

# Hands-on: Stylometry

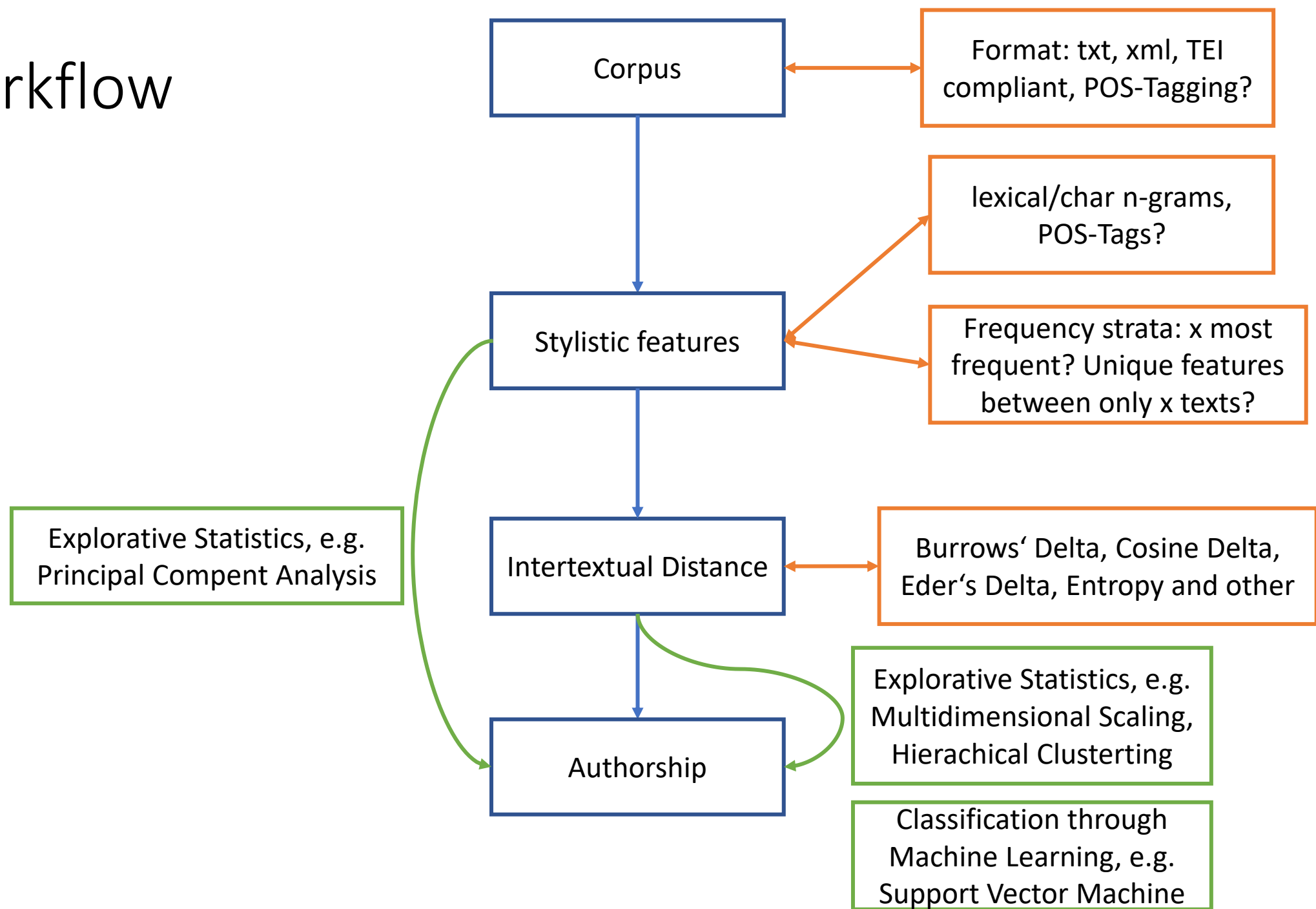
Nikola Krisztian Czindrity

ATDS 2022

Materials available at

<https://github.com/NKCZ/atds2022stylo>

# Workflow



# Good news: all covered in *Stylo*!

The following are required:

- R: <https://www.r-project.org/>
  - R for Windows: <https://cran.r-project.org/bin/windows/base/>
- RStudio: <https://www.rstudio.com/products/rstudio/>
- R-package *Stylo*:
  - run in your R-Enviroment: **install.packages("stylo")**
  - <https://cran.r-project.org/web/packages/stylo/index.html>
- OR
- try running it in Binder (see Github)

Corpus

Corpus

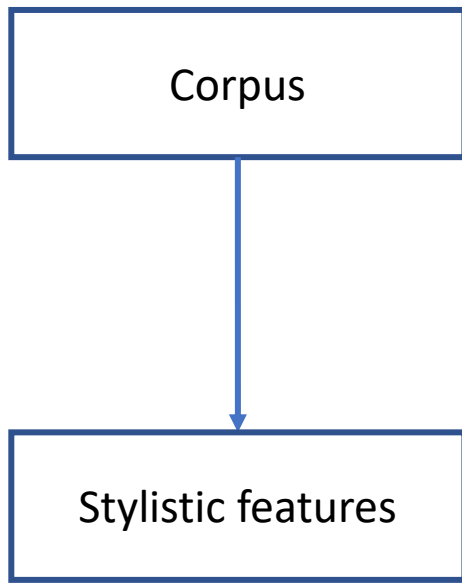
Format: txt, xml, TEI  
compliant, POS-Tagging?



Corpus

Format: txt, xml, TEI  
compliant, POS-Tagging?

Saga Corpus  
47 XML (TEI)  
Icelandic People Sagas,  
Landn., Sturlunga s.



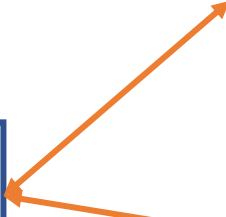
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Corpus



Stylistic features

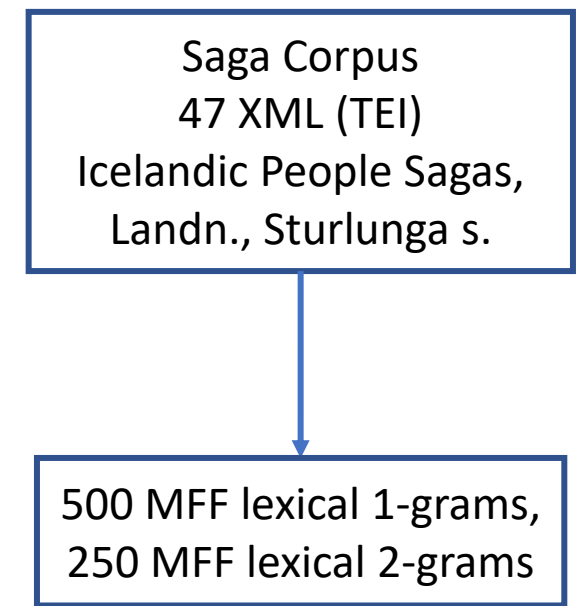
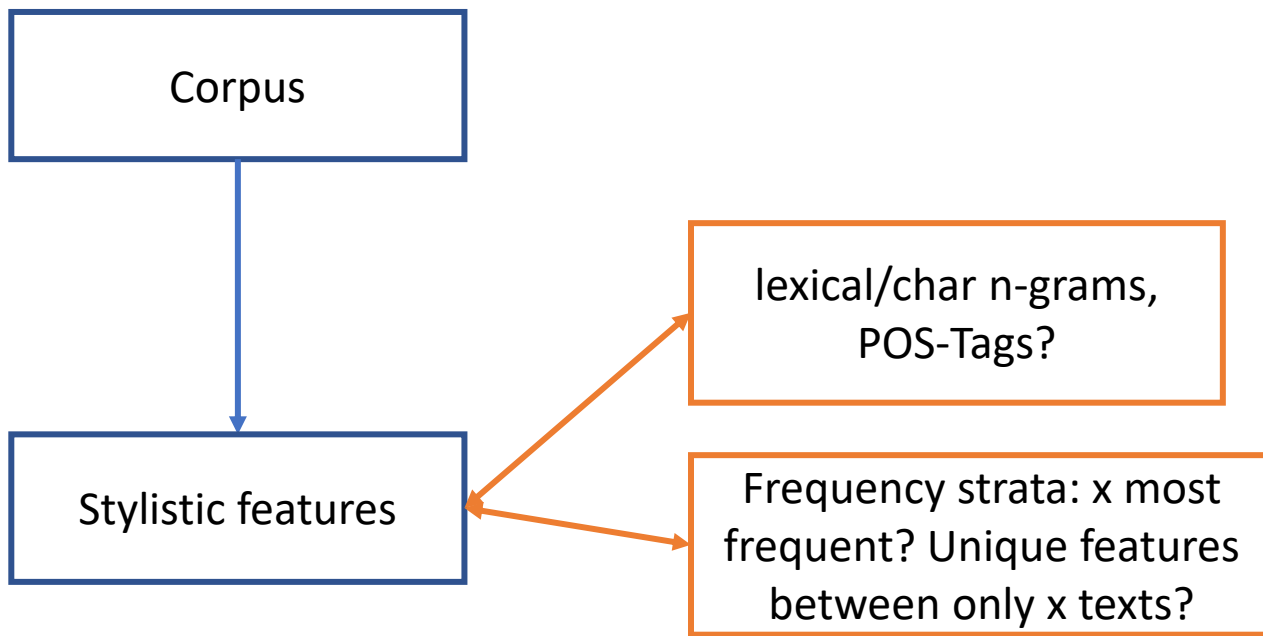
lexical/char n-grams,  
POS-Tags?

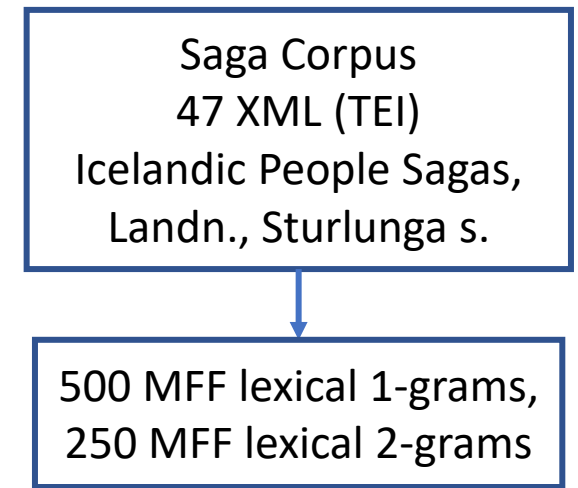
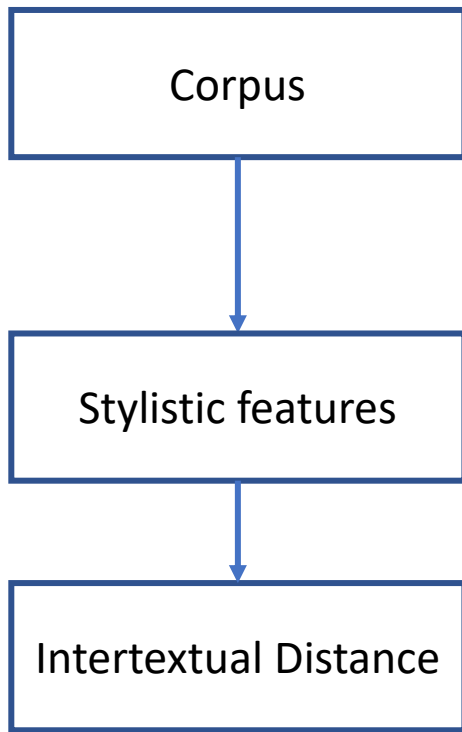


Frequency strata: x most  
frequent? Unique features  
between only x texts?

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Corpus



Stylistic features



Intertextual Distance



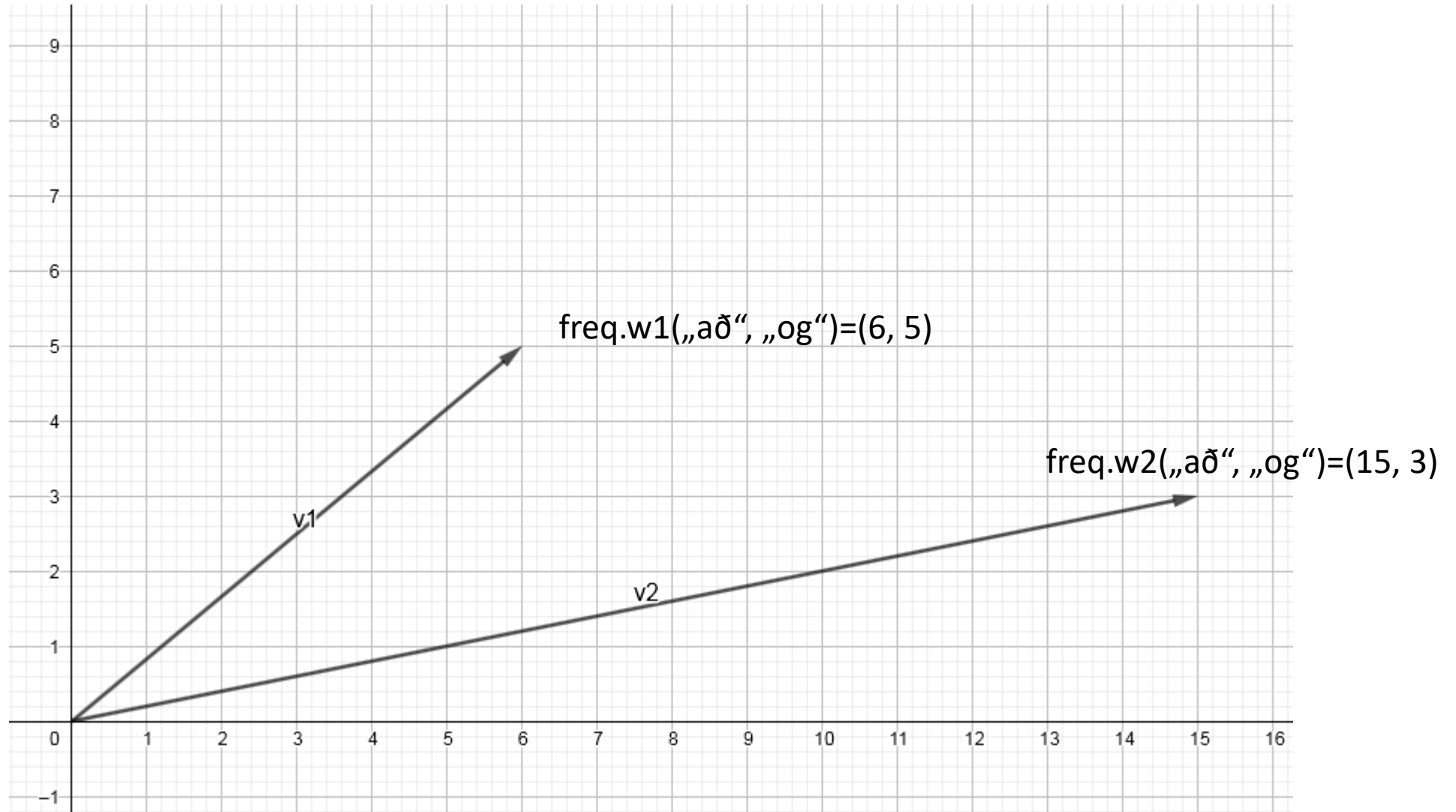
Burrows' Delta, Cosine Delta,  
Eder's Delta, Entropy and other

Saga Corpus  
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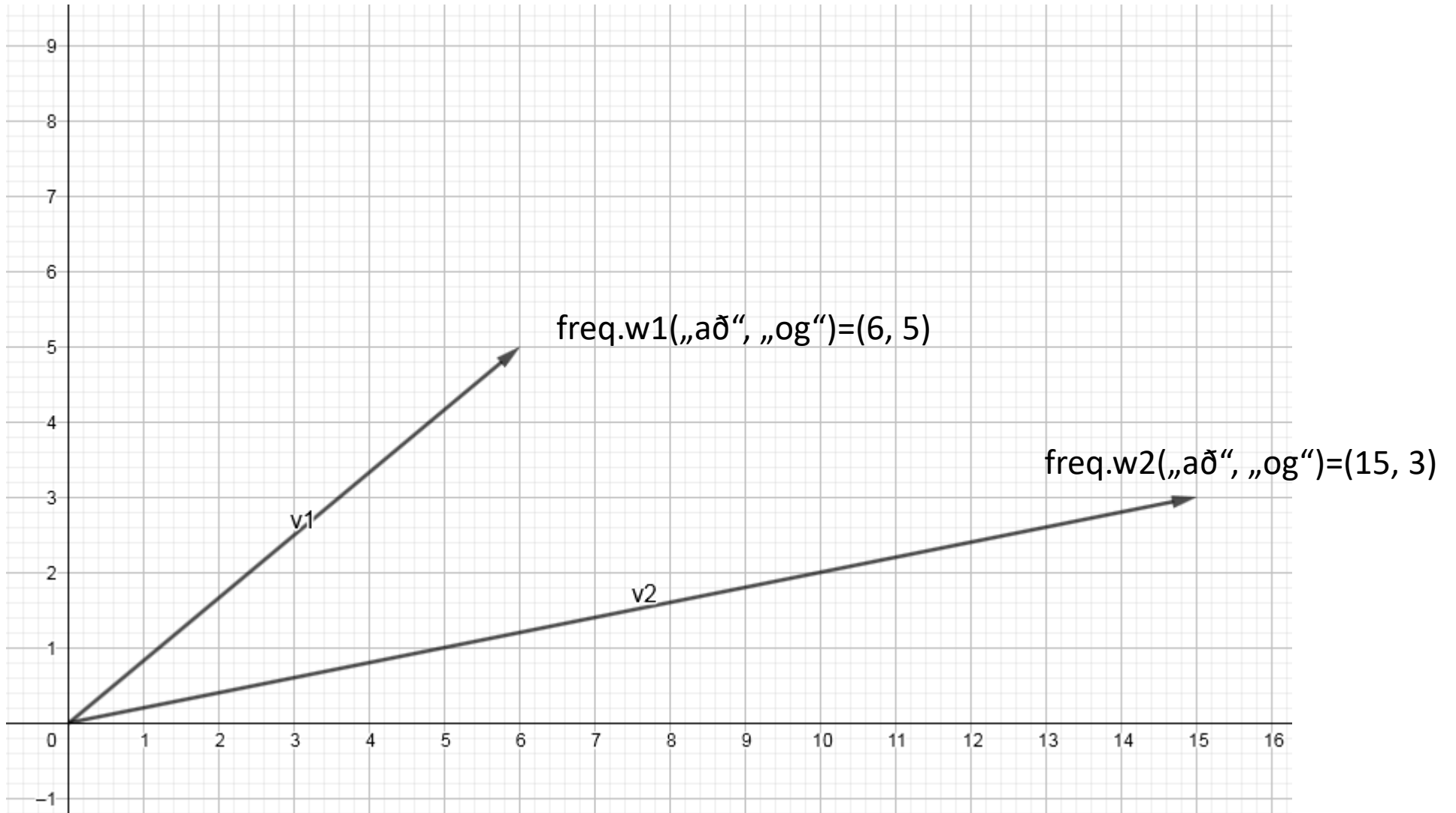


500 MFF lexical 1-grams,  
250 MFF lexical 2-grams

# Vector Space

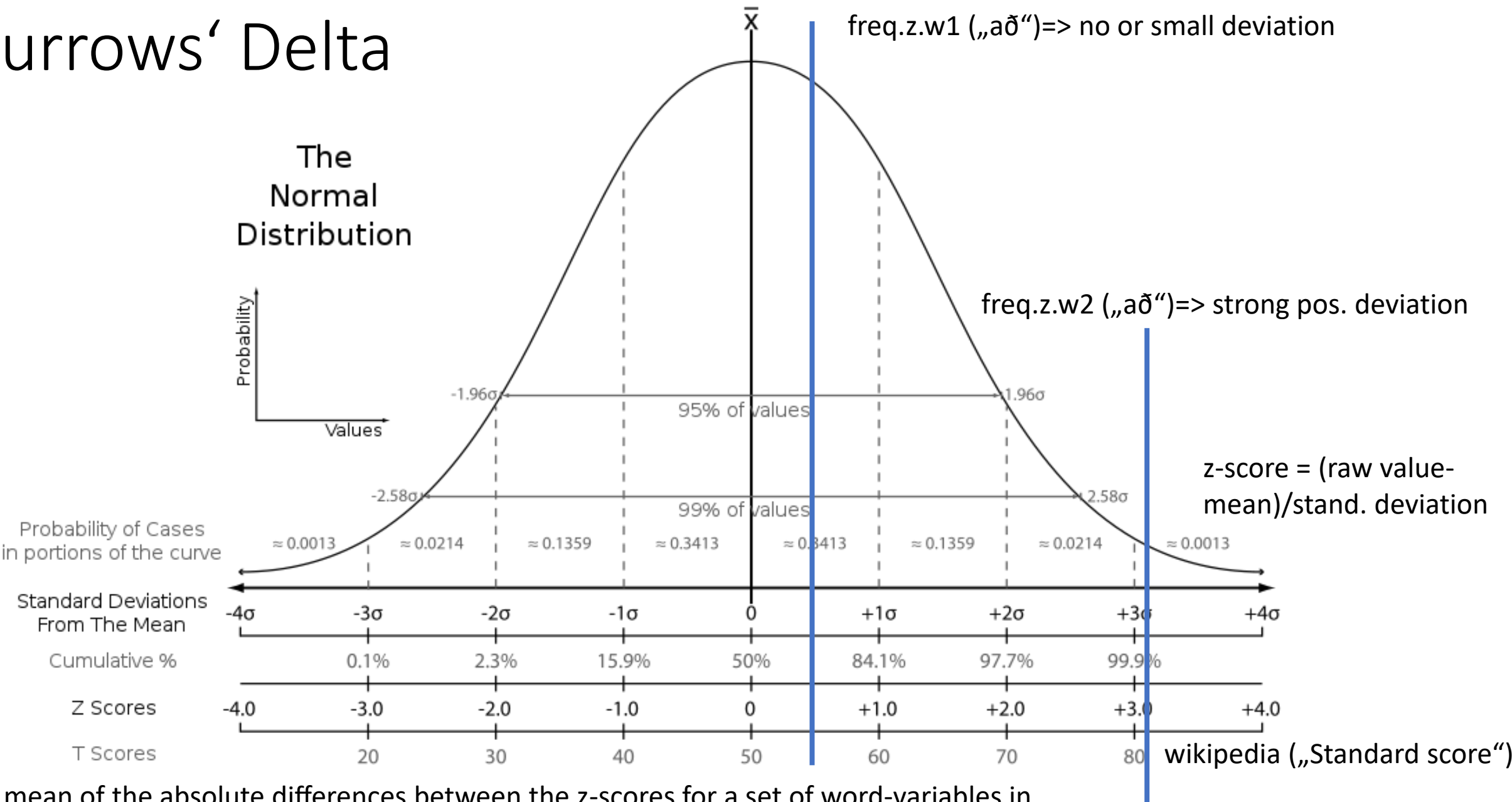


# Vector Space



In that case 2-D, but it can be generalized to n-Dimensions.

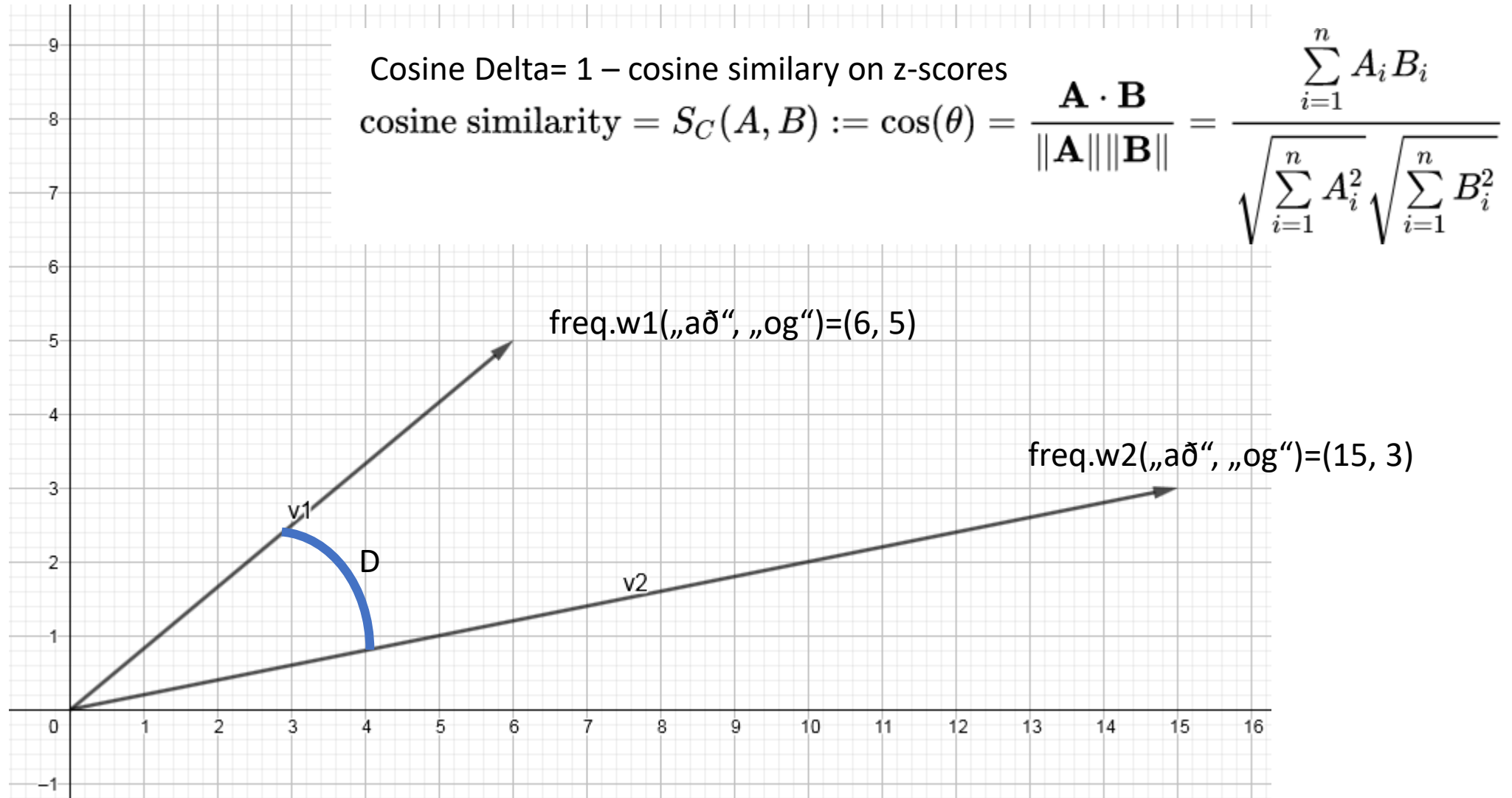
# Burrows' Delta



“the mean of the absolute differences between the z-scores for a set of word-variables in a given text-group and the z-scores for the same set of word-variables in a target text.” Burrows 2002

# Cosine Similarity & Delta

Wikipedia („cosine similarity“)



Corpus



Stylistic features



Intertextual Distance



Burrows' Delta, Cosine Delta,  
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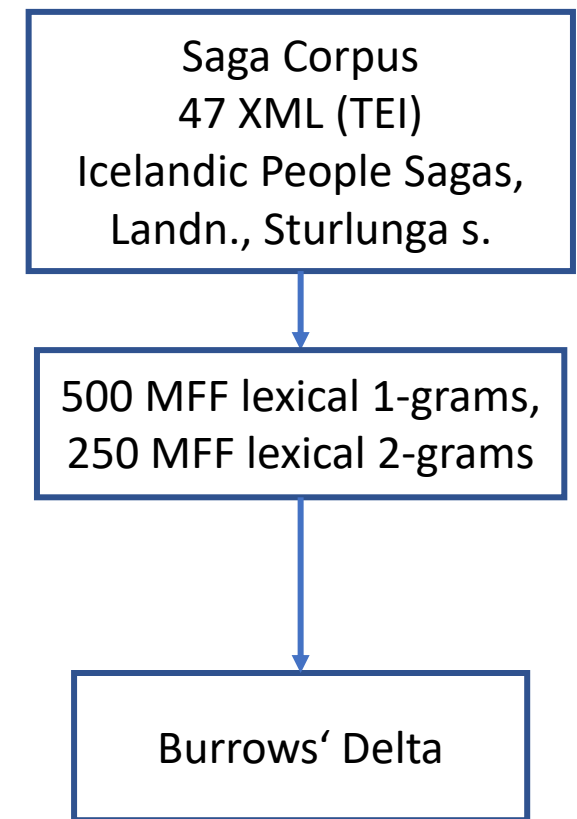
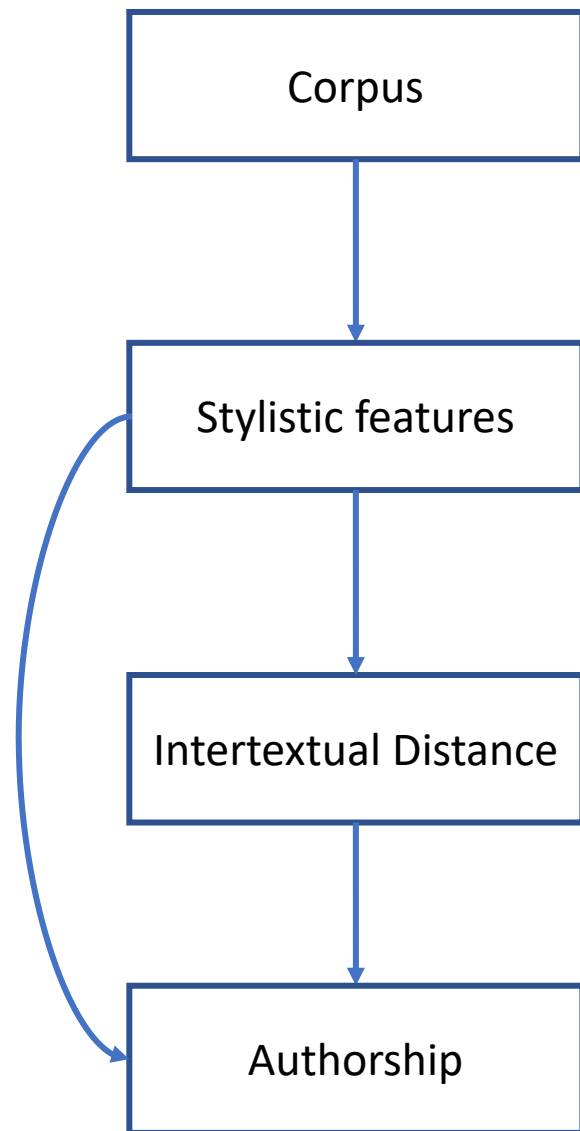


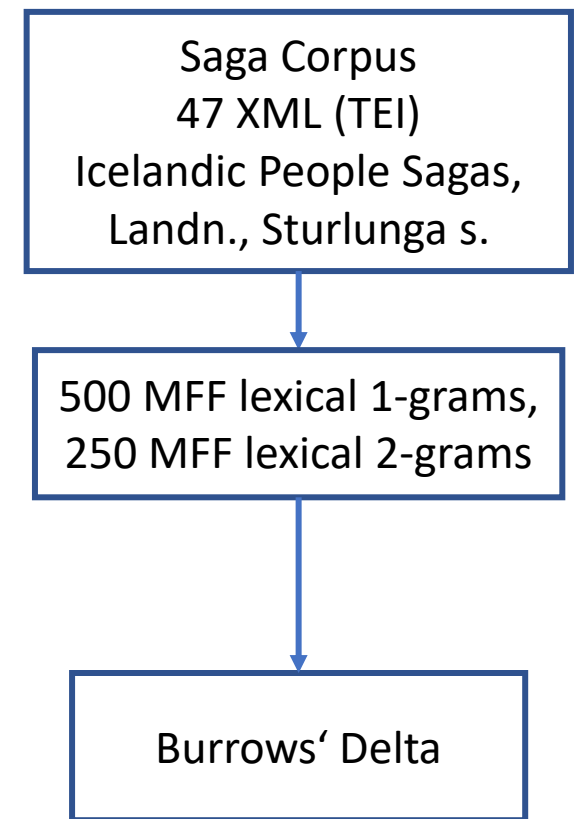
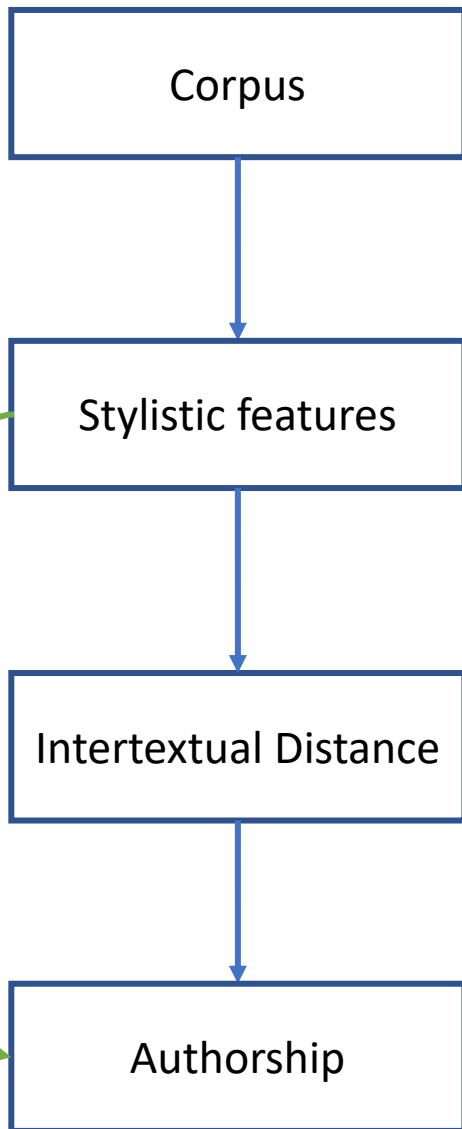
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Burrows' Delta







Corpus



Stylistic features



Intertextual Distance



Authorship

Explorative  
Statistics,  
e.g. PCA

Explorative Statistics, e.g.  
MDS, HCA

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Burrows' Delta

Corpus



Stylistic features



Intertextual Distance



Authorship

Explorative  
Statistics,  
e.g. PCA

Explorative Statistics, e.g.  
MDS, HCA

Classification through  
Machine Learning, e.g.  
Support Vector Machine

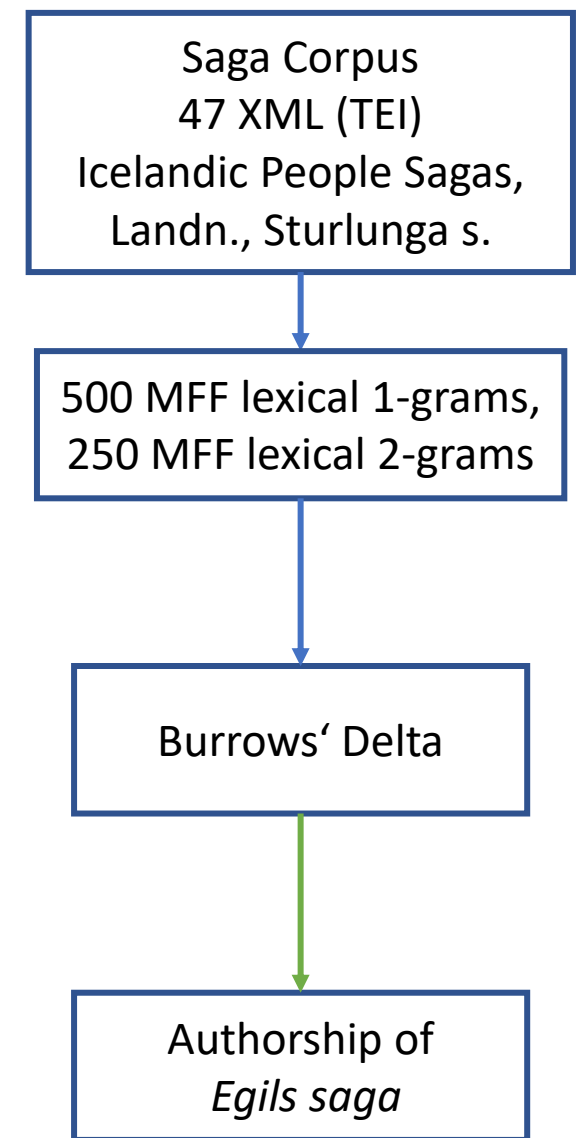
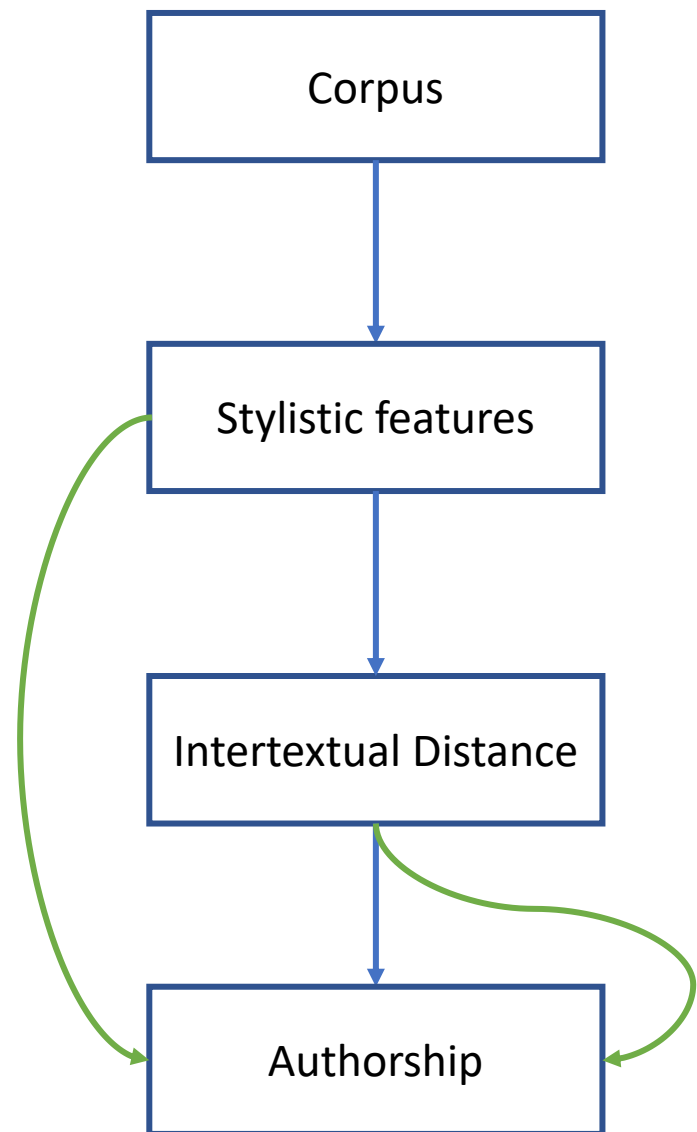
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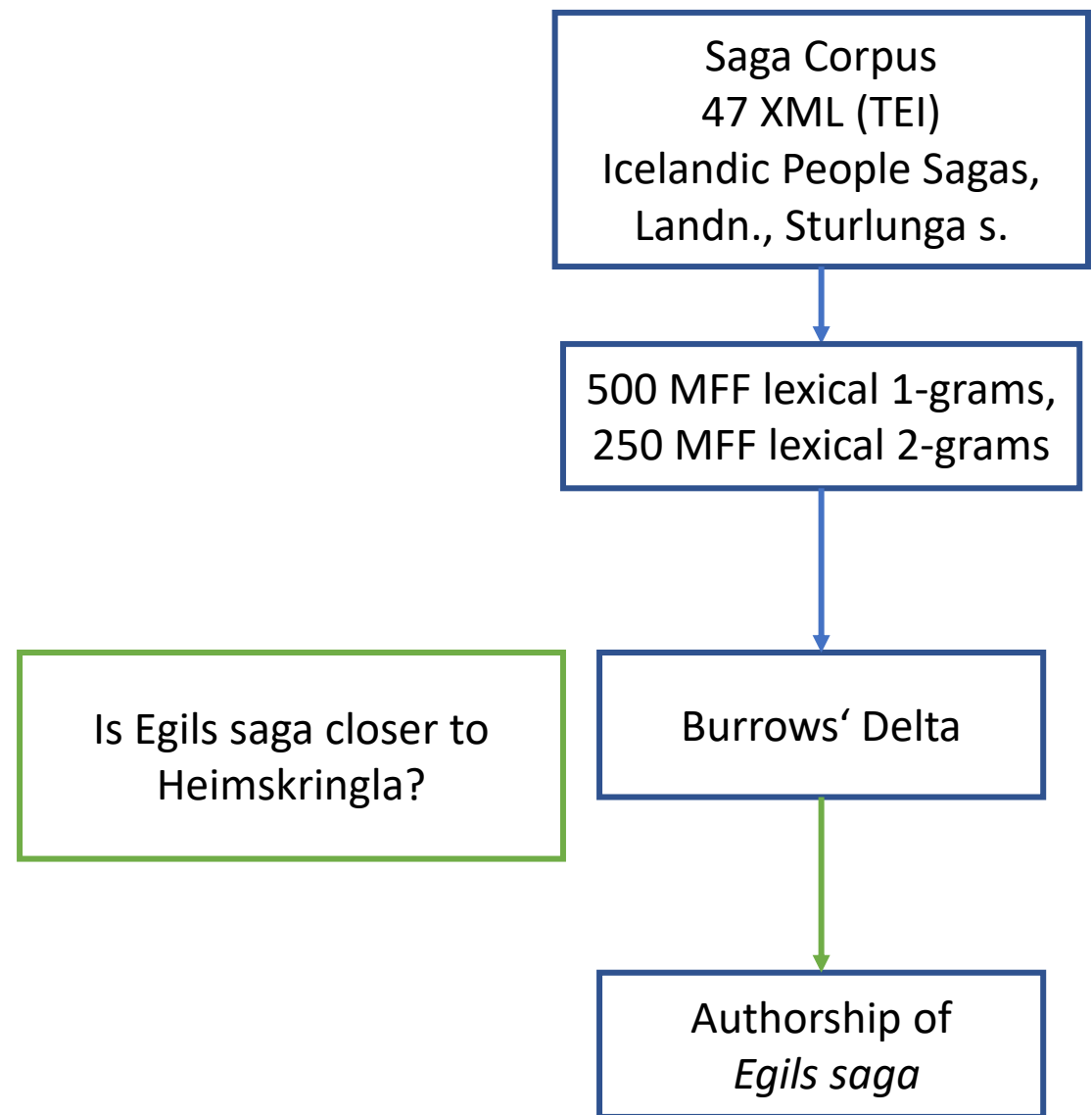
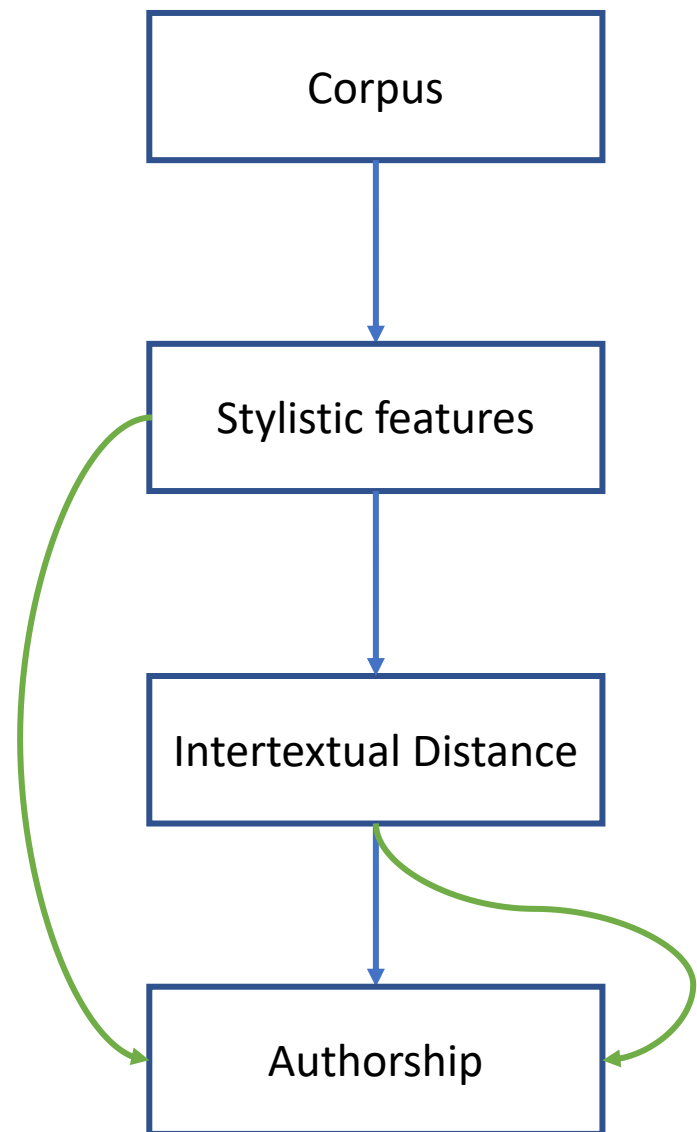


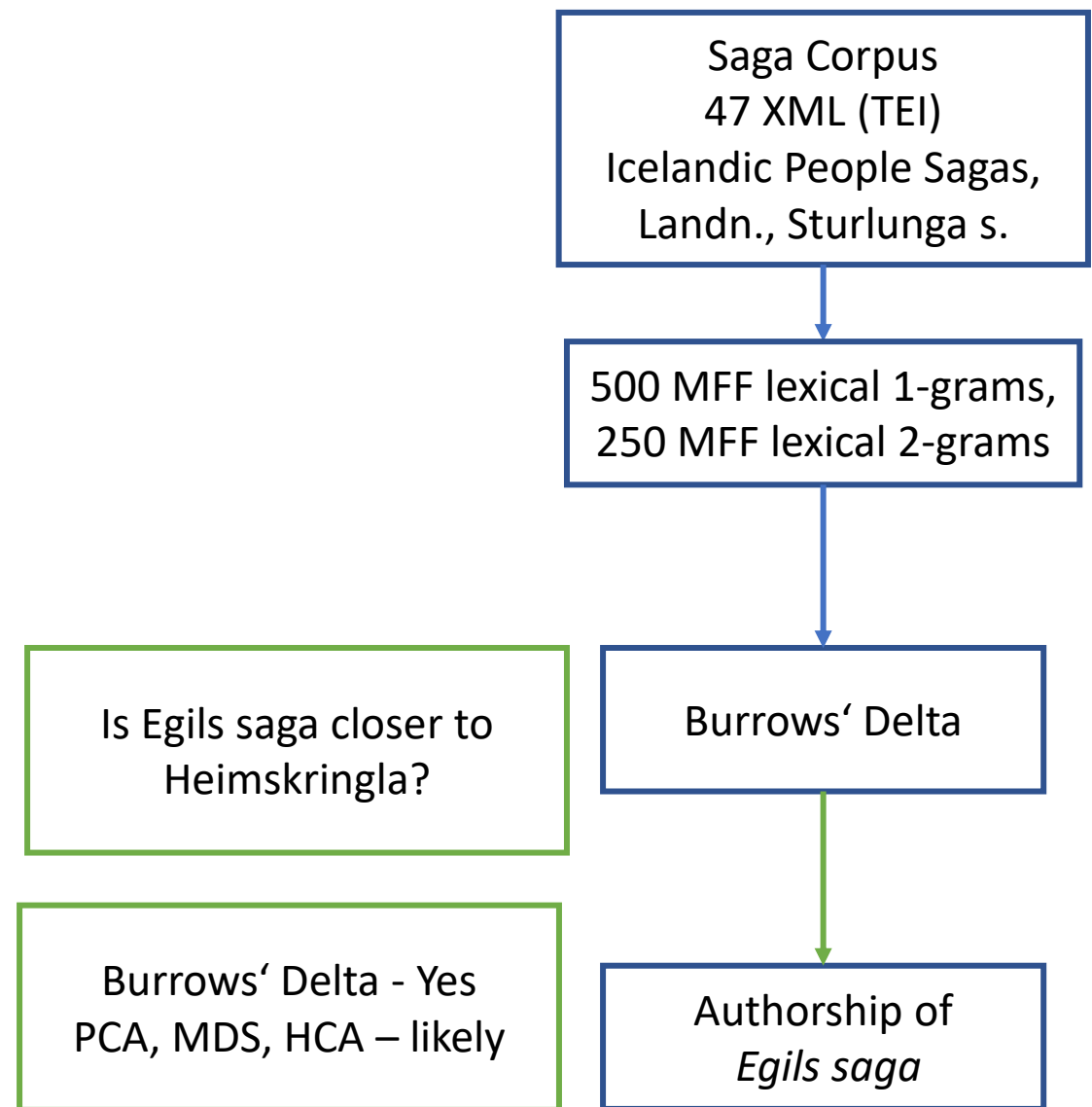
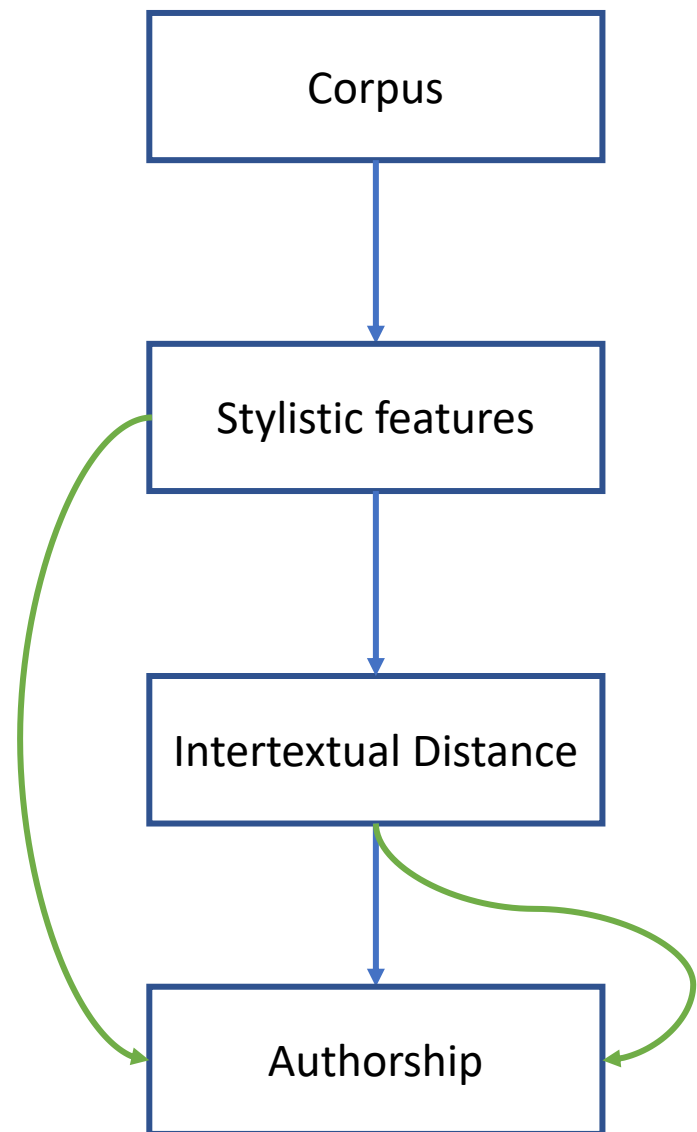
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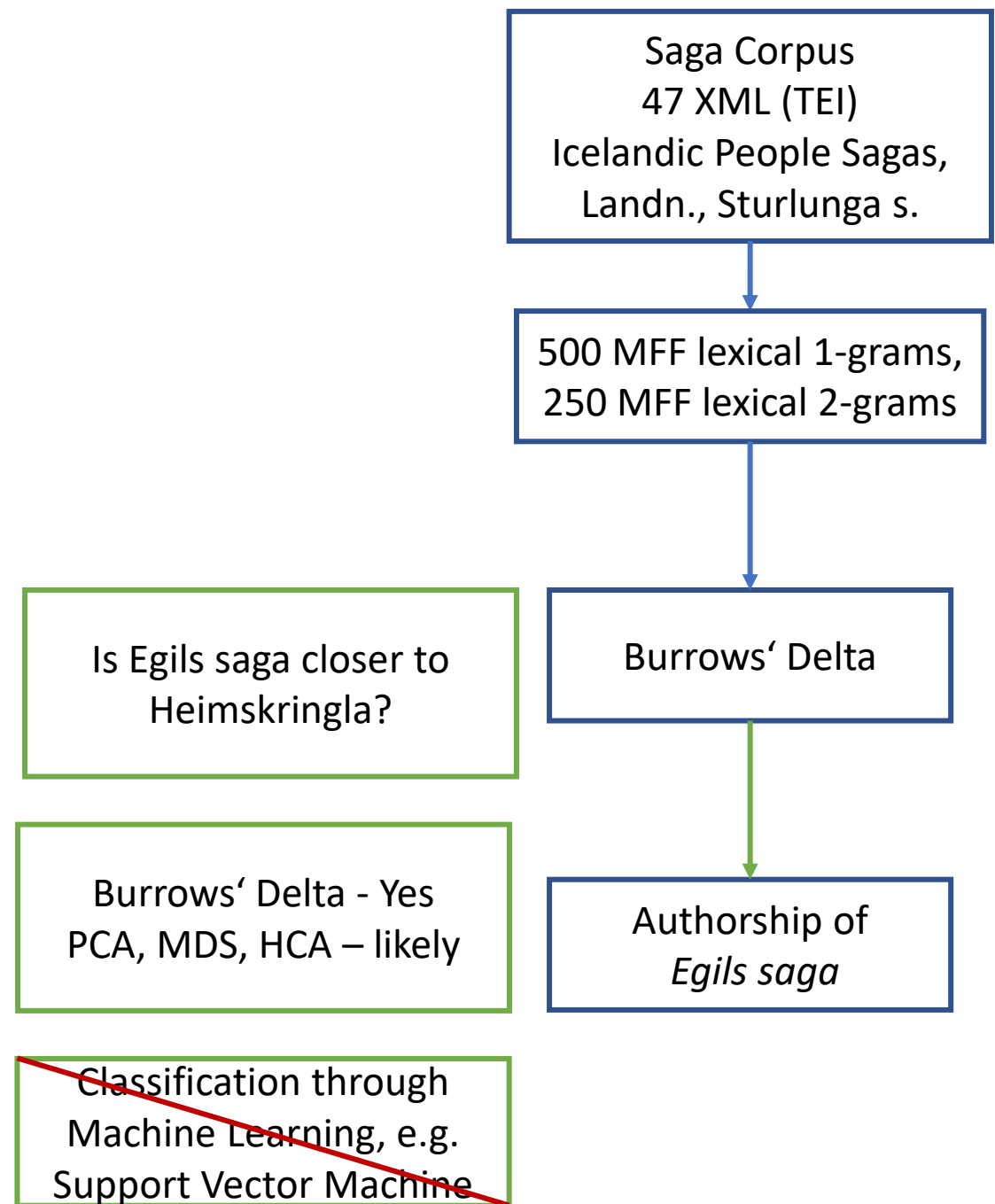
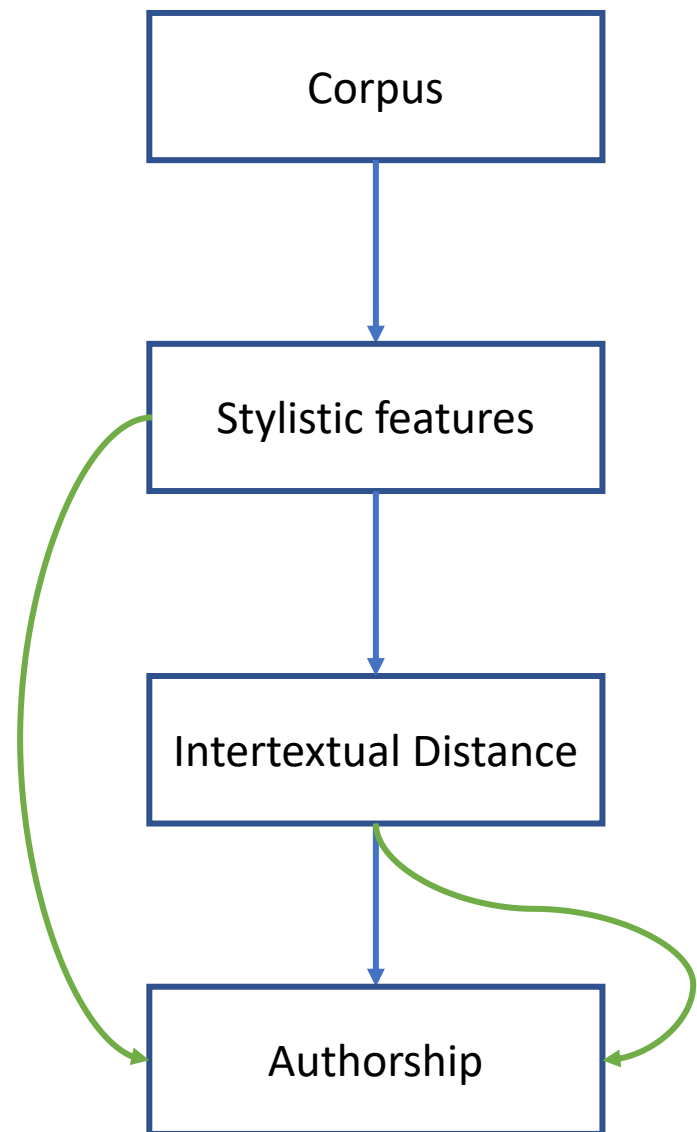


Burrows' Delta

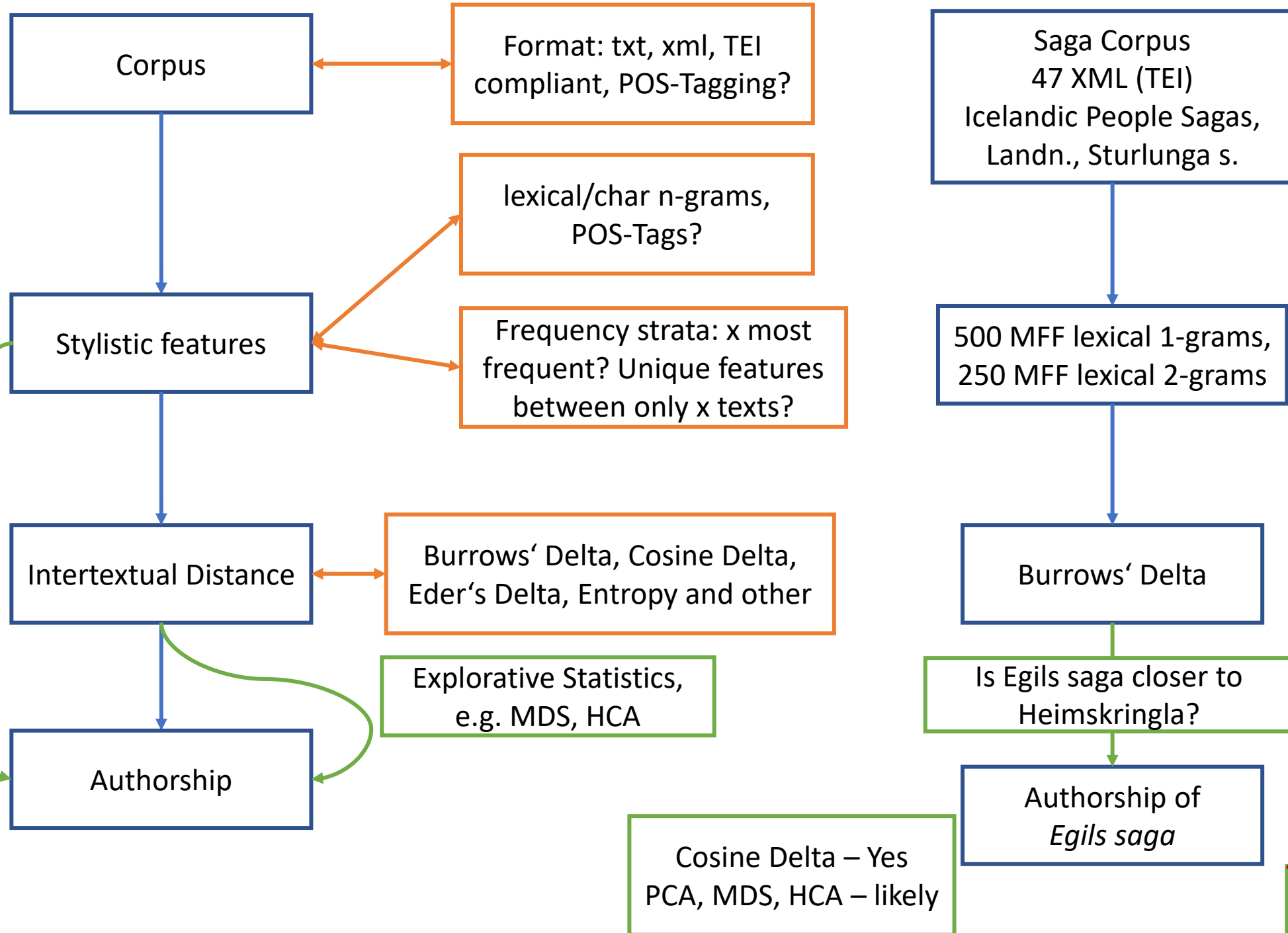












Explorative Statistics, e.g. PCA

Explorative Statistics, e.g. MDS, HCA

Cosine Delta – Yes  
PCA, MDS, HCA – likely

~~ML~~

# Sources & further Information I

- Materials at <https://github.com/NKCZ/atds2022style>
- Corpus:
  - *Saga Corpus* = The Saga Corpus, ed. Eiríkur Rögnvaldsson / Sigrún Helgadóttir. (online: URL <http://www.malfong.is/index.php?lang=en&pg=fornritin>; 2021).
- General information on stylometry:
  - Patrick Juola, Authorship Attribution. In: Foundations and Trends in Information Retrieval 1(3) (2007), 233-334.
  - Efstathios Stamatatos, A Survey of Modern Authorship Attribution Method. In: JASIST 60(3) (2008), 539-556.
  - Maciej Eder / Jan Rybicki / Mike Kestemon, Stylometry with R: a package for computational text analysis. In: R Journal 8(1) (2016), 107-121.
  - Stefan Evert / Thomas Proisl / Fotis Jannidis / Isabella Reger / Steffen Pielström / Christof Schöch / Thorsten Vitt, Understanding and explaining Delta measures for authorship attribution. In: DSH 32(Suppl. 2) (2017), 4–16.
  - Burrows 2002 = John Burrows, 'Delta': a Measure of Stylistic Difference and a Guide to Likely Authorship. In: LLC 17(3) (2002), 267-287.
  - Burrows 2007 = John Burrows, All the Way Through: Testing for Authorship in Different Frequency Strata. In: LLC 22(1) (2007), 27-47.

# Sources & further Information II

- Authorship through stylometry: *Egils saga*
  - Sigurður Ingibergur Björnsson / Steingrímur Páll Kárason / Jón Karl Helgason, Stylometry and the Faded Fingerprints of Saga Authors. In: In Search of the Culprit. Aspects of Medieval Authorship, ed. Lukas Rösli / Stefanie Gropper (Berlin/Boston 2021), 97-122.
  - Haukur Þorgeirsson, How similar are Heimskringla and Egils saga? An application of Burrows' delta to Icelandic texts. In: EJSS 48(1) (2018), 1-18.