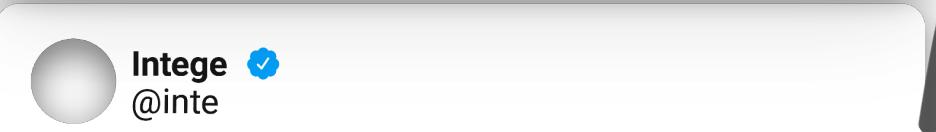


Social Media Feed Ranking Algorithms: Guide to Field Experiments

Tiziano Piccardi
Stanford University

Martin Saveski
University of Washington

ICWSM
06/23/2025

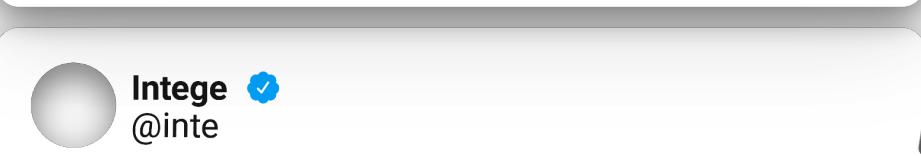


Plan for today

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

MySpace.com | Home The Web MySpace Search Help | SignUp

myspace

Home | Browse | Search | Invite | Film | Mail | Blog | Favorites | Forum | Groups | Events | Videos | Music | Classifieds

Tom
":)"
Male
30 years old
Santa Monica,
CALIFORNIA
United States
Last Login:
4/22/2006

Tom is in your extended network

Tom's Latest Blog Entry [Subscribe to this Blog]
MySpace Concert & Parties -Georgia, Orlando, Miami! ([view more](#))
In Stores Today - MySpace Records Vol. 1 ! ([view more](#))
MySpace Records - get more photos for your profile! ([view more](#))
October 29th - MySpace 2-Year Anniversary Concert! ([view more](#))
NIN, QOTSA, Acoustic and Punk Tours (!) ([view more](#))
[View All Blog Entries]

Tom's Blurb

About me:
I'm here to help you with **MySpace**. Send me a message if you're confused by anything. **Before asking me a question, please check the FAQ to see if your question has already been answered.**

I may have been on your friend list when you signed up. If you don't want me to be, click "Edit Friends" and remove me!

Also, feel free to tell me what features you want to see on MySpace and if I think it's cool, we'll do it!

Contacting Tom

- Send Message
- Forward to Friend
- Add to Friends
- Add to Favorites
- Instant Message
- Block User
- Add to Group
- Rank User

MySpace URL:
<http://www.myspace.com/tom>

Tom's Interests

General	Internet, Movies, Reading, Dancing, Karaoke, Baseball, Language, History of
---------	---

[thefacebook] home search global social net invite faq logout Harvard

(This is you)

quick search go

My Profile [edit]
My Groups
My Friends
My Messages
My Away Message
My Mobile Info
My Account
My Privacy

Picture [edit]



Information [edit]

Account Info:
Name: February 9, 2004
Member Since: January 19, 2005
Last Update: [edit]

Basic Info:
Email: Student
Status: Male
Sex: 2005
Year: Concentration: [edit]

Residence: Adams
Phone: 3-2060
Birthday: [edit]
Home State: [edit]
High School: [edit]

Extended Info:
Screenname: Friendship
Looking For: Dating
Interested In: Women
Relationship Status: Single
Political Views: Moderate

Facebook introduces the News Feed

September, 2006

facebook

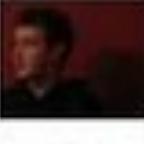
Welcome Ezra!

home search browse invite help logout

News Feed

6 of your friends joined the group Net Neutrality. 8:31pm
Emre Eczacibasi is no longer in a relationship. 8:11pm
James Wang created a group. 7:51pm
Updated: Luke Long and Stephanie Bengtsson joined the New York, NY network. 6:07pm

9 of your friends changed profile pictures. 5:47pm

 Mark  Alkesh  Art  Michael  Ally  Darian
 Justin  Amanda  Brandee

Kevin Ching is no longer single. 5:27pm
Michael Brinkmann is now in an open relationship. 1:52pm

Katie Geminder added new photos. 12:50pm

 Launch!
1 photo
by Katie Geminder
Location: HQ

Updated: Wayne Chang and Katie Geminder added new photos to a group. 12:30pm

Requests

1 friend request
2 event invitations
1 group invitation

My Status edit

Keep your friends updated on your current status.

Upcoming Events see all

housewarming
Thursday, September 07 at 8:00pm

Birthdays see all

Today's Birthdays
Andrew McCollum

The Next Step see all

Join a geography network to see who lives in your area.

Facebook introduces an algorithmic feed

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.

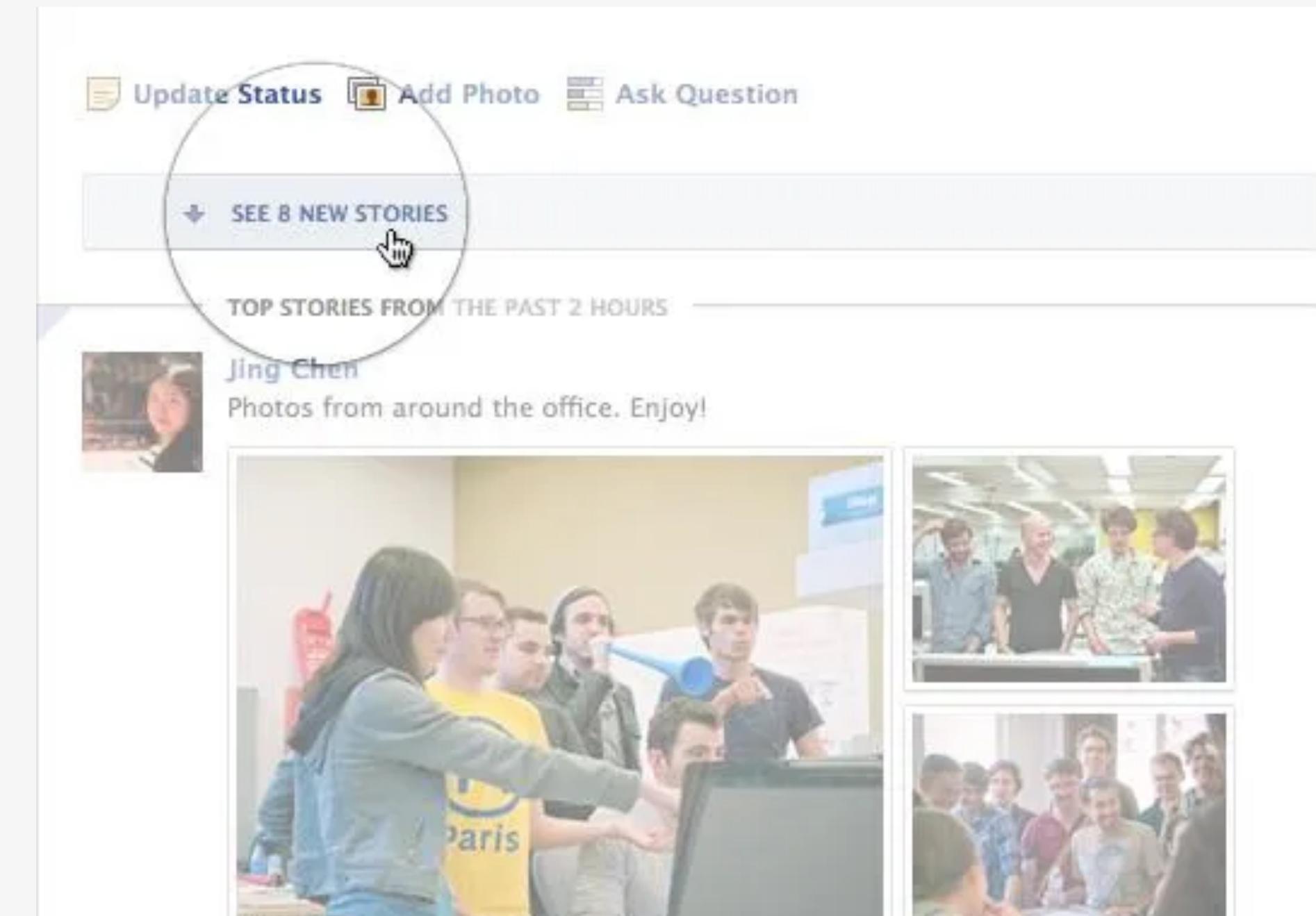
Starting today, it will be easier to keep up with the people in your life no matter how frequently or infrequently you're on Facebook.

News Feed: See What Matters at the Top

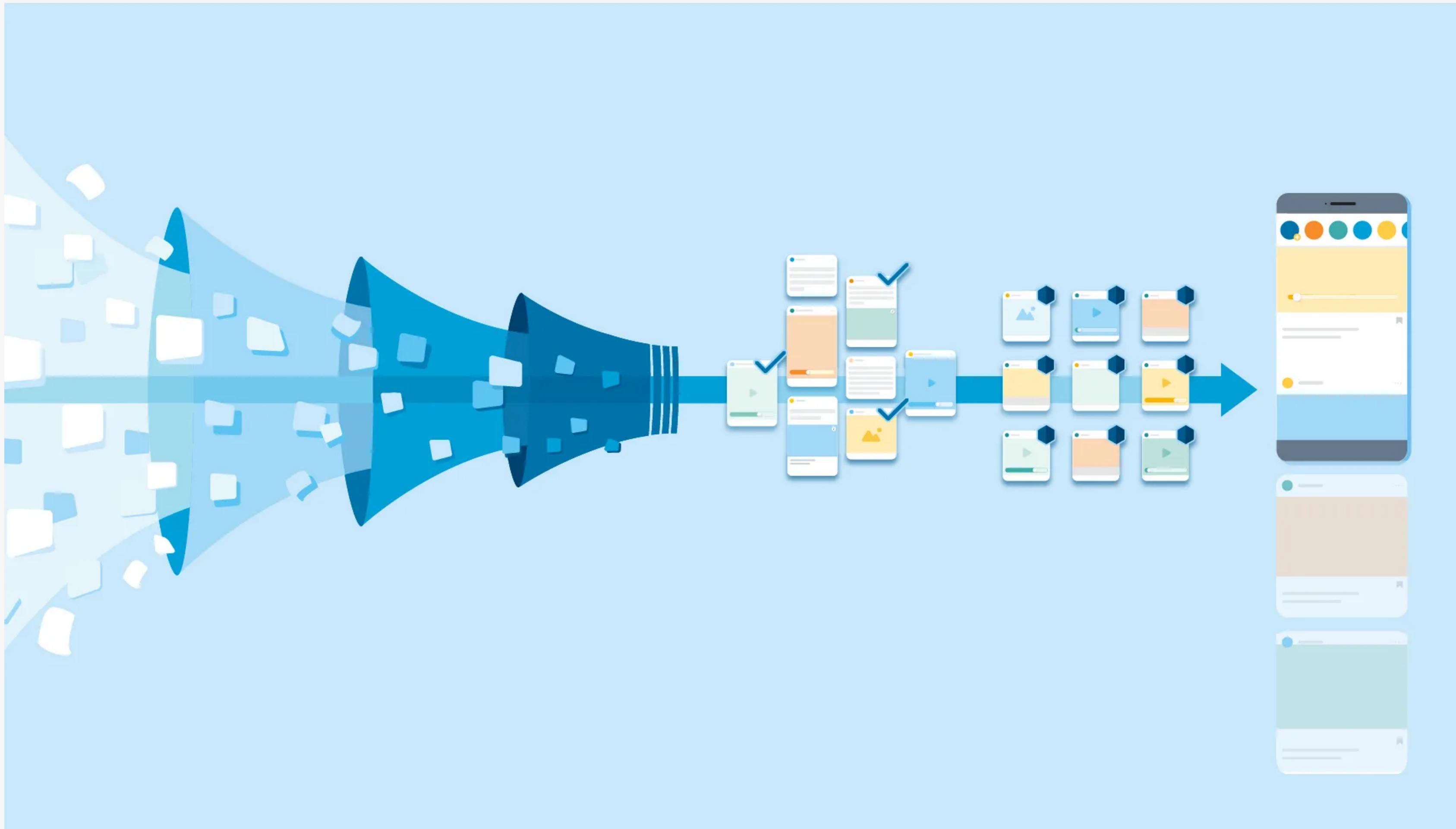
When you pick up a newspaper after not reading it for a week, the front page quickly clues you into the most interesting stories. In the past, News Feed hasn't worked like that. Updates slide down in chronological order so it's tough to zero in on what matters most.

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.

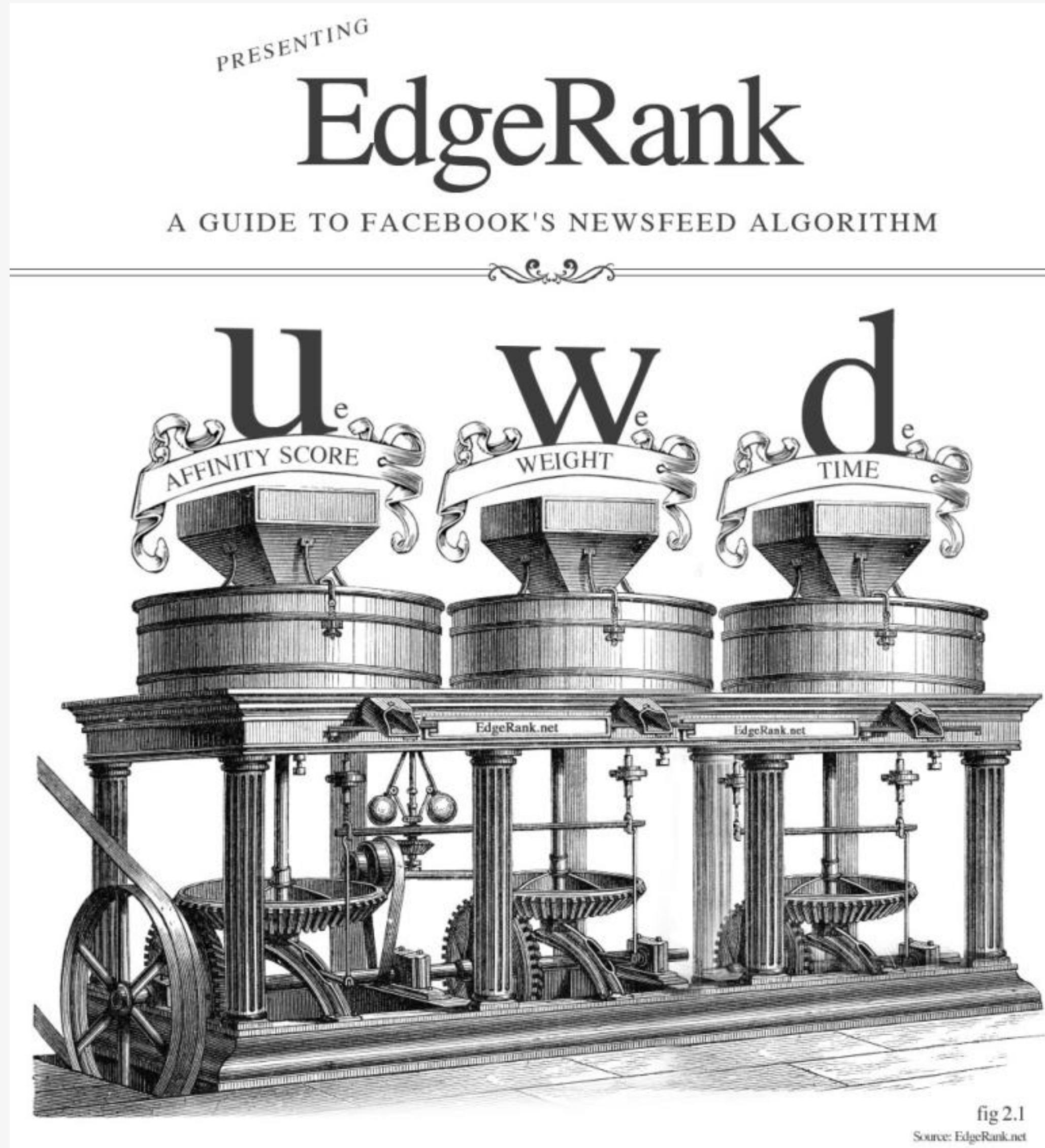
September, 2011



Goals of a feed algorithm

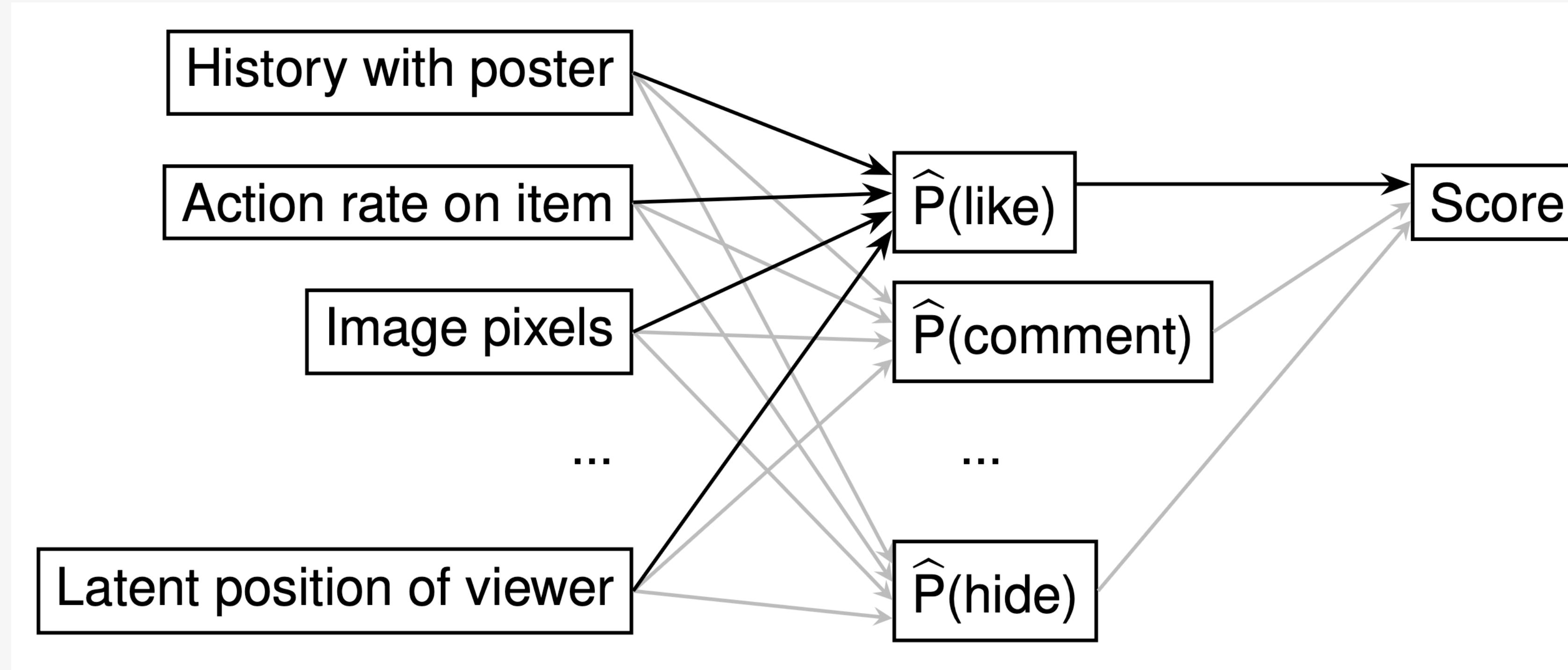


Facebook's first feed ranking algorithm (2011)



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

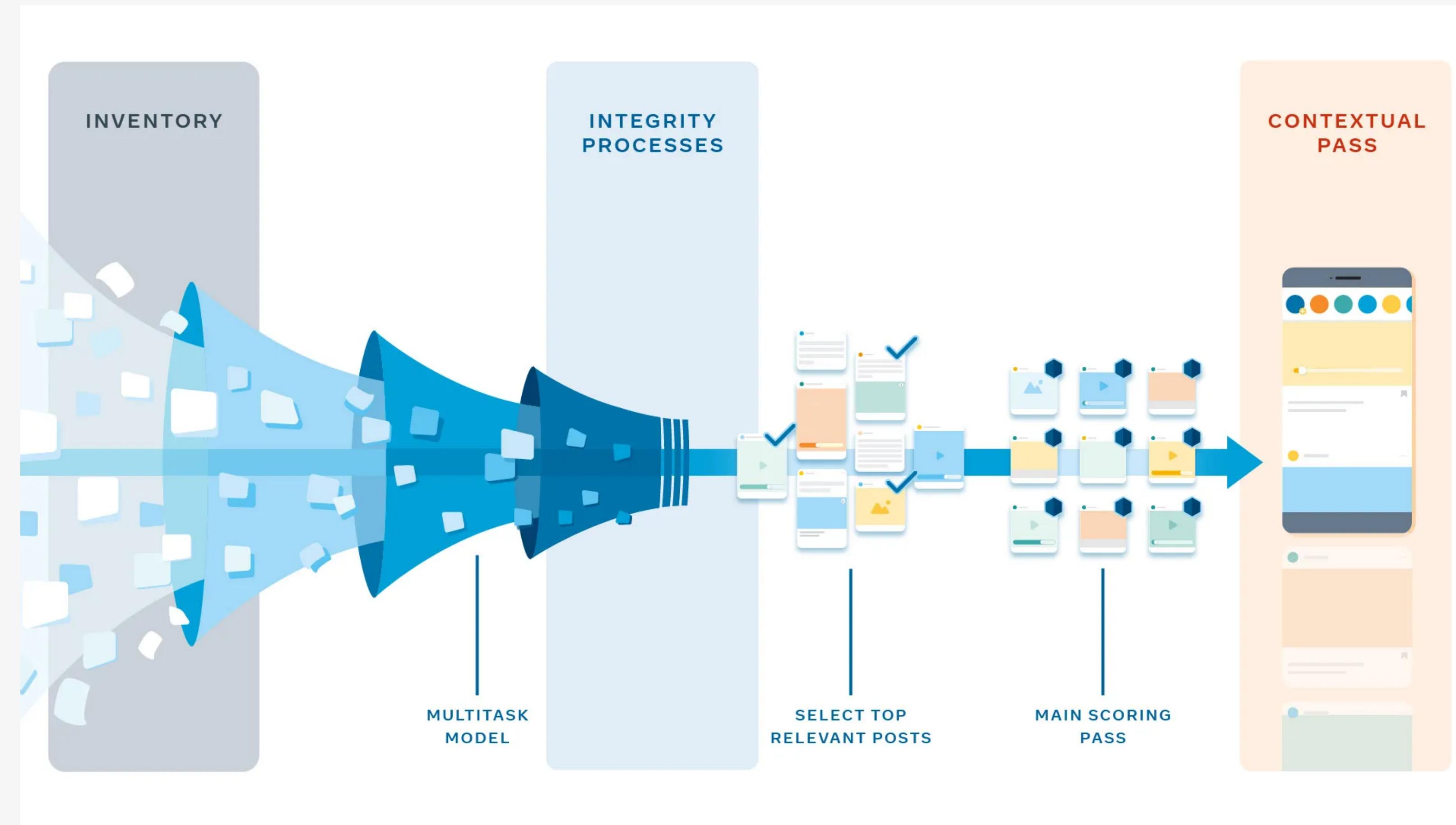
Modern feed ranking algorithms



Score =

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

Facebook's (recent) feed ranking algorithm



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

Facebook's “Meaningful Social Interactions”

The screenshot shows a Microsoft Excel spreadsheet with a title bar "from the files" and a download icon. The main title is "Weight Decision 12/15/2017". The table has two columns: "Component" and "Final Weight for 2018Q1". The components and their weights are:

Component	Final Weight for 2018Q1
Like	1
Reaction, Reshare without Text	5
Non-sig Comment, Non-sig Reshare Non-sig Message, Rsvp	15
Significant Comment, Significant Reshare, Significant Message	30
Groups Multiplier (Non-friends)	0.5
Strangers Multiplier (non-friend-of-friend, small pages)	0.3

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)

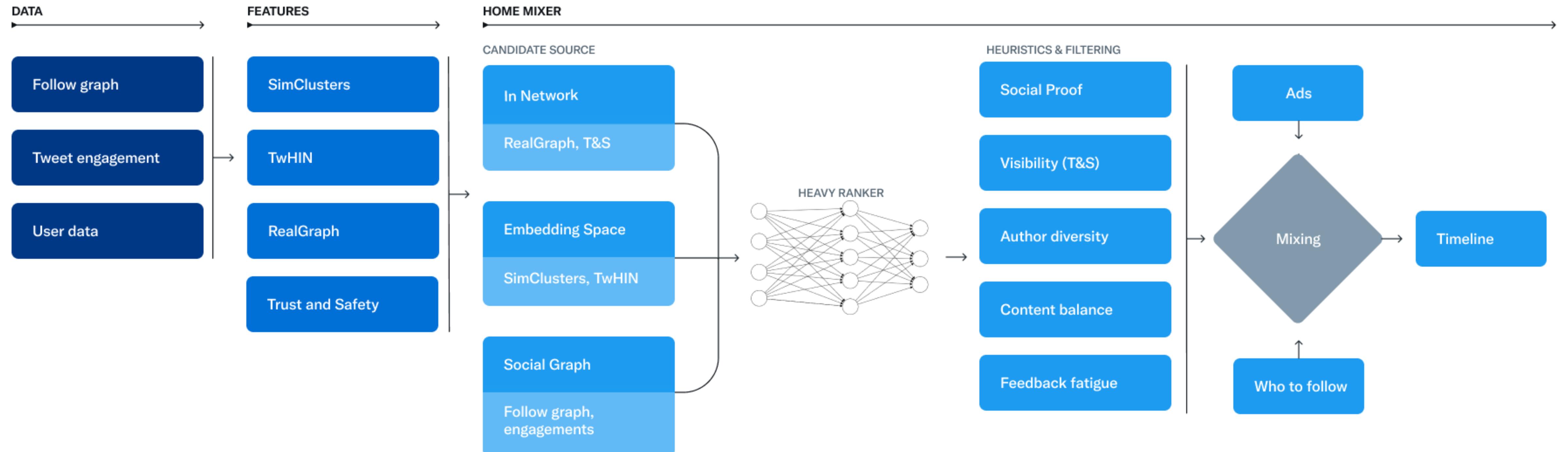
Both designed to predict engagement

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.

.....

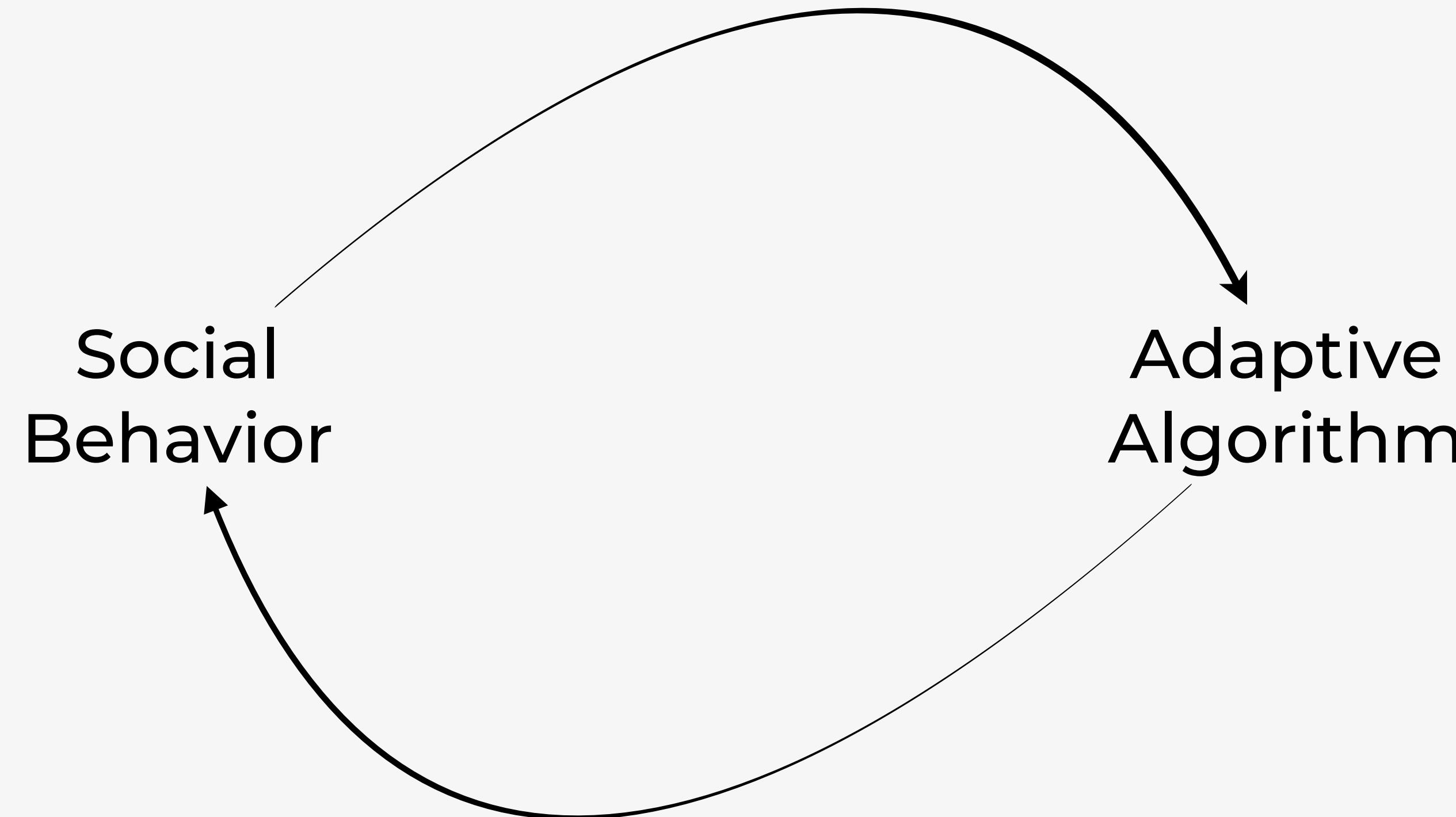
Twitter/x’s “For You” algorithm



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

Complex feedback loop in feed algorithms



Are feed algorithms to blame?

Political
polarization

Mental
health risks

Misinformation

Online
harassment



Are feed algorithms to blame?

The BBC News website features a prominent article titled "Facebook's algorithms 'supercharged' hate speech in Ethiopia's Tigray conflict". The article is dated 31 October 2023 and is written by Kalkidan Yibeltal & Wycliffe Muia from BBC News, Addis Ababa & Nairobi. The BBC logo is at the top left, and a "Watch Live" button is at the top right. The main image shows a person interacting with a computer screen displaying social media content.

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

31 October 2023

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

The Al Jazeera website has an "EXCLUSIVE" feature titled "In India's strife-torn Manipur, narrative battle is fought on social media". It discusses how social media warriors share their community's views and put down others in an ethnic conflict. The Al Jazeera logo is at the top left, and a "LIVE" button is at the top right. The main image shows a person interacting with a computer screen displaying social media content.

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 magazine's website features an article titled "Meta's Facebook Algorithms 'Proactively' Promoted Violence Against the Rohingya, New Amnesty International Report Asserts". The article is categorized under "WORLD • MYANMAR". The TIME logo is at the top left, and a navigation menu is at the top right. The main image shows a person interacting with a computer screen displaying social media content.

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

The screenshot shows the Science magazine website. At the top, there is a navigation bar with links to "Current Issue", "First release papers", "Archive", "About", and "Submit manus". Below the navigation bar is a large graphic featuring a woman standing in front of a giant blue Facebook logo. The logo has a "VOTE" button on it. A small red box labeled "SPECIAL ISSUE" is overlaid on the graphic. The main title "Social media and elections" is displayed in large white letters. Below the title, there is a section titled "INTRODUCTION TO SPECIAL ISSUE" with the title "Democracy Intercepted" by EKEOMA E. UZOGARA. The article summary asks, "Did platform feeds sow the seeds of deep divisions during the 2020 US presidential election?". There are also sections for "RELATED EDITORIAL" (Face value by H. HOLDEN THORP), "RELATED IN DEPTH" (Studies find little impact of social media on polarization by KAI KUPFERSCHMIDT), and "BOOKS ET AL.". On the left side of the page, there is a sidebar with links to various sections: INTRODUCTION TO SPECIAL ISSUE, POLICY FORUM, RESEARCH ARTICLES, EDITORIAL, NEWS, IN BRIEF, IN DEPTH, FEATURE, INSIGHTS, PERSPECTIVES, and BOOKS ET AL.

Big collaboration
between Meta and
external researchers

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](#)

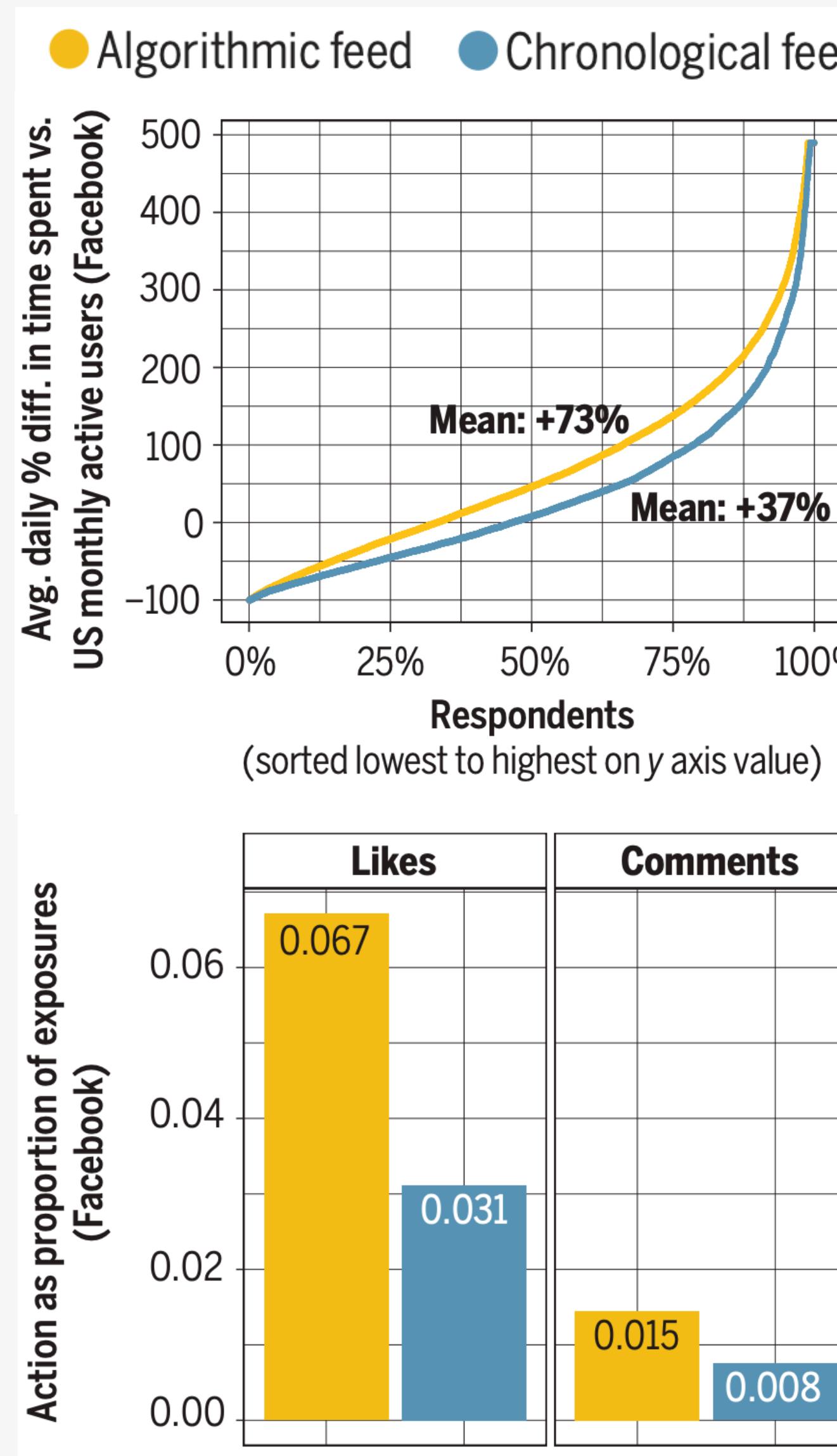
SCIENCE • 27 Jul 2023 • Vol 381, Issue 6656 • pp. 398-404 • DOI: 10.1126/science.abp9364

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](#)

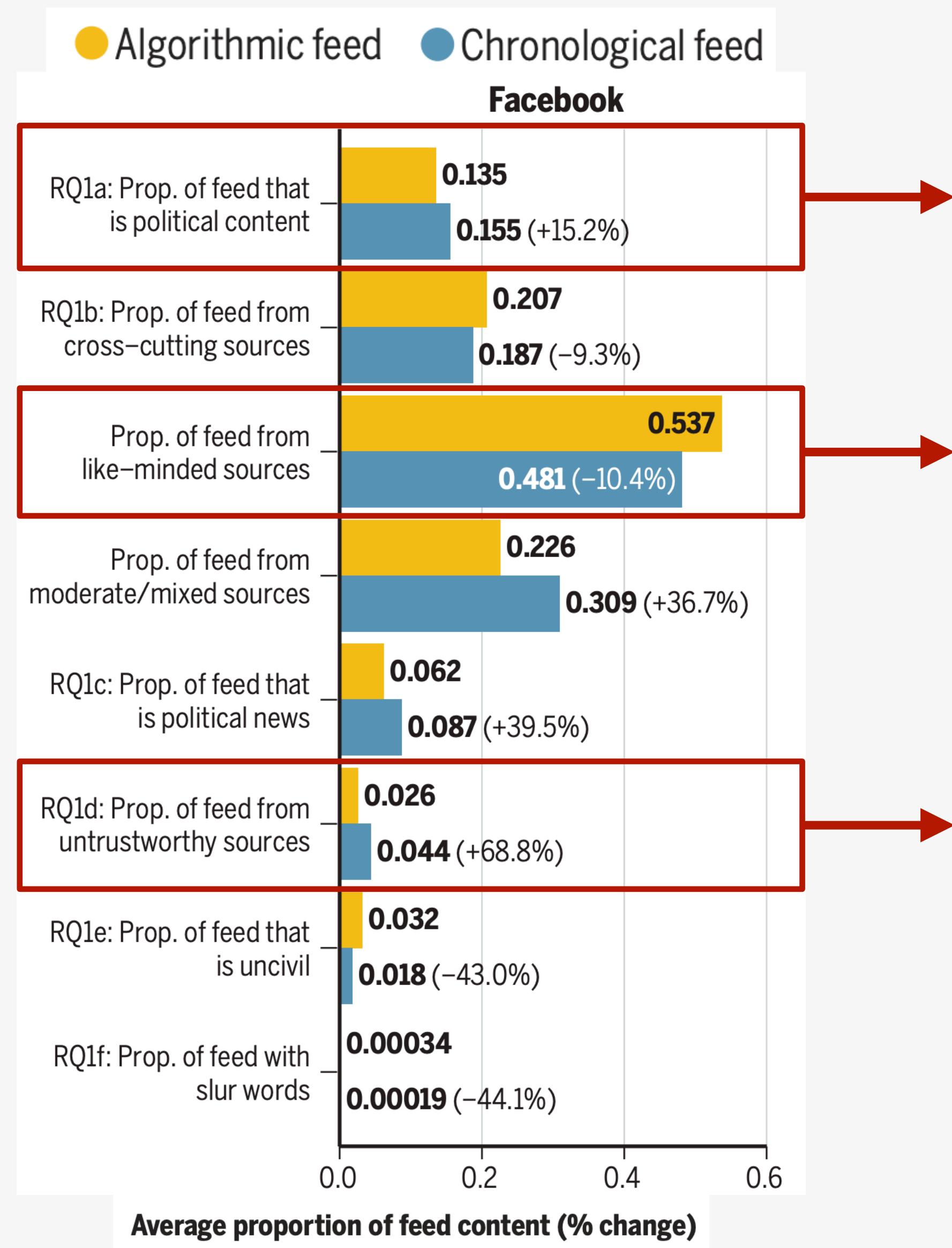
Algorithmic vs. chronological feed (Guess, et al.)



Moving to chronological feed:

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

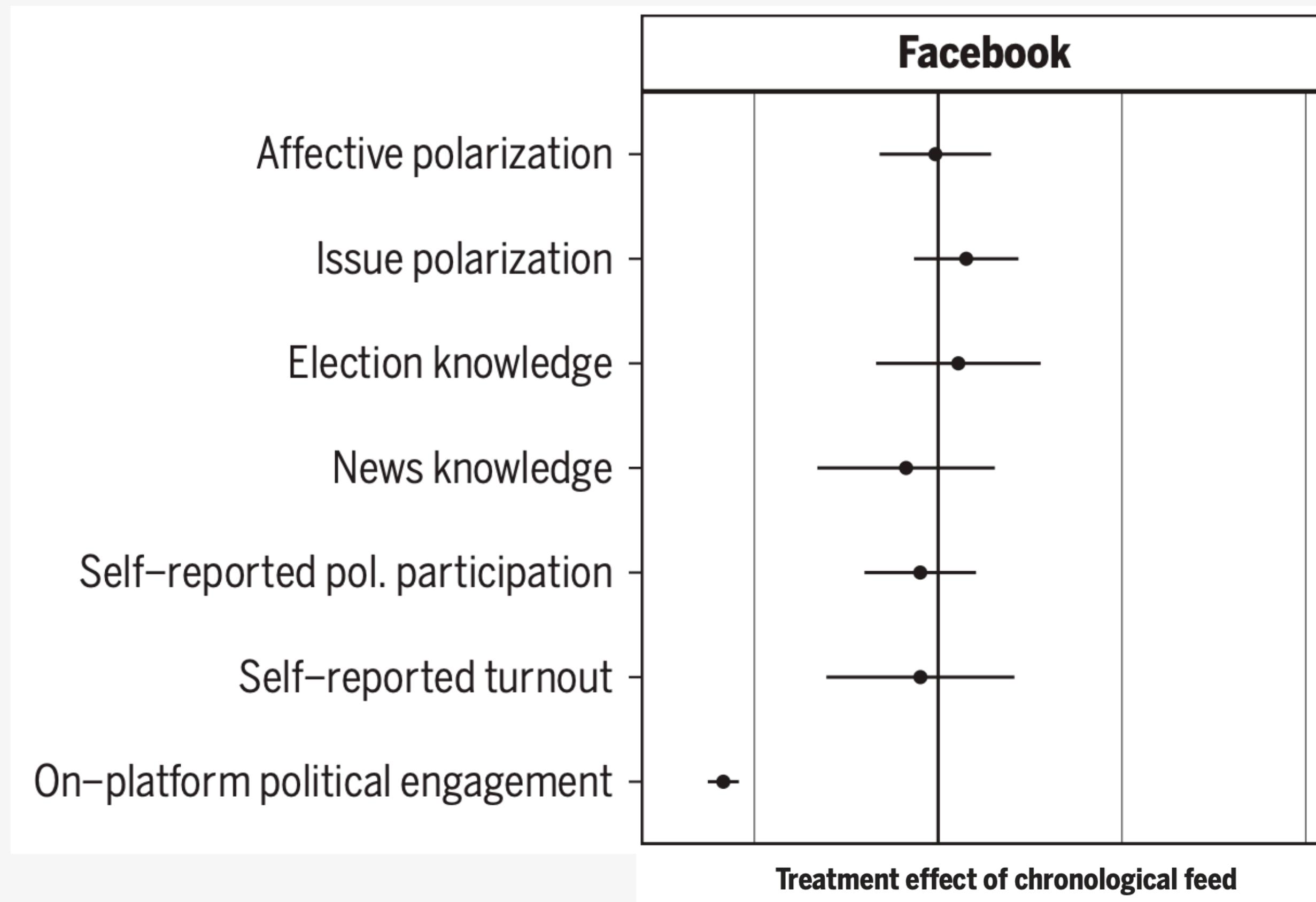
Algorithmic vs. chronological feed (Guess, et al.)



Moving to chronological feed:

- ↑ exposure to political content
- ↓ exposure to like-minded sources
- ↑ exposure to untrustworthy content

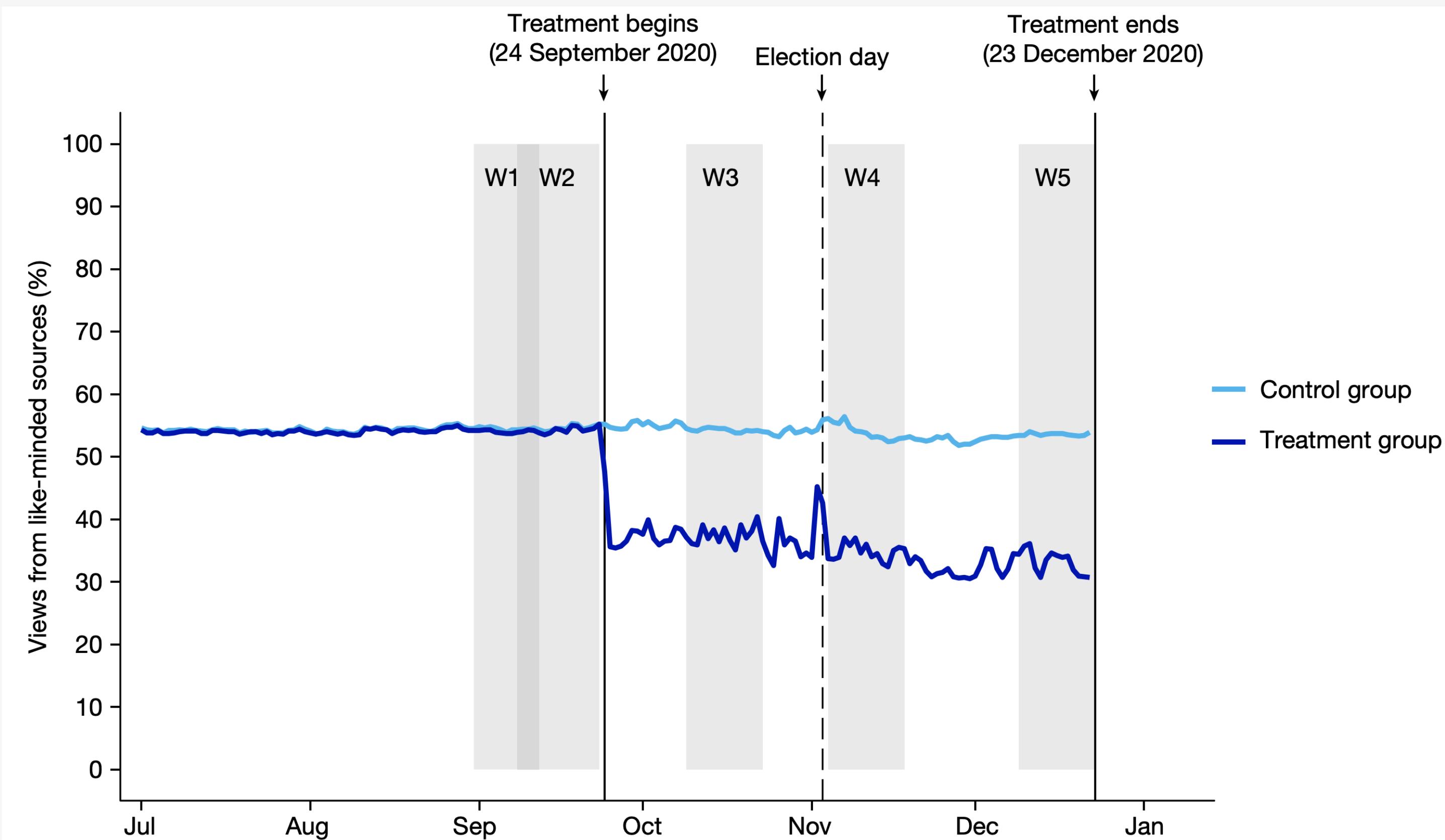
Algorithmic vs. chronological feed (Guess, et al.)



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

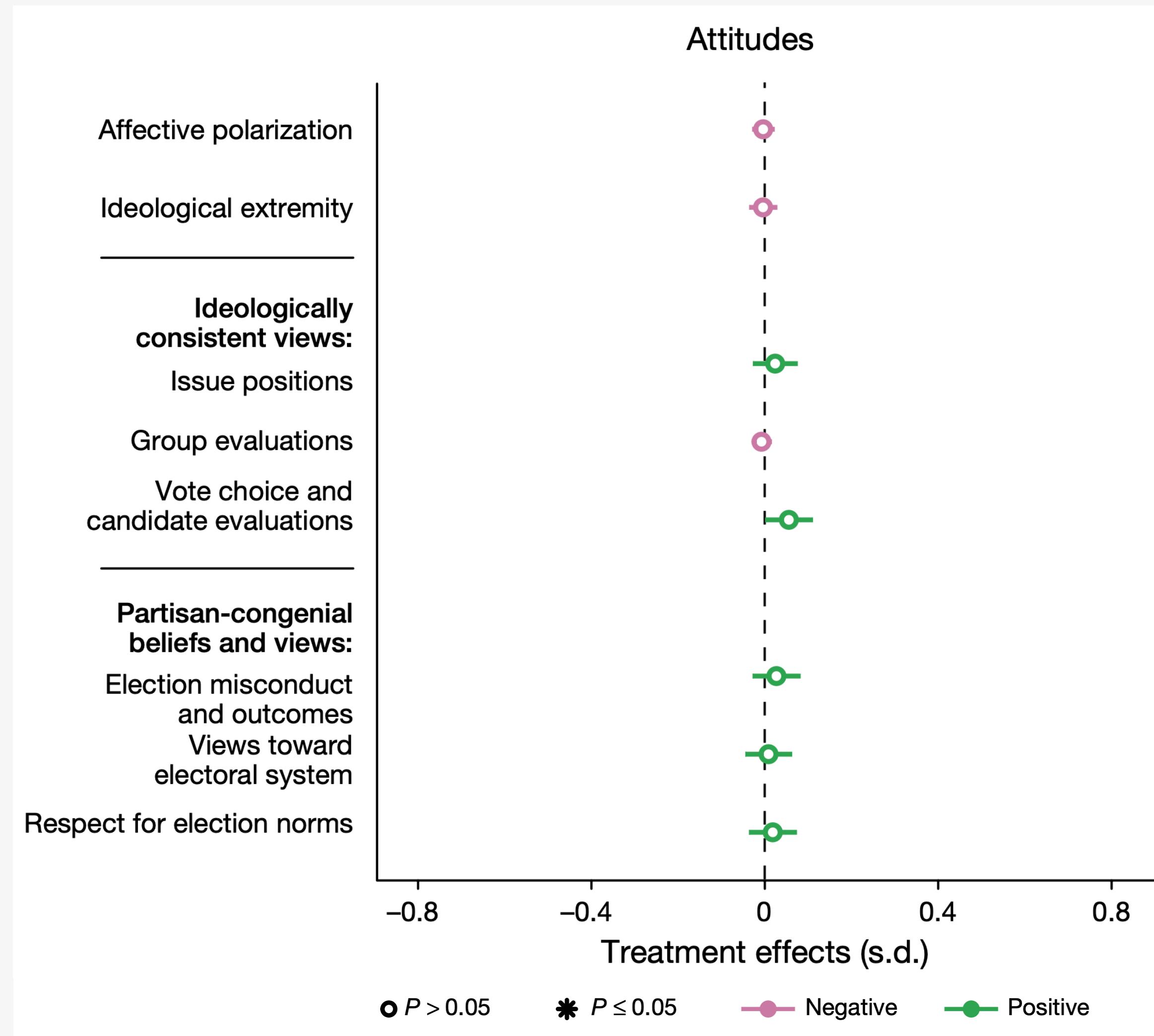
Reduced exposure to like-minded sources (Nyhan et al.)

“... 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”

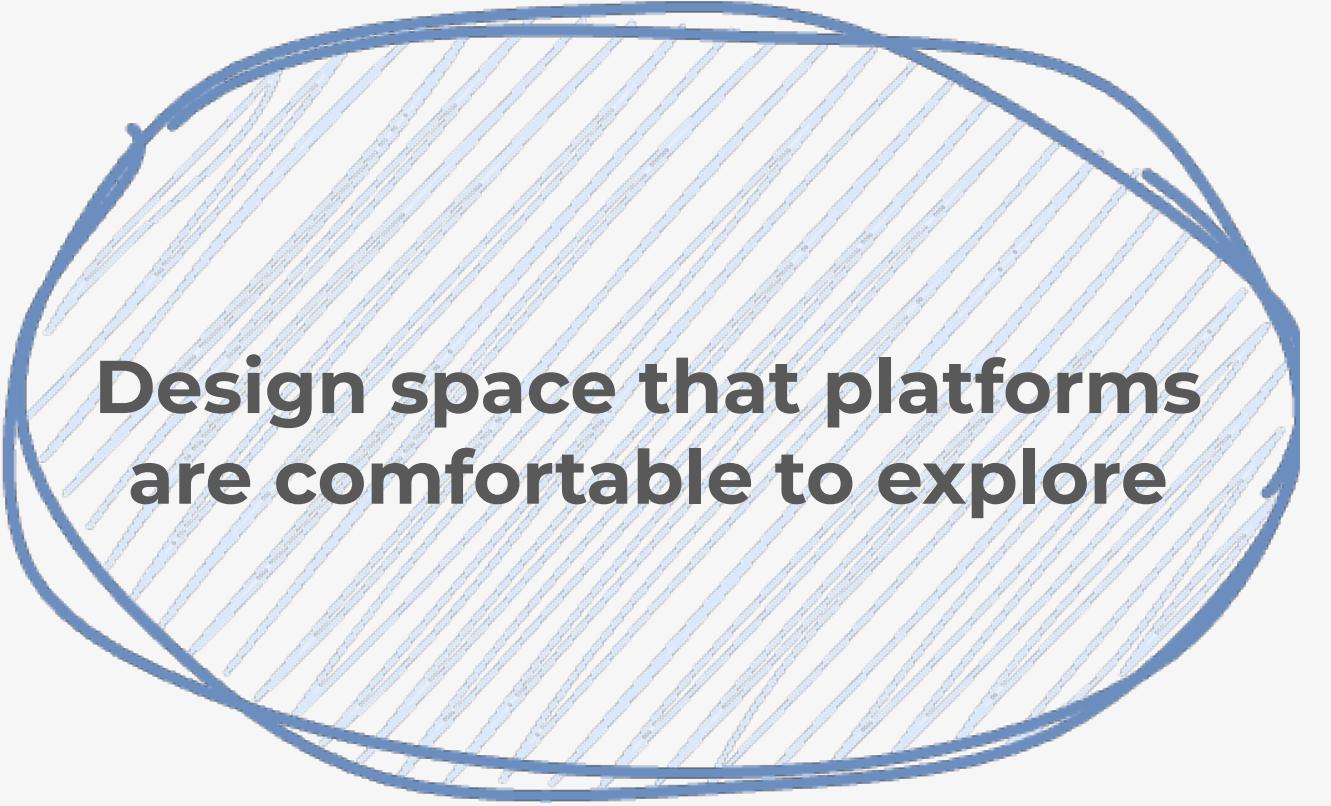


Field experiment on
Facebook **reducing**
exposure to content from
like-minded sources
(n=23k)

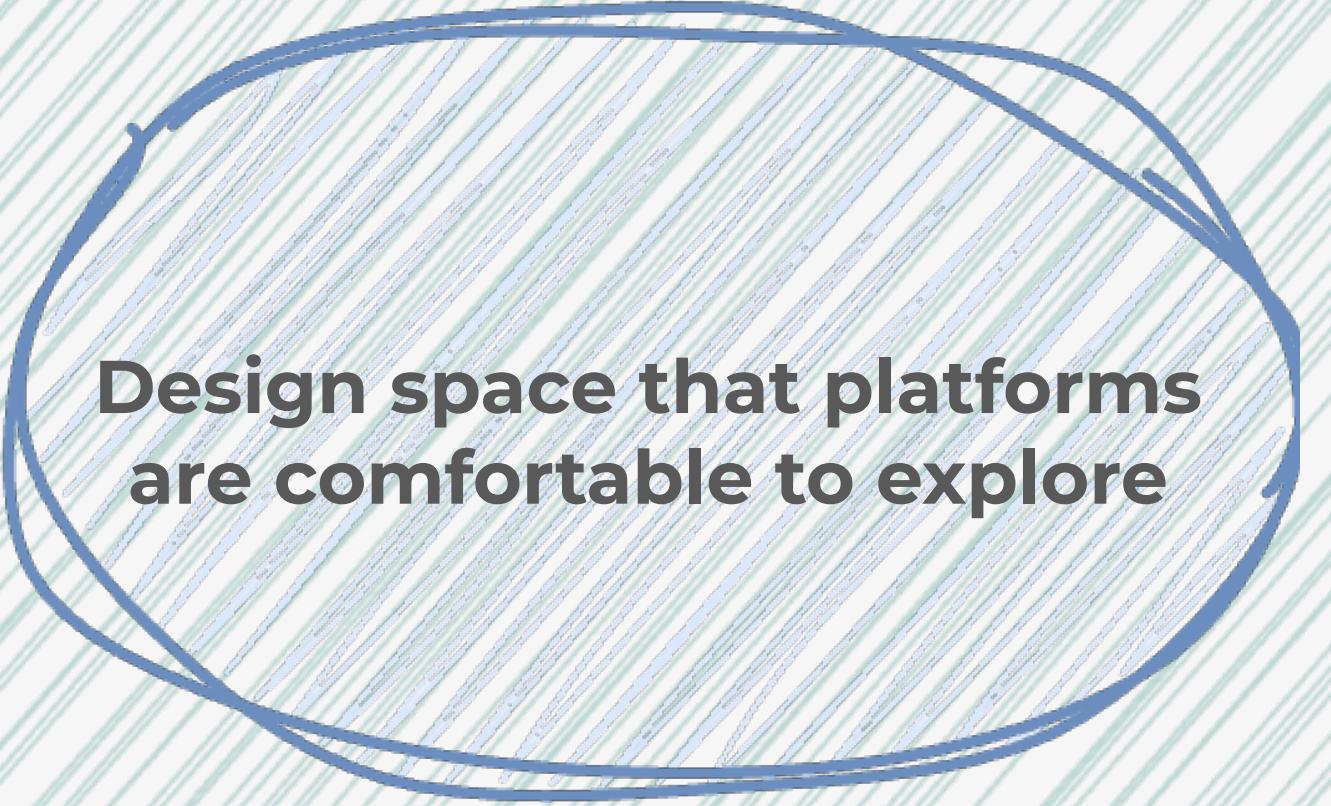
Reduced exposure to like-minded sources (Nyhan et al.)



The intervention had
no measurable effects
on eight preregistered
attitudinal measures



**Design space that platforms
are comfortable to explore**



**Design space that platforms
are comfortable to explore**

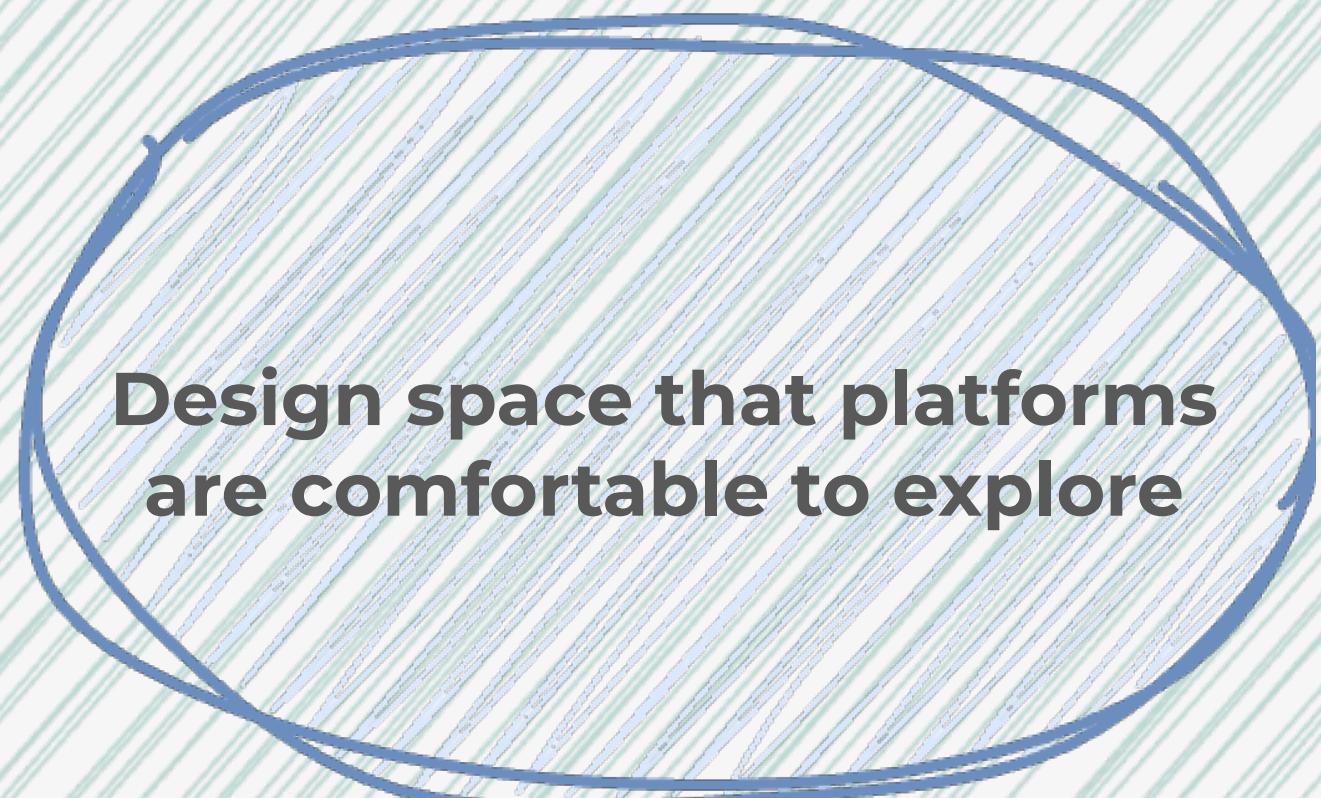
**The real design space
is much bigger!**



**The real design space
is much bigger!**

LLMs →

Opportunities for research



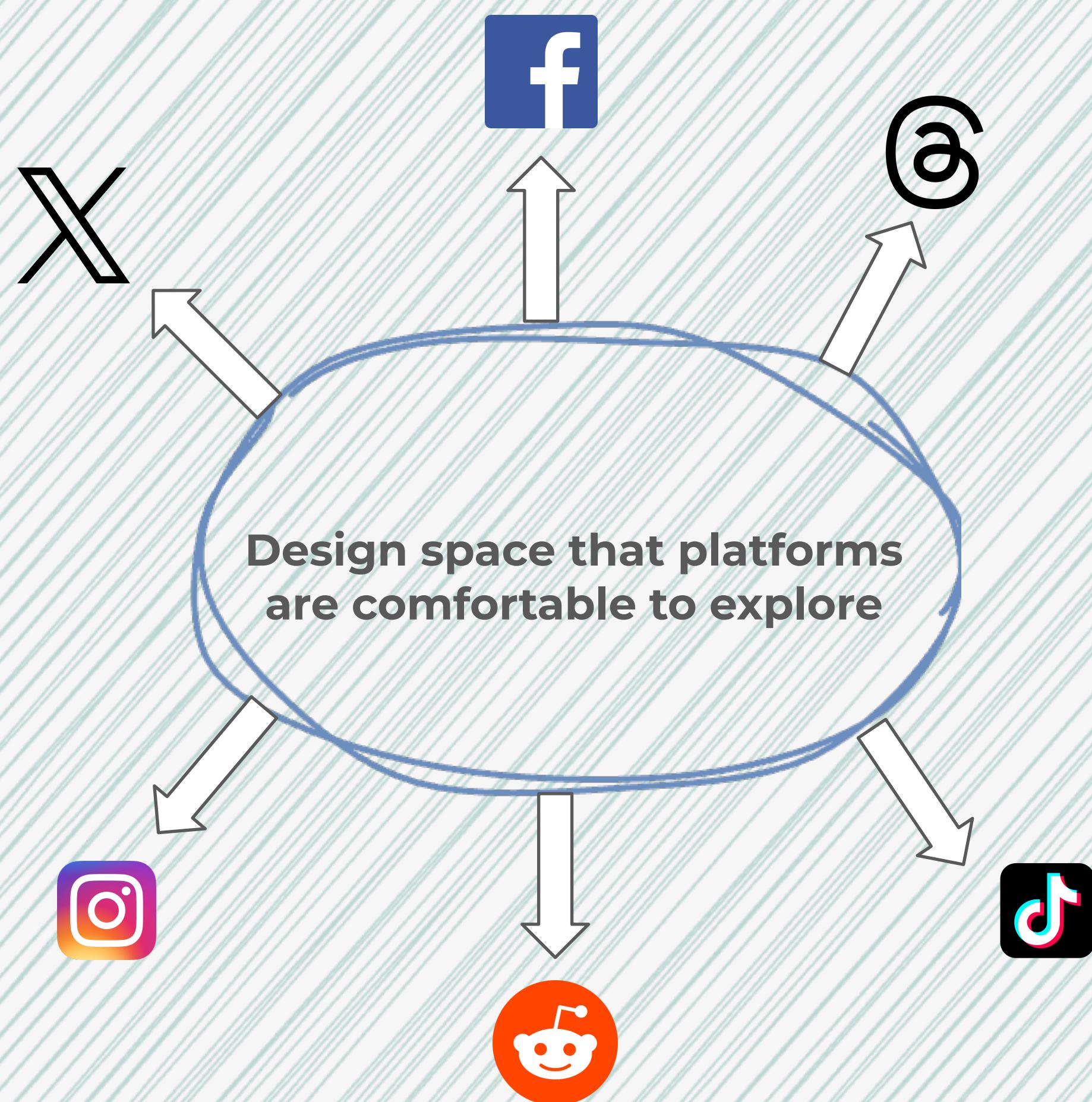
The real design space
is much bigger!

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

