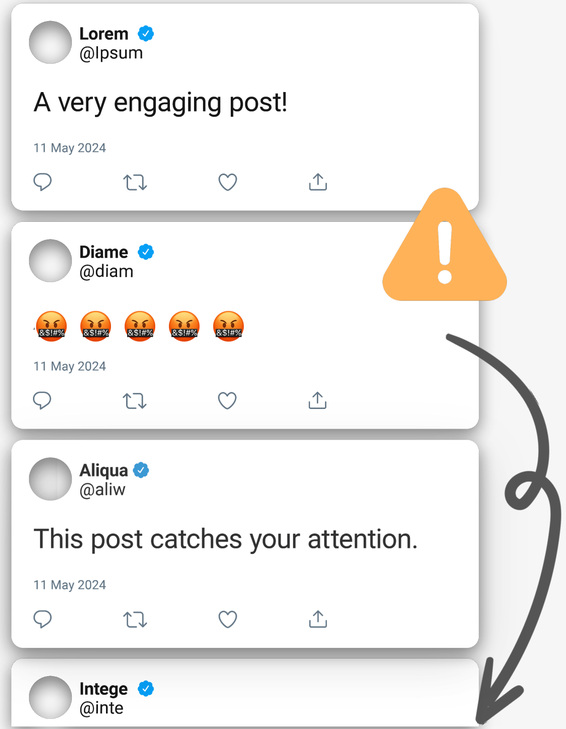
Social Media Feed Ranking Algorithms:
Guide to Field Experiments

Tiziano Piccardi
Stanford University

Martin Saveski
University of Washington



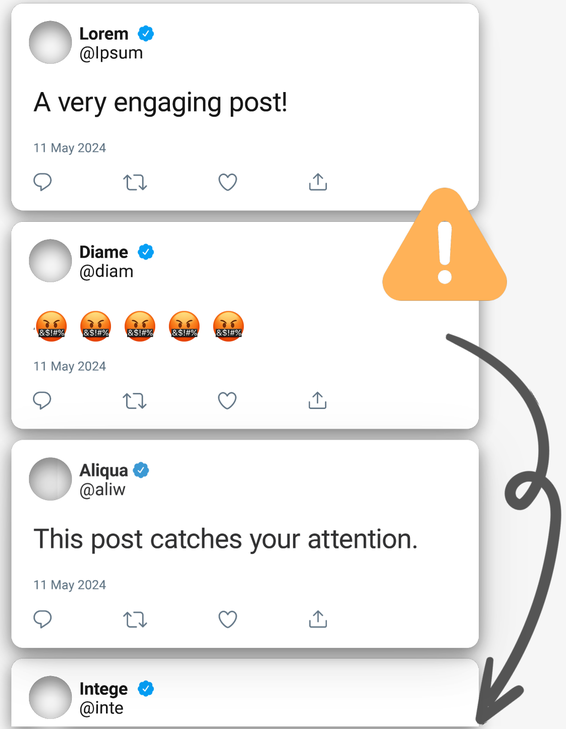
ICWSM
06/23/2025

Plan for today

1. History & foundations (45 mins)
2. Feed experiments using middlewares (45 mins)
3. Planning & analyzing experiments (45 mins)
4. Hands-on exercise: Build your own BlueSky feed (1 hour)

Part 1: History & Foundations of Feed Ranking Algorithms

Martin Saveski



Algorithmic feeds in historical context

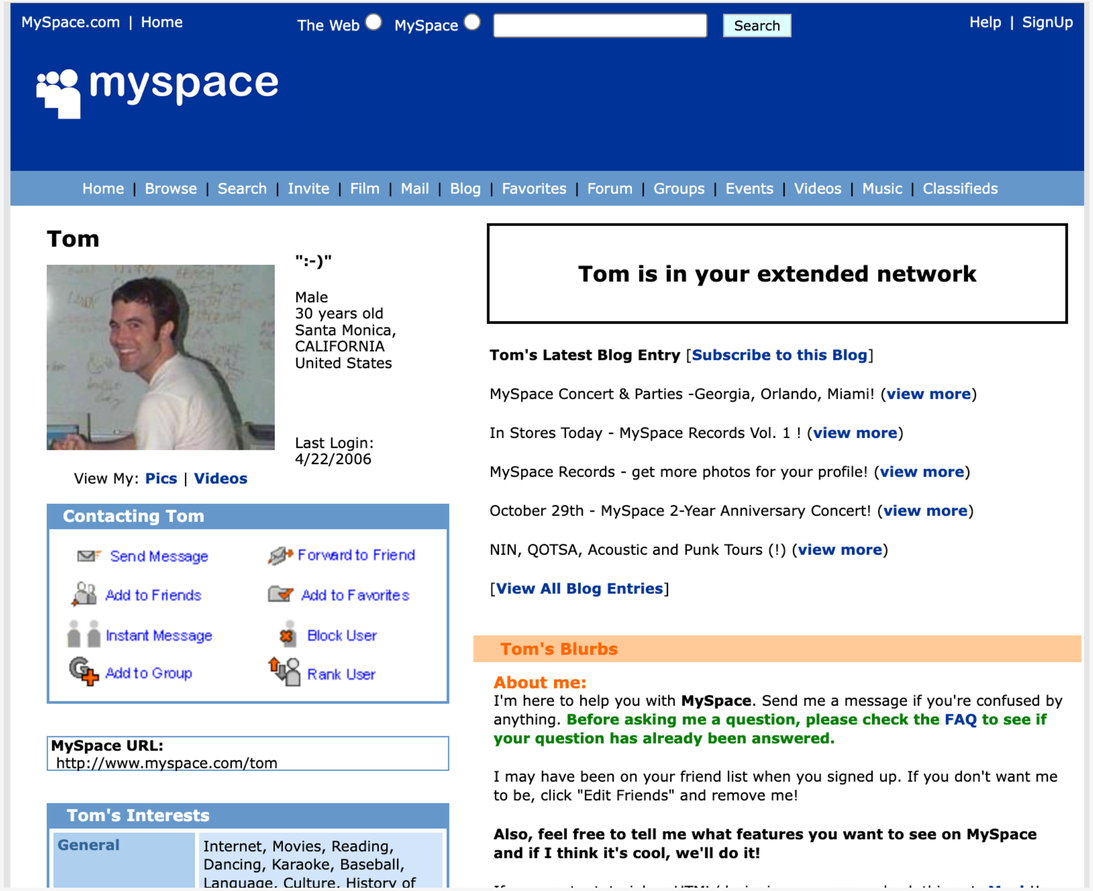
World Wide Web
- Invented in 1989 (36 years ago)

MySpace
- Created in 2003 (22 years ago)

Facebook
- Created in 2004 (21 years ago)
- Introduced the Like button in 2009 (16 years ago)
- Introduced an Algorithmic Feed in 2011 (14 years ago)

Twitter/X
- Created in 2006 (19 years ago)
- Introduced an Algorithmic Feed in 2016 (9 years ago)
- “See what’s happening — right now”

Before the feed



Facebook introduces the News Feed

September, 2006

"Facebook Gets a Facelift": https://www.facebook.com/notes/263466884972254/

Facebook introduces an algorithmic feed

September, 2011

The Facebook Blog

Interesting News, Any Time You Visit

by Mark Tonkelowitz on Tuesday, September 20, 2011 at 12:30pm

When you visit Facebook, you should see the things you're most interested in, like status updates from your family and closest friends. Last week, we announced improvements to Friend Lists and a new Subscribe button to help you see more of what you care about, and less of what you don't.

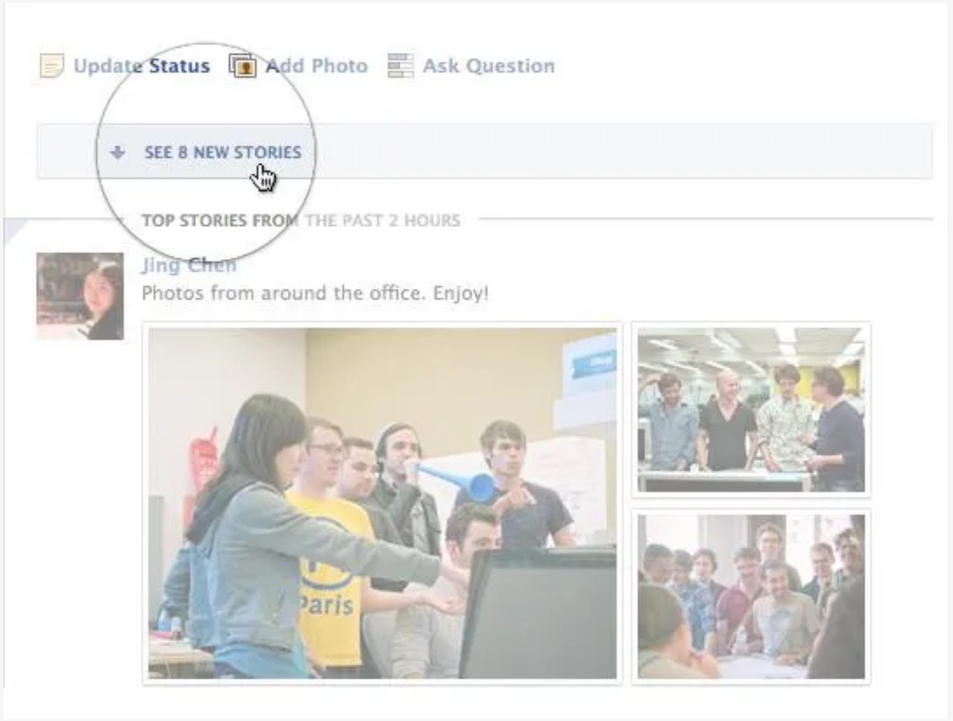
But it's not just the people you hear from that make your News Feed interesting. It also matters how much you visit Facebook. If you haven't returned in a week, you may want to see a summary of top stories first. If you've already visited several times that day, you probably care more about recent news.

Starting today, it will be easier to keep up with the people in your life no matter how frequently or infrequently you're on Facebook.

News Feed: See What Matters at the Top

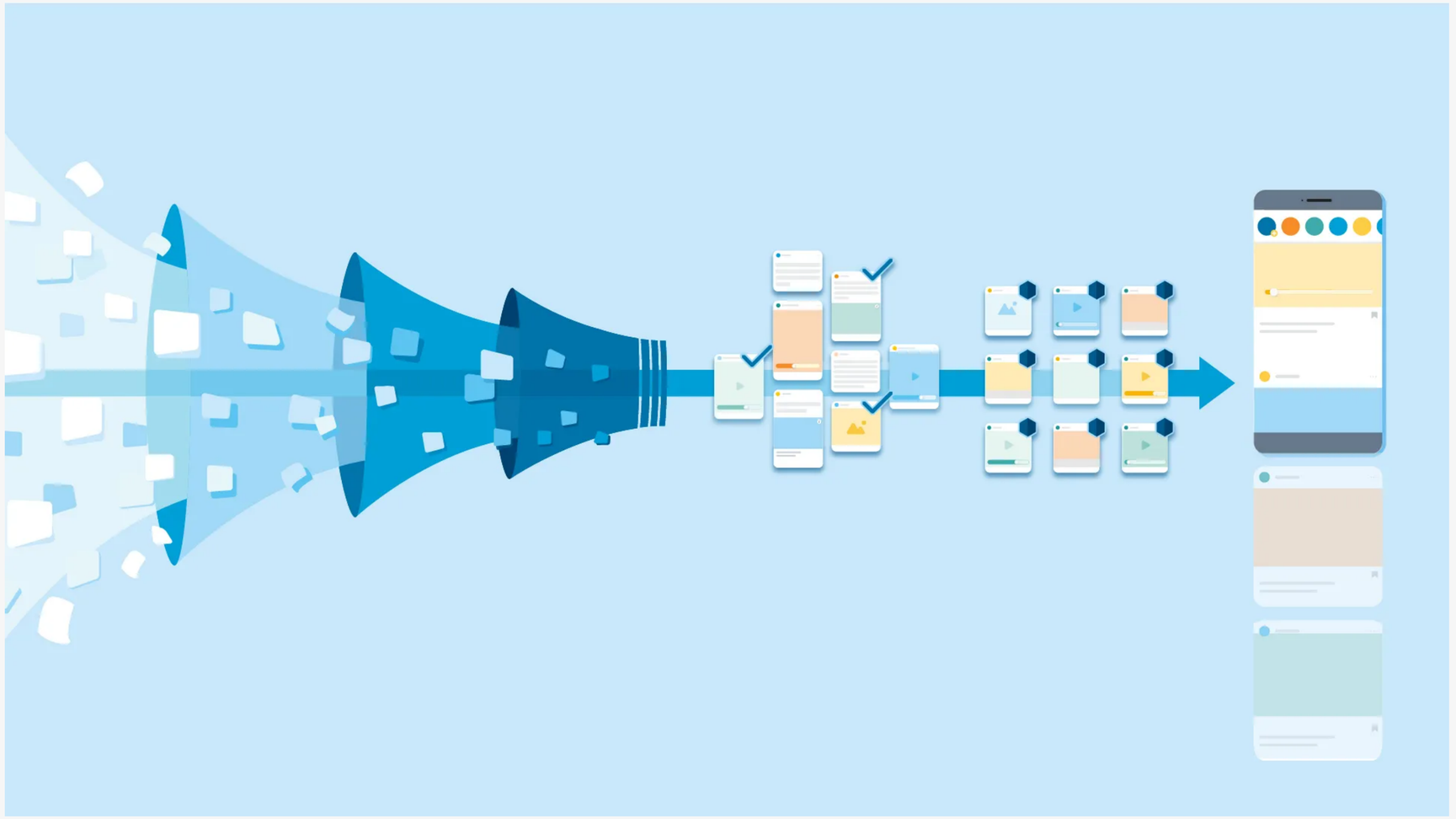
When you pick up a newspaper after not reading it for a week, the front page quickly clues you into the most interesting stories. In the past, News Feed hasn't worked like that. Updates slide down in chronological order so it's tough to zero in on what matters most.

Now, News Feed will act more like your own personal newspaper. You won't have to worry about missing important stuff. All your news will be in a single stream with the most interesting stories featured at the top. If you haven't visited Facebook for a while, the first things you'll see are top photos and statuses posted while you've been away. They're marked with an easy-to-spot blue corner.



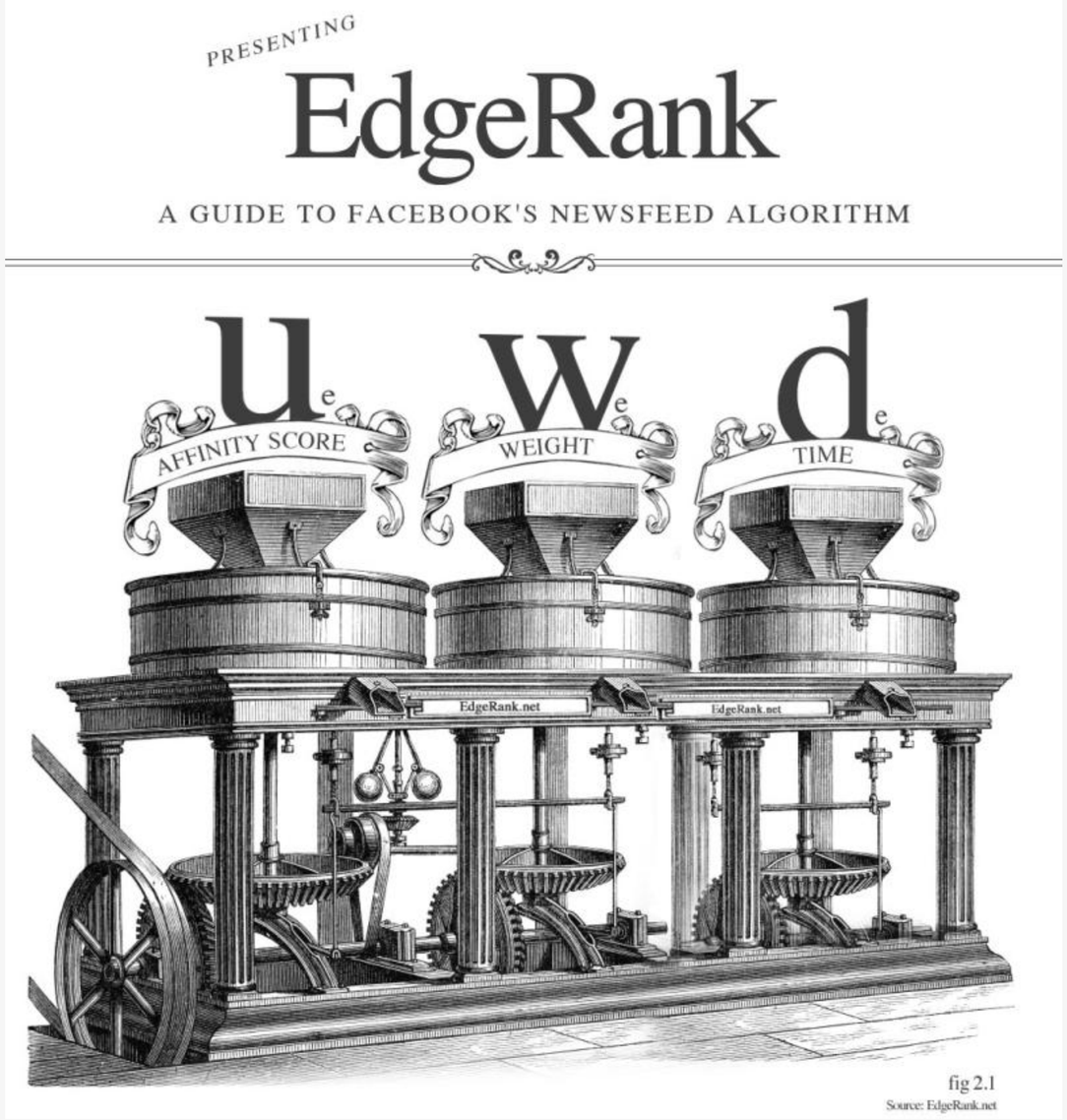
"Interesting News, Any Time You Visit": https://web.archive.org/web/20111005000735/http://blog.facebook.com/blog.php?post=10150286921207131

Goals of a feed algorithm



https://engineering.fb.com/2021/01/26/ml-applications/news-feed-ranking/

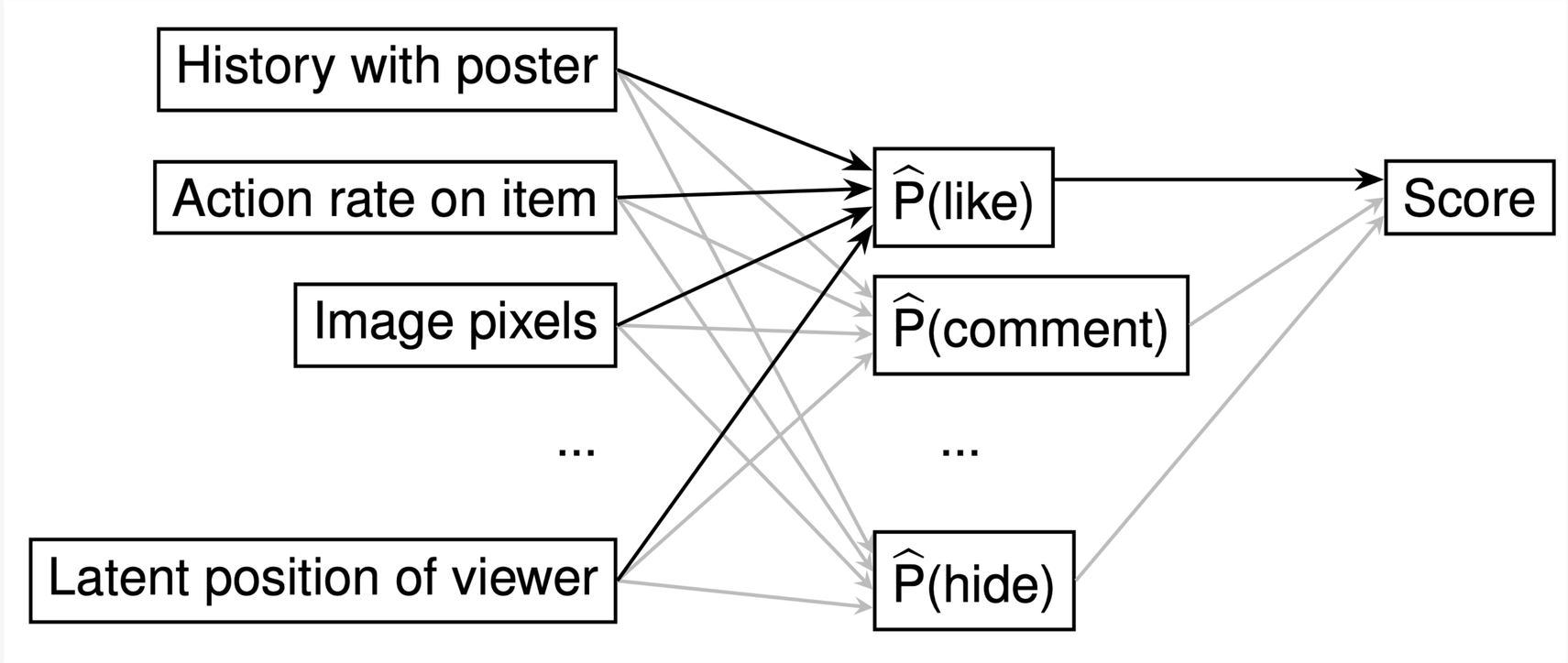
Facebook’s first feed ranking algorithm (2011)



$$\text{score(user, item)} = \frac{\text{affinity(user, poster)} * \text{Weight[item.type]}}{\text{item.age}}$$

https://perma.cc/CY4N-9NJV

Modern feed ranking algorithms

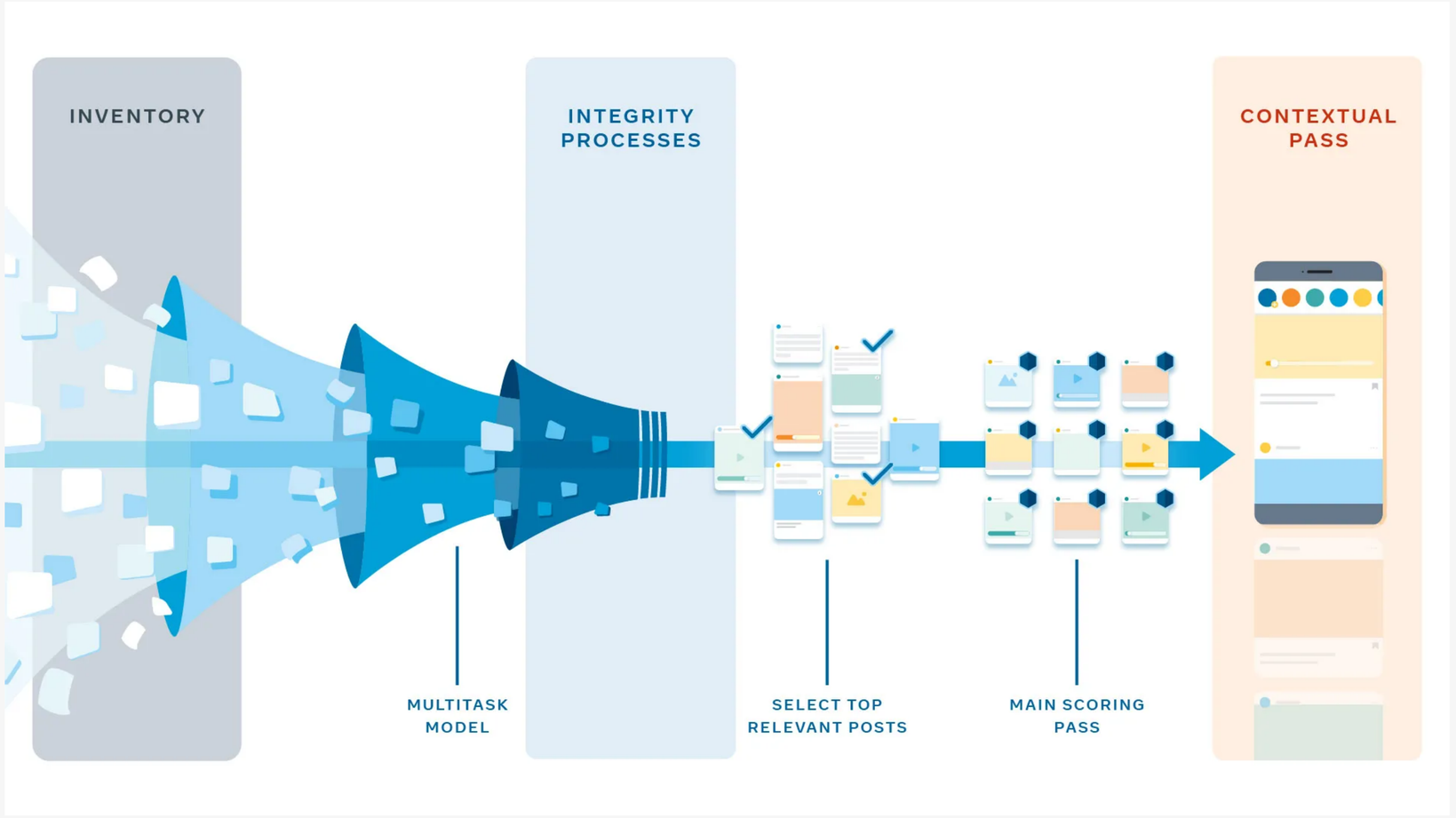


Score =

$w_{like} \times P(like) +$
$w_{comment} \times P(comment) +$
$\ldots +$
$w_{hide} \times P(hide)$

Eckles, “Algorithmic transparency and assessing effects of algorithmic ranking”, Testimony before the Senate Subcommittee on Communications, Media, and Broadband (2021)

Facebook’s (recent) feed ranking algorithm



https://engineering.fb.com/2021/01/26/ml-applications/news-feed-ranking/ & https://transparency.meta.com/features/ranking-and-content/

Facebook’s (recent) feed ranking algorithm

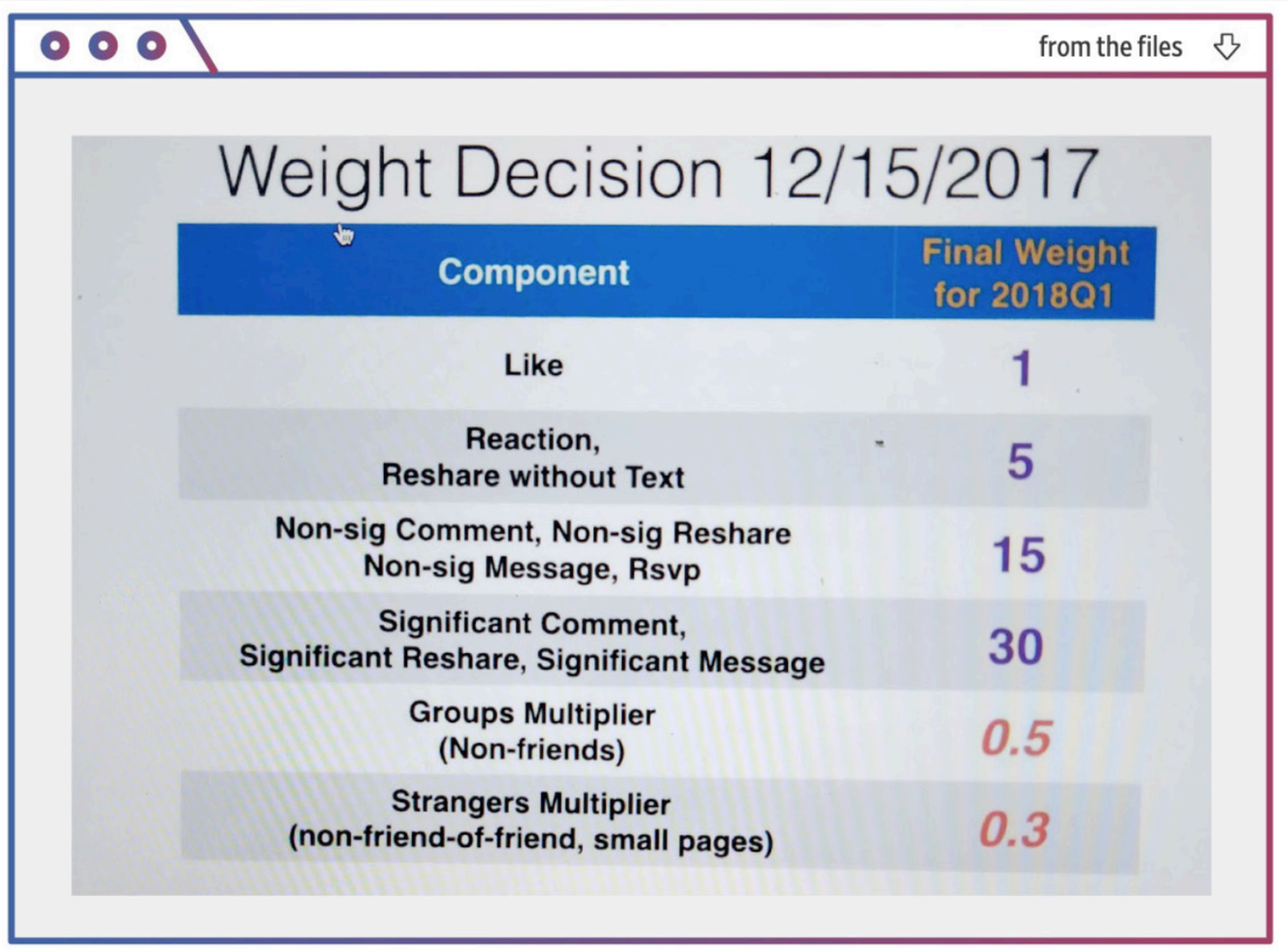
100s of prediction models based on 1000s of signals

Four main categories of predictions:

1. Actions you’ll take on the post
2. How you’ll spend time viewing the post
3. Your interest in the post or person, Page or Group that shared the post
4. How others will interact with the post if you take a certain action, such as commenting or sharing a post

https://transparency.meta.com/features/ranking-and-content/

Facebook’s “Meaningful Social Interactions”



December 2017 internal Facebook memo titled “The story of deriving Meaningful Social Interactions metric weights” published by Wall Street Journal;
Borrowed from: Narayanan, “Understanding Social Media Recommendation Algorithms” (2023)

Twitter/X's "For You" algorithm

Candidate Sourcing

In-network posts (~50%)
- Recent posts by users you follow

Out-of-network posts (~50%)
- Posts users you follow recently engaged with
- Posts & users are similar to your interests

Ranking

Light Ranker
- Fast Logistic Regression model (faster)

Heavy Ranker
- ~48M parameter neural network (slower)

Both designed to predict engagement

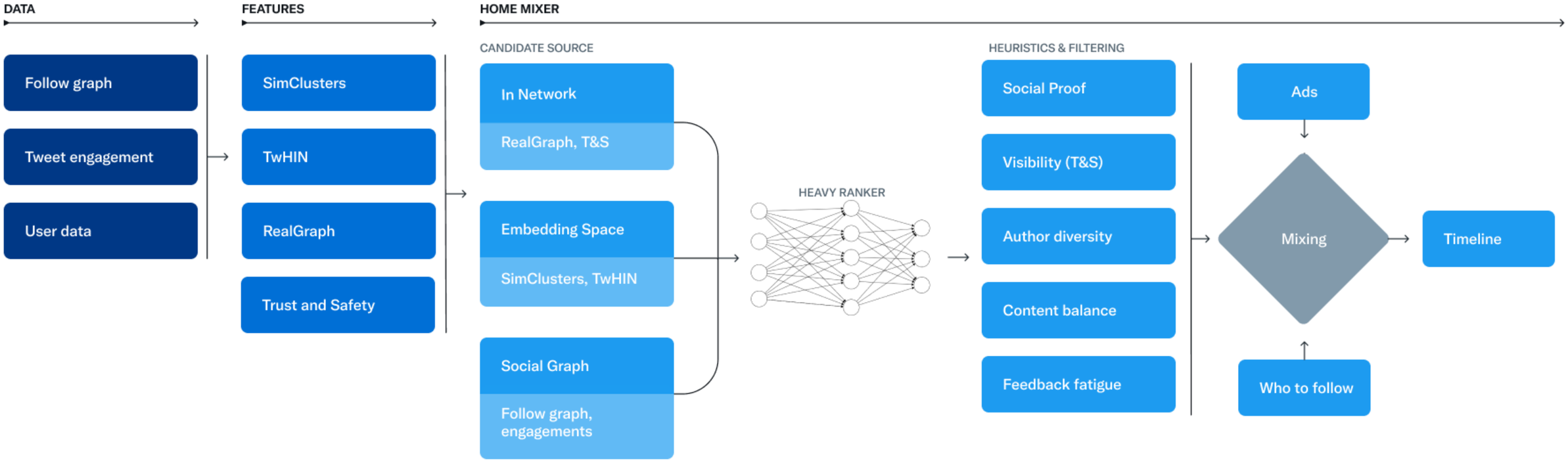
Heuristics & Filters

- **Author Diversity**: Avoid too many consecutive posts from a single author.
- **Content Balance:** balance of In-Network and Out-of-Network posts
- **Conversations**: Provide more context to a reply by threading it together with the original post.

.....

Based on the 2023 open-sourced version of the code.
https://blog.x.com/engineering/en_us/topics/open-source/2023/twitter-recommendation-algorithm
https://github.com/igorbrigadir/awesome-twitter-algo

Twitter/X's "For You" algorithm



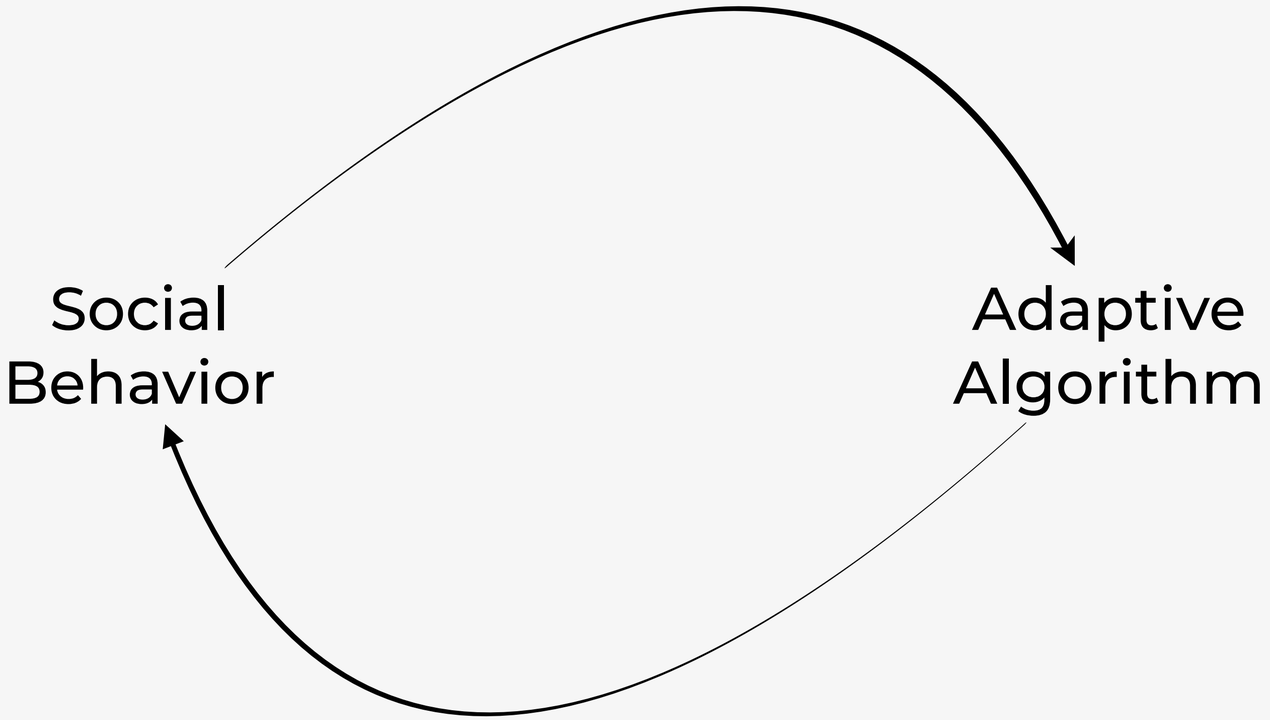
https://blog.x.com/engineering/en_us/topics/open-source/2023/twitter-recommendation-algorithm

Twitter/X's "For You" algorithm: Weights

Type of engagement	Weight
Probability the user will like the tweet	0.5
Probability the user will retweet the tweet	1.0
Probability the user replies to the tweet	13.5
Probability the user opens the tweet author profile and likes or replies to a tweet	12.0
Probability (for a video tweet) that the user will watch at least half of the video	0.005
Probability the user replies to the tweet and this reply is engaged by the tweet author	75.0
Probability the user will click into the conversation of this tweet and reply or like a tweet	11.0
Probability the user will click into the conversation and stay there for at least 2 minutes	10.0
Probability the user will react negatively (requesting "show less often" on the tweet or author, block or mute the tweet author)	-74.0
Probability the user will click report tweet	-369.0

https://github.com/twitter/the-algorithm-ml/blob/main/projects/home/recap/README.md

Complex feedback loop in feed algorithms



Are feed algorithms to blame?

Political polarization

Misinformation

Mental health risks

Online harassment

Are feed algorithms to blame?

BBC

Watch Live

Facebook's algorithms 'supercharged' hate speech in Ethiopia's Tigray conflict

31 October 2023

Kalkidan Yibeltal & Wycliffe Muia
BBC News, Addis Ababa & Nairobi

ALJAZEERA

LIVE

EXCLUSIVE

Features | Social Media

In India's strife-torn Manipur, narrative battle is fought on social media

Social media warriors have sprung up to share their community's views and put down the others' in this ethnic conflict.

TIME

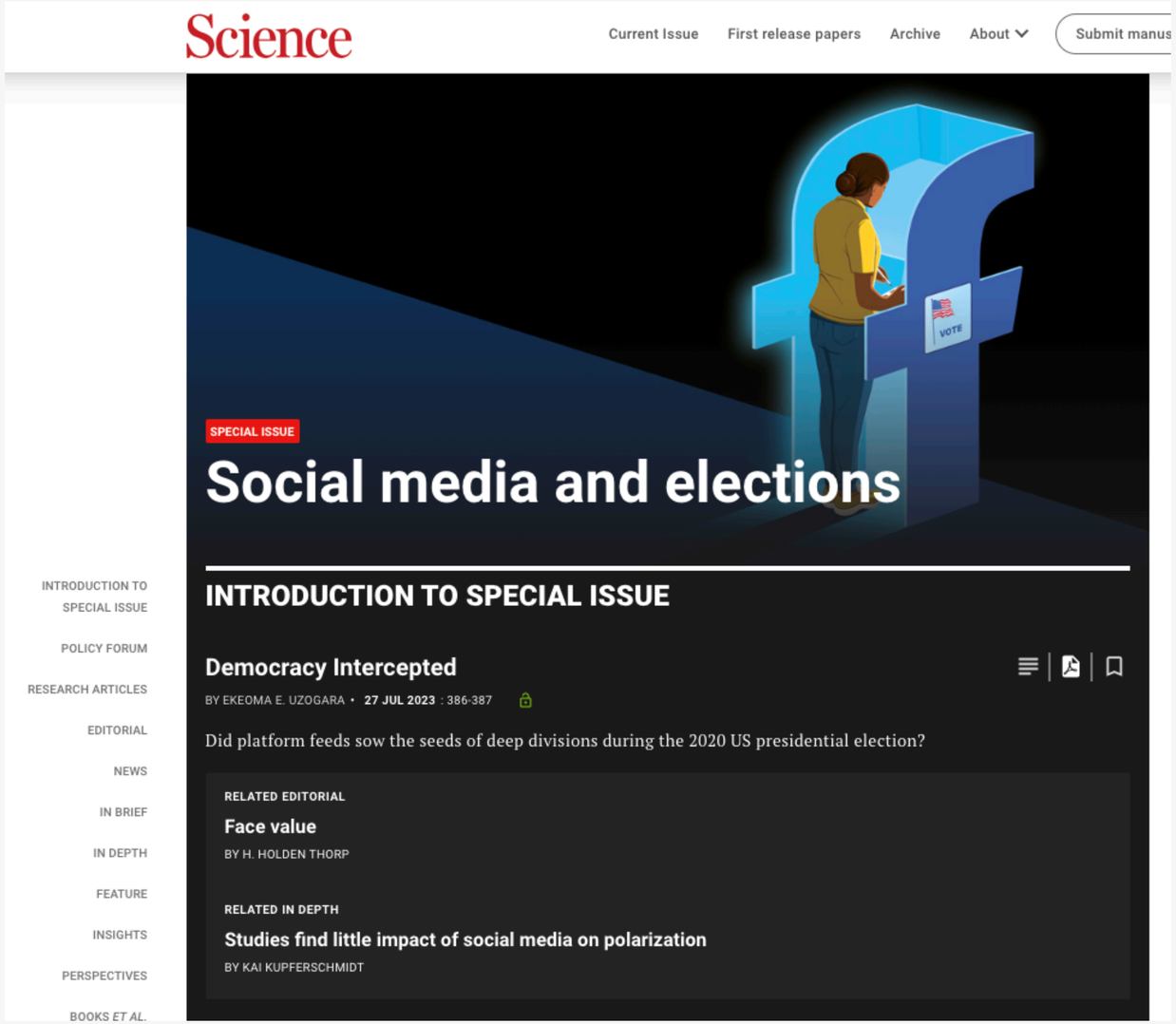
WORLD • MYANMAR

Meta's Facebook Algorithms 'Proactively' Promoted Violence Against the Rohingya, New Amnesty International Report Asserts

Mental health risks

Online harassment

Science: Special issue on social media and elections



Big collaboration between Meta and external researchers

https://www.science.org/toc/science/381/6656

How do social media feed algorithms affect attitudes and behavior in an election campaign?

ANDREW M. GUESS, NEIL MALHOTRA, JENNIFER PAN, PABLO BARBERÁ, HUNT ALLCOTT, TAYLOR BROWN, ADRIANA CRESPO-TENORIO, DREW DIMMERY, DEEN FREELON, [...], AND JOSHUA A. TUCKER +19 authors Authors Info & Affiliations

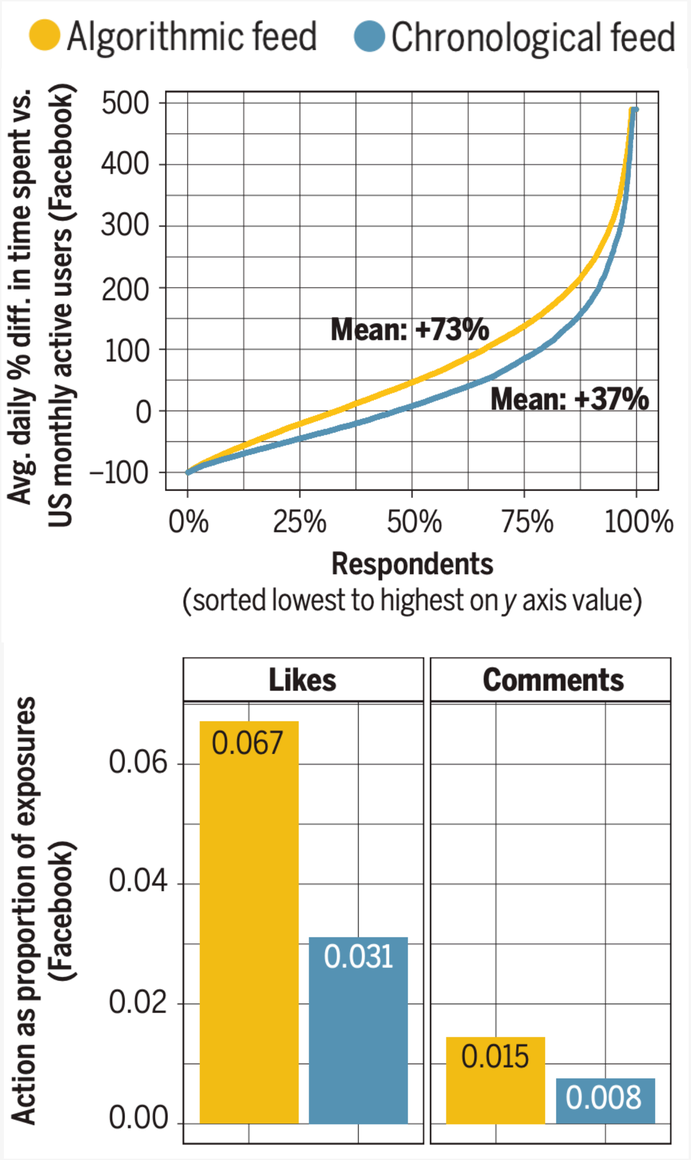
SCIENCE • 27 Jul 2023 • Vol 381, Issue 6656 • pp. 398-404 • DOI: 10.1126/science.abp9364

Like-minded sources on Facebook are prevalent but not polarizing

Brendan Nyhan, Jaime Settle, Emily Thorson, Magdalena Wojcieszak, Pablo Barberá, Annie Y. Chen, Hunt Allcott, Taylor Brown, Adriana Crespo-Tenorio, Drew Dimmery, Deen Freelon, Matthew Gentzkow, Sandra González-Bailón, Andrew M. Guess, Edward Kennedy, Young Mie Kim, David Lazer, Neil Malhotra, Devra Moehler, Jennifer Pan, Daniel Robert Thomas, Rebekah Tromble, Carlos Velasco Rivera, Arjun Wilkins, … Joshua A. Tucker + Show authors

Nature **620**, 137–144 (2023) | Cite this article

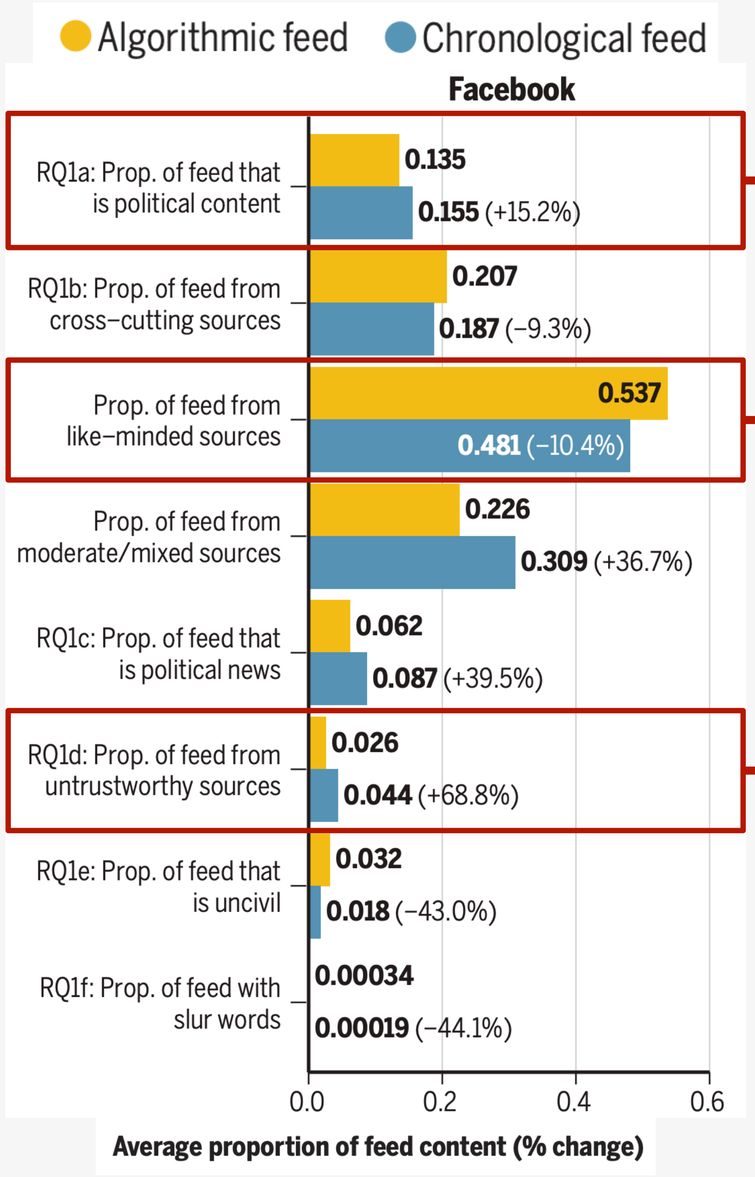
Algorithmic vs. chronological feed (Guess, et al.)



Moving to chronological feed:

- Decreased time spent on the platform
- Decreased rate of likes and comments

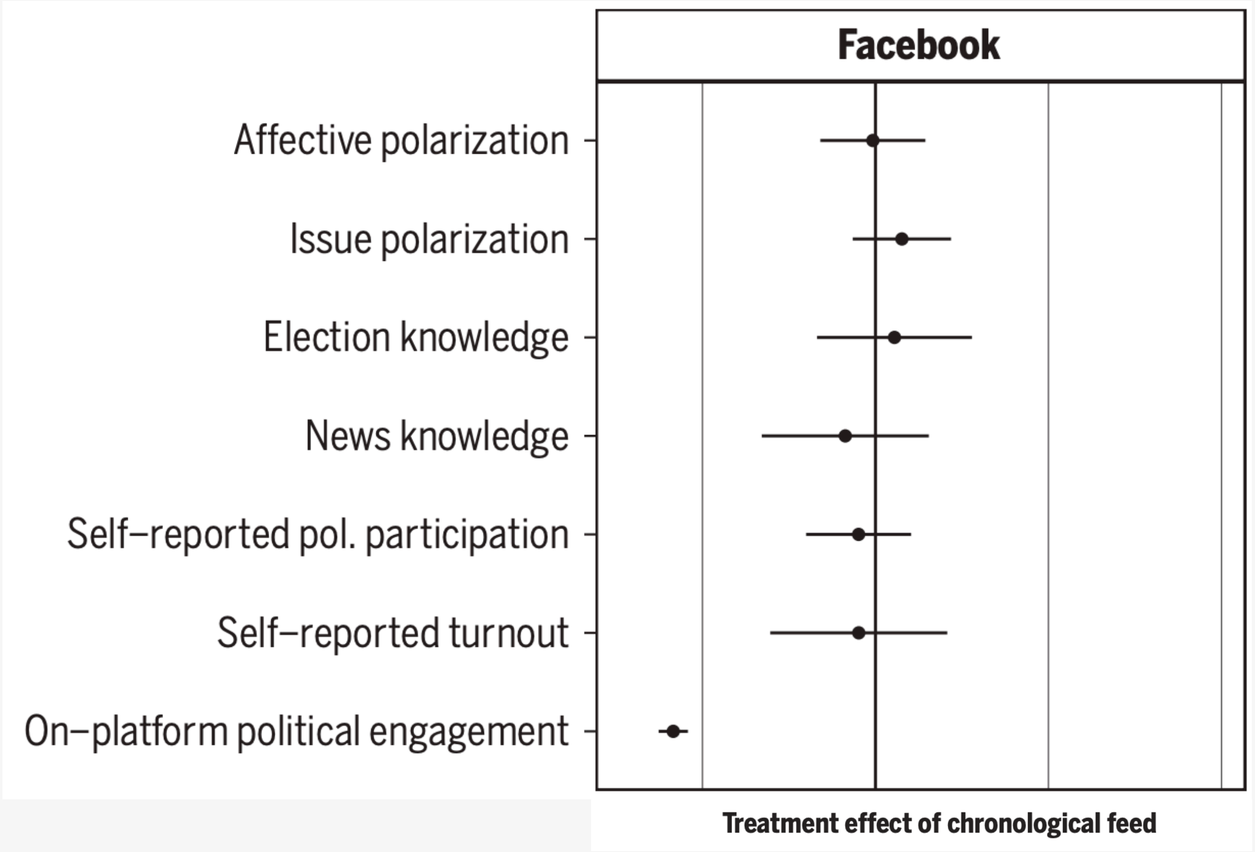
Algorithmic vs. chronological feed (Guess, et al.)



Moving to chronological feed:

- ⬆ exposure to political content
- ⬇ exposure to like-minded sources
- ⬆ exposure to untrustworthy content

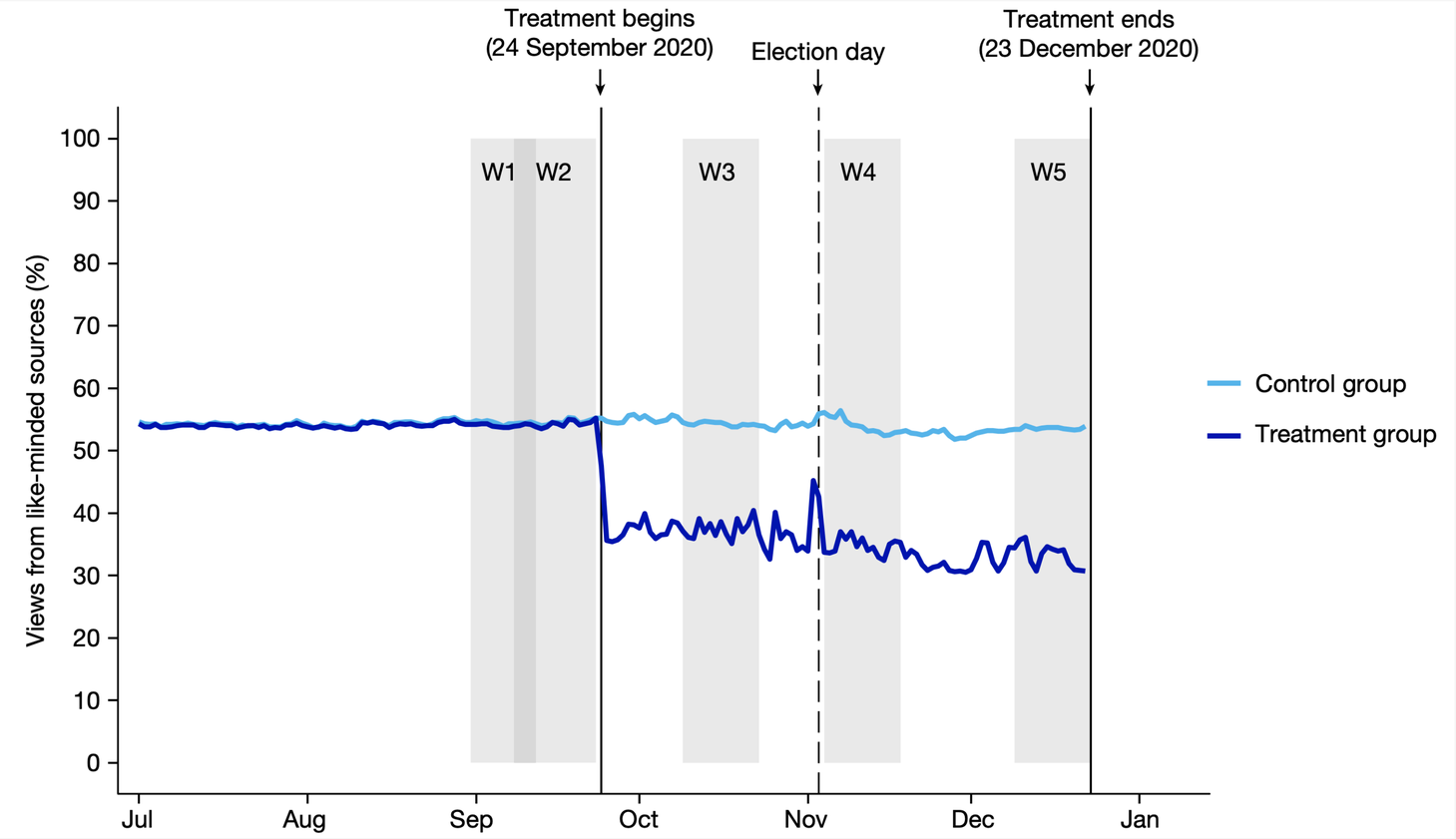
Algorithmic vs. chronological feed (Guess, et al.)



No significant changes on issue polarization, affective polarization, political knowledge, or other key attitudes during the 3-month study period

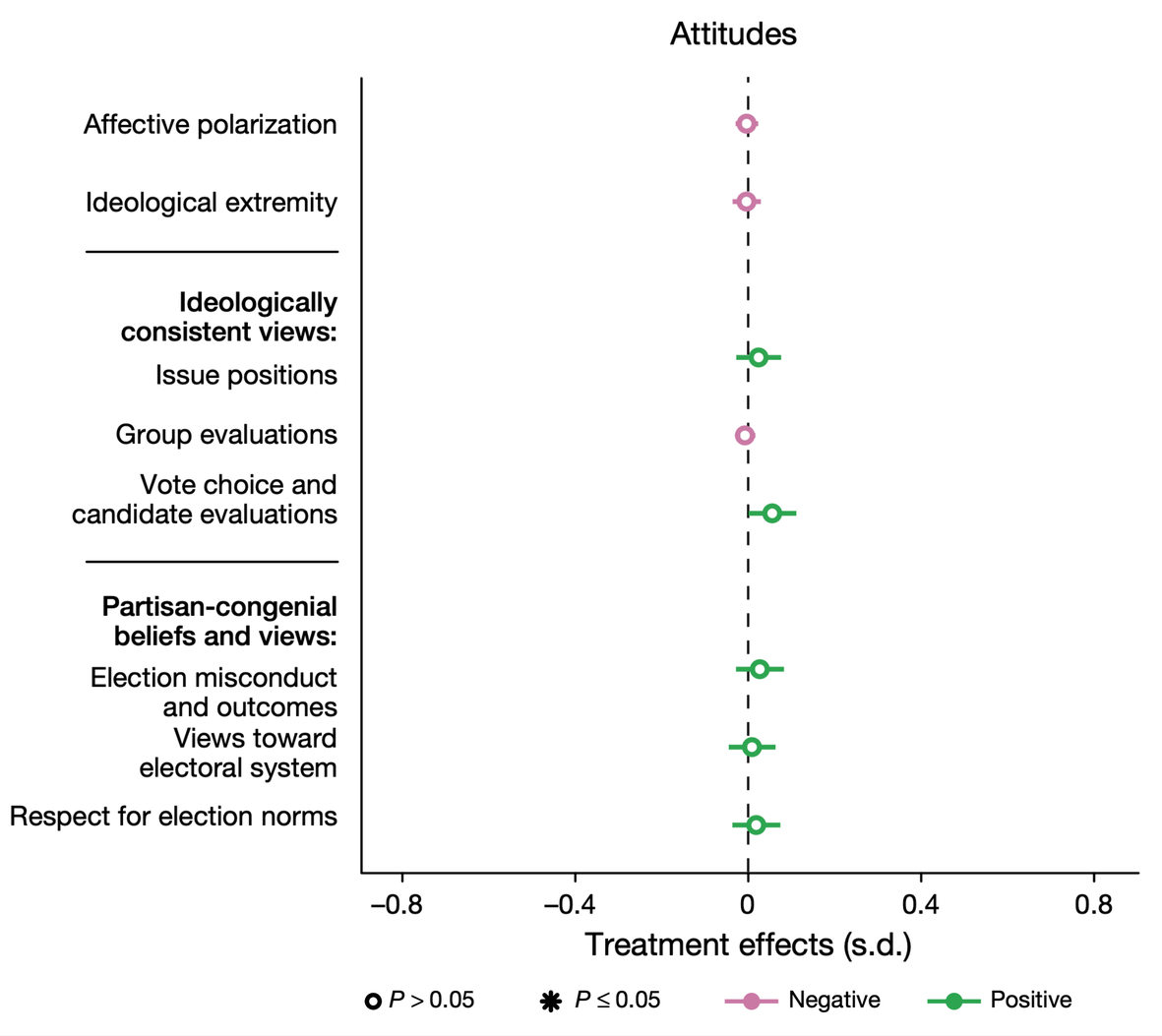
Reduced exposure to like-minded sources (Nyhan et al.)

"... content from 'like-minded' sources constitutes the **majority** of what people see on the platform, although political information and news represent only a **small fraction** of these exposures"

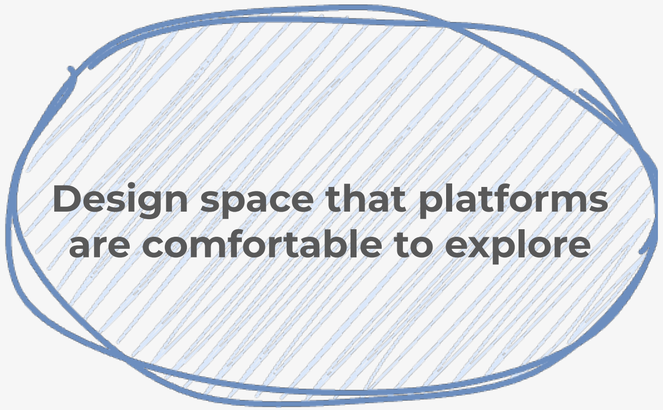


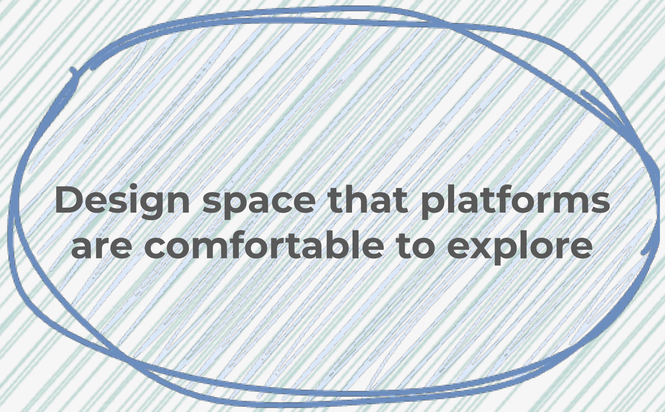
Field experiment on Facebook **reducing exposure** to content from like-minded sources (n=23k)

Reduced exposure to like-minded sources (Nyhan et al.)

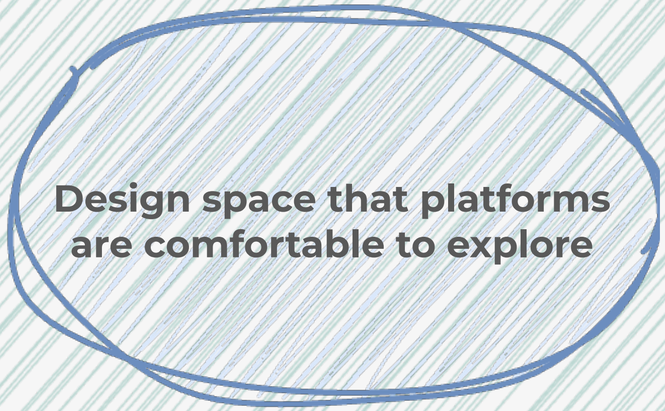


The intervention had **no measurable effects** on eight preregistered attitudinal measures


Design space that platforms
are comfortable to explore



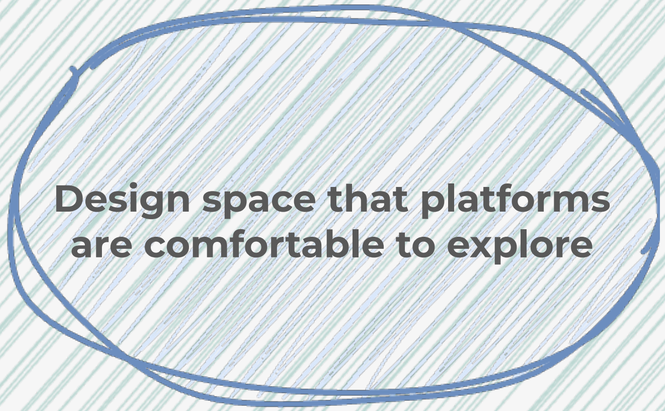
The real design space is much bigger!



The real design space
is much bigger!

LLMs →

Opportunities for research



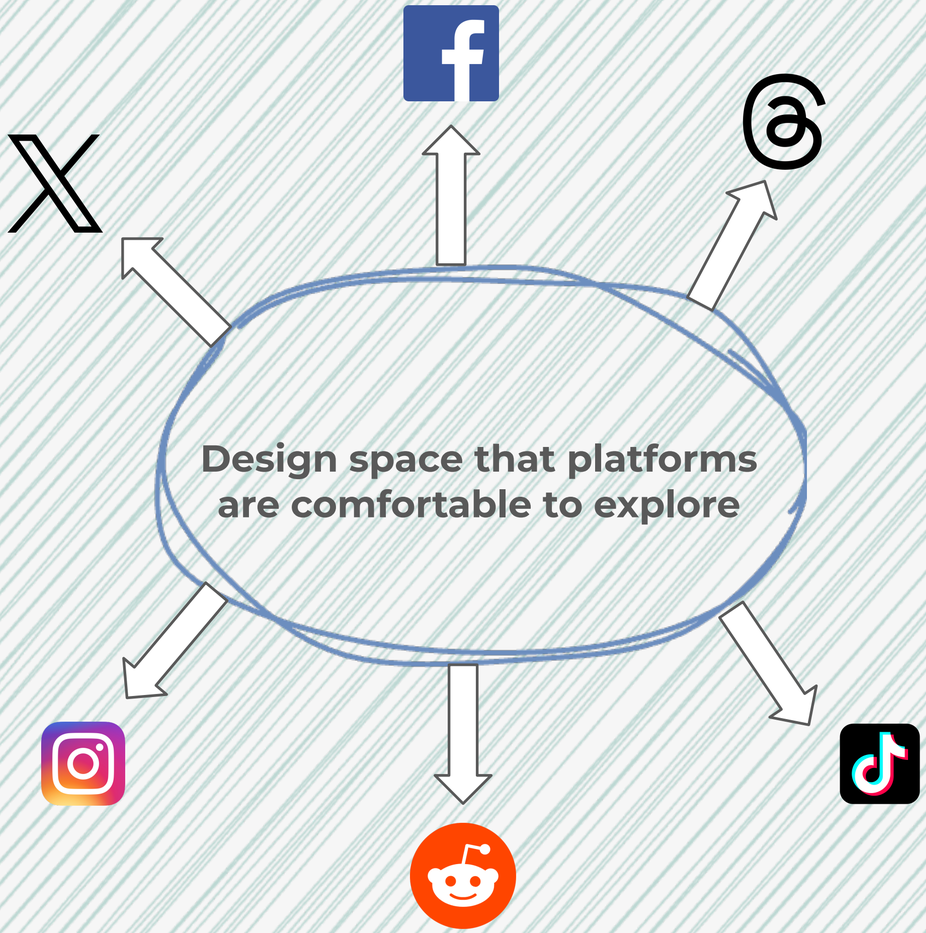
The real design space is much bigger!

Researchers can...

Test bold ideas that platforms cannot try

Articulate new visions for how these platforms could operate

Opportunities for research



With effective solutions we could **build support** for these alternative designs

Parting Thoughts

- Feed ranking algorithms have a lot of power: they control what we see and how we see it
- Feed ranking algorithms are a “recent” invention
- They are very malleable
- Lots of opportunities to make positive change!

> *“We shape our buildings; thereafter they shape us”*
>
> Winston Churchill

10-minute break

Next:
Feed experiments
using middlewares