indicative forms

imperative



more prototypical

more peripheral

Relationship between person and number

	Sg	Pl
1 st	ja	my
2 nd	ty	vy
3 rd	on, ona, ono	on'i

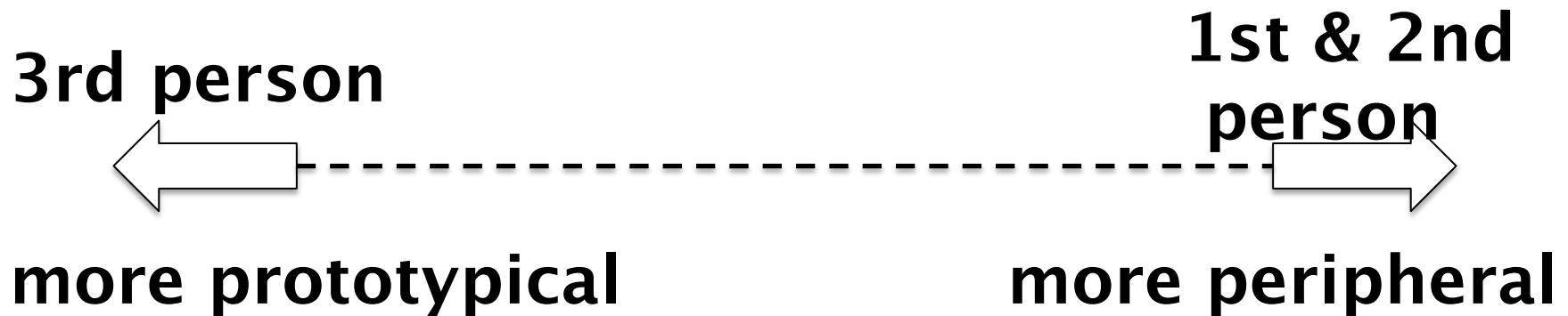
Sg	Pl
moj	naş
tvoj	vaş
jevo, jejo, jevo	ix

Sg	Pl
-u	-V ₁ m
-V ₁ s	-V ₁ t ¹ e
-V ₁ t	-V ₂ t

The major distinction is: 3rd person vs. 1st/2nd person. This indicates that person ranks above number.

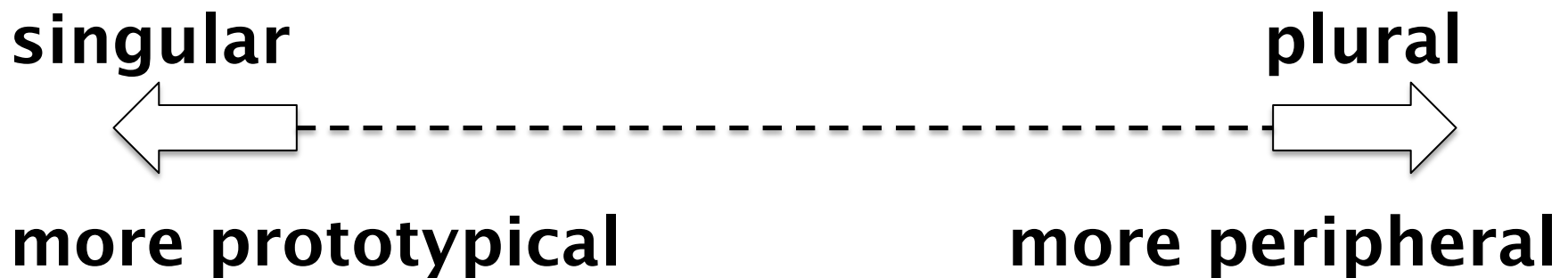
3rd person vs. 1st & 2nd person

- Typologically zero expression is more common for 3rd person than for 1st & 2nd person (Bybee 1985)
- 3rd person is unmarked (Lyons 1977)

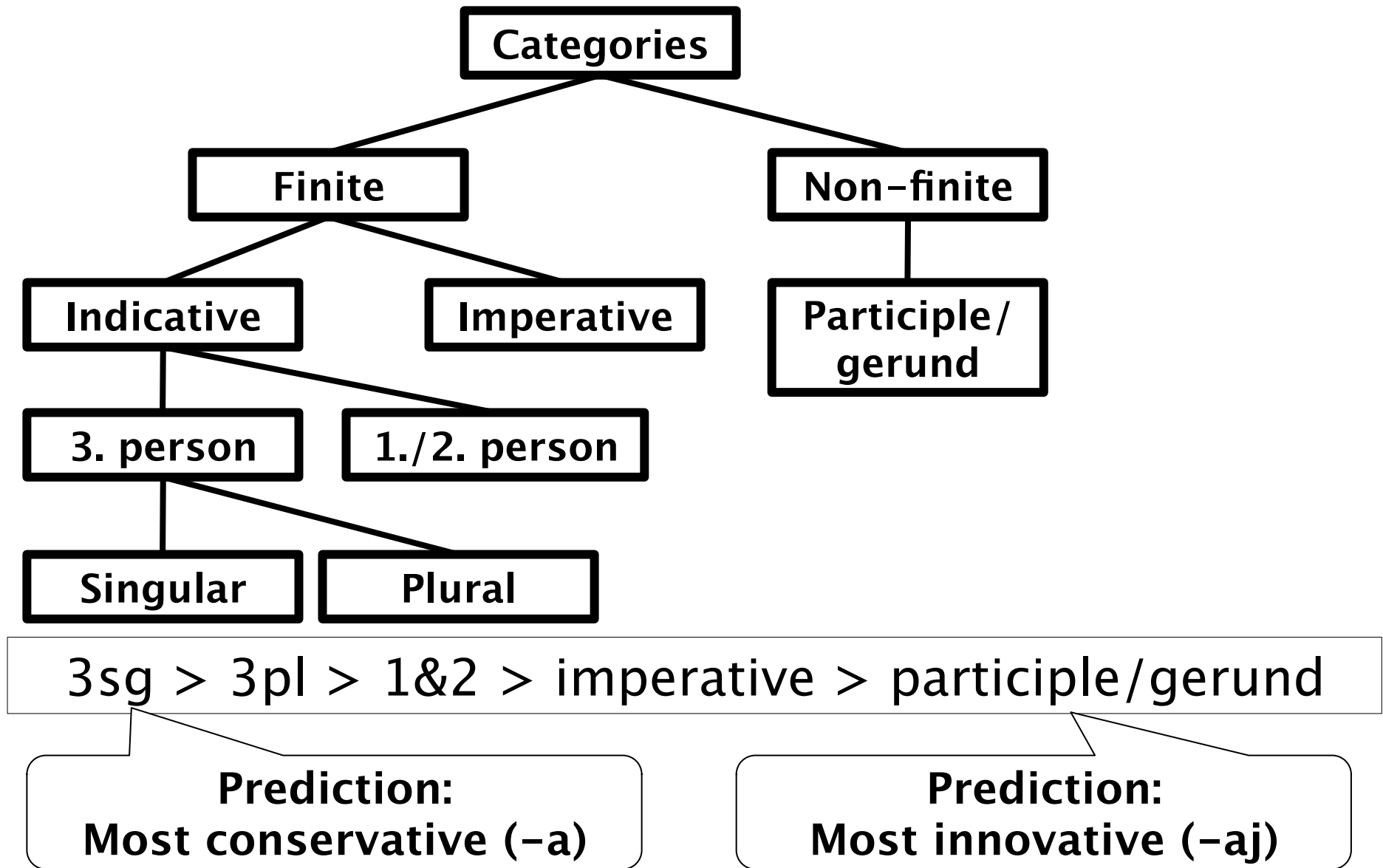


singular vs. plural

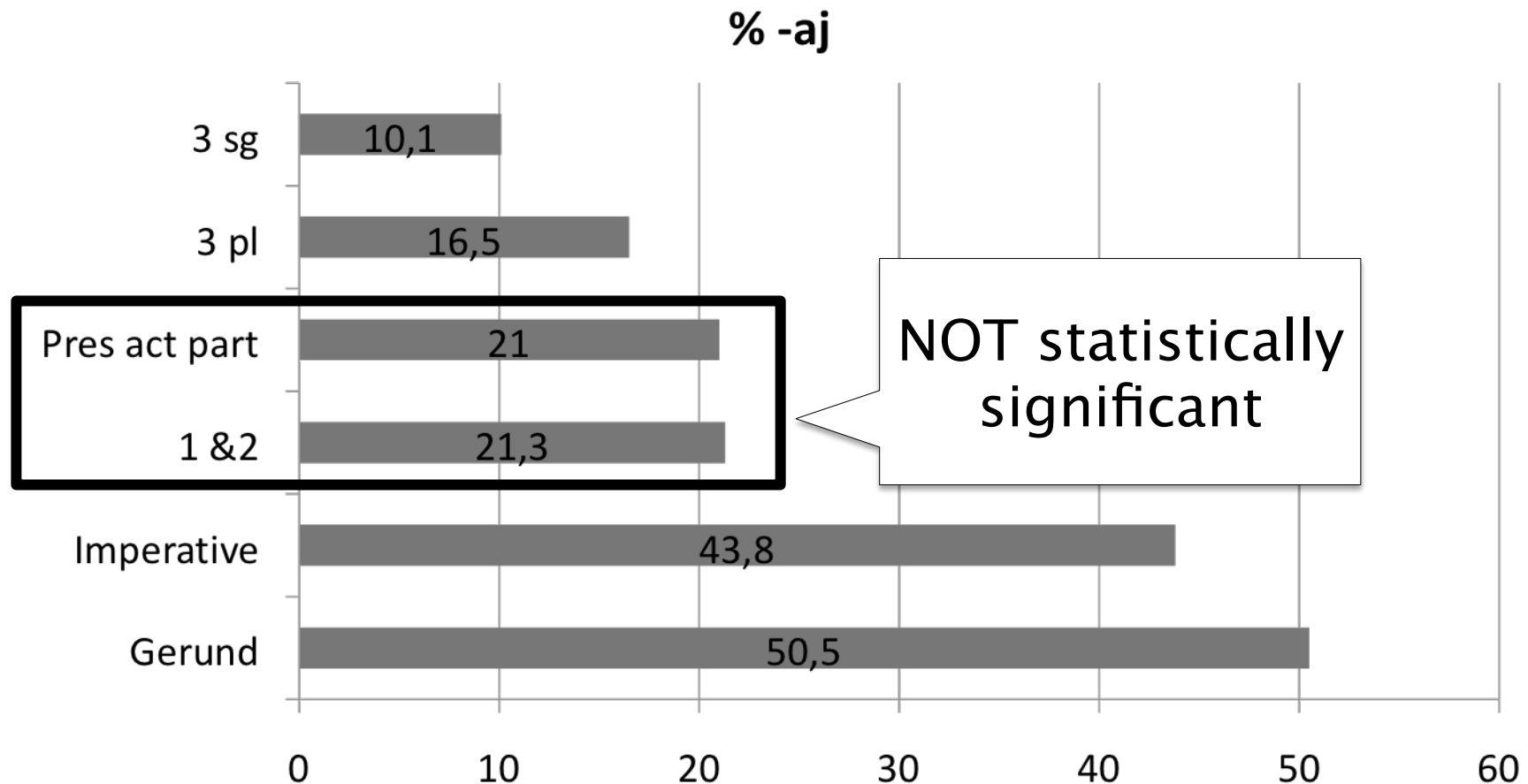
- Cross-linguistically, singular is unmarked (Janda 1995, Corbett 2000, Lyashevskaya 2004)



Prototypical vs. peripheral forms



Results



Other differences are statistically significant

Predictions vs. results

- | | |
|---|---|
| <ul style="list-style-type: none">• Predictions:<ul style="list-style-type: none">• 3 sg• 3 pl• 1. & 2. person• imperative• gerund/
participle | <ul style="list-style-type: none">• Results:<ul style="list-style-type: none">• 3 sg• 3 pl• 1. & 2. person/
participle• imperative• gerund |
|---|---|

The results indicate that the predictions are correct.
Problem: The **participle** behaves like a finite form.

Why does the participle behave like a finite form?

- Hypothesis:
 - Form overrides prototypicality
- 3 pl has suffixes: **-ut ~ -at**
- Part. has suffixes: **-ušč ~ -ašč**
- “Parasitic formation”:
 - The participle “borrows” the vowel from the 3pl form
 - This formal resemblance relates the participle to the finite forms
 - This formal resemblance influences the participle, causing it to behave like a finite form in relation to suffix shift

What about frequency?

Alternative hypothesis:

The least frequent forms are most prone to undergo suffix shift

- Prototypicality ranking:
 - 3 sg
 - 3 pl
 - 1. & 2. person
 - imperative
 - gerund
- Frequency ranking:
 - 3 sg
 - 3 pl
 - **GERUND**
 - 1. & 2. person
 - imperative

Frequency yields incorrect predictions for the **GERUND**.

Frequency: Written vs. Spoken

- Perhaps the gerund has high frequency because **spoken Russian** is underrepresented in the corpus?

	# lemmas	# gerunds	% gerunds
Whole corpus	13,581,979	501,036	3.7
Spoken corpus	135,326	1,522	1.1

- Difference is statistically significant ($p < 2.2e-16$)
- Effect size is less than “small” (Cramers $V = 0,01$)
- Indicates that frequency difference between spoken and written language has minimal impact
- Cannot exclude the possibility that frequency is relevant

Summary

1. Suffix shift

- is sensitive to morphosyntactic features:
 - 3sg is most conservative form (*-a*)
 - Gerund is most innovative (*-aj*)
- Paradigm structure:
 - Results are compatible with the hypothesis that paradigms are radial categories with internal structure
- Frequency:
 - It is possible, but not likely, that frequency is of decisive importance