

What do we know about linguistic journals?

Applying NLP methods to a dataset of abstracts from linguistic journals
(work in progress)

George Moroz, Asya Alekseeva, Timofei Dedov, Artyom Orekhov, Kirill Sidorov, Angelina Stepanova

2 May 2023

Outline of the talk

Introduction

Our team

Data collection

Descriptive statistics

East Caucasian case study

The landscape of linguistic research?

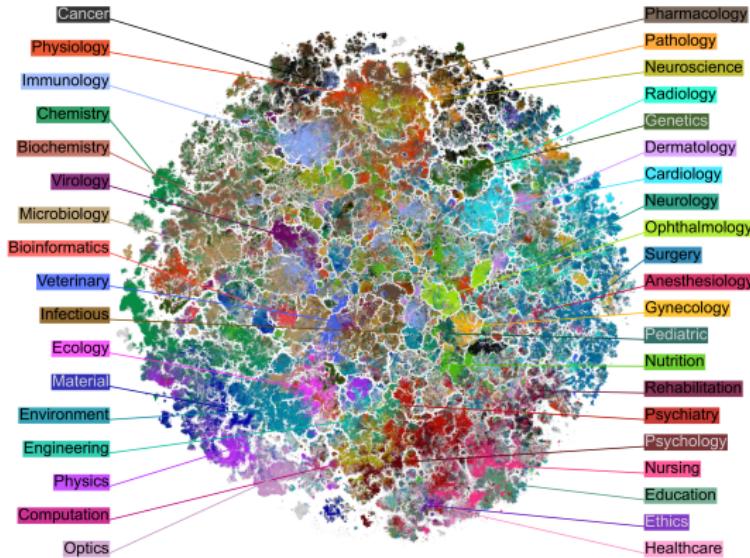
Conclusions

(Gonzalez-Marquez et al. 2023) The landscape of biomedical research

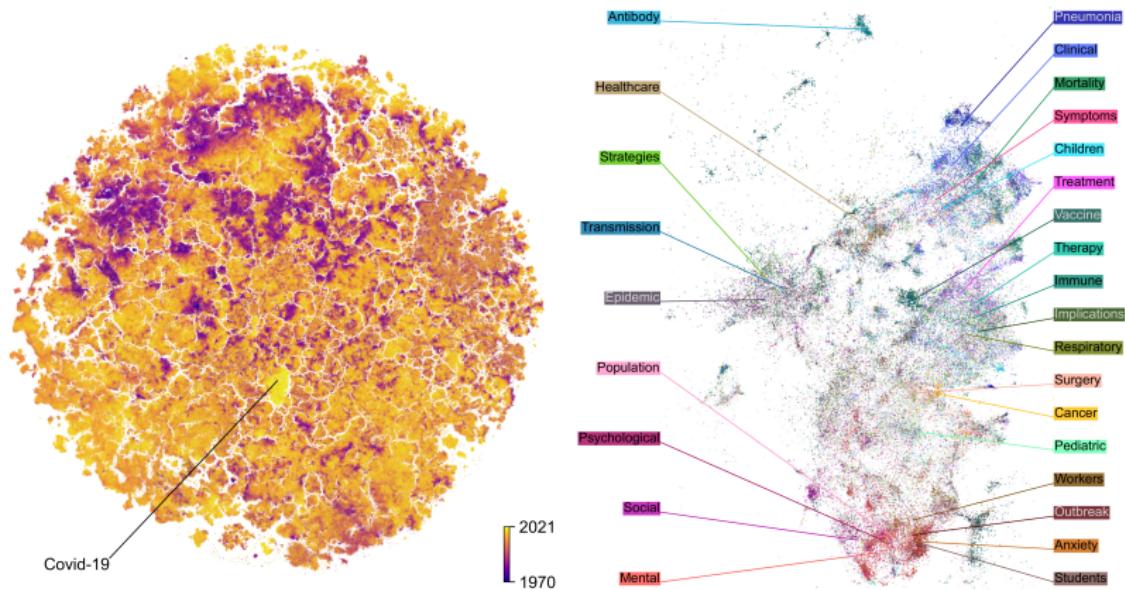
The number of publications in biomedicine and life sciences has rapidly grown over the last decades, with over 1.5 million papers now published every year. This makes it difficult to keep track of new scientific works and to have an overview of the evolution of the field as a whole. Here we present a 2D atlas of the entire corpus of biomedical literature, and argue that it provides a unique and useful overview of the life sciences research. <...>

<https://static.nomic.ai/pubmed.html> (interactive version)

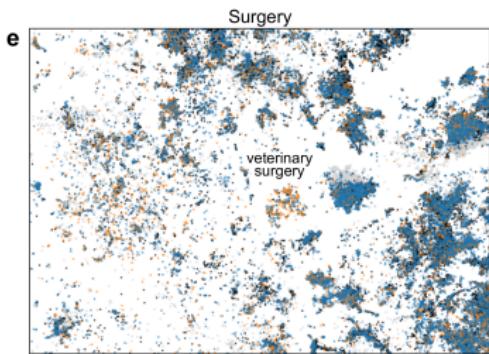
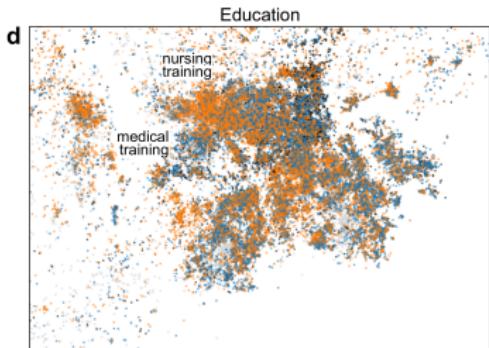
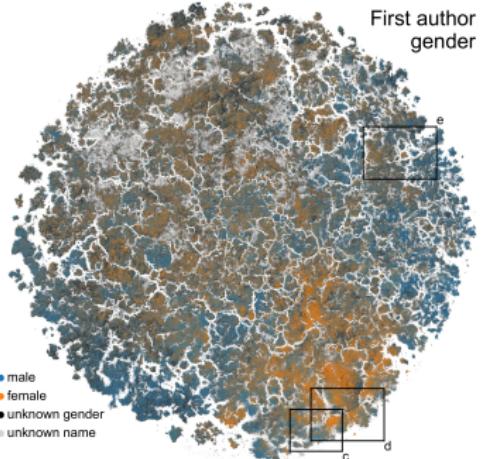
This is a preprint and has not been certified by peer review!



2D embedding of the PubMed dataset. Paper abstracts ($n = 21\text{ M}$) were transformed into 768-dimensional vectors with PubMedBERT (Gu et al. 2021) and then embedded in 2D with t-SNE (Van der Maaten and Hinton 2008). Coloured using labels based on journal titles. Unlabeled papers are shown in gray and are displayed in the background.

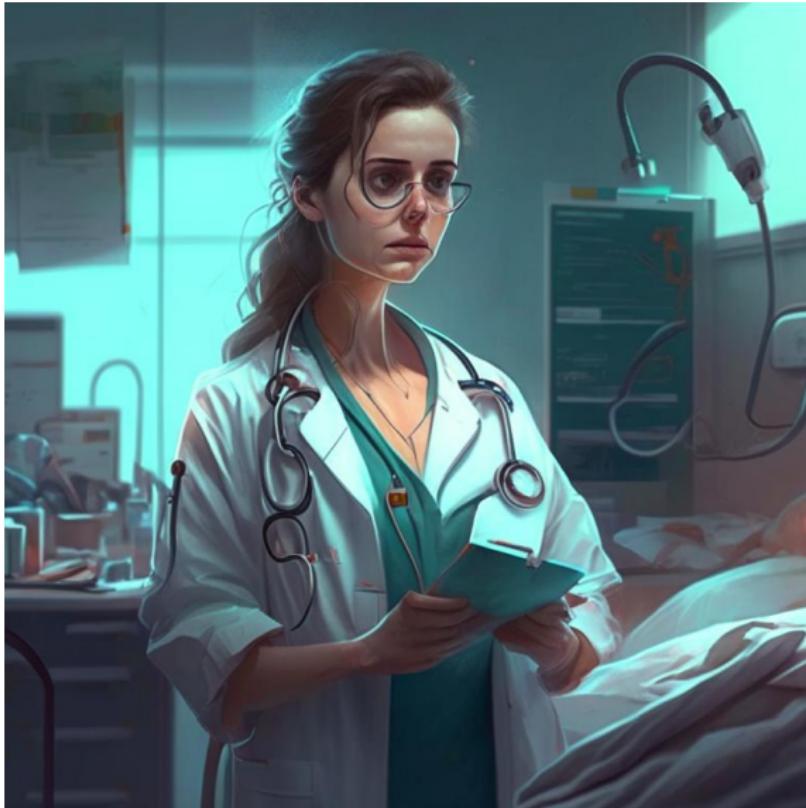


Covid-19 region of the map. Colours are assigned using labels based on paper titles. Unlabeled Covid papers are shown in the background in gray. This region in the embedding also contained some non-Covid papers (~15%) about other respiratory epidemics, they are not shown.



Papers coloured by the inferred gender of their first authors.(d–e)
Regions of the map showing within-label heterogeneity in the distribution of first authors' gender.

Reaction of professional doctors and pharmacologists



AI generated picture

How wonderful would it be to have something like this for linguistics?

- zoning of different subfields of linguistics
- interaction of different subfields of linguistics
 - can we see a boundary between morphology and syntax?
 - can we see cancer-like behavior of the Computer linguistics among all subfields of modern linguistics?
 - can we visualize the emergence of Computer linguistics?
 - can we show how strong/vague are boundaries between philology, Digital Humanity and linguistics?
 - can we visualize the history of linguistics?
 - can we see the scientific track/preferences of different researchers? E. g. if the person is a phonetician will this person also be into the computational linguistics?
 - ...

Plan

- extract abstracts from publications in linguistic journals
- use them in order to create some space of linguistic publications (one dot – one publication)
- see how linguistic journals are distributed within this space

Outline of the talk

Introduction

Our team

Data collection

Descriptive statistics

East Caucasian case study

The landscape of linguistic research?

Conclusions

Our team

- conceptualization: George Moroz, Boris Orekhov
- team leadership: George Moroz, Asya Alekseeva, Kirill Sidorov
- data curation, data analysis: George Moroz
- data gathering and annotation:
 - DH masters: Kirill Sidorov and Artyom Orekhov
 - bachelor students: Asya Alekseeva, Timofei Dedov and Angelina Stepanova
 - group of bachelor students who choose this project as a summer practice (2-week internship)

Outline of the talk

Introduction

Our team

Data collection

Descriptive statistics

East Caucasian case study

The landscape of linguistic research?

Conclusions

We have different journal lists

- Tag филология, лингвистика, медиакоммуникации from list of journals HSE uses for Academic Merit Bonus.¹

Списки журналов НИУ ВШЭ / HSE Journal Lists			
Список А / List A	Список В / List B	Список С / List C	Список D / List D
627	43	1941	36
ПОДРОБНОЕ ПОЛЕЗНОЕ КАТАЛОГИ			
<input type="checkbox"/> ANC: AUGMENTATIVE AND ALTERNATIVE COMMUNIC...	ISSN	Сл...	Категория
<input type="checkbox"/> ACROSS LANGUAGES AND CULTURES	0743-0618; 1477-...	A	БИОЛОГИЯ, МЕДИЦИНА И ЗДРАВООХРАНЕНИЕ; ФИЛО...
<input type="checkbox"/> ACTA BOREALIA	1565-1923; 1588-...	A	ФИЛОЛОГИЯ, ЛИНГВИСТИКА И МЕДИАКОММУНИКАЦИ...
	0800-3831; 1503-...	A	МОРОСТВО И ГУМАНИТАРНЫЕ НАУКИ; ИСТОРИЯ, АРХ...

- Tag 6162 Languages from journal rankings from [Finish Publication Forum](#)

Level	Title	Rank
1	AALITRA REVIEW	1
2	ACROSS LANGUAGES AND CULTURES	2
1	ACROSS THE DISCIPLINES	3
1	ACTA ACUSTICA	4

¹As far as I know, we are not allowed to disclosure those lists outside the HSE. However, right now they are available without any checks for HSE affiliation.

Journal lists

After we gathered journal lists we annotated them according to personal beliefs on what is linguistics, and what is not (tags: linguistics (232), interdisciplinary (203), language_learning (26) and some others).

There is also a side-project on annotation of journals for literature science (tags: literary_studies (168), interdisciplinary (253), philology (12) and some others).

After manual annotation 231 (16%) journals out of 1421 have tag linguistics. 1334 journals have not yet been annotated.

HSE level	Helsenki level				
	a	b	c	d	NA
a	50	51	22	1	1
b	1	3	12	NA	3
c	NA	7	42	1	37

Abstracts extraction

- We planed to scrap all papers' metadata from the journals' web-pages

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- Then we discovered the `Crossref` database and the `rcrossref` package ([Chamberlain et al. 2022](#)) for R
- Then we discovered the `OpenA1ex` database and the `openalexR` package ([Aria and Le 2023](#)) for R

Abstracts extraction: scrapping journal web-pages

Since journals can be grouped by the publishers it is possible to write a web-scraper for the group of journals from one publisher. However there were some problems:

- blocking the IP address
- a lot of old publication are digitized in the form of the first page pdf
- change of the title and ISSN² of the journal
- change of the publisher of the journal
- there are still some mistakes on the journal websites

The screenshot shows a SpringerLink article page for 'Russian Linguistics'. The URL is https://doi.org/10.1007/BF02743731. The page displays the title 'БЪЛГАРСКИ БЫТА / ъжъки дуХОВ НОИ КУЛЬТУРЫ' and the journal information 'Russian Linguistics | 14, 129–146 (1990) | Cite this article'. It shows metrics: 18 Accesses, 3 Citations, and Metrics. A note says 'This is a preview of subscription content, access via your institution.' On the right, there's an 'Access via your institution' section with a link to 'Buy article PDF' for 39,95 €.

²ISSN (International Standard Serial Number) — eight-digit serial number used to uniquely identify a serial publication.

Abstracts extraction: Crossref

Crossref is a digital object identifier (DOI) Registration Agency that provide an API to their database. Crossref does not provide a full text or abstracts of papers, however at the begining we used it in order to gather papers' metadata.

The last change of the pipeline for gathering data (30.04.2023) made this database non-relevant to the project.

Abstracts extraction: OpenAlex

[OpenAlex](#) is a free and open catalog of the world's scholarly papers, researchers, journals, and institutions. [OpenAlex](#) provide free well-documented API that make it possible to download all journal papers' metadata and abstracts using a list of journals' ISSNs (40 lines of R code).

In the further work we will discuss the result based on 222 linguistic journals downloaded from [OpenAlex](#).

The main advantage of the [OpenAlex](#) database is that they provide a concept information for each paper.

Abstracts extraction: OpenAlex concepts

Magnusson, E., Nauclér, K. (1993). The development of linguistic awareness in language-disordered children. *First language*, 13(37), 93–111.

This paper concerns the development of linguistic awareness in language-disordered children, and the role of linguistic and cognitive factors in this development. A longitudinal study was conducted with 39 language-disordered and a matched group of 39 normally-speaking children. Phonological awareness and other abilities were tested from preschool to Grade 4. Various comparisons were made of the abilities of the two groups. The findings indicate the importance of language comprehension and of syntactic production, but not of phonology, for the development of phonological awareness.

concepts	level	score
Linguistics	1	0.7674719
Psychology	0	0.5576790
Language development	2	0.5576040
Philosophy	0	0.1505756

Abstracts extraction: OpenAlex concepts

Arkadiev, P. M. (2023). Finiteness in morphology and syntax: Evidence from Abaza. *Voprosy Jazykoznanija*, (1), 103–131.

The article surveys morphological and syntactic ramifications of finiteness and nonfiniteness of verbal forms in the polysynthetic Abaza language (Northwest Caucasian, Karachay-Cherkessia). In Abaza, a whole range of morphological phenomena exhibit more or less robust correlations with dependent resp. subordinate status of the clause. However, I show that none of these phenomena can be treated as an unequivocal indicator of (non)finiteness, paying particular attention to several types of verbal forms that combine morphological features of both finiteness and nonfiniteness. Hypotheses motivating these “paradoxical” constellations of properties are put forward.

concepts	level	score
Syntax	2	0.7972705
Linguistics	1	0.7173848
Morphology (biology)	2	0.6633695
Range (aeronautics)	2	0.4956700
Psychology	0	0.4723184
Morpheme	2	0.4599627
Mathematics	0	0.3435510
Philosophy	0	0.2382300
Biology	0	0.0801864
Genetics	1	0.0000000
Materials science	0	0.0000000
Composite material	1	0.0000000

Abstracts extraction: OpenAlex concepts

OpenAlex has about 65k concepts that are listed in [this spreadsheet](#). Concepts are hierarchical and are stored in six layers. It is modified version of the similar tree made in ([Shen et al. 2018](#)) (based on Microsoft Academic Graph ([Sinha et al. 2015](#))).

Each work is tagged by a classifier with multiple concepts, based on the title, abstract, and the journal name. The classifier was trained on corpus of Microsoft Academic Graph.

Outline of the talk

Introduction

Our team

Data collection

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East Caucasian case study

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Data structure: 298759 rows and 19 columns

- **id:** <https://openalex.org/W3040611730>
- **doi:** <https://doi.org/10.1075/fol.18056.dob>
- **author:** Nina Dobrushina
- **title:** Negation in complement clauses of fear-verbs
- **publication_year:** 2021
- **journal:** Functions of Language
- **issn_l:** 0929-998X
- **first_page:** 121
- **last_page:** 152
- **volume:** 28
- **issue:** 2
- **is_retracted:** FALSE
- **cited_by_count:** 1
- **abstract:** Complement clauses of verbs of fear often contain expletive negation, which is negative marking without negative meaning. <...>
- **concepts:** Negation; Complement (music); Linguistics; Verb; Meaning (existential); Psychology; Mathematics; Computer science; Philosophy; Biochemistry; Chemistry; Complementation; Psychotherapist; Gene; Phenotype
- **tags_level:** 2; 5; 1; 2; 2; O; O; O; O; O; 1; O; 4; 1; 2; 3

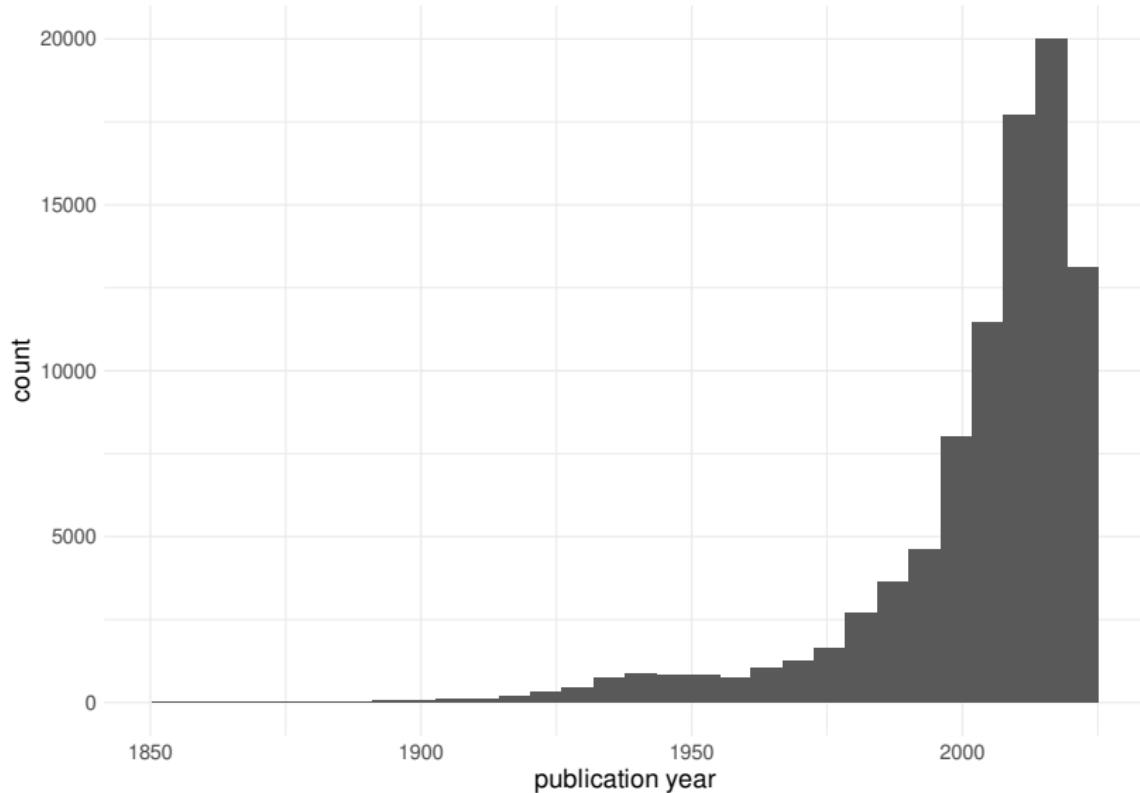
Data cleaning

Let's analyze:

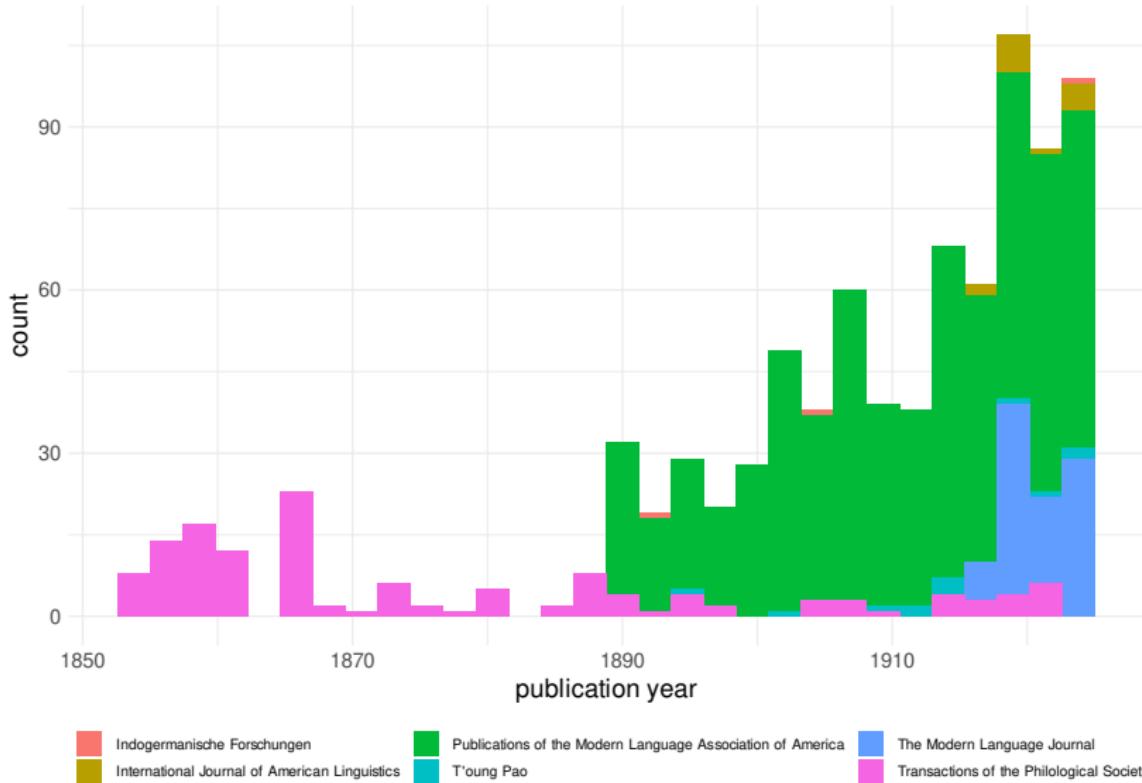
- papers with title and abstracts in English (remove 191403)
- non-retracted papers (remove 5)
- papers with journal affiliation (remove 940)
- papers with authors (remove 4378)
- papers with abstracts longer than 250 symbols (remove 12396)
- papers with abstracts with “No Access” and “Research Article|” notes (remove 1384)
- papers with non-duplicated abstract (remove 5177)

Previous articleNext article No Access Phonology of Alaskan Eskimo, Kuskokwim Dialect Anthony Mattina Anthony Mattina Search for more articles by this author PDF PDF PLUS Add to favorites Download Citation-Track Citations Permissions Reprints Share on Facebook Twitter LinkedIn Reddit Email Sections More Details Figures References Cited by International Journal of American Linguistics Volume 36, Number 1 Jan., 1970 Article DOI <https://doi.org/10.1086/465087> Views: 4 Total views on this site PDF download Crossref reports no articles citing this article.

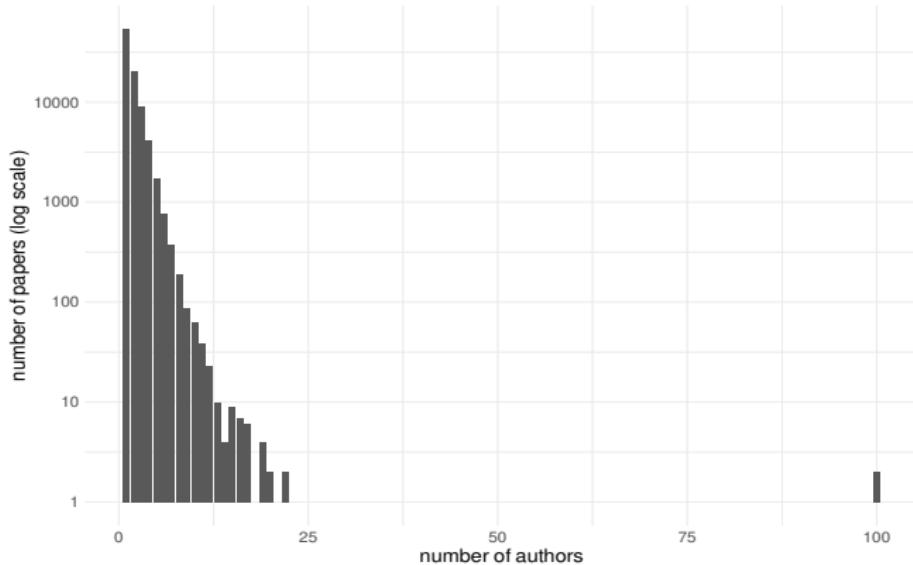
Papers by year



Papers by year (publication year < 1925)



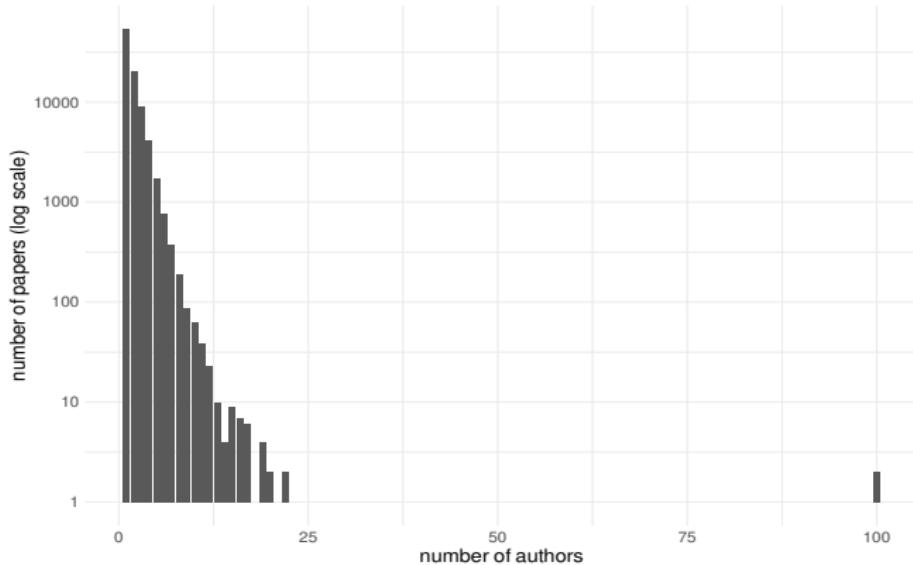
Number of citations



As we see, there is a limit for maximum number of authors. There are two papers with 100 authors:

- Looking Backward, Looking Forward: MLA Members Speak (Alliston et al. 2000) and ...

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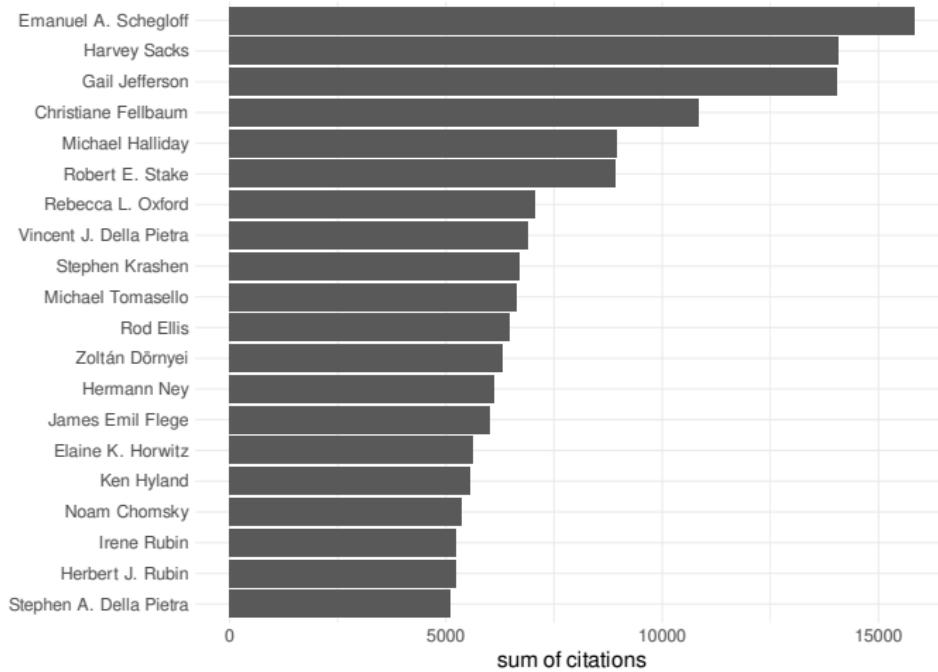
- Looking Backward, Looking Forward: MLA Members Speak (Alliston et al. 2000) and ...
- Universal Dependencies (De Marneffe et al. 2021)

The most cited so-called “papers”

author	year	title
Robert E. Stake	1996	The Art of Case Study Research
Christiane Fellbaum	2000	WordNet: An Electronic Lexical Database
Harvey Sacks et al.	1974	A Simplest Systematics for the Organization of Turn-Taking for Conversation
Michael Halliday	1989	Introduction to Functional Grammar
Herbert J. Rubin et al.	1996	Qualitative Interviewing: The Art of Hearing Data
Harvey Sacks et al.	1974	A simplest systematics for the organization of turn-taking for conversation
H. Douglas Brown	1981	Principles of Language Learning and Teaching
Thomas K. Landauer et al.	1998	An introduction to latent semantic analysis
David Silverman	1997	Interpreting Qualitative Data Methods for Analysing Talk, Text and Interaction
George A. Miller et al.	1990	Introduction to WordNet: An On-line Lexical Database
Franz Josef Och et al.	2003	A Systematic Comparison of Various Statistical Alignment Models
Stephen Krashen	1983	Principles and Practice in Second Language Acquisition
Emanuel A. Schegloff et al.	1977	The preference for self-correction in the organization of repair in conversation
Peter Brown et al.	1993	The mathematics of statistical machine translation: parameter estimation
Rod Ellis	1996	The Study of Second Language Acquisition

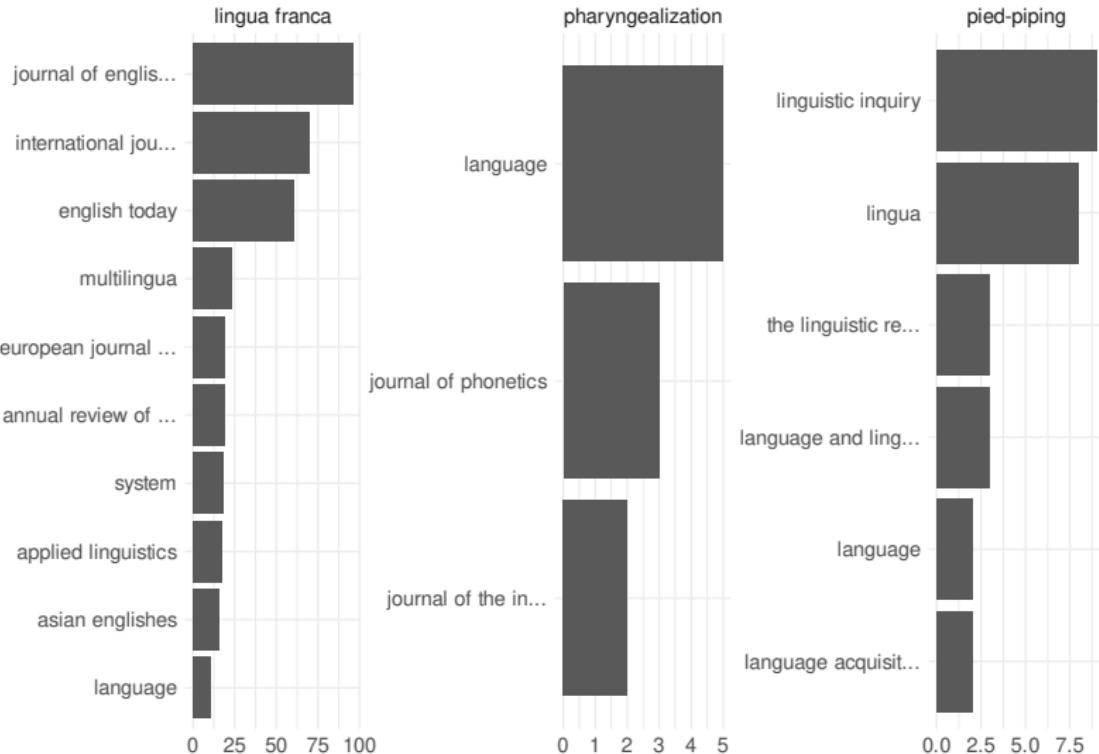
- *The Art of Case Study Research* (Stake 1995), *Introduction to Functional Grammar* (Halliday 1985), *The art of hearing data* (Rubin and Rubin 1995), *Principles of Language Learning and Teaching*, *Interpreting Qualitative Data Methods for Analysing Talk, Text and Interaction*, *Principles and Practice in Second Language Acquisition* are actually books. However the DOIs lead to reviews.
- duplicates with different DOI, see (Sacks et al. 1978)

The most cited authors



- Non-unified names
 - Peter M. Arkadiev vs. Peter Arkadiev;
 - Martin Haspelmath vs. Haspelmath Martin
- Some people are stored in a weird way: Michael E Daniel

Search through the abstracts



Outline of the talk

Introduction

Our team

Data collection

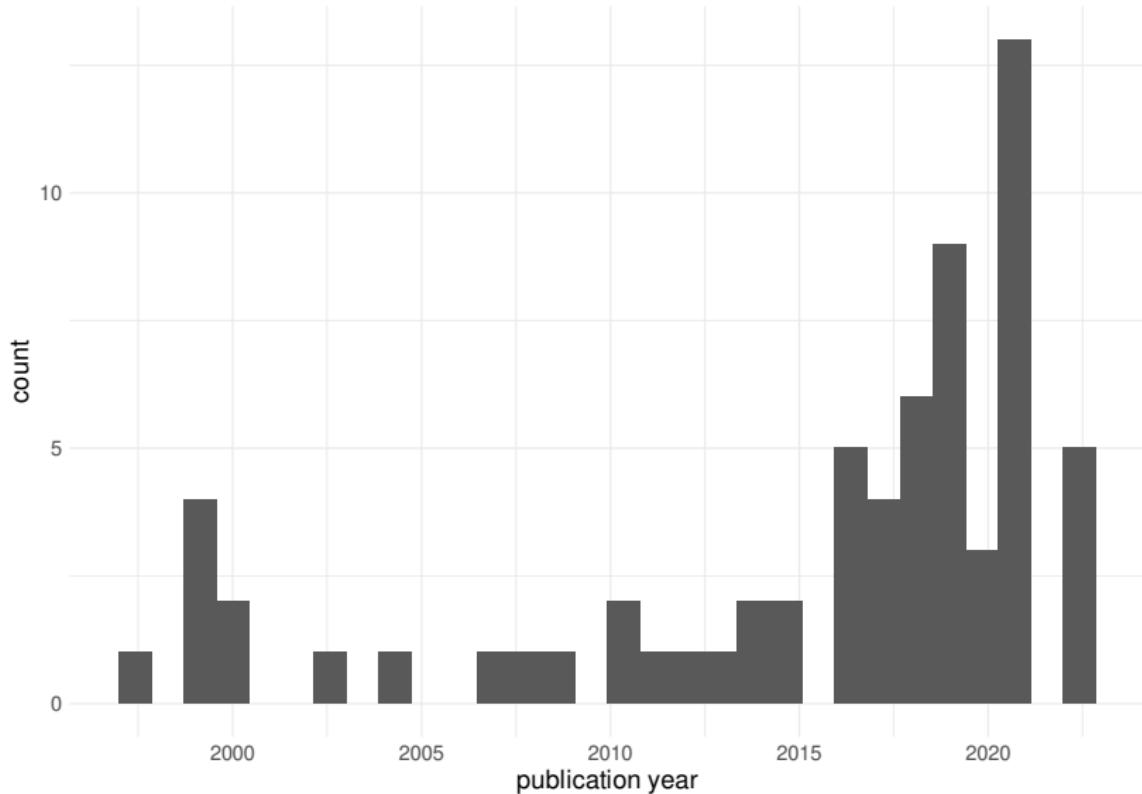
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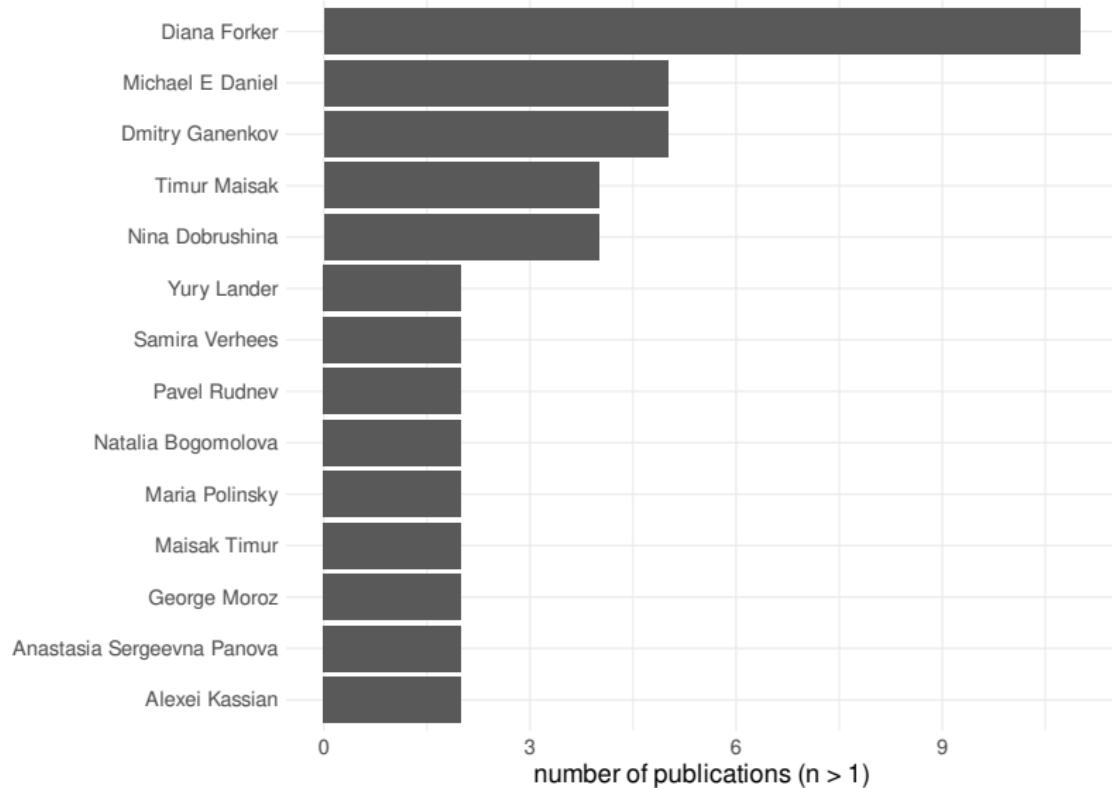
The landscape of linguistic research?

Conclusions

Abstracts contain *East Caucasian, Dag(h)estan, Lezgic, Andic, Nakh, or Tsezic*



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Outline of the talk

Introduction

Our team

Data collection

Descriptive statistics

East Caucasian case study

The landscape of linguistic research?

Conclusions

TF-IDF (term frequency–inverse document frequency) is a measure that is intended to reflect how important a word is to a document in a collection or corpus.

TF (term frequency) is a frequency of a unit. For instance if a unit appears n times in a text of length m , then TF value is $\frac{n}{m}$.

IDF (inverse document frequency) is a measure of how much information the word provides. If a unit appears in j documents of the collection of k documents, then IDF is $\log_{10} \frac{j}{k}$.

5 keywords gathered by TF-IDF

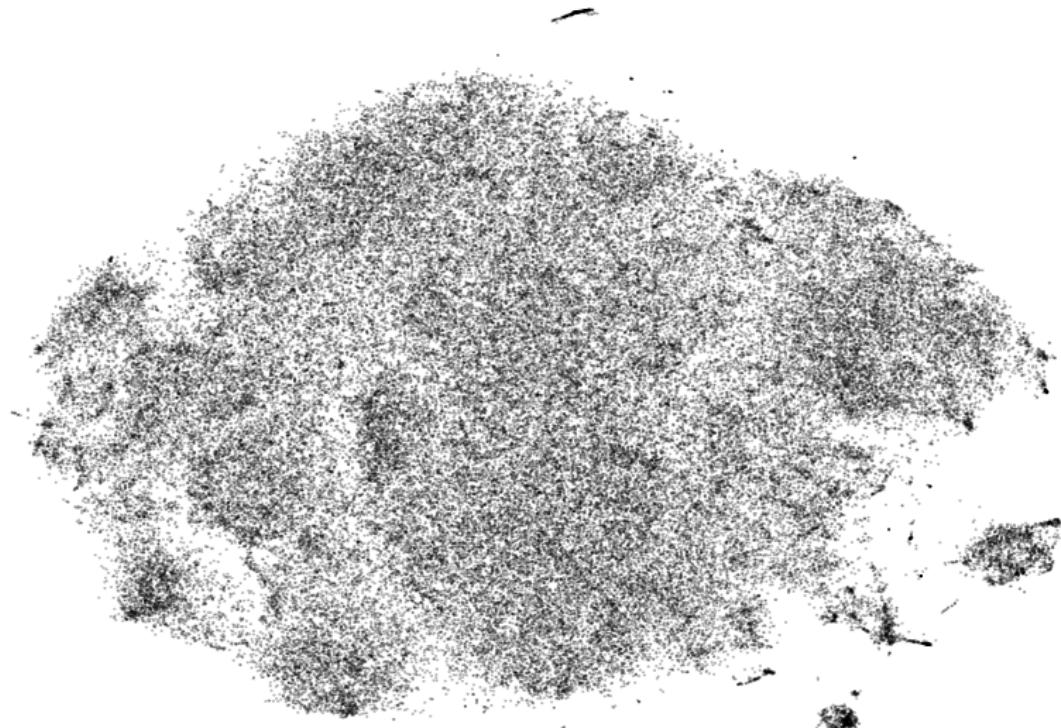
journal	keywords
american speech	american; slang; search; dictionary; dialect
applied psycholinguistics	children; sli; l2; phonological; reading
computational linguistics	parsing; algorithm; nlp; computational; algorithms
discourse processes	readers; inferences; comprehension; causal; experiment
first language	children; mothers; children's; child; maternal
folia phoniatrica et logopaedica	vocal; patients; voice; vhi; dysarthria
international journal of bilingualism	originality; bilinguals; bilingual; l2; objectives
international journal of speech-language pathology	slps; pathologists; pathology; aphasia; clinical
itl – international journal of applied linguistics	learners; students; l2; vocabulary; learning
journal of child language	children; children's; infants; olds; mothers
journal of english for academic purposes	eap; academic; students; writing; writers
journal of language identity and education	identities; identity; students; teachers; classroom
journal of neurolinguistics	aphasia; patients; brain; n400; gyrus
journal of phonetics	vowel; acoustic; listeners; duration; vowels
journal of the international phonetic association	ipa; vowel; acoustic; phonetic; vowels
language	book; chapters; chapter; reviewed; volume
language culture and curriculum	teachers; students; education; teaching; programme
language testing	takers; raters; assessment; scores; rasch
lingua	wh; verb; syntax; clause; phonological
linguistic approaches to bilingualism	bilinguals; l2; bilingual; li; heritage
linguistic inquiry	wh; ellipsis; squib; movement; search
linguistics and education	students; classroom; teachers; teacher; literacy
meta: translators' journal	translation; translators; translator; translations; interpreting
modern language notes	literary; philosophy; critics; philosophical; poetry
modern language quarterly	search; quarterly; icon; toolbar; cite
multilingua	politeness; multilingual; policy; practices; language
names: a journal of onomastics	names; placenames; naming; nicknames; surnames
natural language engineering	machine; extraction; nlp; algorithm; parsing
oceanic linguistics	oceanic; austronesian; polynesian; proto; vanuatu
phonetica	vowel; vowels; duration; acoustic; syllable
phonology	phonological; stress; vowel; phonology; tone
second language research	l2; li; learners; korean; acquisition

Word Embedding

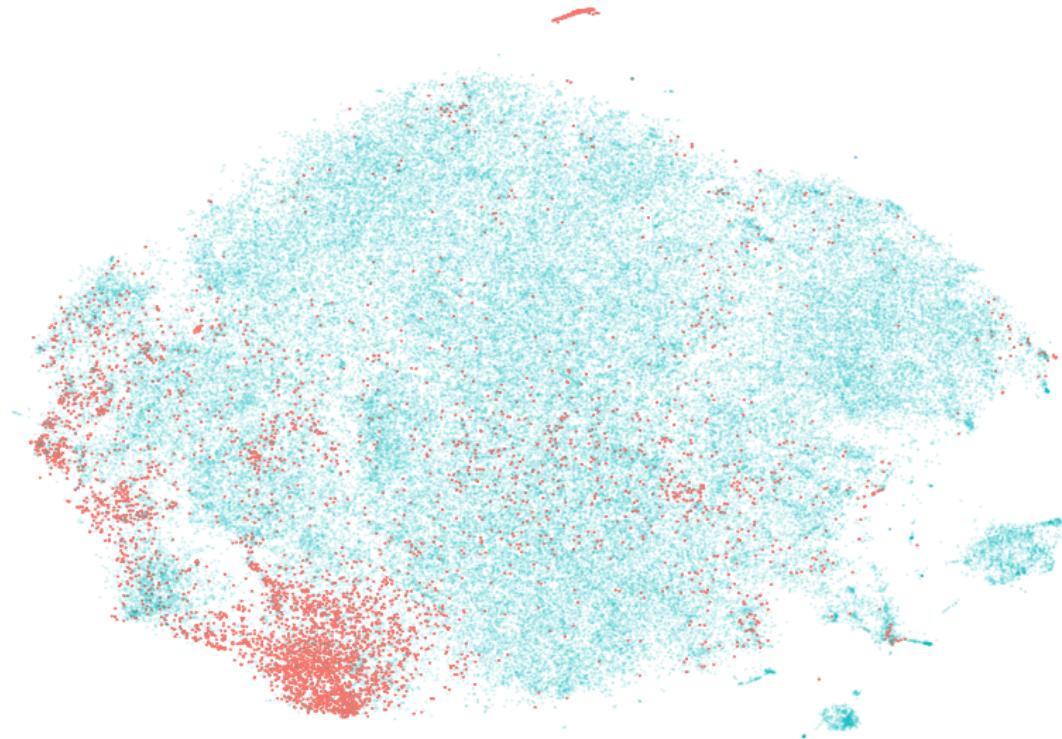
In order to create the landscape of linguistics as in
(Gonzalez-Marquez et al. 2023) we

- used the GloVe language model dataset (Pennington et al. 2014) that represent 6 billion words in 300-dimensional space;
- averaged values within dimension for all words in each abstract;
- use t-SNE algorithm (Van der Maaten and Hinton 2008) in order to reduce 300 dimensions to two

The landscape of linguistic research

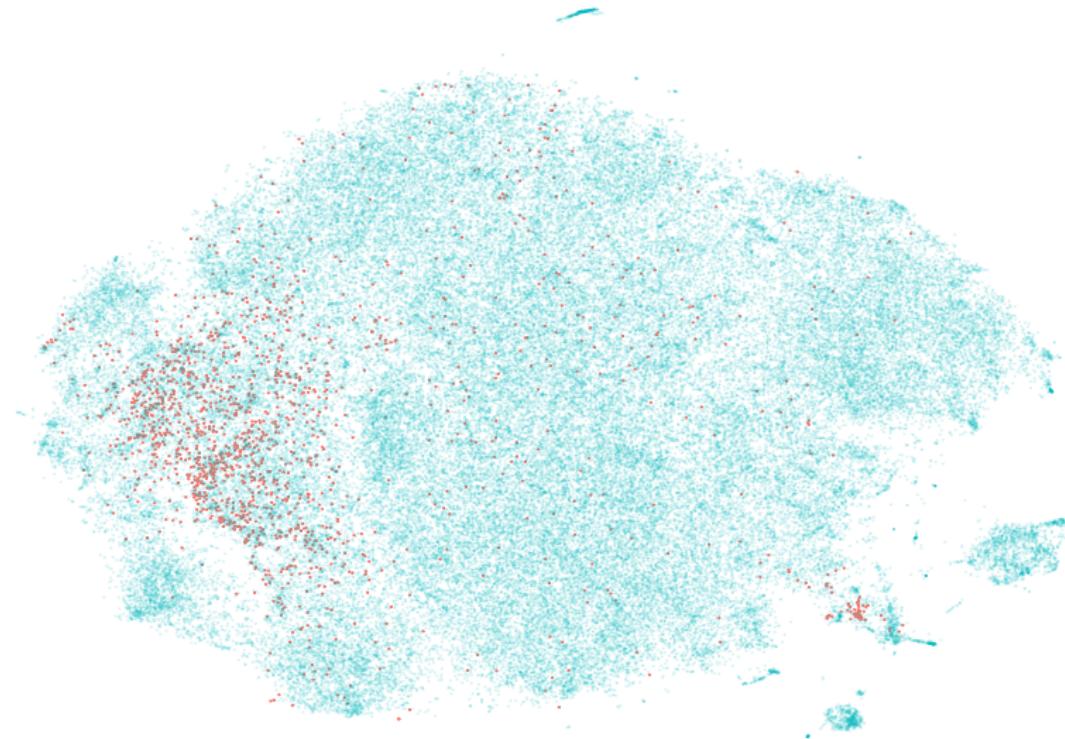


Phonetics and phonology (based on journal titles)

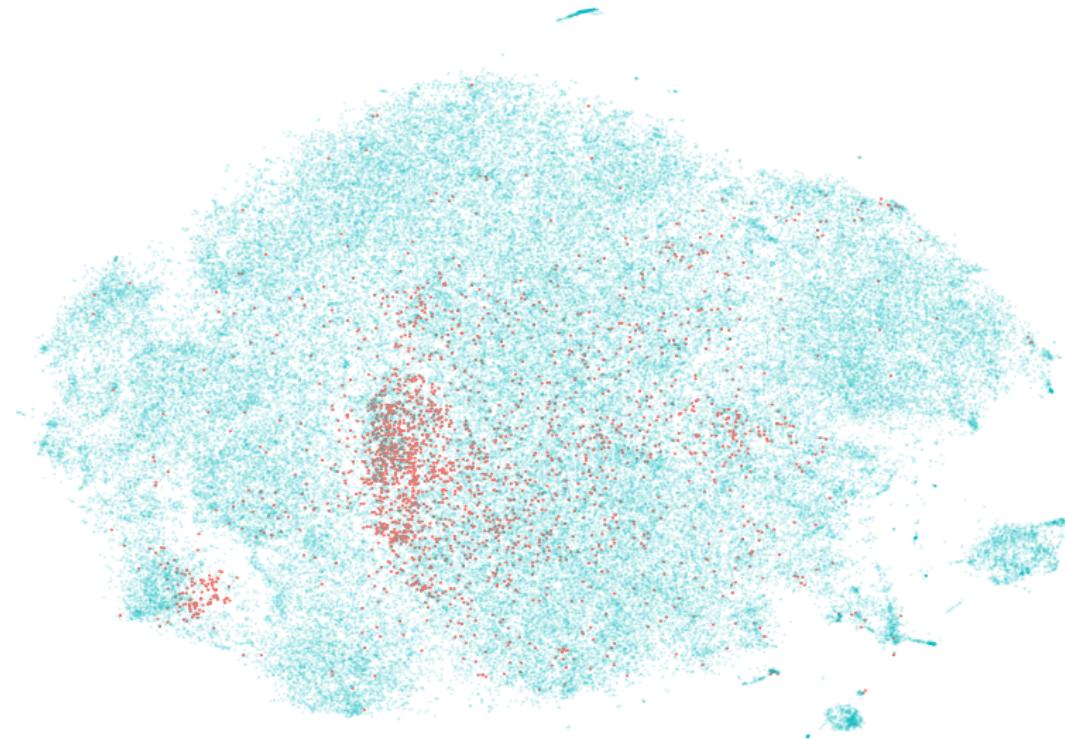


Folia Phoniatrica Et Logopaedica; Journal of Phonetics; Laboratory Phonology; Journal of the International Phonetic Association; Phonetica; Phonology

Psycholinguistics (based on journal titles)

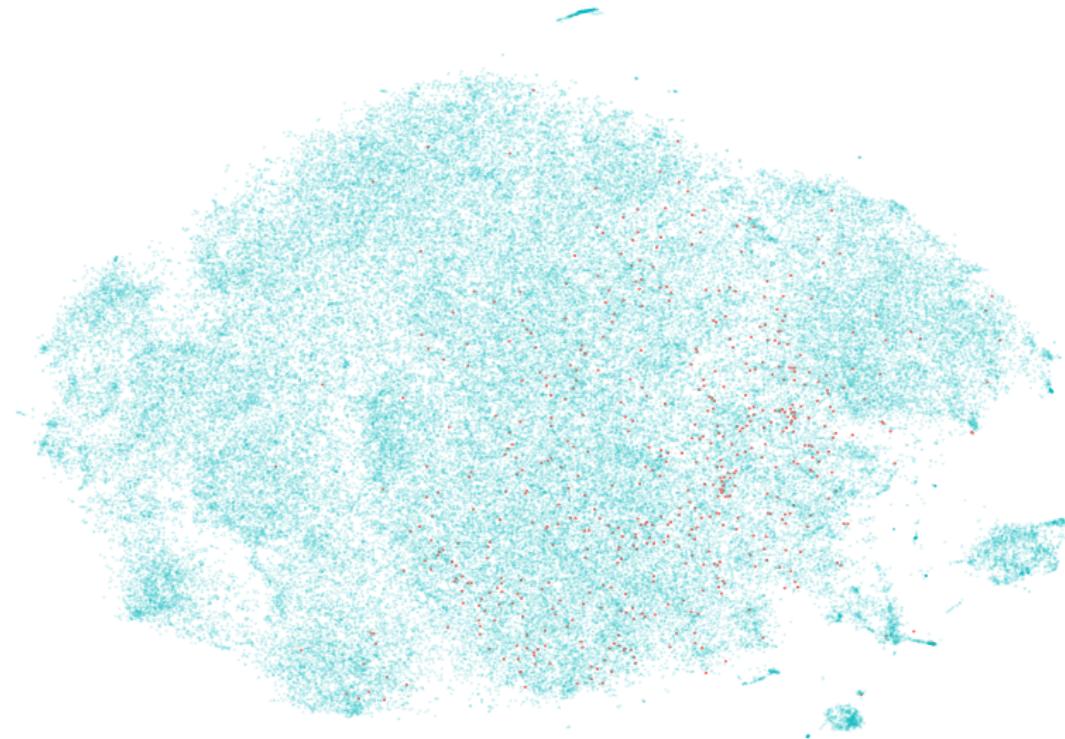


Corpus/comput/quant (based on journal titles)



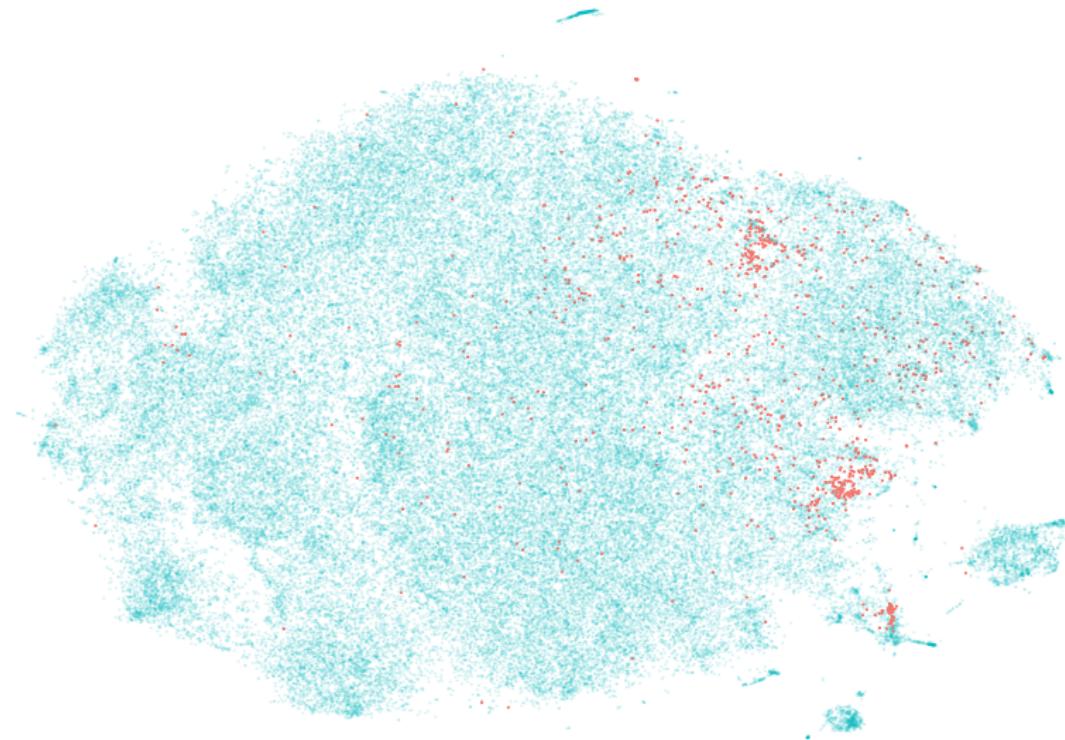
Corpus Linguistics and Linguistic Theory; Corpora; Computational Linguistics; Corpus pragmatics; International Journal of Corpus Linguistics; Journal of Quantitative Linguistics; Machine Translation

Historical linguistics (based on journal titles)

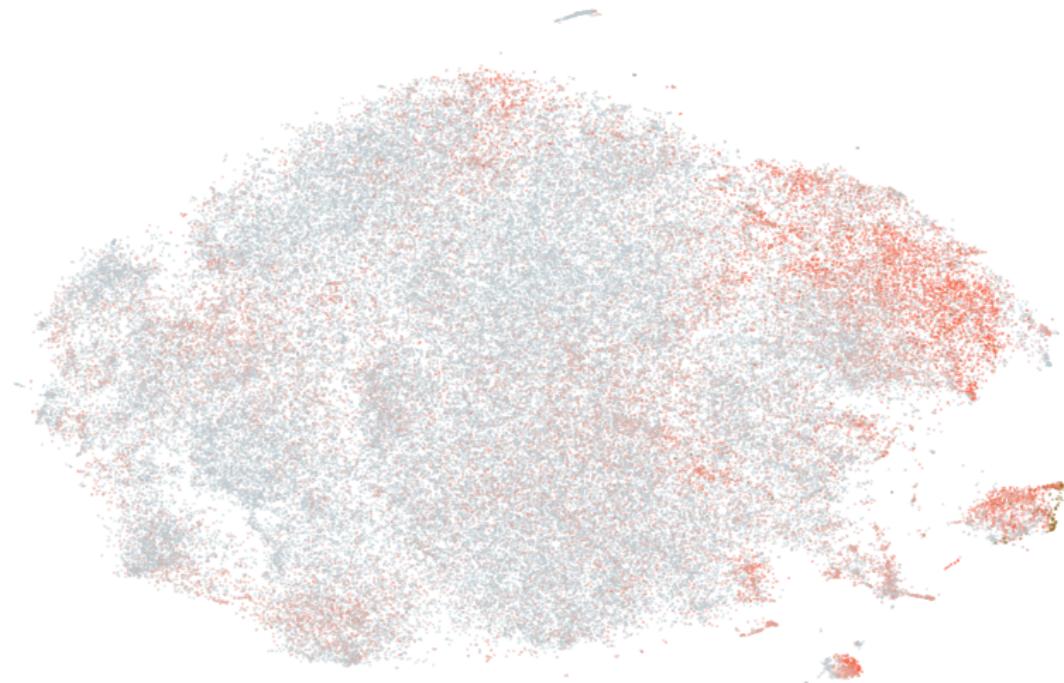


Folia Linguistica Historica; Histoire épistémologie langage; Histoire Épistémologie Langage; Journal of Historical Pragmatics; Journal of historical linguistics

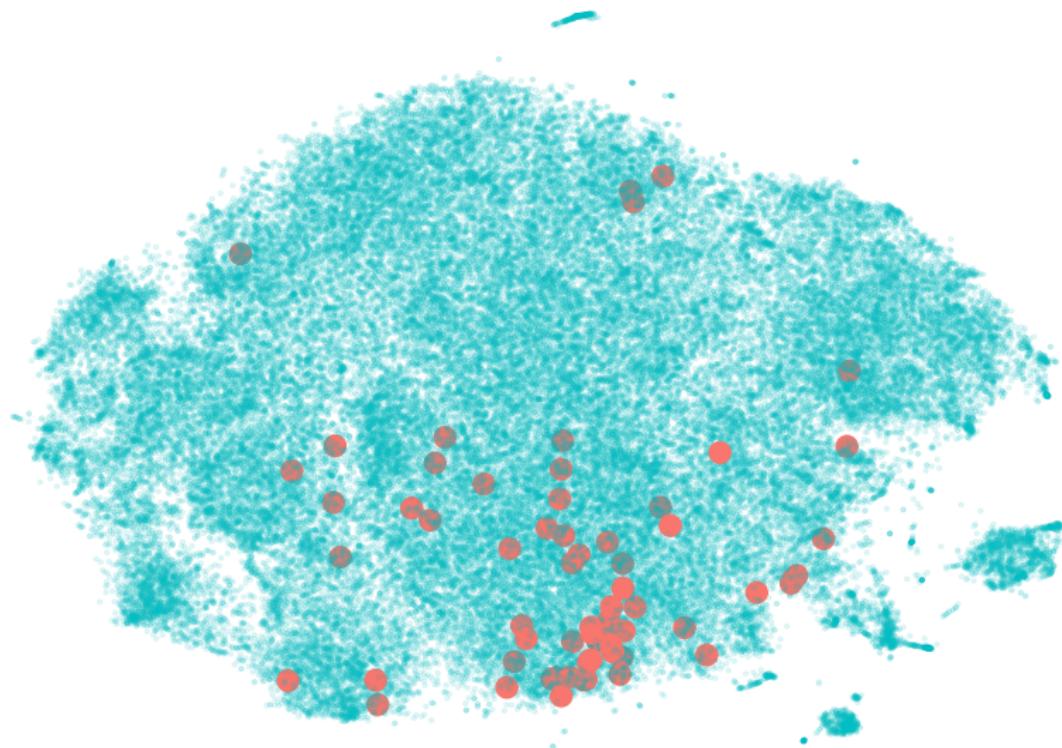
Onomastics (based on journal titles)

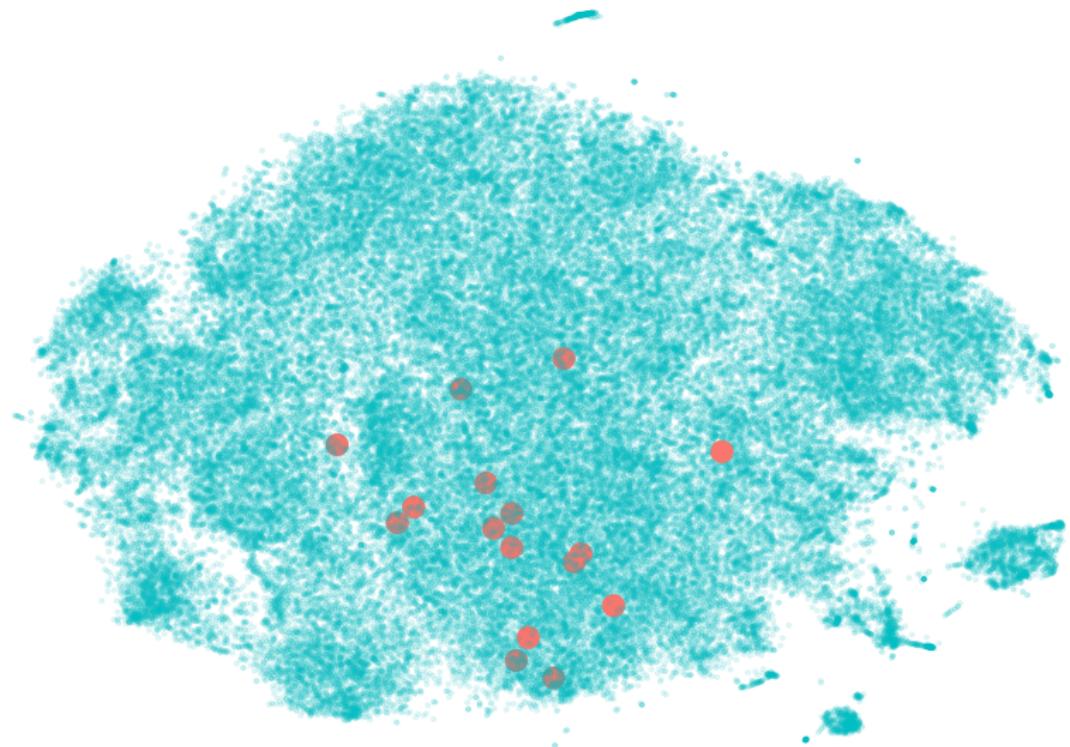


Publications by year



East Caucasian research (based on abstracts)





Outline of the talk

Introduction

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Descriptive statistics

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The landscape of linguistic research?

Conclusions

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Conclusions

- We need to explore gathered space
- We need to analyze concepts from OpenAlex
- We need to go bottom up from papers not from the journals
- We still need to annotate a lot of journals
- Unfortunately journal annotation should be crosschecked
- We can not generalize knowledge gathered from journals on the whole field of linguistics: it is universities who make us think that books and chapters in volumes are not significant

Thank you for your attention!

References

April Alliston, Elizabeth Ammons, Jean Arnold, Nina Baym, Sandra L Beckett, Peter G Beidler, Roger A Berger, Sandra Bermann, JJ Wilson, Troy Boone, et al. Looking backward, looking forward: Mla members speak. *Publications of the Modern Language Association of America*, pages 1986–2076, 2000.

Massimo Aria and Trang Le. *openalexR: Getting Bibliographic Records from 'OpenAlex' Database Using 'DSL' API*, 2023. URL <https://CRAN.R-project.org/package=openalexR>. R package version 1.0.2.9.

Scott Chamberlain, Hao Zhu, Najko Jahn, Carl Boettiger, and Karthik Ram. *rcrossref: Client for Various 'CrossRef' APIs*, 2022. URL <https://CRAN.R-project.org/package=rcrossref>. R package version 1.2.0.

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