## What's the Story?

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Principles of Complex Systems, Vols. 1 & 2 CSYS/MATH 300 and 303, 2021–2022 |@pocsvox

### Prof. Peter Sheridan Dodds | @peterdodds

Computational Story Lab | Vermont Complex Systems Center Vermont Advanced Computing Core | University of Vermont



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- The PoCSverse What's the Story? 1 of 92 Storytellers Stories Power Taxonomy Essence Emotional Arcs Moving ahead
- References



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### On Instagram at pratchett\_the\_cat

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The PoCSverse



# Outline

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### Story editor:

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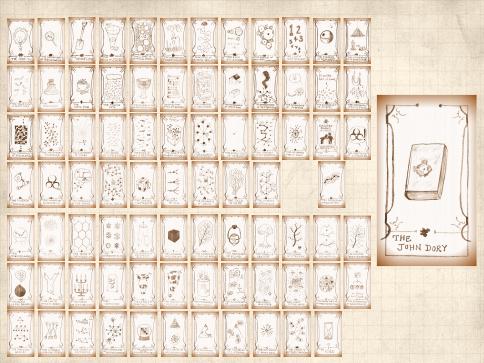
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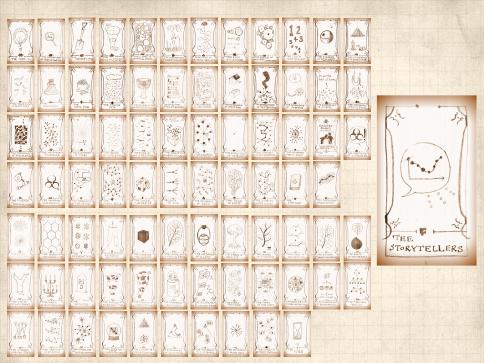
Essence

**Emotional Arcs** 

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### Super Survival of the Stories:



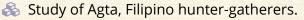
The Desirability of Storytellers , The Atlantic, Ed Yong, 2017-12-05. What's the Story? 8 of 92 Storytellers Stories Power Taxonomy

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- 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.

### Major competing storytelling entities:

- 🚳 News.
- 🚳 Books, magazines.
- 🚳 Art.
- 🚳 Music industry.
- 🗞 Television, movie studios, Netflix, HBO, Disney.
- 🙈 Social media: Facebook, Instagram, Snapchat, ...
- 🚳 All sport.
- 🚳 Video games.
- 🗞 Religions, ideologies, belief systems, Freemasons, ...
- 🗞 Enduring coherent groups: Cultures, countries, cities, ...

#### The PoCSverse What's the Story? 9 of 92

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- 🗞 Enduring coherent groups: Cultures, countries, cities, ...

## Cultural products from Pantheon C:

🗞 Writers, artists, movie directors, video game directors.

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## The famous are storytellers—Japan:

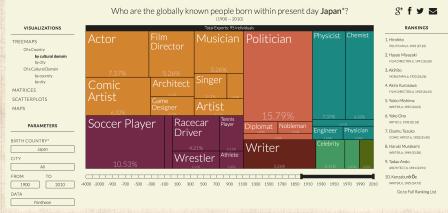
VISUALIZATIONS

RANKINGS PEOPLE

PANTHEON

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If you use the Pantheon dataset, please cite; Yu, A.Z., et al. (2016). Pantheon 1.0, a manually verified dataset of globally famous biographies. Scientific Data 2:150075. doi: 10.1038/sdata.2015.75



### For people born 1950-

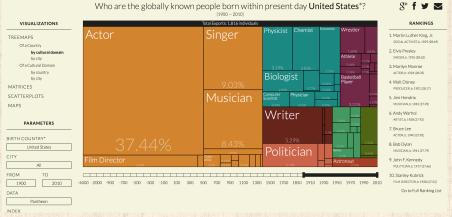
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#### For people born 1950-



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PANTHEON MAPPING HISTORICAL CULTURAL PRODUCTION

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#### Who are the globally known people born within present day United States\*? 9+ f 🖌 🗖 [1950 - 2010]VISUALIZATIONS Total Exports: 947 individuals RANKINGS Wrestler Tennis 1. Bill Gates TREEMAPS BUSINESSPERSON, b. 1955 (26.35) Of a Country 2. Michael Jackson by cultural domain Athlete MUSICIAN & 1958(25:52) Of a Cultural Domain 3 Johnny Denn Basketball by country Plaver 4. Steven Seagal MATRICES SCATTERPLOTS. 5. Robin Williams ACTOR 5 1951 (25:08) MAPS 6 Stevie Monder PARAMETERS 7. Brad Pitt ACTOR 5 1963(24.89) BIRTH COUNTRY\* Writer 8. Barack Ohama United States 9 Tom Hanks All FROM 10. Richard Stallman 4000 -2000 -900 -700 -500 -300 -100 100 300 500 700 900 1100 1300 1500 1700 1850 1910 1930 1950 1970 1990 2010 Pantheon

#### For people born 1950-

VISUALIZATIONS

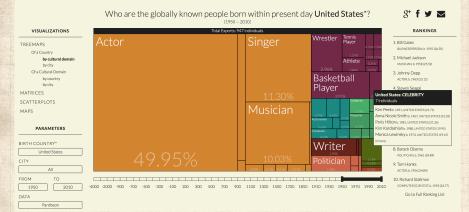
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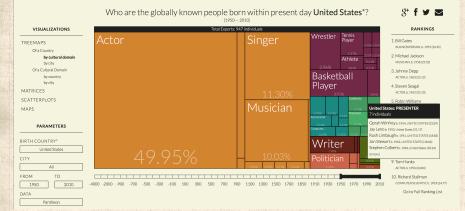
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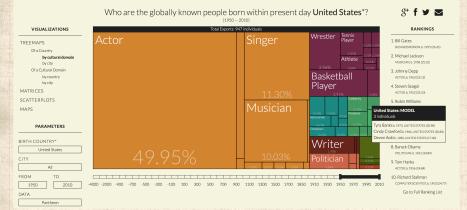
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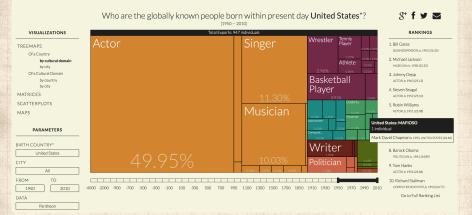
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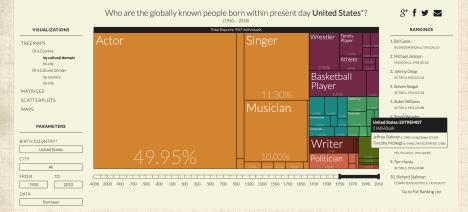
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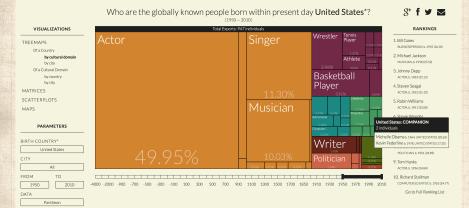
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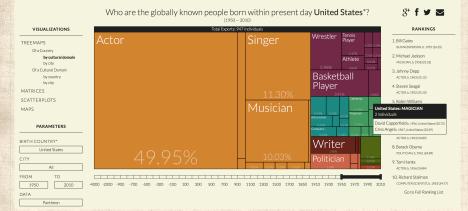
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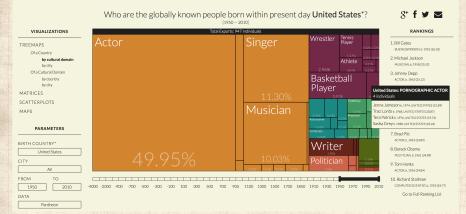
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#### For people born 1950-

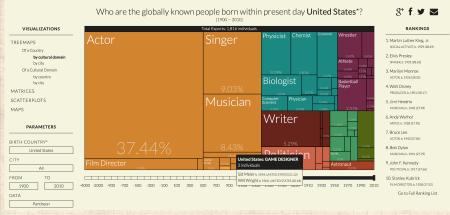
## Storytellers win:

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#### For people born 1900-

## Storytellers win:

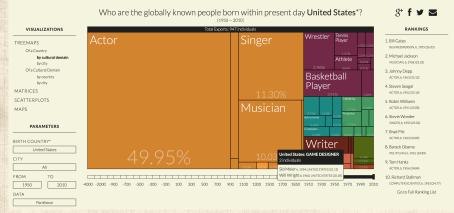
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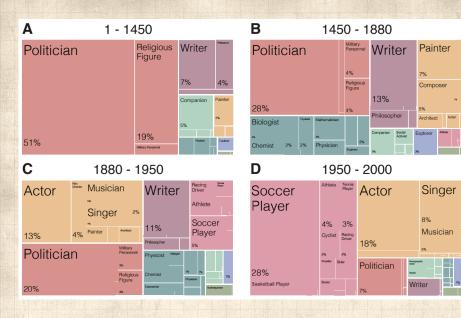
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### For people born 1950-



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

## It's all about algorithms (stories):

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References



"The Storytelling Animal: How Stories Make Us Human" **3** C by Jonathan Gottschall (2013).<sup>[11]</sup>

"On the Origin of Stories: Evolution, Cognition, and Fiction" **a**, **C** by Brian Boyd (2010). <sup>[4]</sup>



# (Sir Terry) Pratchett's 🖸 Narrativium 🗗:



"The most common element on the disc, although not included in the list of the standard five: earth, fire, air, water and surprise. It ensures that everything runs properly as a story."

"A little narrativium goes a long way: the simpler the story, the better you understand it. Storytelling is the opposite of reductionism: 26 letters and some rules of grammar are no story at all." The PoCSverse What's the Story? 15 of 92

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"Heroes only win when outnumbered, and things which have a one-in-a-million chance of succeeding often do so."

## Stories are everything:

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## Stories are everything:

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## Game of Thrones, S6E06: The Iron Throne "What unites people?

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## Game of Thrones, S6E06: The Iron Throne "What unites people? Armies?

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## Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold?



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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup>



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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup> Stories.



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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup> Stories.



<sup>1</sup>Character is the shortcut to story

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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup> Stories. There's nothing in the world more powerful than a good story.



#### <sup>1</sup>Character is the shortcut to story

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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup> Stories. There's nothing in the world more powerful than a good story. Nothing can stop it.



#### <sup>1</sup>Character is the shortcut to story

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Game of Thrones, S6E06: The Iron Throne "What unites people? Armies? Gold? Flags?<sup>1</sup> Stories. There's nothing in the world more powerful than a good story. Nothing can stop it. No enemy can defeat it." The PoCSverse

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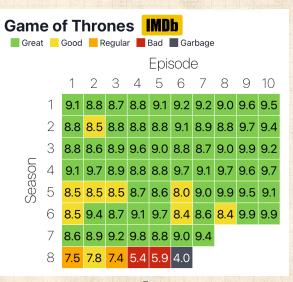
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#### <sup>1</sup>Character is the shortcut to story

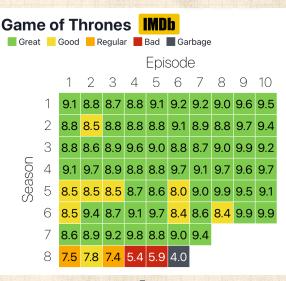
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Except for writers who destroy their own stories.

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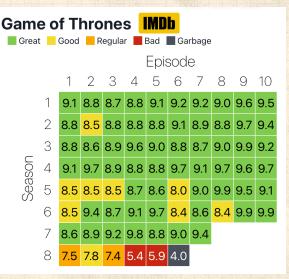
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Except for writers who destroy their own stories. Also audiences.

...

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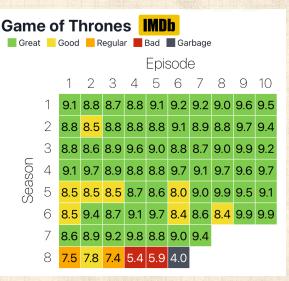


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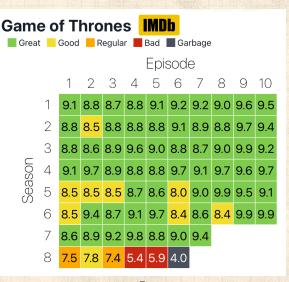


Except for writers who destroy their own stories. Also audiences. Basic word of mouth. 🙈 And critics. 🖸

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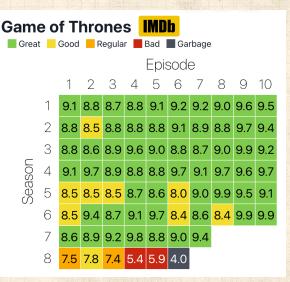


Except for writers who destroy their own stories. Also audiences. Basic word of mouth. And critics. And other, better stories 📿

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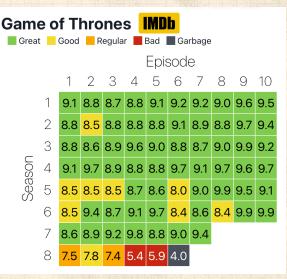


Except for writers who destroy their own stories. Also audiences. Basic word of mouth. And critics. And other, better stories 📿 Character assassination works too.

...

A)

23



### We see (certain kinds of) stories:

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http://www.youtube.com/watch?v=VTNmLt7QX8E?rel=0

Heider and Simmel, 1944<sup>[12]</sup>

## Story C: a laying out of a temporal sequence of events.

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- Story C: a laying out of a temporal sequence of events.
- lime is a great storyteller" (Irish proverb)



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- Story C: a laying out of a temporal sequence of events.
- lime is a great storyteller" (Irish proverb)
- 🚳 Events may be any balance of real and imagined.



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- Story C: a laying out of a temporal sequence of events.
- lime is a great storyteller" (Irish proverb)
- 🚳 Events may be any balance of real and imagined.
- $\clubsuit$  Narrative  $\equiv$  Story.



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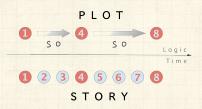
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- Story C: a laying out of a temporal sequence of events.
- 🍪 "Time is a great storyteller" (Irish proverb)
- 🗞 Events may be any balance of real and imagined.
- $\aleph$  Narrative  $\equiv$  Story.
- Plot C: Essential sequence of a story's elements.<sup>2</sup>



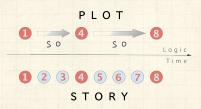
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<sup>2</sup>By まとりょ 回しか — Own work, CC BY-SA 4.0,

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- 🚳 Events may be any balance of real and imagined.
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- Plot C: Essential sequence of a story's elements.<sup>2</sup>



### 🗞 Plot = Algorithm

<sup>2</sup>By まとりょ Eしか — Own work, CC BY-SA 4.0,

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xkcd.com/904/

Goal: a Science of Stories.
Claim: Homo narrativus — we run on stories.
"What's the John Dory?"
"They've lost the plot/thread"
Maybe: The narrative hierarchy and the Scalability of stories .

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3	Goal: a Science of Stories.
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3	"They've lost the plot/thread"
3	Maybe: The narrative hierarchy and
	the Scalability of stories 🗹.
3	Research: Extraction of metaphors,
	frames, narratives, and stories from
	large-scale text/corpora.

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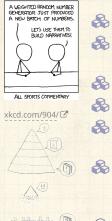
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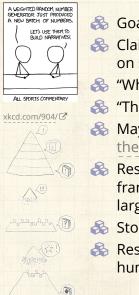
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3	Storywrangler, POTUSometer,
3	Research: What's the taxonomy of
	human stories?
3	Maybe: Stories ↔ Algorithms

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### Algorithms are everywhere:

- 🚳 Communication/Language.
- Economic systems (Shiller: "Narrative Economics" <sup>[19]</sup>)
- 🗞 Legal systems.
- 🚳 Social norms, customs, cultures.
- 🚳 Food:

growing, harvesting, preparing, distribution, ...

- 🙈 Safety codes and protocols
- 🚳 Military.
- 🚳 Stories ...

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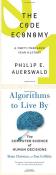
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### Algorithms, recipes, stories, ...



"The Code Economy: A Forty-Thousand Year History" **3** C by Philip E Auerswald (2017).<sup>[2]</sup>

"Algorithms to Live By" **3** C by Christian and Griffiths (2016).<sup>[8]</sup>



"Once Upon an Algorithm" **3**. C by Martin Erwig (2017). [10]

Also: Numerical Recipes in C  $^{[16]}$  and How to Bake  $\pi$   $^{[7]}$ 

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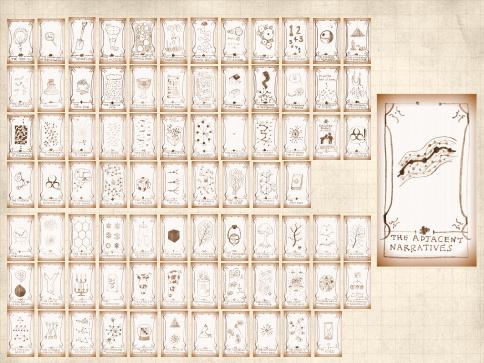
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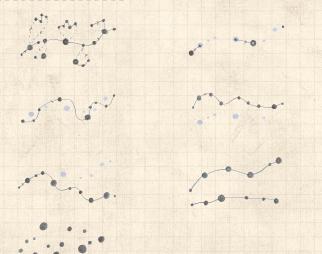
**Emotional Arcs** 

Moving ahead





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



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



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

🚳 Impossible to record every detail.



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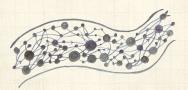
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- 1/4. A real story is never recorded and retold completely
- 🚳 Impossible to record every detail.
- Recording entails compression to scale of medium (narrative hierarchy).



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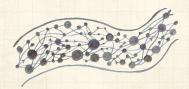
Essence

**Emotional Arcs** 

Moving ahead



- 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.



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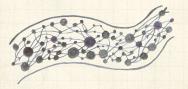
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2/4. The infinitude of adjacent stories will afford "better" stories



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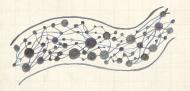
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2/4. The infinitude of adjacent stories will afford "better" stories

Better = More engaging, more motivating to spread, more durable under spreading.



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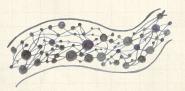
**Emotional Arcs** 

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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).



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



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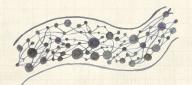
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3/4. The infinitude of adjacent stories means "better" stories exist for those who would disinform

Adjacent stories may be truth-limited and/or falsehood-bearing. The PoCSverse What's the Story? 29 of 92

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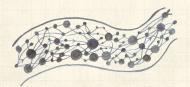
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3/4. The infinitude of adjacent stories means "better" stories exist for those who would disinform

- Adjacent stories may be truth-limited and/or falsehood-bearing.
- There may exist adjacent stories that conform to a world view/ideology.



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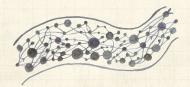
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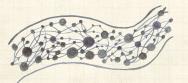
Moving ahead





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).



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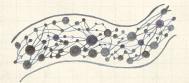
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4/4. Character is the short cut to story



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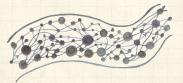
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## 4/4. Character is the short cut to story

# The barely implausible can be believed if the character can make it so.



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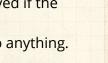
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## 4/4. Character is the short cut to story

- The barely implausible can be believed if the character can make it so.
- 🚳 A believe-to-be evil character can do anything.





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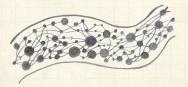
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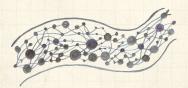
Moving ahead





## 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.



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# 1999 Gallup poll:



8 6% of Americans said the lunar landings were fake. 😤 5% were undecided.

🗞 Video replay 🖸 (The Comments).

Buzz Aldrin has enough:



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## Highlights:

line Earth is flat. https://www.tfes.org

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## Highlights:

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- The Beatles never existed: http://www.thebeatlesneverexisted.com 2.

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The PoCSverse What's the Story? 32 of 92

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     A. "Yes. Yes it is."

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# A Phantom time hypothesis C:

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Phantom time hypothesis C:
 The years 614–911 AD never existed.

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## \lambda Phantom time hypothesis 🗗:

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References



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#### Stories

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- Good to know.

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#### Stories

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- Crushed by reality: Records of solar eclipses, comets, dendrochronology.



## 🚳 Finland does not exist:



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- Parasocial relationships (Cosplay)
   Allusionist 82. A Novel Remedy
  - Agatha Christie type murder mysteries: A salve post the Great War.
- Representation matters—possible future paths (narrative hodology)



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   Aurora, Colorado shooting
   (Joker)

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"The Written World: How Literature Shaped Civilization" **3** C by Martin Puchner (2017). <sup>[17]</sup>

# We are what we read 🔀 (NYT)

"Storytelling is as human as breathing. When fabulation intersected with writing, stories were empowered to propagate themselves in society and around the world as civilization-forming "foundational texts." " The PoCSverse What's the Story? 36 of 92

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- 🙈 BBC, strawfree: How stories have shaped the world 🗹

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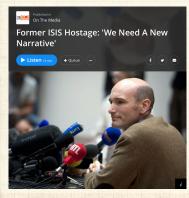
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## Story Wars:



Nicholas Hénin C, French Journalist, held captive for 10 months C. The PoCSverse What's the Story? 37 of 92

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NICOLAS HENIN: No, it was just like in a movie. And, by the way, even the people going to Syria, joining ISIS in Syria to fight, even these people see himself as movie characters. The PoCSverse What's the Story? 38 of 92

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We created, for instance, accounts on the social media named "Stop Jihadism," and this is [BLEEP], like they did not understand anything.

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[BROOKE LAUGHS]

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### [BROOKE LAUGHS]

Just because we have no imagination, we cannot just tell beautiful stories, create beautiful characters, beautiful heroes.

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### [BROOKE LAUGHS]

Just because we have no imagination, we cannot just tell beautiful stories, create beautiful characters, beautiful heroes.

And this is what we have to do because in our world, in our societies what do people want?

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### [BROOKE LAUGHS]

Just because we have no imagination, we cannot just tell beautiful stories, create beautiful characters, beautiful heroes.

And this is what we have to do because in our world, in our societies what do people want? They want to become heroes.

The PoCSverse What's the Story? 38 of 92

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We created, for instance, accounts on the social media named "Stop Jihadism," and this is [BLEEP], like they did not understand anything. And I did understand why we are so bad. It's just because in France we don't know how to write TV series properly.

### [BROOKE LAUGHS]

Just because we have no imagination, we cannot just tell beautiful stories, create beautiful characters, beautiful heroes.

And this is what we have to do because in our world, in our societies what do people want? They want to become heroes. They want to be famous.

The PoCSverse What's the Story? 38 of 92

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We created, for instance, accounts on the social media named "Stop Jihadism," and this is [BLEEP], like they did not understand anything. And I did understand why we are so bad. It's just because in France we don't know how to write TV series properly.

### [BROOKE LAUGHS]

Just because we have no imagination, we cannot just tell beautiful stories, create beautiful characters, beautiful heroes.

And this is what we have to do because in our world, in our societies what do people want? They want to become heroes. They want to be famous. They want to be, to be recognized.

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### Stories make us do all kinds of things: The Comet Ping Pong Gunman Answers Our Reporter's Questions:



According to court documents, Mr. Welch said he had come armed to help rescue the children." The PoCSverse What's the Story? 39 of 92

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### Stories make us do all kinds of things: The Comet Ping Pong Gunman Answers Our Reporter's Questions:



According to court documents, Mr. Welch said he had come armed to help rescue the children."

" "The intel on this wasn't 100 percent," he said."

3

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### Stories make us do all kinds of things: The Comet Ping Pong Gunman Answers Our Reporter's Questions:



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- Table 284
- According to court documents, Mr. Welch said he had come armed to help rescue the children."
- 🚓 " "The intel on this wasn't 100 percent," he said."
- He said he did not believe in conspiracy theories, but then added that the Sept. 11, 2001, attacks needed to be re-examined. He has listened to Alex Jones, whose radio show traffics in conspiracy theories and who once said that Mrs. Clinton "has personally murdered and chopped up" children. "He's a bit eccentric," Mr. Welch said. "He touches on some issues that are viable but goes off the deep end on some things." "

### The Attack on the United States Capitol



Photo: Evelyn Hockstein for The Washington Post

Washington Post's massive analysis C Red Flags, Bloodshed, Contagion

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### The Attack on the United States Capitol



Photo: Evelyn Hockstein for The Washington Post

### Washington Post's massive analysis Red Flags, Bloodshed, Contagion

### Senate Chaplain Barry Black:

"These tragedies have reminded us that words matter, and that the power of life and death is in the tongue." The PoCSverse What's the Story? 40 of 92

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# Massive informational misdirection as a cognitive denial of story:



"How the Chinese government fabricates social media posts for strategic distraction, not engaged argument" King, Pan, and Roberts, American Political Science Review, , , Forthcoming.<sup>[15]</sup>

🚳 Make the truth a needle in a haystack

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# Massive informational misdirection as a cognitive denial of story:



"How the Chinese government fabricates social media posts for strategic distraction, not engaged argument" King, Pan, and Roberts, American Political Science Review, , , Forthcoming.<sup>[15]</sup> The PoCSverse What's the Story? 41 of 92

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### 🚳 Make the truth a needle in a haystack

Trump's Reality Distortion Field C, http://www.onthemedia.org



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"How the Chinese government fabricates social media posts for strategic distraction, not engaged argument" King, Pan, and Roberts, American Political Science Review, , , Forthcoming.<sup>[15]</sup> The PoCSverse What's the Story? 41 of 92

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References

### 🙈 Make the truth a needle in a haystack

- Trump's Reality Distortion Field C, http://www.onthemedia.org C
- Surkov turned Russian politics into a bewildering constantly changing piece of theater. He sponsored all kinds of groups, ...no one was sure what was real or fake. ...it is a strategy of power that keeps any opposition constantly confused."



# Stories generated the first surveillance state:

#### The PoCSverse What's the Story? 42 of 92

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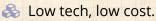
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## l saw that. - GOD

# Stories generated the first surveillance state:

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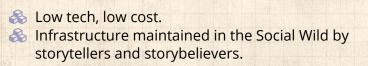
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I saw that.



# Stories generated the first surveillance state:

I saw that.

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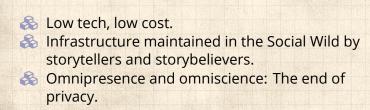
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## Defend the Story: The Ten Commandments:

I am the LORD thy God No other gods before me No graven images or likenesses Not take the LORD's name in vain

Remember the sabbath day

Honour thy father and thy mother Thou shalt not kill Thou shalt not commit adultery Thou shalt not steal Thou shalt not bear false witness Thou shalt not covet The PoCSverse What's the Story? 43 of 92 Storytellers Stories Power

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### **Operating systems:**

Windows: "No other installations before me"



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### **Operating systems:**

Windows: "No other installations before me"

### Propaganda

"If you're looking to understand what's actually happening in this country, always assume the opposite of whatever they're telling you on the big news stations," — Tucker Carlson



### Defend your mind:

If a storyverse—whether it be through storytellers, groups, books, movies-tells you that all other stories are wrong, then that storyverse is false.

### The PoCSverse What's the Story? 44 of 92

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### Book (story) burning C (451 °F)



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### 🚳 The story that anyone can become King or Queen.



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The story that anyone can become King or Queen.
 Story of individual, not the collective.



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- 🚳 The story that anyone can become King or Queen.
- line story of individual, not the collective.
- 🚳 But we know about fame and success:



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- 🗞 The story that anyone can become King or Queen.
- line story of individual, not the collective.
- But we know about fame and success: The presence of outsized fame in a social system means social imitation is a driver of value.



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- 🗞 The story that anyone can become King or Queen.
- 🗞 Story of individual, not the collective.
- But we know about fame and success: The presence of outsized fame in a social system means social imitation is a driver of value.
- Stories of societies can only hold if they have been and remain believable.

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- 🗞 The story that anyone can become King or Queen.
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- But we know about fame and success: The presence of outsized fame in a social system means social imitation is a driver of value.
- Stories of societies can only hold if they have been and remain believable.
- "Entertaining beliefs in economic mobility": Effort to understand if rags to riches stories in popular culture affect people's lives. [14]

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# If not Trump, what? C, David Brooks, New York Times, 2016-04-29:

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## If not Trump, what? C, David Brooks, New York Times, 2016-04-29:

"We'll probably need a new national story.



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### If not Trump, what? C, David Brooks, New York Times, 2016-04-29:

"We'll probably need a new national story. Up until now, America's story has been some version of the rags-to-riches story, The PoCSverse What's the Story? 47 of 92

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### If not Trump, what? C, David Brooks, New York Times, 2016-04-29:

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"We'll probably need a new national story. Up until now, America's story has been some version of the rags-to-riches story, the lone individual who rises from the bottom through pluck and work. But that story isn't working for people anymore, The PoCSverse What's the Story? 47 of 92

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"We'll probably need a new national story. Up until now, America's story has been some version of the rags-to-riches story, the lone individual who rises from the bottom through pluck and work. But that story isn't working for people anymore, especially for people who think the system is rigged." The PoCSverse What's the Story? 47 of 92

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"We'll probably need a new national story. Up until now, America's story has been some version of the rags-to-riches story, the lone individual who rises from the bottom through pluck and work. But that story isn't working for people anymore, especially for people who think the system is rigged."

"I don't know what the new national story will be,

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"We'll probably need a new national story. Up until now, America's story has been some version of the rags-to-riches story, the lone individual who rises from the bottom through pluck and work. But that story isn't working for people anymore, especially for people who think the system is rigged."

"I don't know what the new national story will be, but maybe it will be less individualistic and more redemptive. Power Taxonomy Essence Emotional Arcs Moving ahead References

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"I don't know what the new national story will be, but maybe it will be less individualistic and more redemptive. Maybe it will be a story about communities that heal those who suffer from addiction, broken homes, trauma, prison and loss, a story of those who triumph over the isolation, social instability and dislocation so common today." Stories Power Taxonomy Essence Emotional Arcs Moving ahead References

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Enormous disasters: Fabrications of real experiences.

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- Enormous disasters: Fabrications of real experiences.
  - Plain old making stuff up: A million little pieces

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- Enormous disasters: Fabrications of real experiences.
  - Plain old making stuff up: A million little pieces ... Oprah will get you.

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- Enormous disasters: Fabrications of real experiences.
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  - Vikipedia's has a list of famous fake memoirs .

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- Enormous disasters: Fabrications of real experiences.
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      #kudos
  - Self-plagiarism and more standard badness: Jonah Lehrer .

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Amazingly: Made up Bob Dylan quotes.

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Amazingly: Made up Bob Dylan quotes.

- Lance Armstrong. Also got to meet Oprah.
- Enormous power: Fiction that speaks to real experiences.

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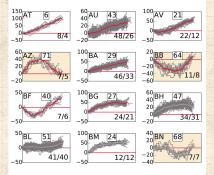
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"The game story space of professional sports: Australian Rules Football" Kiley, Reagan, Mitchell, Danforth, and Dodds. Physical Review E, **93**, 052314, 2016. <sup>[13]</sup>



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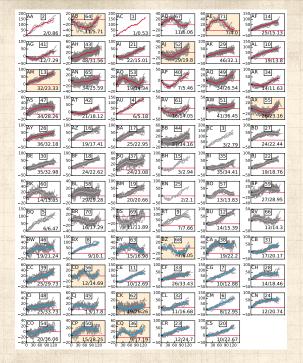
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Sports = Spontaneous story producing systems



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### The story trap 🖸 by Philip Ball, 2015-11-12



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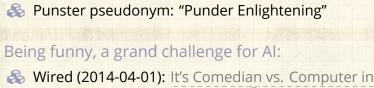
- We use neat stories to explain everything from sports matches to symphonies. Is it time to leave the nursery of the mind?"
- "...we might wonder if the ultimate intelligibility of the universe will be determined not so much by the capacity of our minds to formulate the appropriate concepts and equations, but by whether we can find a meaningful story to tell about it."



Competitive Punning, The Economist, 2017-08-12

The quip and the dread Why English is such a great language for puns

Gamers now even take part in world champunships



a Battle for Humor Supremacy . Myq Kaplan pun-off.

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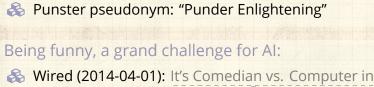
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Pun-free paper title: "Generating Novel Puns and Plays of Word with Machine Learning" The PoCSverse What's the Story? 52 of 92

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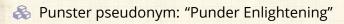
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Competitive Punning, The Economist, 2017-08-12

The quip and the dread Why English is such a great language for puns

Gamers now even take part in world champunships



### Being funny, a grand challenge for AI:

- Wired (2014-04-01): It's Comedian vs. Computer in a Battle for Humor Supremacy C. Myq Kaplan pun-off.
- Pun-free paper title: "Generating Novel Puns and Plays of Word with Machine Learning"
- Warning: This paper may cause the reader to groan to death."

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The "I wonder who wrote this?" Great Man Theory:



"The Power of Myth" **3** C by Campbell and Moyers (1991).<sup>[6]</sup>



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"The Hero with a Thousand Faces" **3**, C by Joseph Campbell (2008). <sup>[5]</sup>



The "I wonder who wrote this?" Great Man Theory:



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"The Hero with a Thousand Faces" **3**, C by Joseph Campbell (2008). <sup>[5]</sup>



Highly influential but it's a trap!



"Save the Cat!" **3** C by Blake Snyder (2005).<sup>[20]</sup>

🚳 9 acts.



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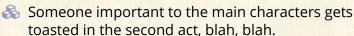
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"Save the Cat!" **3** C by Blake Snyder (2005).<sup>[20]</sup>





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"Save the Cat!" **a** by Blake Snyder (2005). <sup>[20]</sup>





- Someone important to the main characters gets toasted in the second act, blah, blah.
- 🚳 Believes irony is key.



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"Save the Cat!" **a** by Blake Snyder (2005).<sup>[20]</sup>





- Someone important to the main characters gets toasted in the second act, blah, blah.
- Believes irony is key.
- Logline = one or two sentence summary.



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"Save the Cat!" a by Blake Snyder (2005).<sup>[20]</sup>





- Someone important to the main characters gets toasted in the second act, blah, blah.
- Believes irony is key.
- Logline = one or two sentence summary.
- logline fails to be a summary of logline.

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### Seven "good" stories?:



BOOKER &

"The Seven Basic Plots: Why We Tell Stories" **3 C** by Christopher Booker (2005). <sup>[3]</sup>

- Seven Gateways to the Underworld (?)
   Overcoming the Monster ×2 and the Thrilling escape from Death (plot).
- 🚳 Rags to Riches (plot).
- 🚳 The Quest (plot).
- 🗞 Voyage and Return (plot).
- line comedy ×2 (plot but really structure).
- 🗞 Tragedy ×3 (plot).
- 🚳 Rebirth (plot).
- The Dark Power: From Shadow into Light (master structure).

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### The taxonomy of stories:

 ANIMAL TALES 1-299 Wild Animals 1-99 The Clever Fox (Other Animal) 1-69 Other Wild Animals 70-99 Wild Animals and Domestic Animals 100-149 Wild Animals and Humans 150-199 Domestic Animals 200-219 Other Animals and Objects 220-299 TALES OF MAGIC 300-749 Supernatural Adversaries 300-399 Supernatural or Enchanted Wife (Husband) or Other Relative 400-459 Wife 400-424 Husband 425-449 Brother or Sister 450-459 Supernatural Tasks 460-499 Supernatural Helpers 500-559 Magic Objects 560-649 Supernatural Power or Knowledge 650-699 Other Tales of the Supernatural 700-749 RELIGIOUS TALES 750-849 God Rewards and Punishes 750-779 The Truth Comes to Light 780-799 Heaven 800-809 The Devil 810-826 Other Religious Tales 827-849 REALISTIC TALES 850-999 The Man Marries the Princess 850-869 The Woman Marries the Prince 870-879 Proofs of FidelitY and Innocence 880-899 The Obstinate Wife Learns to Obey 900-909 Good Precepts 910-919 Clever Acts and Words 920-929

### Folkloristics:

Academic area formally started around 1900.

Aarne–Thompson classification systems

🚳 Motif-based taxonomy.

Solution

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Computational Folkloristics

"Computational folkloristics" Abello, Broadwell, and Tangherlini, Communications of the ACM, **55**, 60–70, 2012.<sup>[1]</sup>

Motivation: "As a simple, historical example from the Danish materials, no one has yet classified (according to the ATU index) the several thousand fairy tales in the collections of the Danish Folklore Archive (http://www.dafos.dk ), nor does it seem anyone ever will." The PoCSverse What's the Story? 57 of 92

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'Imagine a system in which the complexities of a folklore corpus can be explored at different levels of resolution, from the broad perspective of "distant reading" down to the narrow perspective of traditional "close reading." The PoCSverse What's the Story? 57 of 92

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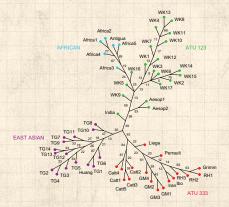
**Emotional Arcs** 

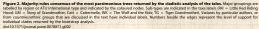
Moving ahead





### "The phylogeny of Little Red Riding Hood" Jamshid J. Tehrani, PLoS ONE, **8**, e78871, 2013.<sup>[21]</sup>





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### Fundamental arcs:



🚳 Kill the Monster.

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### Fundamental arcs:



🙈 Kill the Monster.

🚳 Rags to Riches (and Riches to Rags—Metamophosis).

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### **Fundamental arcs:**



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- 🚳 Romance.

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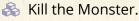
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### Fundamental arcs:



- Rags to Riches (and Riches to Rags—*Metamophosis*).
- Journey/Odyssey: Search for a salvation, a "Holy Grail".
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- Narratives in Left Nullspace: Again, All Stories of The Many.

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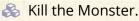
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What about comedies?

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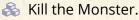
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- Narratives in Left Nullspace: Again, All Stories of The Many.

### What about comedies?

Comedies are not in themselves a story, but a way of telling stories.

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## Stories are algorithms for life: Homo narrativus:

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### Homo narrativus:

Provide dynamic paths and trajectories.

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# Stories are algorithms for life: Homo narrativus:

Provide dynamic paths and trajectories.If this, then that.



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## Stories are algorithms for life: Homo narrativus:

- Provide dynamic paths and trajectories.
- 🚳 If this, then that.
- Convey and reinforce how to behave, how not to behave.

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### Homo narrativus:

- Provide dynamic paths and trajectories.
- 🚳 If this, then that.
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- Full ecology of stories = Competing, self-defending operating system for people's minds.

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- 🚳 "A stitch in time saves nine."

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Proverbs as algorithms (hero: Wolfgang Mieder 🗷):

- "Pride cometh before the fall."
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  - A stitch in time saves nine.
- 🚳 "Look before you leap."

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- 🗞 "A stitch in time saves nine."
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- 🚓 "Anti-aphorism: The one who hesitates is lost."

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- left for the fall."
- 🚳 "A stitch in time saves nine."
- 🚳 "Look before you leap."
- 🚓 "Anti-aphorism: The one who hesitates is lost."
- A Understanding randomness: "Chirt hannons"



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## Hatchings, Matchings, and Dispatchings:

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

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- 🚳 Hatchings, Matchings, and Dispatchings.
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- 🚳 Survival algorithms for individuals and groups.

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

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- 🚳 Hatchings, Matchings, and Dispatchings.
- 🚳 Stories encode survival algorithms.
- 🚳 Survival algorithms for individuals and groups.
- 🚯 Dynamic paths: the true, the possible, the unlikely.

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- 🚳 Hatchings, Matchings, and Dispatchings.
- 🚳 Stories encode survival algorithms.
- 🚳 Survival algorithms for individuals and groups.
- 🚯 Dynamic paths: the true, the possible, the unlikely.
- The unifying theme of existence is existence.

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#### **Emotional Arcs**

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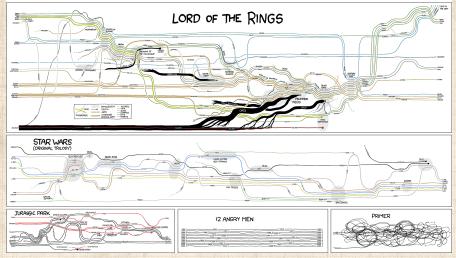
References



Kurt Vonnegut on the Shapes of Stories Longer piece with bonus stories (Metamorphosis and Hamlet).

### Emotional arcs are not plots. Neither are character paths:

THESE CHARTS SHOW MOVIE CHARACTER INTERACTIONS. THE HORIZONTAL AXIS IS TIME. THE VERTICAL GROUPING OF THE LINES INDICATES WHICH CHARACTERS ARE TOGETHER AT A GIVEN TIME.



https://xkcd.com/657/



# "Plotted: A Literary Atlas" **3** C by Andrew DeGraff (2015).<sup>[9]</sup>





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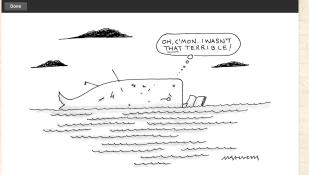
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http://www.andrewdegraff.com/moviemaps/



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The New Yorker, December 16, 2013, p. 56.

### Ron Swanson on metaphors:

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"I hate metaphors. That's why my favorite book is Moby Dick. No frou-frou symbolism.

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#### The PoCSverse What's the Story? 67 of 92

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"I hate metaphors. That's why my favorite book is Moby Dick. No frou-frou symbolism. Just a good, simple tale about a man who hates an animal." Aside: From a 2013 Believer Magazine C interview with Maurice Sendak C:

BLVR: Did the success of Where the Wild Things Are ever feel like an albatross?

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# Aside: From a 2013 Believer Magazine C interview with Maurice Sendak C:

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🗞 Sendak named his dog Herman.

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The essential (true) Colbert interview: Pt. 1 and Pt. 2 .



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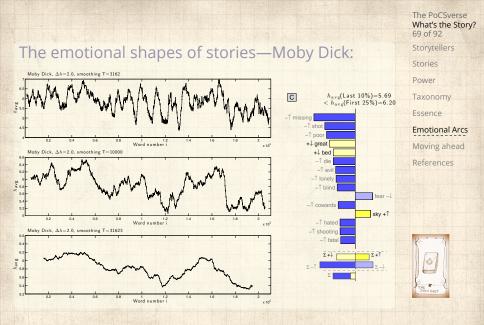
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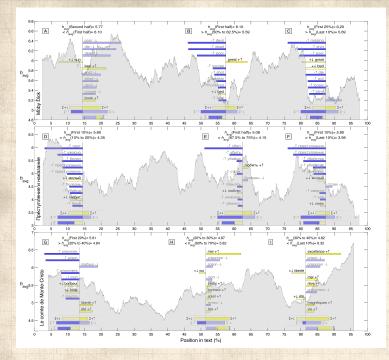
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# Online, interactive Emotional Shapes of Stories **7** for 10,000+ books:

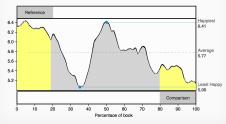
# Frankenstein; Or the Modern Prometheus (wiki)

Search Gutenberg Corpus	by Title 🗸	Classics -	Harry Potter -	Random

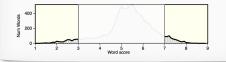
by Mary Shelley

#### Book happiness time series:

Explore the work's emotional dynamics by sliding and resizing the reference and comparison sections.



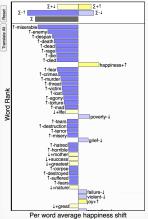
Lens (for advanced users): Slide and resize the stop-window to change the lens:



#### Word Shift:

Why comparison section is less happy than the reference one Reference sections's happiness = 6.31

Comparison section's happiness = 5.35



# Online, interactive Emotional Shapes of Stories **7** for 10,000+ books:

### Harry Potter (all books together)

Search Gutenberg Corpus

by Title -	Classics -	Harr
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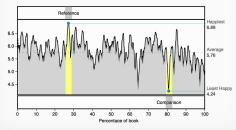
s - Harry Potter -

Random

by J.K. Rowling

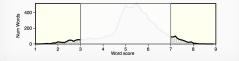
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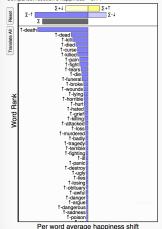
#### Lens (for advanced users):

Slide and resize the stop-window to change the lens:



#### Word Shift:

Why comparison section is less happy than the reference one Reference sections's happiness = 6.13Comparison section's happiness = 5.14



### Online, interactive Emotional Shapes of Stories C for 1,000+ movie scripts: Pulp Fiction

Search Movies

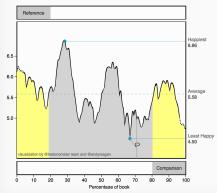
Classics -

Team Picks - Random

directed by Quentin Tarantino

#### Movie happiness time series:

Explore the work's emotional dynamics by sliding and resizing the reference and comparison sections.



#### Movie script:

Portion of script scored for each point in timeseries.

Zed takes the chair, sits it in front of the two prisoners, then lowers into it. Maynard hands The Gimp's leash to Zed, then backs away.

MAYNARD

(to The Gimp) Down!

The Gimp gets on its knees.

Maynard hangs back while Zed appraises the two men.

MAYNARD Who's first?

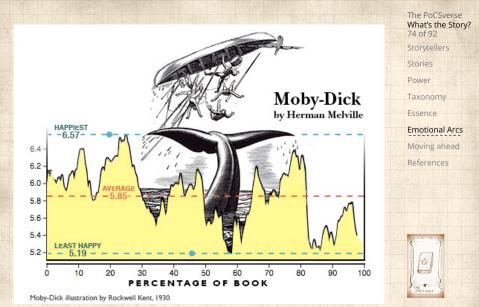
ZED I ain't fer sure yet.

Then with his little finger, Zed does a silent "Benie, meany, miney, moe..." just his mouth mouthing the words and his finger going back and forth between the two.

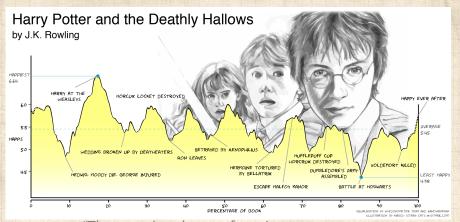
Butch are Marsellus are terrified.

Maynard looks back and forth at the victims.

The Gimps's eyes go from one to the other inside the mask.



http://whyfiles.org/2015/in-10-languages-happy-words-beat-sad-ones/



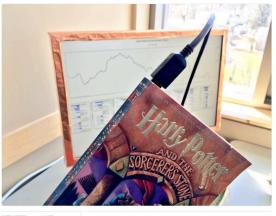


"The emotional arcs of stories are dominated by six basic shapes" Reagan, Mitchell, Danforth, Dodds, and Dodds. EPJ Data Science, **5**, 31, 2016. <sup>[18]</sup>



Ö Following

USB in a book? What is this wizardry? Check it out at the Student Research Conference creative lounge. #<u>uvmresearch</u>



RETWEETS LIKES 😹 🔝 🔰 👔 🕼 📾 🎼 14 8

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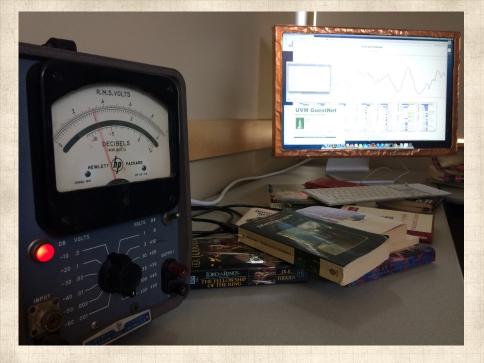
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9:30 AM - 28 Apr 2016



### Harry Potter and the Chamber of Plot Devices:

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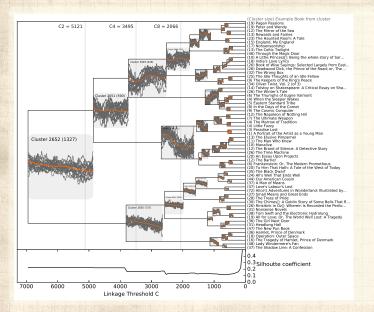
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### Emotional arcs for 1748 books from gutenberg.org



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## Another Great Moment in being Andy Reagan:

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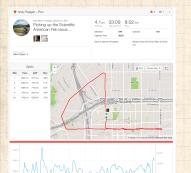
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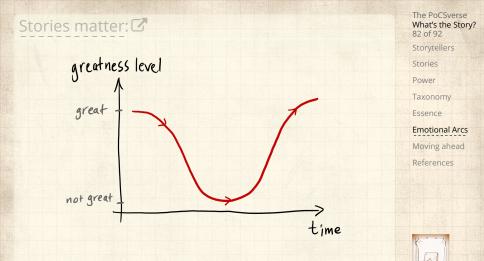
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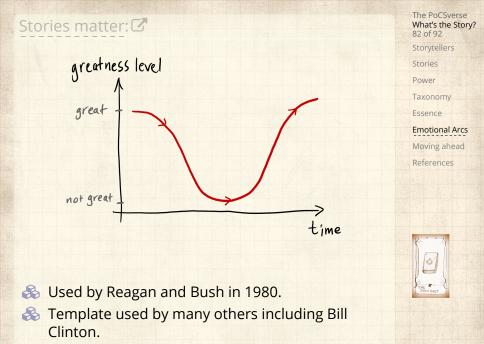


Mode	Mode Arc	$N_m$	$N_m/N$	DL Median ▼	DL Mean $\triangledown$	DL Variance	Download Distribution
SV 1		263	15.1%	295.0	644.3	2207201	าให้หลางการการการการการการการการการการการการการก
-SV 1	$\sim$	442	25.3%	337.5	636.0	913464	In minimum
SV 2	$\sim$	230	13.2%	314.0	630.3	1058916	
-SV 2	$\sim$	169	9.7%	296.0	569.1	780365	hitten
SV 3	$\sim$	104	6.0%	298.0	874.5	7826797	Minna.
-SV 3	$\sim \sim$	108	6.2%	298.0	748.7	2517822	Million
SV 4	$\sim$	108	6.2%	316.0	848.8	2763060	Mhandan
-SV 4	$\sim$	50	2.9%	292.0	770.7	1546202	didama
SV 5	$\sim \sim$	48	2.7%	280.0	421.7	182443	
-SV 5	$\sim \sim$	48	2.7%	263.5	462.0	211259	

FIG. 6: Download statistics for SVD Modes with more than 2.5% of books. Modes SV 3 through -SV 4 (both polarities of modes 3 and 4) exhibit a higher average number of downloads and more variance than the rest.



🚳 Used by Reagan and Bush in 1980.



A Science of Stories? Stories are everything & Probably, yes.

### We talk about and study stories everywhere but ...

- line a central place academically.
- Departments of: English, political science, folklore, cognitive sciences, arts, musicology, communication, ...

### Organizing structure going forward:

- PLOS One foundational paper and collection<sup>4</sup>
- Annual meeting?
- SOCKS: Study of Online Collective Knowledge and Stories

<sup>4</sup>the journal formerly known as PLoS ONE

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### Observations/Claims/Questions:

- Primacy of storytelling and storybelieving in for individuals and populations.
- Maybe: Stories are dynamical paths; plots are algorithms that give rise to stories.
- Internet gives extraordinary power to propaganda, disinformation C, conspiracy theories, ...
- Solution of the second second
  - Failure can be endogenous (infighting) and/or ignited/supported from the outside.

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### Observations/Claims/Questions:

- Basic social fabric: What is the spectrum of stories in the media being told about classes of people, from within and without.
- 🚳 Story decoherence: telephone game
- What about stories about global problems like climate change? Government? Journalism?
  - All separately powerful: Words, Music/Sound, Visual, ... interplay?
- Outcome: How to communicate scientific findings powerfully.

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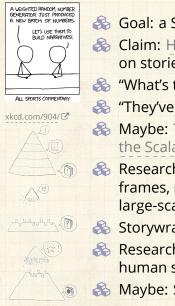
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### Understanding the Sociotechnocene—Stories:



Goal: a Science of Stories. 🗞 Claim: Homo narrativus 🗹 — we run on stories. 🚳 "What's the John Dory?" 🍪 "They've lost the plot/thread" Maybe: The narrative hierarchy and the Scalability of stories C. Research: Extraction of metaphors, frames, narratives, and stories from large-scale text/corpora. Storywrangler, POTUSometer, ... Research: What's the taxonomy of human stories? Maybe: Stories  $\leftrightarrow$  Algorithms

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