

# a difficult crossing

how complex systems can help social research

Tommaso Venturini

Associate Professor, Université de Genève, Medialab  
Researcher, CNRS, Center for Internet and Society

[tommasoventurini.it](http://tommasoventurini.it)

Conte et al., 2012. *Manifesto of computational social science*  
*European Physical Journal: Special Topics*, 214(1)

Part of the difficulty for us to respond to the challenges mentioned above is inherent to **fundamental features of social complexity**.

Complex social systems are

1. characterised by **multiple ontological levels with multidirectional connections**...
2. ... present a **far-reaching and accelerated diffusion of phenomena**, behaviours and cultural traits...
3. ... often show **interdependences and interferences** among their properties and processes of transformation.

# The problem of social complexity

Conte et al., 2012. **Manifesto of computational social science**  
*European Physical Journal: Special Topics*, 214(1)

Information and communication technologies can greatly enhance the possibility to uncover the laws of the society.

- First, **ICT produces a flood of data**. These data represent traces of almost all kinds of activities of individuals enabling an entirely new scientific approach for social analysis.
- Second, the **development of computer capacities makes it possible to handle the data deluge** and to invent models that reflect the diversity and complexity of the society.

What complex systems are  
supposed to Bring to the Table

Conte et al., 2012. *Manifesto of computational social science*  
*European Physical Journal: Special Topics*, 214(1)

In view of this, it is clear that naive or brute-force incorporation of large-scale data into simulation models may not lead to the expected results in terms of achieving relevant progress in social science.

The relation between social simulation and theoretical understanding is still problematic. Thus, simulations must be accompanied by micro-macro-loop theories, i.e., theories of mechanisms at the individual level that affect the global behavior, and theories of loop-closing downward effects or second-order emergence.

What social sciences are  
supposed to Bring to the Table



Traag, V., & Franssen, T. (2016).

## Revealing the quantitative-qualitative divide in sociology using bibliometric visualization

We find that research topics are intimately tied to their methods.

The universe of quantitative sociology consists of terms like "survey", "data" and "scale" but also of "socioeconomic status", "women", "men" and "career".

The universe of qualitative sociology consists of terms such as "discourse", "practice" and "meaning" but also of "power", "identity" and "masculinity".

From quali/quant to micro/macro

Latour, B., Jensen, P., Venturini, et al. (2012).

*The whole is always smaller than its parts*

*British Journal of Sociology, 63(4)*

This is where the two-level argument begins to take hold: one for the parts, another for the whole.

It will seem irresistible to argue that to define general features, one should look at the level of structures; if one wishes to look at specificity, go to the level of individuals.

But in effect, this distribution of roles between levels is a consequence of the type of technology used for navigating inside datasets.

From quali/quantitative to micro/macro

# quali/quantitative divide

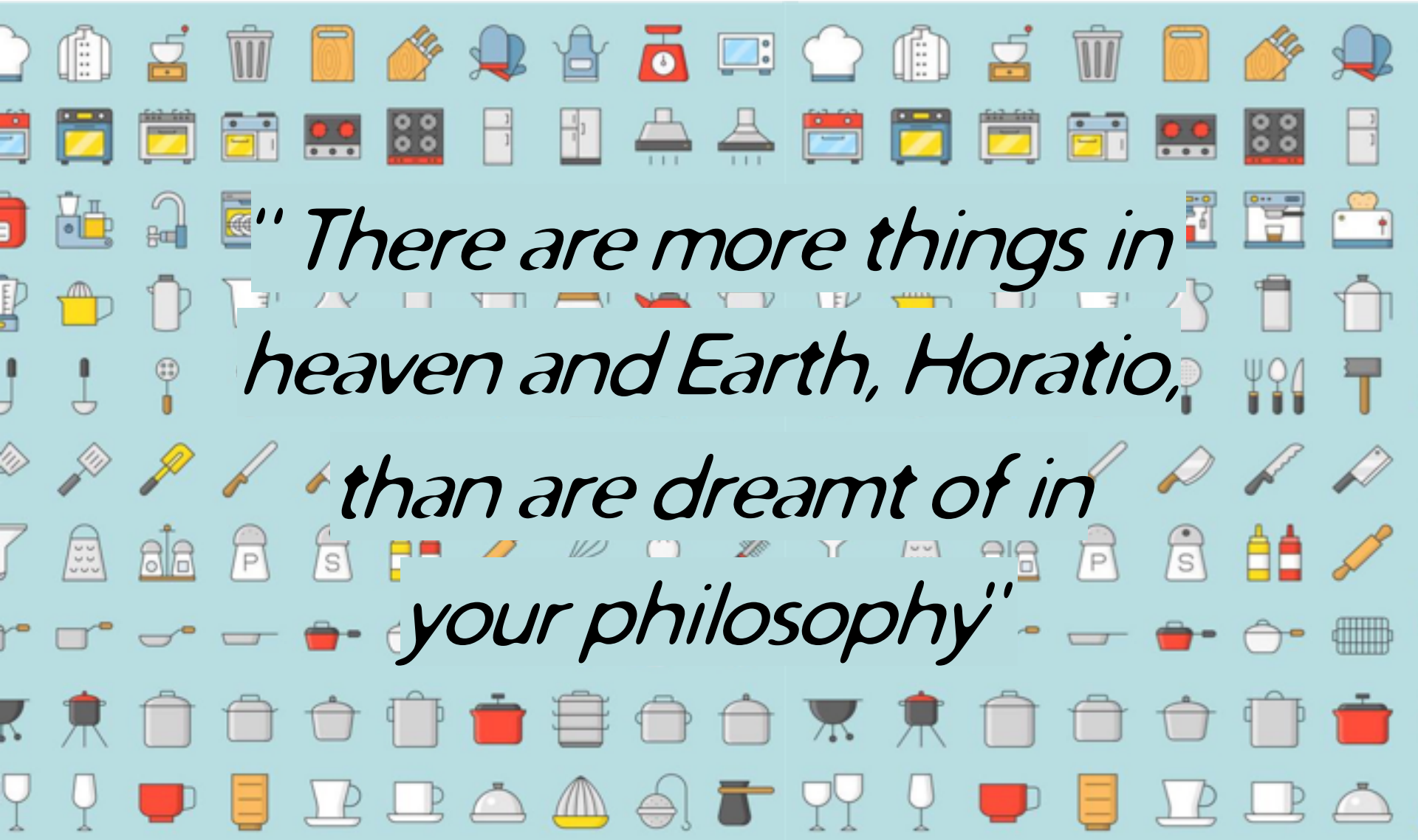


## mixed methods



Yes, this makes sense, but ...





*"There are more things in  
heaven and Earth, Horatio,  
than are dreamt of in  
your philosophy"*

... I think we can do better  
(if you help us)

## Hamlet, Act 1, Scene 5

**HORATIO:**

O day and night, but this is wondrous strange!

**HAMLET:**

And therefore as a stranger give it welcome.

**There are more things in heaven and earth,  
Horatio, Than are dreamt of in your  
philosophy.**

But come; Here, as before, never, so help you  
mercy, How strange or odd soe'er I bear  
myself...



On embracing weirdness and acting weird





Cross here?

Quantitative  
methods

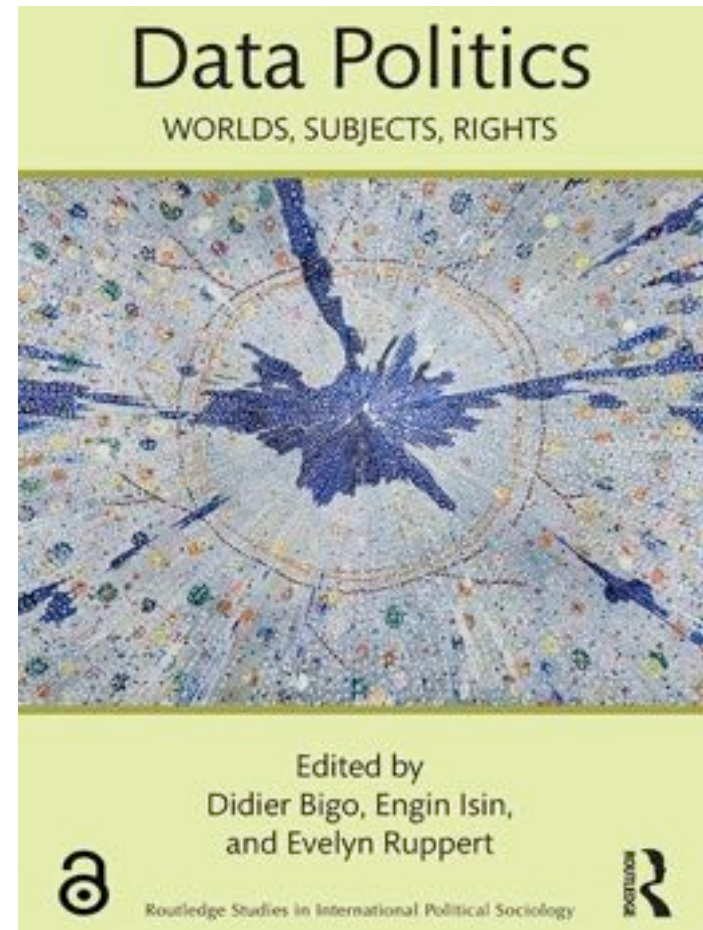
Qualitative  
methods

Or here?





Bounegru, Jonathan, Venturini, Mauri  
*A Field Guide to "Fake News"  
 and other Information Disorders*  
 Amsterdam, Public Data Lab, 2018



Venturini Tommaso  
*From Fake to Junk News,  
 the Data Politics of Online Virality*  
 dans D. Bigo, E. Isin et E. Ruppert (dir.),  
*Data Politics: Worlds, Subjects, Rights,*  
 London, Routledge, 2019

McLuhan, Marshall. 1964

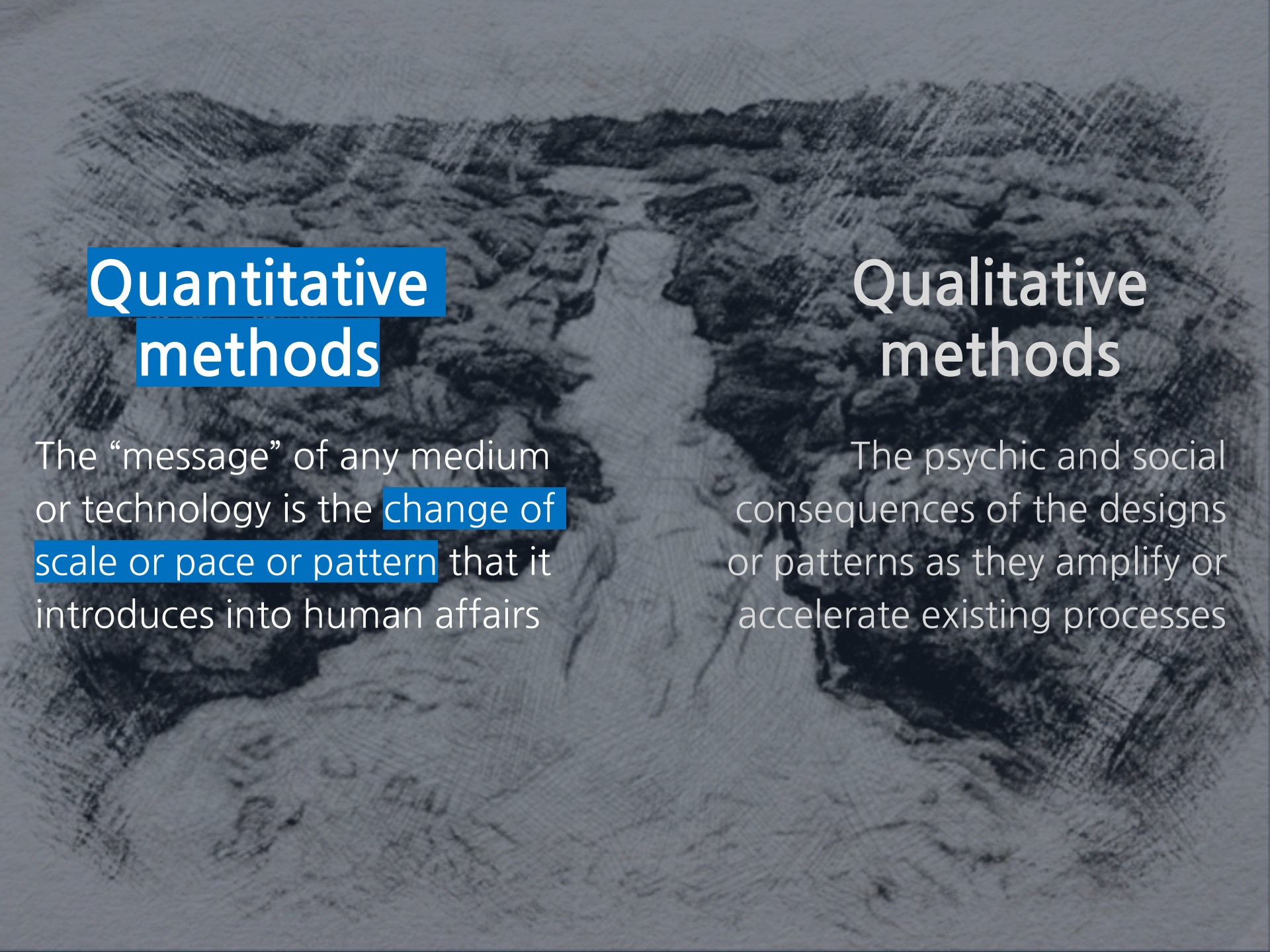
*Understanding Media: The Extensions of Man*

The “message” of any medium or technology is the **change of scale or pace or pattern** that it introduces into human affairs

What we are considering here are the **psychic and social consequences** of the designs or patterns as they amplify or accelerate existing processes.

The acceleration of media  
and its consequences





## Quantitative methods

The “message” of any medium or technology is the **change of scale or pace or pattern** that it introduces into human affairs

## Qualitative methods

The psychic and social consequences of the designs or patterns as they amplify or accelerate existing processes

Computer Science > Social and Information Networks

[Submitted on 19 Apr 2020]

# Junk News Bubbles: Modelling the Rise and Fall of Attention in Online Arenas

Maria Castaldo, Tommaso Venturini, Paolo Frasca

In this paper, we present a type of media disorder which we call "junk news bubbles" and which derives from the effort invested by online platforms and their users to identify and share contents with rising popularity. Such emphasis on trending matters, we claim, can have two detrimental effects on public debates: first, it shortens the amount of time available to discuss each matter; second it increases the ephemeral concentration of media attention. We provide a formal description of the dynamic of junk news bubbles, through a mathematical exploration the famous "public arenas model" developed by Hilgartner and Bosk in 1988. Our objective is to describe the dynamics of the junk news bubbles as precisely as possible to facilitate its further investigation with empirical data.

Comments: Submitted as journal publication  
Subjects: **Social and Information Networks (cs.SI)**  
Cite as: [arXiv:2004.08863 \[cs.SI\]](#)  
(or [arXiv:2004.08863v1 \[cs.SI\]](#) for this version)

## Download:

- [PDF only](#)  
(license)

Current browse context:  
**cs.SI**

[< prev](#) | [next >](#)  
[new](#) | [recent](#) | [2004](#)

Change to browse by:  
[cs](#)

## References & Citations

- [NASA ADS](#)
- [Google Scholar](#)
- [Semantic Scholar](#)

[Export citation](#)

## Bookmark



# Junk News Bubbles

an attention regime in which

- few items attracts large shares of collective attention
- but are incapable of sustaining it for a long time



# The Rise and Fall of Social Problems: A Public Arenas Model<sup>1</sup>

Stephen Hilgartner  
*Columbia University*

Charles L. Bosk  
*University of Pennsylvania*

This paper develops a model of the process through which social problems rise and fall. Treating public attention as a scarce resource, the model emphasizes competition and selection in the media and other arenas of public discourse. Linkages among public arenas produce feedback that drives the growth of social problems. Growth is constrained by the finite "carrying capacities" of public arenas, by competition, and by the need for sustained drama. The tension between the constraints and forces for growth produces successive waves of problem definitions, as problems and those who promote them compete to enter and to remain on the public agenda. Suggestions for empirical tests of the model are specified.

In its most schematic form, our model has six main elements:

2. the institutional arenas that serve as "environments" where social problems compete for attention and grow;
3. the "carrying capacities" of these arenas, which limit the number of problems that can gain widespread attention at one time;
4. the "principles of selection," or institutional, political, and cultural factors that influence the probability of survival of competing problem formulations;
1. a dynamic process of competition among the members of a very large "population" of social problem claims;<sup>5</sup>
5. patterns of interaction among the different arenas, such as feedback and synergy, through which activities in each arena spread throughout the others; and
6. the networks of operatives who promote and attempt to control particular problems and whose channels of communication crisscross the different arenas.

Hilgartner, S. & Bosk, C. 1988  
The Rise and Fall of Social Problems: A Public Arenas Model  
*American Journal of Sociology* 94 (1)

Popularity ( $\pi$ ) of each issues (i) is incremented at each time (t) by

its increment of t-1 multiplied by  $\alpha$

$x \sim \mathcal{N}(0, 1/2n)$   
plus a random factor (x)

$$\hat{\pi}_{t+1}^i = \max(\underbrace{\pi_t^i}_{\text{current popularity}} + \underbrace{\alpha(\pi_t^i - \pi_{t-1}^i)}_{\text{trend increment}}, \underbrace{x}_{\text{random factor}})$$

1. Boost of trending topics

If negative, the new popularity is set to zero

2. No negative attention

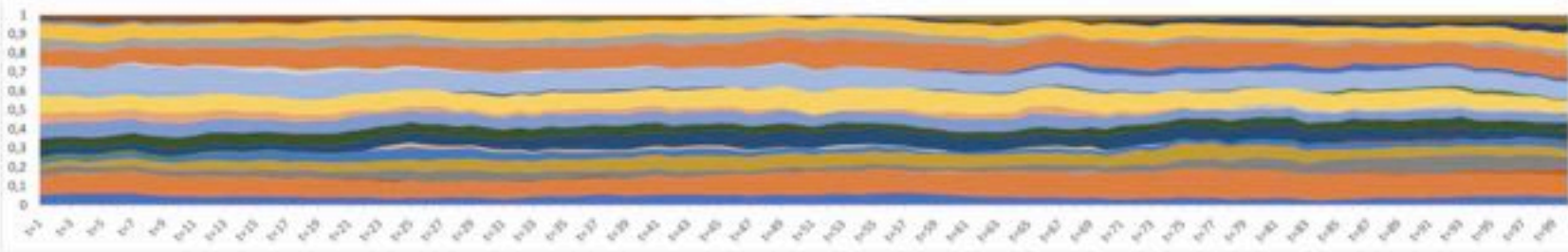
$$\pi_t^i = \frac{\hat{\pi}_t^i}{\sum_j \hat{\pi}_t^j}$$

After increment, the popularity ( $\pi$ ) of each item (i) is divided by the sum of all popularities so that they sum is always 1

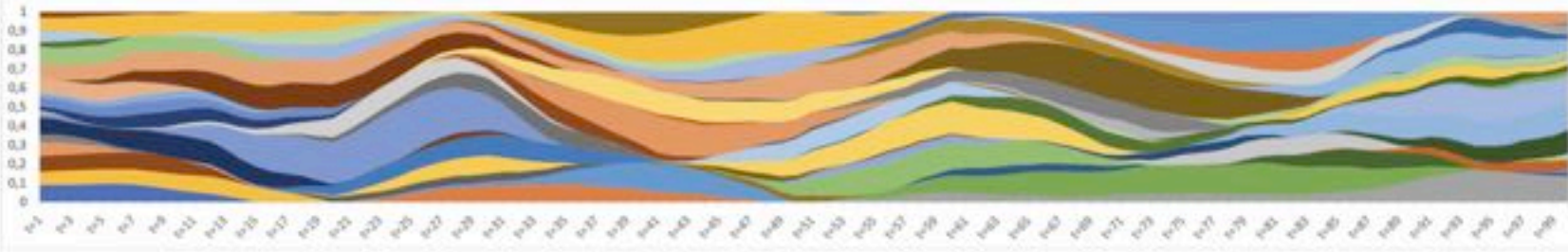
3. Inelasticity of total attention

A junk news bubble toy-model

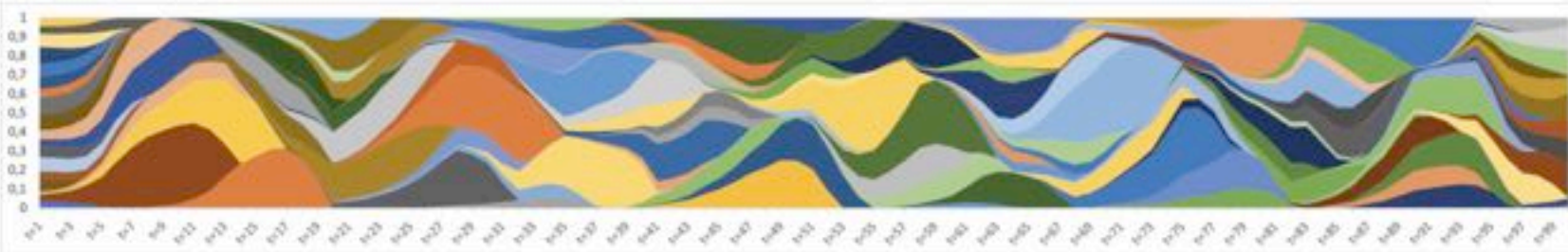
$\alpha = 0$



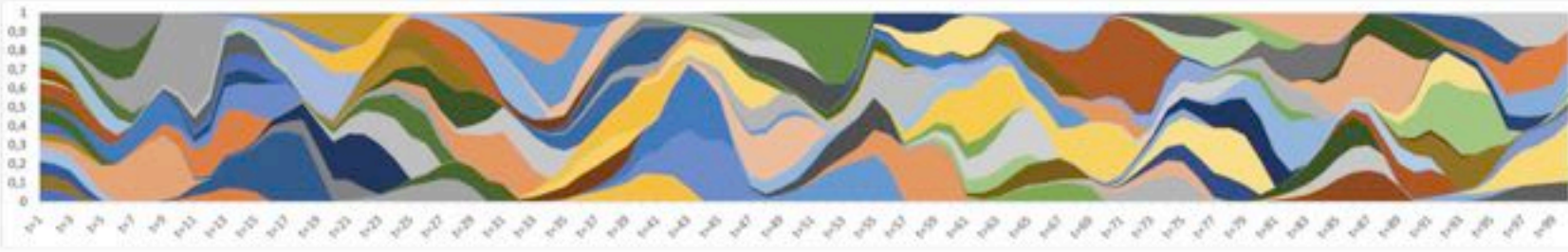
$\alpha = 1$



$\alpha = 2$



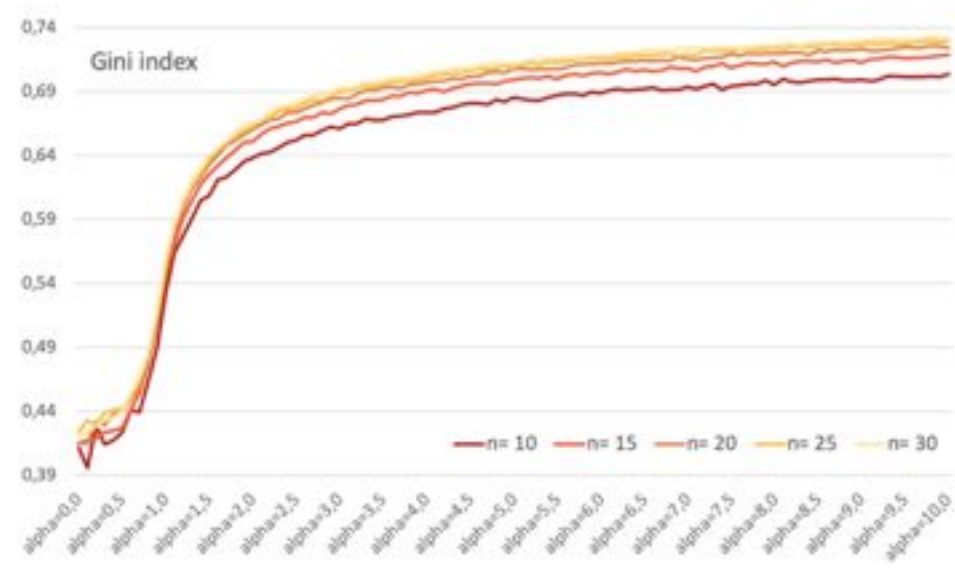
$\alpha = 3$



The consequences of trendiness



more ephemerality



more concentration

The consequences of trendiness



Covington, Jay, and Emre, 2016  
Deep Neural Networks for YouTube  
Recommendations  
*Proceedings of the 10th ACM  
Conference on Recommender Systems*

We consistently observe that users prefer fresh content, though not at the expense of relevance. In addition to the first-order effect of simply recommending new videos that users want to watch, there is a critical secondary phenomenon of bootstrapping and propagating viral content.

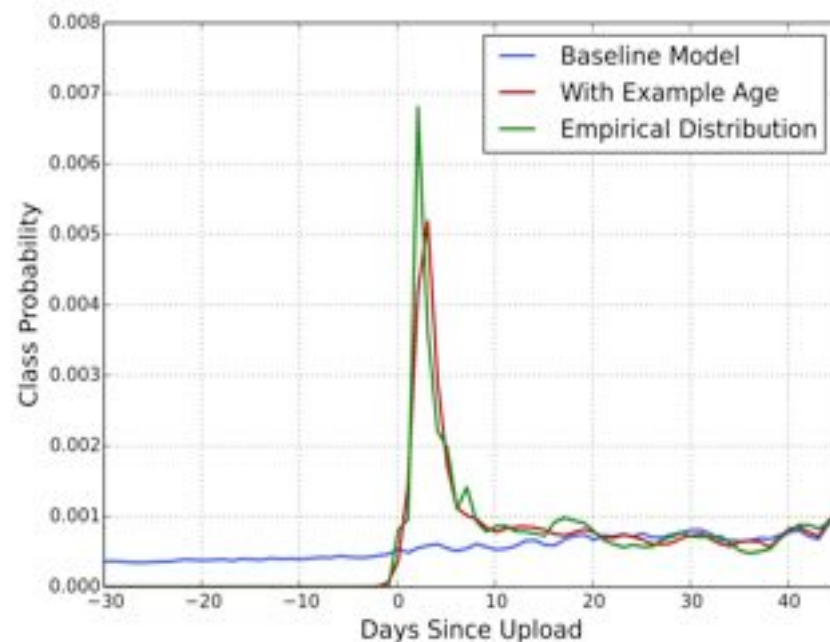
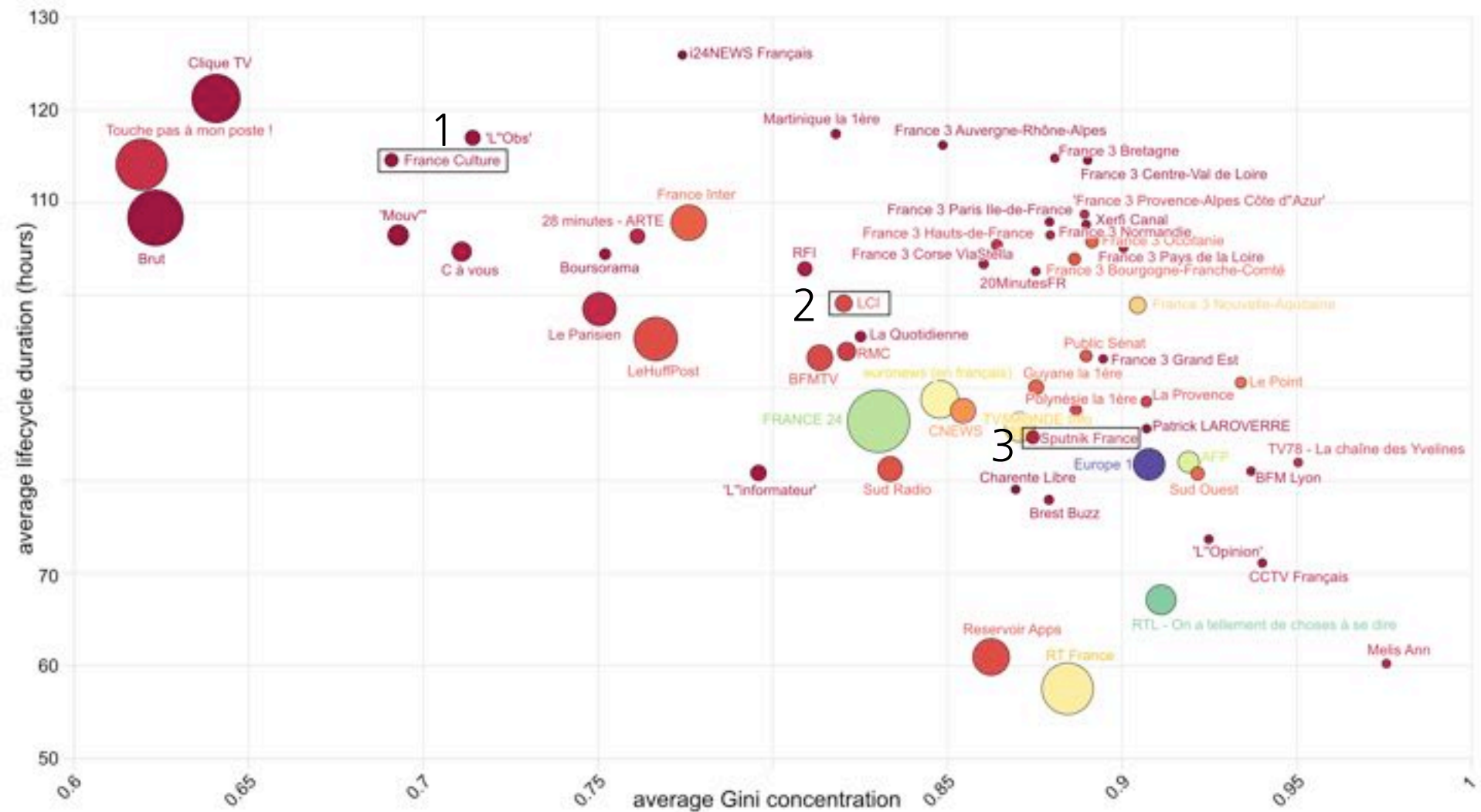
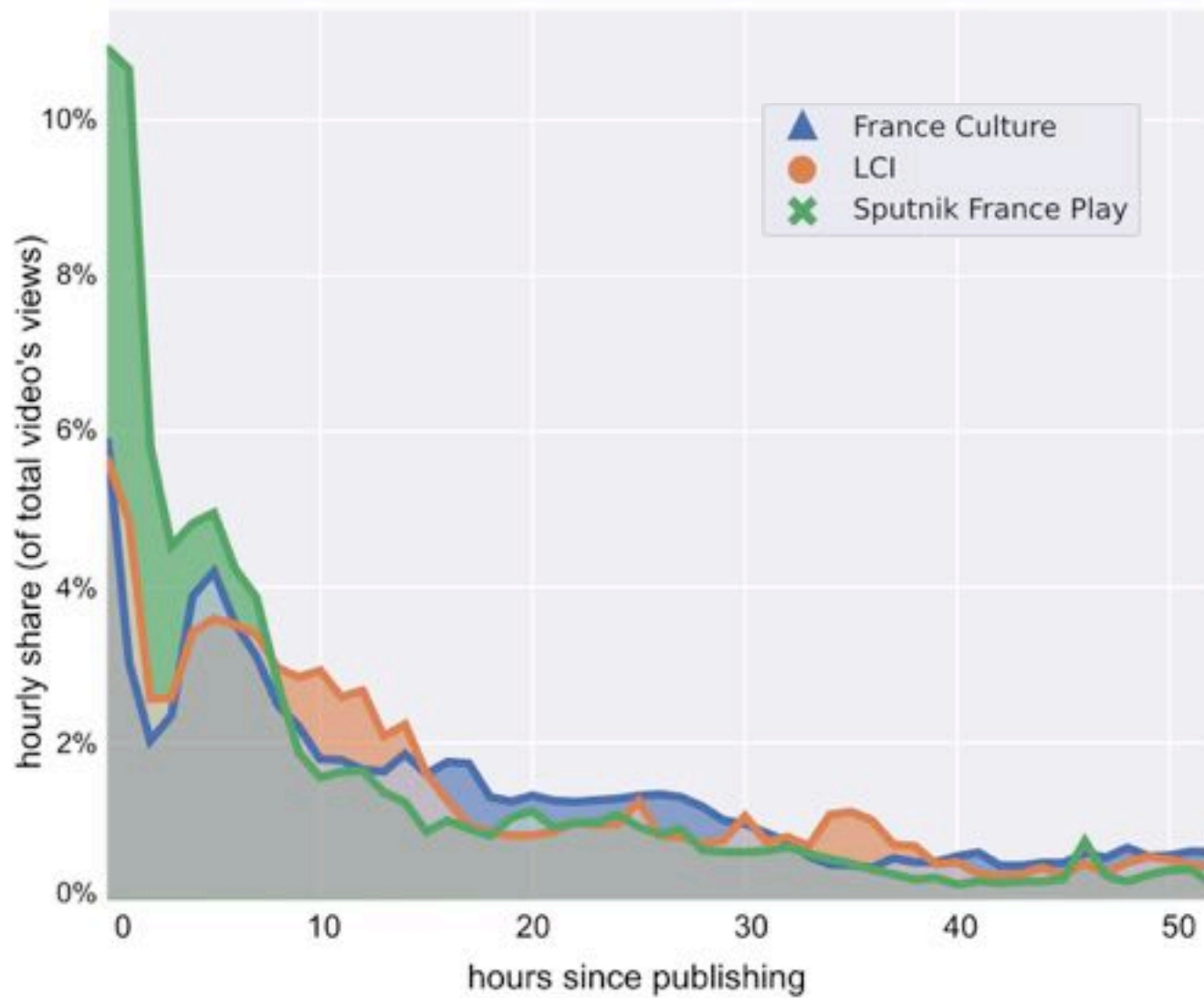


Figure 4: For a given video [26], the model trained with example age as a feature is able to accurately represent the upload time and time-dependant popularity observed in the data. Without the feature, the model would predict approximately the average likelihood over the training window.

Some second-hand evidence



Some empirical evidence



Three cherry-picked channels





## Quantitative methods

The “message” of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs

## Qualitative methods

The **psychic and social consequences** of the designs or patterns as they amplify or accelerate existing processes



## Article Menu

Close ^

Access Options



Full Article

Content List

Abstract

State of the Art: The Deaf Spot of  
Online Conspiracy

Hypothesis: Online Vernacular

Figures & Tables

Article Metrics

## Online Conspiracy Theories, Digital Platforms and Secondary Orality: Toward a Sociology of Online Monsters

Tommaso Venturini

First Published March 5, 2022 | Research Article



<https://doi.org/10.1177/02632764211070962>

Article information ▾

Altmetric

3



### Abstract

Reviving the somewhat forgotten notion of 'secondary orality', this paper conceptualizes online conspiracism as a creative, if monstrous, response to the attention economy of social media. Combining classic literature on oral cultures and current research on online subcultures, this paper takes conspiratorial folklore seriously and develops a program of research into its features and into its surprising adaptation to the attention regime of digital media.

### Keywords

4chan, attention cycles, conspiracy theories, secondary orality, vernacular web

Article available in:

OnlineFirst

Related Articles

Articles Citing This One:

Online Conspiracy Theories, Digital  
Platforms and Secondary Orality  
*Theory, Culture & Society*

Ong, Walter S. J. 1982.

*Orality and Literacy - The Technologizing of the Word*

Contrasts between electronic media and print have sensitized us to the earlier contrast between writing and orality. The electronic age is also an age of 'secondary orality', the orality of telephones, radio, and television, which depends on writing and print for its existence. (p. 2)

Sound exists only when it is going out of existence. It is not simply perishable but essentially evanescent, and it is sensed as evanescent. When I pronounce the word 'permanence', by the time I get to the 'pence', the 'perma-' is gone, and has to be gone. (pp. 31, 32).

Oral cultures and ephemerality

Ong, Walter S. J. 1982. *Orality and Literacy*

This new orality has resemblances to the old in its participatory mystique, communal sense, its concentration on the present moment, and even its use of formulas. (p. 133)

- Redundant or 'copious'
- Agonistically toned
- Empathetic and not objectively distanced
- Aggregative rather than analytic
- Additive rather than subordinate
- Close to the human lifeworld
- Situational rather than abstract
- Homeostatic
- Conservative or traditionalist

McLuhan, Marshall. 1964.

*Understanding Media:  
The Extensions of Man*

Radio provides a speed-up of information that also causes acceleration in other media. It certainly contracts the world to village size, and creates an insatiable village tastes for gossip, rumor, and personal malice (p. 306)

Features of secondary orality  
and features of online debate

# non-quali/quantitative methods

The “message” of any medium or technology is the **change of scale or pace or pattern** that it introduces into human affairs

The **psychic and social consequences** of the designs or patterns as they amplify or accelerate existing processes



a difficult crossing

Ong, Walter S. J. 1982. *Orality and Literacy*

This new orality has resemblances to the old in its participatory mystique, communal sense, its concentration on the present moment, and even its use of formulas. (p. 133)

- Redundant or 'copious'
- Agonistically toned
- Empathetic and not objectively distanced
- Aggregative rather than analytic
- Additive rather than subordinate
- Close to the human lifeworld
- Situational rather than abstract
- Homeostatic
- Conservative or traditionalist

McLuhan, Marshall. 1964.

*Understanding Media:  
The Extensions of Man*

Radio provides a speed-up of information that also causes acceleration in other media. It certainly contracts the world to village size, and creates an insatiable village tastes for gossip, rumor, and personal malice (p. 306)

# Formulas and secondary orality



Ong, Walter S. J. 1982.

*Orality and Literacy - The Technologizing of the Word*

In an oral culture, knowledge, once acquired, had to be constantly repeated or it would be lost: fixed, formulaic thought patterns were essential for wisdom and effective administration (p. 24)

I shall understand formula and formulary and formulaic here as referring quite generically to more or less exactly repeated set phrases or set expressions (such as proverbs) in verse or prose, which, as will be seen, do have a function in oral culture more crucial and pervasive than any they may have in a writing or print or electronic culture.(pp. 26).

Formulas as birthmark of oral cultures



## Popular Threads

options ▼

### Technology



What free app could I use to track my wife's phone location?

### Traditional Games



How would apes and monkeys fit into a fantasy setting? What cultural significance would they have to...

### Video Games



what is the best/worst game released on or ported to significantly weaker hardware?

### Mecha



Untranslated /m/anga: If you knew Japanese, what /m/anga would you read?

### Weapons



China vs Taiwan/Japan/SK: If the US didn't step in, would the East Asian democracies be able to stop China from taking Ta...

### Photography



post happy accidents  
[EXIF data available. Click here to show/hide.]  
Camera-Specific Properties: Equi...

### LGBT



I want a bf :( What do???:  
What do I have to do to get a bf who meets these requirements??

### Television & Film



>only black person in entire trilogy is a zombie with 5 seconds of screen time  
>white person ...

01L  
open intelligence lab

# Investigating "memecry" With Sal Hagen

# Memecry

## repetition-with-variation in Internet memes

“What did Darwin's thesis about natural selection amount to?  
To having proclaimed the fact of competition among living things ?  
No, but in having for the first time combined this idea with the  
ideas of variability and heredity.

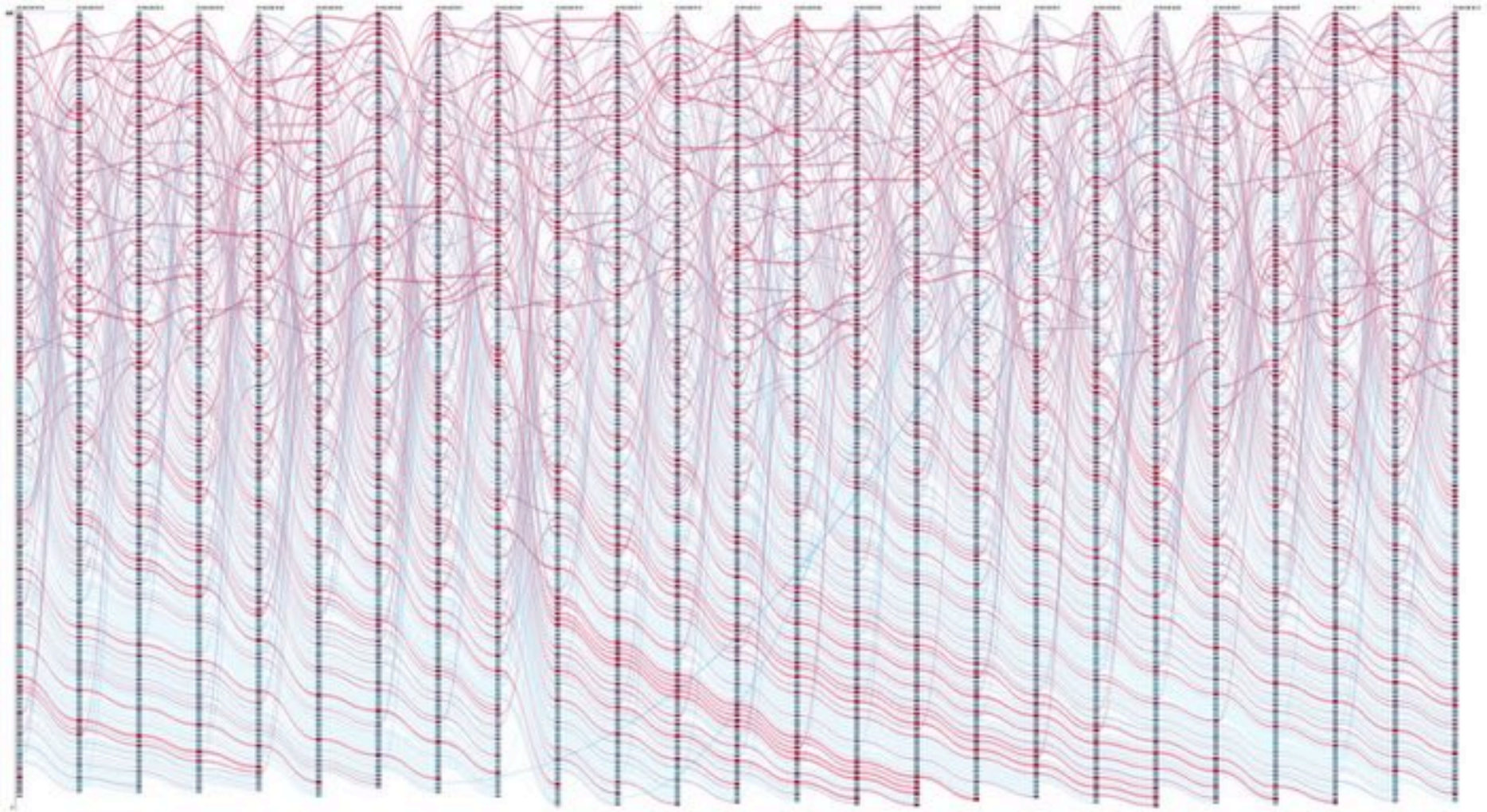
The former idea, as it was proclaimed by Aristotle, remained sterile  
until it was associated with the two latter ideas. From that as a starting  
point, we may say that the generic term, of which invention is but a  
species, is the fruitful interference of repetitions”

(Tarde, 1903, *The Laws of Imitation*, p.382).



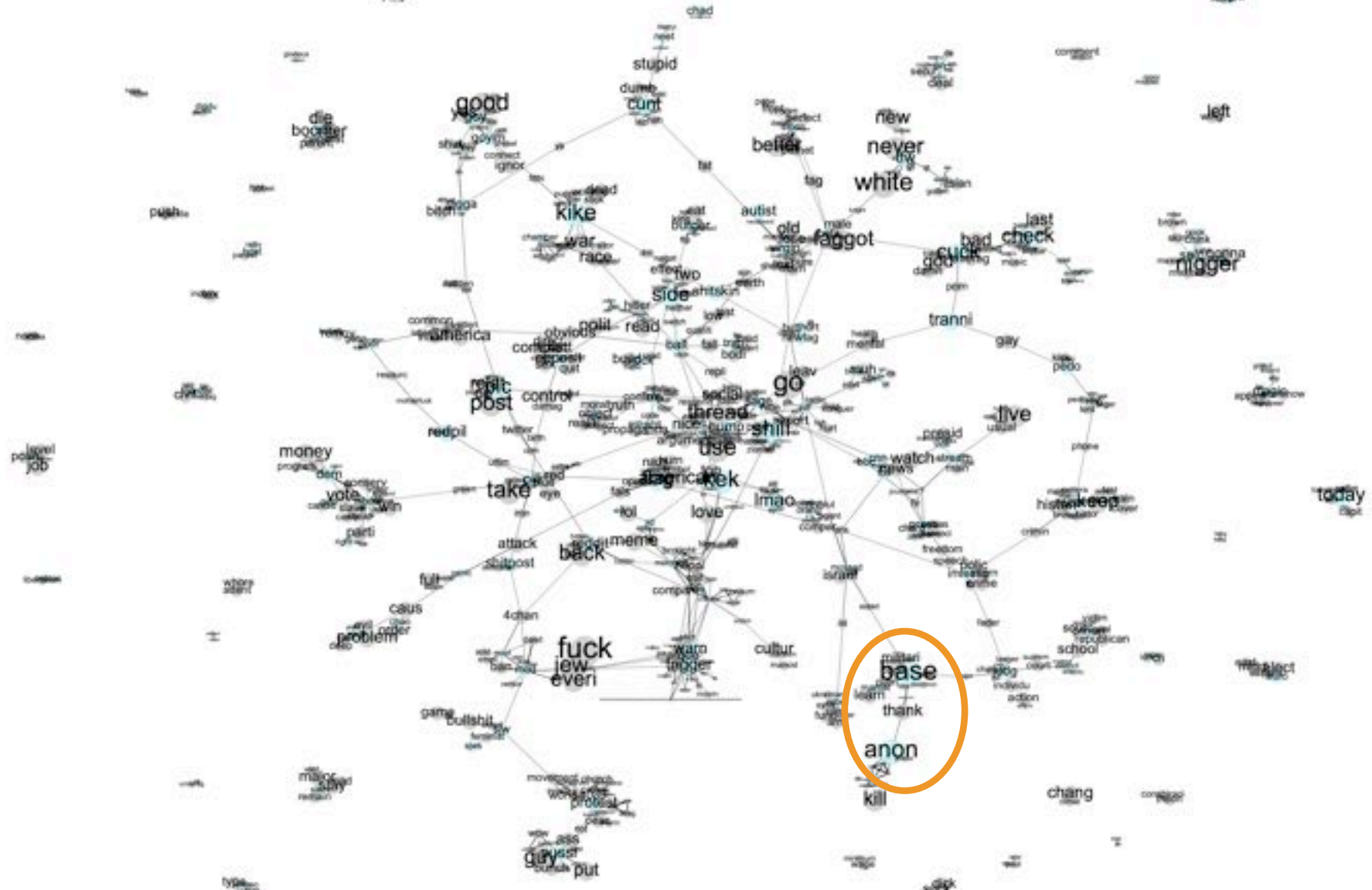
1. We downloaded the entire archive of 4chan/pol/
2. We pre-processed all posts and comments (350 millions) and parsed them using newlines as separators. We removed list and spam posts
3. We tokenized the texts removing English stopwords, URLs, numbers, and special characters (save for some that have a vernacular meaning, e.g. “b8”, or “(((they)))” )
4. We stemmed the tokens and converted them to lowercase
5. We sampled our dataset (by about 75%) keeping only posts that contained at least one term from a list of 270 terms of 4chan vernacular (neologisms and contextually changing words).
6. We generated a network of terms connected by their "normalised pointwise mutual information (NPMI)
7. We singled out potential memetic formulas by identifying triplets of words forming a distinct “clique” in yearly time slices.
8. We investigated the repetition-with-variation of our memetic formulas by
  - tracing the yearly occurrences of 4-grams containing at least two terms of each formulaic triplets
  - tracing the variation of the average NPMI of the terms more often co-occurring with the three terms of each formulaic triplet

## Protocol to investigate memecry



<https://oilab.eu/rendering-legible-the-ephemerality-of-4chanpol>

Ephemerality by design in 4chan

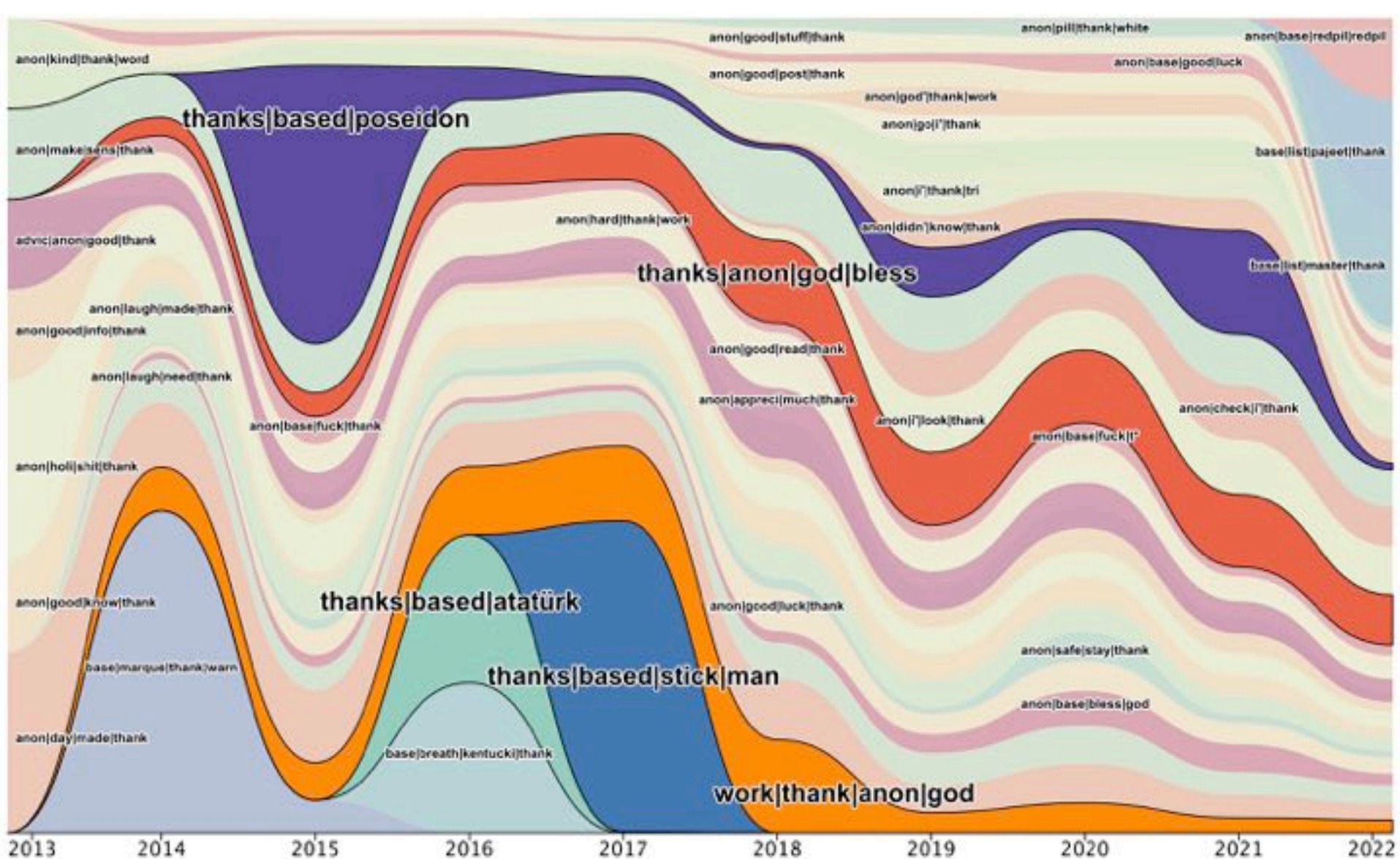


Pointwise mutual information network  
(2014 networks)

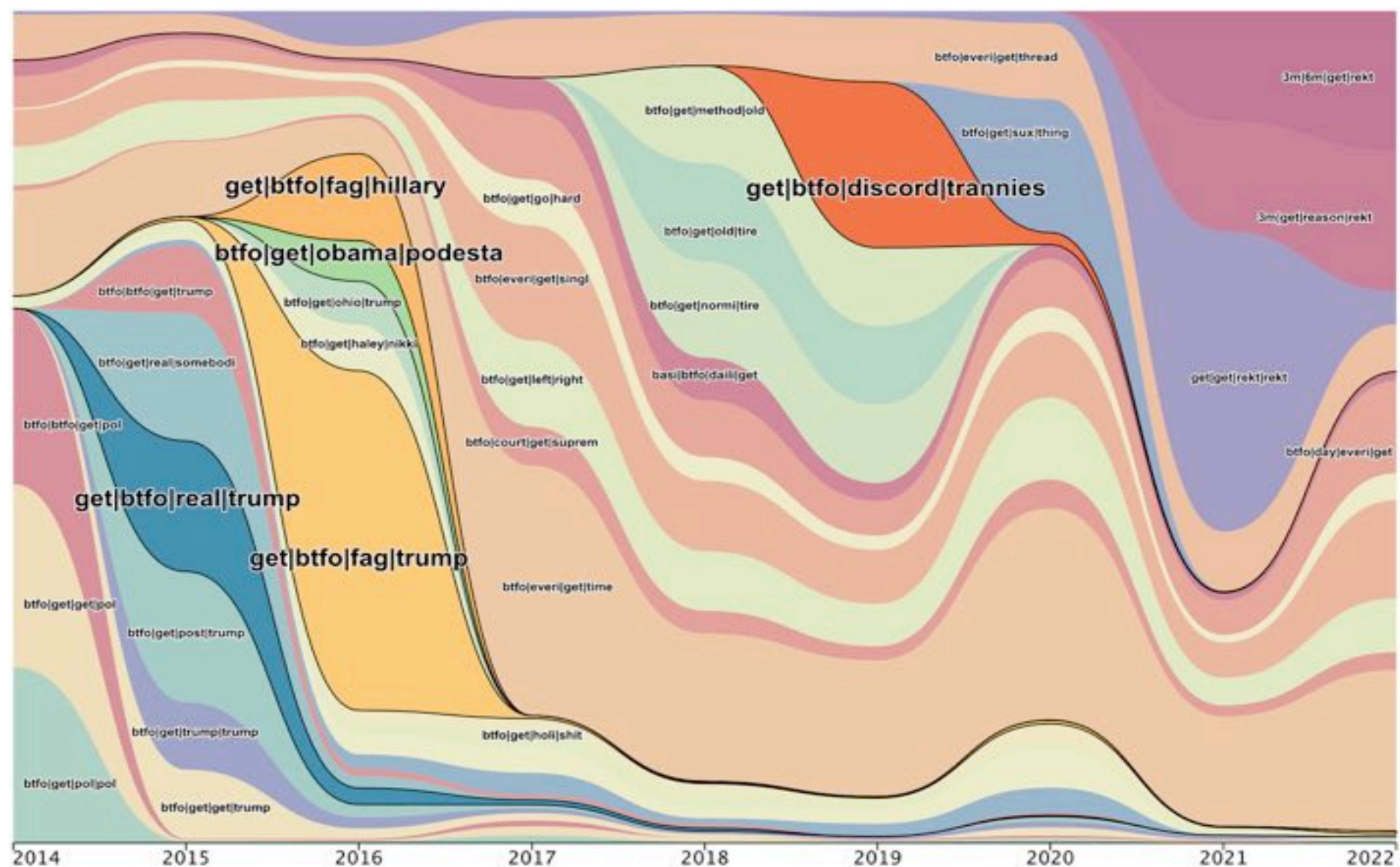


2014	2015	2016	2017	2018	2019	2020	2021
war   gas   kike	magic   sky   wizard	neet   basement   dwell	dey   dindu   nuffin	pollut   gene   pool	newfag   lurk   moar	patrician   tier   tast	oy   vey   goym
remov   gene   pool	le   happi   merchant	qt   tfw   gf	desu   baka   senpai	gr8   b8   m8	orang   man   bad	hello   uh   depart	cope   seeth   dilat
hurr   durr   muh	desu   baka   senpai	slide   sage   thread	oy   vey   goym	nice   strawman   argument	cope   seeth   harder	newfag   lurk   moar	orang   man   bad
prepar   storm   maggot	check   privileg   shitlord	oy   vey   goym	pollut   gene   pool	anti-white   anti-racist   code	qt   tfw   gf	orang   man   bad	bgc   certif   design
qt   tfw   gf	gr8   b8   m8	hurr   durr   muh	dude   weed   lmao	yr   old   boomer	tits   timestamp   GTFO	homicid   gas   chamber	newfag   lurk   moar
check   privileg   shitlord	nice   strawman   argument	prais   lord   kek	swallow   pill   red	gud   dindu   nuffin	chad   VS   virgin	le   epic   xd	hurr   durr   inb4
take   pill   red	oy   vey   goym	child   traffick   ring	neet   basement   dwell	slide   sage   thread	alpha   beta   male	chuck   sneed   feed	le   epic   xd
le   epic   maymay	thank   base   poseidon	dude   weed   lmao	chad   VS   virgin	read   mein   kampf	prepar   storm   maggot	gr8   b8   m8	gr8   b8   m8
get   rekt   btfo	prepar   storm   maggot	top   lel   kek	dri   warlock   wizard	newfag   lurk   moar	anti-white   anti-racist   code	nice   strawman   argument	tits   timestamp   GTFO
bump   limit   reach	dey   dindu   nuffin	little   cuntsuck   hugbox	(((their)))   globalist   agenda	oy   vey   goym	(((their)))   globalist   agenda	gr8   b8   m8	rod   ring   strik
top   lel   kek	remov   gene   pool	sven   prep   bull	anti-white   anti-racist   code	patrician   tier   tast	remov   gene   pool	desu   baka   senpai	take   med   schizo
gr8   b8   m8	ahm   cool   clock	newfag   lurk   moar	low   qualiti   bait	qt   tfw   gf	third   world   shithol	tits   timestamp   GTFO	qt   tfw   gf
gotten   asian   waifu	hurr   durr   muh	skrillex   aid   carl	gr8   b8   m8	magic   sky   wizard	sloppy   mossad   job	autist   screech   histrion	
thank   base   anon	(((they)))   usuri   covert	reddit   memer   cut-rate		(((their)))   globalist   agenda	take   med   schizo		

60 potential memetic formulas



Repetition-with-variation  
4grams method ("Thanks | Based | Anon")



Repetition-with-variation  
4grams method ("get | rekt | btfo")



