Computational History

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Principles of Complex Systems, Vols. 1, 2, & 3D
CSYS/MATH 6701, 6713, & a pretend number,
2023–2024| @pocsvox

Prof. Peter Sheridan Dodds | @peterdodds

Computational Story Lab | Vermont Complex Systems Center
Santa Fe Institute | University of Vermont

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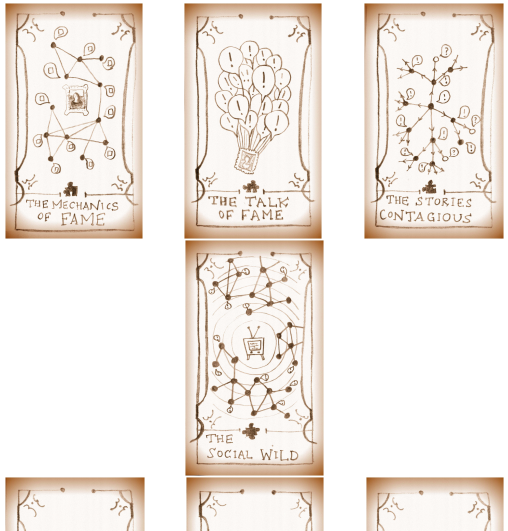
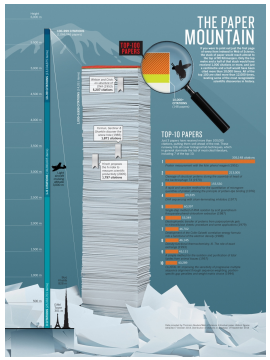
Outline

Statistics of Surprise
Stories
Mechanics of Fame
Superspreading
Lexical Ultrafame
Turbulent times
Extras
Sociotechnical time series
Adjacent Narratives
Extras
Memory & Turbulence
References



Fame by rank



Nature (2014): Most cited papers of all time

Word frequency:

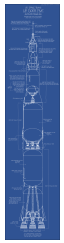
Brown Corpus ($\sim 10^6$ words):

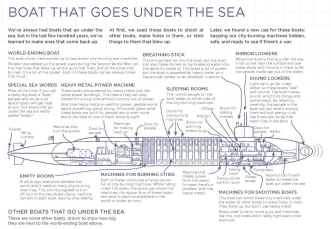
rank	word	% q	rank	word	% q
1.	the	6.8872	1945.	apply	0.0055
2.	of	3.5839	1946.	vital	0.0055
3.	and	2.8401	1947.	September	0.0055
4.	to	2.5744	1948.	review	0.0055
5.	a	2.2996	1949.	wage	0.0055
6.	in	2.1010	1950.	motor	0.0055
7.	that	1.0428	1951.	fifteen	0.0055
8.	is	0.9943	1952.	regarded	0.0055
9.	was	0.9661	1953.	draw	0.0055
10.	he	0.9392	1954.	wheel	0.0055
11.	for	0.9340	1955.	organized	0.0055
12.	it	0.8623	1956.	vision	0.0055
13.	with	0.7176	1957.	wild	0.0055
14.	as	0.7137	1958.	Palmer	0.0055
15.	his	0.6886	1959.	intensity	0.0055

Jonathan Harris's Wordcount:

A word frequency distribution explorer:

"Thing Explainer: Complicated Stuff in Simple Words" by Randall Munroe (2015). [14]





Up goer five

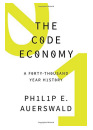
The everywhereness of algorithms and stories:

"On the Origin of Stories: Evolution, Cognition, and Fiction" by Brian Boyd (2010). [3]

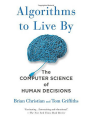
"The Storytelling Animal: How Stories Make Us Human" by Jonathan Gottschall (2013). [10]

"The Written World: How Literature Shaped Civilization" by Martin Puchner (2017). [17]

Algorithms, recipes, stories, ...



"The Code Economy: A Forty-Thousand Year History" by Philip E Auerswald (2017). [1]

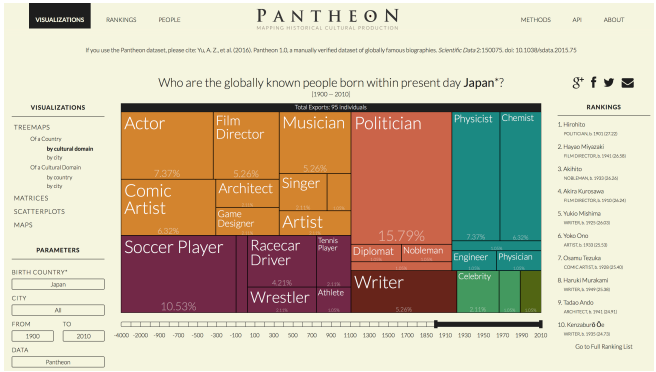


"Algorithms to Live By" by Christian and Griffiths (2016). [6]

"Once Upon an Algorithm" by Martin Erwig (2017). [9]

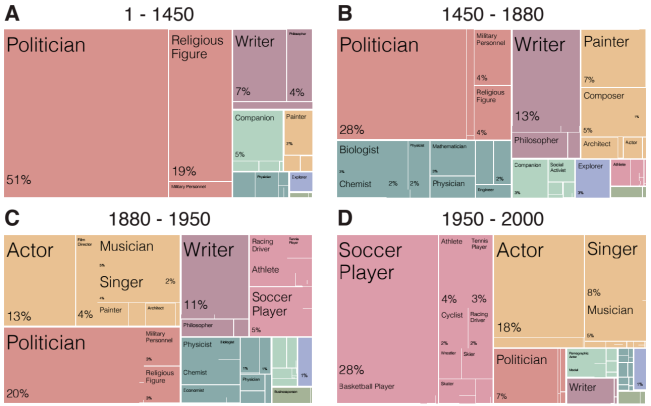
Also: Numerical Recipes in C [16] and How to Bake π [4]

The famous are storytellers—Japan:



For people born 1950–

http://pantheon.media.mit.edu/treemap/country_exports/JP/all/1900/2010/H15/pantheon



https://www.media.mit.edu/projects/pantheon-new/overview/

Super Survival of the Stories:

The Desirability of Storytellers, The Atlantic, Ed Yong, 2017-12-05.

- Study of Agta, Filipino hunter-gatherers.
- Storytelling valued well above all other skills including hunting.
- Stories encode prosocial norms such as cooperation.
- Like the best stories, the best storytellers reproduce more successfully.

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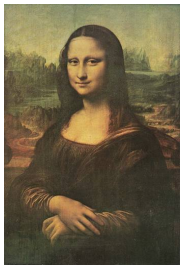
The most famous painting in the world:



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The dismal predictive powers of editors .....

Twelve ...

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The completely unpredicted fall of Eastern Europe:

Timur Kuran: [12] "Now Out of Never: The Element of Surprise in the East European Revolution of 1989"

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We understand bushfire stories:

1. Sparks start fires.
2. System properties control a fire's spread.

3. But for three reasons, we make two mistakes about Social Fires ...

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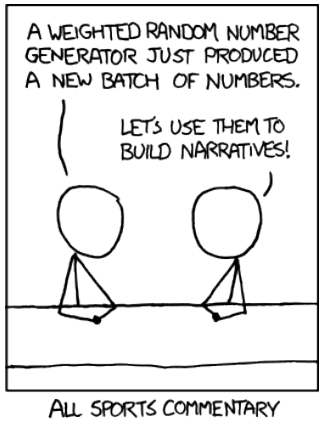
Reason 1—We are Homo Narrativus.



http://xkcd.com/904/

Reason 2—"We are all individuals."

Archival footage:

- Individual narratives are not enough to understand distributed, networked minds.

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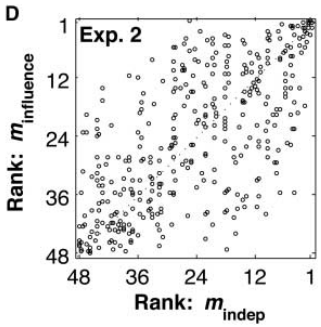
Reason 3—We are spectacular imitators.

BBC/David Attenborough.

Resolving the paradox:



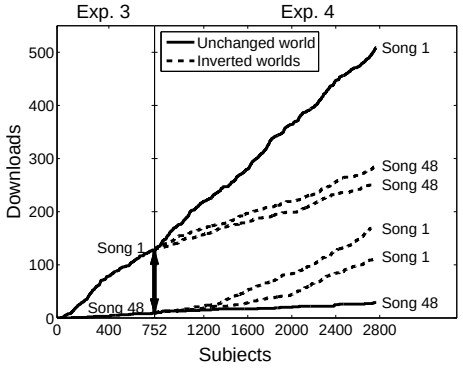
Increased social awareness leads to
Stronger inequality + Less predictability.

"This is truly the last time, believe me"

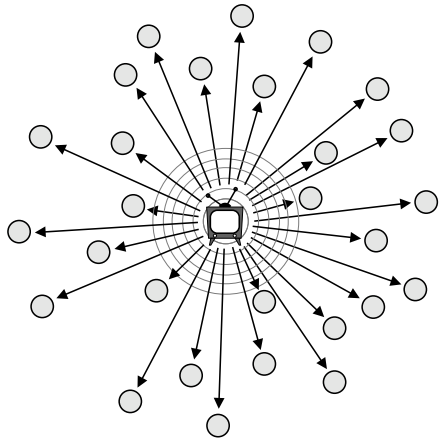
WaPo article

Mistake 1:
Success is due to intrinsic properties

Payola/Deceptive advertising hurts us all:



The hypodermic model of influence:



See "Becoming Mona Lisa" by David Sassoon

48 songs
30k participants

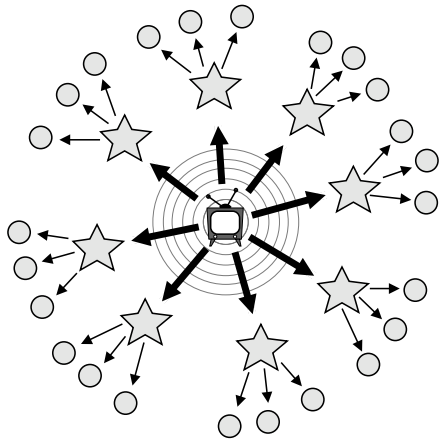
Exp 1— weak social

Exp. 2—strong social

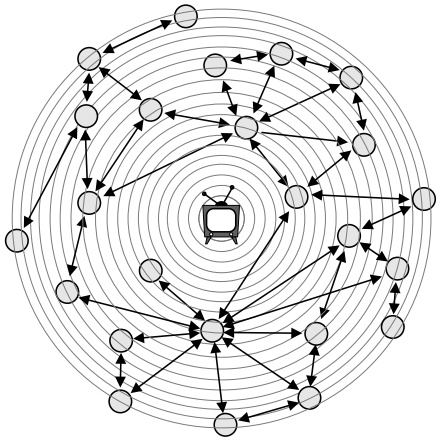
"An experimental study of inequality and unpredictability in an artificial cultural market"
Salganik, Dodds, and Watts,
Science, **311**, 854–856, 2006. [18]

"Mistake" 2:
Seeing success is 'due to social' and wanting to say 'all your interactions are belong to us'

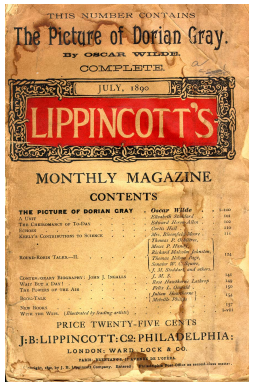
The two step model of influence: [11]



The network model of influence:



Oscar Wilde, The Picture of Dorian Gray: Raw Fame

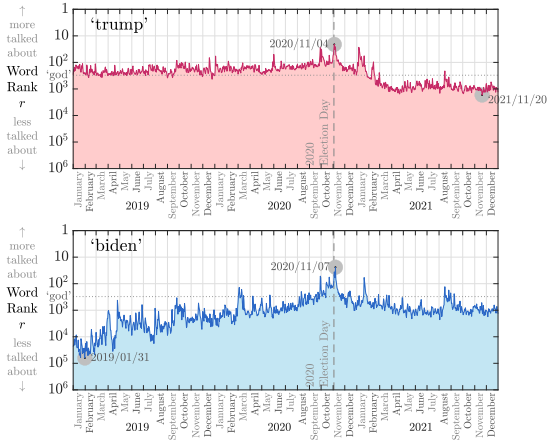


"There is only one thing in the world

worse than being talked about,

and that is

not being talked about."



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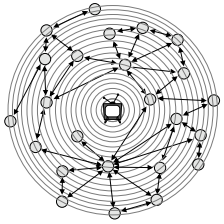


How superspreading works:

Many interconnected, average, trusting people
must benefit from both receiving and sharing a message far from its source.

"Influentials, Networks, and Public Opinion Formation"
Watts and Dodds,
J. Consum. Res., **34**, 441–458, 2007. [19]

Ultrafame:
Nobody expects ~~the Spanish Inquisition~~ K-pop:

Vox (2019-04-17):
BTS, the band that changed K-pop, explained

Etymological clarity:

- Fate—from the Latin *fatus*: meaning "spoken".
- Fate is talk that has been done.
  "It is written", fore-tell, pre-dict.
- "There is no such thing as fate, only the story of fate."
- Destiny is probablistic.
- Fame—from the Latin *fāma*: meaning "to talk."
- Fame is inherently the social discussion about the thing, not the thing itself.
- Renown: Repeatedly named, talked about. Old French renon, from re- + non ("name").
- Réclame. "Clamo"—Proto-Indo-European: "to shout" (again). Connected to "lowing".

"Fame and Ultrafame: Measuring and comparing daily levels of 'being talked about' for United States' presidents, their rivals, God, countries, and K-pop"
Dodds et al.,
Available online at
https://arxiv.org/abs/1910.00149, 2019. [7]

"Computational timeline reconstruction of the stories surrounding Trump: Story turbulence, narrative control, and collective chronopathy"
Dodds et al.,
, 2020. [8]

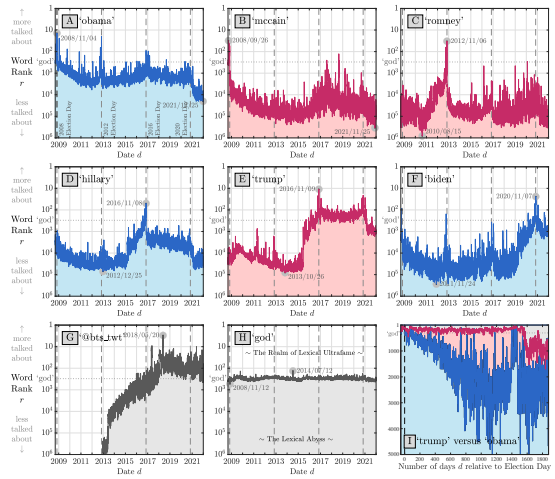
- POTUSometer with the Smorgasdashbord:
  http://compstorylab.org/potusometer/
- Stories surrounding Trump:
  http://compstorylab.org/trumpstoryturbulence/

Telegnomics

Distant reading by smashing texts into storyons:

```
cd ~/work/stories/2019-10story-turbulence-trump/
261G
more updateall.sh
file names:
compute_rank_turbulence_divergence_sweep_the_leg

Zip files:
zless 2018-01-06/1grams/en_*.tar.tsv
zless 2021-01-05/1grams/en_*.tar.tsv
zless 2021-01-06/1grams/en_*.tar.tsv
zless 2021-01-07/1grams/en_*.tar.tsv
```

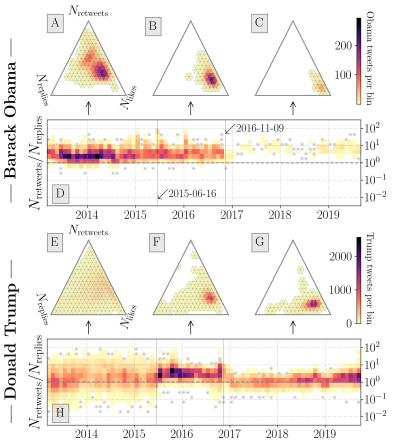


2011 Whitehouse Correspondents' Dinner

Relative median rates of 'being talked about' in the 8 weeks (56 days) pre-election day:

	2008	2012	2016	2020
'barack'	128	11	11	13
'obama'	1000	132	135	71
'@barackobama'	9	24	10	17
'john'	307	66	72	65
'mccain'	757	1	2	3
'@senjohnmccain'	0	0	1	0
'mitt'	3	50	2	2
'romney'	2	120	3	3
'@mittromney'	0	14	1	1
'hillary'	20	3	357	30
'clinton'	42	8	326	23
'@hillaryclinton'	0	0	130	19
'donald'	7	5	178	135
'trump'	4	3	656	1001
'@realdonaldtrump'	0	4	219	656
'joe'	128	39	32	287
'biden'	37	4	5	504
'@joebiden'	0	1	1	212
'@bts_twt'	0	0	166	1037
'god'	400	484	362	380

Ratiometrics:



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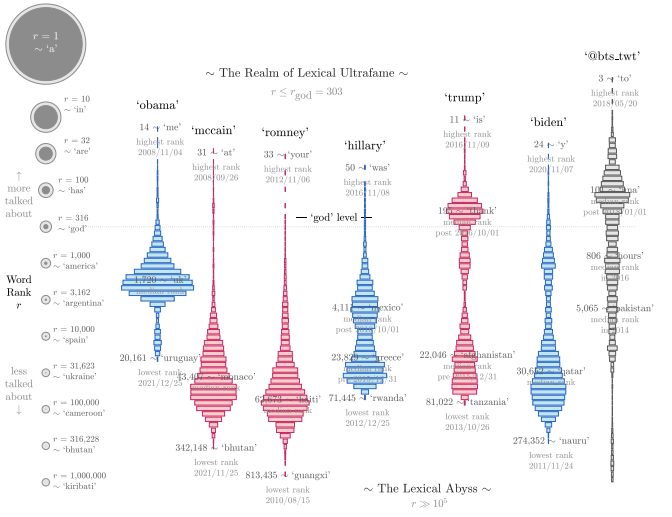
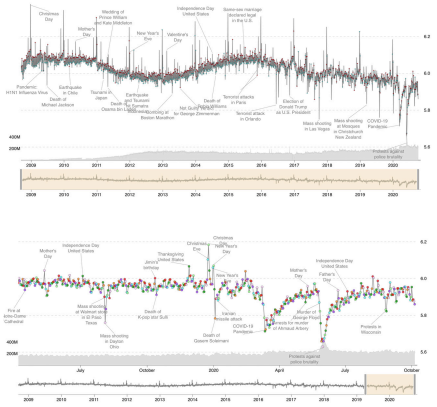


Relative median rates of 'being talked about' per year:

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
'barack'	150	38	17	9	10	7	8	11	14	15	14	14	19	3
'obama'	897	370	152	87	97	79	91	103	156	160	129	106	104	17
'@barackobama'	10	8	11	10	17	15	16	13	13	17	17	13	24	5
'john'	401	274	188	126	117	104	113	121	118	129	128	114	108	82
'mccain'	579	11	4	2	2	2	1	1	3	15	7	5	3	2
'@senjohnmccain'	0	2	1	0	0	1	1	1	1	9	2	0	0	0
'mitt'	5	8	5	6	25	6	5	4	4	2	2	3	3	2
'romney'	3	1	1	4	42	2	1	1	4	1	1	3	4	1
'@mittromney'	0	0	0	0	5	0	0	0	0	1	0	1	1	0
'hillary'	28	10	5	3	3	4	6	30	169	72	61	43	33	6
'clinton'	62	25	16	10	8	6	8	27	140	65	62	45	32	8
'@hillaryclinton'	0	0	0	0	0	0	1	11	71	22	19	21	23	3
'donald'	11	17	11	11	8	6	7	44	166	45	114	104	43	43
'trump'	7	20	10	7	4	3	3	77	583	1000	865	808	1134	229
'@realdonaldtrump'	0	0	0	1	2	3	2	32	219	468	555	652	888	1
'joe'	157	187	138	87	66	58	44	46	50	48	44	78	197	117
'biden'	72	7	3	1	2	2	2	3	5	3	4	52	284	221
'@joebiden'	0	0	0	0	0	0	0	0	1	1	2	18	162	28
'@bts_twt'	0	0	0	0	0	5	36	123	282	595	2487	1802	1440	1437
'god'	666	851	687	694	791	719	607	616	601	590	612	611	612	510

Emotional turbulence:



http://hedonometer.org/

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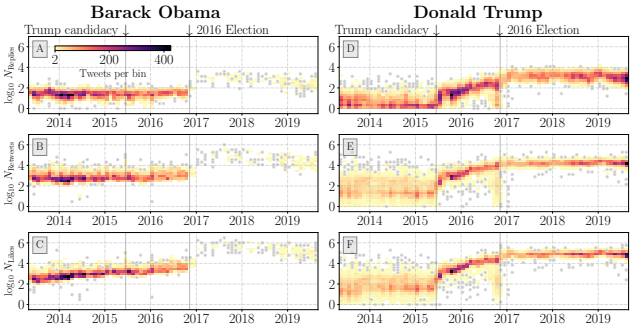
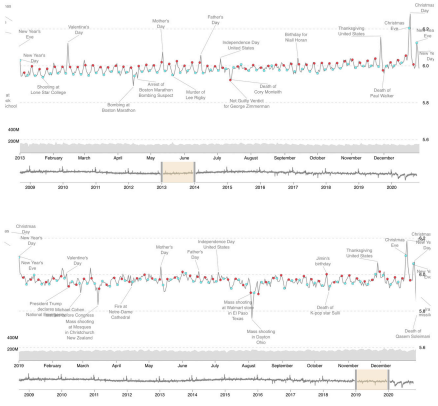


"Ratioing the President: An exploration of public engagement with Obama and Trump on Twitter," Minot et al., 2020 [13]

Ultraframe—Percentage of days per year ranked above 'god'

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
'barack'	1.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'obama'	54.4%	6.9%	0.5%	0.5%	2.2%	0.3%	0.0%	0.3%	2.2%	2.2%	0.5%	0.0%	0.3%	0.0%
'@barackobama'	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'john'	3.5%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.8%	0.3%	0.5%	0.0%
'mccain'	39.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	1.1%	0.0%	0.0%	0.0%
'@senjohnmccain'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'mitt'	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'romney'	0.0%	0.0%	0.0%	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%
'@mittromney'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
'hillary'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.4%	0.0%	0.0%	0.0%	0.0%	0.0%
'clinton'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%
'@hillaryclinton'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%
'donald'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	0.5%	0.0%	0.0%	1.6%	0.6%
'trump'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	47.8%	98.6%	93.7%	92.3%	100.0%	10.2%
'@realdonaldtrump'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	26.8%	41.4%	62.7%	90.2%	2.2%
'joe'	3.5%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.2%	0.6%
'biden'	1.8%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	23.8%	6.1%
'@joebiden'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.1%	0.3%
'@bts_twt'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	8.5%	50.7%	100.0%	100.0%	98.9%	93.1%

Emotional turbulence:



http://hedonometer.org/

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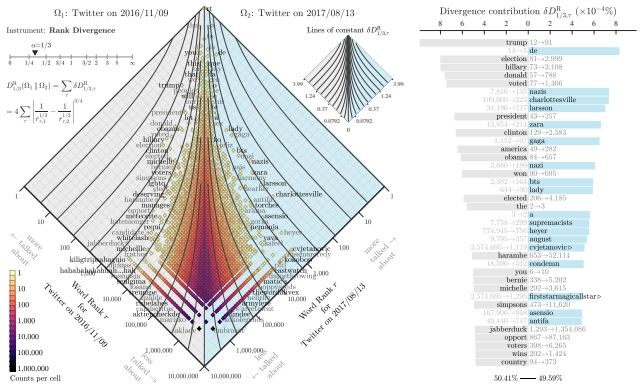

Allotaxonometry—
the comparison of complex systems:
http://compstorylab.org/allotaxonometry/

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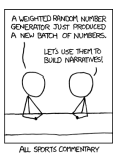
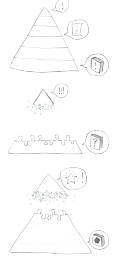
Week	2016	2017	2018	2019	2020	2021
1. 01/01–01/07	Hillary Clinton 32.7	plant in 85.1	Steve Bannon 5.7	the government 0.0	a war 6.6	in Georgia 20.2
2. 01/08–01/14	Trump rally 0.0	Meryl Streep 6.6	shithole countries 0.0	ice hockey 1.0	impeachment trial 0.0	the Capitol 0.0
3. 01/15–01/21	Ted Cruz 26.0	Trump's inauguration 0.0	the government 1.4	Cohen to 0.0	impeachment trial 0.0	the Capitol 0.0
4. 01/22–01/28	Megyn Kelly 4.9	executive order 0.0	the FBI 5.6	the government 0.0	impeachment trial 0.0	the Capitol 0.0
5. 01/29–02/04	Ted Cruz 19.7	travel ban 1.6	the FBI 9.4	Ralph Northam 26.0	impeachment trial 0.0	the Capitol 0.0
6. 02/05–02/11	New Hampshire 19.5	travel ban 1.1	military parade 0.0	El Paso 4.7	Alexander Vindman 0.0	the Capitol 0.0
7. 02/12–02/18	Ted Cruz 15.7	Michael Flynn 0.0	school shooting 3.1	national emergency 0.0	Roger Stone 4.0	the Capitol 0.0
8. 02/19–02/25	Ted Cruz 20.1	Trump administration 0.0	the NRA 0.0	Jussie Smollett 0.0	Bernie Sanders 13.6	the Capitol 0.0
9. 02/26–03/04	vote for 4.4	to Russia 22.0	Hope Hicks 0.0	Michael Cohen 5.3	the coronavirus 0.0	the Capitol 0.0
10. 03/05–03/11	Ted Cruz 2.4	travel ban 0.0	Stormy Daniels 0.0	Tim Apple 0.0	the coronavirus 0.0	voted for 0.0
11. 03/12–03/18	Trump is 0.1	Meals on 0.0	Stormy Daniels 0.0	New Zealand 17.9	the coronavirus 0.0	Lars Trump 0.0
12. 03/19–03/25	Lyin' Ted 66.2	health care 0.0	Cambridge Analytica 0.0	Mueller report 0.0	the coronavirus 0.0	the border 0.0
13. 03/26–04/01	Trump is 0.0	Freedom Caucus 20.8	Stormy Daniels 0.0	Mueller report 0.0	the coronavirus 0.0	Matt Gaetz 0.0
14. 04/02–04/08	Ted Cruz 3.0	Susan Rice 0.3	National Guard 0.0	tax returns 0.0	the coronavirus 0.0	Matt Gaetz 0.0
15. 04/09–04/15	New York 19.3	to Syria 0.2	Michael Cohen 0.0	sanctuaries 5.3	the coronavirus 0.0	Matt Gaetz 0.0
16. 04/16–04/22	Ted Cruz 28.1	turnout for 0.0	Michael Cohen 2.4	Mueller report 0.0	the coronavirus 0.0	Maxine Waters 0.0
17. 04/23–04/29	Trump rally 0.0	tax plan 0.0	the Koreas 0.0	Mueller report 0.0	the coronavirus 0.0	Liz Cheney 0.0
18. 04/30–05/06	Ted Cruz 5.5	health care 0.0	Stormy Daniels 0.0	Mueller report 0.0	treated worse 0.0	Liz Cheney 0.0
19. 05/07–05/13	Paul Ryan 2.0	James Comey 6.7	the Iran 9.0	tax returns 0.0	tested positive 0.0	Liz Cheney 0.0
20. 05/14–05/20	Hillary Clinton 26.5	Saudi Arabia 12.3	any Democrats 0.0	Lindsey Graham 0.0	the pandemic 0.0	Kevin McCarthy 0.0
21. 05/21–05/27	Hillary Clinton 24.8	Saudi Arabia 8.2	the FBI 23.3	Nancy Pelosi 12.5	a mask 6.3	the January 6.0
22. 05/28–06/03	Trump University 3.4	Kathy Griffin 5.7	Samantha Bee 4.4	John McCain 0.0	photo op 0.0	Memorial Day 0.0
23. 06/04–06/10	Hillary Clinton 18.6	James Comey 0.2	Justin Trudeau 8.5	with Mexico 20.2	Left Democrats 75.1	Jean Carroll 0.0
24. 06/11–06/17	Trump is 0.0	obstruction of 12.6	their parents 0.0	the FBI 8.5	in Tulsa 7.4	Trump DOJ 0.0
25. 06/18–06/24	Hillary Clinton 20.6	Karen Handel 16.6	their parents 3.4	need soap 0.0	in Tulsa 2.2	the Capitol 0.0
26. 06/25–07/01	Hillary Clinton 20.5	Fake News 37.6	Supreme Court 3.7	Jean Carroll 0.0	American soldiers 0.0	Trump Organization 0.0
27. 07/02–07/08	Crooked Hillary 82.8	North Korea 28.6	Trump administration 0.0	Jeffrey Epstein 0.0	Mount Rushmore 3.9	Ashli Babbitt 0.0
28. 07/09–07/15	Crooked Hillary 73.3	Trump Jr 0.0	Supreme Court 7.9	Jeffrey Epstein 0.0	Roger Stone 0.0	the Capitol 0.0
29. 07/16–07/22	Mike Pence 6.8	Secret Service 0.0	in Helsinki 1.7	a racist 0.0	in Portland 0.0	Tom Barrack 0.0
30. 07/23–07/29	Crooked Hillary 79.6	Boy Scouts 0.0	Walls of 0.0	Elijah Cummings 27.2	in Portland 8.9	the Capitol 0.0
31. 07/30–08/05	Khizr Khan 0.0	Maxine Waters 0.0	enemy of 22.2	El Paso 11.1	the election 3.4	the Capitol 0.0
32. 08/06–08/12	Hillary Clinton 10.5	North Korea 5.7	Space Force 11.1	El Paso 7.7	Social Security 0.0	overturn the 0.0
33. 08/13–08/19	Trump campaign 0.0	white supremacists 0.0	security clearance 0.0	New Hampshire 26.5	the USPS 0.0	the Taliban 0.0
34. 08/20–08/26	Hillary Clinton 19.1	Joe Arpaio 3.5	Michael Cohen 4.3	Prime Minister 28.7	Joe Biden 5.9	the Taliban 0.0
35. 08/27–09/02	Crooked Hillary 61.8	Hurricane Harvey 0.1	John McCain 0.2	Hurricane Dorian 9.6	Joe Biden 2.7	the Taliban 0.0
36. 09/03–09/09	in Detroit 0.0	to end 0.0	Brett Kavanaugh 15.2	the Taliban 3.0	Joe Biden 3.4	Robert E 0.0
37. 09/10–09/16	tax returns 0.0	white supremacist 0.0	Puerto Rico 8.4	Dan Bishop 37.7	Joe Biden 13.3	the Taliban 0.0
38. 09/17–09/23	Hillary Clinton 7.5	North Korea 22.8	Blasey Ford 0.0	a foreign 6.4	Supreme Court 7.1	to overturn 0.0
39. 09/24–09/30	Mike Pence 8.9	Puerto Rico 5.2	Brett Kavanaugh 15.3	impeachment inquiry 0.0	Supreme Court 5.7	debt ceiling 0.0
40. 10/01–10/07	sexual assault 0.0	Puerto Rico 2.6	Supreme Court 6.9	Adam Schiff 13.3	Walter Reed 5.7	the debt 0.0
41. 10/08–10/14	Mike Pence 8.9	Puerto Rico 2.2	Kanye West 0.0	the Kurds 11.3	Biden is 26.5	the January 6.0
42. 10/15–10/21	Hillary Clinton 19.9	families of 0.0	Saudi Arabia 6.6	the Kurds 3.8	Joe Biden 12.1	the January 6.0
43. 10/22–10/28	Hillary Clinton 11.7	Myeshia Johnson 0.0	the bombs 0.0	World Series 0.0	Joe Biden 10.1	Alec Baldwin 0.0
44. 10/29–11/04	Hillary Clinton 6.5	Twitter employee 0.0	birthright citizenship 0.0	the impeachment 0.0	Joe Biden 12.6	in Virginia 0.0
45. 11/05–11/11	Trump wins 0.0	mental health 0.0	Jim Acosta 0.0	pro-gun 8.1	the election 2.2	infrastructure bill 0.0
46. 11/12–11/18	Steve Bannon 0.0	ban on 0.0	president who 0.0	impeachment inquiry 0.0	the election 7.5	Chris Christie 0.0
47. 11/19–11/25	Mike Pence 24.3	Roy Moore 0.0	Saudi Arabia 2.5	quid pro 1.3	the election 6.7	Kyle Rittenhouse 0.0
48. 11/26–12/02	popular vote 17.4	Native American 0.1	Trump Tower 2.5	Hong Kong 0.0	voter fraud 32.2	Donald Trump 0.0
49. 12/03–12/09	Air Force 18.2	Roy Moore 3.5	campaign finance 0.0	to impeach 7.7	in Georgia 12.9	Donald Trump 0.0
50. 12/10–12/16	of State 7.6	of sexual 0.0	Michael Cohen 7.8	articles of 0.0	the election 9.0	Mark Meadows 0.0
51. 12/17–12/23	Electoral College 5.8	tax bill 0.0	the wall 13.7	Christianity Today 8.1	election fraud 13.9	the Capitol 0.0

Understanding the Sociotechnocene—Stories:



xkcd.com/904/



- Toward a Science of Stories.
- Claim: Homo narrativus—we run on stories.
- "What's the John Dory?"
- "They've lost the plot/thread"
- Narrative hierarchies and scalability of stories.
- Research: Real-time and offline extraction of metaphors, frames, plots, narratives, conspiracy theories, and stories from large-scale text.
- Research: The taxonomy of human stories.
- To be built: Storyscopes—improvable, online, interactive instruments.

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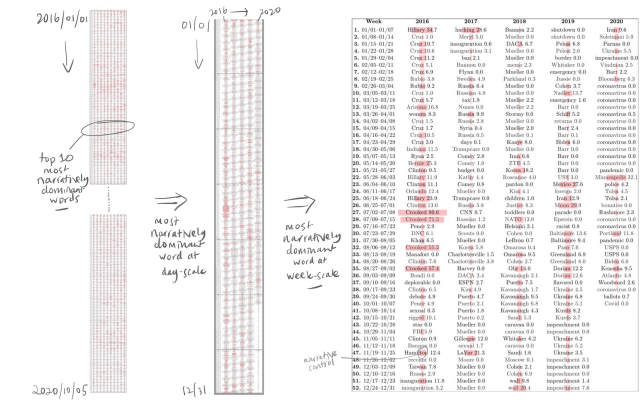

Week	2016	2017	2018	2019	2020
1. 01/01–01/07	Hillary 34.7	hacking 28.6	Bannon 2.2	shutdown 0.0	Iran 9.6
2. 01/08–01/14	Cruz 1.0	Meryl 5.0	Mueller 0.0	shutdown 0.0	Soleimani 5.9
3. 01/15–01/21	Cruz 10.7	inauguration 0.6	DACA 6.7	Pelosi 6.8	Parnas 0.0
4. 01/22–01/28	Cruz 10.6	inauguration 3.1	Mueller 0.0	Pelosi 2.6	Ukraine 5.5
5. 01/29–02/04	Cruz 11.2	ban 2.1	Mueller 0.0	impeachment 0.0	Greene 0.0
6. 02/05–02/11	Cruz 5.1	Bannon 0.0	mendp 2.3	Whitaker 0.0	Vindman 2.5
7. 02/12–02/18	Cruz 6.9	Flynn 0.0	Mueller 0.0	emergency 0.0	Barr 2.2
8. 02/19–02/25	Rubio 3.8	Sweden 4.9	Parkland 0.3	Jussie 0.0	Capitol 0.0
9. 02/26–03/04	Rubio 9.2	Russia 6.4	Mueller 0.0	Cohen 3.7	coronavirus 0.0
10. 03/05–03/11	Cruz 1.0	Russian 4.8	Mueller 0.0	Nadler 13.7	coronavirus 0.0
11. 03/12–03/18	Cruz 5.7	taxi 1.8	Mueller 2.2	emergency 1.6	coronavirus 0.0
12. 03/19–03/25	Arizona 16.8	Nunes 0.0	Mueller 2.2	Barr 0.0	coronavirus 0.0
13. 03/26–04/01	women 8.3	Russia 9.9	Stormy 0.0	Schiff 5.2	coronavirus 0.0
14. 04/02–04/08	Cruz 1.5	Syria 0.4	Mueller 2.0	Barr 2.4	coronavirus 0.0
15. 04/09–04/15	Cruz 1.7	Syria 0.4	Mueller 0.1	Barr 0.1	coronavirus 0.0
16. 04/16–04/22	Cruz 10.5	Russia 0.5	Mueller 0.1	Barr 0.1	coronavirus 0.0
17. 04/23–04/29	Cruz 3.0	days 0.1	Kanye 8.0	Biden 6.0	coronavirus 0.0
18. 04/30–05/06	Indiana 11.5	Trumpcare 0.0	Mueller 0.0	Barr 0.0	coronavirus 0.0
19. 05/07–05/13	Ryan 2.5	Comey 2.8	Iran 6.6	Barr 0.0	coronavirus 0.0
20. 05/14–05/20	Bridge 25.3	Comey 1.0	ZTE 4.5	Barr 0.0	coronavirus 0.0
21. 05/21–05/27	Clinton 9.5	budget 0.0	Korea 18.2	Barr 0.0	pandemic 0.0
22. 05/28–06/03	Hillary 11.9	Comey 0.8	Kathy 4.4	Mueller 0.0	reinstated 0.0
23. 06/04–06/10	Clinton 11.1	Comey 0.8	pardon 0.0	Mueller 0.0	McGahn 0.0
24. 06/11–06/17	Orlando 12.4	Mueller 0.0	Kim 4.1	foreign 2.0	DOJ 0.0
25. 06/18–06/24	Hillary 23.9	Trumpcare 0.0	children 1.0	Iran 12.9	Capitol 0.0
26. 06/25–07/01	Clinton 13.0	Russia 5.3	Justice 8.3	Mayor 28.9	coronavirus 0.0
27. 07/02–07/08	Crooked 80.6	CNN 0.7	toddlers 0.0	parade 0.0	Rushmore 2.3
28. 07/09–07/15	Crooked 71.5	Russian 1.2	NATO 13.0	Epstein 0.0	coronavirus 0.0
29. 07/16–07/22	Pence 2.9	Mueller 0.0	Helsinki 3.1	racist 0.8	coronavirus 0.0
30. 07/23–07/29	DNC 6.1	Scouts 0.0	Colon 0.0	Baltimore 13.6	Portland 11.8
31. 07/30–08/05	Khan 6.5	Mueller 0.0	Baltimore 9.4	pandemic 0.0	Capitol 0.0
32. 08/06–08/12	Crooked 59.2	Omarosa 0.4	Puzo 7.6	USPS 0.0	Rouen 0.0
33. 08/13–08/19	Manafort 0.0	Charlottesville 1.5	Omarosa 9.5	Greenblatt 6.9	Taliban 0.0
34. 08/20–08/26	Clinton 7.0	Charlottesville 3.8	Cohen 2.7	Greenblatt 8.0	Taliban 0.0
35. 08/27–09/02	Crooked 57.4	Harvey 0.0	Orr 14.0	Dorian 12.2	Kenosha 9.5
36. 09/03–09/09	Bondi 0.0	DACA 2.4	Kavanaugh 2.1	Dorian 12.6	Atlantic 4.8
37. 09/10–09/16	deplorable 0.0	ESPN 2.7	Puerto 7.5	flavored 0.0	Woodward 2.6
38. 09/17–09/23	Clinton 6.5	Kim 4.9	Kavanaugh 1.7	Ukraine 4.5	coronavirus 0.0
39. 09/24–09/30	debate 4.9	Puerto 4.7	Kavanaugh 9.5	Ukraine 6.8	ballots 0.7
40. 10/01–10/07	Pence 4.9	Puerto 2.1	Kavanaugh 6.8	Ukraine 5.1	Covid 1.4
41. 10/08–10/14	sexual 0.3	Puerto 1.8	Kavanaugh 4.3	Kurds 8.2	COVID 1.4
42. 10/15–10/21	rigged 10.1	Puerto 0.2	Saudi 5.3	Kurds 3.7	Biden 8.2
43. 10/22–10/28	star 0.0	Mueller 0.0	caravan 0.0	impeachment 0.0	Biden 9.2
44. 10/29–11/04	FBI 5.9	Mueller 0.0	caravan 0.0	impeachment 0.0	Biden 10.0
45. 11/05–11/11	Clinton 0.9	Gillespie 12.0	Whitaker 6.2	Ukraine 6.2	votes 3.4
46. 11/12–11/18	Bannon 0.0	sexual 1.7	caravan 0.0	Ukraine 5.2	Dominion 23.2
47. 11/19–11/25	Hamilton 12.4	LaVar 21.3	Saudi 1.6	Ukraine 3.5	Sidney 0.1
48. 11/26–12/02	recount 0.0	Moore 0.0	Moscow 0.1	impeachment 3.1	votes 24.1
49. 12/03–12/09	Taiwan 7.8	Mueller 0.0	Cohen 2.1	impeachment 0.0	Georgia 20.2
50. 12/10–12/16	Russia 2.9	Mueller 0.0	Cohen 6.9	impeachment 0.0	vaccine 11.1
51. 12/17–12/23	inauguration 11.8	Mueller 0.0	wall 9.8	impeachment 1.4	vaccine 15.4
52. 12/24–12/31	inauguration 3.2	Mueller 0.0	wall 20.4	impeachment 7.6	Election 60.2

http://compstorylab.org/trumpstoryturbulence/

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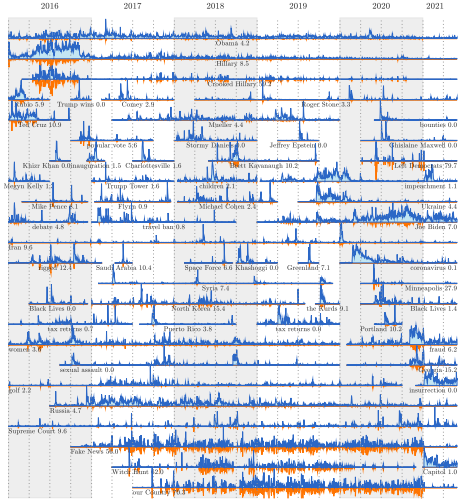

ding!

On Instagram at pratchett_the_cat

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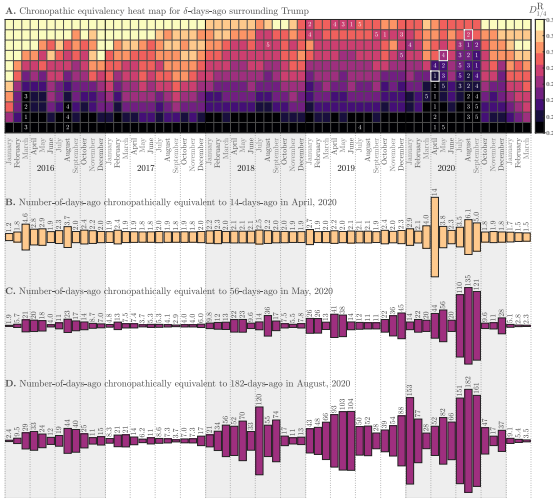
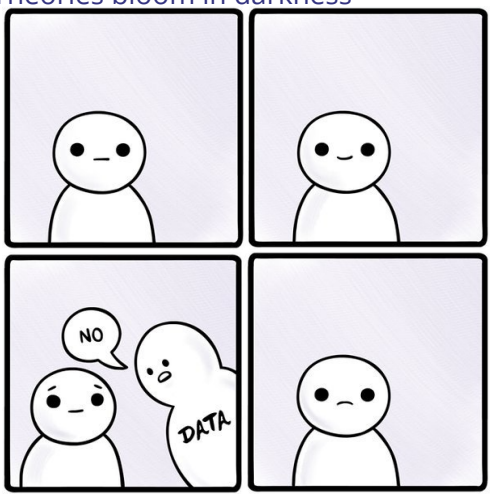


Theories bloom in darkness



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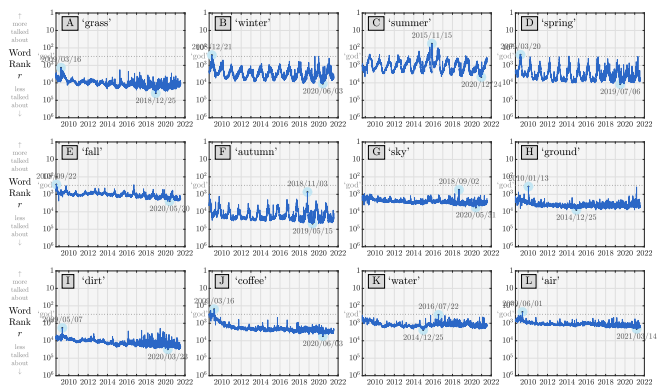
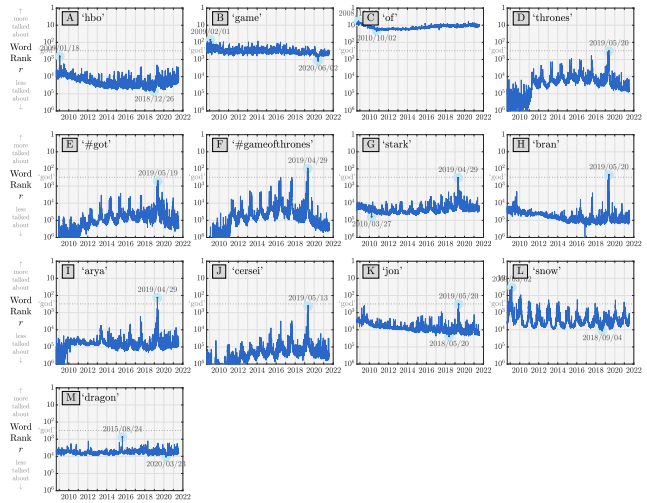
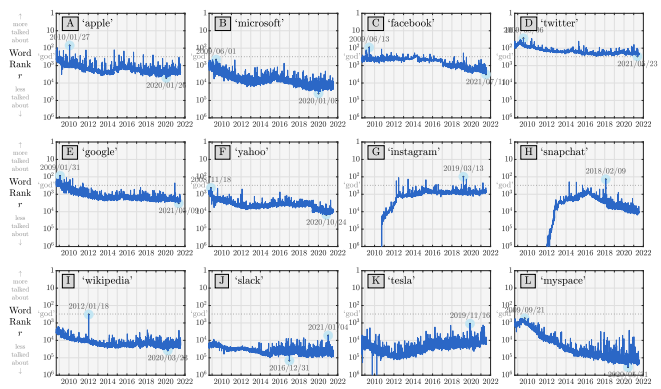
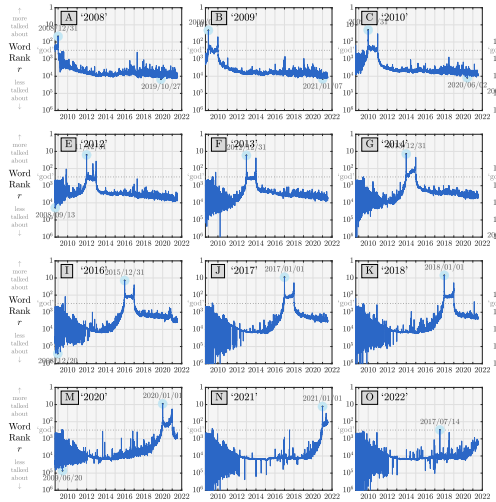
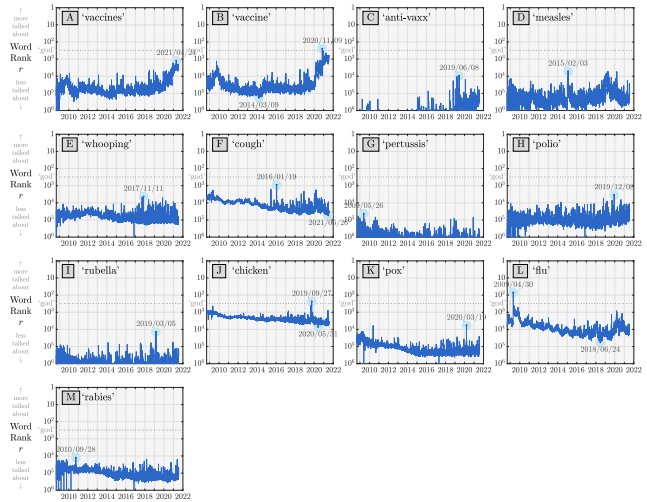
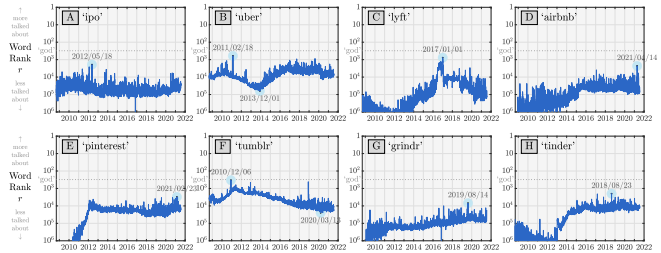

A 'grass'
B 'winter'
C 'summer'
D 'spring'
E 'fall'
F 'autumn'
G 'sky'
H 'ground'
I 'dirt'
J 'coffee'
K 'water'
L 'air'
Word Rank r
more talked about
less talked about

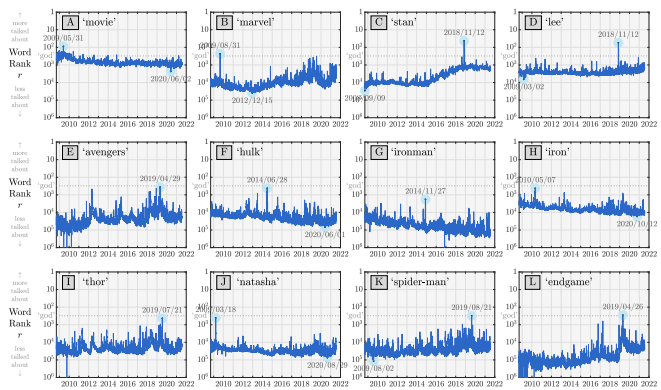

A 'hbo'
B 'game'
C 'of'
D 'thrones'
E '#got'
F '#gameofthrones'
G 'stark'
H 'bran'
I 'arya'
J 'cersei'
K 'jon'
L 'snow'
M 'dragon'
Word Rank r
more talked about
less talked about

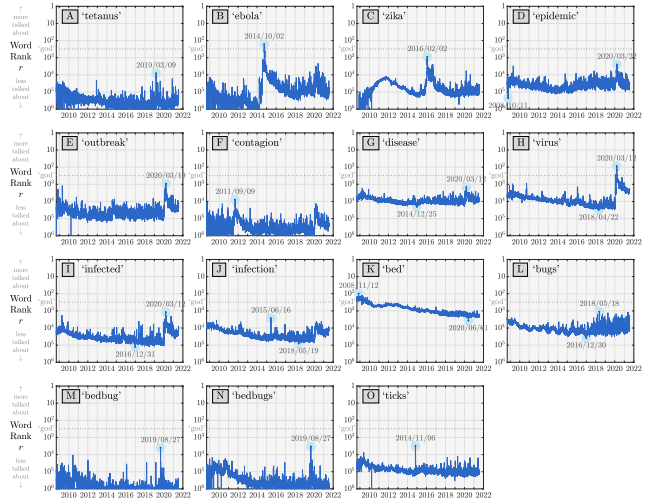

A 'apple'
B 'microsoft'
C 'facebook'
D 'twitter'
E 'google'
F 'yahoo'
G 'instagram'
H 'snapchat'
I 'wikipedia'
J 'slack'
K 'tesla'
L 'myspace'
Word Rank r
more talked about
less talked about

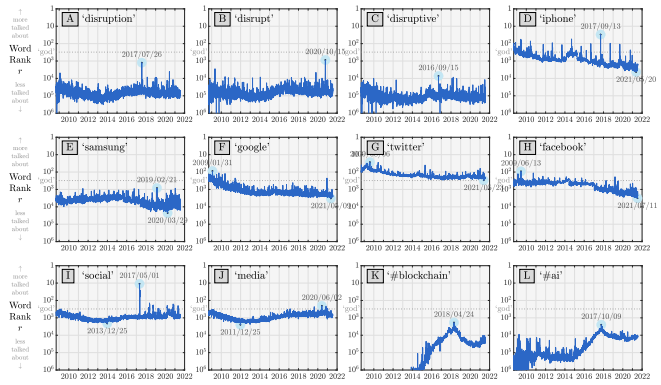

A '2008'
B '2009'
C '2010'
D '2011'
E '2012'
F '2013'
G '2014'
H '2015'
I '2016'
J '2017'
K '2018'
L '2019'
M '2020'
N '2021'
O '2022'
Word Rank r
more talked about
less talked about

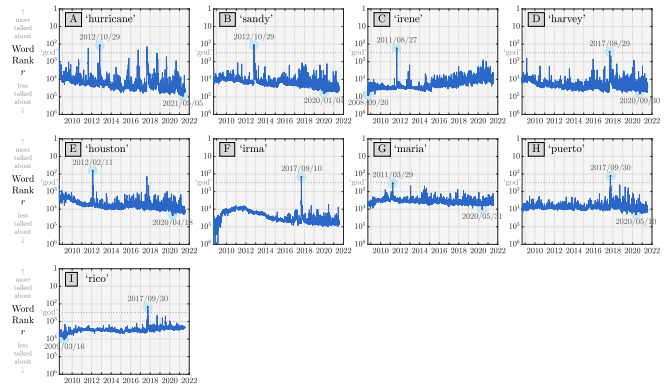

A 'vaccines'
B 'vaccine'
C 'anti-vaxx'
D 'measles'
E 'whooping'
F 'cough'
G 'pertussis'
H 'polio'
I 'rubella'
J 'chicken'
K 'pox'
L 'flu'
M 'rabies'
Word Rank r
more talked about
less talked about

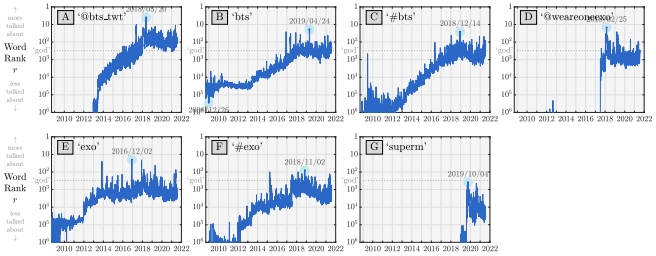

A 'ipo'
B 'uber'
C 'lyft'
D 'airbnb'
E 'pinterest'
F 'tumblr'
G 'grindr'
H 'tinder'
Word Rank r
more talked about
less talked about

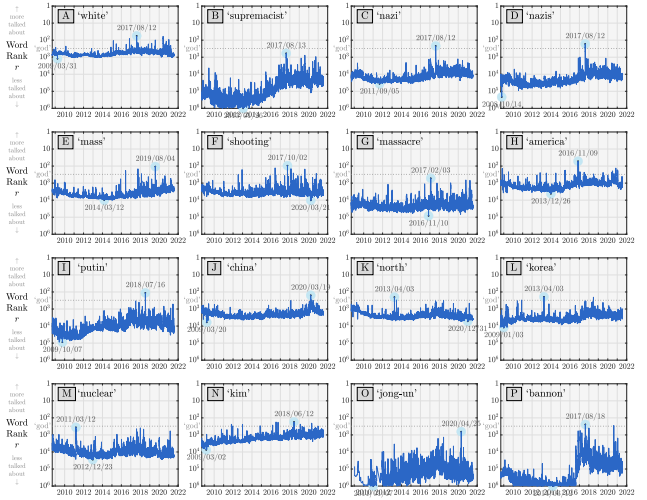

A 'movie'
B 'marvel'
C 'stan'
D 'lee'
E 'avengers'
F 'hulk'
G 'ironman'
H 'iron'
I 'thor'
J 'natasha'
K 'spider-man'
L 'endgame'
Word Rank r
more talked about
less talked about

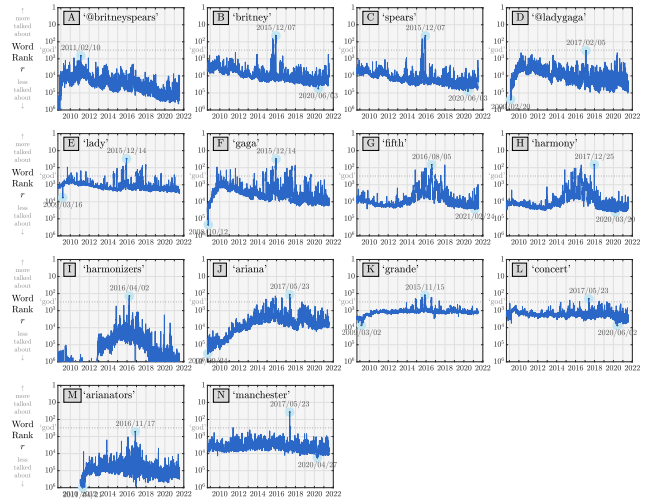

A 'tetanus'
B 'ebola'
C 'zika'
D 'epidemic'
E 'outbreak'
F 'contagion'
G 'disease'
H 'virus'
I 'infected'
J 'infection'
K 'bed'
L 'bugs'
M 'bedbug'
N 'bedbugs'
O 'ticks'
Word Rank r
more talked about
less talked about

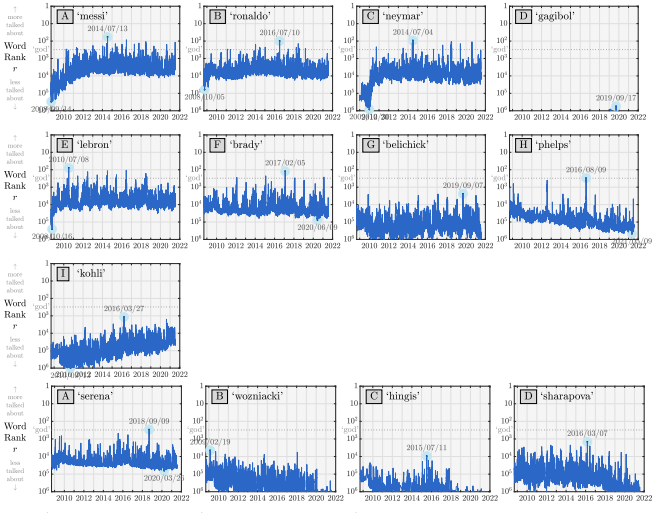

A 'disruption'
B 'disrupt'
C 'disruptive'
D 'iphone'
E 'samsung'
F 'google'
G 'twitter'
H 'facebook'
I 'social'
J 'media'
K '#blockchain'
L '#ai'
Word Rank r
more talked about
less talked about


A 'hurricane' 2012/10/29 2021/05/05
B 'sandy' 2012/10/29 2020/01/04
C 'irene' 2011/08/27 2008/09/20
D 'harvey' 2017/08/29 2020/09/30
E 'houston' 2012/02/11 2020/04/18
F 'irma' 2017/09/10
G 'maria' 2011/03/29 2020/05/21
H 'puerto' 2017/09/30 2020/05/20
I 'rico' 2017/09/30 2009/03/16
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A '@bts_twt' 2018/05/20
B 'bts' 2019/04/24
C '#bts' 2018/12/14
D '@wearecomeback' 2020/12/25
E 'exo' 2016/12/02
F '#exo' 2018/11/02
G 'superm' 2019/10/06
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A 'white' 2017/08/12 2009/03/31
B 'supremacist' 2017/08/13
C 'nazi' 2017/08/12 2011/09/05
D 'nazis' 2017/08/12
E 'mass' 2019/08/04 2014/03/12
F 'shooting' 2017/10/02 2020/03/23
G 'massacre' 2017/02/03 2016/11/10
H 'america' 2016/11/09 2013/12/26
I 'putin' 2018/07/16 2009/10/07
J 'china' 2020/03/13 2017/03/20
K 'north' 2013/04/03 2020/12/31
L 'korea' 2013/04/03 2001/01/03
M 'nuclear' 2011/03/12 2012/12/23
N 'kim' 2018/06/12 2009/03/02
O 'jong-un' 2020/04/25
P 'bannon' 2017/08/18
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A '@britneyspears' 2011/02/10
B 'britney' 2015/12/07 2020/06/03
C 'spears' 2015/12/07 2020/06/03
D '@ladygaga' 2017/02/05
E 'lady' 2015/12/14 2009/03/16
F 'gaga' 2015/12/14
G 'fifth' 2016/08/05 2021/02/24
H 'harmony' 2017/12/25 2020/01/30
I 'harmonizers' 2016/04/02
J 'ariana' 2017/05/23
K 'grande' 2015/11/15 2009/03/02
L 'concert' 2017/05/23 2020/06/02
M 'arianators' 2016/11/17
N 'manchester' 2017/05/23 2020/04/27
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022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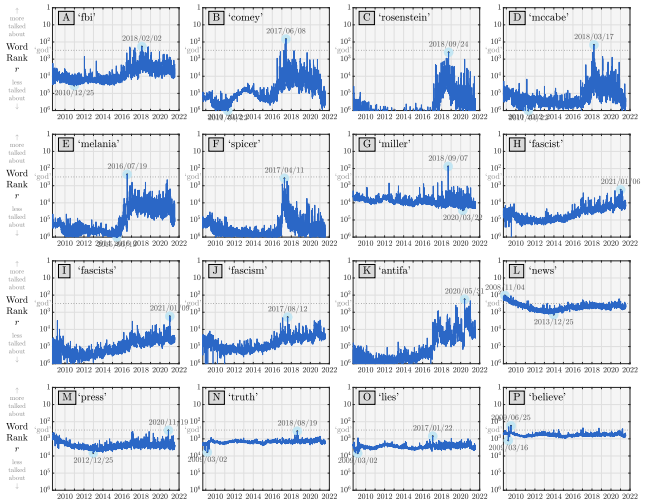
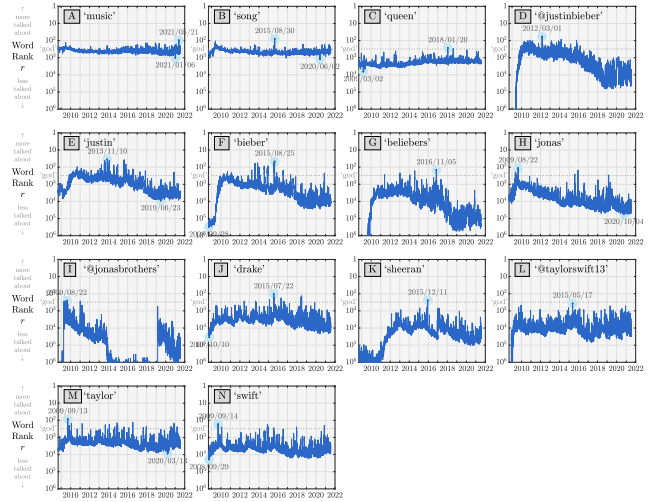
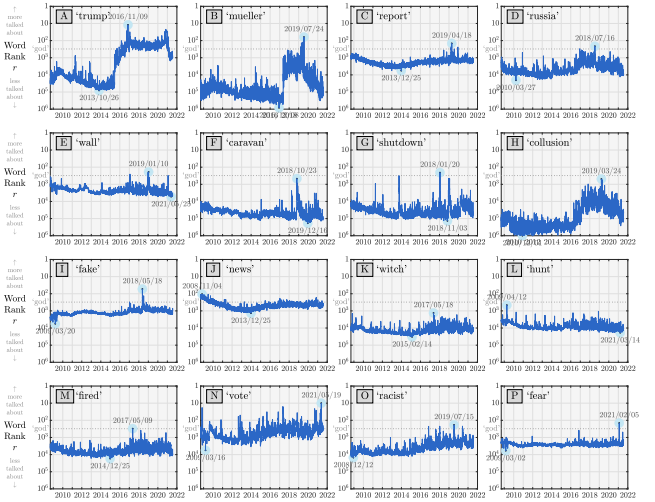
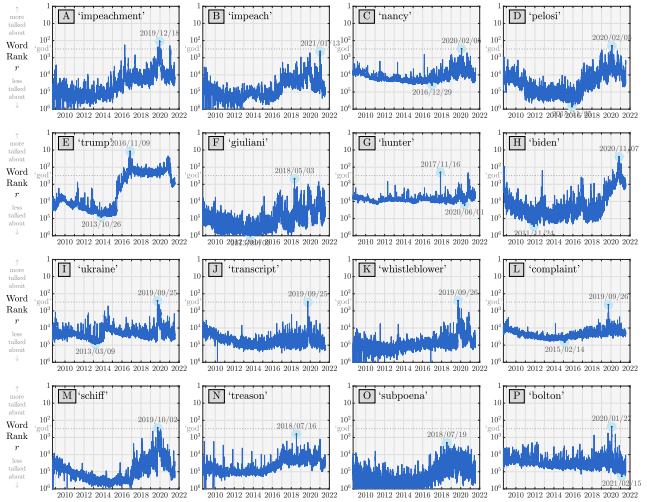
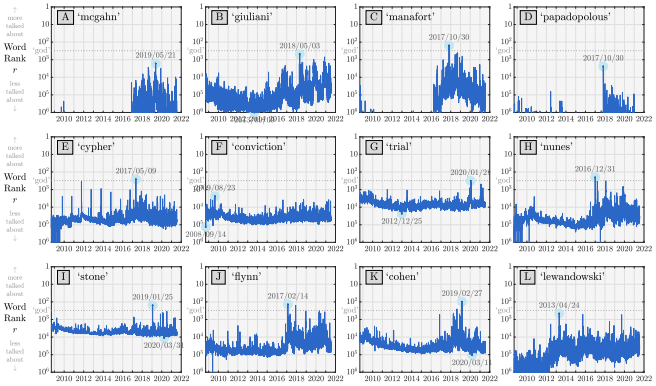
B 'ronaldo' 2016/07/10
C 'neymar' 2014/07/04
D 'gagibol' 2019/09/17
E 'lebron' 2010/07/08
F 'brady' 2017/02/05
G 'belichick' 2019/09/07
H 'phelps' 2016/08/09
I 'kohli' 2016/03/27
A 'serena' 2018/09/09
B 'wozniacki' 2017/02/19
C 'hingis' 2015/07/11
D 'sharapova' 2016/03/07
E 'federer'
F 'nadal'
G 'djokovic'
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022

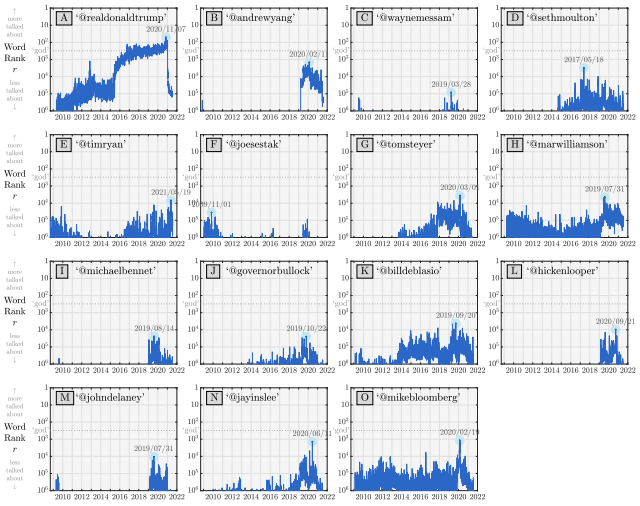

A 'fbi' 2018/02/02 2010/12/25
B 'comey' 2017/06/08
C 'rosenstein' 2018/09/24
D 'mccabe' 2018/03/17
E 'melania' 2016/07/19
F 'spicer' 2017/04/11
G 'miller' 2018/09/07 2020/03/22
H 'fascist' 2021/01/06
I 'fascists' 2021/01/06
J 'fascism' 2017/08/12
K 'antifa' 2020/05/21
L 'news' 2020/11/04 2013/12/25
M 'press' 2020/11/19 2012/12/25
N 'truth' 2018/08/19 2020/03/02
O 'lies' 2017/01/22 2009/03/02
P 'believe' 2020/06/25 2009/03/16
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A 'music' 2021/05/21 2021/01/06
B 'song' 2015/08/30 2020/06/02
C 'queen' 2018/01/20 2009/03/02
D '@justinbieber' 2012/03/01
E 'justin' 2013/11/10 2019/06/23
F 'bieber' 2015/08/25
G 'beliebers' 2016/11/05
H 'jonas' 2019/08/22 2020/10/04
I '@jonasbrothers' 2019/08/22
J 'drake' 2015/07/22 2009/10/10
K 'sheeran' 2015/12/11
L '@taylorswift13' 2015/05/17
M 'taylor' 2009/09/13 2020/03/13
N 'swift' 2009/09/14 2009/09/29
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A 'trump' 2016/11/09 2013/10/26
B 'mueller' 2019/07/24
C 'report' 2019/04/18 2013/12/25
D 'russia' 2018/07/16 2010/03/27
E 'wall' 2019/01/10 2021/05/27
F 'caravan' 2018/10/23 2019/12/10
G 'shutdown' 2018/01/20 2018/11/03
H 'collusion' 2019/03/24
I 'fake' 2018/05/18 2007/03/20
J 'news' 2008/11/04 2013/12/25
K 'witch' 2017/05/18 2015/02/14
L 'hunt' 2021/03/14
M 'fired' 2017/05/09 2014/12/25
N 'vote' 2021/03/19 2009/03/16
O 'racist' 2019/07/15 2018/12/12
P 'fear' 2021/02/05 2009/03/02
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022


A 'impeachment' 2019/12/18
B 'impeach' 2021/01/27
C 'nancy' 2020/02/04 2016/12/29
D 'pelosi' 2020/02/04
E 'trump' 2016/11/09 2013/10/26
F 'giuliani' 2018/05/03
G 'hunter' 2017/11/16 2020/06/01
H 'biden' 2020/11/07
I 'ukraine' 2019/09/25 2013/03/09
J 'transcript' 2019/09/25
K 'whistleblower' 2019/09/26
L 'complaint' 2019/09/26 2015/02/14
M 'schiff' 2019/10/02
N 'treason' 2018/07/16 2018/07/19
O 'subpoena' 2020/01/22
P 'bolton' 2021/02/15
Word Rank r
more talked about
less talked about
good
2010 2012 2014 2016 2018 2020 2022





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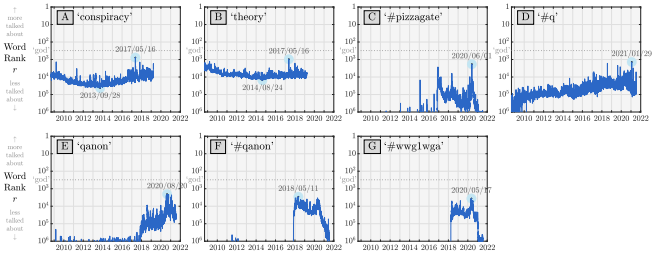
Extras
Sociotechnical time series
Adjacent Narratives
Extras
Memory & Turbulence
References



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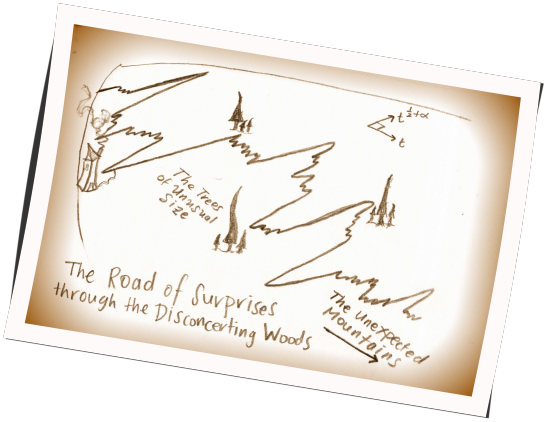

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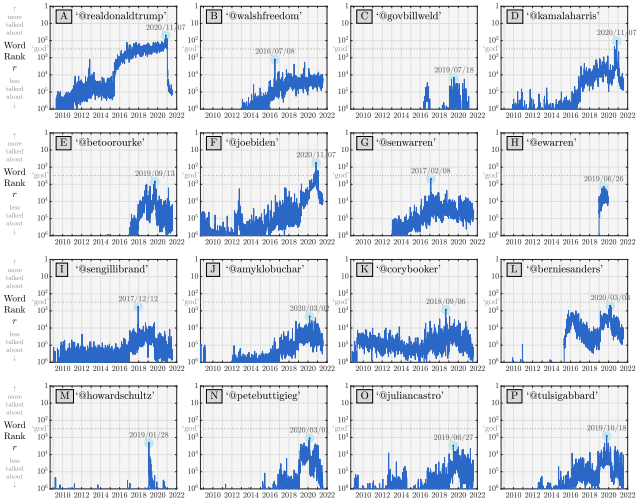

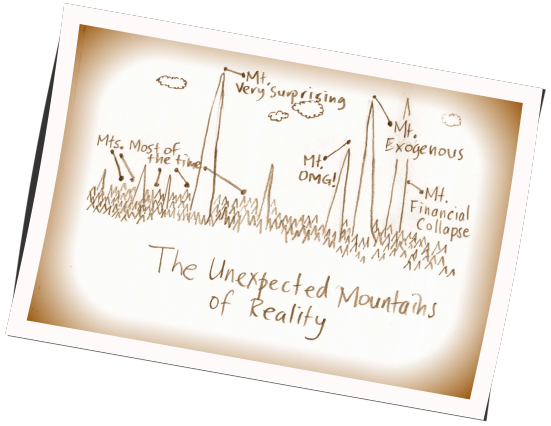

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The long tail:

Money
≡
Belief

Two questions about wealth distribution in the United States:

1. Estimate the percentage of all wealth owned by individuals when grouped into quintiles.
2. Estimate what you believe each quintile should own, ideally.
3. Extremes: 100, 0, 0, 0, 0 and 20, 20, 20, 20, 20

"Building a better America—One wealth quintile at a time"
Norton and Ariely, 2011. [15]

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Wealth distribution in the United States: [15]

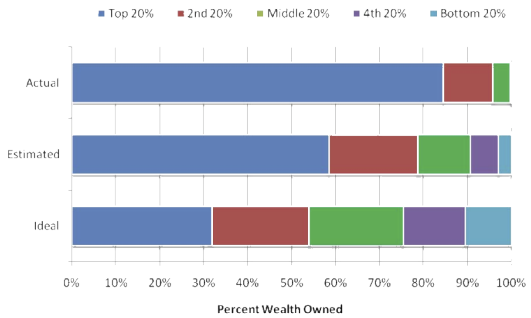
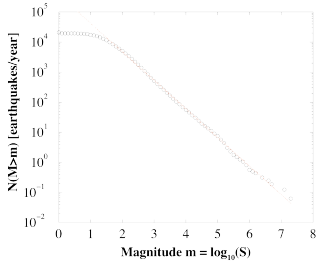


Fig. 2. The actual United States wealth distribution plotted against the estimated and ideal distributions across all respondents. Because of their small percentage share of total wealth, both the "4th 20%" value (0.2%) and the "Bottom 20%" value (0.1%) are not visible in the "Actual" distribution.

"Building a better America—One wealth quintile at a time" Norton and Ariely, 2011. [15]

The statistics of surprise:

Gutenberg-Richter law



- Log-log plot
- Base 10
- Slope = -1

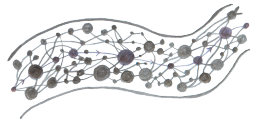
$$N(M > m) \propto m^{-1}$$

- From both the very awkwardly similar Christensen et al. and Bak et al.:
  "Unified scaling law for earthquakes" [5, 2]

Why adjacent narratives exist and untrue stories flourish:

2/4. The infinitude of adjacent stories will afford "better" stories

- Better = More engaging, more motivating to spread, more durable under spreading.
- Better stories exist for truthful recorders and retellers (journalists).



Wealth distribution in the United States: [15]

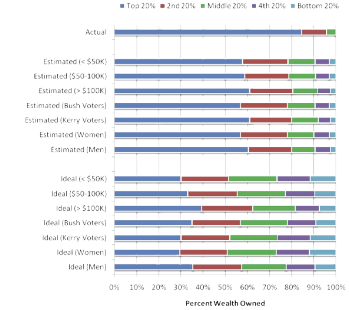
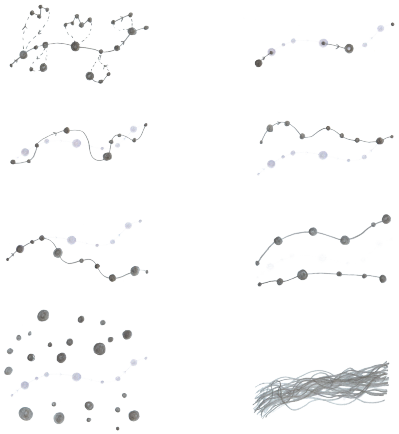


Fig. 3. The actual United States wealth distribution plotted against the estimated and ideal distributions of respondents of different income levels, political affiliations, and genders. Because of their small percentage share of total wealth, both the "4th 20%" value (0.2%) and the "Bottom 20%" value (0.1%) are not visible in the "Actual" distribution.

Aside: The 1% framing may be effective but makes no sense.

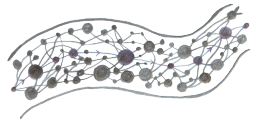
- Adjacent narratives—why mistruths and conspiracy theories exist and flourish:



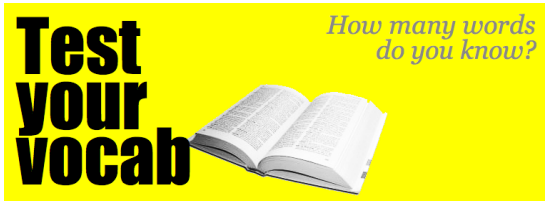
Why adjacent narratives exist and untrue stories flourish:

3/4. The infinitude of adjacent stories means "better" stories exist for those who would disinform

- Adjacent stories may be truth-limited and/or falsehood-bearing.
- There may exist adjacent stories that conform to a world view/ideology.
- Even the seemingly non-adjacent must have some plausibility (Pizzagate).



My, what big words you have ...



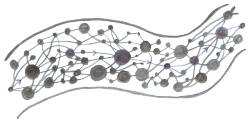
- Test capitalizes on word frequency following a heavily skewed frequency distribution with a decaying power-law tail.

- This Man Can Pronounce Every Word in the Dictionary (story here)
- Best of Dr. Bailly

Why adjacent narratives exist and untrue stories flourish:

1/4. A real story is never recorded and retold completely

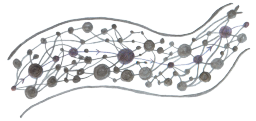
- Impossible to record every detail.
- Recording entails compression to scale of medium (narrative hierarchy).
- Story logic will be favored, and seemingly irrelevant aspects discarded.



Why adjacent narratives exist and untrue stories flourish:

4/4. Character is the short cut to story

- The barely implausible can be believed if the character can make it so.
- A believe-to-be evil character can do anything.
- Iterate between character and story to make the character fixed.



Things that spread quickly:

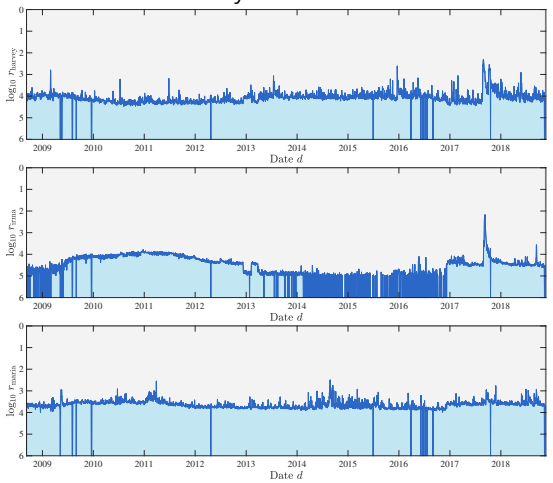
+ News + Conspiracy Theories …

buzzfeed.com:

Shareworthy Content is "King":

1. Build entities/messages/stories that have intrinsic and social value out in the Social Wild.
2. Advertise but lay off the social interactions.
3. Just keep trying and be trustworthy.
4. Of course it can all go wrong and be used for any purpose: good, stupid, bad, evil, …
5. Essential implication: Billions of people can be harmoniously wrong.
6. Beware the evil, payola version.
7. Challenge: What's the societal vaccine for conspiracy theories?

Awareness and Memory: Hurricanes



The boiled-down essence of stories:

The three fundamental events of (non-clone) life:

- Hatchings, Matchings, and Dispatchings.
- Stories encode survival algorithms.
- Survival algorithms are for both individuals and groups.
- Stories are dynamic paths of the true, the possible, the unlikely.
- The unifying theme of existence is existence.

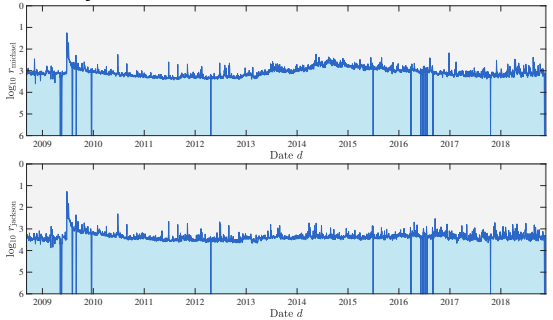
Fame: Zipfian rank-frequency plots

George Kingsley Zipf:

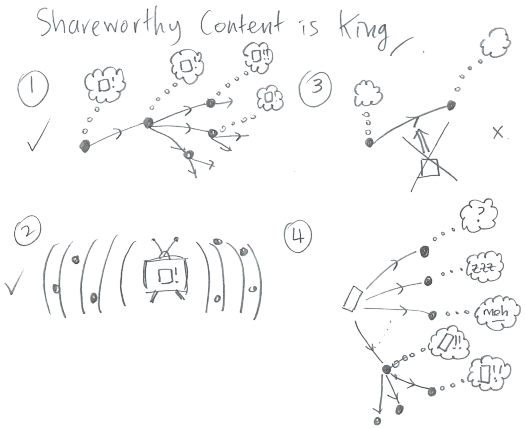
- Noted various rank distributions have power-law tails, often with exponent near -1 (word frequency, city sizes, species numbers, …)
- Zipf's 1949 Magnum Opus:

"Human Behaviour and the Principle of Least-Effort" by G. K. Zipf (1949). [20]

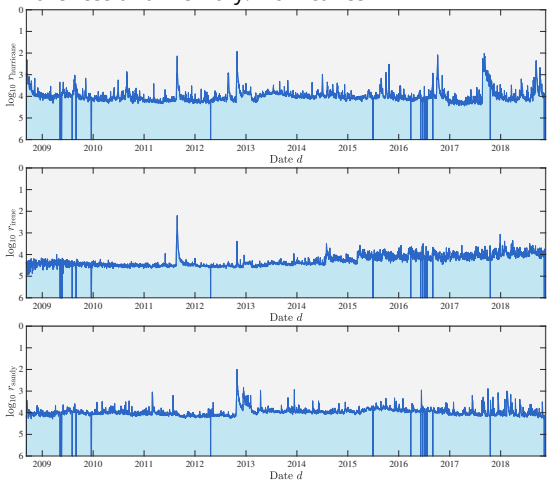
Michael Jackson

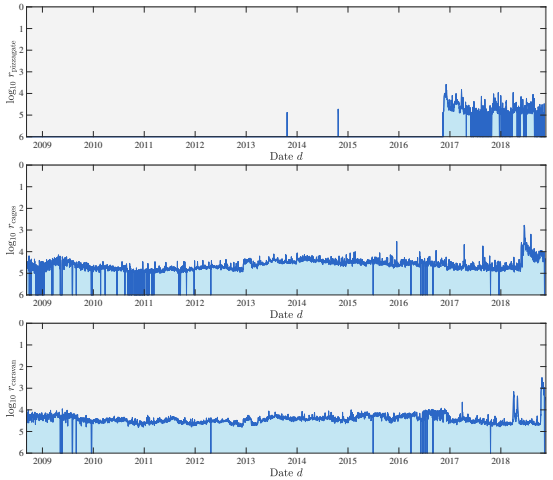


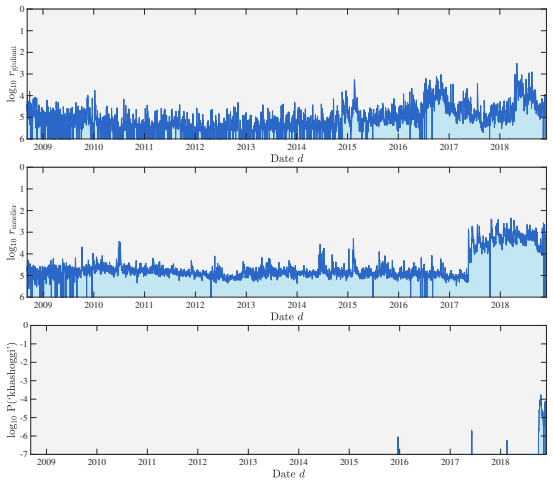
Deep fame:



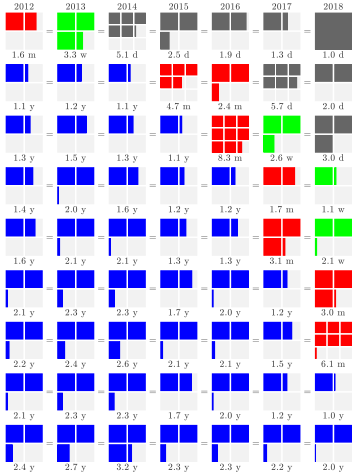
Awareness and Memory: Hurricanes







Story turbulence:



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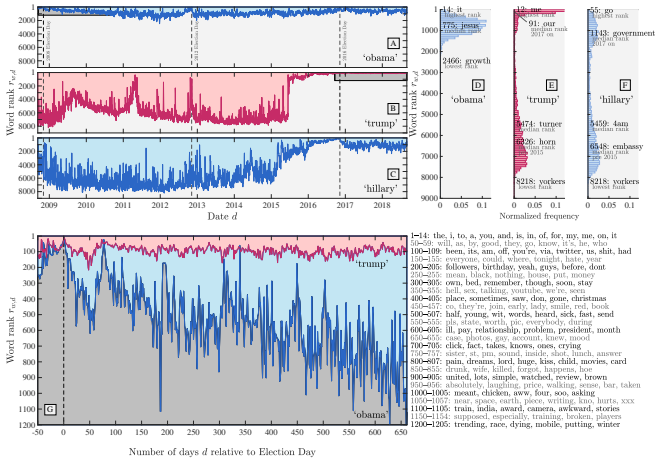
Lexical fame of POTUSes and possible POTUSes:



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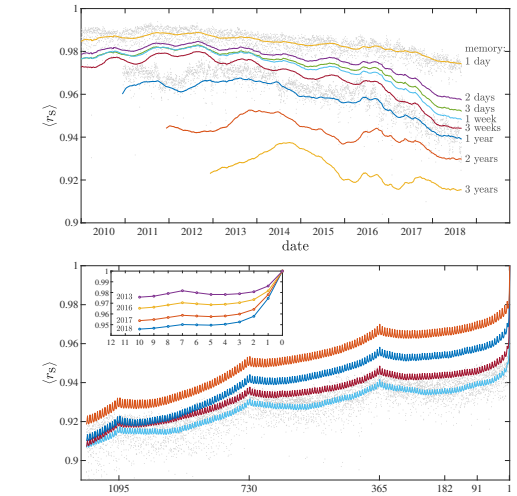
Story turbulence:



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