

The Shape of Stories

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Do stories have a shape?

The question begets two further questions.

What is a story?

In his *Quantitative Narrative Analysis* (2010:11) Franzosi asks:

But what is a story? A story, according to the Oxford English Dictionary (OED, 1989) is

A narrative, true or presumed to be true, relating to important events and celebrated persons of a more or less remote past; a historical relation or anecdote.

A recital of events that have or are alleged to have happened; a series of events that are or might be narrated.

And what is an event?

We seem to be facing here an infinite regress. Franzosi continues (2010:17):

But what is an event? Despite the central role of this concept in any definition of narrative, story, and plot, you will be hard-pressed to find a rigorous definition of event in the vast body of literature on narrative. The event almost seems to be taken as a given, as a commonsensical element of the language that does not need to be defined.

... what narrative theorists have in mind when they talk about events is *human action*.

Other types of events (and characters) can be part of narrative but only in a subordinate position (e.g., a heat wave and the effect that global warming may have on the

probability of this type of event). They don't play a leading role but only a supportive one (e.g., in a story of older people having to be hospitalized during the heat wave).

5 Ws + H

A story, then, involves characters (typically, human) who act in time and space, the *scene* of the action, a text structure that can be summed up in the Who, What, When Where, Why, and How, or the 5 Ws of journalism + H.

So... What is a story shape?

A good answer would be: it's complicated. So, let's turn, once again, to the Oxford English Dictionary (OED) for help.

“External form or contour; that quality of a material object (or geometrical figure) which depends on constant relations of position and proportionate distance among all the points composing its outline or its external surface; a particular variety of this quality.”

Visual and beautiful

Nearly all OED definitions of shape have this in common: a focus on the visual, perhaps on the beautiful. **So... however we define shape of a story, it must be visual, perhaps beautiful. We must be able to represent it.**

Story & plot

There is another OED definition, albeit obsolete, that is of particular interest in this context: “Form, order and arrangement (of words, etc.); course, order (of a story). Obsolete.” The order of a story? There is an old distinction in narrative theory between story and plot. In his *From Words to Numbers*, Franzosi (2004: 56) thus introduces the distinction between story and plot:

It is the Russian formalists who introduced the distinction between story versus plot in narrative (*fabula* versus *sjuzhet*). Building upon Aristotle's idea of plot-structure – mythos, in the master's own words: “[B]y this term ‘plot-structure’ I mean the organisation of the events” – Tomashevski (1965, p. 67) wrote: “Plot is distinct from story. Both include the same events, but in the plot the events are arranged and connected according to the orderly sequence in which they were presented in the work. [Continued in a note; the story is] “the action itself, ... [the plot] how the reader learns of the action.” A story, in other words, refers to a skeletal description of the fundamental events in their natural logical and chronological order (perhaps, with an equally skeletal listing of the roles of the characters in the story).

A *story* then moves the events chronologically; a *plot* scrambles them for rhetorical effect, to keep the audience interested, like Hitchcock starting his movies from the murder scene and then moving back to the antecedents.

How would you visualize the differences between story and plot? A question for a different time... But, just to give you a hint on a possible answer, it would involve a focus on the changing scenes (time & space), on the changing actors.

The consequences of action

For Aristotle, a story has a beginning, a middle, and an end. What happens in the middle determines whether the story is happy ending (a *comedy*) or unhappy ending (a *tragedy*). A tragedy no doubt is Oedipus's story who, after much tribulations, ends up unwittingly killing his father and marrying his mother (only the Greeks can think of such horrible stories, with Oedipus' mother ending up killing herself when she finds out the truth about her new relationship).

Sentiment analysis

Killing your father is not a good thing. Neither is sleeping with your mother. And we frown upon suicide. That is how we react to these events, *negatively*. Modern computational tools allow us to measure these reactions, to put a number to them. We can use those numbers to plot the unfolding of events, the ups and downs of stories. The technique is called **sentiment analysis**. To learn more about sentiment analysis, read the TIPS_NLP_Sentiment analysis.

Our “shape of stories” algorithm is fundamentally based on sentiment scores, computed via a variety of algorithms.

Story shapes at last!

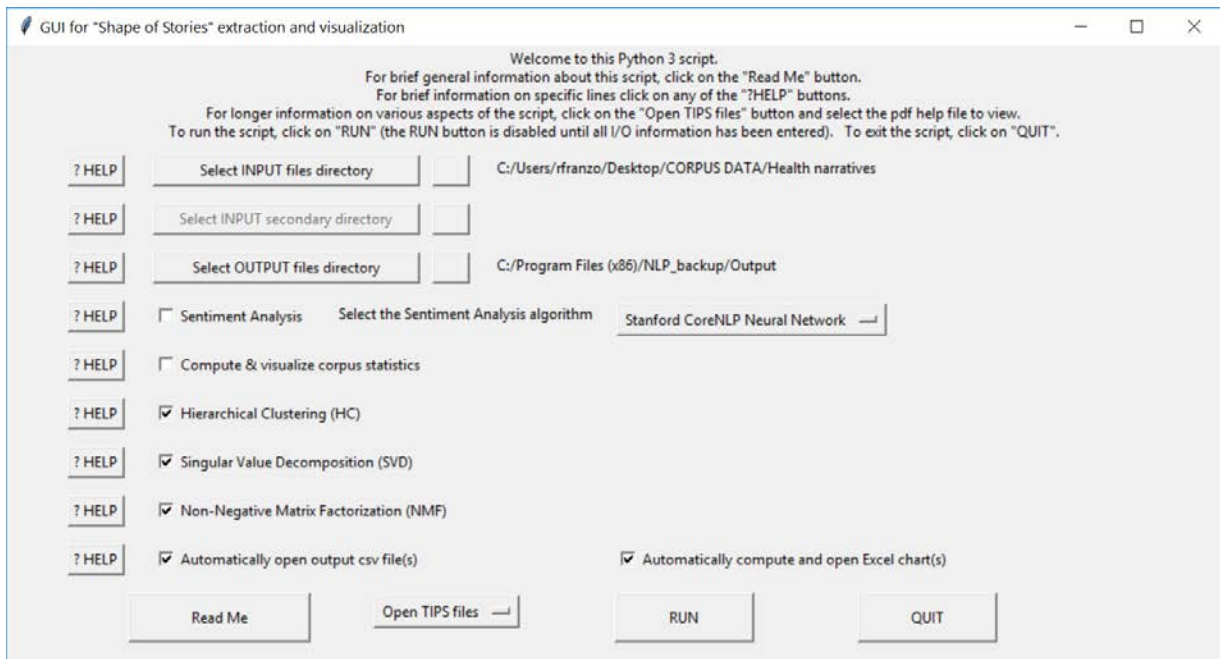
“There is no reason why the simple shape of stories can't be fed into a computer. They are beautiful shapes.” says Kurt Vonnegut on a widely viewed video available on YouTube. Vonnegut draws three different types of curves that he calls: “man in a hole”, “boy gets girl”, “Cinderella”.

Reagan et al. (2016) took up Kurt Vonnegut's challenge of drawing story shapes *automatically* with a computer (a good example of Moretti's “distant reading”). They ultimately settle on six fundamental shapes:

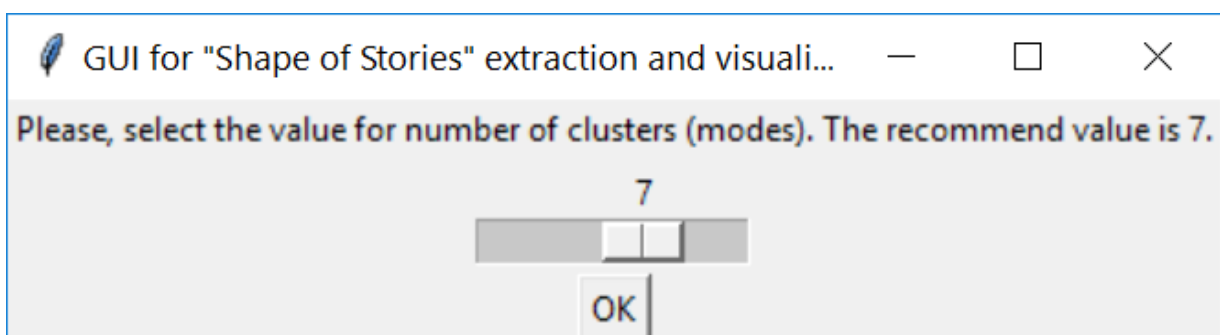
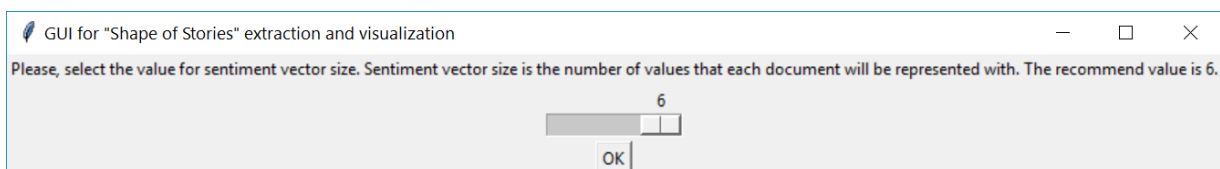
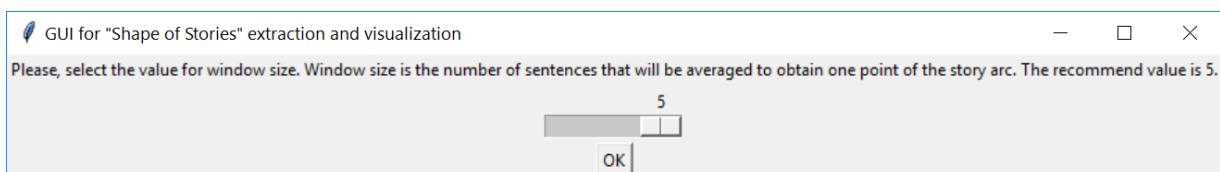
1. Rags to Riches (rise)
2. Riches to Rags (fall)
3. Man in a Hole (fall then rise)
4. Icarus (rise then fall)
5. Cinderella (rise then fall then rise)
6. Oedipus (fall then rise then fall)

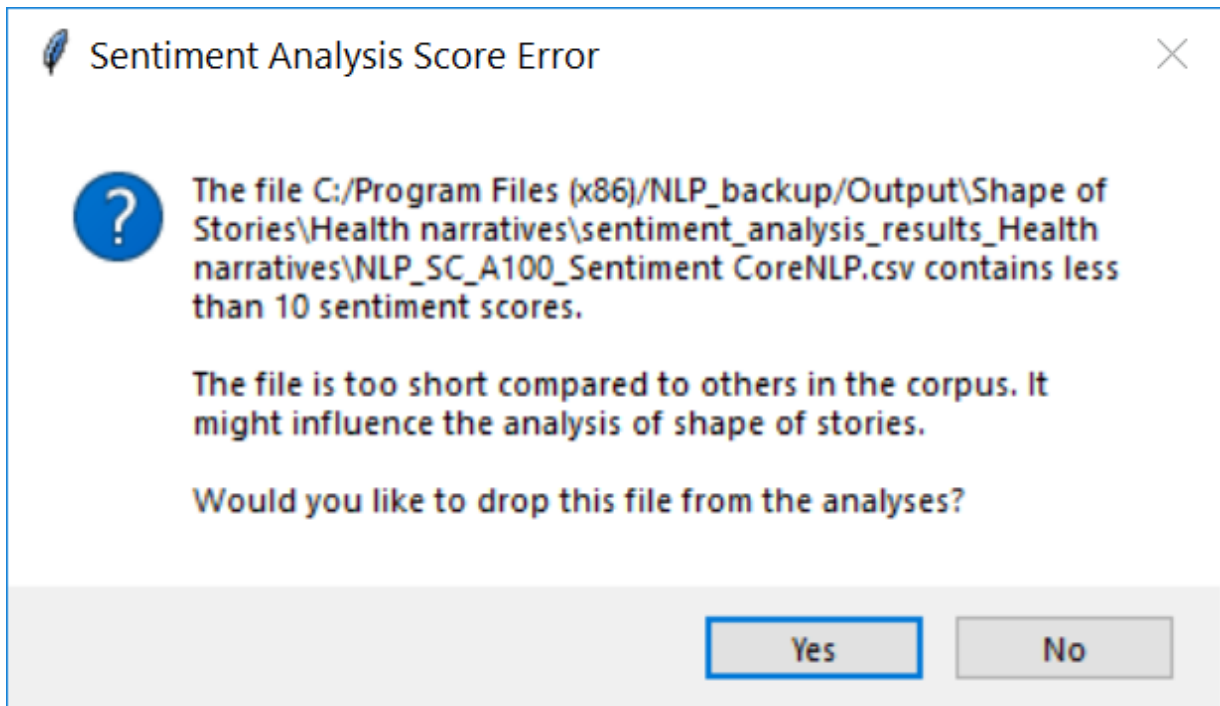
Our shape of stories algorithm

Our shape of stories pipeline includes both Python and Java scripts. The algorithm follows Reagan et al.'s approach, with a big difference. **It is meant** for humanists and social scientists with no computational skills. It provides a convenient GUI (Graphical User Interface) (see screenshot below), several ?HELP buttons for specific topics, an overall Read Me button, and several TIPS files to guide the inexperienced user.



The rest is done automatically: the computation of sentiment scores by various algorithms (the neural network approach by Stanford CoreNLP, the dictionary-based approaches by ANEW, hedonometer, SentiWordNet, and VADER), the visualization of corpus statistics to identify outliers, and three different approaches to the data reduction required for going from several hundreds or thousands of stories to a handful of common shared patterns: Hierarchical Clustering, Singular Value Decomposition, Non-negative Matrix Factorization, and the computing of the default parameters to be fed to these algorithms. Several pop-up messages remind the user what to do.

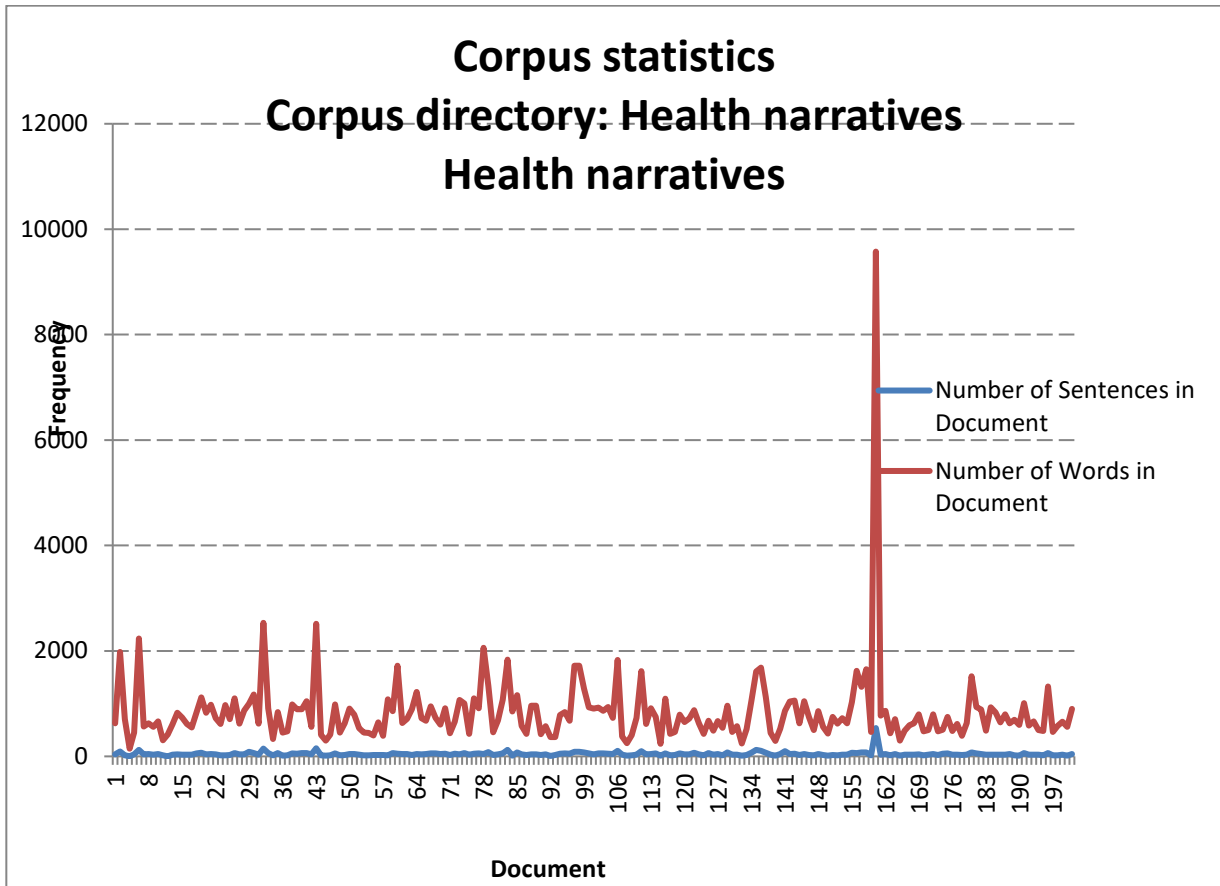


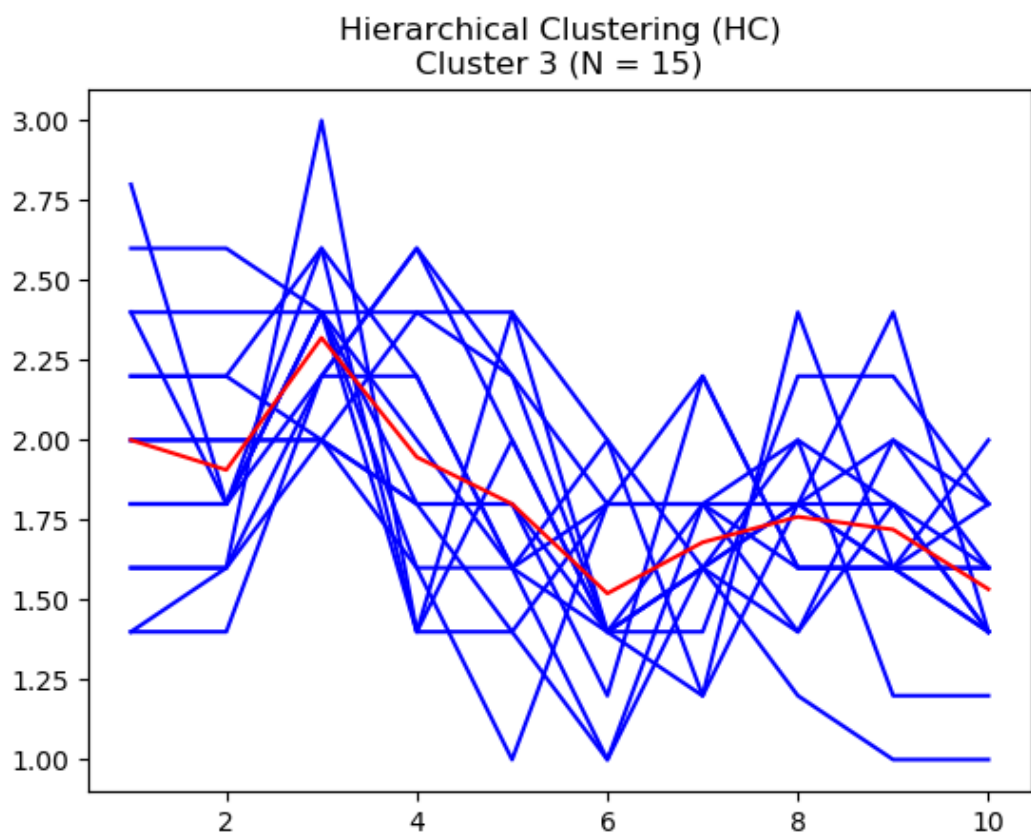
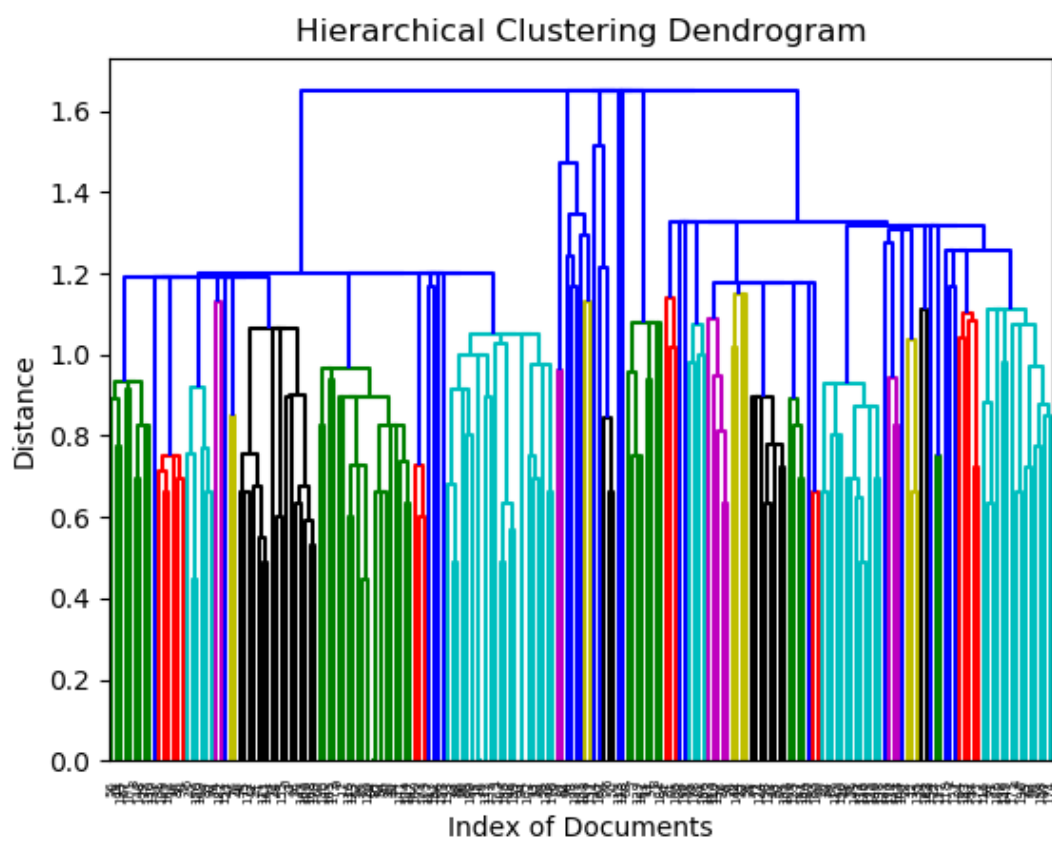


Most importantly, the pipeline provides a number of tabular (csv files) and visual tools to help the user to identify common story shapes.

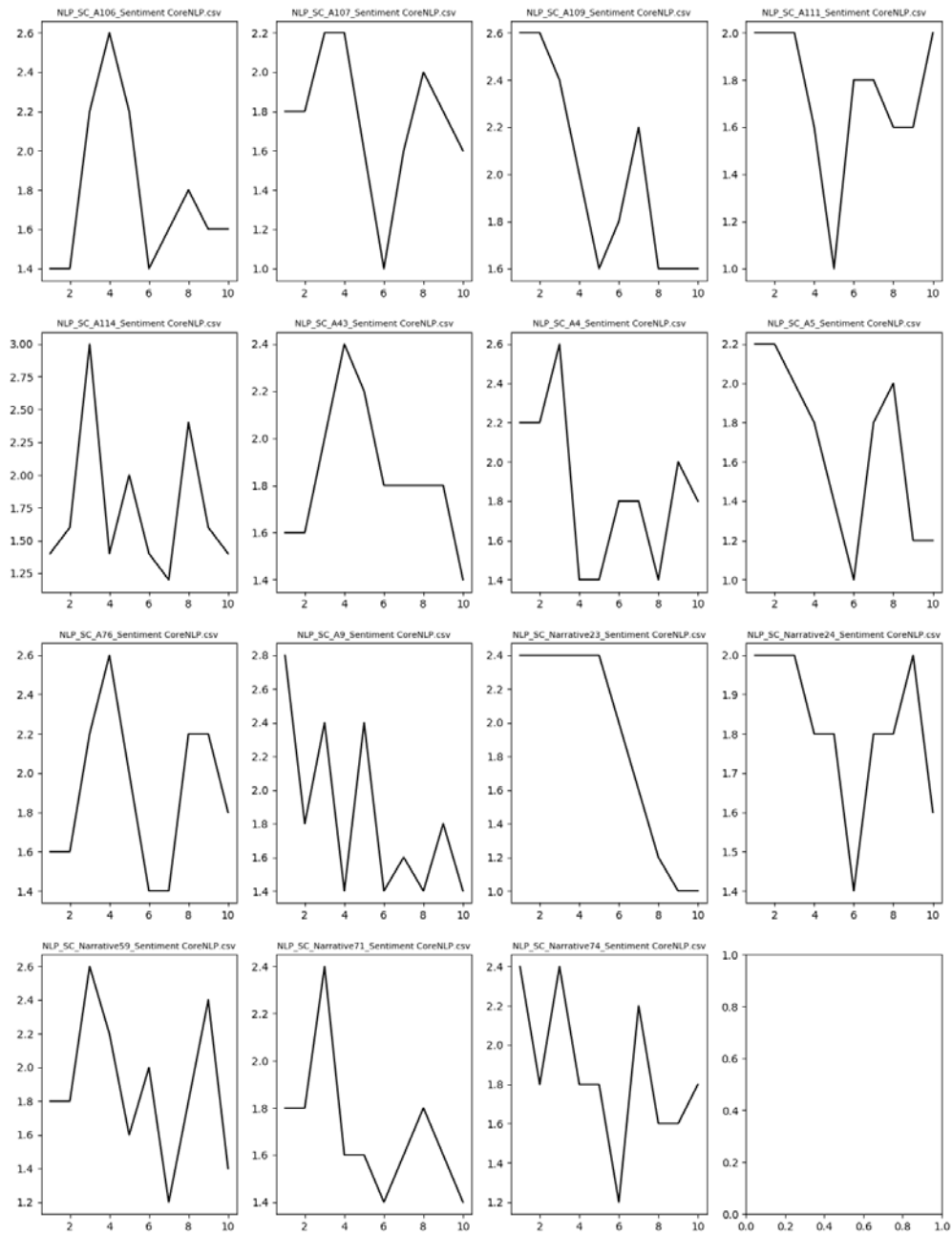
Output csv files

Output graphs





Hierarchical Clustering (HC)
Cluster 3 (N = 15)



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