

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

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## Precursors

## Precursors of the project



Nina Dobrushina



Michael Daniel

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

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    - Corpus of Russian spoken in Daghestan
    - Ustya River Basin Corpus

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  - Online corpora available for everyone:
    - 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 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.

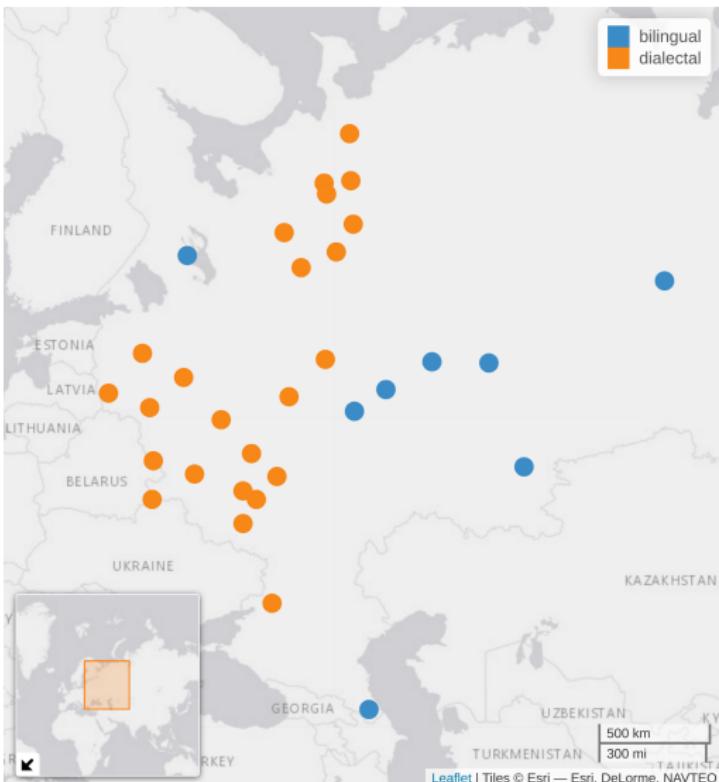
**Corpus of the Russian dialect spoken in Tserkovnoe**  
 39,469 tok.

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

## Bilingual Corpora

|   |  |
|---|--|
| Corpus of Russian spoken in Daghestan<br>376,717 tok. | Khanty Russian Corpus<br>40,225 tok.                     |
| Corpus of Russian spoken in Chuvasia<br>46,307 tok.   | Corpus of Russian spoken by the Roma<br>41,767 tok.      |
| Corpus of Russian spoken in Mari El<br>69,109 tok.    | Corpus of Russian spoken in Bashkortostan<br>93,127 tok. |
| Corpus of Karelian Russian<br>578,646 tok.            | Corpus of Russian spoken by the Besermans<br>97,216 tok. |

# Bilingual and Dialectal Corpora



# Can we analyze variation of linguistic features across all corpora?

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## What are the factors that influence variation?

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## What are the factors that influence variation?

## Can we find different 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]
- Dialect of Ustya River Basin [Daniel et al., 2019]

DiaL2

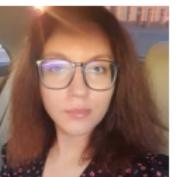
## The DiaL2 team



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 syntactical annotation
- filter the result table for particular feature selected by a 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

## Non-standard numeral constructions in L2 Russian



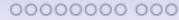
Chiara Naccarato



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



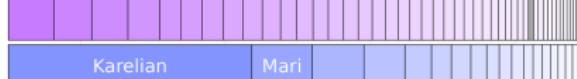
(1.3) gender



(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



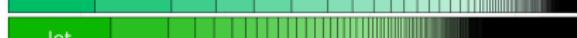
(2.2) numeral



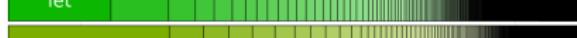
(2.3) noun token



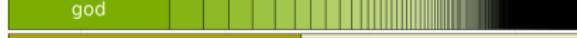
(2.4) noun lemma



(2.5) numeral type



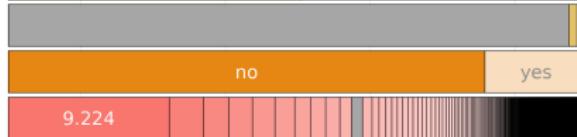
(2.6) noun type



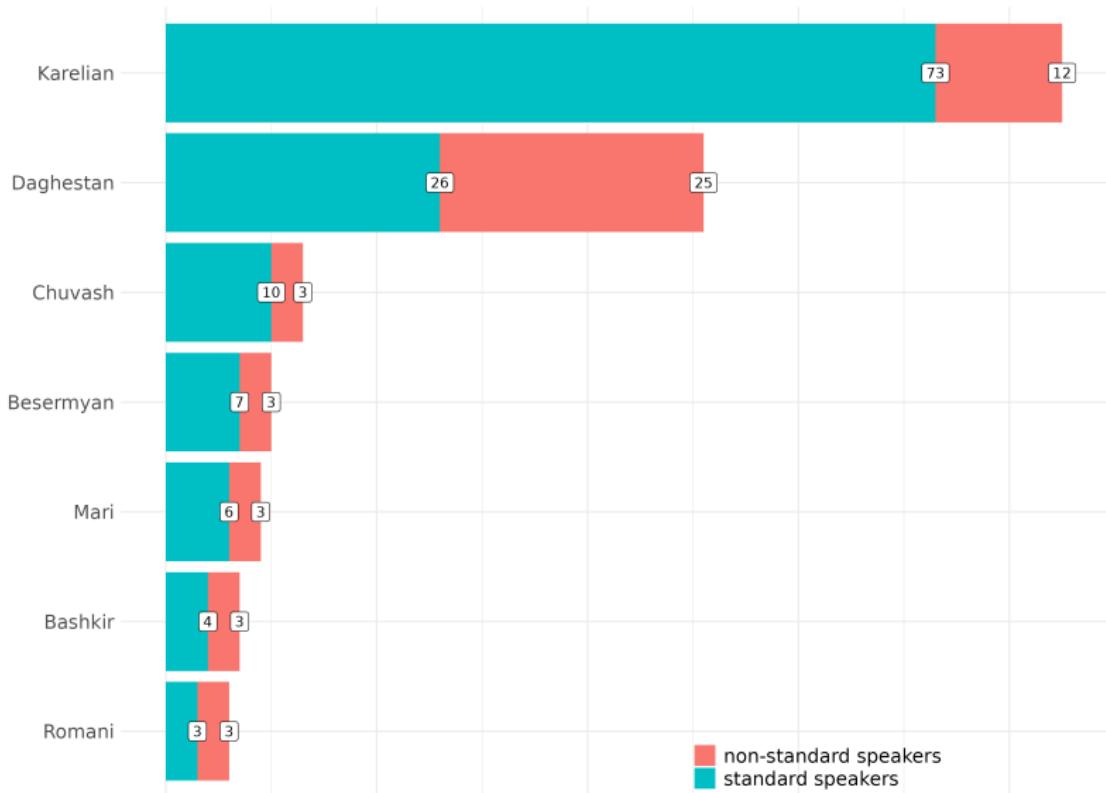
(2.7) ambiguous



(2.8) dice coefficient

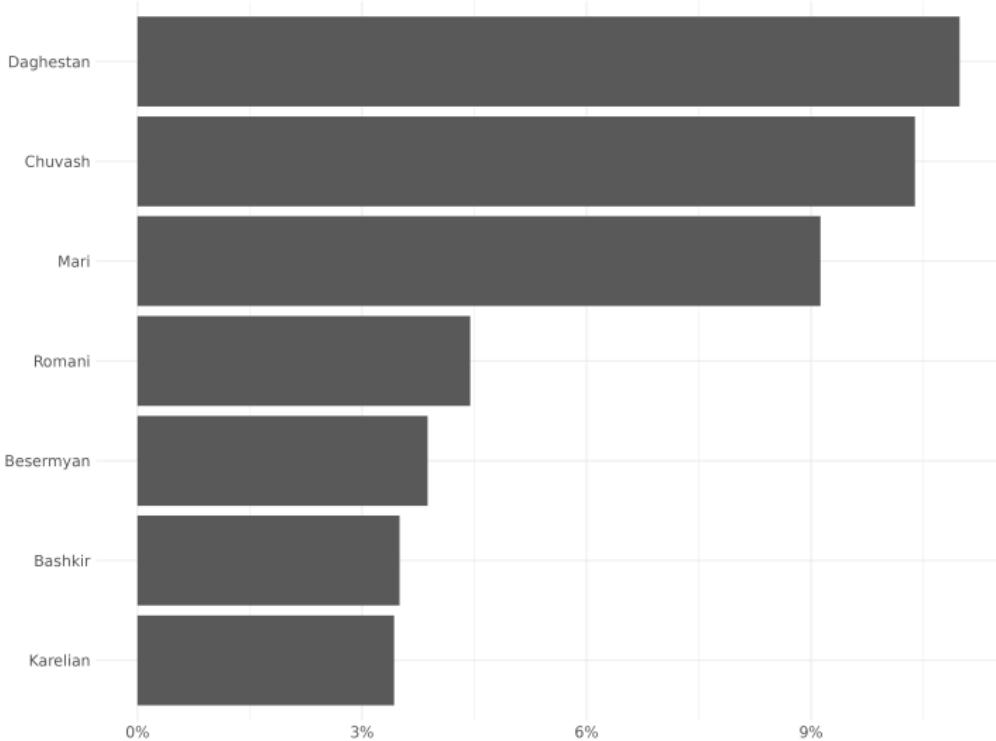


## Fully standard (71.3%) vs. non-standard speakers (28.7%)



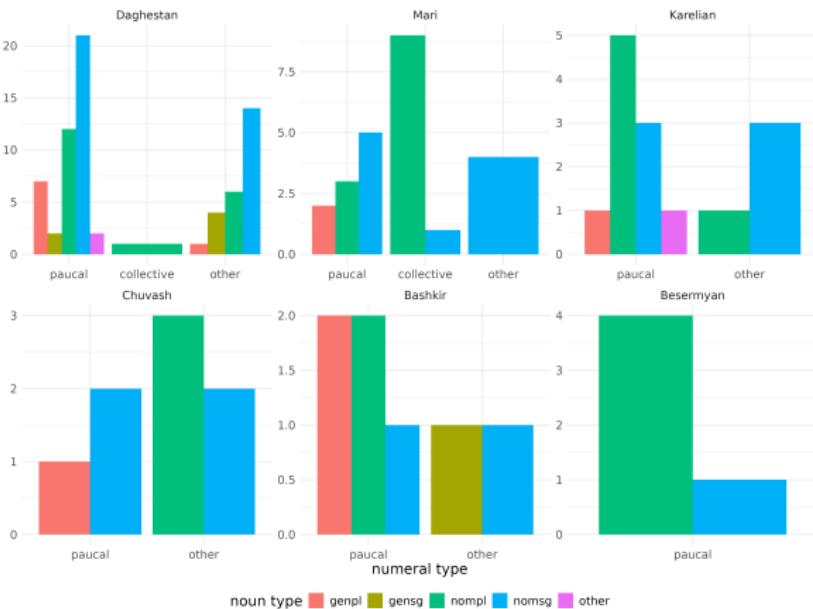
## Proportion of non-standard occurrences per corpus

1,748 observations

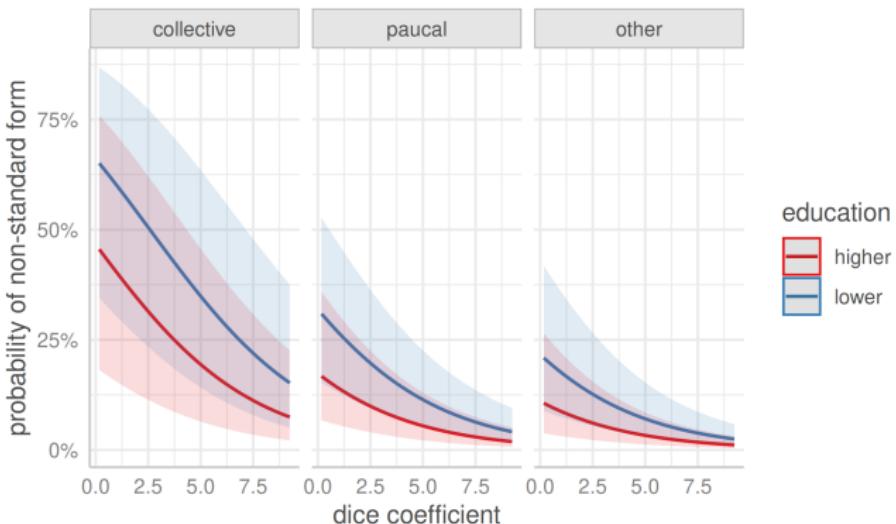


## Distribution of n-std forms with different types of numerals

- NOM instead of GEN is frequent both with paualcs 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 ~ Dice coefficient + year of birth + education + numeral type + gender + (1|L1 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

Prepositional drop  
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Gen Pl Forms  
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Neg Exist constructions  
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Sideproject Future Plans  
oooooooo oo

# Prepositional drop

Precursors    DiaL2    Num constructions  
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Prepositional drop  
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Gen Pl Forms  
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Neg Exist constructions  
oooooooooooo

Sideproject  
oooooooo    oo

Future Plans

# 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

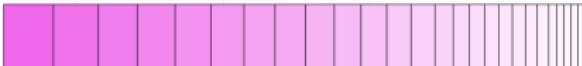
- spontaneous oral speech of 20 Beserman-Russian and Mari-Russian bilinguals;
- total number of tokens ~166,000;
- in comparison with the speech of nine Russian monolinguals.

# Methods and Data

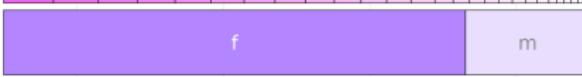
(1.1) corpora: 3



(1.2) speakers: 29



(1.3) gender



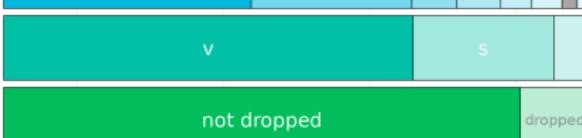
(1.4) year of birth



(1.5) years of education



(2.1) preposition lemma



(2.2) following wordform's token



(2.3) following wordform's lemma



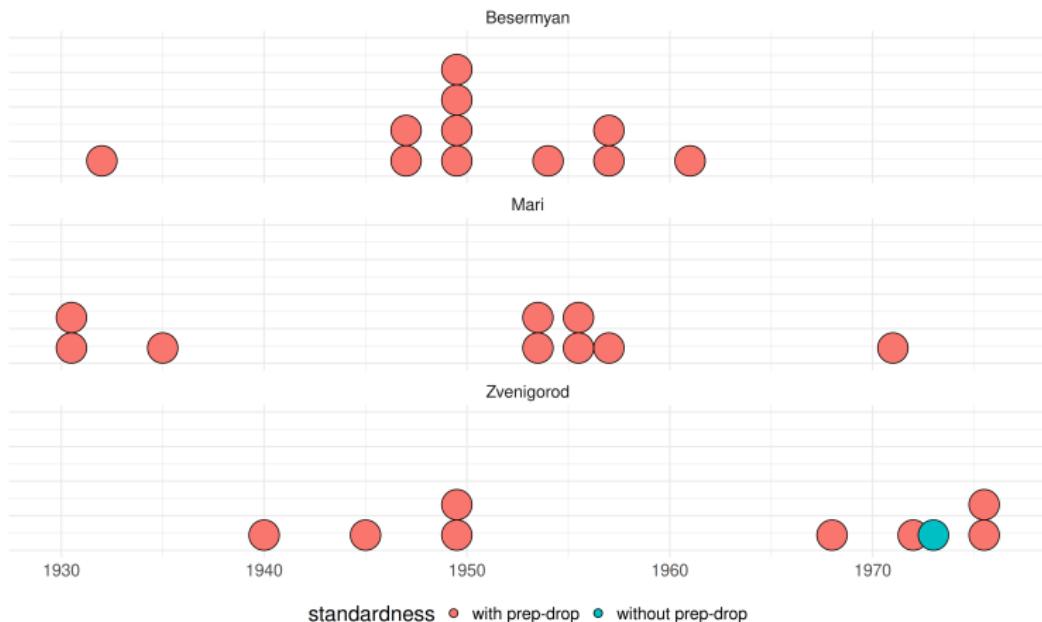
(2.4) following wordform's first sound



(2.6) dice coefficient

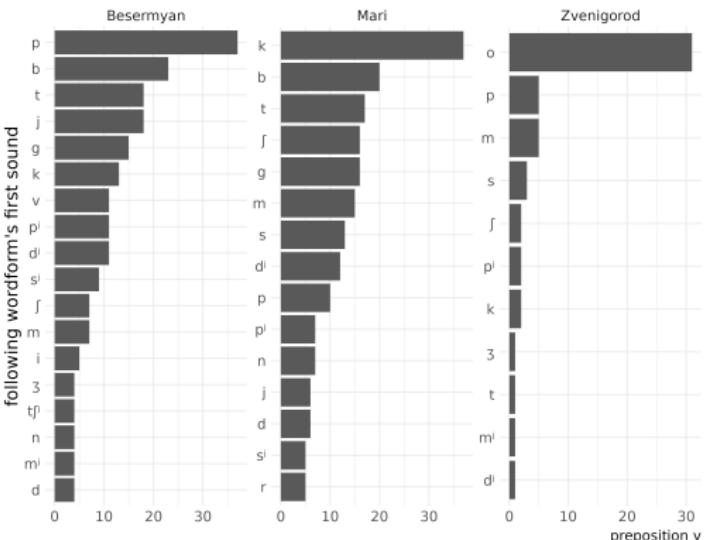


## Findings



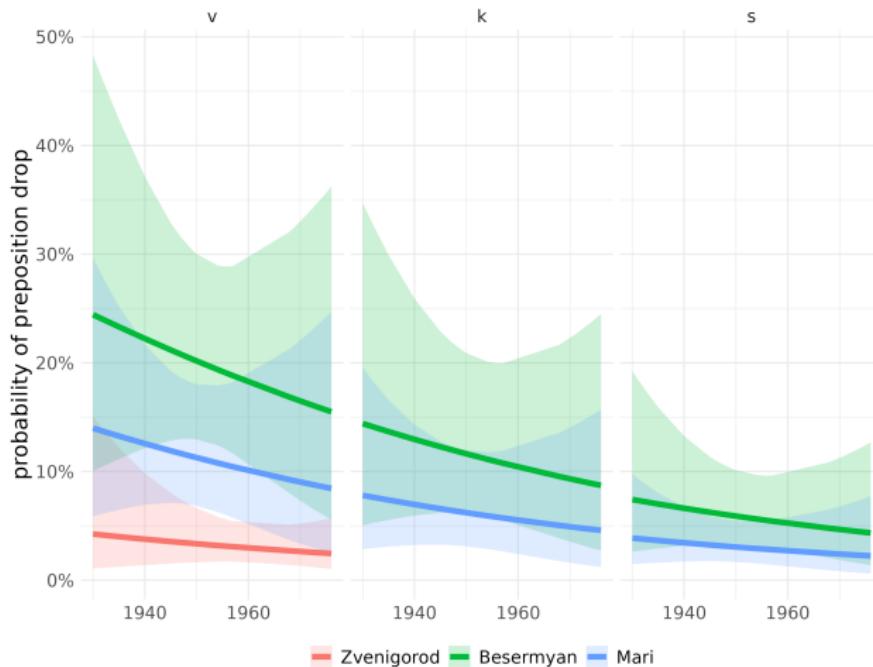
- both bilinguals and monolinguals omit prepositions;
- however, they do it in different contexts and for different reasons

# Findings



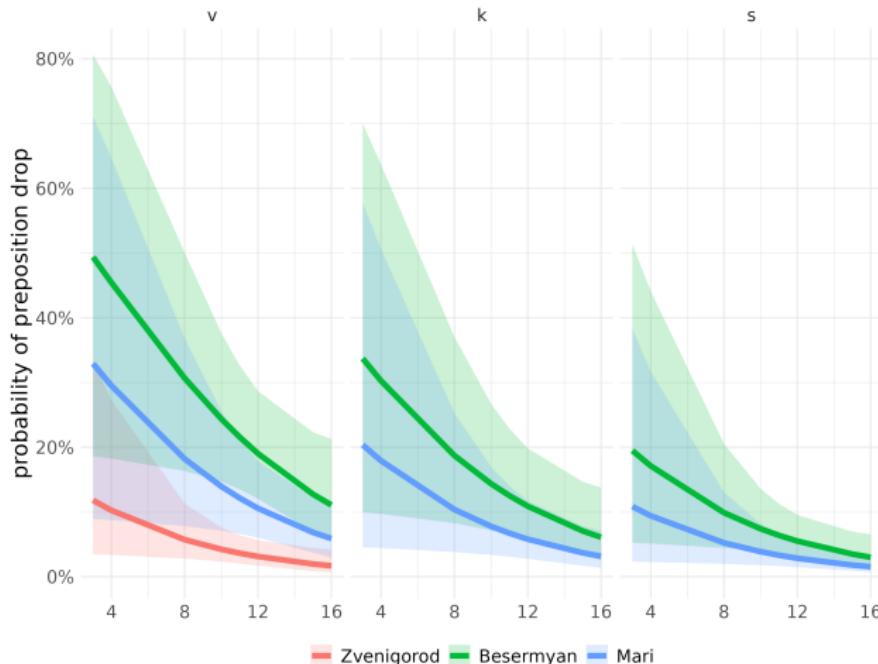
- In bilinguals, p-drop can possibly be explained by phonetic interference from their native languages (avoiding consonant cluster);
- monolinguals mainly omit prepositions in lexicalized expressions (v obschem 'in general').

## Findings: sociolinguistic factors



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

## Findings: sociolinguistic factors



The older and less educated a person is, the higher the probability of prep-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] kazhdom poverote stolba stoit ‘A pillar stands on every turn’

## Preposition drop in Chuvash Russian

- The omission of syllabic prepositions and 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.

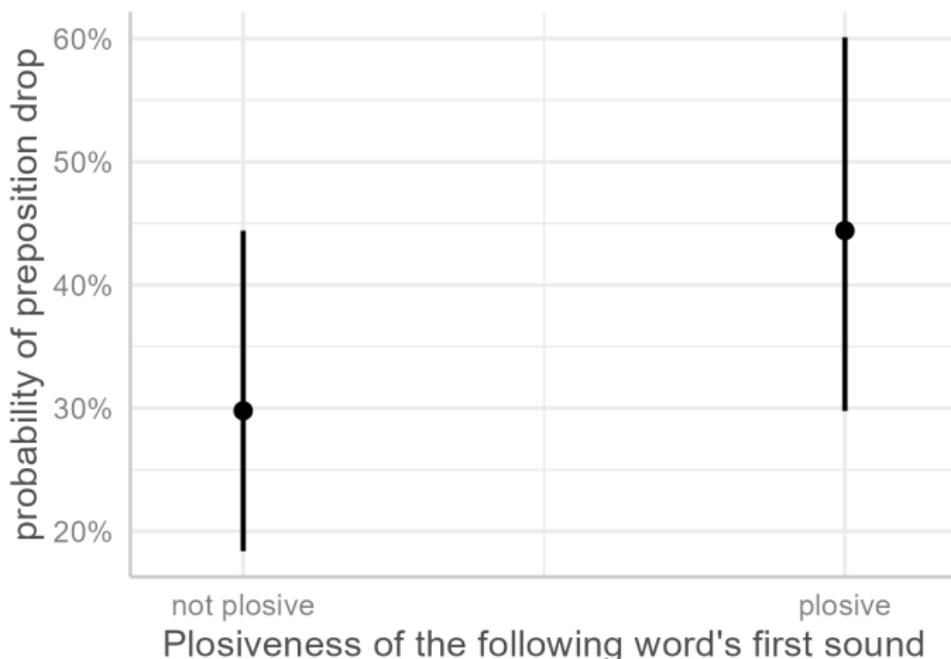
## Preposition drop in Chuvash Russian

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:

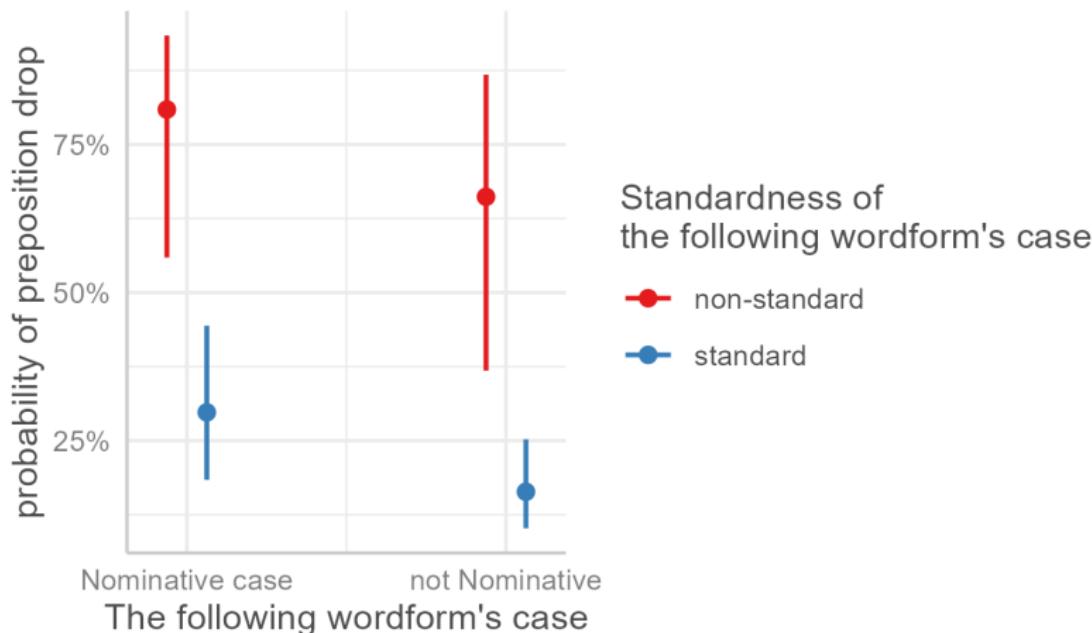
- semantics of the prepositional phrase
- the plosiveness of the following word's first sound
- the Nominative case of the following word
- dice coefficient
- the standardness of the following word's case

## Preposition drop in Chuvash Russian



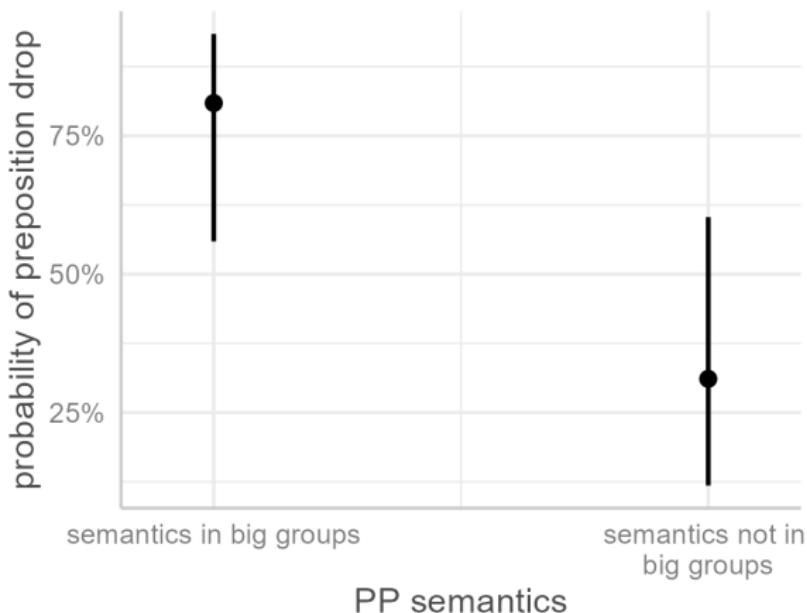
The plosiveness of the following word's first sound increases the probability of a preposition drop

## Preposition drop in Chuvash Russian



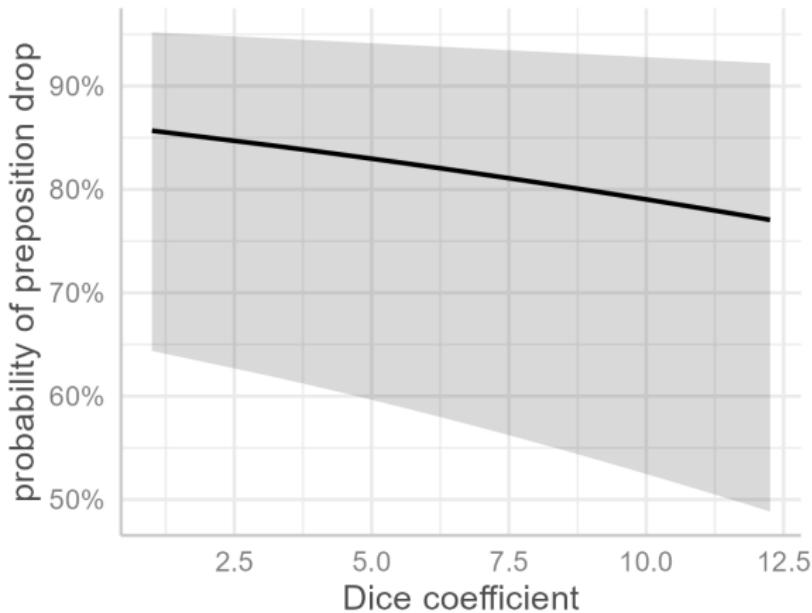
The Nominative or a non-standard case of the following wordform increase the probability of a preposition drop

## Preposition drop in Chuvash Russian



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

Precursors DiaL2 Num constructions P

Prepositional drop  
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## Gen Pl Forms

## Neg Exist constructions

Sideproject Future

ans F

## 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 be controversial to the tendencies observed in other colloquial varieties

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

Precursors      DiaL2      Num constructions      Prepositional drop      Gen Pl Forms      Neg Exist constructions      Sideproject      Future Plans      P

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

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

No

| lexeme          | -ov | Ø  | total | percentage of Ø 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?

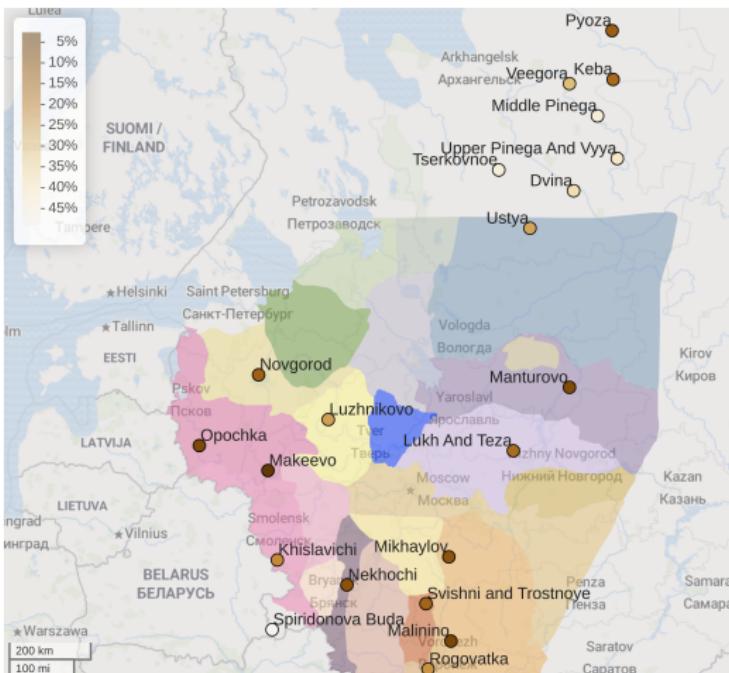
## Does noun stem play a role?

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]

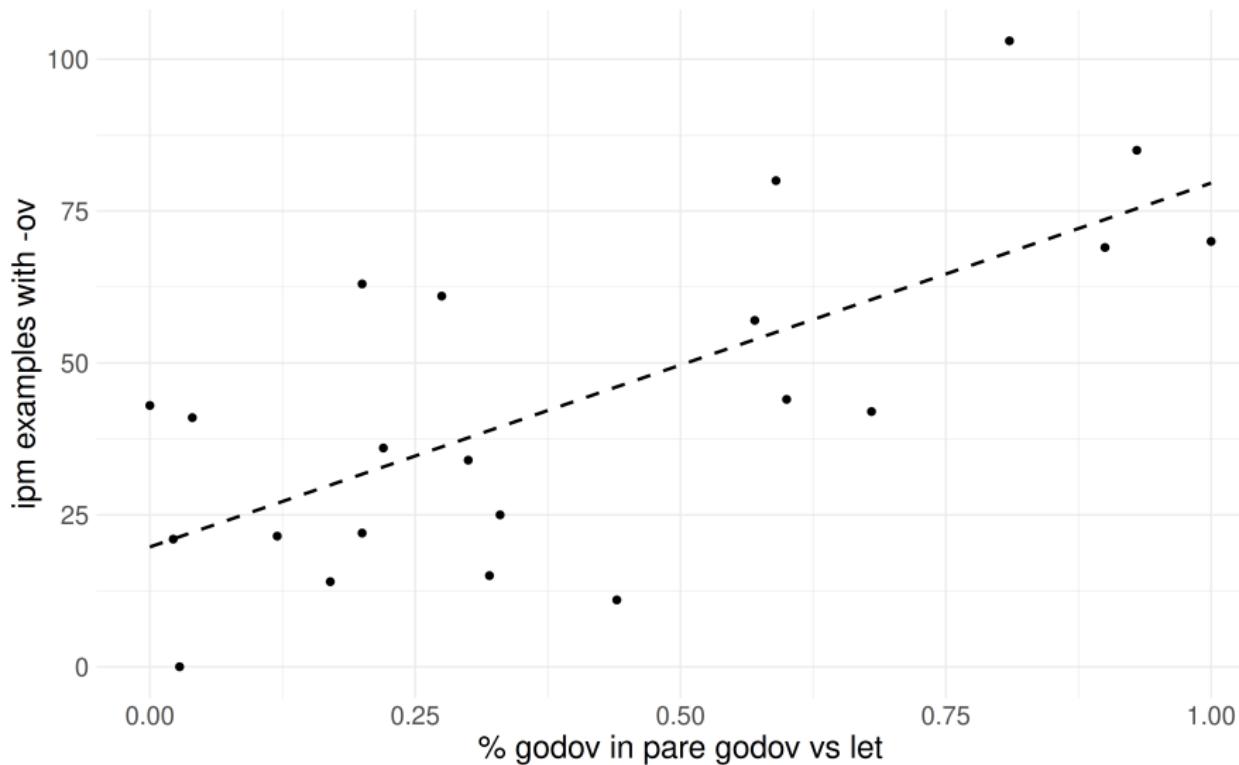
No geographical pattern observed (but, see Spiridonova Buda).

## Does 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
- imp -*ov*: 132

Example of 'other' context: *ne bylo cerkvov* (stand *cerkvej*) 'the was no churches'

## Pearson correlation coefficient: 0.699



Precursors Dial2 Num constructions

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Prepositional drop

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**Gen Pl Forms**

oooooooooooooo

Neg Exist constructions

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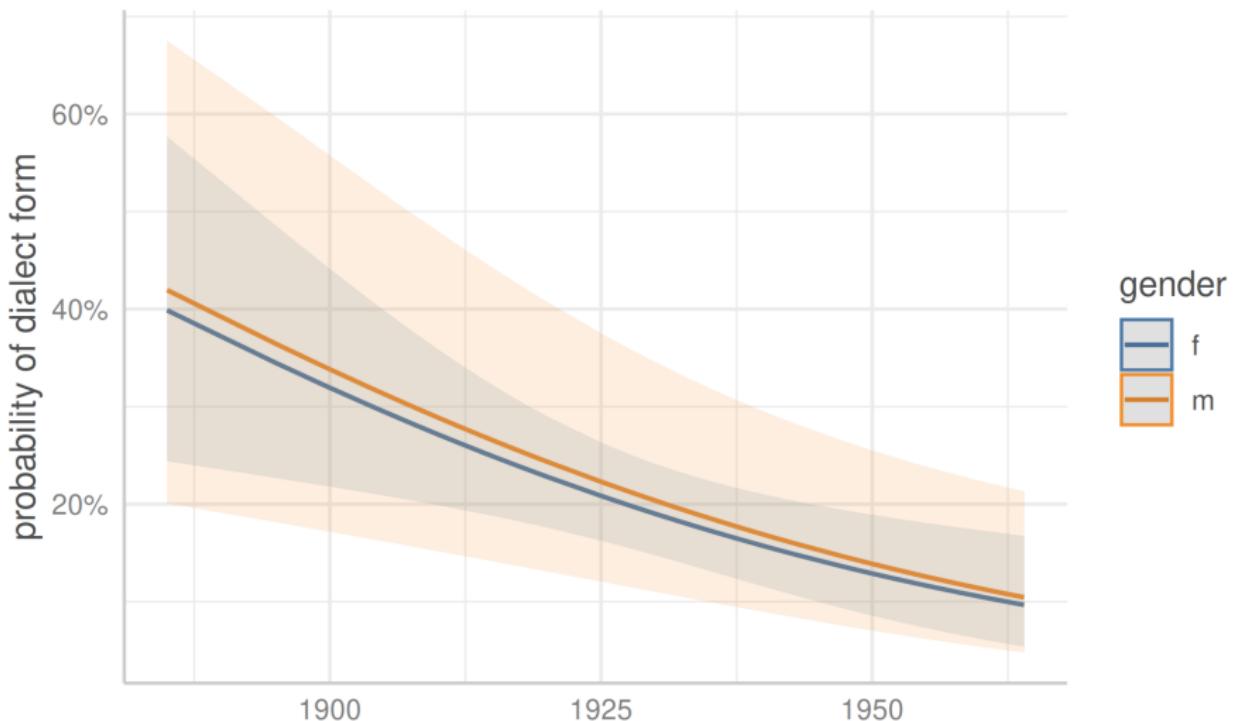
Sideproject

oooooooo

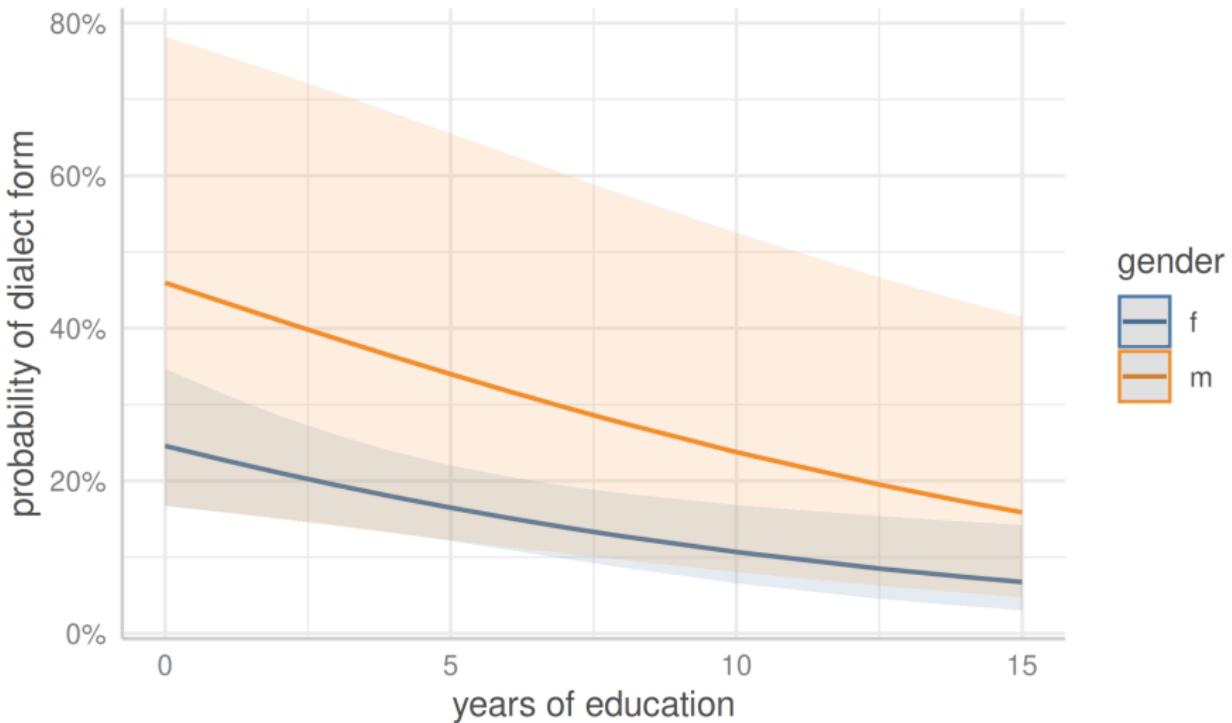
Future Plans

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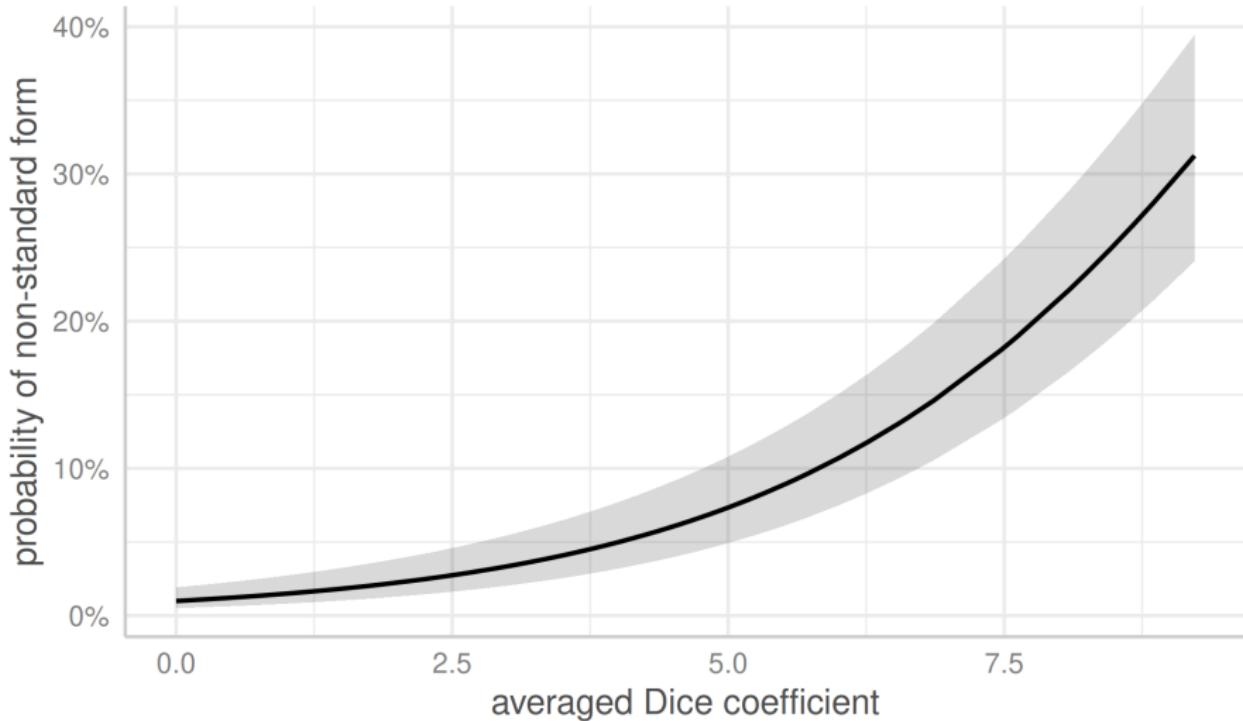
## Is year of birth significant?



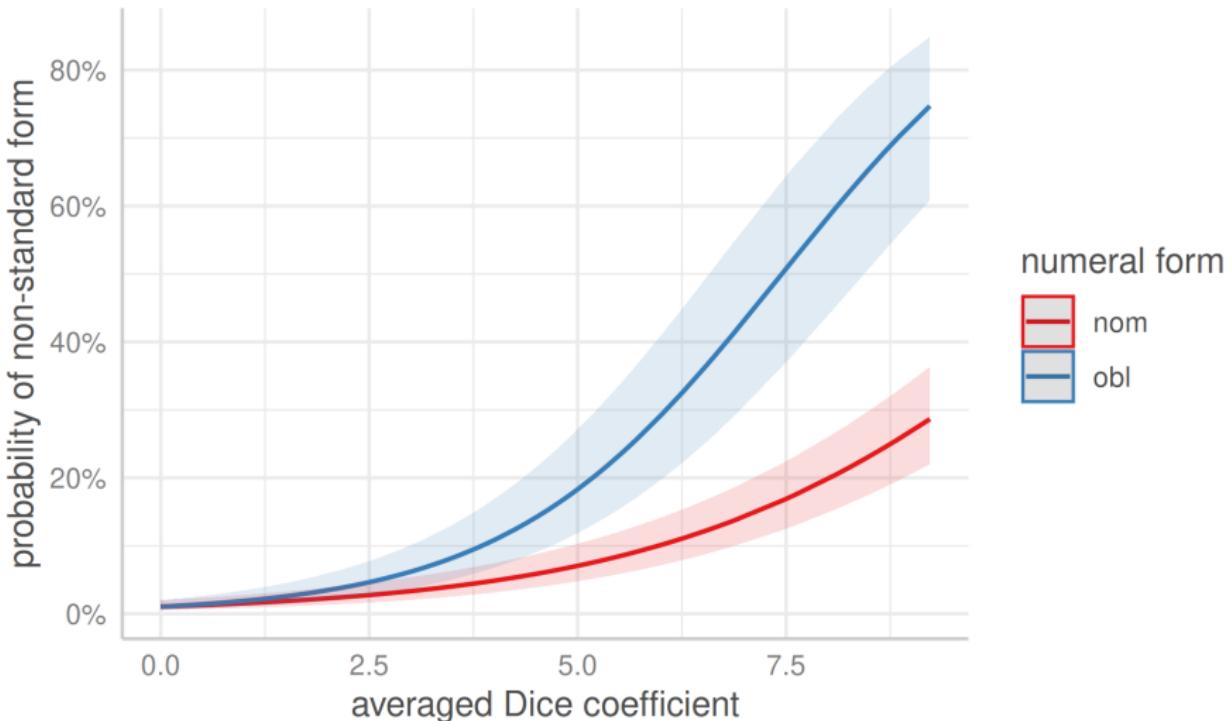
## Is education level significant?



## Is the collocationality significant?



## Is the numeral form significant?



## Conclusions

- Dialect “overuse” of the *-ov* ending doesn’t affect measure words: zero inflexion forms (*kilogram*) are found in more than 90% of contexts
- Early year of birth & low education level make the probability of using dialect Gen.Pl form higher
- ‘The most frequent pairs survive’ (Chiara): the probability of dialect form higher for nouns which often cooccur 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*

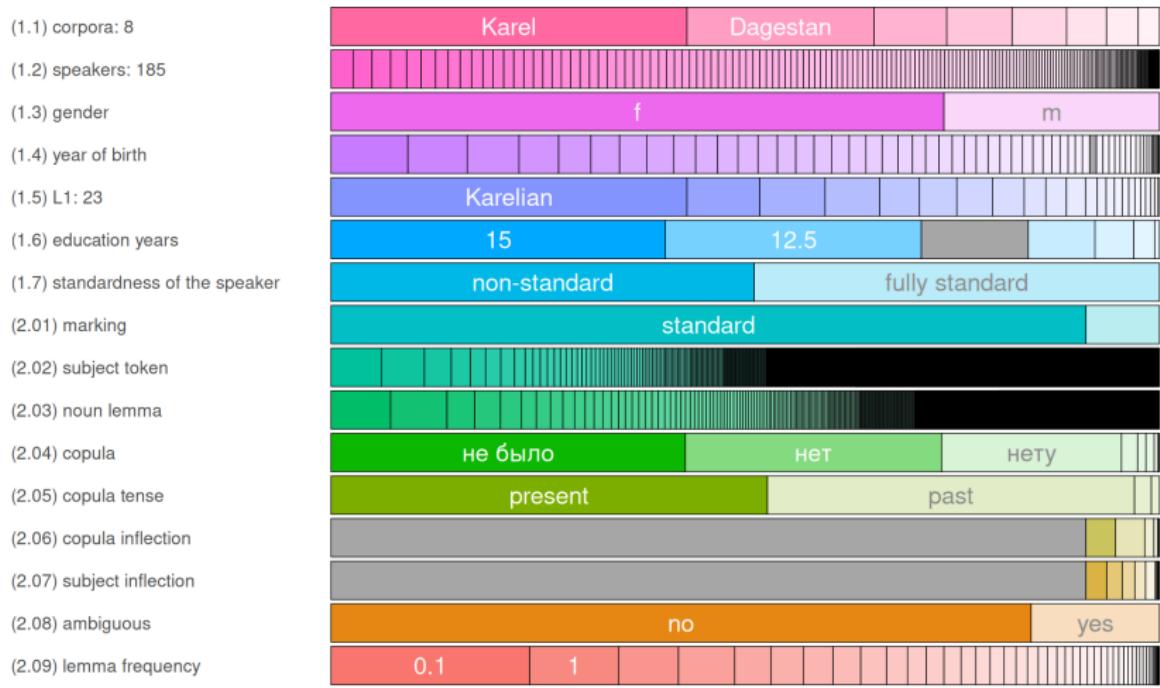
- Previous research on other L2 Russian varieties
  - Nanai and Ulcha Russian [[Stoynova, 2019](#), 27]
  - Moksha Russian [[Kashkin, 2020](#), 116]
  - Hill Mari Russian [[Kashkin, 2022](#), 39]
- Usually treated as a contact phenomenon because in the L1s of Russian bilinguals who display this trait 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

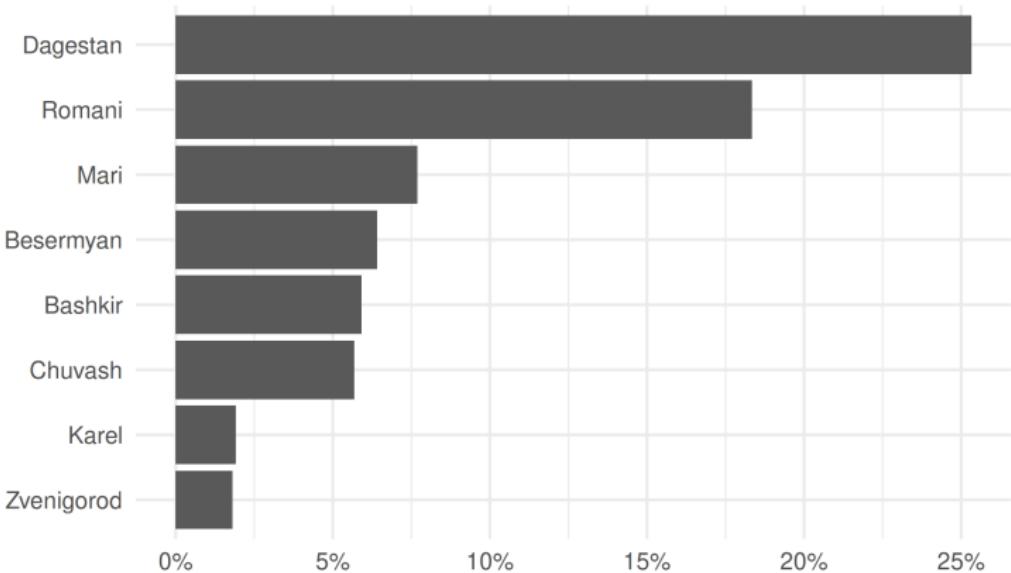
2,309 observations



## 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 ljudi 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

Precursors Dial2

Num constructions

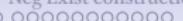
Prepositional drop



Gen Pl Forms



Neg Exist constructions



**Sideproject**



Future Plans



## The Dial2 sideproject



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## Objective of the Project

- Typos and spelling errors in corpora complicate the search.
- Looking for the mistakes in the corpora manually is time-consuming.
- Standard spell-checking algorithms are ineffective for cleaning collected data due to the presence of non-literary wordforms.
- Spell-checkers for the literary 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 a 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 2000 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.

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- analyze how features interact within the speaker

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