

# Use of Natural Language Processing and Data Visualization for Ethics Pedagogy and Research

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# Social/Technical Issues with Ethics in AI

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Generative AI like GPT models can arguably pass the **Turing Test**

- → they can fool us into thinking they are human

## Dangers and limitations of AI

- Misinformation, privacy, employment, distributive justice, political propaganda, war, etc.
- In education – ease of cheating using ChatGPT
- Machine learning is only as good as the input data. ChatGPT is trained on the entire internet. GIGO
- Machine learning makes mistakes, even if the data is good

Intelligence is not the same as wisdom

# Issues with Ethics in AI

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Can AI ever pass the **Winograd Schema Test**?

- Common sense? Wisdom? Getting the facts right?
- See Hector Levesque: [Common Sense, the Turing Test, and the Quest for Real AI](#)
- Pronoun resolution: The trophy couldn't fit in the briefcase because **it** was too big.
  - Is "it" the briefcase or the trophy?
- → Knowledge is important. Machine learning (pattern recognition) can't do it all. **GOFAI**

Can expert knowledge plus machine learning facilitate AI wisdom? **AW?**

<https://storyanalyzer.org/>

# About Story Analyzer (SA)

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Story Analyzer depends on two principal technologies

Natural Language Processing – Stanford’s CoreNLP

Data Visualization – d3 (Data Driven Documents) and Google visualizations and maps

Using NLP, SA performs **information extraction**. Given a body of text, SA extracts the following:

People, organizations, and groups

Places and Times

Interactions between entities

Linguistic relationships between concepts

# Stanford's CoreNLP

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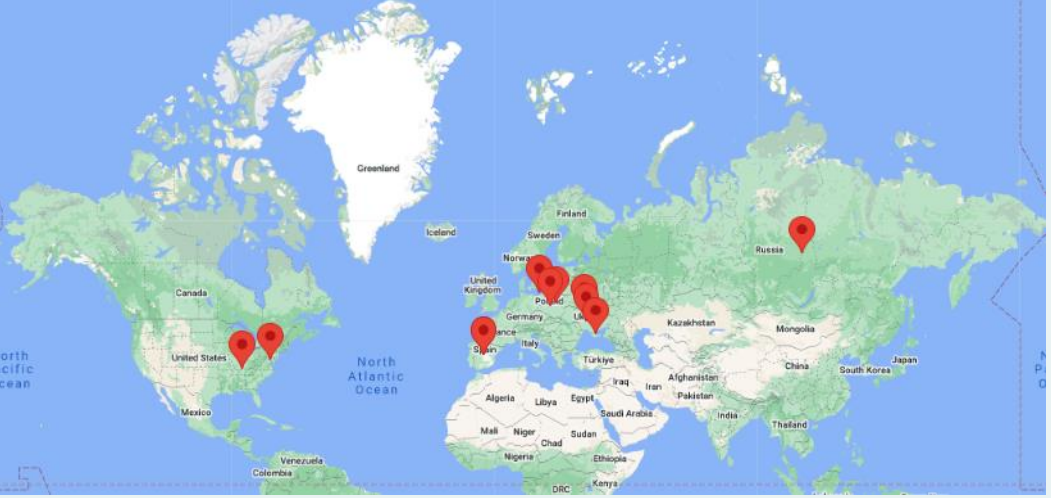
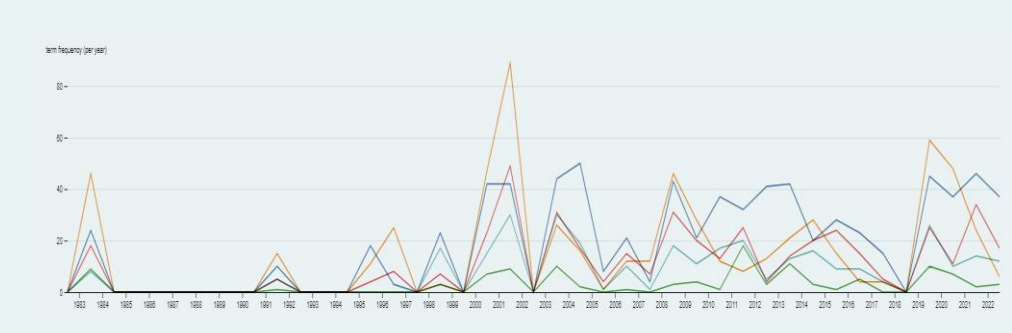
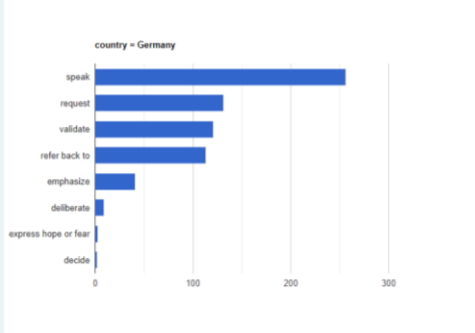
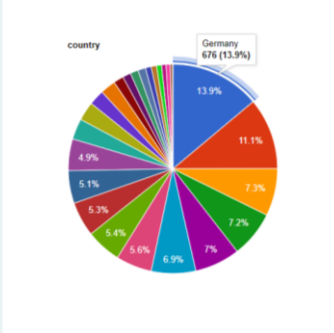
An open-source set of services that can do several things:

- Sentence splitting – breaking a text document into individual sentences
- Tokenizing a sentence (breaking it into individual “words”)
- Identifying parts of speech (POS) within a sentence (nouns, verbs, adjectives, adverbs, etc.)
- Named entity recognition: Recognizing names of people, places, organizations
- Constituency parsing
- Dependency parsing
- Co-reference resolution – finding all expressions that refer to the same entity in a text. (e.g., finding connections between nouns and their associated pronouns)
- Temporal tagging – recognizing and normalizing temporal expressions



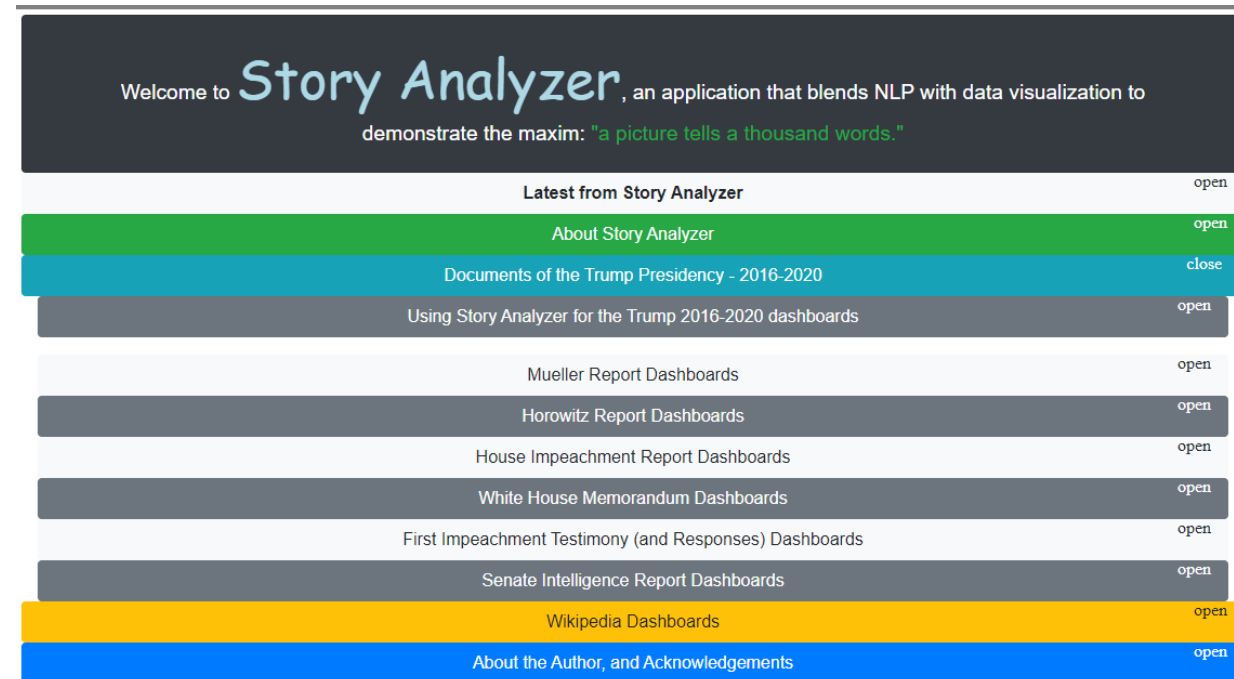
# Google Visualization types for SA

People	#Mentions
Donald J. Trump	415
Rudolph Giuliani	97
Walt Nauta	89
John Eastman	61
Carlos De Oliveira	50
Kenneth Cheseboro	48
Harrison William Prescott Floyd	40
Robert David Cheely	40
David James Shafer	36
Trevian C. Kutti	34
Alston Latham	32
Joseph Biden	31
Sydney Powell	31
Jeffrey Clark	31
Cathleen Alston	20



# Early Story Analyzer Dashboards

- SA project began in 2017
- First robust dashboards:
  - Mueller Report
  - Horowitz Report
  - House Impeachment Report (2019)
  - Senate Intelligence Report
  - Various news and Wikipedia stories



Screenshot from <https://storyanalyzer.org/>

# Example: House Impeachment Report

## Story Analyzer - House Impeachment Report - Exec Summary Section 1 (pp. 12-27)

see [https://intelligence.house.gov/uploadedfiles/the\\_trump-ukraine\\_impeachment\\_inquiry\\_report.pdf](https://intelligence.house.gov/uploadedfiles/the_trump-ukraine_impeachment_inquiry_report.pdf)

### Narrative and Highlighted Information

#### Narrative

##### EXECUTIVE SUMMARY

The impeachment inquiry into **Donald J. Trump**, the 45th President of the United States, uncovered a months-long effort by President **Trump** to use the powers of his office to solicit foreign interference on his behalf in the 2020 election. As described in this executive summary and the report that follows, President **Trump**'s scheme subverted U.S. foreign policy toward Ukraine and undermined our national security in favor of two politically motivated investigations that would help his presidential reelection campaign. The President demanded that the newly elected Ukrainian president, Volodymyr **Zelensky**, publicly announce investigations into a political rival that he apparently feared the most, former Vice President Joe Biden, and into a discredited theory that it was Ukraine, not Russia, that interfered in the 2016 presidential election. To compel the Ukrainian President to do his political bidding, President **Trump** conditioned two official acts on the public announcement of the investigations: a coveted White House visit and critical U.S. military assistance Ukraine needed to fight its Russian adversary.

During a July 25, 2019, call between President **Trump** and President **Zelensky**, President **Zelensky** expressed gratitude for U.S. military assistance. President **Trump** immediately responded by asking President **Zelensky** to "do us a favor though" and openly pressed for Ukraine to investigate former Vice President Biden and the 2016 conspiracy theory. In turn, President **Zelensky** assured President **Trump** that he would pursue the investigation and reiterated his interest in the White House meeting. Although President **Trump**'s scheme intentionally bypassed many career personnel, it was undertaken with the knowledge and approval of senior Administration officials, including the President's Acting Chief of Staff Mick Mulvaney, Secretary of State Mike Pompeo, and Secretary of Energy Rick Perry. In fact, at a press conference weeks after public revelations about the

#### Highlighted Information

Interactions between President Zelensky-14-6 and Donald J. Trump-7-2

Sentence# 7) President **Trump** immediately responded by asking President **Zelensky** to "do us a favor though" and openly pressed for **Ukraine** to investigate former Vice President **Biden** and the **2016** conspiracy theory.

Sentence# 8) In turn, President **Zelensky** assured President **Trump** that he would pursue the investigation and reiterated his interest in the **White House** meeting.

Sentence# 42)

President **Trump** then asked President **Zelensky** to look into" former Vice President **Biden**'s role in encouraging **Ukraine** to remove a prosecutor widely viewed by the **United States** and numerous **European** partners to be corrupt.

Sentence# 87) **Days later**, President **Trump** rescinded the plans for Vice President Pence to attend President **Zelensky**'s inauguration, which had not yet been scheduled

### People, Groups, Interactions, and Narrative Web

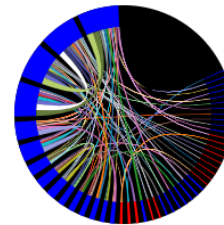
#### People

Person	Impact
Donald J. Trump-7-2	209
Ambassador Sondland-2-30	156
President Zelensky-14-6	124
President Trump-23-2	108
Rudy Giuliani-29-44	79
Ambassador Kurt Volker-11-90	37
Ambassador Taylor-7-100	36

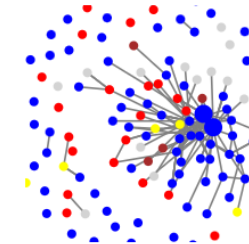
#### Groups

Group	Impact
NSC-21-25	13
Congress-21-57	13
Office of the President-20-11	11
Burisma-33-32	7
CNN-17-230	7
OMB-16-107	7
Congressional Intelligence Committees-24-257	6

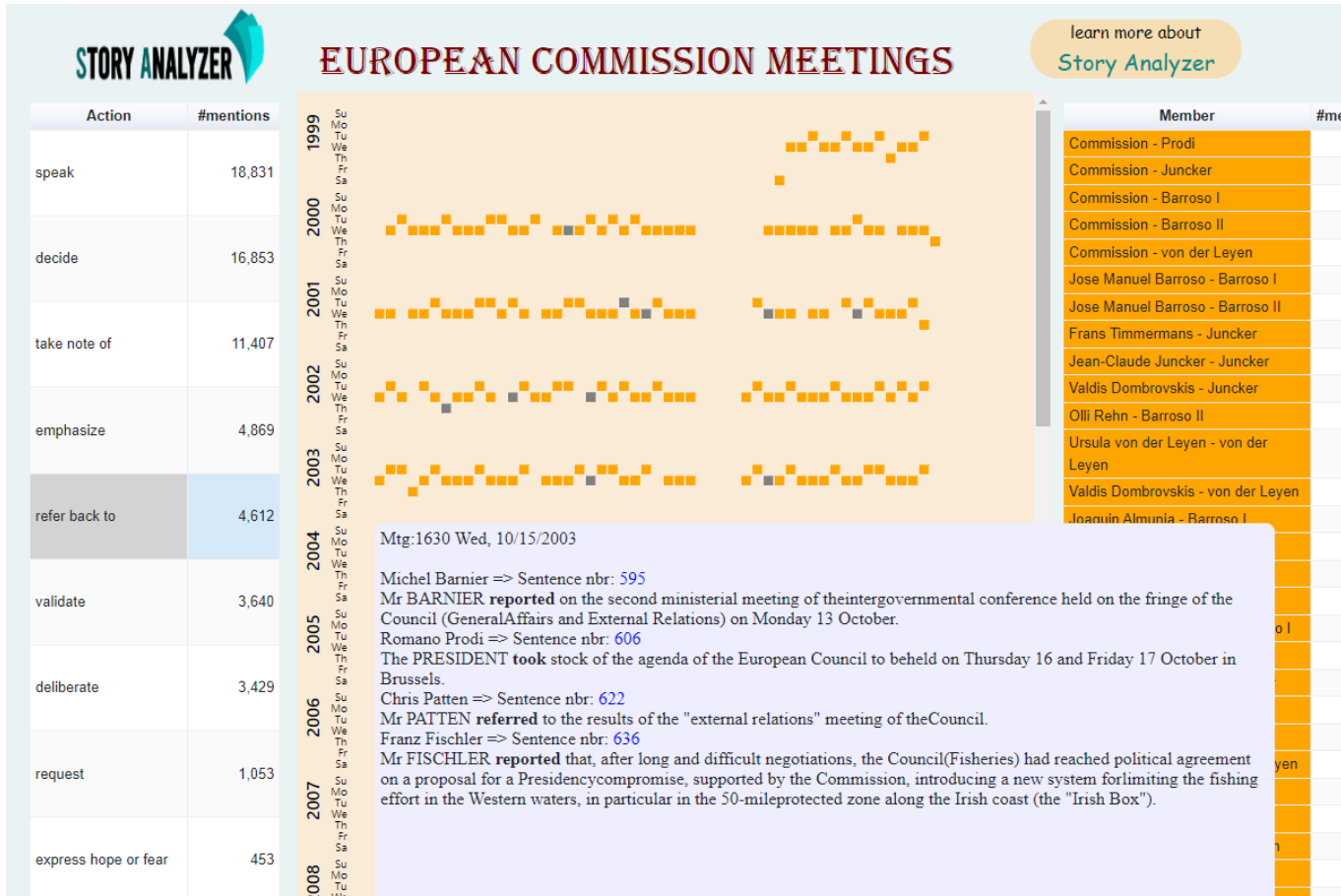
#### Interactions



#### Narrative Web



# SA and Social Science Research



This dashboard supports the work of Dr. John Scherpereel, professor of political science at JMU.

Dr. Scherpereel is analyzing the minutes of 975 European Commission meetings going back to 1999 (almost 7 million words).

The dashboard depicts nine action categories and shows each sentence for that action either via the calendar or the list of EC member names.

<https://storyanalyzer.org/ecmeetings/>

# January 6 and Trump Indictments



## Trump's 2020 Election Indictments: a Dashboard

learn more about  
Story Analyzer

Story Analyzer's  
web application

read Read Trump's 2020  
Election Indictments

How to use dashboard

Documents, fragments, keywords

Interactions Network

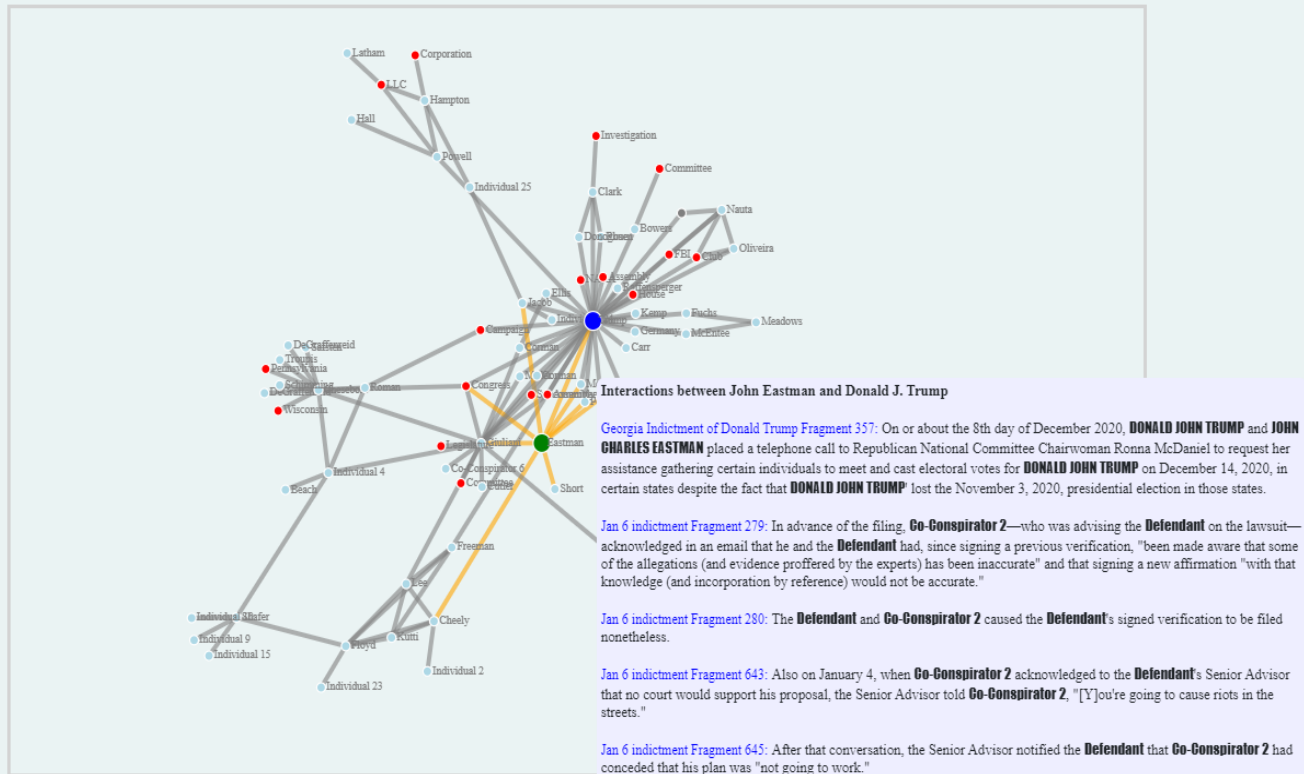
Times and Places

Other stuff

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Contact us  
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People	#Mentions
Donald J. Trump	415
Rudolph Giuliani	97
Walt Nauta	89
John Eastman	61
Carlos De Oliveira	50
Kenneth Cheseboro	48
Harrison William Prescott Floyd	40
Robert David Cheely	40
David James Shafer	36
Trevian C. Kutti	34
Alston Latham	32
Joseph Biden	31
Sydney Powell	31
Jeffrey Clark	31

Organizations	#Mentions
State	158
Mar-a-Lago Club	61
White House	46
FBI	45
Congress	35
Georgia Bureau of Investigation	24
Georgia Senate	24
SullivanStrickler LLC	21
Dominion Voting Systems	18
Coffee County Board of Elections	17
Senate	17



Jan 6 report – 840 pages, 360K words

<https://storyanalyzer.org/jan6/Jan6Report.html>

Trump indictments – Jan 6, Mar-a-Lago, Georgia

<https://storyanalyzer.org/trumpindictments/>

# SA's Application to Student Ethics Project

<https://storyanalyzer.org/sawebite/facebook%20ethics%20discussion%20spring%202020.html>

JMU's Ethical Reasoning in Action (ERIA)

8 key questions: fairness, outcomes, responsibilities, character, liberty, empathy, authority, rights

Student project: evaluate Facebook & Cambridge Analytica scandal using 8KQ. Online discussion.

Dashboard of results:



**Facebook data privacy scandal: Ethics Discussion**

A dashboard extracted from an ethics discussion in a senior level Business Intelligence class in the Computer Information Systems program at James Madison University see <https://www.techrepublic.com/article/facebook-data-privacy-scandal-a-cheat-sheet/>

**Narrative and Highlighted Information**

**Narrative**

rather than fulfilling its duties and taking a proactive approach.

The FTC contends that Facebook and Cambridge Analytica violated various data laws, deceiving its users by sharing the data of users' Facebook friends with third-party apps. Users are entitled to **privacy** especially when **users** specify their **privacy** settings before they upload private information to their account. Using financial incentives, Cambridge Analytica had Facebook users complete surveys that granted Cambridge Analytica access to the users data. Users who joined Facebook's private groups assumed their data was kept safe from any users outside of the private groups, we now know that their data (specifically health data) may have been harvested and viewed by health insurance providers. When user data is harvested from friend lists, messages, likes, or even contact lists, their **right to privacy** is breached.

Zuckerberg claimed that he would be unable to unsend messages until the "unsend" capability rolls out to users, but he suspiciously deleted his own messages from months back. Not only is it suspicious but it seems a bit unfair for Zuckerberg to have the ability to delete his messages from months ago while all other users are permitted to delete messages within 10 minutes of sending them. **Zuckerberg** rarely took full blame for any of the **privacy** incidents that happened during the scandal and it shows that his goal was only to make money, not

**Highlighted Information**

Sentence# 15) **Zuckerberg** rarely took full blame for any of the **privacy** incidents that happened during the scandal and it shows that his goal was only to make money, not improving **privacy**.

Sentence# 20)

As the ethical handbook says, with every **right** comes a responsibility.

Sentence# 21) Every **Facebook** user has the **right to privacy** and with that, **Facebook** has the responsibility to provide this.

Sentence# 22) However, as it can be seen throughout the timeline, to what extent do **users** have a **right of privacy** on the internet?

Sentence# 24) It seems throughout all the instances there is a back and forth between the **Rights** of the user and the responsibility of **Facebook** to provide the safeguards and blatant notifications of **privacy** breach.

**People, Groups, Interactions, and Ethics Word Cloud**

**People**

Person	Impact
people-22-42	70
1-1-2	64
Zuckerberg-1-13	24
user-10-80	4

**Groups**

Group	Impact
Facebook-1-4	222
users-16-8	56
Cambridge Analytica-11-6	14
GSR-13-136	6
CA-16-86	5
JMU-32-35	5
FTC-2-8	5
Microsoft-17-90	4
Samuel-20-00	2

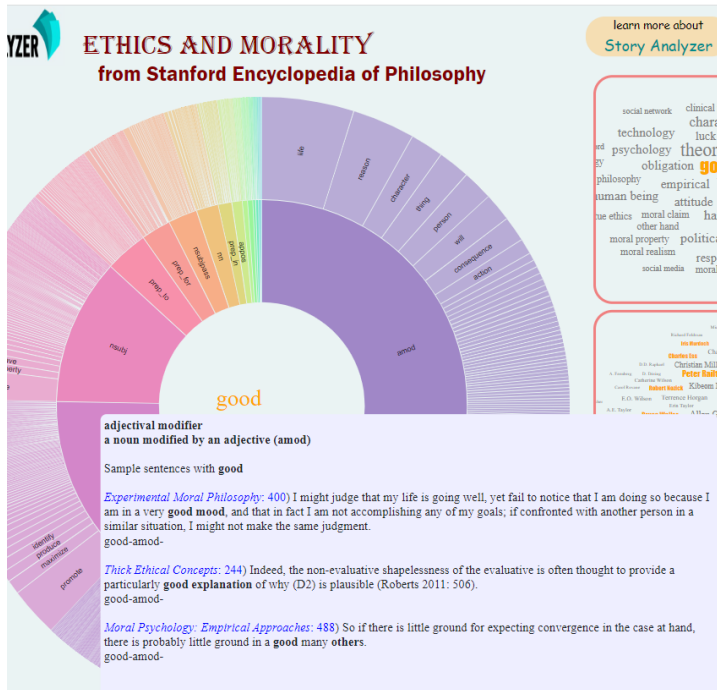
**Interactions**

**Eight Key Questions**





# Using SEP Dashboards



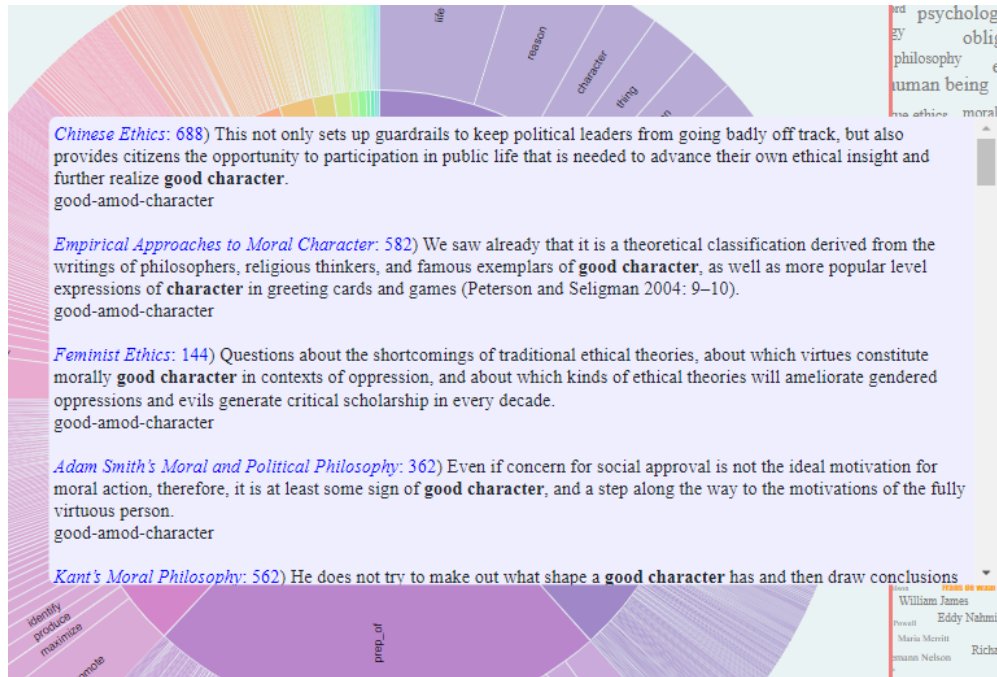
Some CoreNLP dependency relationships:

- **amod** – adjectival modifier
- **prep** (of, in, from, for, etc.) – prepositions
- **nn** – compound noun
- **nsubj** – nominal subject
- **dobj** – direct object
- Lots of others

If you hover over an item in the middle ring, you'll see an explanation of the dependency type and some sample sentences involving that type.

The **sunburst** center is the selected word. The middle ring shows dependency relationship types, and the outer ring shows word connected to the keyword via these relationships.

# Using SEP Dashboards



Clicking a segment in the outer ring (**character** in this case) will show all sentences with the specified dependency relationship between the keyword and the outer-ring word.

For a sentence number of an article, if you hover over the blue italicized text, you'll see expanded text showing surrounding sentences. Click the blue text to freeze the expansion in place.

# Using SEP Dashboards

**Empirical Approaches to Moral Character: Sentences 579 - 586** [see in browser](#)

For the VIA, unlike the other three approaches examined in this entry, was *not* arrived at empirically. As Peterson noted in a later article, “Our classification of character strengths under core virtues is a conceptual scheme and *not* an empirical claim” (Peterson and Park 2009: 31). **We saw already that it is a theoretical classification derived from the writings of philosophers, religious thinkers, and famous exemplars of good character, as well as more popular level expressions of character in greeting cards and games** (Peterson and Seligman 2004: 9–10). Furthermore, Peterson and Seligman are explicit that they aligned their approach with virtue ethics (2004: 10). Unfortunately, subsequent empirical tests of the VIA have raised problems. MacDonald and colleagues (2008) found that four factors, rather than the six in the VIA, best fit the questionnaire data. McGrath (2014) found support for five factors. Nofle and his colleagues (2011) used confirmatory factor analysis to test existing six factor, five factor, four factor, and one factor models, and could not find support for any of them (2011: 212).

**Chinese Ethics: 688** This not only sets up guardrails to keep political leaders from going badly off track, but also provides citizens the opportunity to participation in public life that is needed to advance their own ethical insight and further realize **good character**.  
good-amod-character

**Empirical Approaches to Moral Character: 582** We saw already that it is a theoretical classification derived from the writings of philosophers, religious thinkers, and famous exemplars of **good character**, as well as more popular level expressions of **character** in greeting cards and games (Peterson and Seligman 2004: 9–10).  
good-amod-character

**Feminist Ethics: 144** Questions about the shortcomings of traditional ethical theories, about which virtues constitute morally **good character** in contexts of oppression, and about which kinds of ethical theories will ameliorate gendered oppressions and evils generate critical scholarship in every decade.  
good-amod-character

**Adam Smith's Moral and Political Philosophy: 362** Even if concern for social approval is not the ideal motivation for moral action, therefore, it is at least some sign of **good character**, and a step along the way to the motivations of the fully virtuous person.  
good-amod-character

**Kant's Moral Philosophy: 562** He does not try to make out what shape a **good character** has and then draw conclusions  
good-amod-character

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## 4.2 Philosophical Relevance of Positive Psychology and the VIA

Philosophers might initially have some questions about the VIA classification. Where, for instance, is the virtue of patience? Or self-respect? Why does humor fall under the virtue of transcendence (for more questions like these, see Kristjánsson 2013: 151–152)?

These are good questions, but not serious problems. For as we saw Peterson and Seligman were the first to admit that their classification could need revision. If anything, these questions might help to make the VIA even better.

A larger revision will be demanded by many Aristotelians, namely that the list of virtues include practical wisdom (Kristjánsson 2013: chapter 7). On traditional Aristotelian approaches, practical wisdom is necessary for the possession of any virtue. Leaving it off the list would be a serious omission, but again there is nothing about Peterson and Seligman’s framework that would preclude it from being added (for more on practical wisdom, see Russell 2009; Miller forthcoming).

In fact, on the face of it philosophers should be quite amenable to this framework, and be interested in incorporating it into their thinking about character. For unlike the Big Five, the VIA is focused specifically on character traits, rather than personality traits in general (Peterson and Park 2009: 26–27). And while there might be a few omissions, it is remarkably comprehensive. Plus, unlike most advocates of the Big Five, Peterson, Seligman, and their colleagues seem to be more comfortable describing character traits on metaphysical grounds as dispositions with causal powers.

But caution is needed here (for a number of concerns, see Miller 2019b). For the VIA, unlike the other three approaches examined in this entry, was *not* arrived at empirically. As Peterson noted in a later article, “Our classification of character strengths under core virtues is a conceptual scheme and *not* an empirical claim” (Peterson and Park 2009: 31). **We saw already that it is a theoretical classification derived from the writings of philosophers, religious thinkers, and famous exemplars of good character, as well as more popular level expressions of character in greeting cards and games** (Peterson and Seligman 2004: 9–10). Furthermore, Peterson and Seligman are explicit that they aligned their approach with virtue ethics (2004: 10).

Unfortunately, subsequent empirical tests of the VIA have raised problems. MacDonald and colleagues (2008) found that four factors, rather than the six in the VIA, best fit the questionnaire data. McGrath (2014) found support for five factors. Nofle and his colleagues (2011) used confirmatory factor analysis to test existing six factor, five factor, four factor, and one factor

Finally, clicking the “see in browser” link of the expansion text should take you to the specific SEP article and the specific sentence. This doesn’t work with all browsers.

# Want to build your own SA dashboards?

<https://app.storyanalyzer.org>

Select a Story Analysis to Visualize Order by date

What we know about the victims of the school shooting in Texas -- 2022-05-31 13:26:47

Date/Time of Analysis Request 2022-05-31 13:26:47

Source <https://www.washingtonpost.com/nation/2022/05/25/uvalde-texas-school-shooting-victims/>

Visualizations:  Interactions Chord,  Narrative Web,  Calendar,  Timeline,  Map

Word clouds:  People,  Groups,  Places,  Dates,  Enlarge Theme Words in Clouds?

Submit

interactions

actions between: Gabby and Eva Mireles  
"paid to" in sentence# 49  
"never saw" in sentence# 52  
"having" in sentence# 52  
"always thought" in sentence# 56  
"still cared" in sentence# 57

groups

Robb Elementary School, Texas State University, Flores Middle School

theme

daughter, teacher, mother, father, love, sister, friend, school, happy

text

Interactions between Gabby and Eva Mireles

Sentence# 49 Audrey Garcia said she will never forget the attention Mireles paid to her daughter Gabby, now 23, when she was in third grade.

Sentence# 52 She never saw Gabby as having less potential than any of the other students."

Sentence# 56 She would say that she always thought about Gabby when she put up her Christmas tree," Garcia said.

Sentence# 57 After all those years, she still cared about Gabby as a student.

map

Years: 2020 - 2022

Display interactive visualizations in dashboard

Edit/Correct NLP errors

Story Analysis Editing

Select a Story Analysis to Edit Order by date

What we know about the victims of the school shooting in Texas -- 2022-05-26 19:39:25

Date/Time of Analysis Request 2022-05-26 19:39:25

Source <https://www.washingtonpost.com/nation/2022/05/25/uvalde-texas-school-shooting-victims/>

Submit

	Sentence Number	Token Number	Token	Speech	Named Entity	Lemma
Edit	4	5	year as a teacher — all of it spent at Robb	NP	ORGANIZATION	Robb
Edit	24	10	and she had won professional honors	NNP	ORGANIZATION	Robb
Edit	30	12	Robb as teacher of the year, her son said.	NNP	ORGANIZATION	Robb
Edit	58	4	Robb	NNP	ORGANIZATION	Robb
Edit	68	9	Robb	NNP	ORGANIZATION	Robb
Edit	76	9	Robb	NNP	ORGANIZATION	Robb
Edit	86	8	Robb	NNP	ORGANIZATION	Robb
Update/Cancel	87	17	87) She was wrapping up her 23rd	NNP	PERSON	Robb
Edit	171	14	Robb	NNP	ORGANIZATION	Robb
Edit	188	9	Robb	NNP	ORGANIZATION	Robb

# Limitations, differences, possibilities, approaches

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## Machine learning's Accuracy limitations

- POS – 95%+
- NER, Dependency parsing – 80%+
- Coreference resolution – 60%+
- ChatGPT – lots of demonstrable errors
- Even OCR has errors

My software has bugs. It's a work in progress.

Purpose of ChatGPT vs. SA & CoreNLP – generative (writing, creating) vs analytical (reading, understanding)

Inductive reasoning vs. knowledge-based deduction (ML vs “expert systems”)

Reprise – Common sense? Wisdom? Getting it right? GIGO?

# Future Goals for SA

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Can SA help to evaluate the truth or falseness of a story? Can SA become a “fact-checker”?

Philosophical theories of truth:

- Correspondence theory
  - A statement is true if it corresponds with the facts
  - Compare stories to research findings (e.g., Our World in Data), and Google FactCheck (from Politico)
- Coherence theory
  - A statement is true if it coheres with other well-accepted truths
  - Compare stories against each other
- Pragmatic theory
  - A statement is true if it “works”, if it produces beneficial results
  - Prescriptive analytics – decision theory, utility measures, etc.

# Questions?

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