Beyond echo chambers and filter bubbles: Towards a feedback-loop model of political communication

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1

How I got interested in feedback loops: *a lot* of talk about bubbles and echochamers, but *despite* (seemingly) plausible mechanism, little real-world evidence.

That's fascinating!

ERC-Project NEWSFLOWS



Anne Kroon



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Problematic metaphors

Echo chambers and Filter Bubbles: Two metaphors

- law scholar Cass Sunstein (2001) popularized idea of "echo chamber; internet activist Eli Pariser (2011) coined "filter bubble"
- speaks to the imagination; easy to find anecdotal evidence
- but: ill-defined, misleading, and hence too weak pillars for theory to rest on (e.g., Bruns, 2019; Dahlgren, 2021; Jungherr et al., 2020; Jungherr & Schroeder, 2021; Rau & Stier, 2019)

Problematic metaphorsFeedback loopsTypesWhy aren't we doomed?Contemporary problemsHow further?0000000000000000000000000000000000000000

Echo chambers and Filter Bubbles: Two metaphors

- "frequently employed as quasi-synonymous terms" (Vaccari & Valeriani, 2021, p. 84)
- different emphasis:
 - echo chambers: connections of like-minded people
 - filter bubbles: constraints on information exposure.
 - echo chambers: psychological mechanisms (+ algorithmic filtering?)
 - filter bubbles: almost exclusively about algorithmic filtering

These metaphors are fuzzy and ill-defined, but there lies some truth in them: People can radicalize in their small like-minded social-media-group, and algorithmic recommendation systems can influence which news we see.

How can we move beyond oversimplifying metaphors without throwing the baby out with the bathwater?
 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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Let's focus on the underlying dynamic processes: feedback loops.

Feedback loops

What are feedback loops?

"parts joined so that each affects the other" (Ashby, 1956, p. 54).

- cybernetics (e.g., Ashby, 1956)
- complexity science today (e.g., Meyers, 2009)
- system theory (e.g., Littlejohn & Foss, 2009)

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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The "feedback loop" notion in communication science i

- Dynamic-transactional approach (Früh & Schönbach, 1982):
 "it takes two to generate media effects, and [...] the relationship between the two actors may change during an effects process" (Schönbach, 2017, p. 8)
- Gatekeeping (Shoemaker & Vos, 2009; Westley & MacLean, 1957): journalists adopt their writing to audience feedback (letters to the editor, metrics,...)

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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The "feedback loop" notion in communication science ii



Figure 1: A system of two simple feedback loops in which the product that a journalist delivers is shaped by audience feedback on that product, but also by the feedback that sources (like interview partners) receive from the journalists.

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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The "feedback loop" notion in communication science iii

Every cross-lagged models a feedback loop!



Figure 2: "Unrolling" a feedback loop and plotting it over multiple slices in time (figure by Slater, 2007)

Types

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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Types of feedback loops

I distinghuish between *human feedback loops* and *algorithmic feedback loops*

Types

Human feedback loops

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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1. Within-human feedback loops

Two examples:

- selective exposure: a vicious circle of ever-increasing polarization of attitudes and ever-increasing selectivity in media use (e.g., Stroud, 2008)
- a "feedback loop between identity, status seeking, and political polarization" (Bail, 2021, p. 122)

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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2. Between-human feedback loops

Two examples:

- a politician acting upon what a journalist writes, who then writes about the politician's action, ... (e.g., Bruns & Nuernbergk, 2019; Van Aelst et al., 2016);
- user comments, where (a) users affect each other (e.g., Ziegele et al., 2018), and (b) the comments serve as a cue for reading the item (e.g., Messing & Westwood, 2011).

Types

Algorithmic feedback loops

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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1. Algorithmic feedback loops without human actors

Think: two chess programs playing against each other. (very rare in political communication settings)

2. Algorithmic feedback loops with human actors

Typical example:

• The "filter bubble" argument: a recommendation system learns someone's preferences from their previous choices, offers more similar content, further strengthening the preferences, and so on (e.g., for YouTube, Kaiser & Rauchfleisch, 2020; Ribeiro et al., 2019; Whittaker et al., 2021)
 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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It can get complex easily...

Problematic metaphors	Feedback loops	Types	Why aren't we doomed?	Contemporary problems	How further?
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Why aren't we doomed?

Why aren't we doomed? i

Slater (2007) talks about *positive* feedback loops as "reinforcing processes" that "spin out of control". But:

- 1. Also negative, self-regulating, feedback loops: "thermostat"
 - If recommendations become too tailored, or if the journalist is only driven by audience metrics, the result gets *boring* users will turn away, changing the metrics
 - Typical recommender systems include serendipity and allow the user to "correct" the system if it over-personalizes
- 2. Nonlinearity: Over time, media effects will level off

Why aren't we doomed? ii

 "competing social, psychological, and environmental influences" ensure that the system is not fully "closed" (Slater, 2007, p. 288)

Why aren't we doomed? iii



Figure 3: The linear function $y = 0.15 \times (x - 1)$ (dashed) and the non-linear function $y = 1 - \frac{1}{x}$ (solid).

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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While the notion of "feedback loops" seems to resemble filter bubble and echo chamber arguments, at least three arguments exist that show why feedback loops are compatible with a view that finds little evidence for the existence of filter bubbles or echo chambers (Bruns, 2019; Dahlgren, 2021: Flaxman et al., 2016; Haim et al., 2018; Zuiderveen Borgesius et al., 2016): negative feedback loops, non-linearity, and competing forces.

Contemporary problems

Three examples

- 1. The spread of mis- and disinformation
- 2. Normalization of extreme positions
- 3. Radicalisation of fringe groups

1. The spread of mis- and disinformation i

- 1. Only a minority of people visits "fake news websites", let alone shares that content (Guess et al., 2019; Tsfati et al., 2020)
- 2. yet, many are aware of specific so-called fake news stories
- 3. due to the "role played by mainstream news media in the dissemination of disinformation" (Tsfati et al., 2020, p. 170).

1. The spread of mis- and disinformation ii

- 1. Media reporting on rumours on social media dots
- 2. are quoted again on social media (Andrews et al., 2016)
- 3. further accelerating their dissemination. \Rightarrow a feedback loop

Apparently, misinformation is not confined to some bubble but *spreads* (see also Bruns, 2019, p. 108)

1. The spread of mis- and disinformation iii

"Propaganda feedback loop" between public, polticians, and the media due to identity confirmation (Benkler et al., 2018).

But:

- evidence for *negative* self-correcting feedback loops that "dampen and contain partisan statements that are demonstrably false" (p. 75) on the political left;
- but *positive* feedback loops with "susceptibility to information cascades, rumor and conspiracy theory, and drift toward more extreme versions of itself" (p. 73) on the right.

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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The spread of mis- and disinformation can at least partly be explained by a feedback loop in which attention to it, even if meant to criticize it, creates more attention.
 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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2. Normalization of extreme positions

Different ways to describe it:

- "propaganda pipeline from the periphery to the core" (Benkler et al., 2018, p. 232)
- normalization of anti-immigrant rhetoric as a "discursive shift" (Krzyżanowski, 2020, p. 509)
- widening of the Overton window (e.g., Marwick, 2018)

The repeated expression of positions on the border of what is deemed acceptable creates a feedback loop that over time shifts this border and the positions expressed.

3. Radicalisation of fringe groups

- lack of evidence for omnipresent bubbles, but undeniable existence of radicalized homophilous groups
- "fringe bubbles" (Möller, 2021), e.g. extremists creating a ...
- ... "spiral of noise" that incorrectly suggests to the inhabitants of the bubble that they are in the majority...
- leading to overconfidence leading to actually stepping out of the bubble. . .
- and increasing support.

cf. "feedback loops of extremism" (Bail, 2021, p. 67); "vicious cycle of extremism" (Kaiser & Rauchfleisch, 2019, p. 241) or "vicious cycle of counterpublics" (Kaiser & Rauchfleisch, 2019, p. 249) .

 Problematic metaphors
 Feedback loops
 Types
 Why aren't we doomed?
 Contemporary problems
 How further?

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Fringe groups have an incentive to express radical positions and to exaggerate the amount of support for them, which creates a feedback loop that leads to further radicalization. How further?

Conclusion

Three implications for empirical research

- 1. Simulation
- 2. Algorithm audits and agent-based testing
- 3. From large N and small T to small N and large T

Conclusion

Three general suggestions

- 1. Conceptualize humans and algorithms as interacting actors
- 2. Be careful with the interpretation and attribution of coefficients, proportions, and effect sizes
- 3. Investigate both directions



Any feedback?



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