

“Socially-Transmitted Information”

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Social Transmission: Personal Theme

- Infectious disease
 - **McAdams et al (PLoS Biology 2019)**; McAdams (Covid Economics 2020); Day et al (PLoS Biology 2021); McAdams et al (JET 2023); Avery et al (AER: Insights 2024)
- Viral marketing
 - **McAdams Song (TE forthcoming)**
- “Information markets”
 - **Kranton McAdams (AEJ: Micro 2024)**
- Learning on networks
 - **Jackson Malladi McAdams (PNAS 2022, WP 2025)**
- Evolution of information
 - **this paper**

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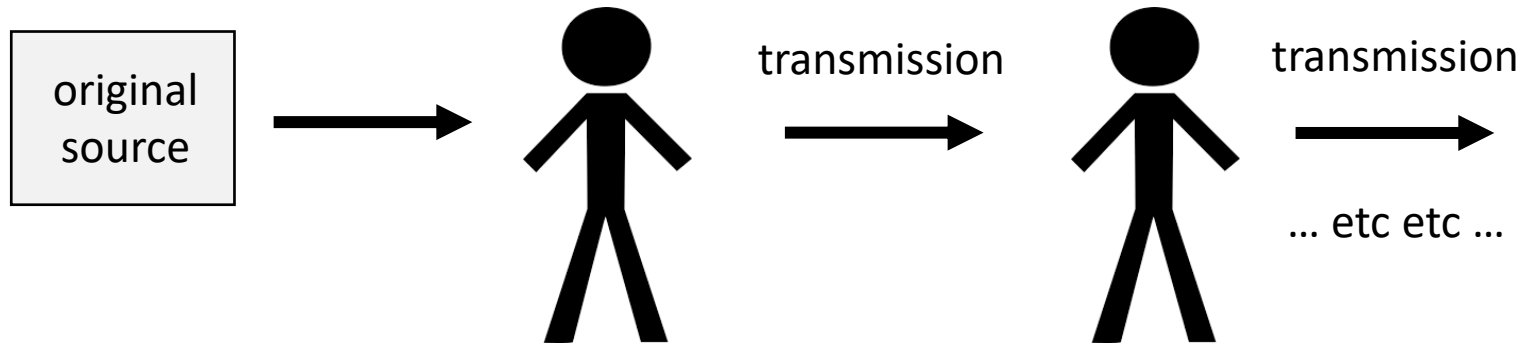
*reshaping evolutionary dynamics
[of antibiotic resistance in bacteria]*

*learning from epidemically-
spreading information*

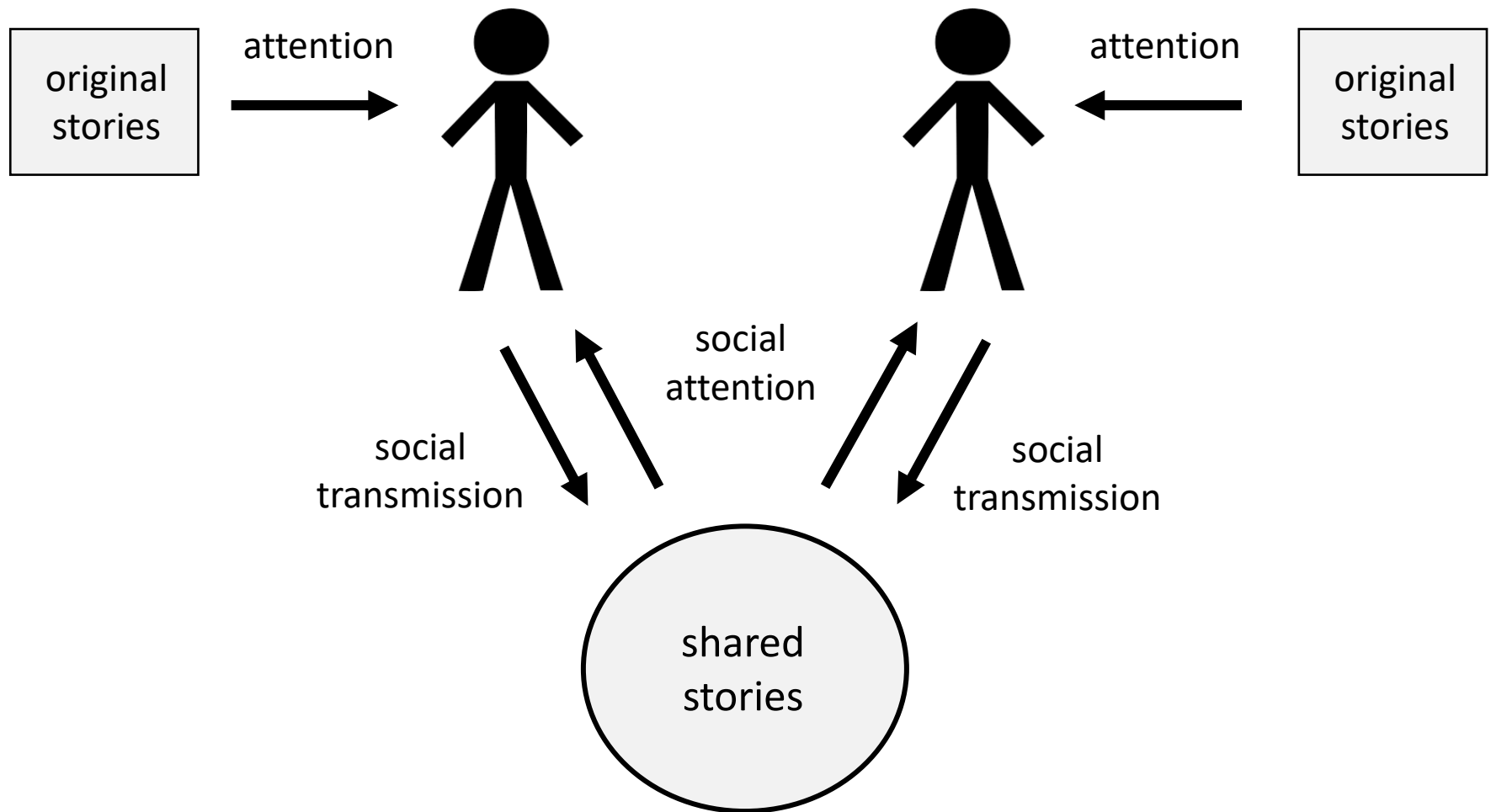
*“social filtering” and
endogenous attention*

*learning from re-shared
information*

Social Transmission on a Chain

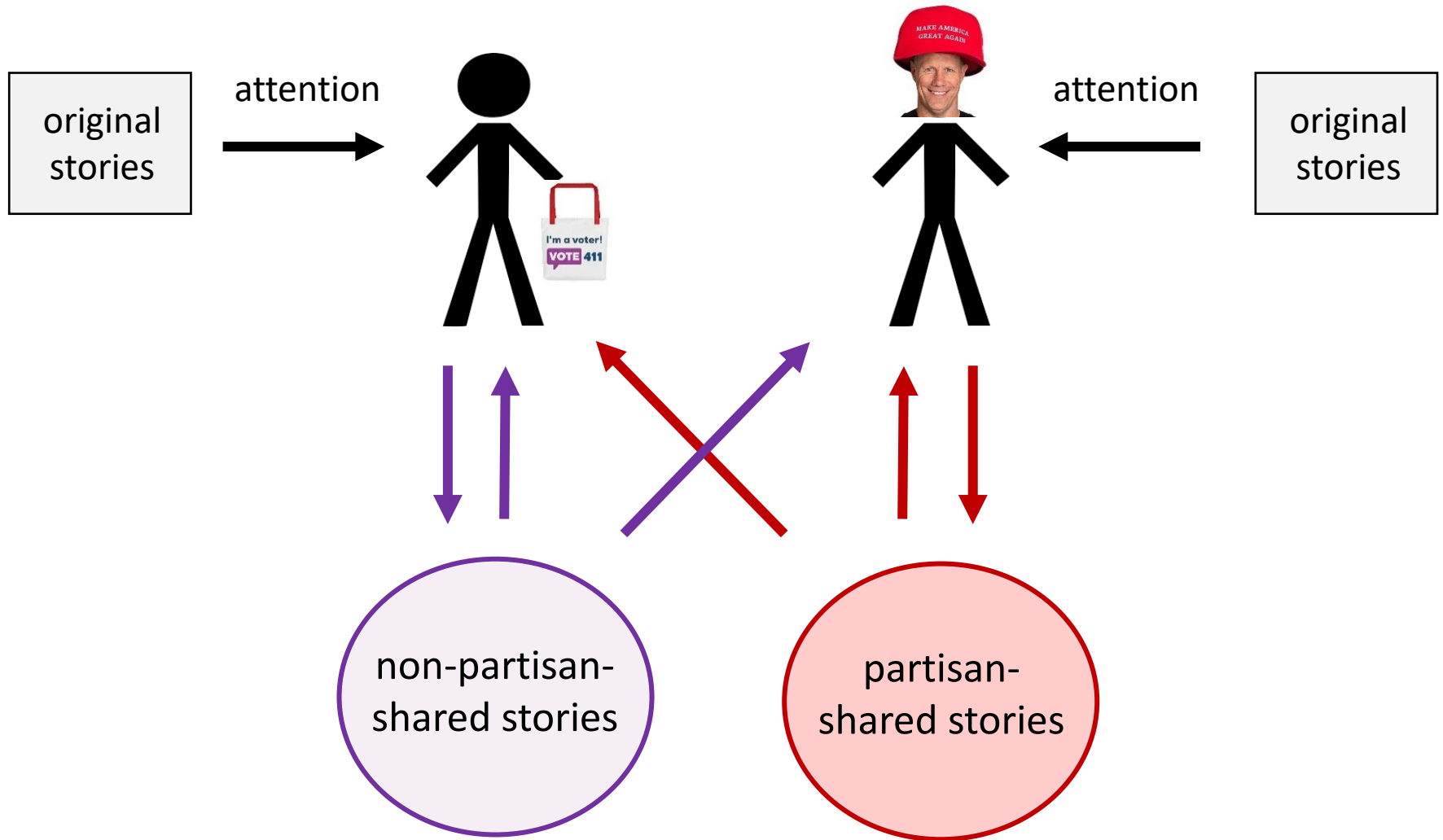


Social Transmission: This Paper



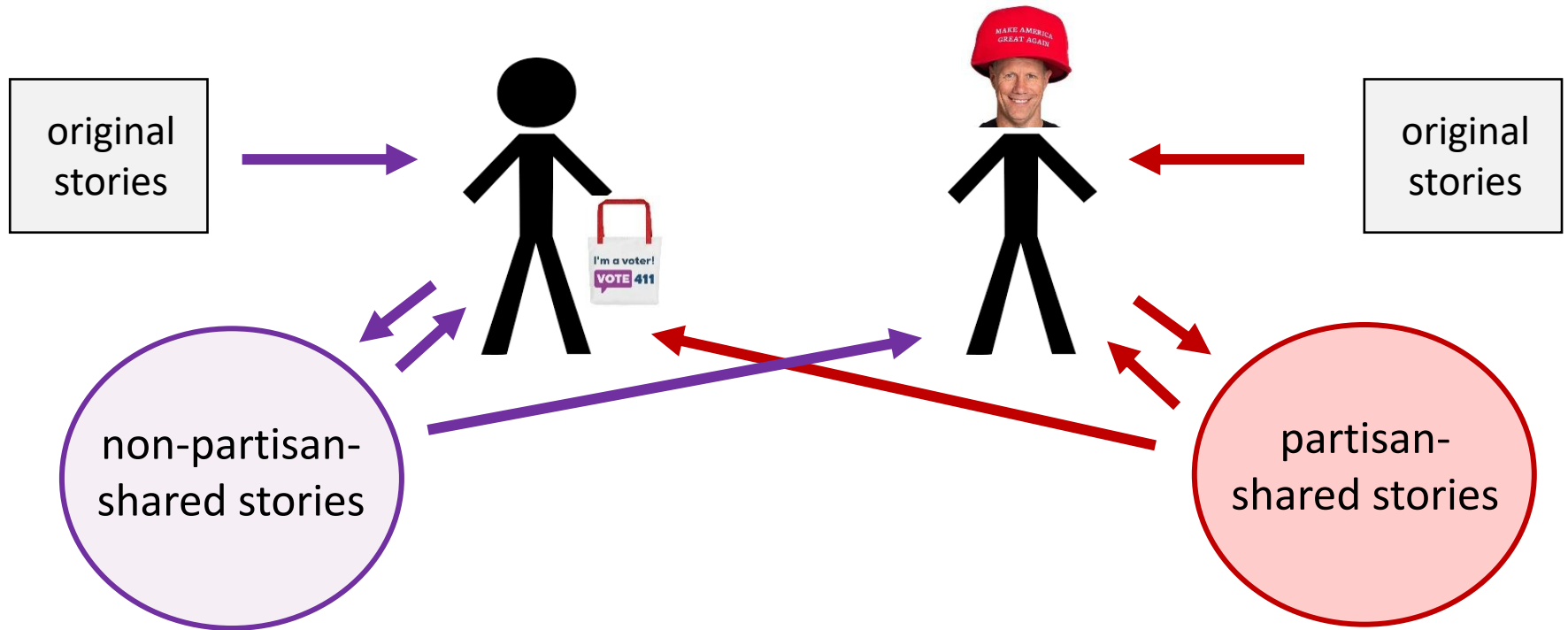
evolutionary dynamics of the shared-story pool

Social Transmission: This Paper



co-evolutionary dynamics of the shared-story pools

Social Transmission: This Paper



This paper provides a **tractable evolutionary model** of how people's choices about **where to seek out information** and **what to share** shapes the **veracity** and **other transmissive qualities** of the information that people encounter.

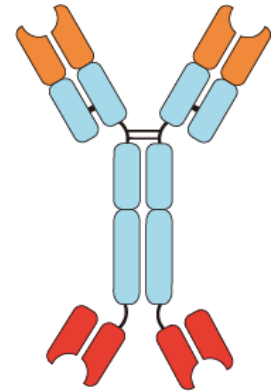
Some Examples: Socially-Transmitted Info



Grandma's recipe



The Big Lie

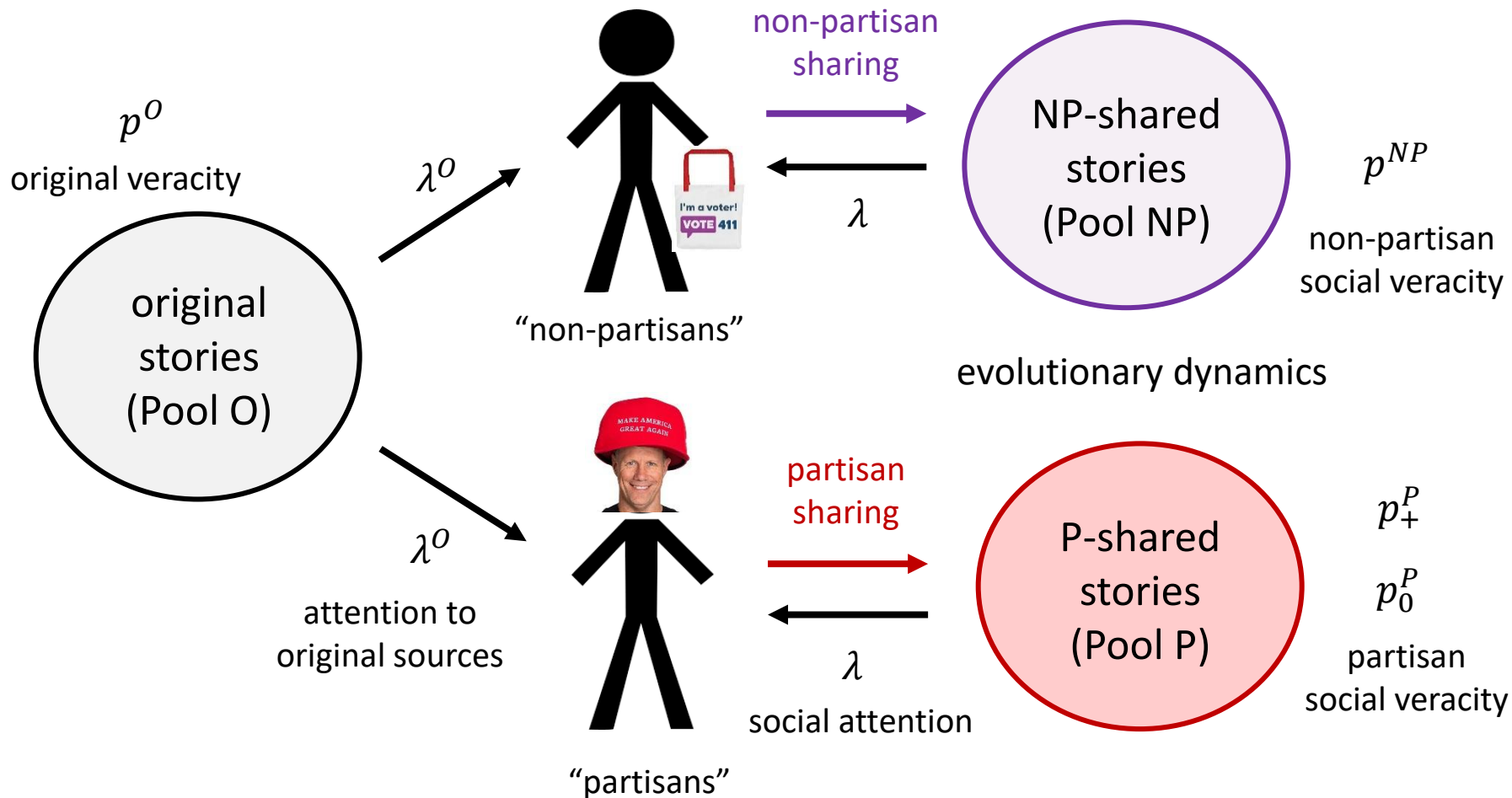


Binding reagents

- [2018 study](#): More widely-shared recipes on Allrecipes.com tend to be both tastier and healthier.
- [2024 poll](#): 38% of US adults believed that Biden's 2020 victory was not legitimate in Jan 2024, up from 31% in Dec 2021.
- [2015 call to action](#) by world's leading chemical-probe researchers: Biomedical researchers persistently fail to use the best binding reagents.

Why does social transmission seem to “work” in promoting high-quality recipes, but not truth in politics or research methods in biomedicine?

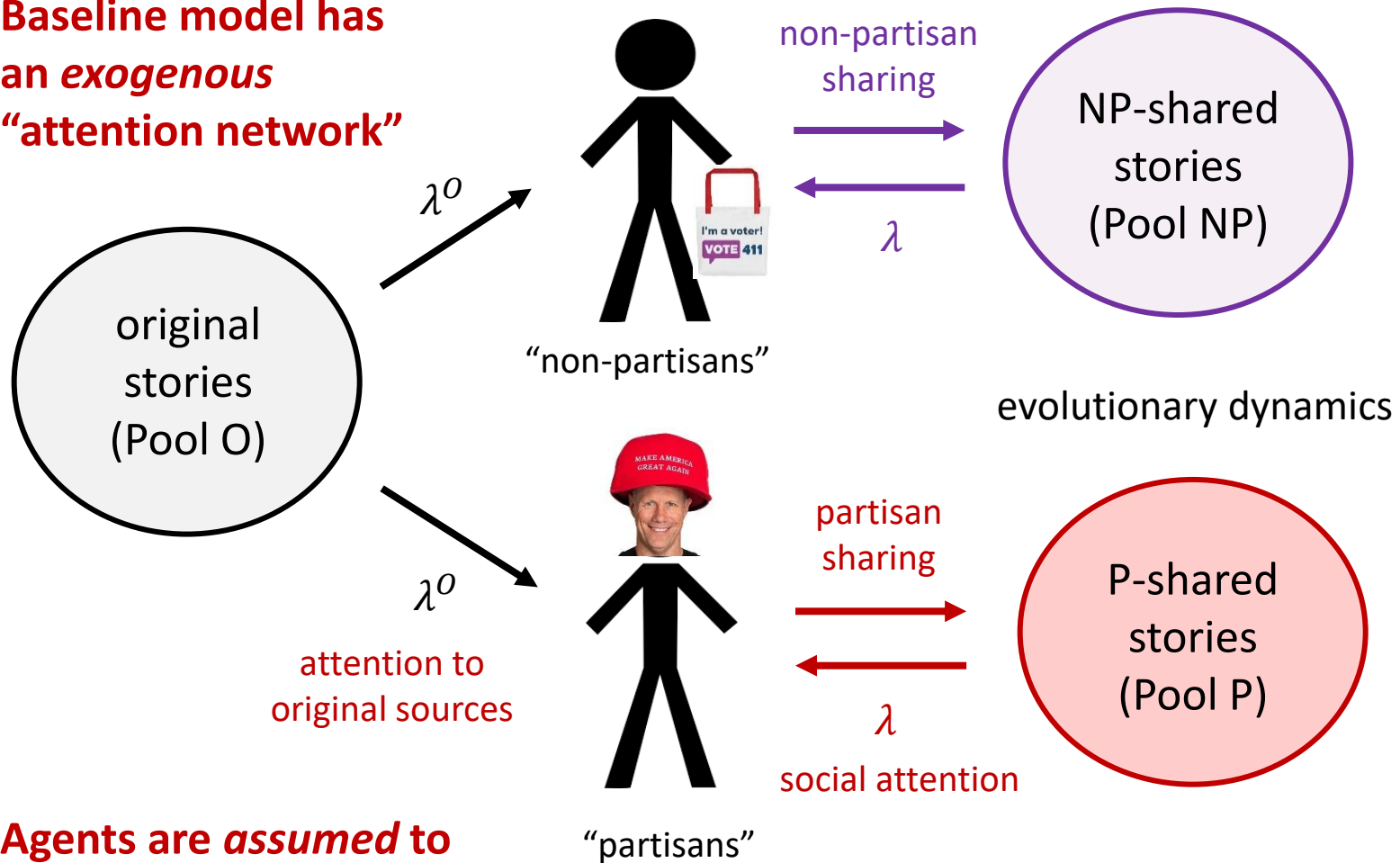
Illustration of the Baseline Model



Notes: (i) $p^O = \Pr(\text{true})$ among original stories. (ii) Stories are "neutral" (0) or "partisan" (+) but partisanship is assumed to be uncorrelated with truth

Key Simplification in the Baseline

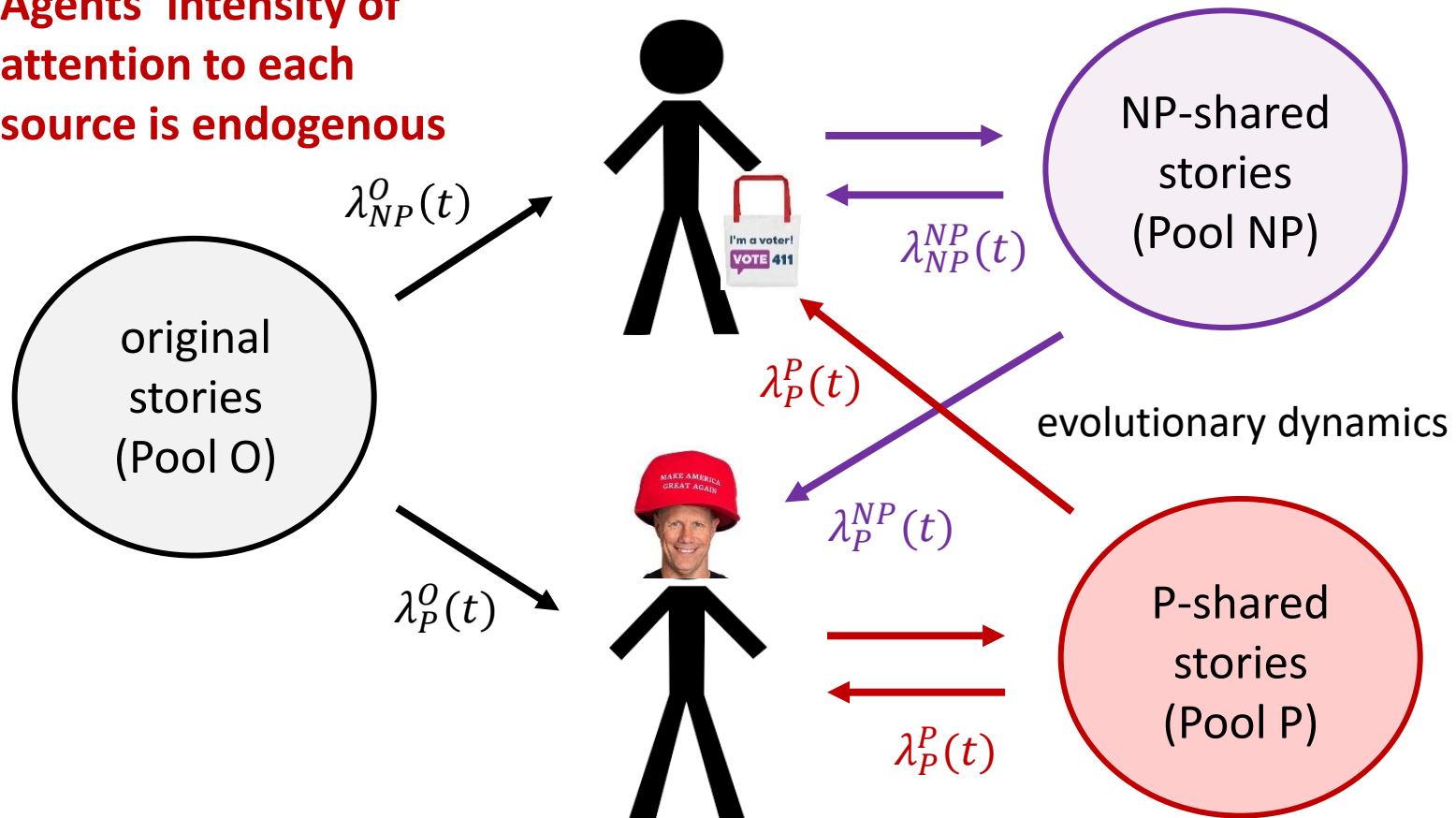
Baseline model has
an *exogenous*
“attention network”



Agents are *assumed* to
be in “echo chambers”

Illustration of the Extended Model

Agents' intensity of attention to each source is endogenous



Baseline Findings

Social filtering: most stories in Pool NP are true regardless of the veracity of original stories.

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Differential social filtering: partisan stories in Pool P are less likely to be true than neutral stories in Pool P.

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Differential social filtering: partisan stories in Pool P are less likely to be true than neutral stories in Pool P.

Awash in partisan content: if agents are strongly partisan, most stories in Pool P are partisan.

- *strongly partisan* = partisans prefer to share partisan content, even if definitely false. **For this talk: assume strongly partisan.**
- *barely-strongly partisan* = partisan agents are indifferent whether to share false partisan content.
- *extremely partisan* = partisan agents get a sufficiently high payoff when sharing false partisan content .

Baseline Findings

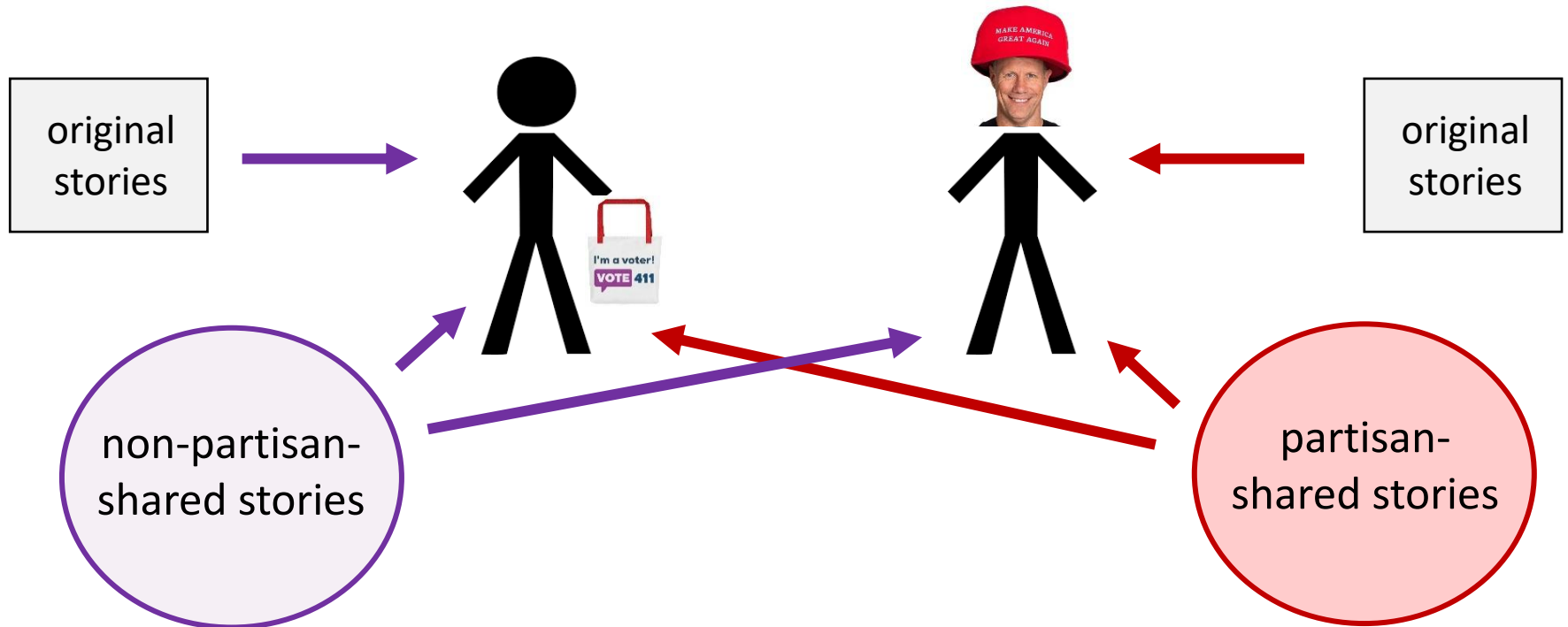
Social filtering: most stories in Pool NP are true regardless of the veracity of original stories.

Differential social filtering: partisan stories in Pool P are less likely to be true than neutral stories in Pool P.

Awash in partisan content: most stories in Pool P are partisan.

Neutral vs **Neutral:** neutral stories are also less likely to be true in Pool P.

Where Will Agents Pay Attention?



original sources?
other type?
own type?

Endogenous Attention Findings

Everyone pays minimal attention to original sources

Why? Sharing by others of your own type selects for the sorts of stories you prefer to encounter

→ agents are better off shifting attention from Pool O to the shared-story pool for their own type (**)

(**) This argument relies on several simplifying features

- Attention is fungible across story pools
- Agents don't care about the newness of stories
- Agent payoffs from encountering a story only come from their own resulting sharing payoffs

Endogenous Attention Findings

Everyone ignores original sources

Non-partisans ignore partisans

- Why? At each point in time, partisan and neutral stories in Pool P have lower veracity than all stories in Pool NP
- non-partisans will focus exclusively on Pool NP

Endogenous Attention Findings

Everyone ignores original sources

Non-partisans ignore strong partisans

Extreme partisans ignore non-partisans

- Why? So long as partisans *sufficiently* love sharing false partisan content, their main concern is maximizing their flow of encounters with partisan content.
 - The fact that partisan stories in Pool NP are more likely to be true is outweighed by the fact that partisan stories make up a larger fraction of stories in Pool P
- extreme partisans will focus exclusively on Pool P

Endogenous Attention Findings

Everyone ignores original sources

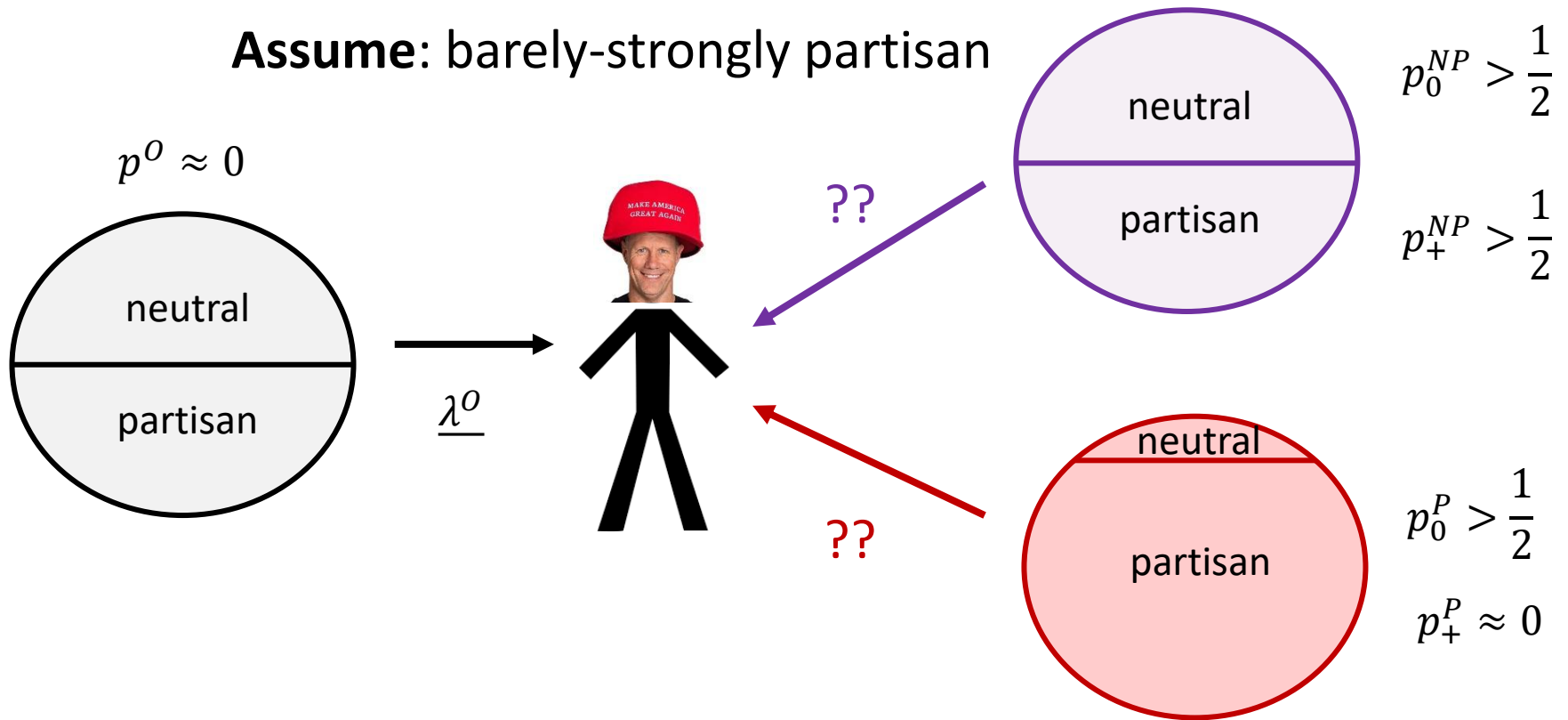
Non-partisans ignore strong partisans

Extreme partisans ignore non-partisans

Barely-strongly partisans split their social attention
across Pool P and Pool NP ...

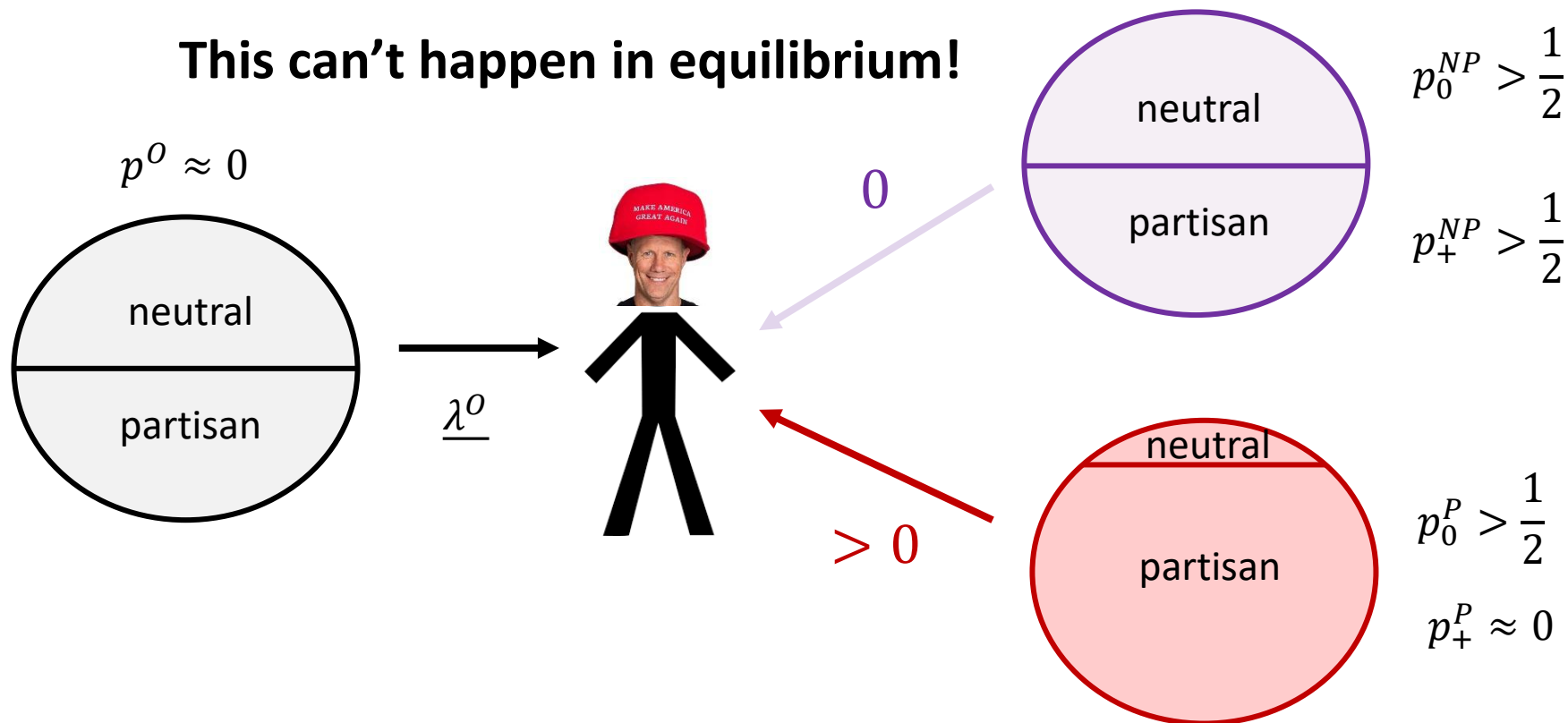
- in any equilibrium steady state
- whenever original-story veracity is sufficiently low

Where Will Partisans Pay Attention?



Could Ps only “follow” Ps?

This can't happen in equilibrium!

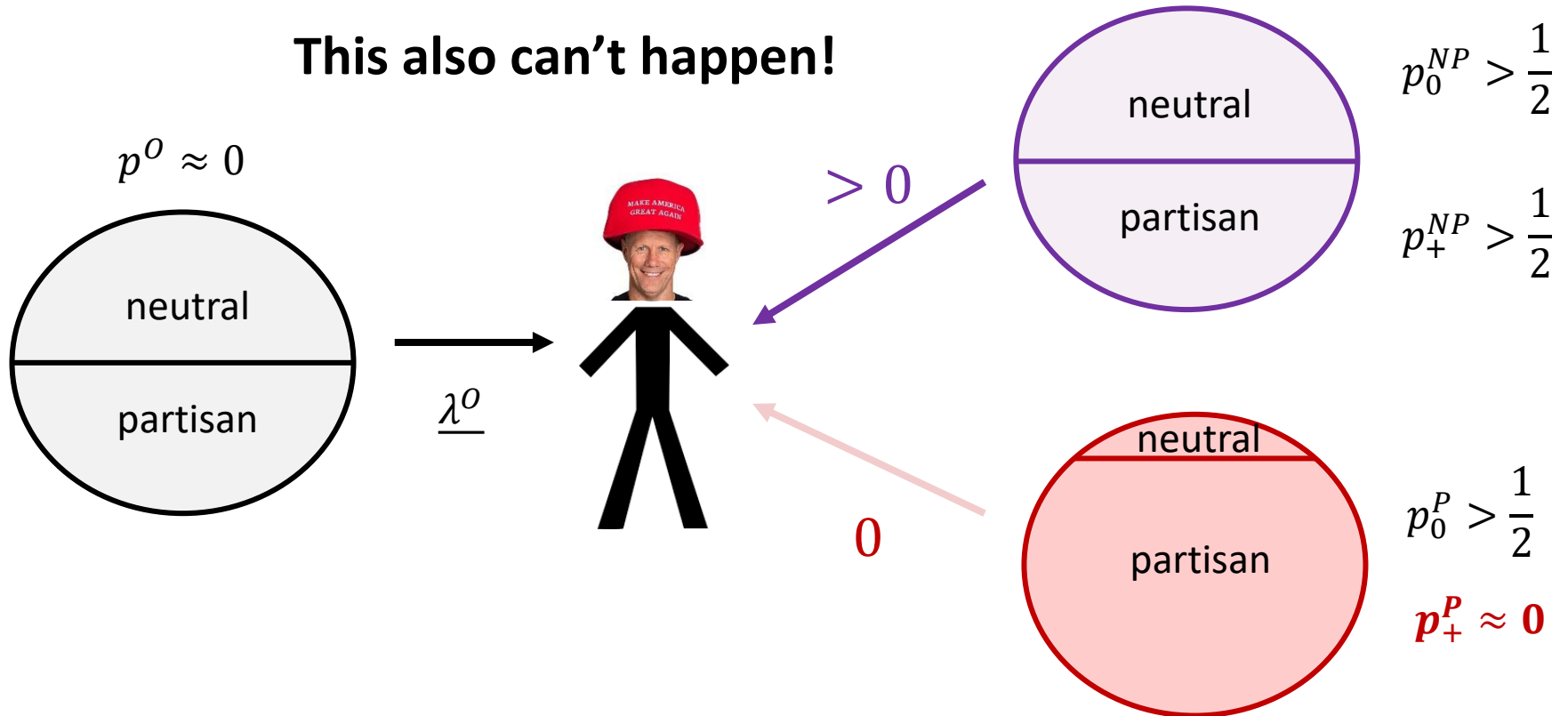


In the resulting “echo-chamber equilibrium,” Pool P will consist almost entirely of false partisan stories

→ Barely-partisan agents get sharing payoff ≈ 0 and hence strictly prefer to follow non-partisan agents [contradiction!]

Could Ps only “follow” NPs?

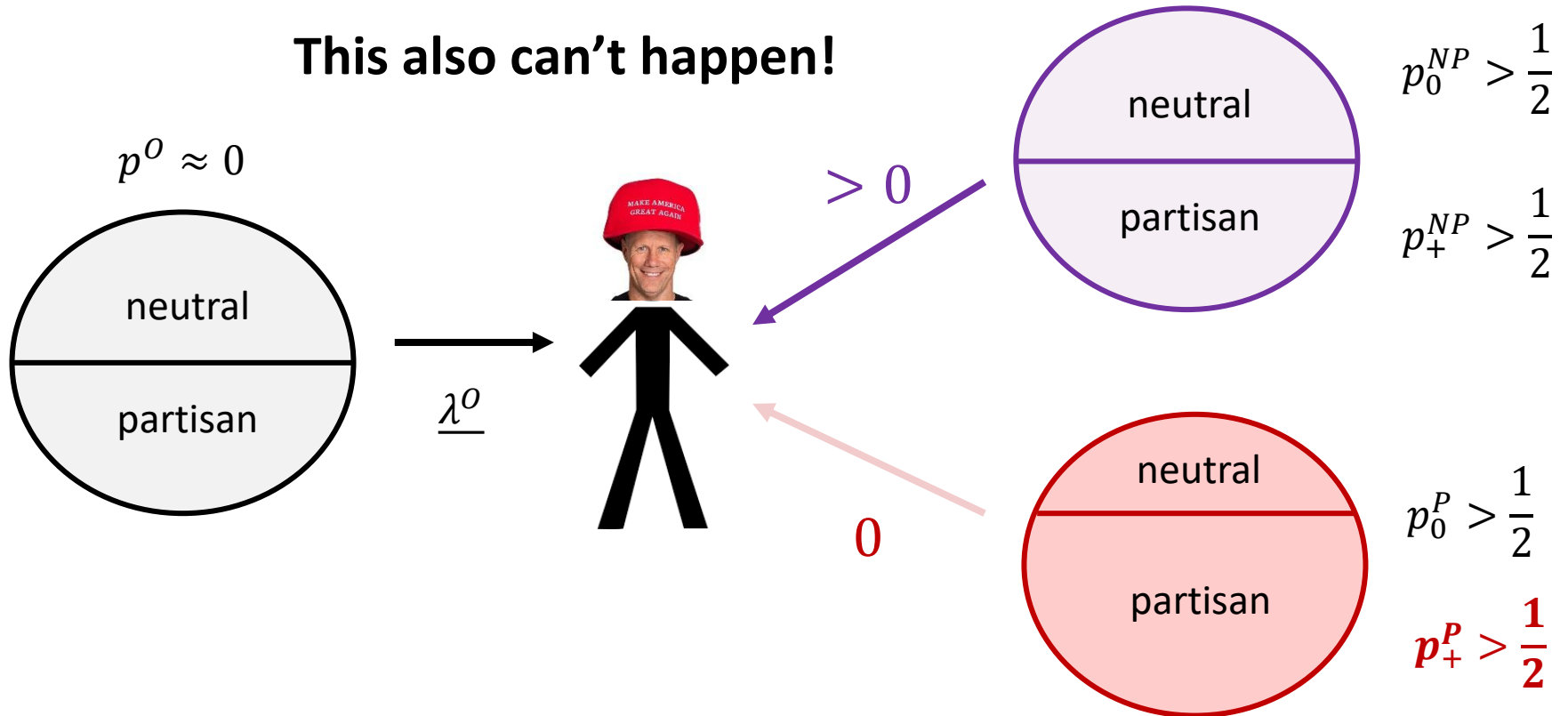
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If partisan agents were to only follow Pool NP, Pool P would evolve away from its unfavorable baseline ...

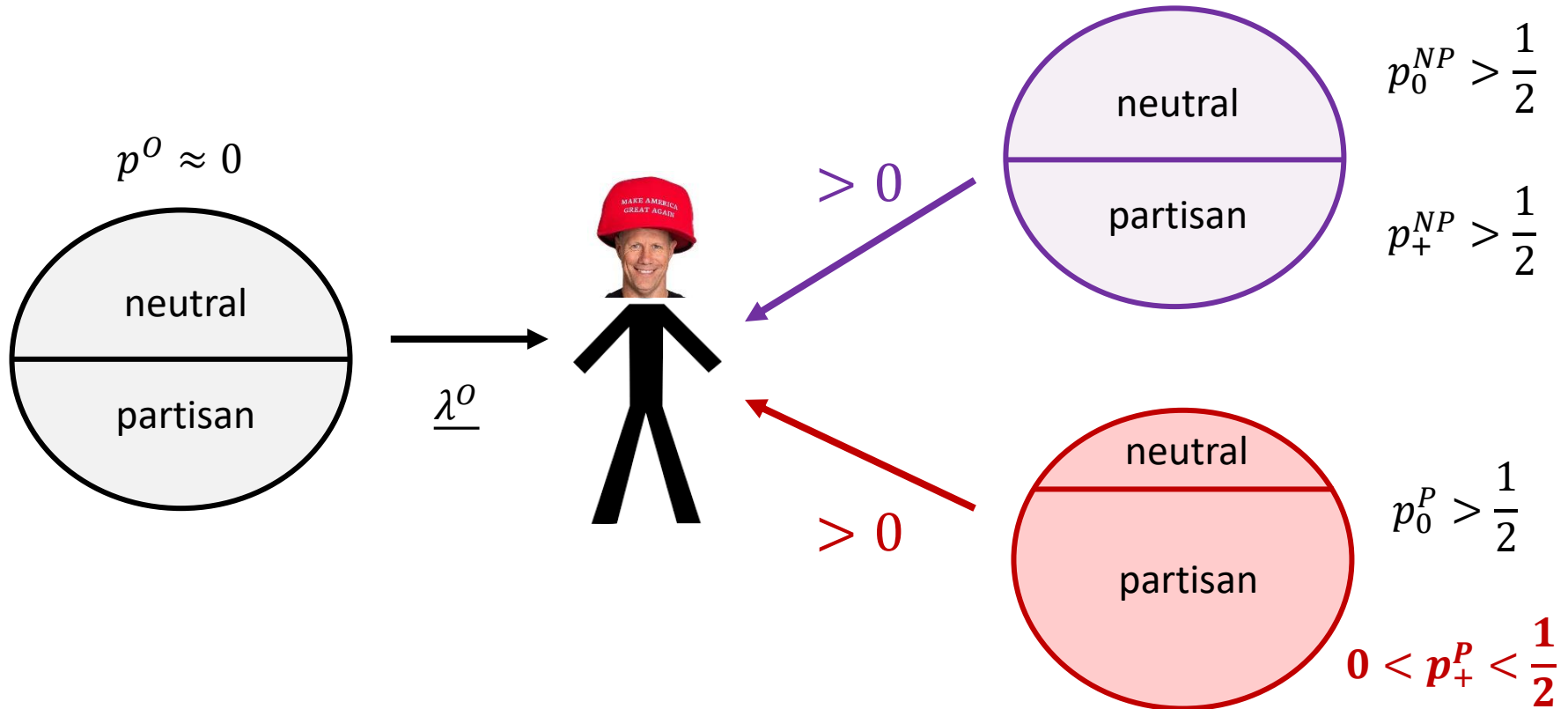
Could Ps only “follow” NPs?

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If partisan agents were to only follow Pool NP, Pool P would evolve away from its unfavorable baseline and evolve into a *more* attractive sources for partisans

Equilibrium with Mixed Attention



In the mixed-attention equilibrium steady state, Pool P is less partisan and more true than in the baseline model, but still more partisan and less true than Pool NP.

Concluding Remarks

This paper introduces a tractable model of **information evolution** driven by social transmission

I focused here specifically on how **transmissive-driving characteristics** (e.g. partisanship) impact the co-evolutionary process of socially-shared info

But the model invites extension & adaptation in many directions. A few that especially interest me:

- identifiable individuals & richer “social payoffs”
- endogenous original-story production
- platform transmission
- interactions and combinations of ideas