The ABC of Computational Text Analysis

#2 Text as Data

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Outline

- recap + reading
- methodological foundation 😬
- first computational text analysis

Recap last Lecture

computer as ...

- … an intelligent device
- … a tool for analysis

datafication

- abundance of data
- exploit new form of data

Reading

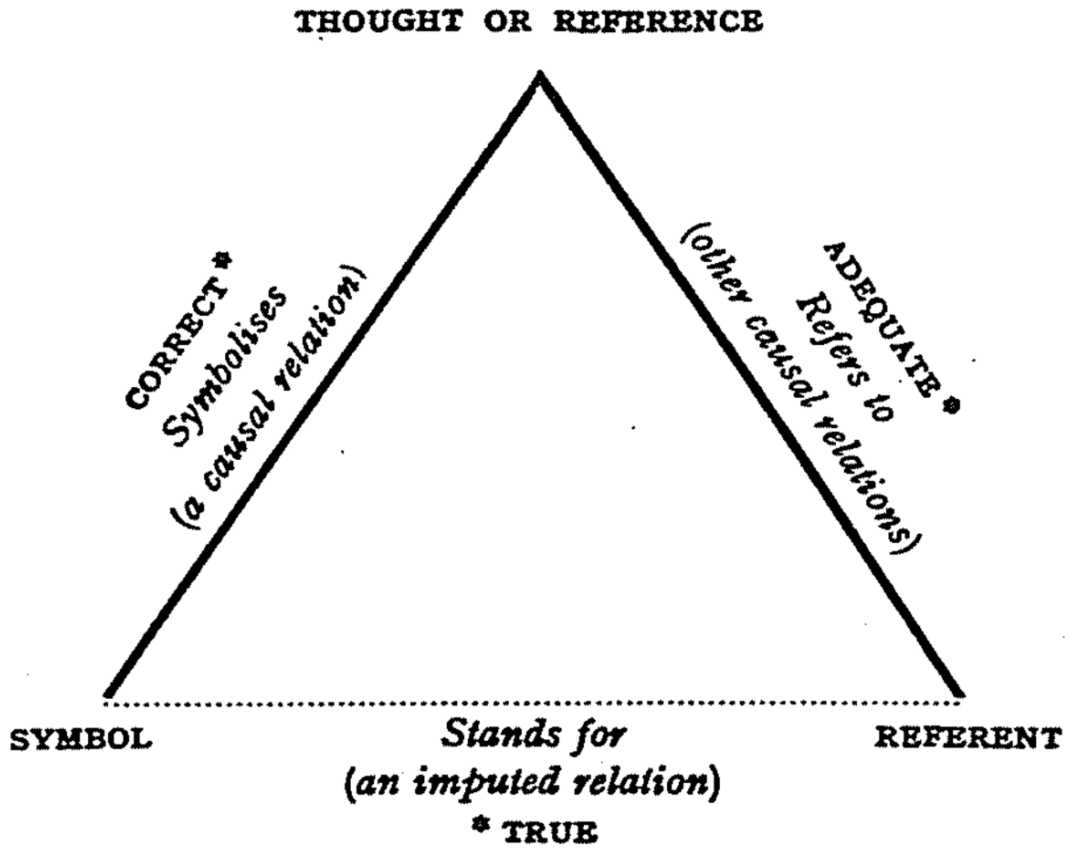
Computational Social Science (Lazer et al. 2009)

- data-driven
- network analysis + text analysis
- historical perspective vs. real-time dynamics
- issue: limited access to data

Semiotic Triangle

Loose coupling between

- World
- Cognition
- Language



Semiotic Triangle *(Ogden and Richards 1923)*

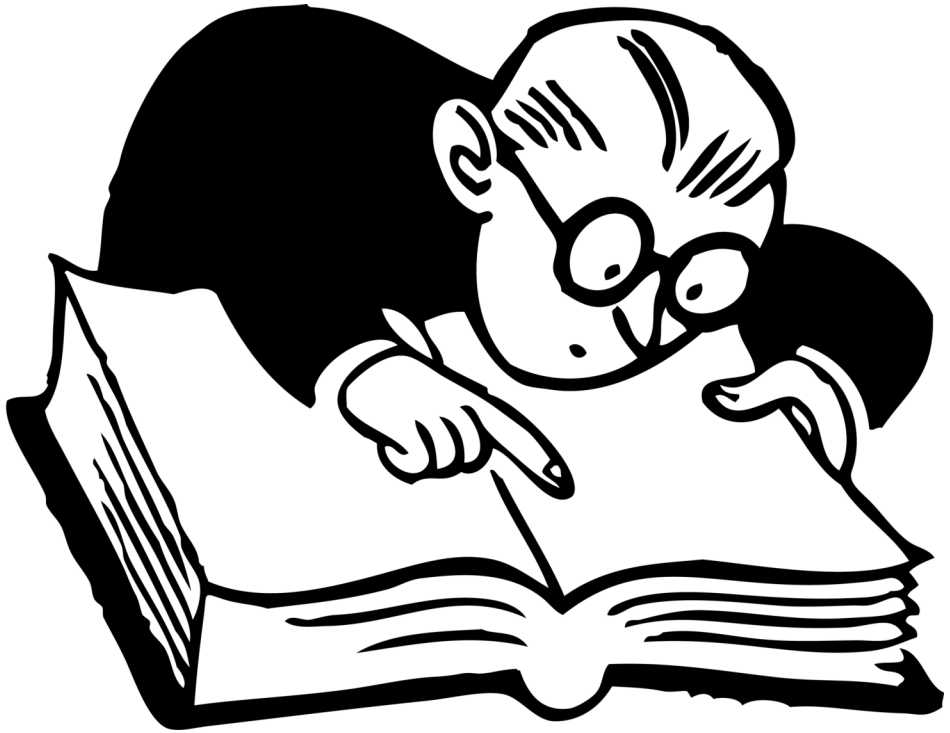
«Language shapes the way we think,
and determines what we can think about.»

—Benjamin Lee Whorf

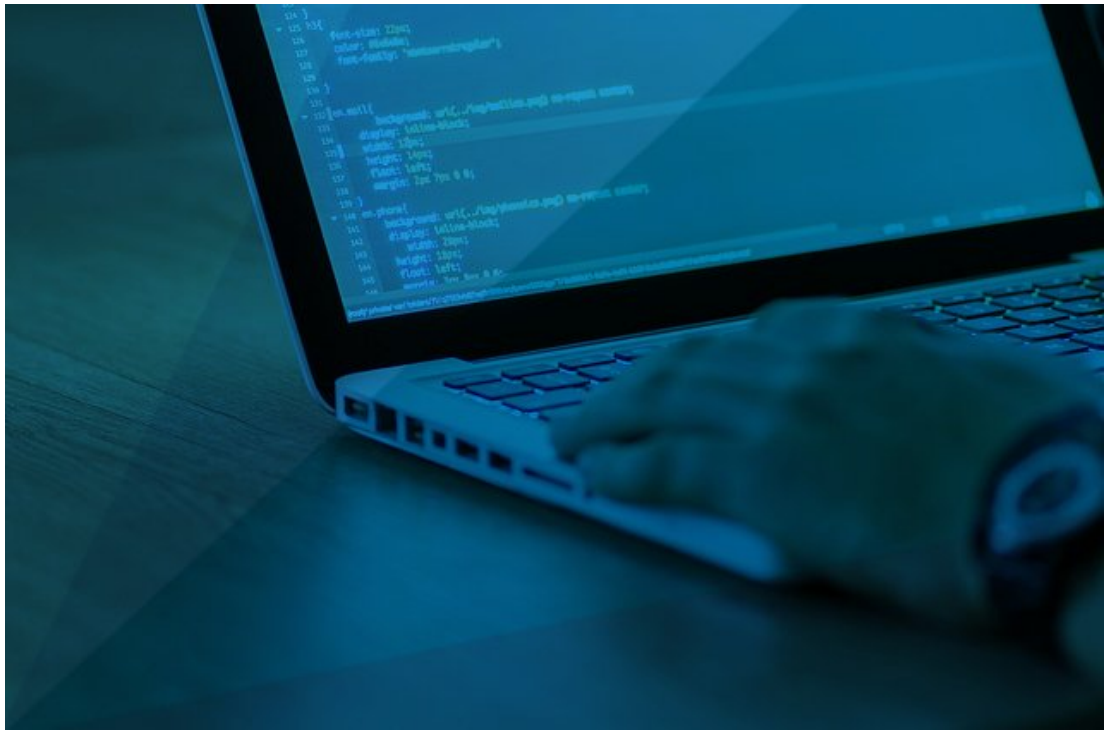
Working with Texts

A micro and macro perspective I

individual cases vs. collective trends



close reading (source)

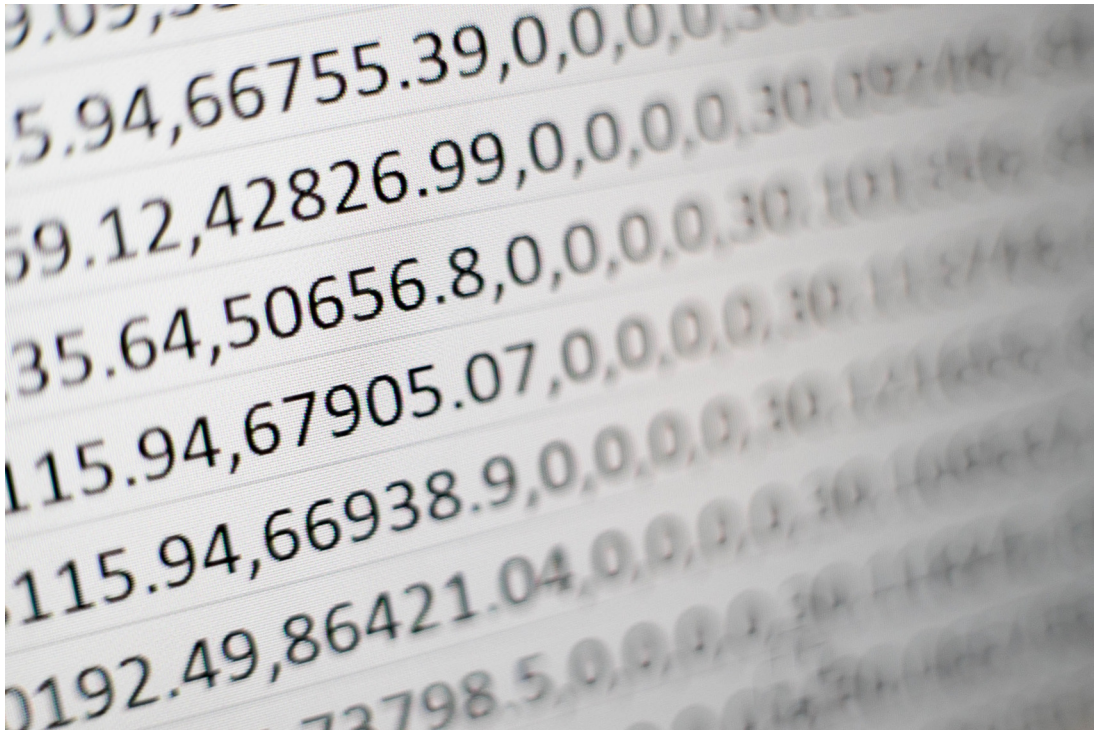


distant reading (source)

A micro and macro perspective II

non-scalability vs. abstraction

tons of text (source)



meaning of numbers (source)

From micro to macro 

...and back again 

Two Research Paradigms

data exploration vs. hypothesis testing *(Evans and Aceves 2016)*

- add nuance
- develop new narratives
- verify hypothesis

Numbers do not talk; never.

Quantification and qualitative analysis go well together.

Text as Data

- synonymy
- ambiguities
- compositonality of meaning
- agnostic, discrete symbols
- unstructured, messy data

(see also Grimmer and Stewart 2013)

Data Formats

In-class task: File types

- What file formats do you know?
- Open files of different types in a text editor. Which ones look good?

File formats

- machine-readability
  - *raw: txt, csv, tsv*
  - *formatted: docx, pdf, html, xml*
- open vs. proprietary
- digital sustainability

Let’s dive into it! 

Counting ngrams

Google Ngram Viewer

- historical perspective with ngrams
- > 5.2 million books
- rise and fall of cultural ideas and phenomena

learn more

In-Class Task: Environmental Discourse

questions about the environmental discourse

- What other terms have been used to describe nature?

  e.g. environment

- What environmental issues are debated the strongest? When?

  e.g. nuclear power plant

- Are there any differences between languages?

  i.e. similar words with non-equivalent curves over time

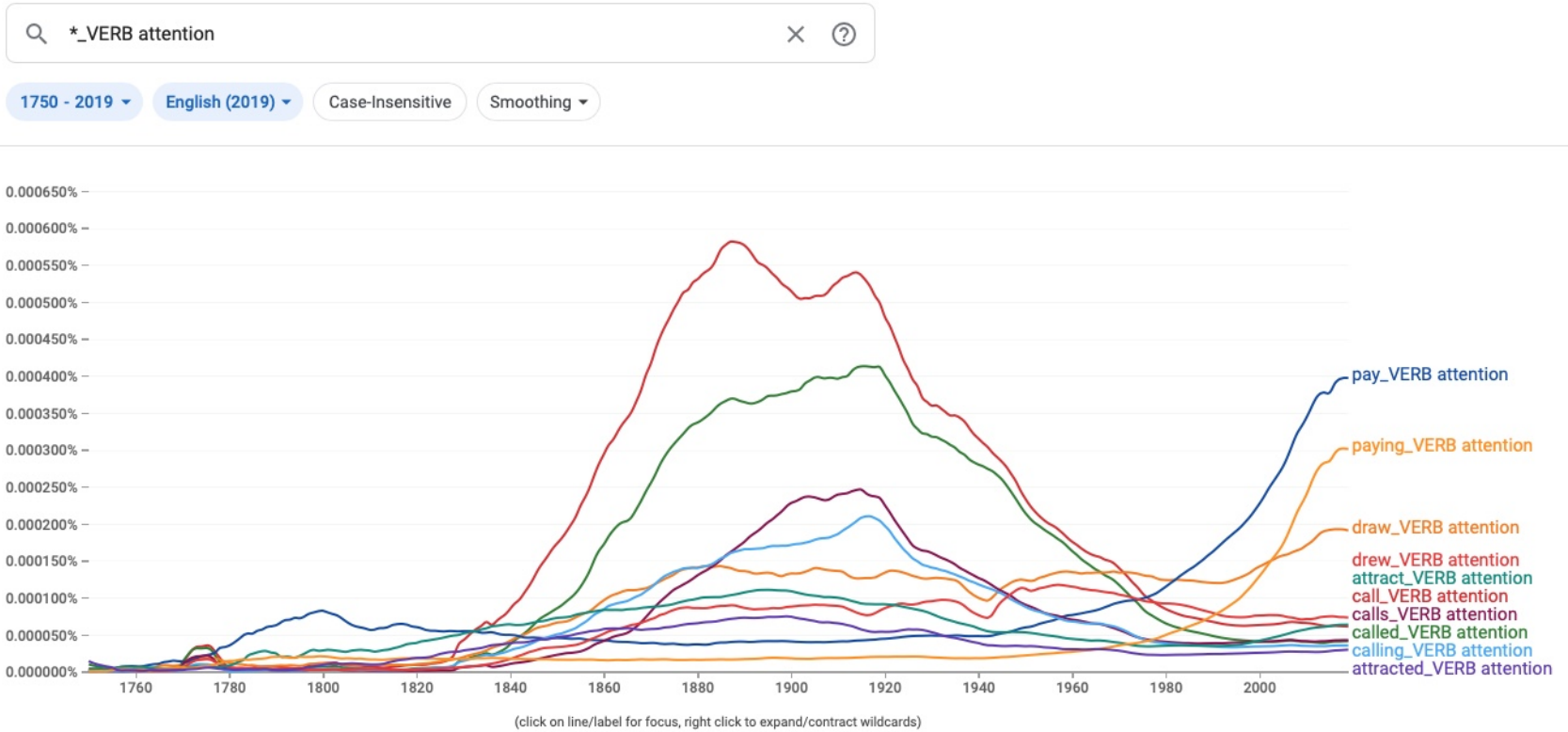
🎯 What do you conclude from your observation?

Refine your Queries

check out case-sensitiveness, wildcards (*) and operators 🤓

Operator	Description
+	sums multiple expressions into one to **aggregate trends**.
–	subtracts the expression on the right from the expression on the left, giving you a way to **measure one ngram relative to another**.
/	divides the expression on the left by the expression on the right, which is useful for **isolating the behavior of an ngram with respect to another**.
*	multiplies the expression on the left by the number on the right, making it easier to compare ngrams of very different frequencies. (Be sure to enclose the entire ngram in parentheses so that * isn't interpreted as a wildcard.)

Ngram “pay attention”



Google Ngram Viewer: Evolution of the phrase “attention”

Remember 👍

Has the language evolved over time or the social perception?

Both, most likely.

Similarly, language may vary across regions and communities.

No Culturomics but Meaning-Making

phenomena in collective memory

- semantic drifts
- lexical shifts

Read, read, read to complement stats with context!

Questions of Interpretation

possible reasons of decreasing frequency

- loosing interest
- becoming an established fact
- new reference

  The Great War → World War I

- selection of data sources

A word of caution

The unknowns of Google Ngram Viewer

- indexed books

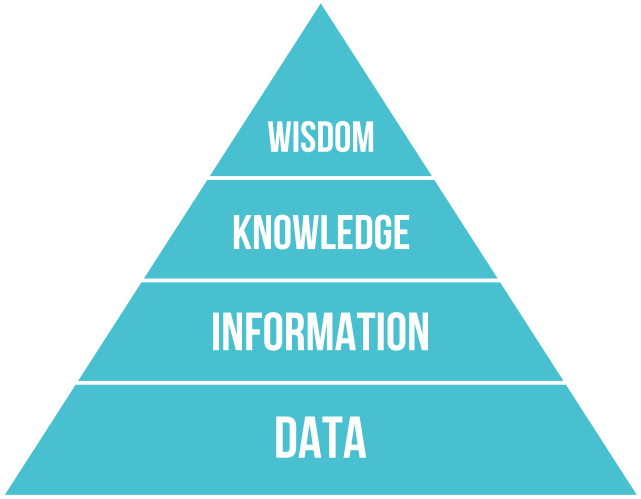
  genre, authors, quantity

- artifacts of digitalization

use better alternative: bookworm HathiTrust

Interacting instead of mapping

It is a lense, not a map.



DIKW pyramid (Wikipedia)

Prepare your System

- backup files + update system
- start installation (guide coming soon!)


Questions?

References

Evans, James A., and Pedro Aceves. 2016. “Machine Translation: Mining Text for Social Theory.” *Annual Review of Sociology* 42 (1): 21–50. https://doi.org/10.1146/annurev-soc-081715-074206.

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Lazer, David, Alex Pentland, Lada Adamic, Sinan Aral, Albert-László Barabási, Devon Brewer, Nicholas Christakis, et al. 2009. “Computational Social Science.” *Science* 323 (5915): 721–23. https://doi.org/10.1126/science.1167742.

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