Культуромика

можно ли «делать науку» в Google Ngram Viewer?

Цель этого блока

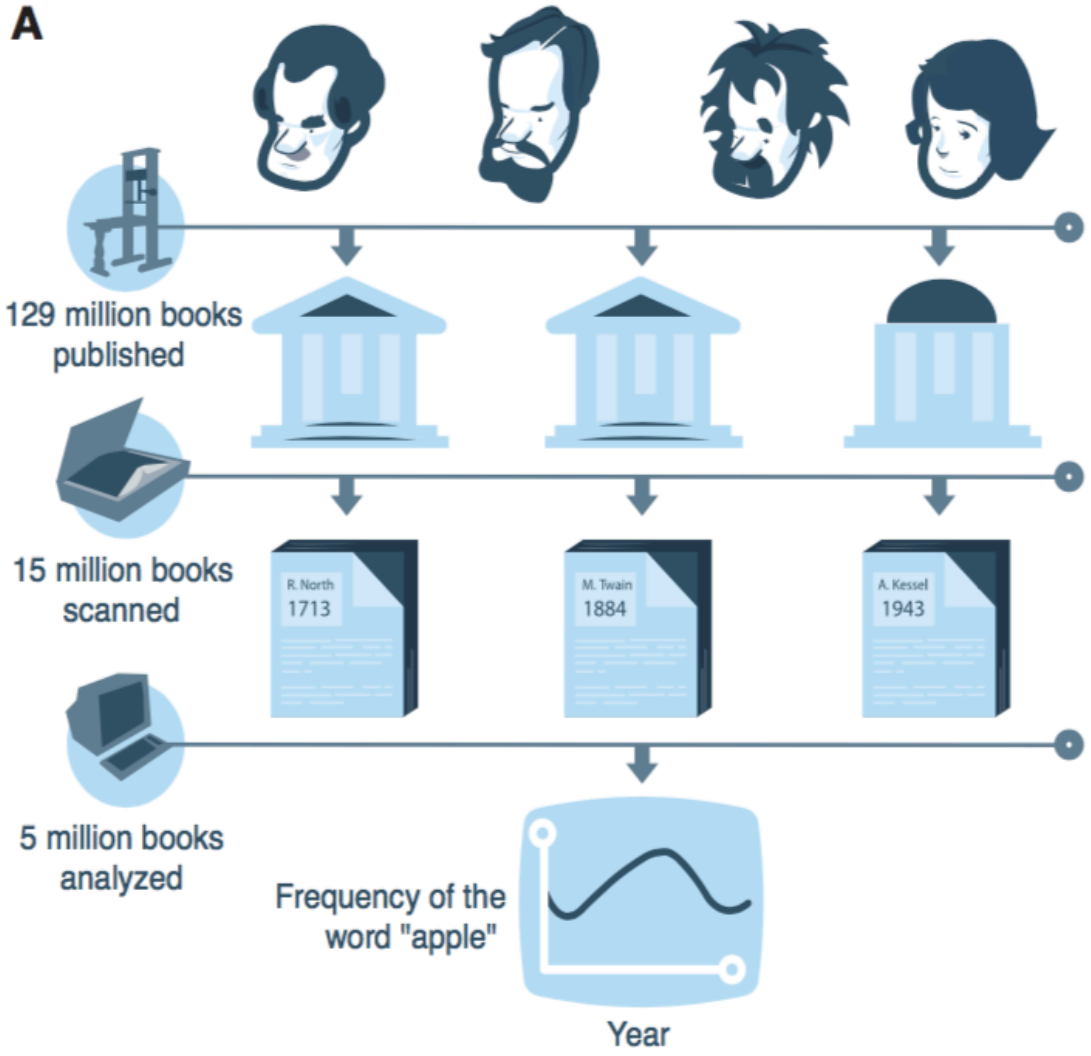
- Познакомиться с идеей культуромики
- Посмотреть на примеры культуромики
- Почитать критику культуромики
- Понять, можно ли сделать «культуромику здорового человека»

С чего все началось?

We constructed a corpus of digitized texts containing about 4% of all books ever printed. Analysis of this corpus enables us to investigate cultural trends quantitatively.
[*Мы собрали корпус оцифрованных текстов, в котором содержится около 4% всех когда либо напечатанных книг. Анализ этого корпуса позволяет нам делать количественные исследования культурных трендов*]

Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182., перевод мой

Google Books



Корпус Google Books действительно большой

- The corpus cannot be read by a human. If you tried to read only the entries from the year 2000 alone, at the reasonable pace of 200 words/minute, without interruptions for food or sleep, it would take eighty years.
- The sequence of letters is one thousand times longer than the human genome: if you wrote it out in a straight line, it would reach to the moon and back 10 times over.
- The resulting corpus contains over 500 billion words, in English (361 billion), French (45B), Spanish (45B), German (37B), Chinese (13B), Russian (35B), and Hebrew (2B)

Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182.

Но впечатлило всех не это, а масштаб замысла

<…> this approach can provide insights about fields as diverse as lexicography, the evolution of grammar, collective memory, the adoption of technology, the pursuit of fame, censorship, and historical epidemiology.
[<…> этот подход может дать новое знание в широком спектре областей: лексикографии, эволюции, исследованиях коллективной памяти, скорости внедрения технологий, феноменов славы и популярности, а также цензуры и исторической эпидемиологии]

Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182., перевод мой

В статье был замах на «новую науку»

“Culturomics” extends the boundaries of rigorous quantitative inquiry to a wide array of new phenomena spanning the social sciences and the humanities.
[“Культуромика” расширяет границы точных количественных исследований, распространяясь на множество гуманитарных и социальных феноменов.]

Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182., перевод мой

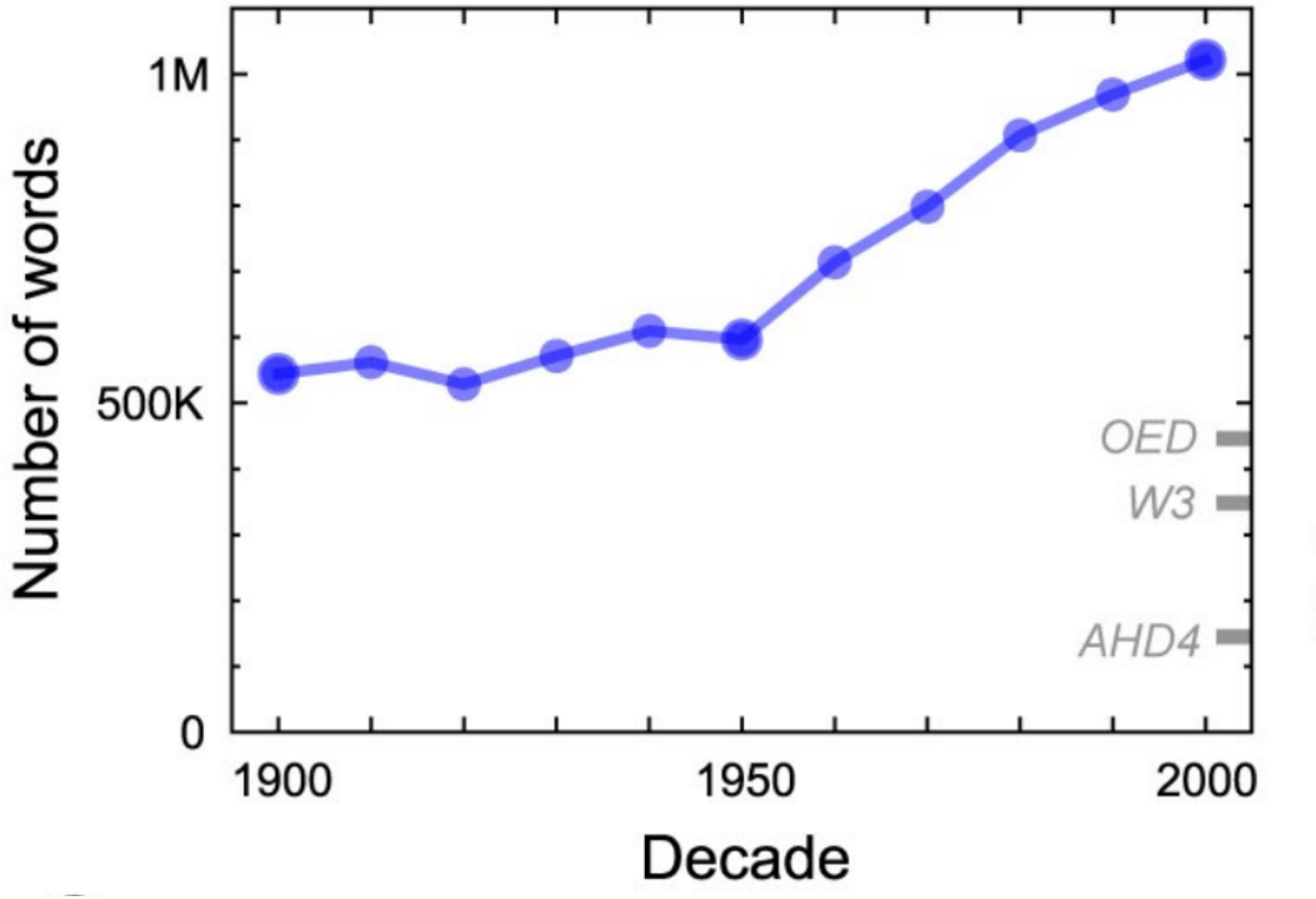

Science
14 January 2011 • 331

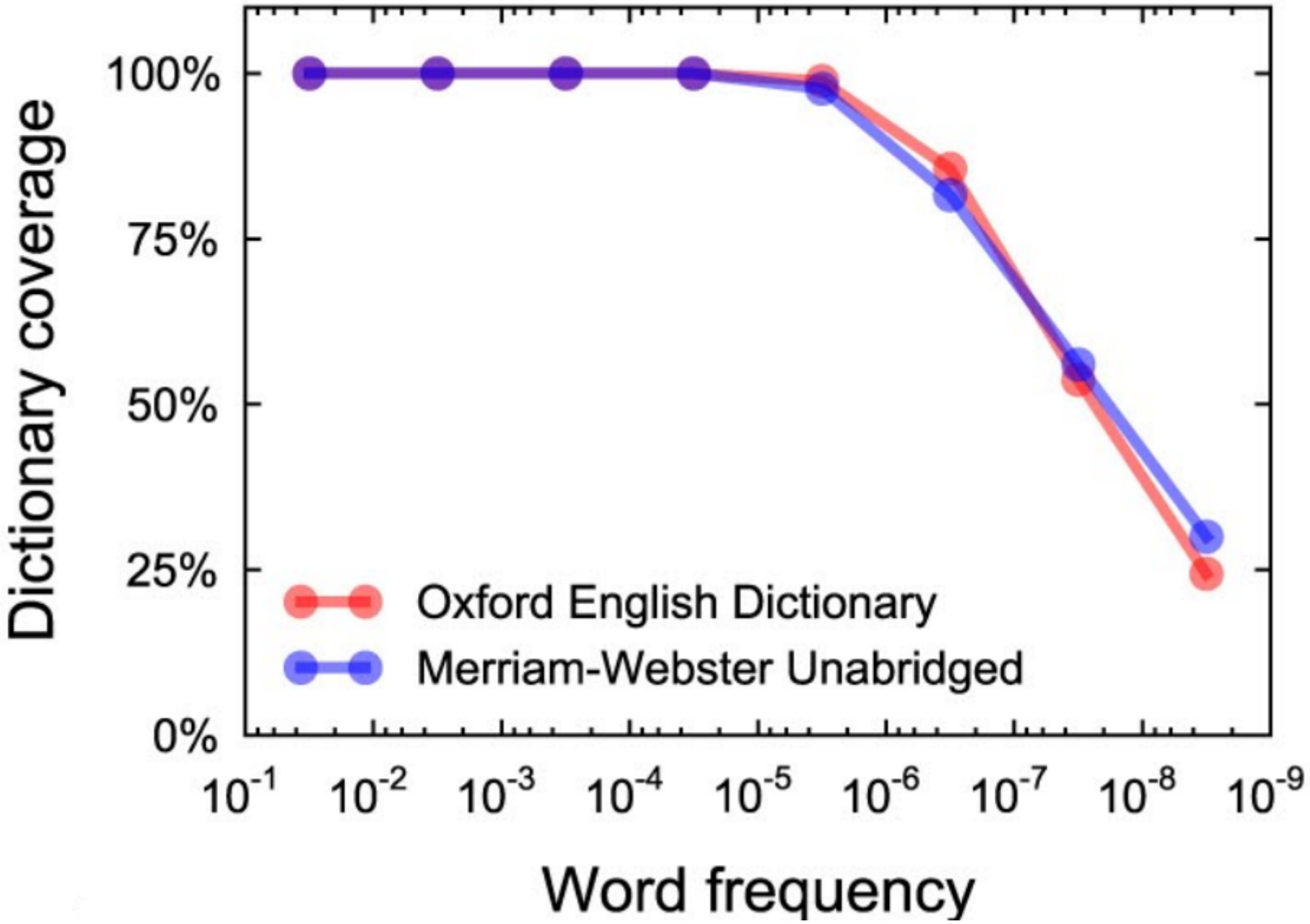
В тот же день открылся Google Ngram Viewer

books.google.com/ngrams

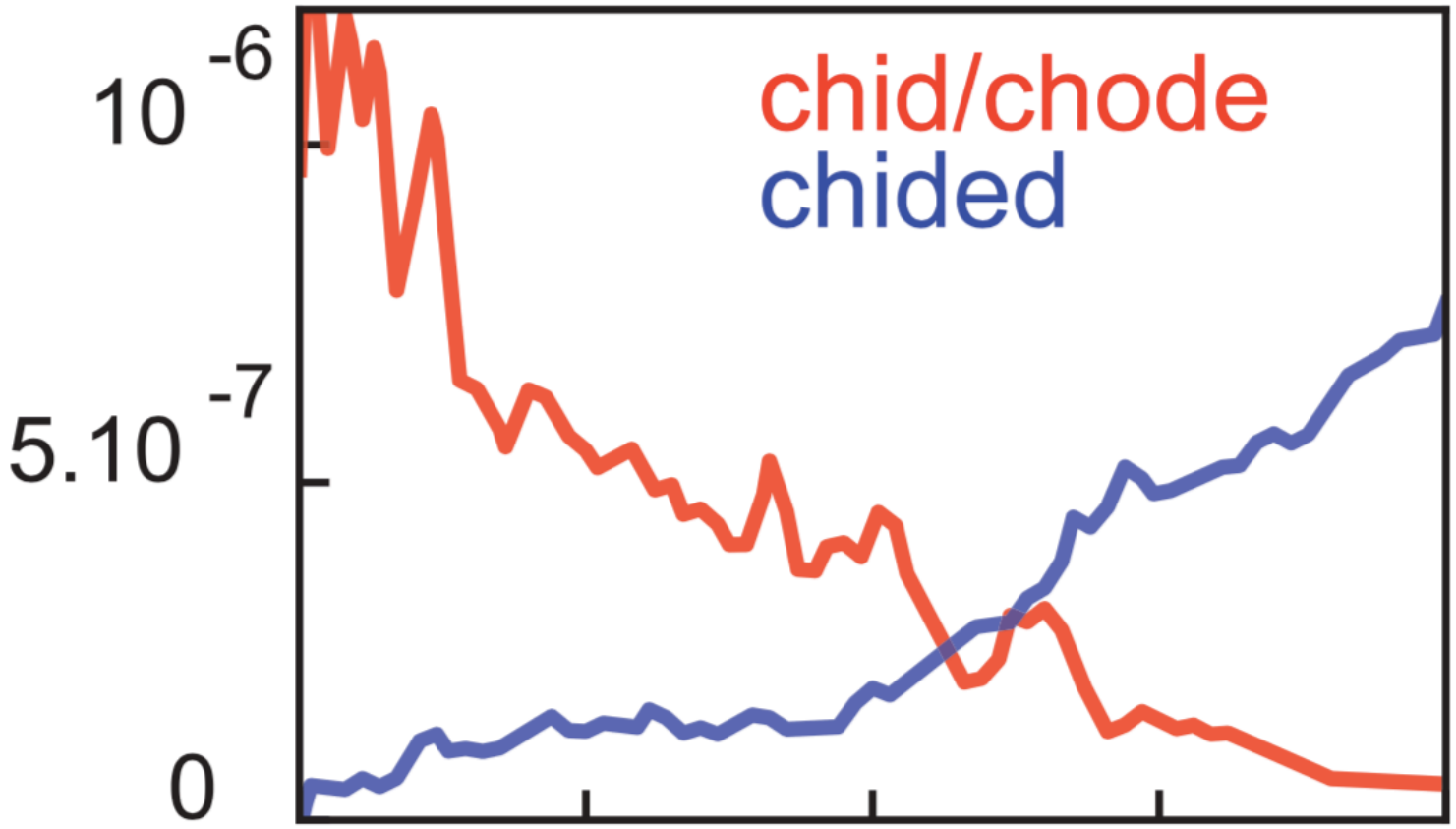
Начали с лингвистики и лексикографии

Размер лексикона



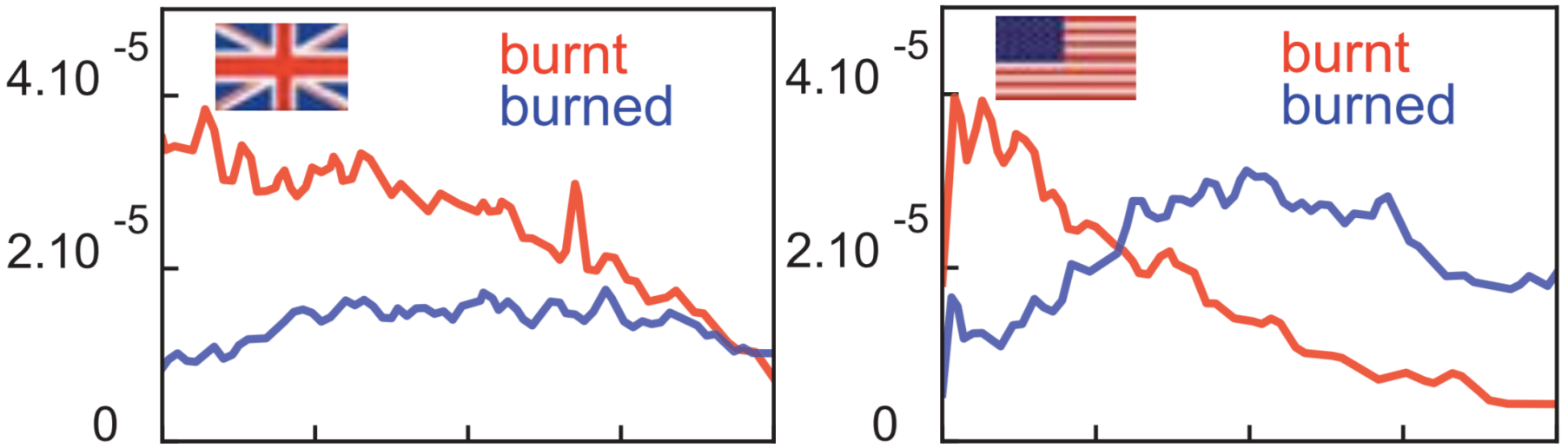

Dictionary coverage
100%
75%
50%
25%
0%
Oxford English Dictionary
Merriam-Webster Unabridged
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
Word frequency

Регуляризация английских глаголов



Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182.

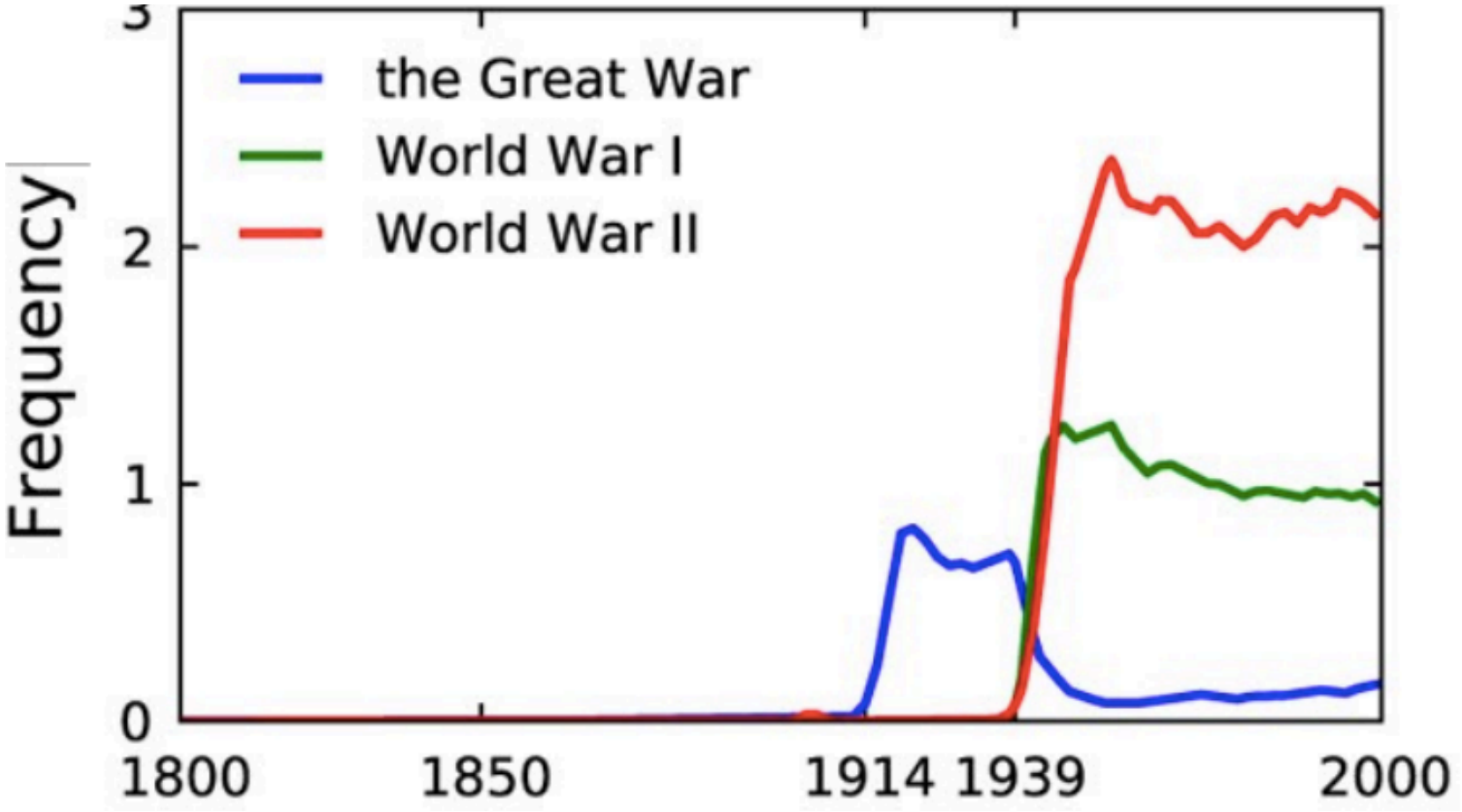
… происходит по-разному на разных сторонах Атлантики



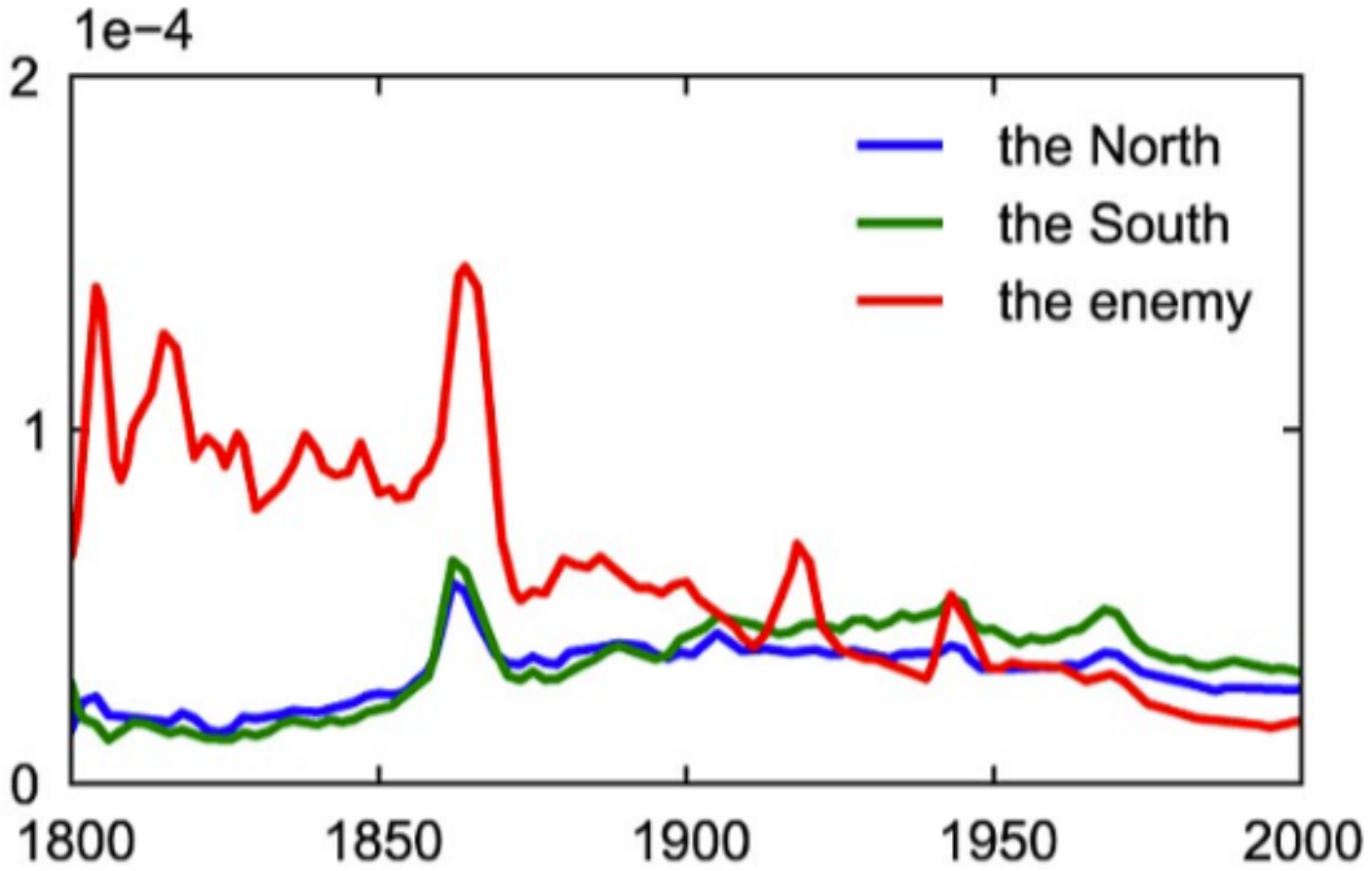
Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182.

Исторические события

(уже не) Великая война

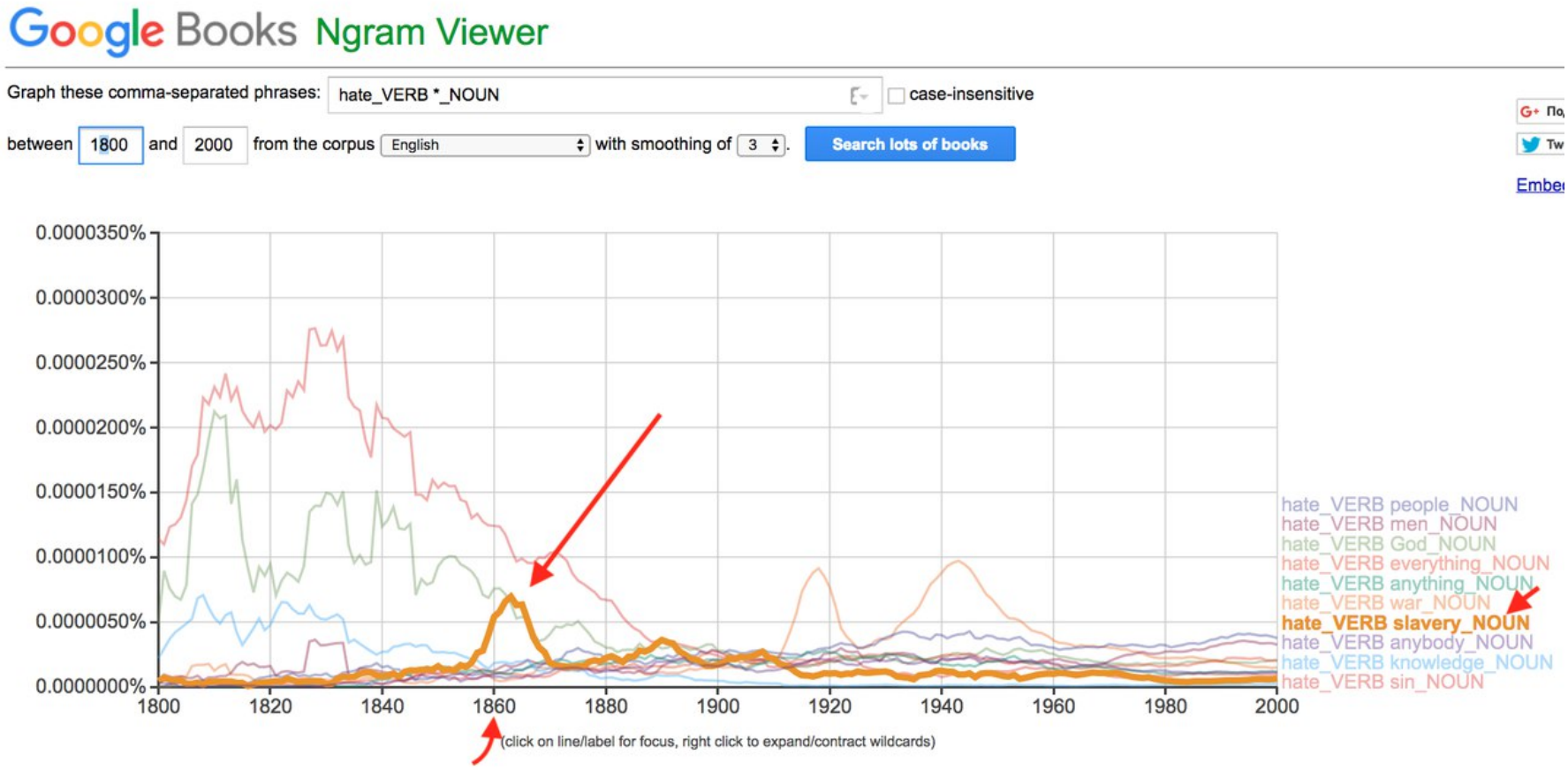


Еще войны

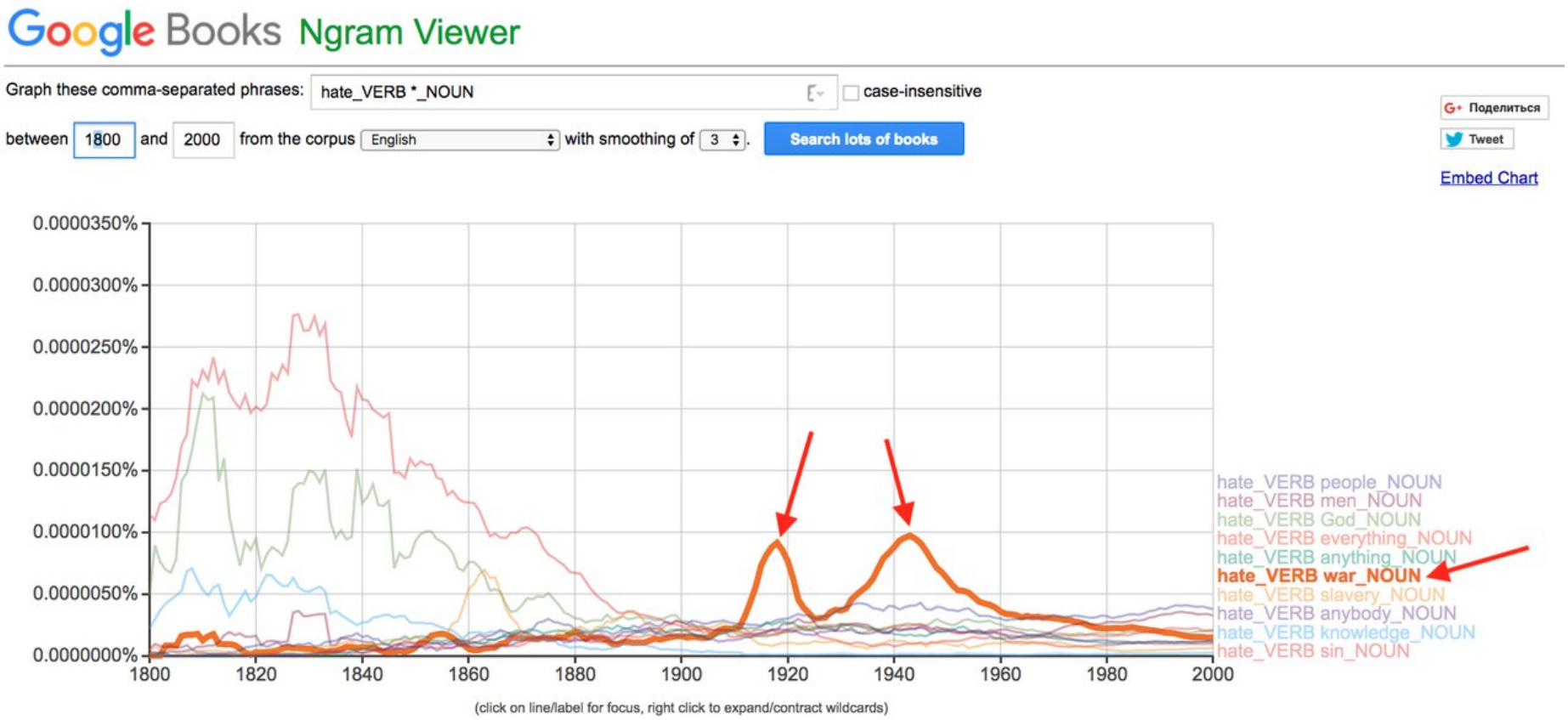


Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182.

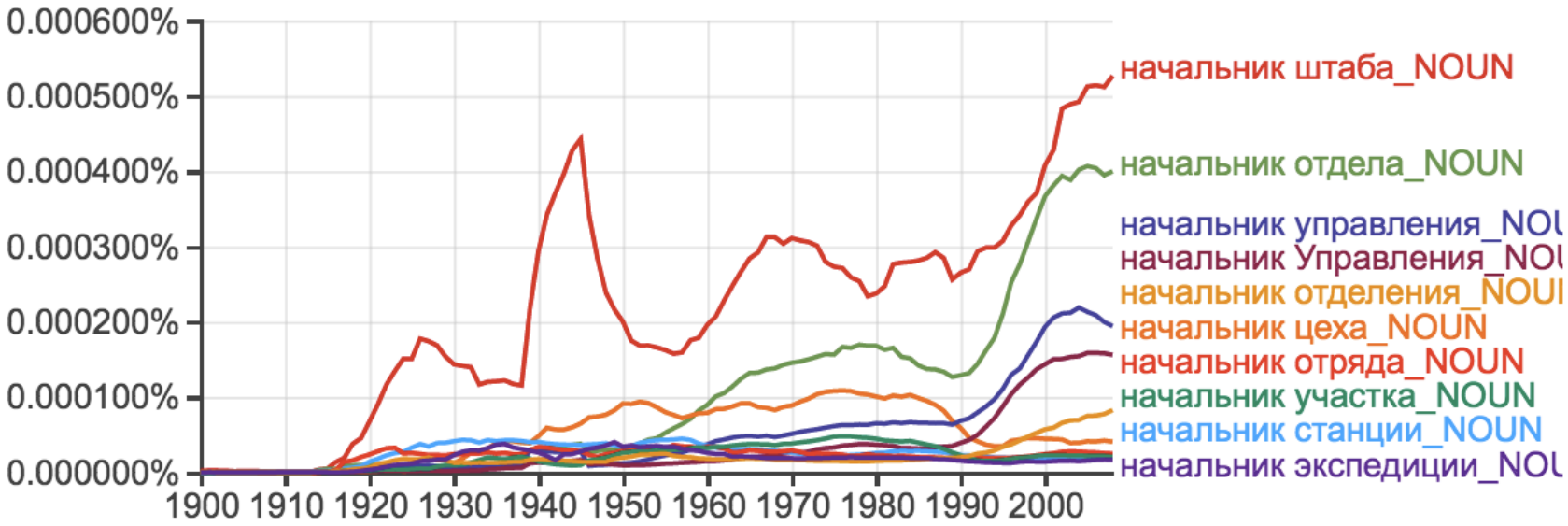
Мой пример: ненавидеть + сущ



Мой пример: ненавидеть + сущ



Мой пример (русский): начальник штаба



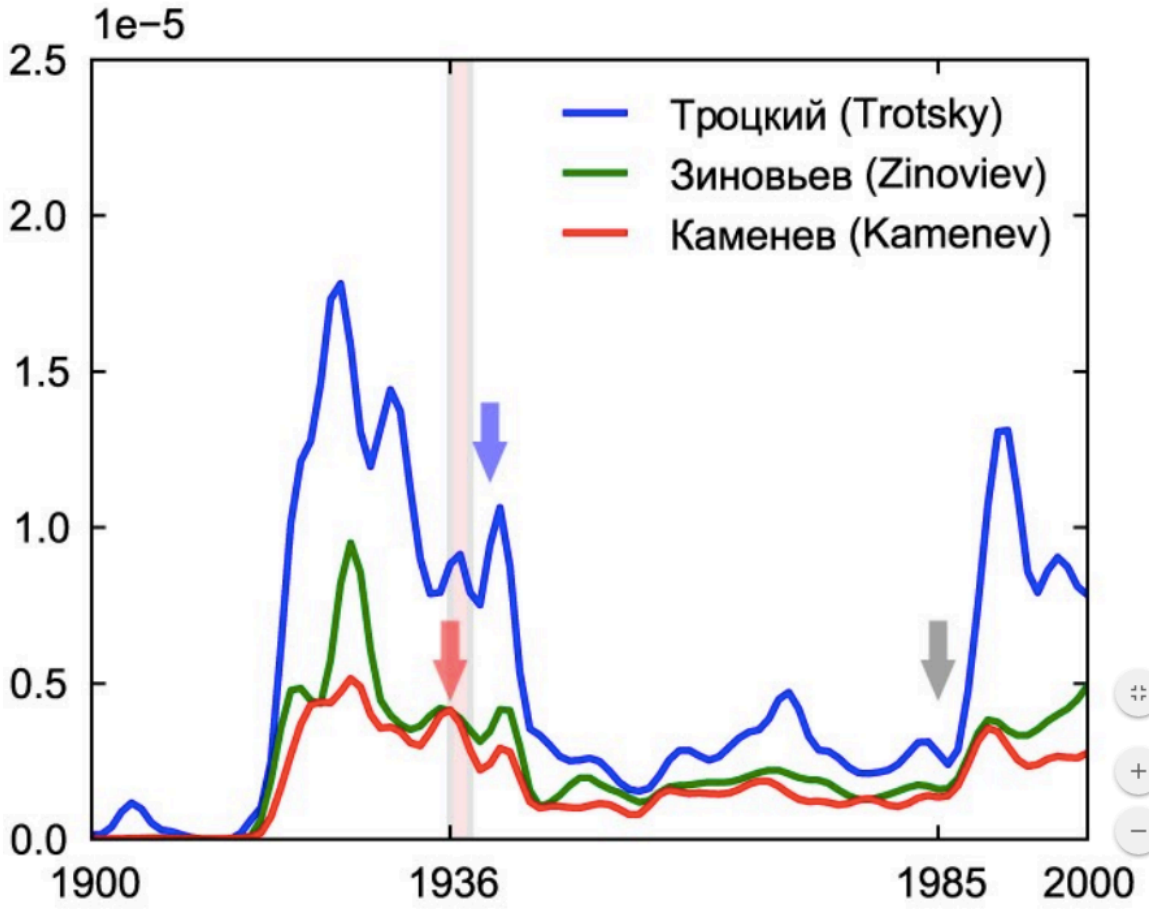
Sidenote: возможности поиска

- Форма слова (начальником)
- Несколько форм ((начальника + начальнику))
- Все формы одной лексемы (наука_INF)
- С учетом/без учета регистра
- Часть речи (hate_VERB, hate_NOUN)
- Wildcards (love *_NOUN)
- Синтаксические зависимости (транспорт=>*_ADJ)
- Поиск в разных корпусах:

Подробнее см. тут: books.google.com/ngrams/info

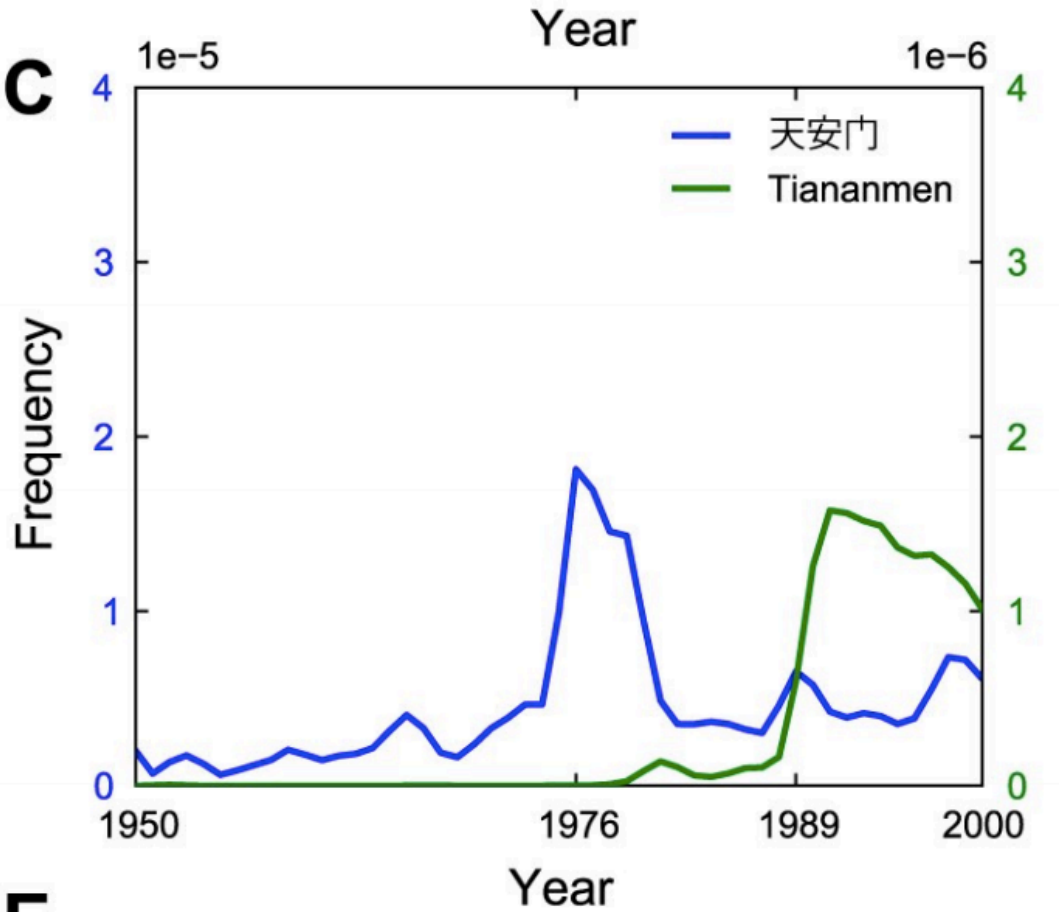
Более подробно про лингв.разметку: aclweb.org/anthology/P12-3029

Уничтожение оппозиции в ВКП(б) и цензура в СССР

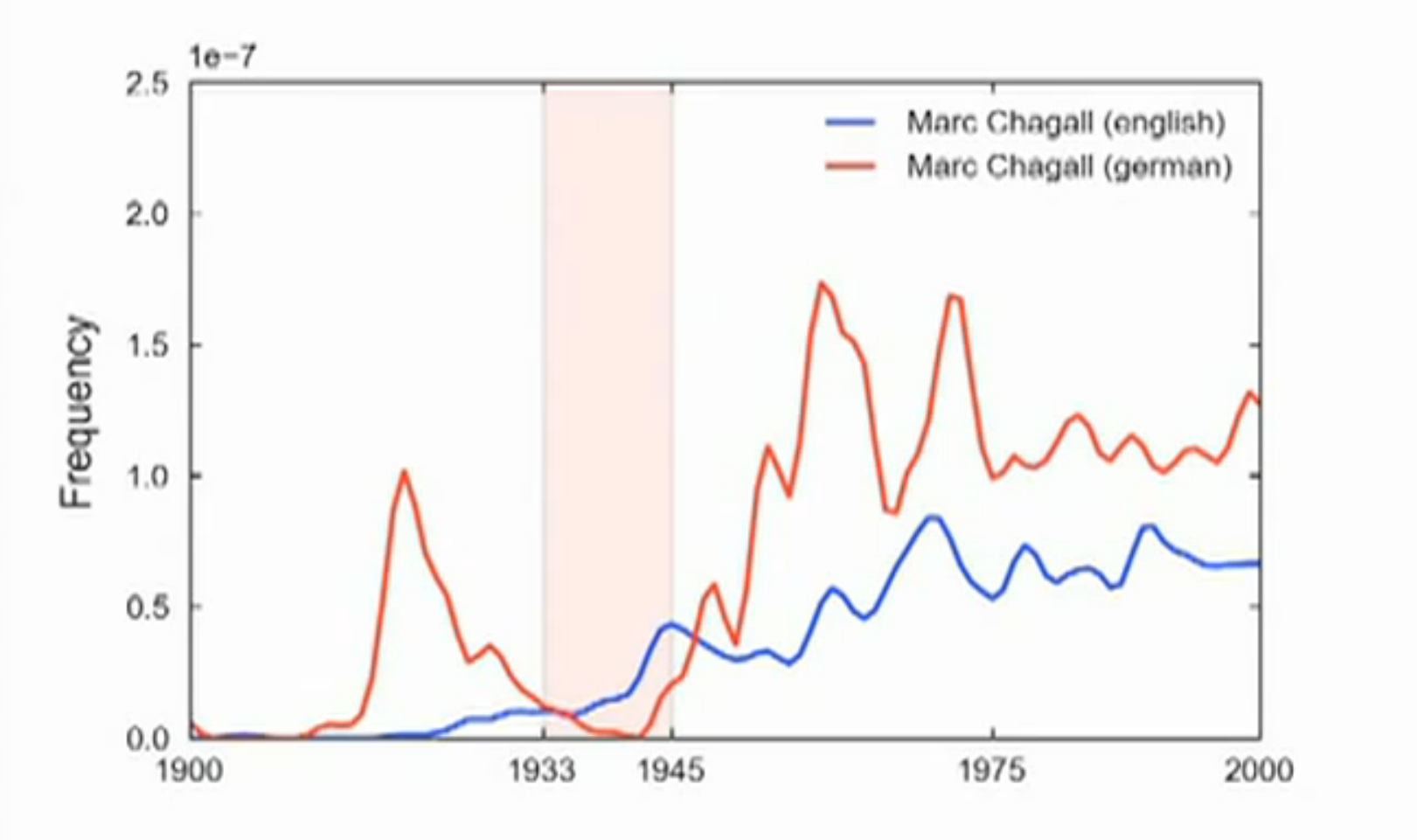


Мой пример: Ленин/Сталин

Цензура в Китае



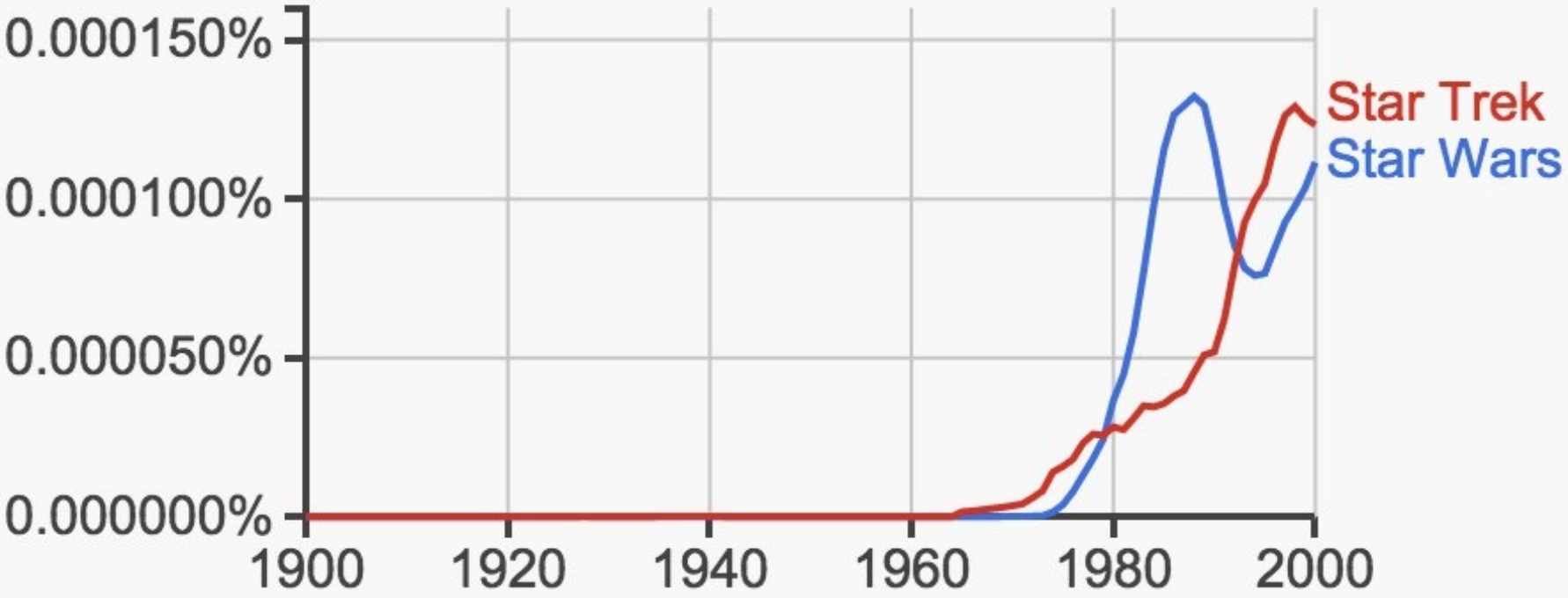
Цензура в Германии?



И еще про Германию

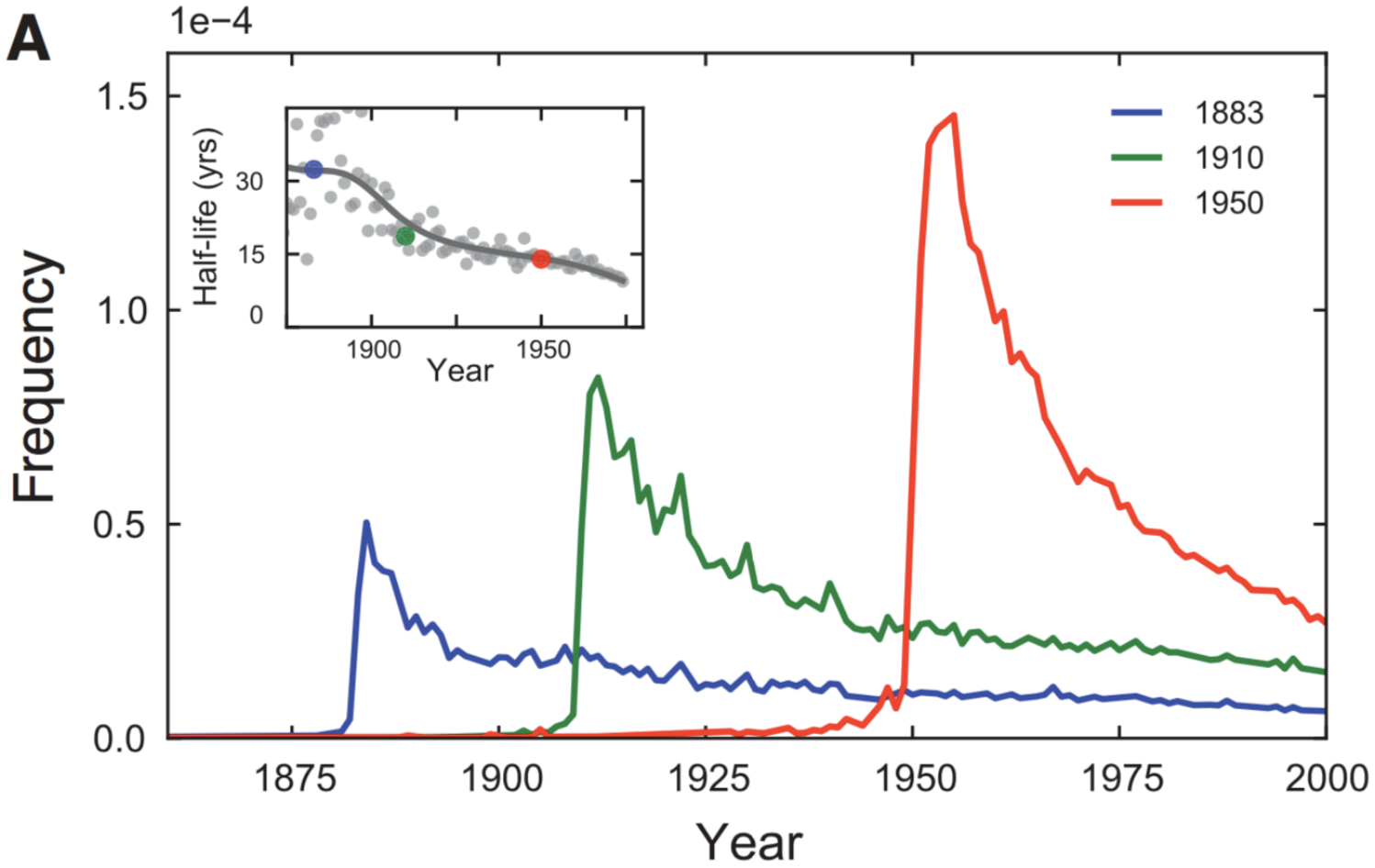
Попробуйте Du sollst nicht töten в немецком корпусе:

Спасибо за наводку Борису Орехову ☺

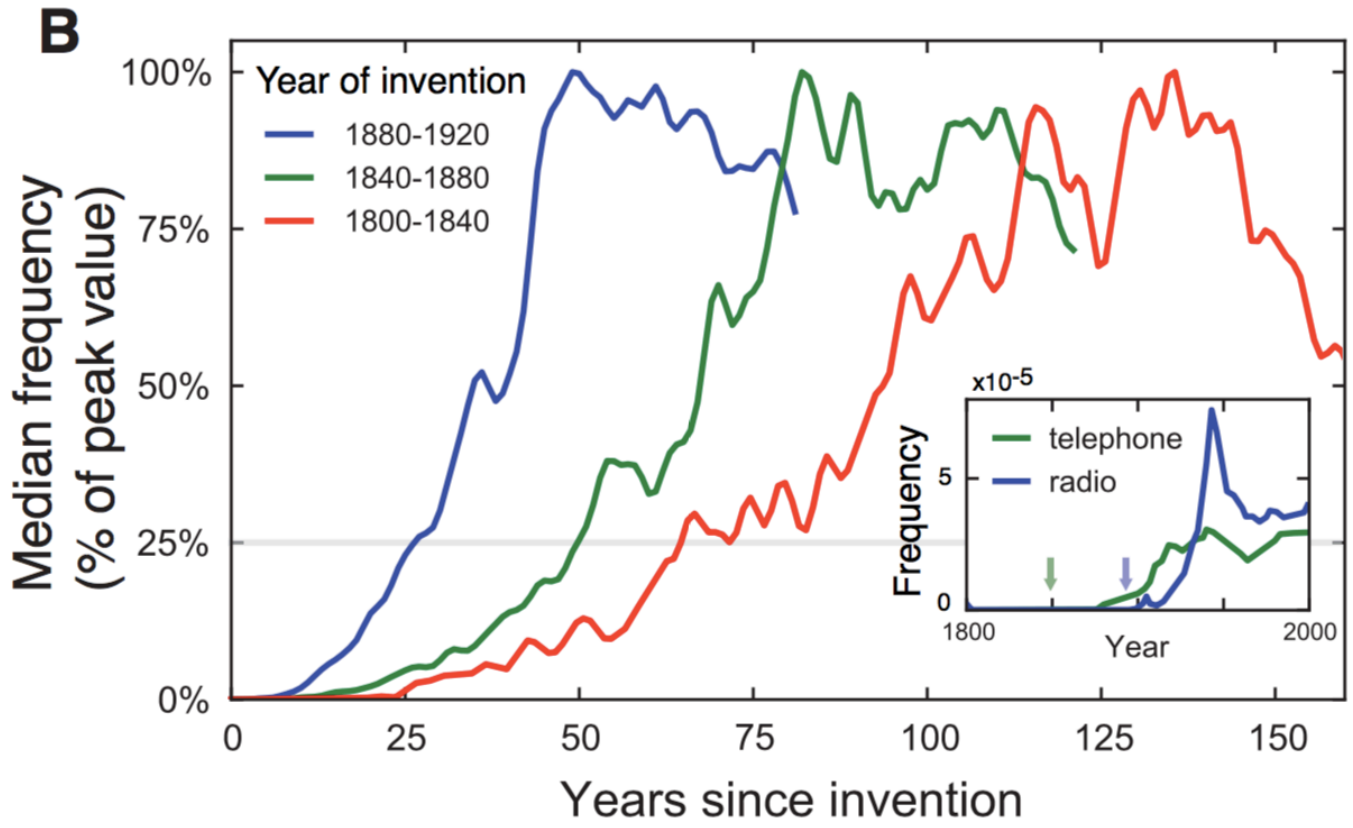


Общественные и культурные тренды

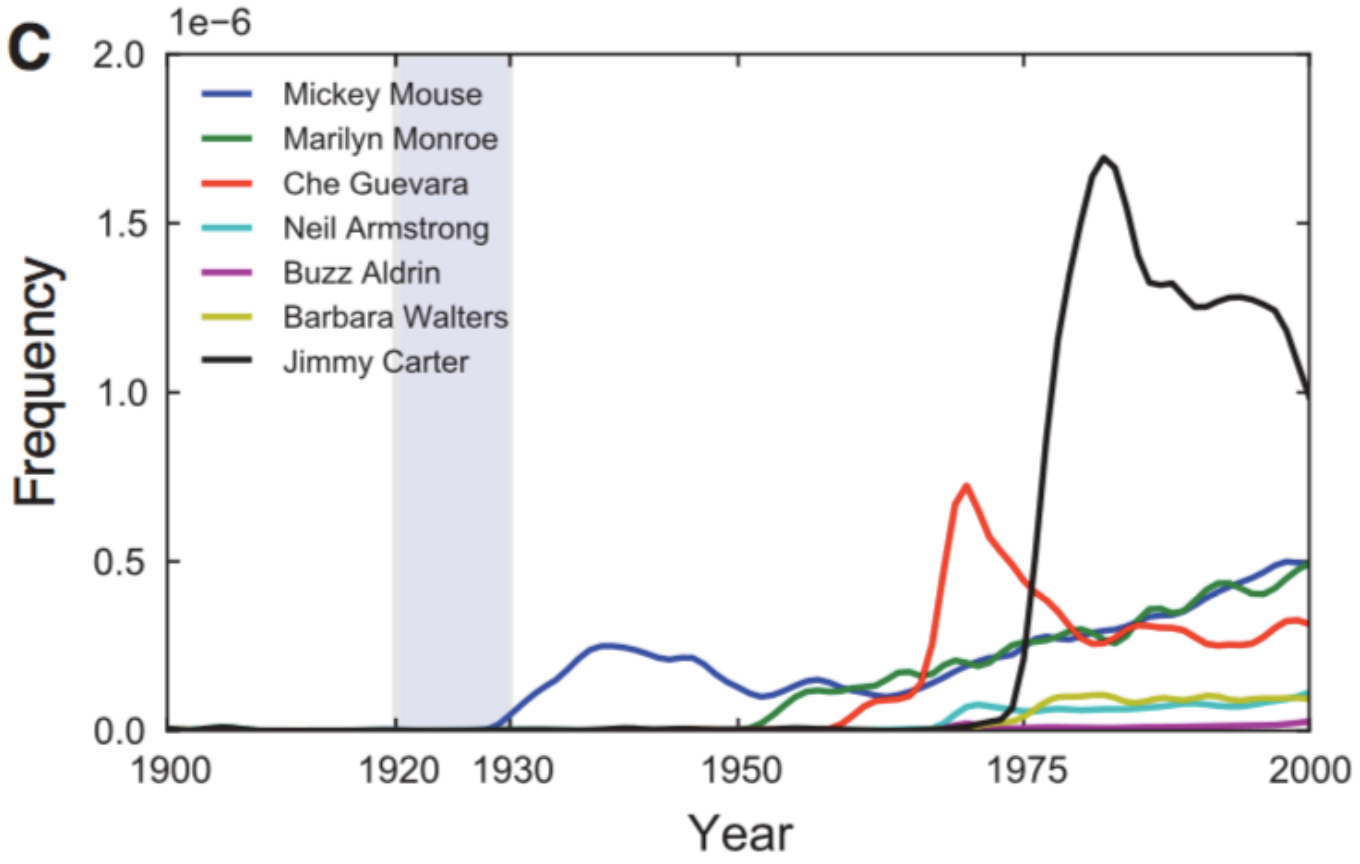
Ускорение истории?



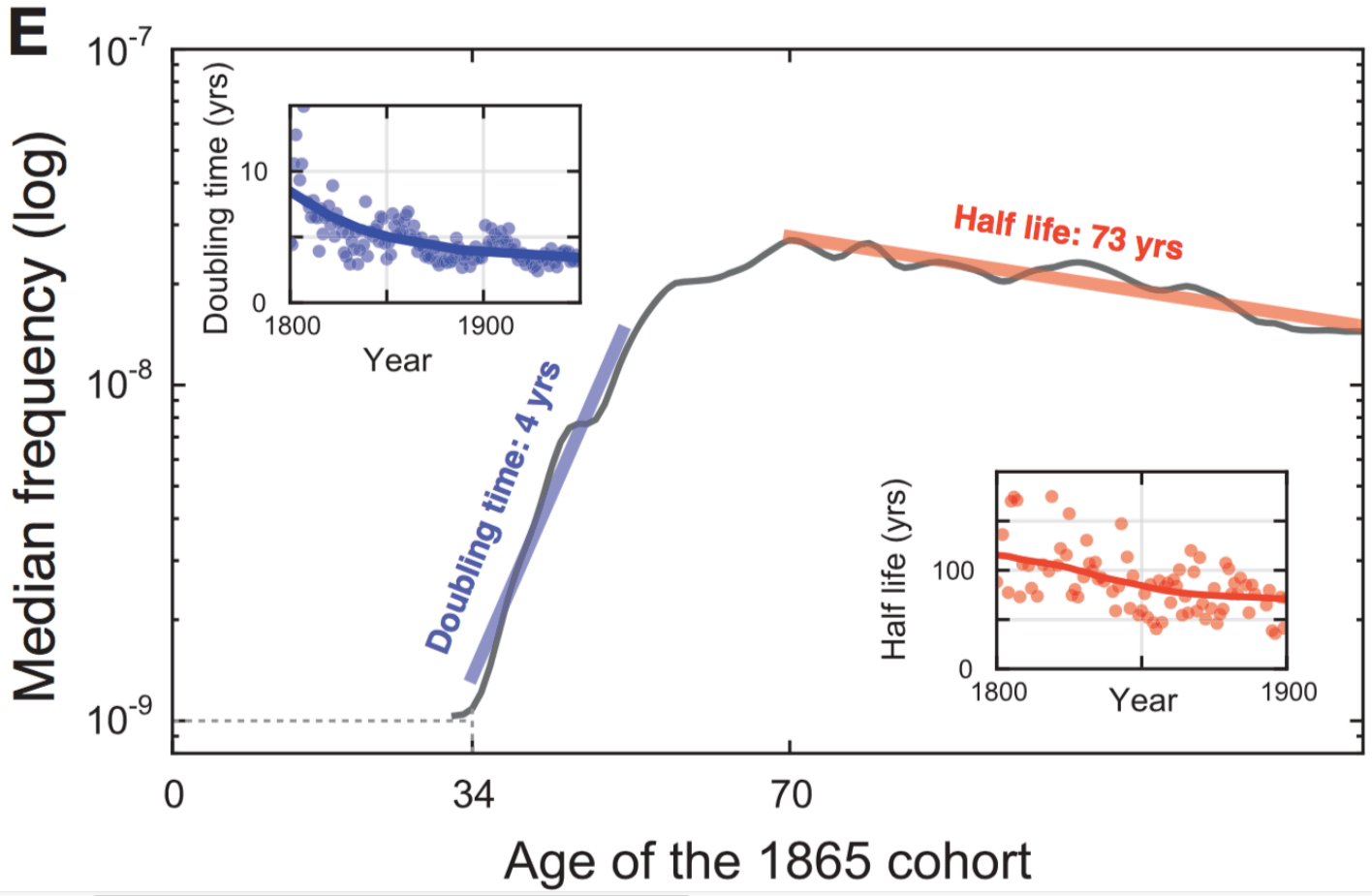
Ускорение технического прогресса



Слава и забвение



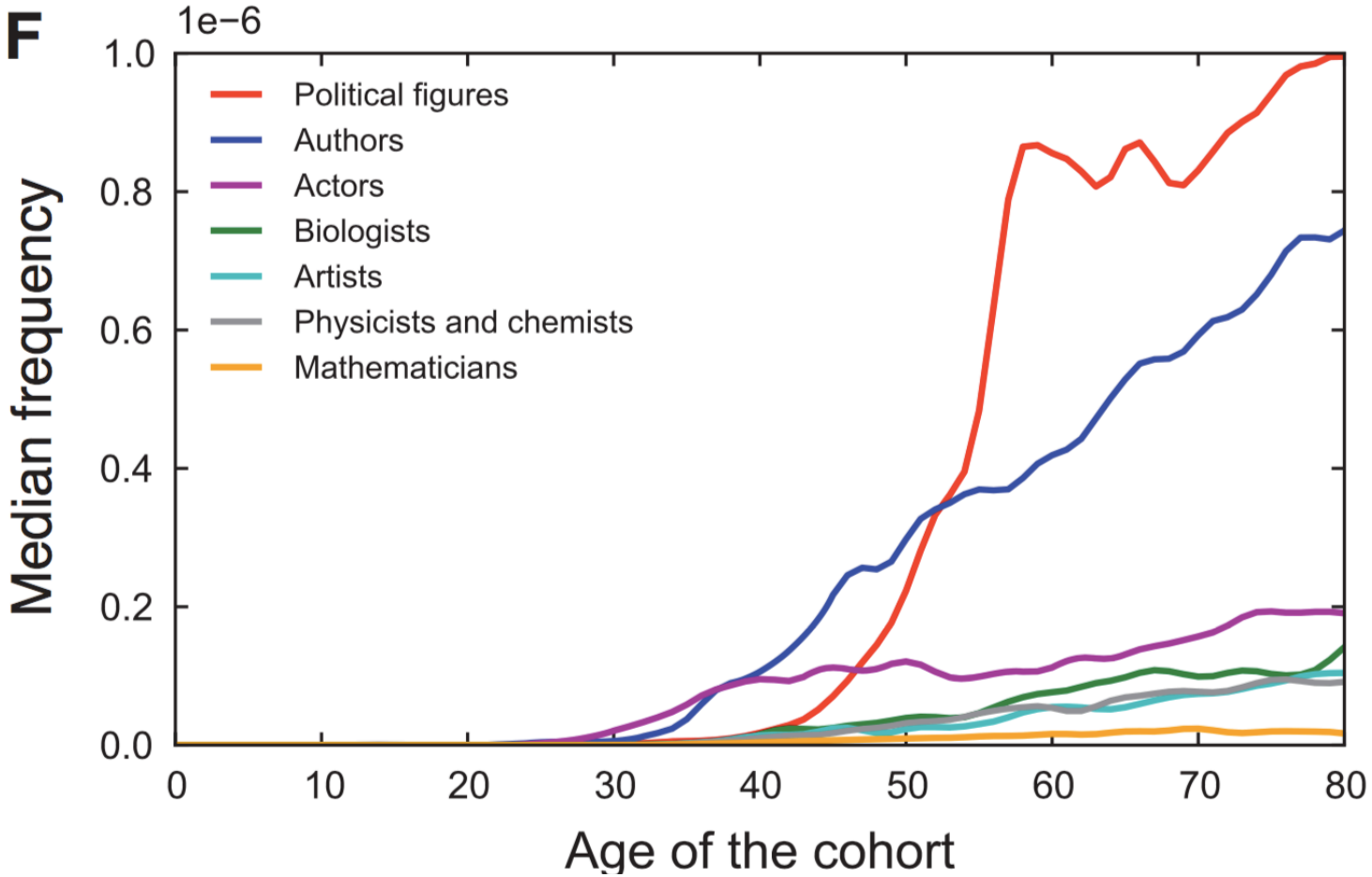
Слава и забвение



In the future, everyone will be famous for 7.5 minutes”

– Whatshisname

Слава и забвение



Чем хороша культуромика в Google Books?

Обсудим

Чем хороша культуромика в Google Books? Мои пункты:

- Очевидно, что некоторые явления истории/культуры/языка там действительно отражаются
- Воспроизводимость исследований
- Опора на большие агрегированные данные, тысячи разнородных свидетельств
  - Ни одно свидетельство не весит слишком много

Последний пункт особенно спорный

- A primary issue is that the corpus is in effect a library, containing one of each book. A single, prolific author is thereby able to noticeably insert new phrases into the Google Books lexicon, whether the author is widely read or not.

  Pechenick E. A., Danforth C. M., Dodds P. S. (2015). Characterizing the Google Books corpus: Strong limits to inferences of socio-cultural and linguistic evolution

- <…>when content is treated as digital information, a flattening of the structures of knowledge occurs which means that ‘thirteen hundred words of gibberish and the Declaration of Independence are digitally equivalent’ (Brown and Duguid, 2002, p. xiii).

  Gooding P. (2012). Mass digitization and the garbage dump: The conflicting needs of quantitative and qualitative methods. Literary and Linguistic Computing, 28(3), 425–431.

Чем плоха культуромика в Google Books?

1. Технические проблемы

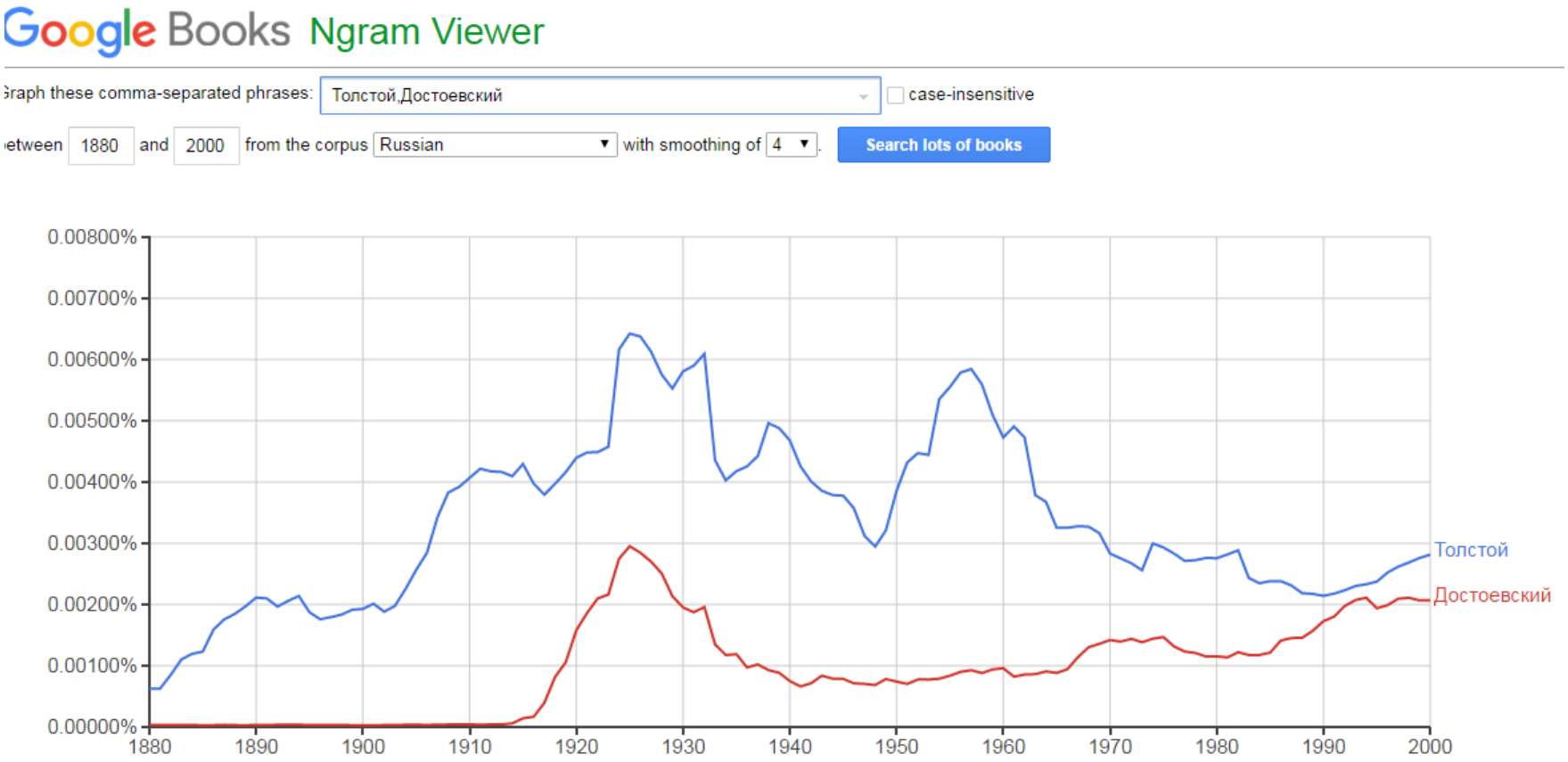
Google "wifi"

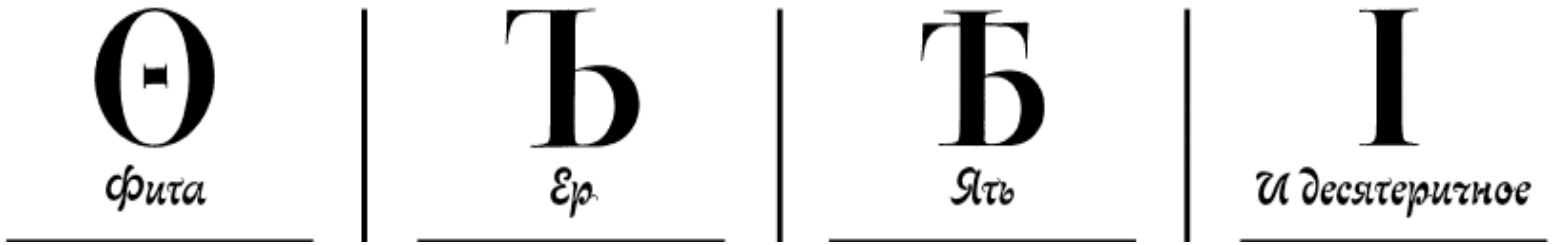
Добавить в библиотеку Написать отзыв Стр. 465

В этой книге: результат 2 из 2 по запросу ""wifi"" - ‹ Предыдущая Следующая › - Просмотреть все Закрыть панель пои

On the 6th of December, an Indulgence, by way of Jubilee, was publiſhed at Rome, to implore the Aſſiſtance of God upon Account of the Reſolutions the Pope intended to take for vigorouſly maintaining the Immunities of the Church, which are openly violated in Sicily, and ſeveral Parts of Italy, to the great Contempt of Eccleſiaſtical Cenſures. The next Day he made a Speech to the Cardinals, aſſembled in a Conſiſtory, telling them, That he had thought fit to publiſh that Indulgence, becauſe he was reſolv'd to aſſert the Authority of the Church and Religion, without having therein any other Regard or Conſideration, than the Service and the Glory of God. What effect theſe Reſolutions of the Pontiff will have, we ſhall leave to Time to determine; but 'tis certain that it is high Time for the Court of Rome to take this matter into Conſideration, for 'tis certain, that their Thunders are more and more ſlighted, and that every Body laughs at their Excommunications, which were once ſo much reſpected and dreaded, that they were ſufficient to ſhake the Throne of the Greateſt Prince of the Chriſtian World. The Church daily laments the loſs of theſe Days, which ſhe calls the Golden Age of the Church, and will uſe all poſſible Means to bring back thoſe Times, when an inſolent Prieſt trod under Foot a great Emperor; but as their enormous Impudence was the chief Cauſe of the loſs of their extravagant and ſcandalous Power, we hope that the violent Means they will uſe to retrieve the ſame, will prove the occaſion of its entire Deſtruction.

While they are chiefly intent at Rome, on the Recovery of their pretended ancient Rights, they cannot but be ſurpriz'd at a Report ſpread throughout Germany, that the Pope is endeavouring to bring about an





Спасибо за пример Борису Орехову ☺

2. Проблемы репрезентативности и состава выборки

Нерепрезентативный состав Google Books

<...> a fundamental flaw in its methodology: its reliance on Google Books for its sample. Google Books has focused on digitizing academic libraries. I would argue that books found in academic libraries are not necessarily representative of cultural trends across society.

Anita Guerini (2011) Analyzing Culture with Google Books: Is It Social Science?

Нерепрезентативный состав Google Books

- One of the problems with the Google ngram corpus is that really we have no idea what genres are represented in it, or how their relative proportions may vary over time. So it's possible that an apparent decline in the frequency of words for moral values is actually a decline in the frequency of certain genres — say, conduct books, or hagiographic biographies.
- A decline of that sort would still be telling us something about literary culture; but it might be telling us something different than we initially assume from tracing the decline of a word like "fidelity."

Ted Underwood (2012). How not to do things with words

Пример

Books that substantively mention memory before 1800 are most often either volumes dedicated to instructing the reader in the arts of mnemonics or examples of monody, a poem dedicated to the memory of specified individual. The frequency of memory compared with other terms in the corpus declines in the first half of the 20th century, only to increase again after 1960 (see Figure 9). Such usage fits well with a familiar story: the cognitive revolution that reintroduced the psychological study of mental states after decades of neglect. However, a click on the “Search in Google Books” function reveals that the increase is also due to the academic study of the “collective memory”

Michael Pettit (2016) Historical time in the age of big data: Cultural psychology, historical change, and the Google Books Ngram Viewer

Нерепрезентативный состав Google Books

<…> the evolution of the corpus throughout the 1900s is increasingly dominated by scientific publications rather than popular works. We have shown that even the first data set specifically labeled as fiction appears to be saturated with medical literature.

Pechenick E. A., Danforth C. M., Dodds P. S. (2015). Characterizing the Google Books corpus: Strong limits to inferences of socio-cultural and linguistic evolution

<…> the corpus includes very few examples of the cheap but largely ephemeral dime novels and pulp fiction that were widely popular with American working-class readers (Egnal, 2013).

Ограничение определенным типом культурных объектов

It <…> excludes the visual culture, oral traditions, and symbolic rituals that have been at the heart historical and anthropological interpretations of culture for decades.

Michael Pettit (2016) Historical time in the age of big data: Cultural psychology, historical change, and the Google Books Ngram Viewer

Смешение разных культур без возможности разделить

It assumes that cultures are undifferentiated and totalizing wholes whose self-understanding is driven by the thought leaders who make it into print. The tool provides no ways of disaggregating distinct subcultures. In short, it risks replicating a version of the past that 50 years of social history and cultural studies have debunked (Hall, 1981). Instead, we need to recognize that the Google Books corpus does not represent culture as an undifferentiated whole, but foregrounds the culture of particular subgroups.

Michael Pettit (2016) Historical time in the age of big data: Cultural psychology, historical change, and the Google Books Ngram Viewer

Диахронические диспропорции Google Books

- The oldest works were published in the 1500s.
- The early decades are represented by only a few books per year, comprising several hundred thousand words.
- By 1800, the corpus grows to 60 million words per year;
- by 1900, 1.4 billion;
- and by 2000, 8 billion.

Поэтому авторы статьи в Science в основном приводили примеры про XIX – XX вв.

We survey the vast terrain of “culturomics”, focusing on linguistic and cultural phenomena that were reflected in the English language between 1800 and 2000.

[Мы исследуем просторы культуромики, фокусируясь на лингвистических и культурных феноменах, отраженных в английском языке между 1800 и 2000 гг.]

Michel J.-B. et al. Quantitative Analysis of Culture Using Millions of Digitized Books // Science. 2011. Vol. 331, № 6014. P. 176–182., перевод мой

3. Частотности слов — слишком грубая и примитивная метрика

Слова меняют значения

If we crowdsource “leadership” using twenty-first-century reactions on Mechanical Turk, for instance, we’ll probably get words like “visionary” and “professional.” “Loud-voiced” probably won’t be on the list — because that’s just rude. But to Homer, there’s nothing especially noble about working for hire (“professionally”), whereas “the loud-voiced Achilles” is cut out to be a leader of men, since he can be heard over the din of spears beating on shields

<…>
The laws of perspective apply to history as well. We don’t have an objective overview; we have a position in time that produces its own kind of distortion and foreshortening.

Ted Underwood (2012). How not to do things with words

Слова меняют значения

Searching for individual words is risky. A word's meaning is as likely to change over time as its frequency. For example, I am not convinced that "God" meant precisely the same thing in 1800 versus 1900 versus 1950

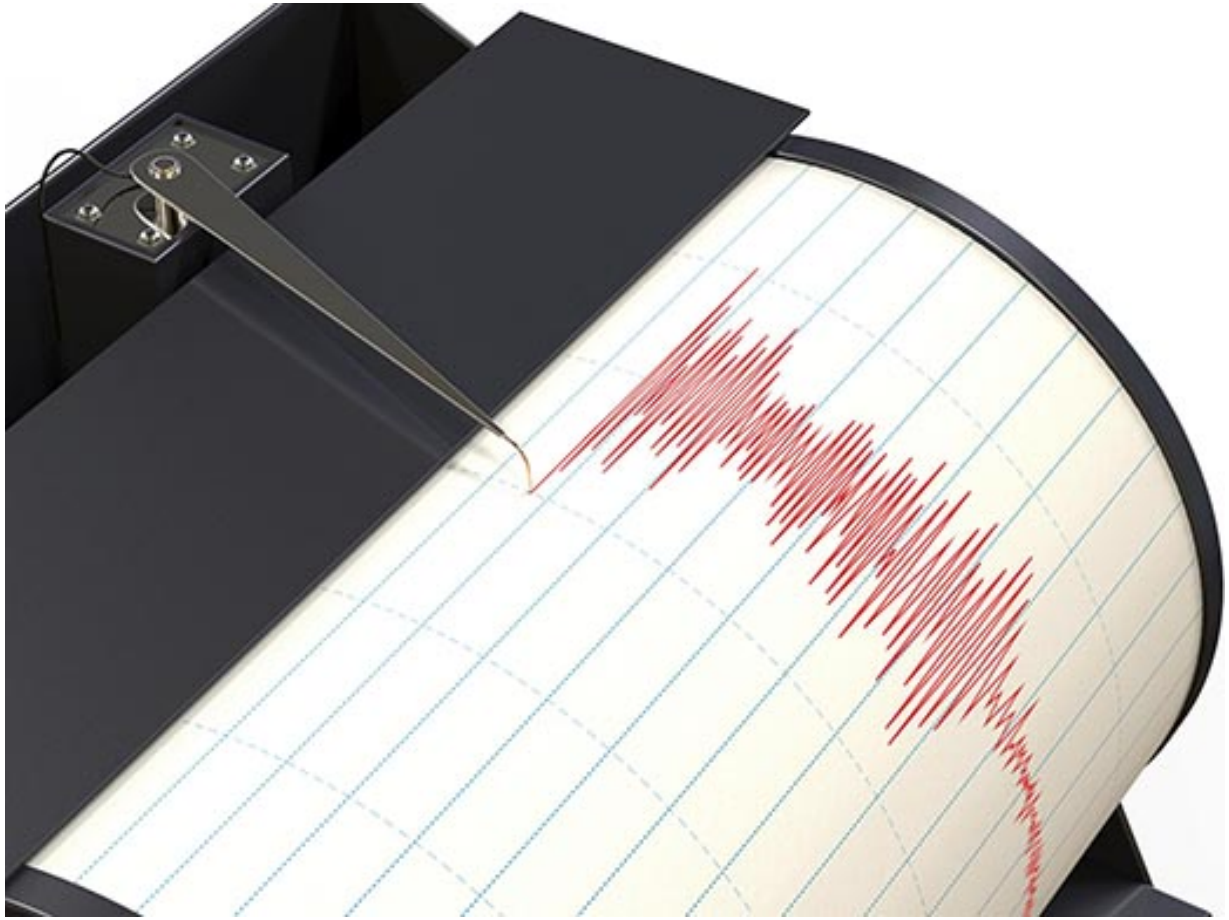
Michael Pettit (2016) Historical time in the age of big data: Cultural psychology, historical change, and the Google Books Ngram Viewer

Корпусный поиск — это как анализ данных сейсмографа

At its heart, the use of word frequency with a reasonably sized (if problematic) data set simply provides one more form of evidence to be added to all the rest. Knowing that the term 'electricity' peaks between 1870 and 1900 is useful evidence, but does not provide either an explanation for why, or a description of how it is being used.

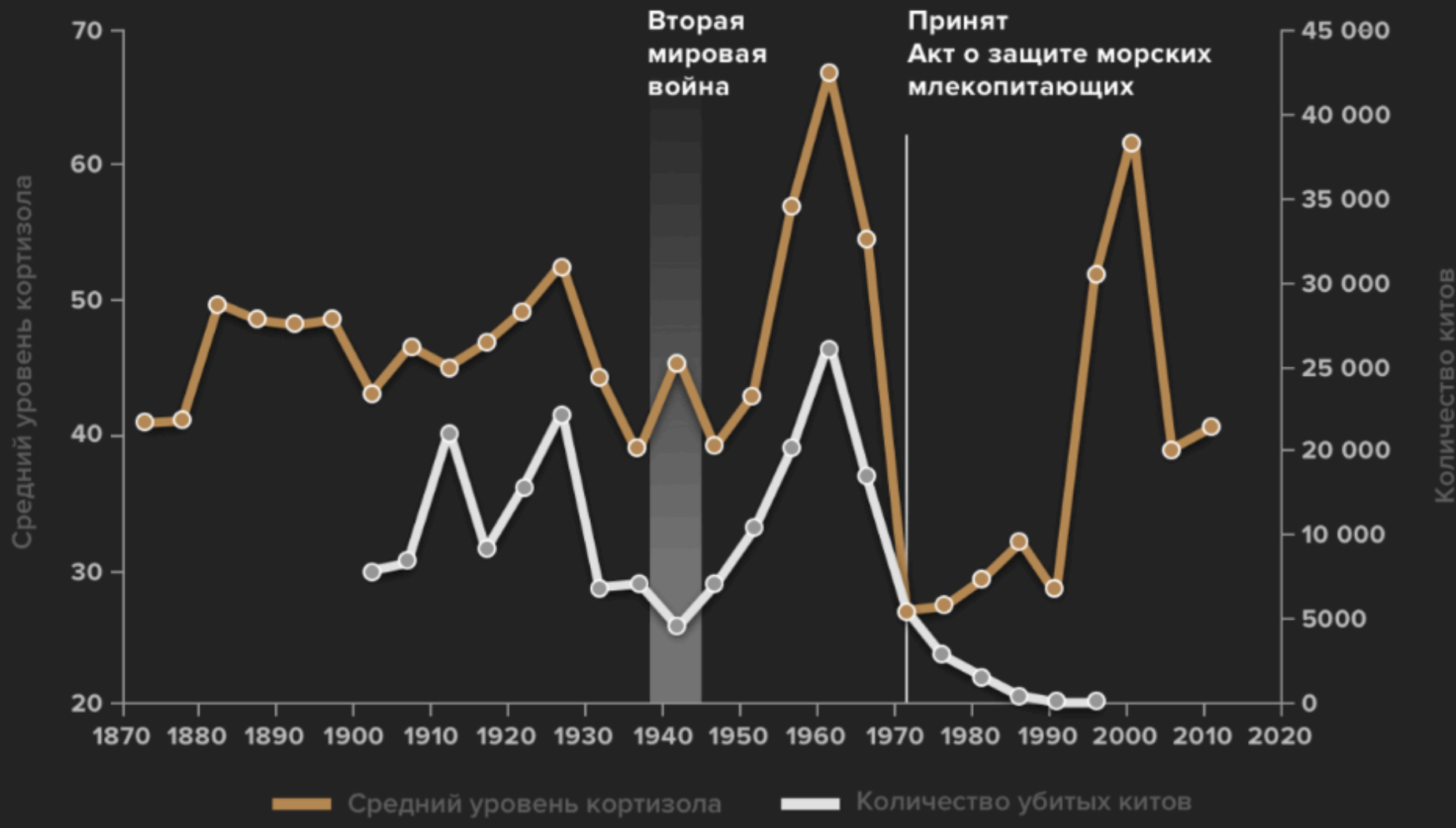
Tim Hitchcock (2011) Culturomics, Big Data, Code Breakers and the Casaubon Delusion

Корпусный поиск — это как анализ данных сейсмографа



meduza

Уровень гормона стресса у китов в XX веке



Коктейль из очевидного и неинтерпретируемого

Инструмент не анализирует

These large-scale visualisations of language may be the raw material of history, the basis for an argument, the foundation for a narrative, the evidence put in the appendix in support of a subtle point, but they do not serve as a work of history.

Tim Hitchcock (2011) Culturomics, Big Data, Code Breakers and the Casaubon Delusion

Инструмент не анализирует

<…> the humanities will always have to rely on human analysis to some degree. <…> When texts are deconstructed to the extreme of granularity, and interactions become mediated by automated tools, there is no book. Instead, there is merely a massive corpus of words which carry no great epistemological significance.

Gooding P. (2012). Mass digitization and the garbage dump: The conflicting needs of quantitative and qualitative methods. Literary and Linguistic Computing, 28(3), 425–431

Конец

Поищите сами интересные примеры в Google Ngram Viewer

Примеры запросов к Ngram Viewer

- burned,burnt
- science,religion
- наука,церковь
- Ленин,Сталин
- ((Bigfoot + Sasquatch) - (Loch Ness monster + Nessie))
- (Ленин-Сталин)
- в Украине/(в Украине+на Украине)
- hate *
- hate_VERB *_NOUN
- начальник *_NOUN
- internet:eng_2012,интернет:rus_2012