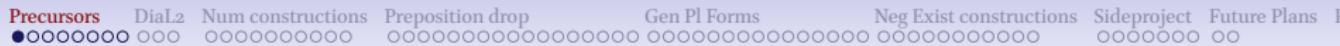


# The DiaL2 project: pipeline, results, news and future work

George Moroz    Olga Gich    Anna Grishanova    Natalia Koshelyuk  
Chiara Naccarato    Anna Panova    Anastasia Yakovleva  
Svetlana Zemicheva

17.09.2024



# Precursors

## Precursors of the project



Nina Dobrushina



Michael Daniel

- Multiple sociolinguistic fieldtrips to Daghestan
  - Several dialect fieldtrips to Ustya

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- Online corpora available for each of them:
  - [\*\*Corpus of Russian spoken in Daghestan\*\*](#)
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- Several dialect fieldtrips to Ustya
- Online corpora available for each of them:
  - [Corpus of Russian spoken in Daghestan](#)
  - [Ustja River Basin Corpus](#)
  - ... and other bilingual and dialect corpora

# Resources of the Linguistic Convergence Laboratory

- <https://lingconlab.ru/>
  - 24 dialectal corpora
  - 8 bilingual corpora

## Dialectal Corpora

**Corpus of the Russian dialect spoken in Khislavichi district**  
 260,793 tok.

**Ustja River Basin Corpus 959,782 tok.**

**Corpus of the Russian dialect spoken in the villages of the Middle Pyoza**  
 79,566 tok.

**Corpus of the Russian dialect spoken in Nekhochi**  
 88,965 tok.

**Corpus of the Russian dialect spoken in the village Veegora**  
 91,514 tok.

**Corpus of the Russian dialect spoken in Manturovo**  
 113,837 tok.

**Corpus of Lukh and Teza river basins dialects**  
 146,350 tok.

**Corpus of Russian spoken in Zvenigorod**  
 68,324 tok.

**Luzhnikovo Corpus**  
 68,666 tok.

**Corpus of Opochetsky dialects**  
 68,741 tok.

**Upper Pinega and Vyva Corpus**  
 70,803 tok.

**Corpus of Spiridonova Buda dialect**  
 70,565 tok.

**Corpus of Rogovatka dialect**  
 100,047 tok.

**Corpus of the Russian dialect spoken in the village Malinino**  
 138,943 tok.

**Corpus of the Russian dialect spoken in the villages of the Middle Pinega**  
 43,270 tok.

**Corpus of the Russian dialect spoken in the Mikhaylov area**  
 47,579 tok.

**Corpus of the Russian dialect spoken in the villages of the Middle Northern Dvina**  
 68,010 tok.

**Corpus of Spiridonova Buda dialect**  
 70,565 tok.

**Corpus of Shetnevo and Makeevo dialect**  
 95,335 tok.

**Corpus of the Russian dialect spoken in Ilmen Lake district**  
 134,207 tok.

**Vishni and Trostnoe Corpus**  
 24,414 tok.

**Corpus of the Russian dialect spoken in Popovka**  
 36,617 tok.

**Corpus of the Russian dialect spoken in Tserkovnoe**  
 39,469 tok.

**Corpus of the Russian dialect spoken in Keba**  
 54,535 tok.

## Bilingual Corpora

**Corpus of  
Russian spoken in  
Daghestan  
376,717 tok.**

**Corpus of  
Karelian  
Russian  
578,646 tok.**

**Khanty Russian Corpus  
40,225 tok.**

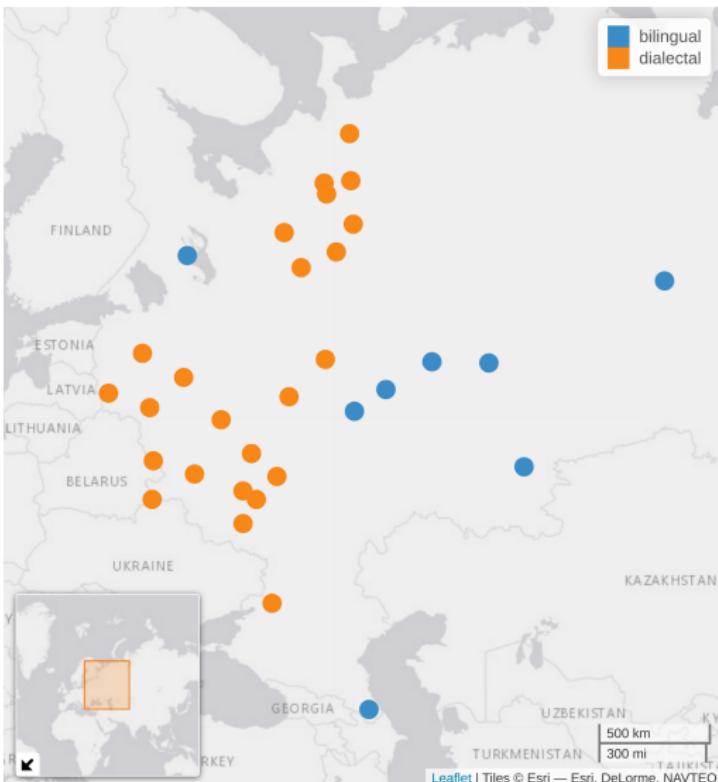
**Corpus of  
Russian spoken in  
Chuvashia  
46,307 tok.**

**Corpus of Russian  
spoken in Mari El  
69,109 tok.**

**Corpus of  
Russian spoken in  
Bashkortostan  
93,127 tok.**

**Corpus of Russian  
spoken by the  
Besermans  
97,216 tok.**

# Bilingual and Dialectal Corpora



Can we analyze variation of linguistic features  
across all corpora?

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across all corpora?

What are the factors that influence variation?

Can we analyze variation of linguistic features  
across all corpora?

What are the factors that influence variation?

Can we find variation patterns?

## Previous publications

- Daghestanian Russian [Daniel et al., 2010, Naccarato et al., 2021, Panova and Philippova, 2021]
- Russian of Erzya speakers [Shagal, 2016]
- Russian of Kazakh speakers [Rakhilina and Kazkenova, 2018]
- Contact Russian of Northern Siberia and the Russian Far East [Stoyanova, 2019, 2021]
- Russian of Moksha speakers [Kashkin, 2020]
- Russian of Hill Mari [Kashkin, 2022]
- Russian of Nganasan speakers [Khomchenkova, 2020]

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- Russian of Hill Mari [Kashkin, 2022]
- Russian of Nganasan speakers [Khomchenkova, 2020]
- Dialect of Ustya River Basin [Daniel et al., 2019]

# DiaL2

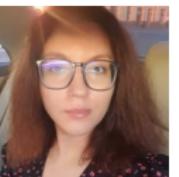
## The DiaL2 team



Maria Ermolova



Anna Grishanova



Natalia Koshelyuk



George Moroz



Chiara Naccarato



Anastasia Yakovleva



Svetlana Zemicheva

## The Dial2 pipeline

- collect all .eaf files
- extract transcriptions using the phonfieldwork R package [Moroz, 2023]
- use the udpipe package in order to gather morphological and syntactic annotation
- filter the result table for a particular feature selected by the researcher
- annotate standardness of the utterances
- remove fully-standard speakers
- model the standardness of the utterances using sociolinguistic and linguistic features as predictors



## Num constructions

Precursors    Dial2  
oooooooooooo    ooo

**Num constructions**  
●●oooooooooooo

Preposition drop  
oooooooooooooooooooo

Gen Pl Forms  
oooooooooooooooooooo

Neg Exist constructions  
oooooooooooo

Sideproject  
oooooooo    oo

Future Plans

# Non-standard numeral constructions in L2 Russian



Chiara Naccarato



George Moroz

## Non-standard numeral constructions in L2 Russian

- Variation in numeral constructions (NCs) in bilingual corpora
  - e.g. *dva brat* vs. *dva brata*
- Previous research on other L2 Russian varieties
  - Stoynova (2021) on Nanai and Ulcha Russian: evidence for pattern borrowing
- Also mentioned by
  - Shagal (2016: 369-370) for Erzya Russian
  - Rakhilina & Kazkenova (2018: 610) for Kazakh Russian

## Research questions

- Does the amount of variation in NCs differ across corpora and/or among speakers of the same variety?
- Can variation in NCs be explained in terms of contact influence?
- Do other factors promote or hinder variation in NCs?

# The database and parameters of data annotation

4,144 observations

(1.1) corpora: 7



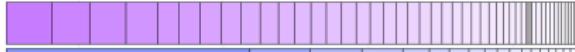
(1.2) speakers: 181



(1.3) gender



(1.4) year of birth



(1.5) L1: 21



(1.6) L1 family



(1.7) education



(1.8) standardness of the speaker



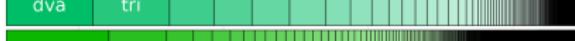
(2.1) marking



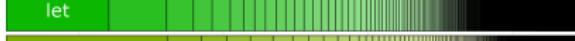
(2.2) numeral



(2.3) noun token



(2.4) noun lemma



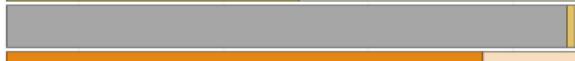
(2.5) numeral type



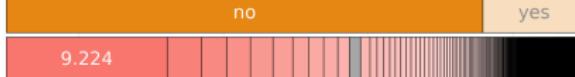
(2.6) noun type



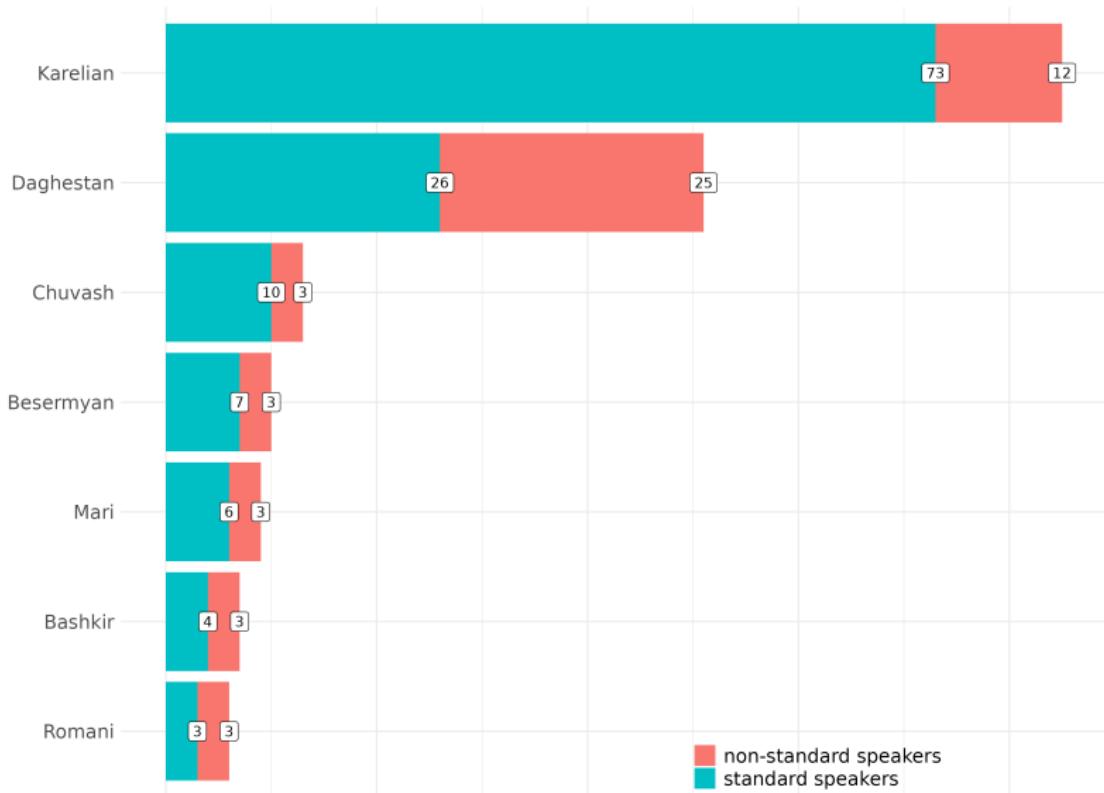
(2.7) ambiguous



(2.8) dice coefficient

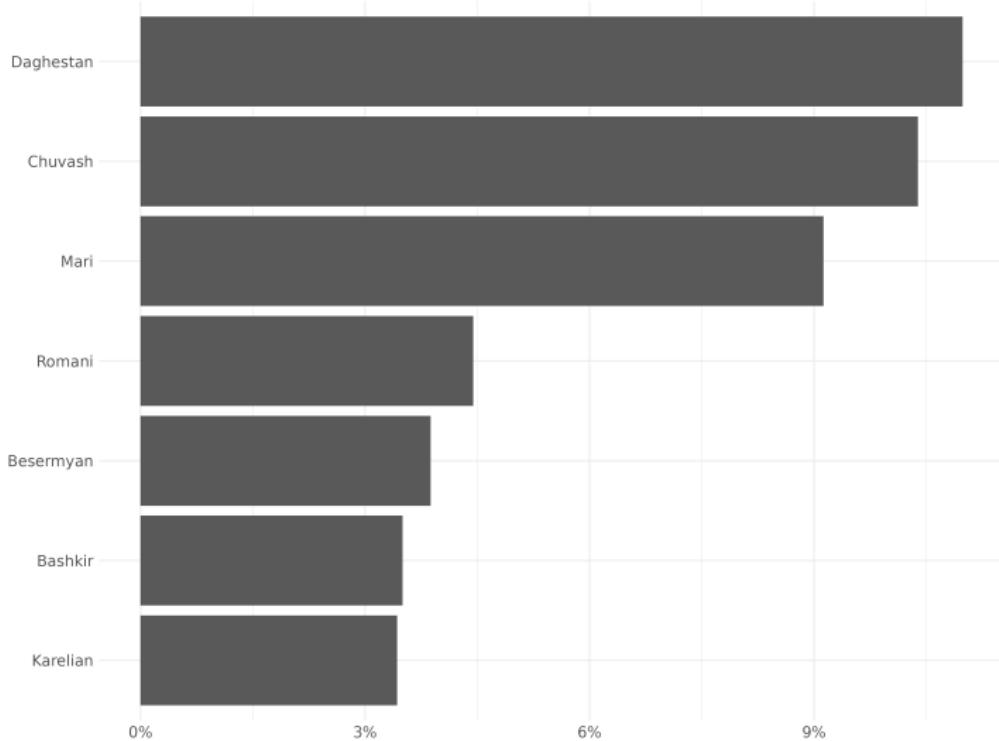


## Fully standard (71.3%) vs. non-standard speakers (28.7%)



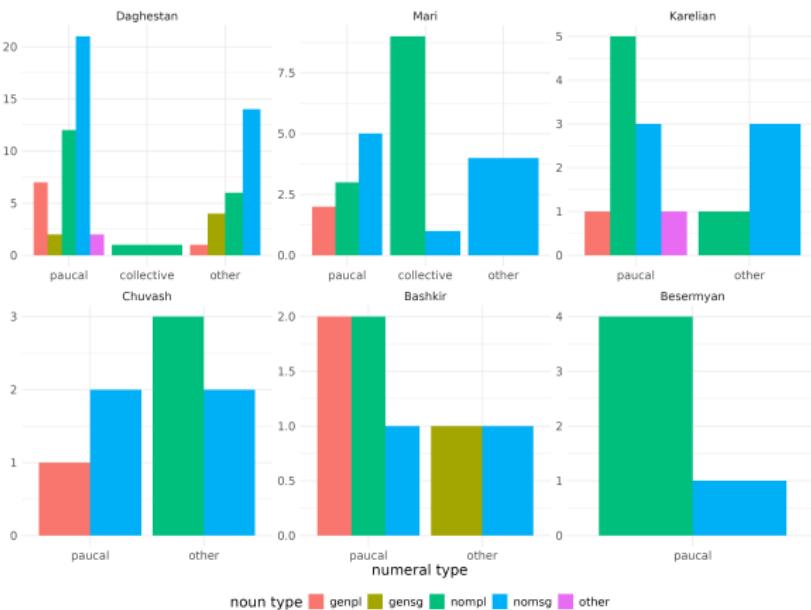
## Proportion of non-standard occurrences per corpus

1,748 observations

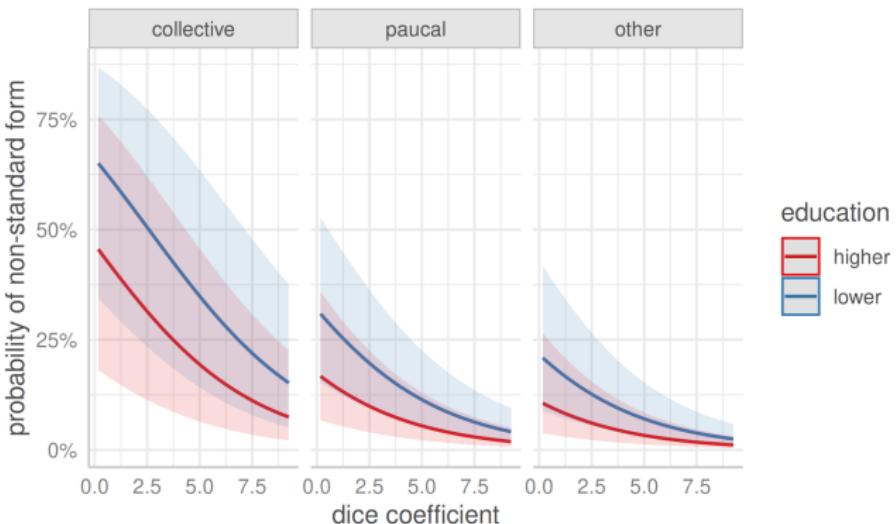


## Distribution of n-std forms with different types of numerals

- NOM instead of GEN is frequent both with paucals and other numerals
- n-std GEN is attested sporadically
- other case forms are even less frequent
- only ~45% of n-std expressions could in principle be explained by L1 pattern borrowing



## Statistical modelling



- Logistic regression: standardness  $\sim$  Dice coefficient + year of birth + education + numeral type + gender +  $(1|L1\text{ family/speaker id})$
- Conditional importance of the variables in our model (generalized R squared): collocationality (Dice coefficient) > education > year of birth > numeral type > gender

## Conclusions

- Variation in NCs is attested in all L2 corpora, but not to the same extent in each of them
- Daghestanian Russian as a more uniform variety, probably due to a lower pervasiveness of Russian in every-day life, especially in the more isolated communities of the highlands
- The variables that turned out to be statistically significant are all logically related to L2 proficiency and exposure to the input, but there is no robust evidence for a contact explanation

Precursors    Dial2    Num constructions  
oooooooooooo    ooo    ooooooooooooo

**Preposition drop**  
●oooooooooooooooooooo

Gen Pl Forms  
oooooooooooooooooooo

Neg Exist constructions  
oooooooooooo

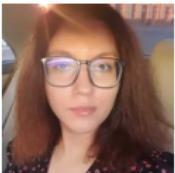
Sideproject    Future Plans  
oooooooo    oo

# Preposition drop

# Preposition drop in Russian spoken by Mari and Beserman bilinguals



Anastasia Yakovleva



Natalia Koshelyuk



George Moroz

## Aims and Research Questions

- a corpus-based study of preposition drop (p-drop) in the speech of Mari-Russian and Beserman-Russian bilinguals compared to the speech of Russian monolinguals;
- demonstrate that the prepositions *v* ‘in’, *k* ‘to’, *s* ‘with’ are omitted in the speech of bilinguals more often than in monolinguals’ speech;
- propose some possible explanations for the variation attested across different bilingual speakers.

## Methods and Data

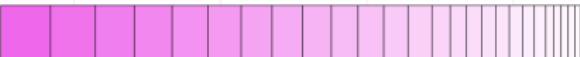
- spontaneous oral speech of 20 Beserman-Russian and Mari-Russian bilinguals;
- total number of tokens ~166,000;
- in comparison with the speech of nine Russian monolinguals.

# Methods and Data

(1.1) corpora: 3



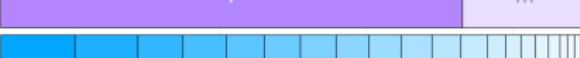
(1.2) speakers: 29



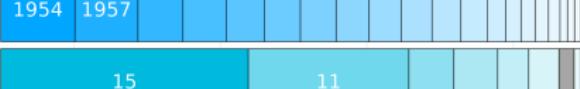
(1.3) gender



(1.4) year of birth



(1.5) years of education



(2.1) preposition lemma



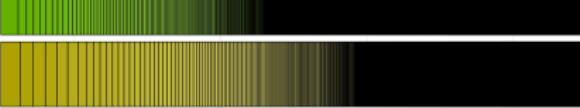
(2.2) preposition drop



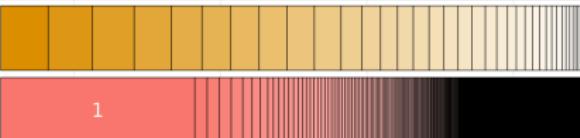
(2.3) following wordform's token



(2.4) following wordform's lemma

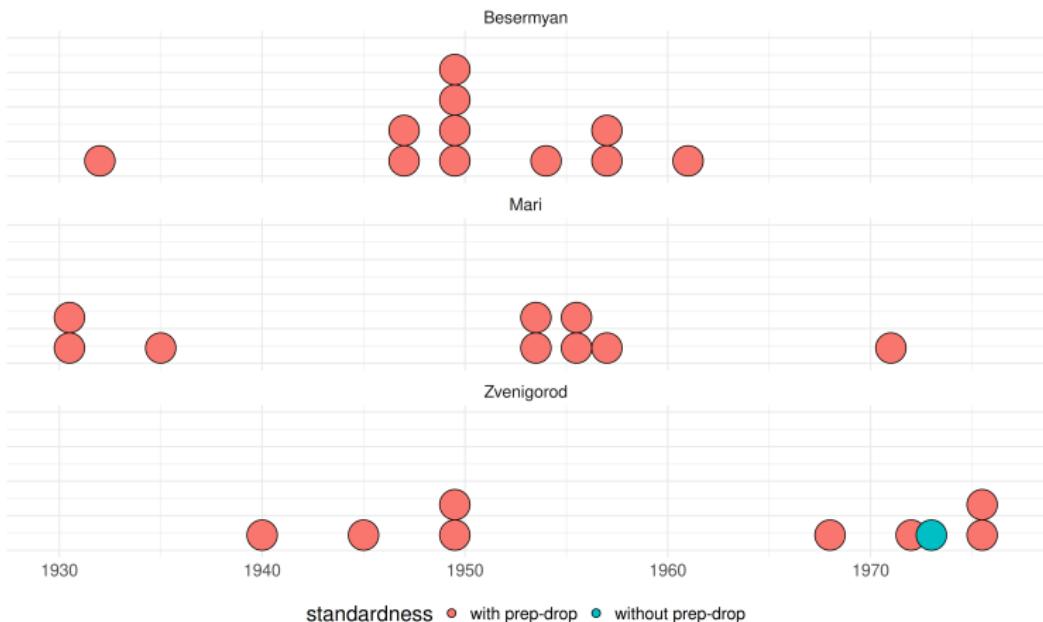


(2.5) following wordform's first sound



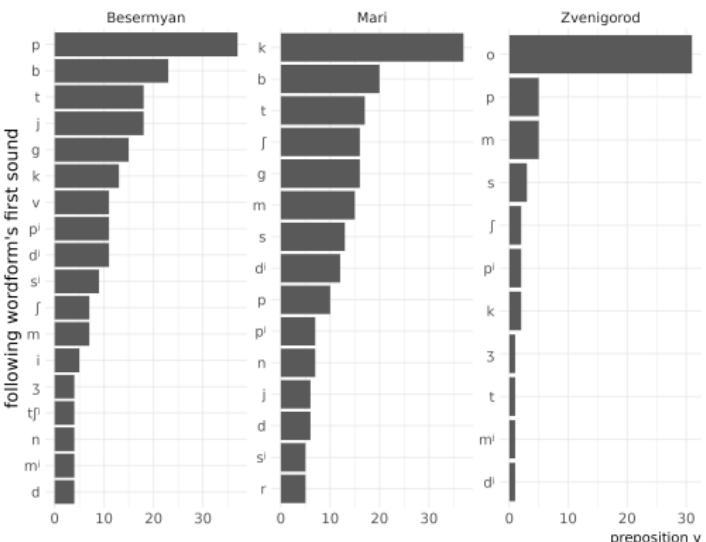
(2.6) dice coefficient

## Findings



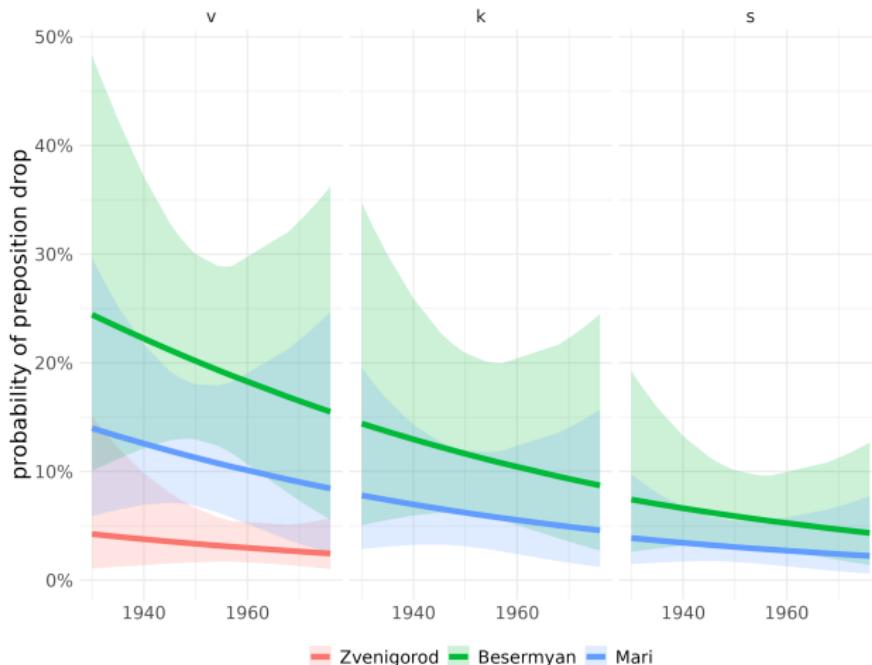
- both bilinguals and monolinguals omit prepositions;
  - however, they do so in different contexts and for different reasons

# Findings



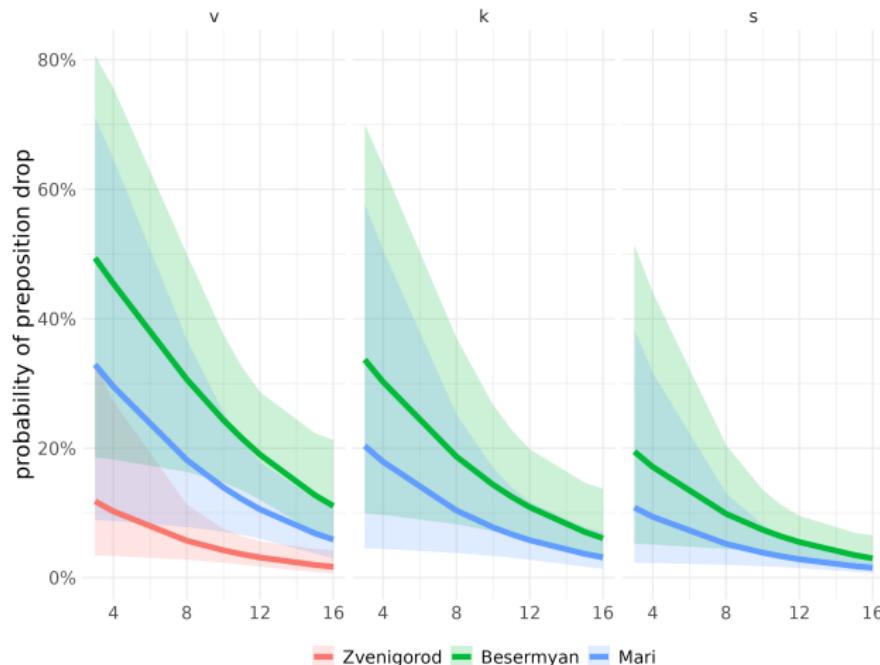
- In bilinguals' speech, p-drop can possibly be explained by phonetic interference from their native languages (avoiding consonant cluster);
- monolinguals mainly omit prepositions in lexicalized expressions (*v obščem* 'in general').

## Findings: sociolinguistic factors



The older and less educated a person is, the higher the probability of p-drop in their speech.

## Findings: sociolinguistic factors



The older and less educated a person is, the higher the probability of p-drop in their speech.

# Preposition Drop in Chuvash



Anna Grishanova

## Preposition drop in Chuvash Russian

- The following prepositions were dropped at least once: *v* ‘in/to’, *u* ‘at’, *na* ‘on/to’, *s* ‘with/from/off’, *iz* ‘from/of’, *do* ‘up to/until’, *čerez* ‘via/through/later’.
- This includes syllabic prepositions (such as *na* ‘on’) that do not tend to drop in the speech of Mari and Beserman bilinguals:
- [na] *každom poverote stolba stoit* ‘A pillar stands on every turn’

## Preposition drop in Chuvash Russian

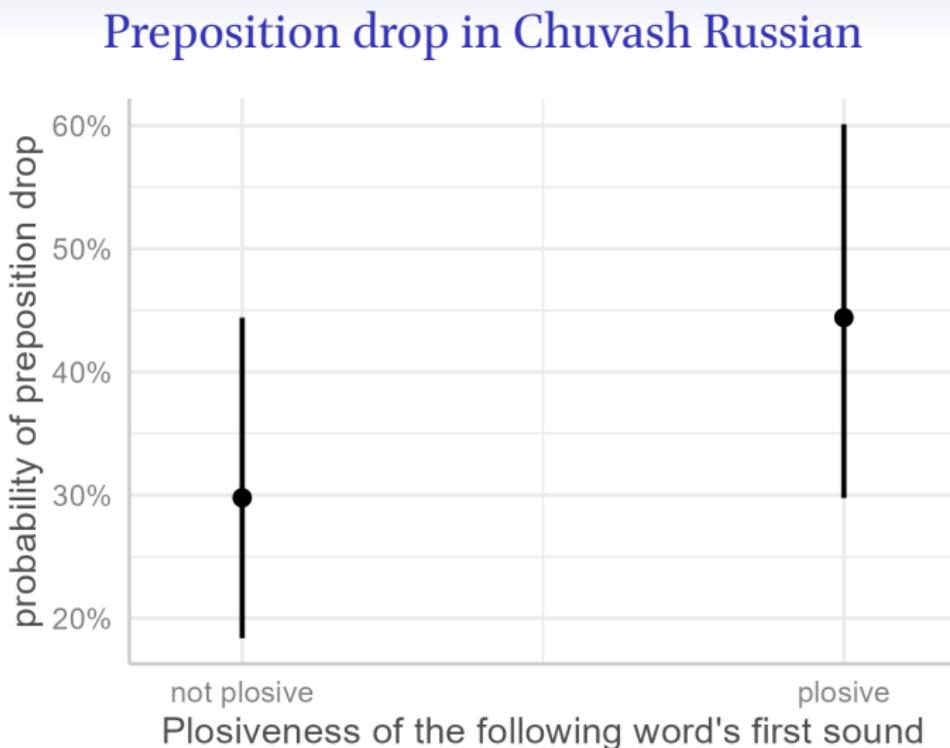
- The omission of syllabic prepositions and the sporadic nature of the drop of certain prepositions compelled a more semantic approach to this data. Thus, every context in the dataset was annotated according to four big semantic groups: location, direction, source and time.
- Another interesting feature found in Chuvash Russian speech was non-standard case usage, in particular the expansion of the Nominative case. Thus, we also annotated instances of non-standard case usage and used the following word's case as a factor in statistical modeling.

## Preposition drop in Chuvash Russian

We implemented a nested mixed effect logistic regression model.

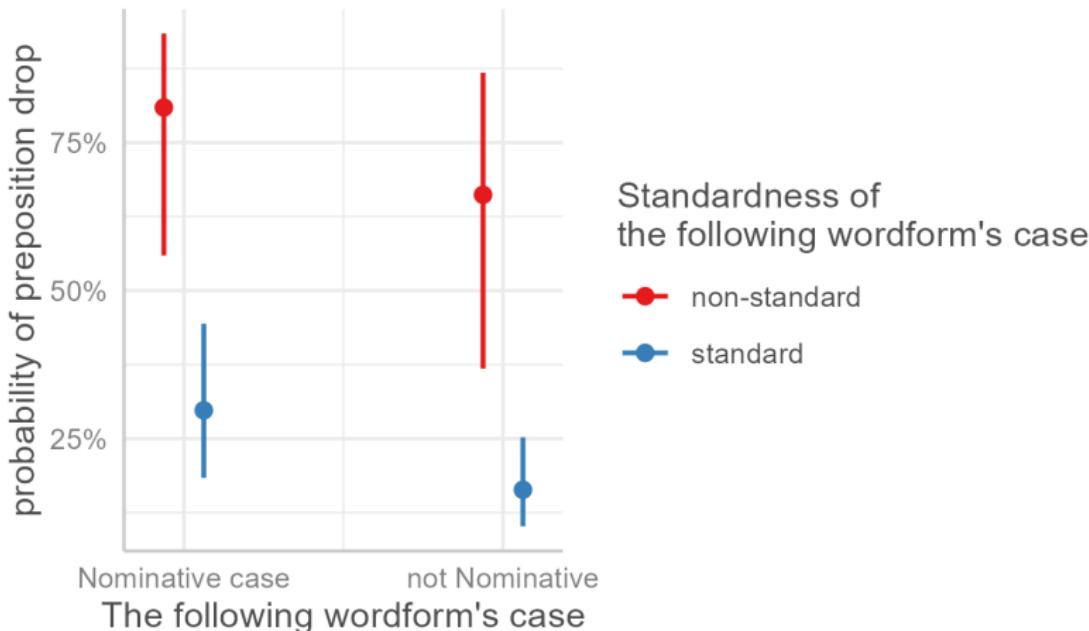
Sociolinguistic factors like **age** and **years of education** appeared to be not significant. The significant factors turned out to be:

- semantics of the prepositional phrase
- the plosiveness of the following word's first sound
- the Nominative case of the following word
- dice coefficient
- the standardness of the following word's case



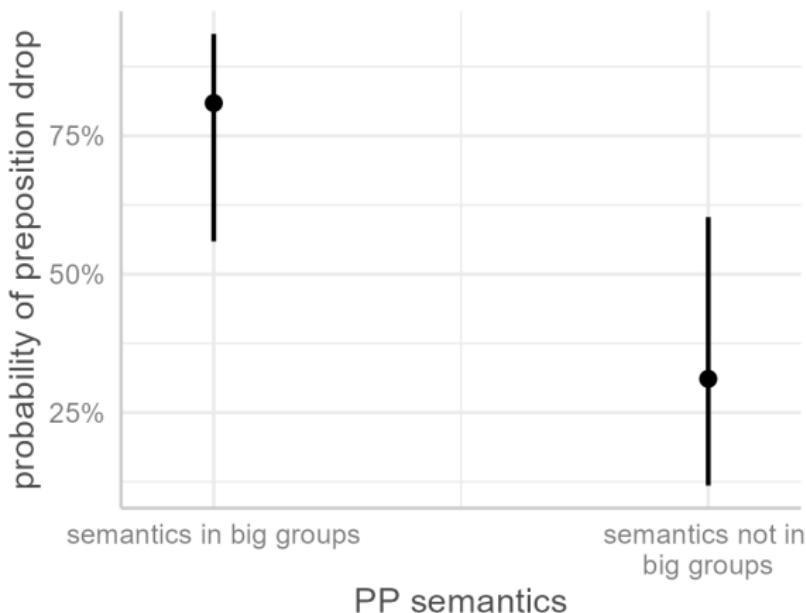
The plosiveness of the following word's first sound increases the probability of preposition drop

## Preposition drop in Chuvash Russian



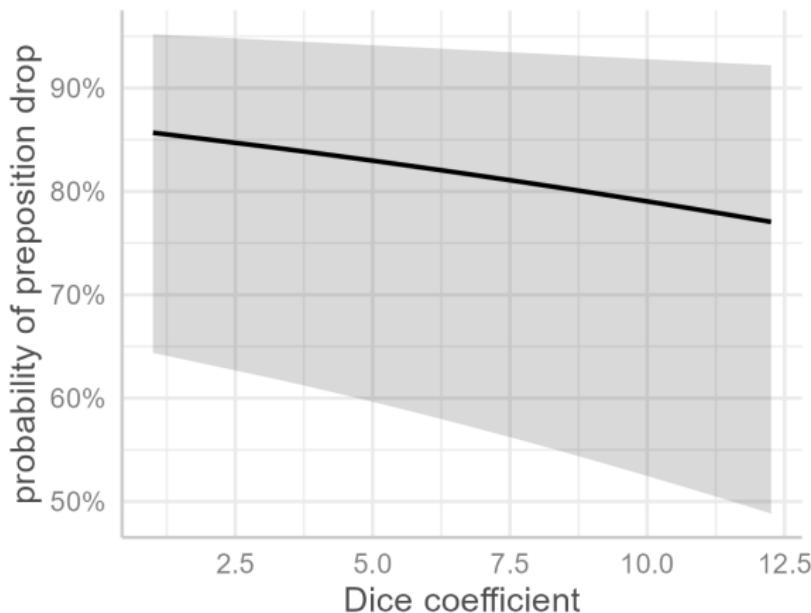
The Nominative or a non-standard case of the following wordform increases the probability of preposition drop

## Preposition drop in Chuvash Russian



On the other hand, the semantics of the prepositional phrase not being that of location, direction, source and time decreases the probability of a preposition drop.

## Preposition drop in Chuvash Russian



Finally, just like in the study of preposition drop in the speech of Mari and Beserman bilinguals, higher degree of collocationality (dice coefficient) decreases the probability of omission of a preposition.

Precursors    Dial2    Num constructions  
oooooooooooo    ooo    ooooooooooooo

Preposition drop  
oooooooooooooooooooo

## Gen Pl Forms

Neg Exist constructions  
oooooooooooo

Sideproject    Future Plans  
oooooooo    oo

# Gen Pl Forms

# Dialect Genitive Plural Forms in Numeral Constructions



Svetlana Zemicheva



Chiara Naccarato



George Moroz

## Motivation

- widespread feature
- was studied in standard Russian & bilingual varieties
- in standard Russian some special numerative forms tend to appear in numeral constructions (Kholodilova, forthcoming)
- dialect speech may show different tendencies as compared to other spoken varieties of Russian

## Examples

- Num(not-paucal)<sub>nom,acc,gen</sub> + N<sub>m,n-Gen.Pl</sub>
  - pjat' xozjaev-ov (dial. five owner-Gen.Pl)
  - pjat' xozja-ev-Ø (stnd. five owner-Pl-Gen)
- Num(paucal)<sub>acc,gen</sub> + N<sub>m,n-Gen.Pl</sub>
  - tridcat-i dv-ux god-ov (dial. thirty-Gen two-Gen year-Gen.Pl)
  - tridcat-i dv-ux let-Ø (stnd. thirty-Gen two-Gen year-Gen.Pl)

## Research questions

- What factors may affect the probability of using dialect Gen.Pl forms in numeral constructions?
  - Overall frequency of dialect Gen.Pl in different contexts
  - Noun stem
  - Numeral-Noun collocationality
  - Numeral form (Nom/Gen)
  - Year of birth
  - Education level
  - Gender
- Does dialect “overuse” [Kasatkin, 2005] of the *-ov* ending affect cases like *kilogramm* vs *kilogramm-ov*?

## Does dialect “overuse” of the *-ov* ending affect measure words?

## Does dialect “overuse” of the *-ov* ending affect measure words?

No

lexeme	<i>-ov</i>	$\emptyset$	total	percentage of $\emptyset$ forms
<i>hectare</i>	2	25	27	93%
<i>kilogram</i>	2	76	78	97%
<i>gram</i>	0	58	58	100%

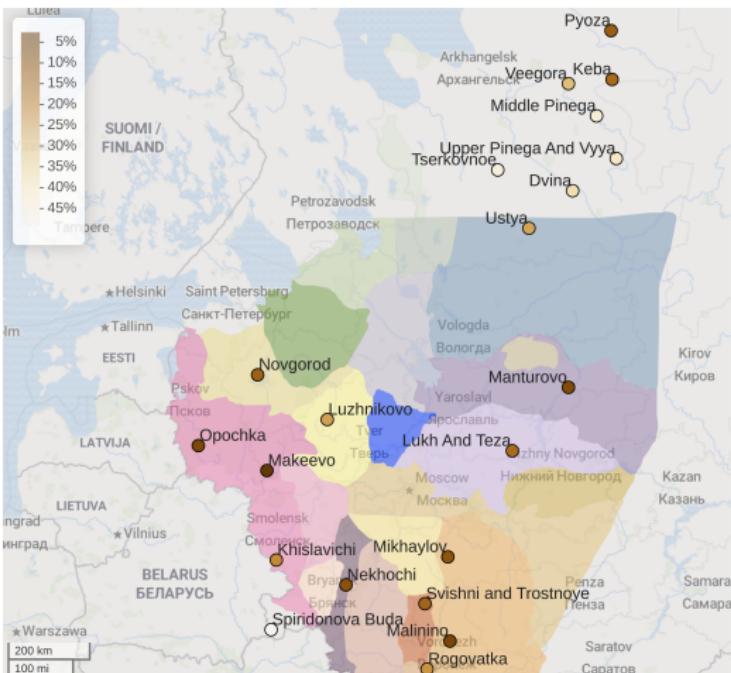
## Does noun stem play a role?

Yes

stem type	dialect	standard	total	dialect share
1 - t	503	1297	1800	28%
2 - t'	20	356	376	5%
3 - g	3	278	281	1%
3* - g	3	20	23	13%
4 - ž	1	6	7	14%
5 - č	21	56	77	27%
6 - a	0	2	2	0%
7 - I	0	1	1	0%

Fisher exact test p-value = 0.0004998

## Geographical distribution



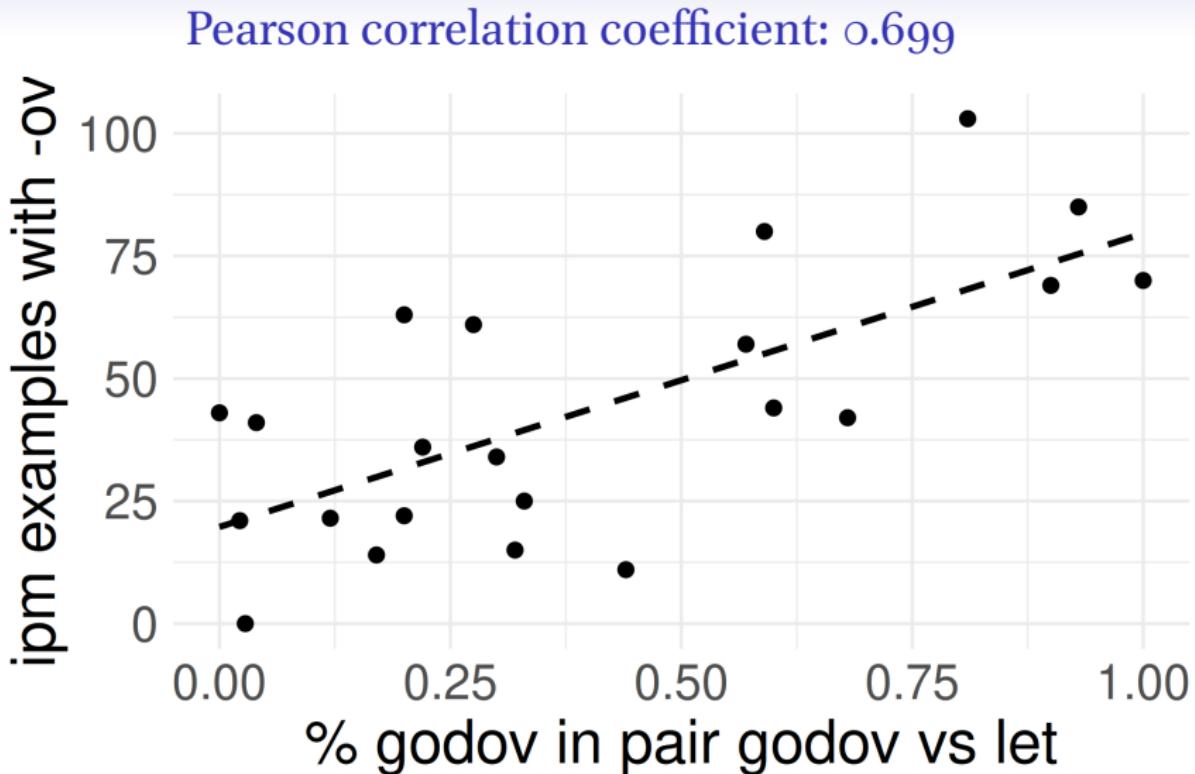
Dialect polygones by I. A. Marchenko, created with lingtypology [Moroz, 2017]

No geographical pattern observed (but, see Spiridonova Buda).

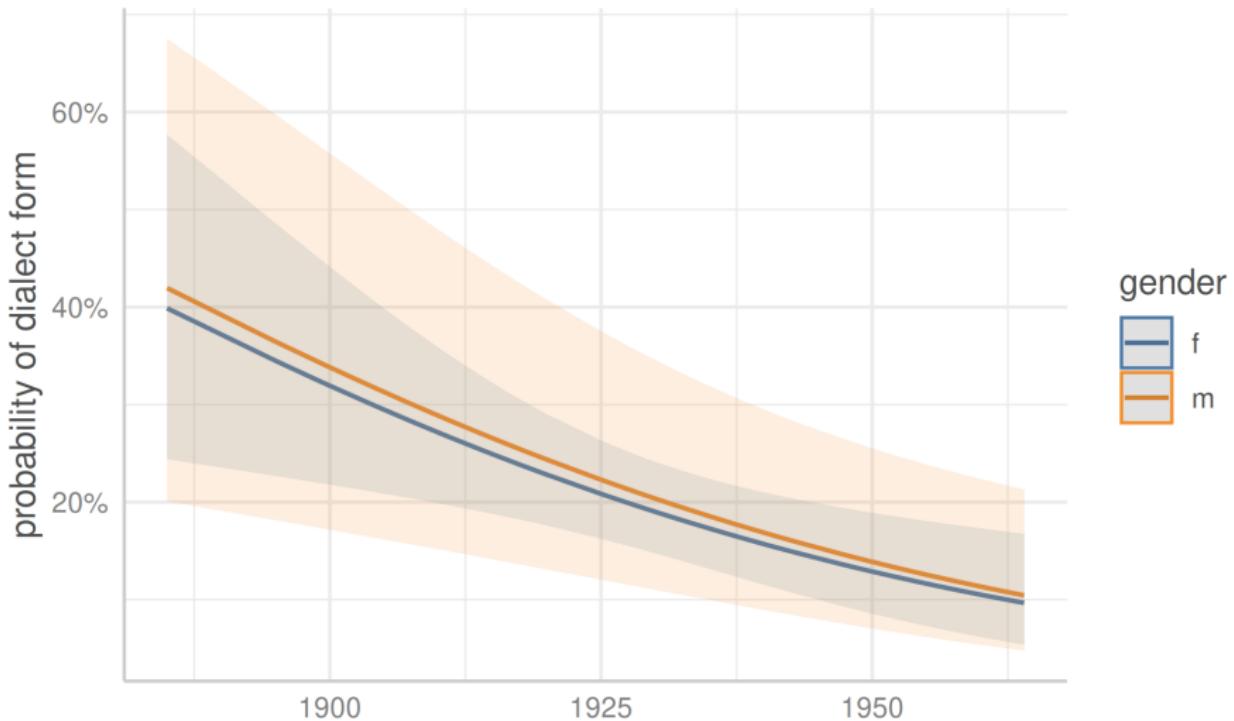
## Is overall frequency of dialect Gen.Pl significant?

- corpus: Dvina
- *godov*: 25
- *let*: 8
- % *godov*: 75
- -ov in other than numeral contexts: 9
- corpus size: 68,010
- ipm -ov: 132

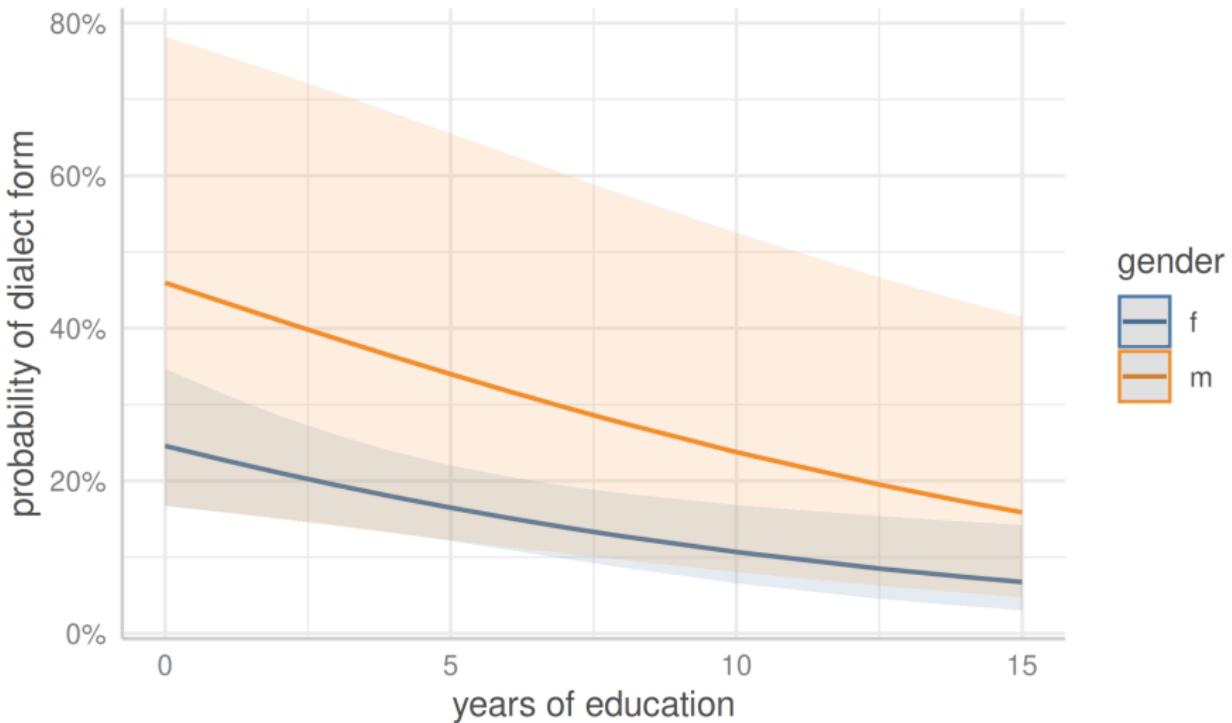
Example of 'other' contexts: *ne bylo cerkvov* (stand *cerkvej*) 'there were no churches'



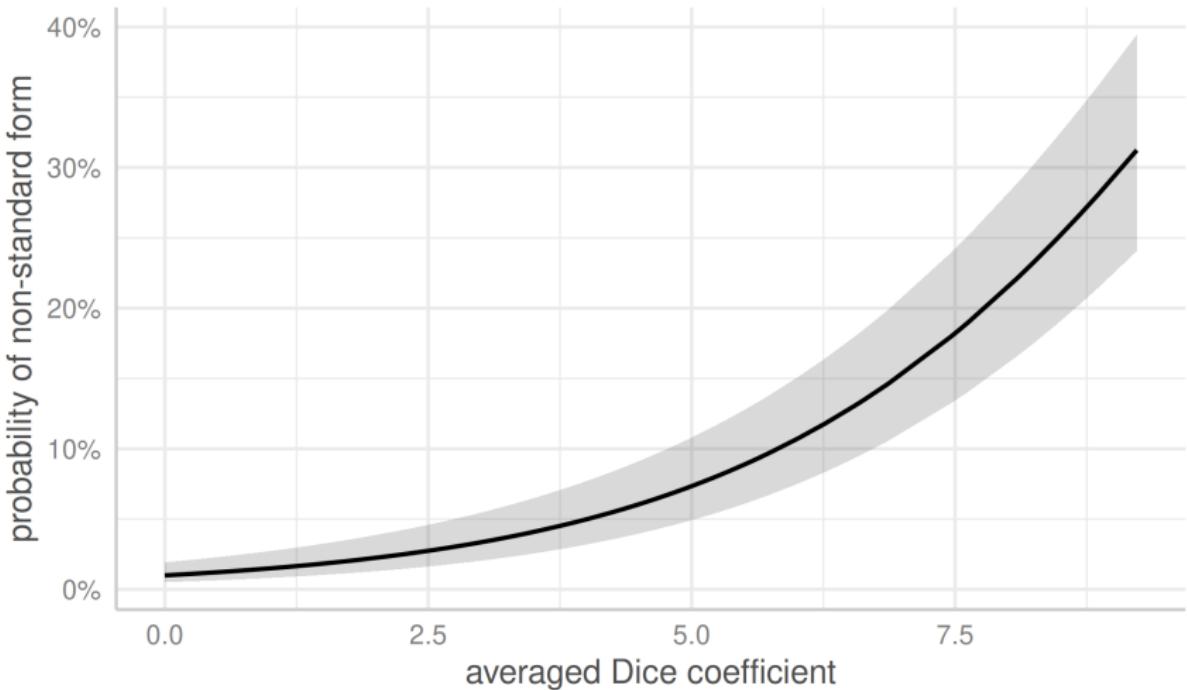
## Is year of birth significant?



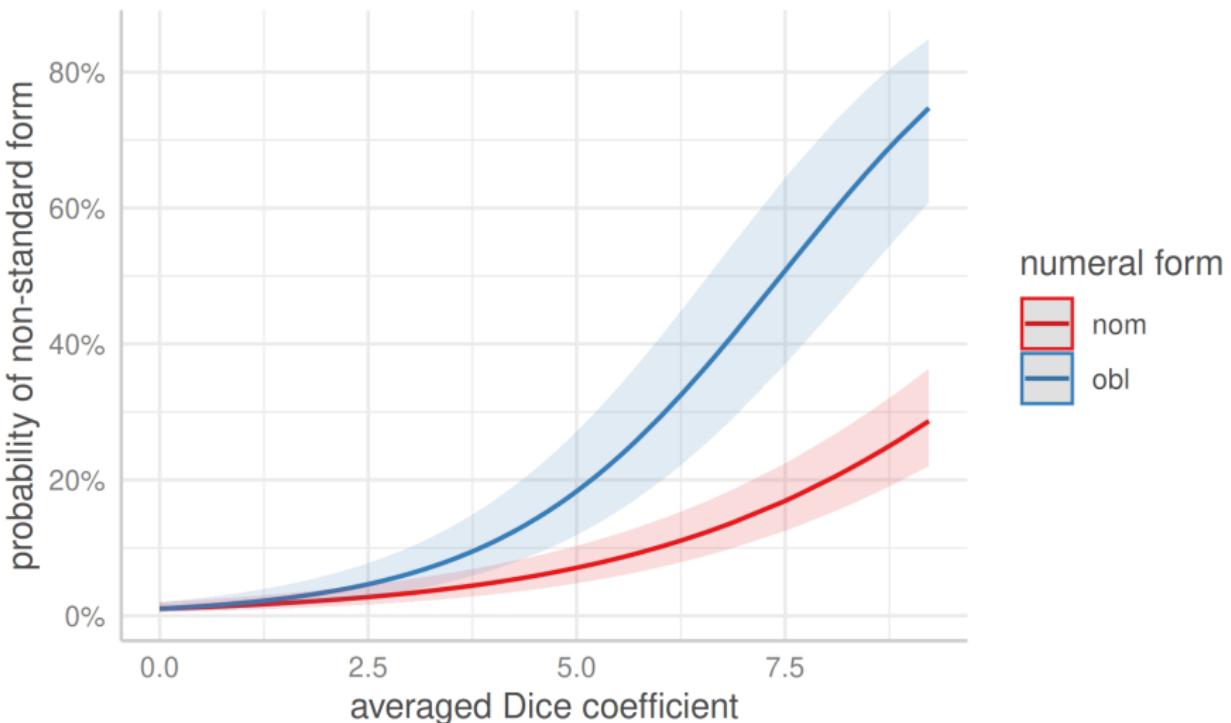
## Is education level significant?



## Is collocationality significant?



## Is the numeral form significant?



## Conclusions

- Dialect “overuse” of the *-ov* ending does not affect measure words: zero inflection forms (*kilogramm*) are found in more than 90% of contexts
- Year of birth and education level affect the probability of using dialect Gen.Pl forms (older people and people with a low education level use dialect forms more frequently)
- ‘The most frequent pairs survive’ (Chiara): the probability of using dialect forms is higher for nouns which often co-occur with numerals
- The type of noun stem seems to be significant
- Potential contact influence in the case of Spiridonova Buda? (Belorussian)
- The correlation between the frequency of dialect Gen.Pl forms in numeral constructions and other types of contexts is questionable

# Neg Exist constructions

# Negative Existential Constructions



Chiara Naccarato



George Moroz

## Negative Existential Constructions

- Existential negation = negation strategies used in existential sentences of the type *there is/are no X (somewhere)*, in which the subject is typically non-referential
- We use the terms “existential negation” and “negative existential constructions” (NECs) in a wider sense to include constructions that are sometimes referred to as “locative negation” (*X is/are not in some place*, in which X is a definite subject) and “possessive negation” (*Y does/do not have X*); cf. [[Veselinova, 2013](#), 110–111]
- All of them predicate absolute absence rather than relative absence, and Russian employs one and the same strategy in all three cases, which is different from the strategy employed in standard negation, i.e. negation of overt verb predicates

## Non-standard marking in NECs

- Variation in NECs in bilingual corpora (+ comparison with the monolinguals' variety of Russian spoken in Zvenigorod)

e.g. *gaz ne bylo* vs. *gaza ne bylo*

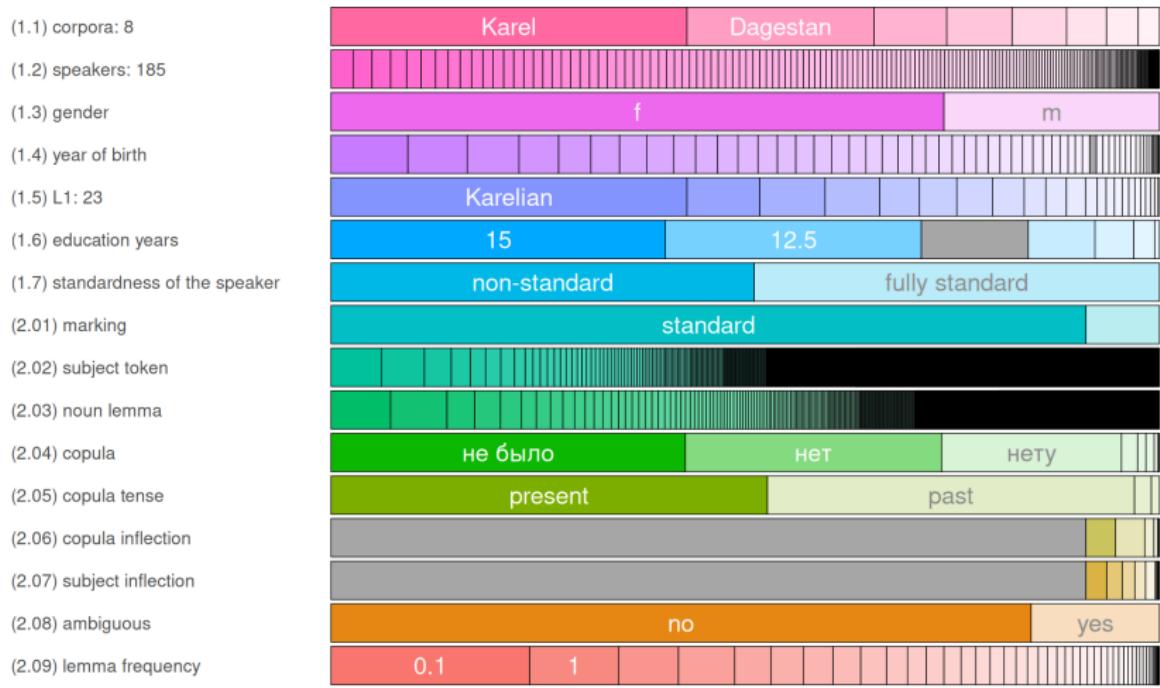
- Previous research on other L2 Russian varieties
  - Nanai and Ulcha Russian [[Stoynova, 2019](#), 27]
  - Moksha Russian [[Kashkin, 2020](#), 116]
  - Hill Mari Russian [[Kashkin, 2022](#), 39]
- Usually treated as a contact phenomenon because in the L1s of Russian bilinguals who display this trait there is no genitive (or any other special) marking of negated subjects

## Research questions

- Does the amount of variation in NECs differ across corpora and/or among speakers of the same variety?
- Can variation in NECs be explained in terms of contact influence?
- Do other factors promote or hinder variation in NECs?

## The database and parameters of data annotation

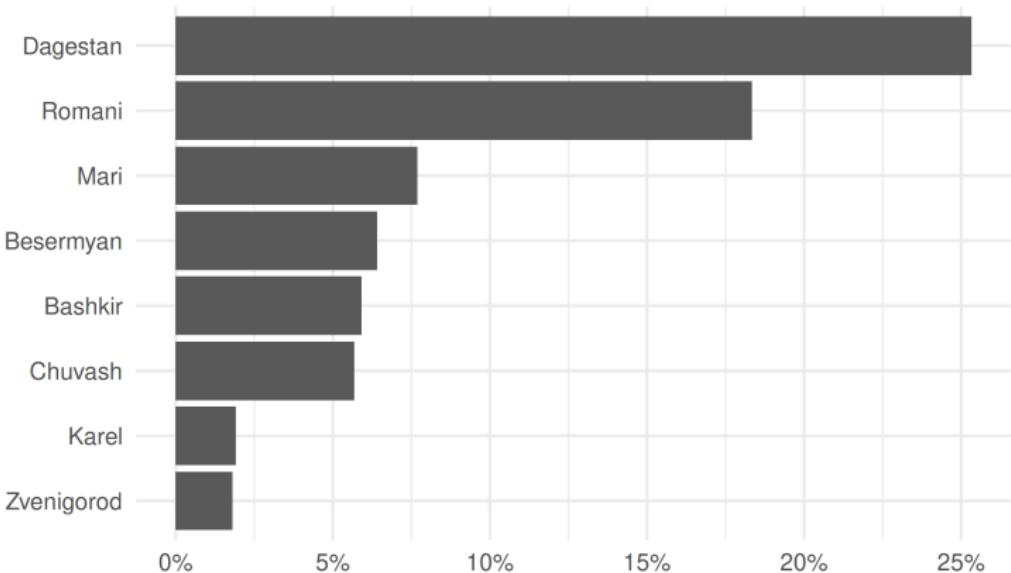
2,309 observations



## Fully standard (58%) vs. non-standard speakers (42%)



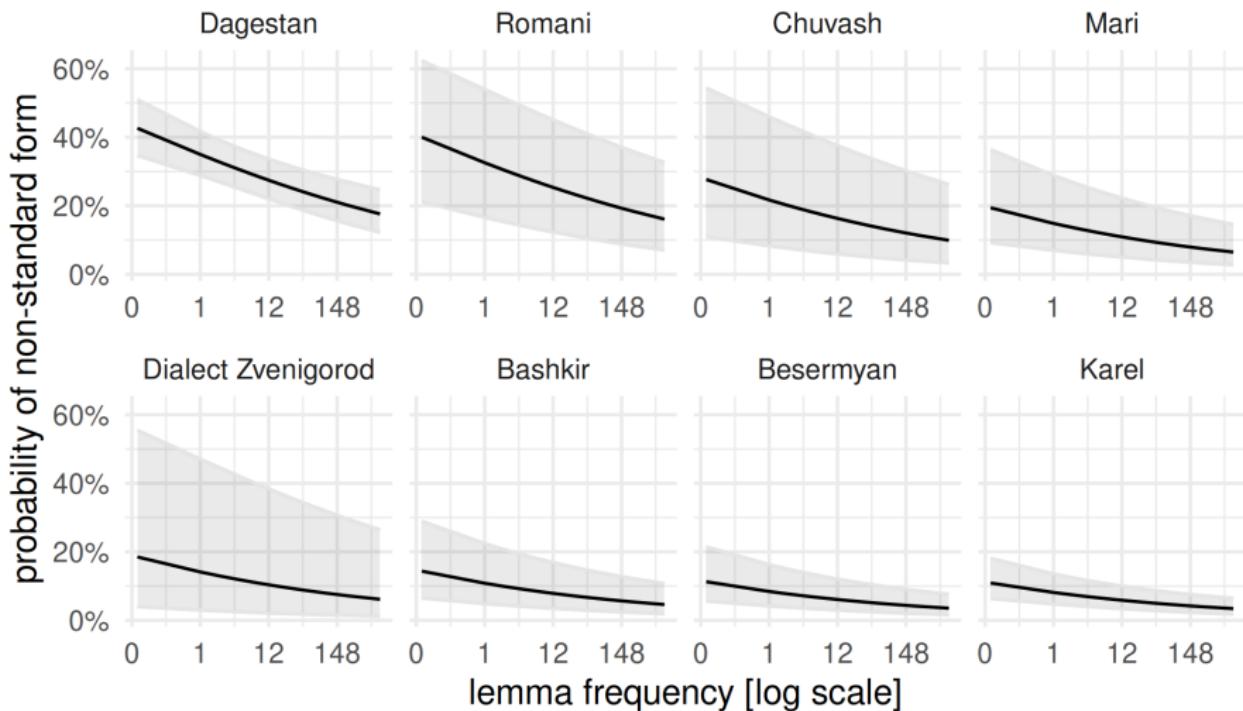
## Proportion of non-standard occurrences per corpus



## Types of non-standard marking

- Neuter copula
  - *gaz ne bylo*
- Non-neuter copula
  - *doma ne byl*
- Agreeing subject (could be pattern borrowing for Daghestan)
  - *bogatye /judi ne byli*

## Statistical modelling



## Preliminary conclusions

- Findings comparable to those obtained for NCs
- Variation attested in all L2 corpora, but not to the same extent in each of them
- Daghestan as a more uniform variety
- Not all cases of variation can be explained by contact



# Sideproject

# The Dial2 sideproject



Anna Panova



Olga Gich



George Moroz

## Aim of the project

- Typos and spelling errors in corpora complicate the search
- Looking for mistakes in the corpora manually is time-consuming
- Standard spell-checking algorithms are ineffective for cleaning data due to the presence of non-standard wordforms
- Spell-checkers for Standard Russian treat dialectal wordforms as spelling errors
  - *Они все разъехадчи* —> *Они все разъехались*
- Objective: create a mechanism for automatic search for errors and typos
- It is crucial for the future mechanism to distinguish between a typo and a dialectal wordform

## Hapax Legomema

- First Approach: Analyze hapax legomema (tokens that appear only once in the corpora) to identify typos
- Pipeline:
  - Select all hapax legomema
  - Put them in the normal form
  - Check with a spellchecker and dictionaries
- Results: Low effectiveness, most part of the hapax legomema are not typos
  - Out of 2,000 hapax legomema, only 10 were typos

## Utilizing LLMs and Machine Learning

- First Idea: Utilize prompts for Chat GPT-4o Mini and Gemini 1.5 Pro models
- Testing: Verification on test sentences
- The results were satisfactory, especially when combining models
- Further Steps:
  - Use free and local models
  - Develop the method further

# Machine Learning and BERT

- Objective: Train the model to predict if a word is spelled correctly or if it is dialectal
- Pipeline:
  - Annotation:
    - D — dialectal wordform
    - E — typo
    - O — absence of dialectal wordforms or typos
  - Create a synthetic dataset of typos to balance the classes
  - Train a model to assign labels to words in a sentence
  - Example of a row in the dataset:

```
[('вот', '0'), ('сейчас', '0'), ('вот', '0'), ('я', '0'), ('тоже', '0'),  
('ездиала', 'E'), ('на', '0'), ('автобусе', '0'), ('ну', '0'),  
('но', '0'), ('уже', '0'), ('наверно', 'D'), ('с', '0'), ('месяц', '0'),  
('не', '0'), ('ездию', 'D'), ('ну', '0')]
```

## Machine Learning and BERT

- Results: promising but imperfect, the training dataset needs to be augmented
- Further Steps:
  - Train the BERT model on the annotated corpus
  - Evaluate the accuracy of the model on test data
  - Apply the model to clean data from typos

## Future Plans

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- create more corpora
  - we can do this within the Lab too (thanks to whisper speech to text model)

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- annotate more features
- make an Atlas of analyzed features
- analyze how features interact within the speaker

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