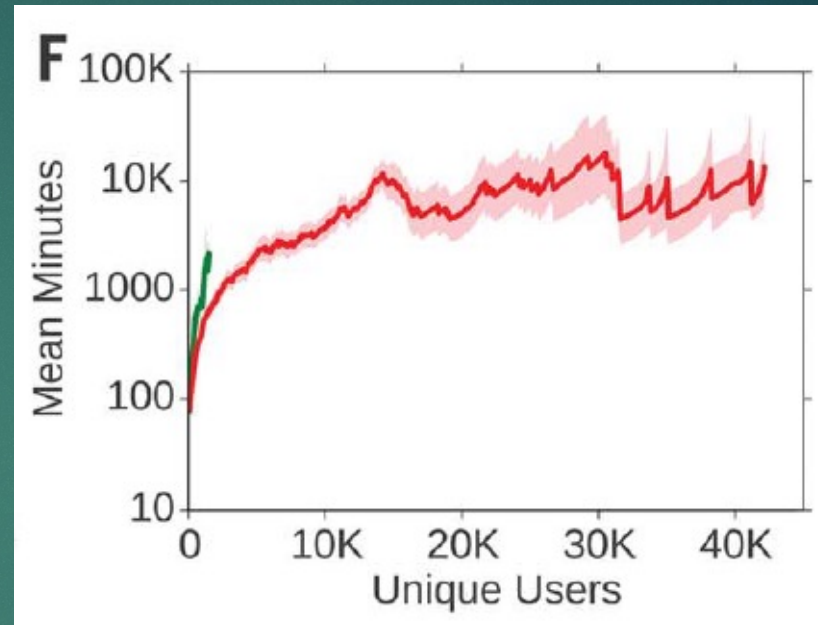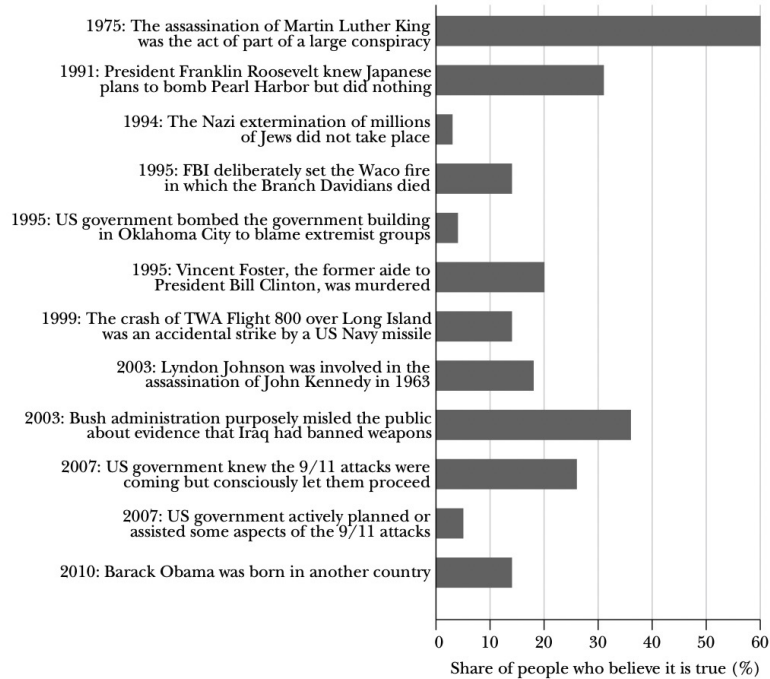# Social Inequality and the Spread of Misinformation

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JAMES SIDERIUS

Misinformation and Fake News

Figure 1
Share of Americans Believing Historical Partisan Conspiracy Theories

1975: The assassination of Martin Luther King was the act of part of a large conspiracy

1991: President Franklin Roosevelt knew Japanese plans to bomb Pearl Harbor but did nothing

1994: The Nazi extermination of millions of Jews did not take place

1995: FBI deliberately set the Waco fire in which the Branch Davidians died

1995: US government bombed the government building in Oklahoma City to blame extremist groups

1995: Vincent Foster, the former aide to President Bill Clinton, was murdered

1999: The crash of TWA Flight 800 over Long Island was an accidental strike by a US Navy missile

2003: Lyndon Johnson was involved in the assassination of John Kennedy in 1963

2003: Bush administration purposely misled the public about evidence that Iraq had banned weapons

2007: US government knew the 9/11 attacks were coming but consciously let them proceed

2007: US government actively planned or assisted some aspects of the 9/11 attacks

2010: Barack Obama was born in another country

Share of people who believe it is true (%)

Learning

Learning Agent

Knowledgeable Agent

VACCINE CHIP MISINFORMATION
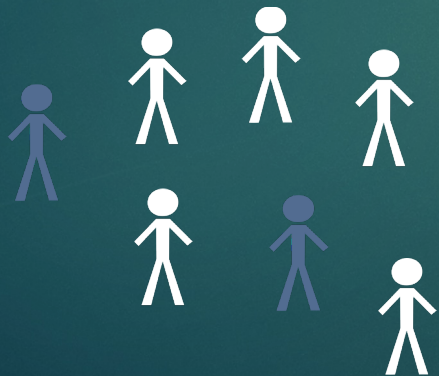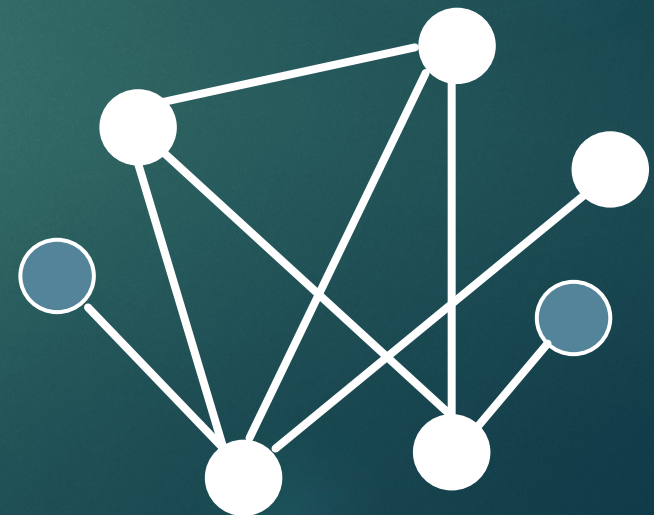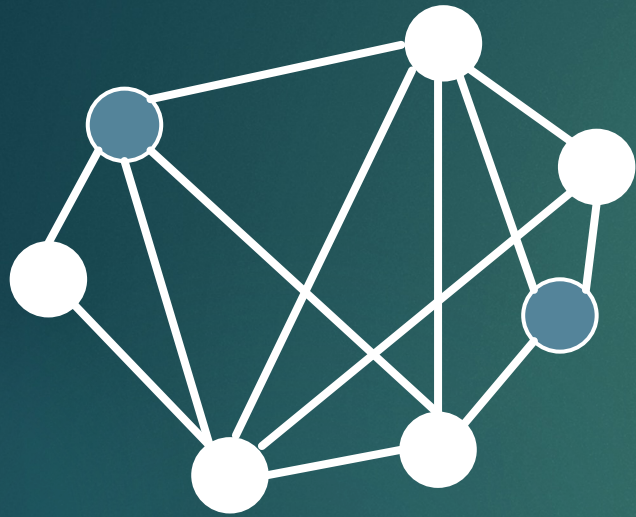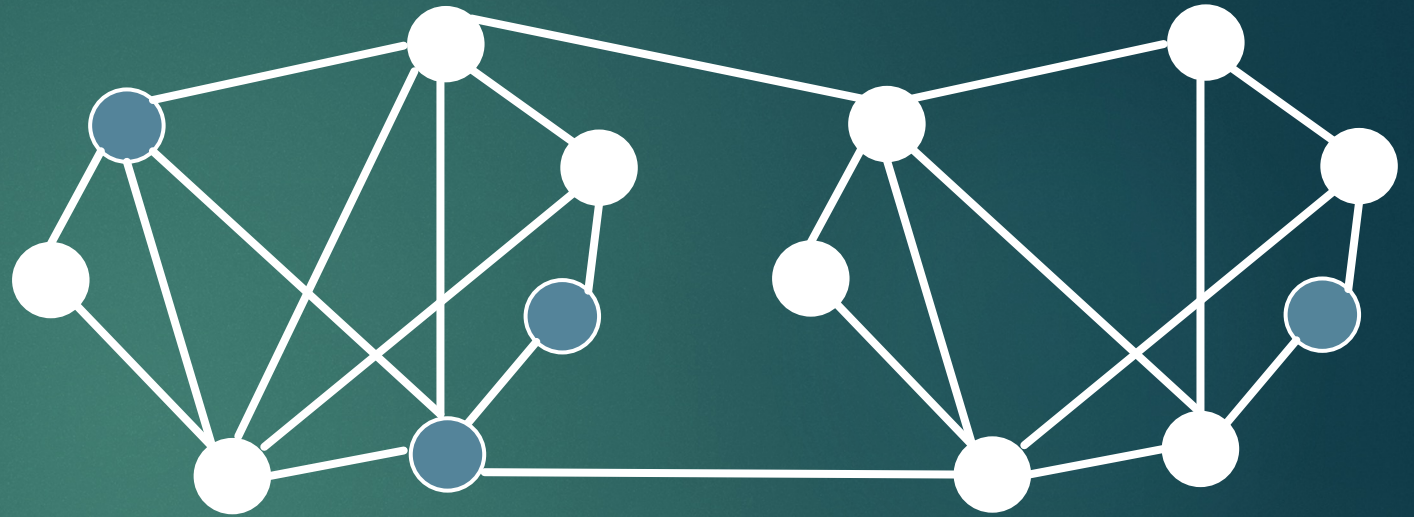
Social Learning

Social Inequality

Relatively even access

Unequal Access

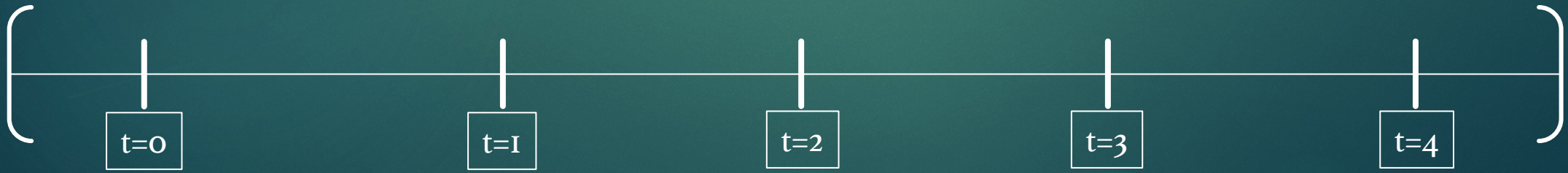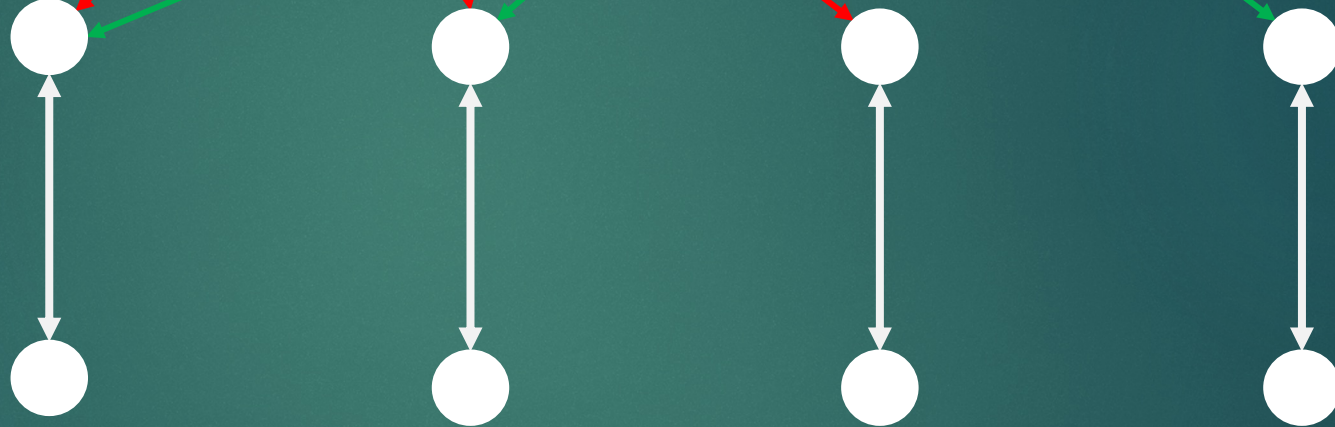**How does this inequality affect learning?**

Model
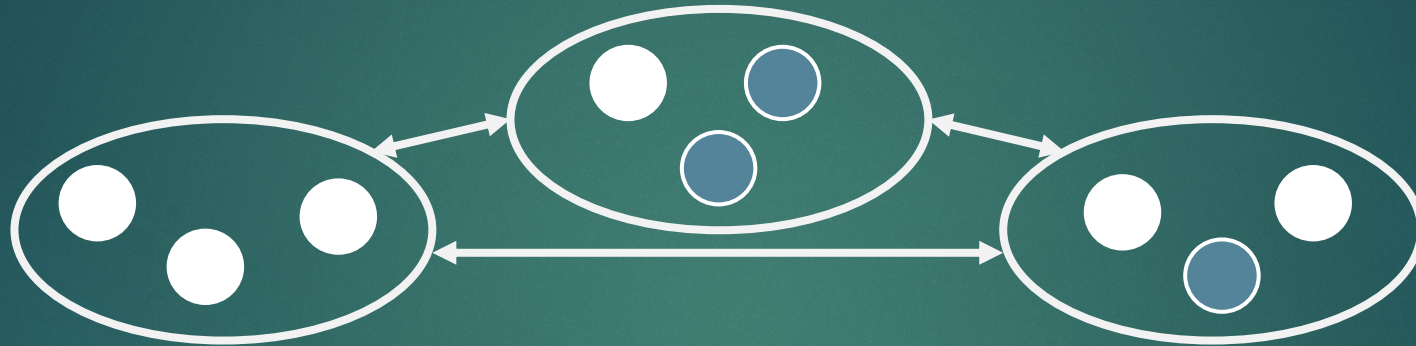
Random Networks

- k islands (or communities) that tend to associate with each other based on demographic factors.

- Each island has some fraction of knowledgeable agents on it.

- Agents on the same island are connected with probability p_s and agents on different islands are connected with probability $p_d < p_s$.

- *Manipulation*: the principal successfully deceives an agent into believing the incorrect state.

- **Theorem:** As the network grows large, manipulation in the random network is the same as manipulation in the expected network with high probability.
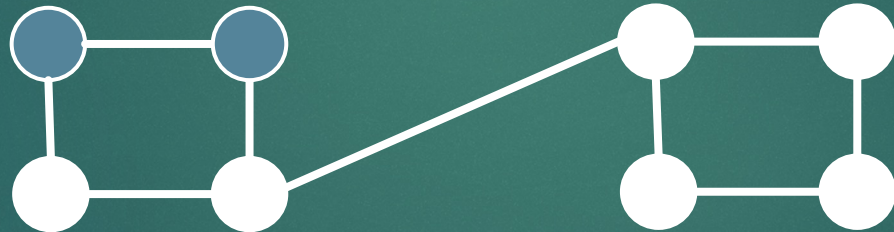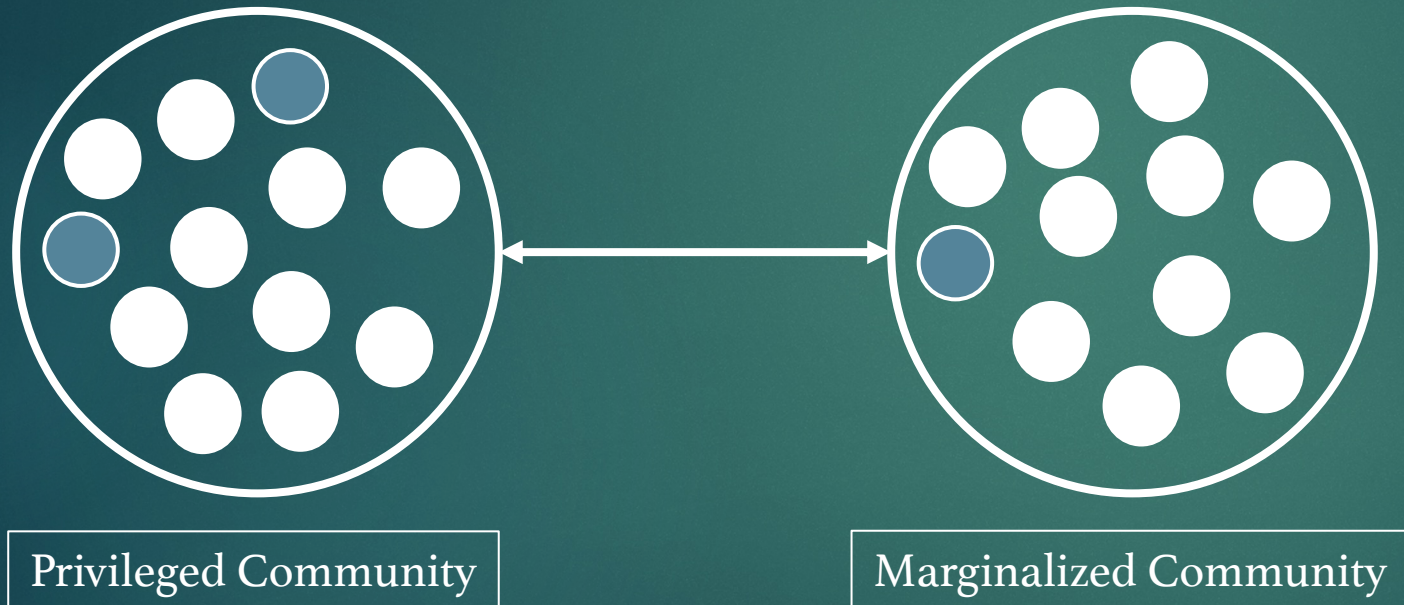
Changes in Inequality

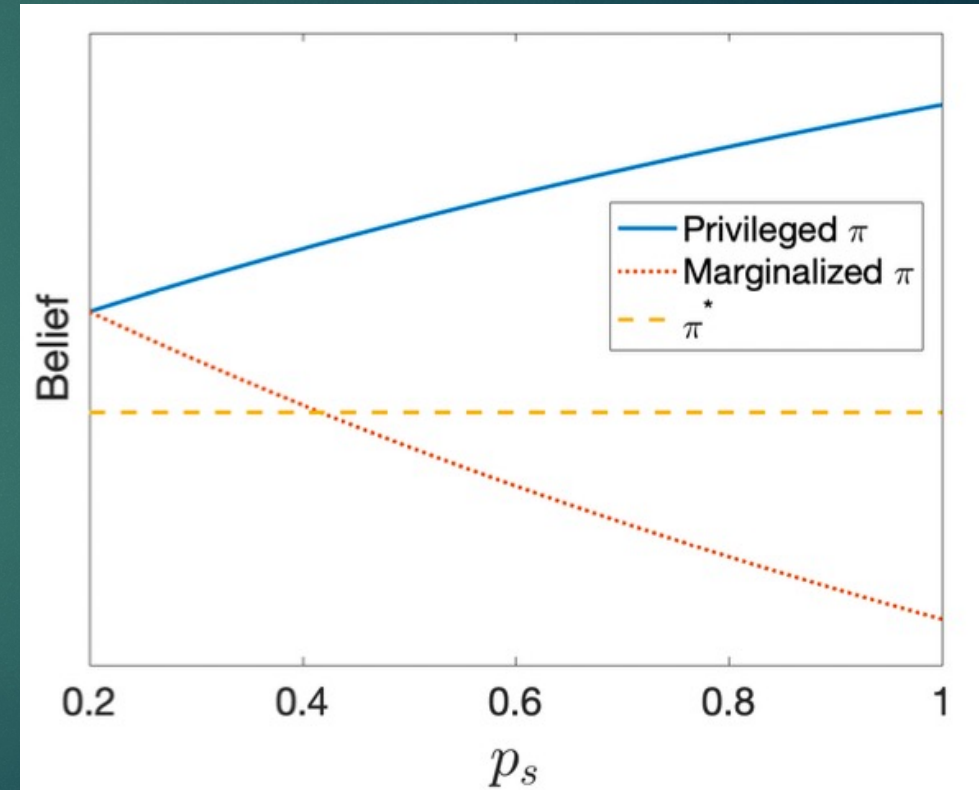Original Network

Change in p_s

Change in p_d

Majorization ("Robin Hood")

Inequality hurts Marginalized Communities

π is the belief of the correct state (S)

Privileged Community

Marginalized Community
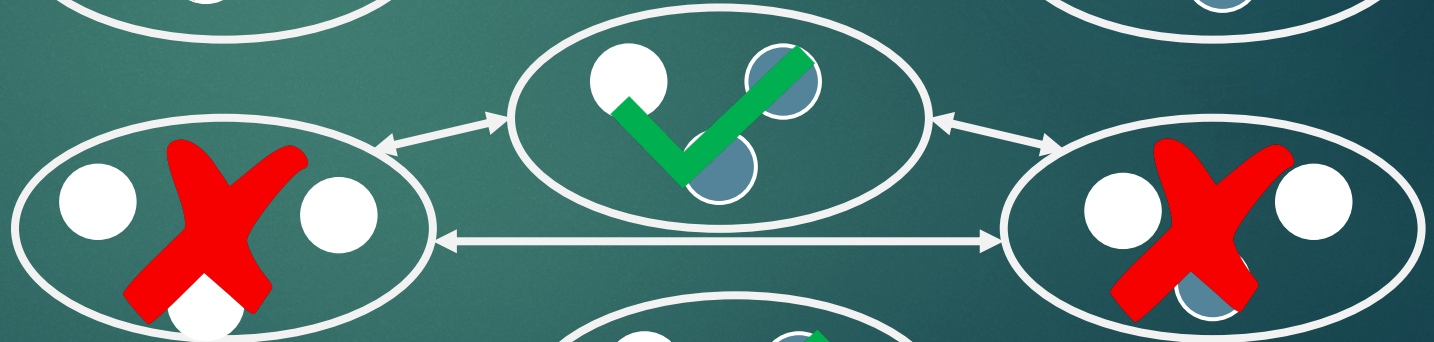
Manipulation and Inequality

Theorem 1. *If society* $(p_s, p_d, \mathbf{m})$ *is susceptible to manipulation and has less inequality than society* $(p'_s, p'_d, \mathbf{m}')$, *then society* $(p'_s, p'_d, \mathbf{m}')$ *is also susceptible to manipulation.*
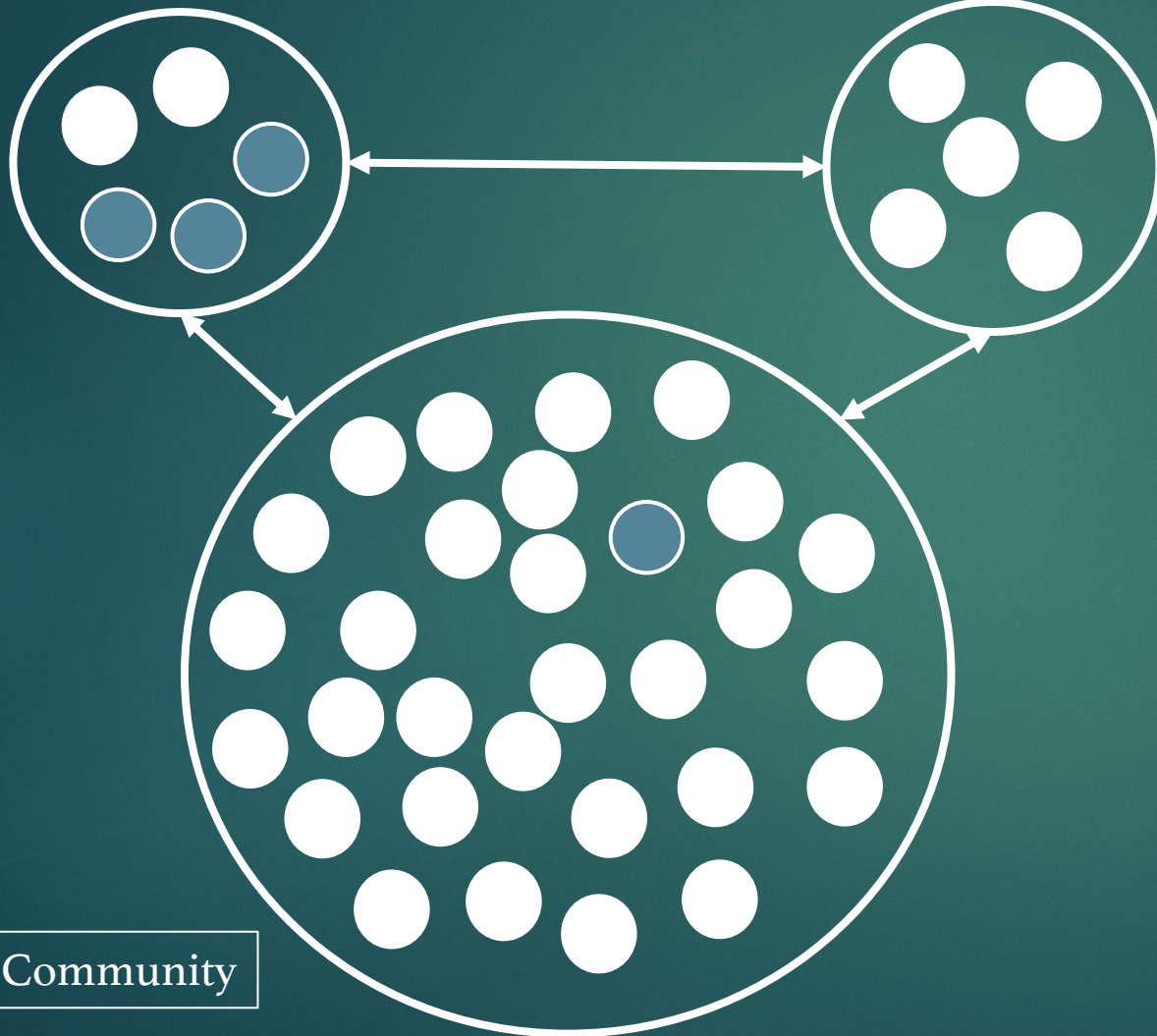
Caveat!

No Inequality

Intermediate Inequality
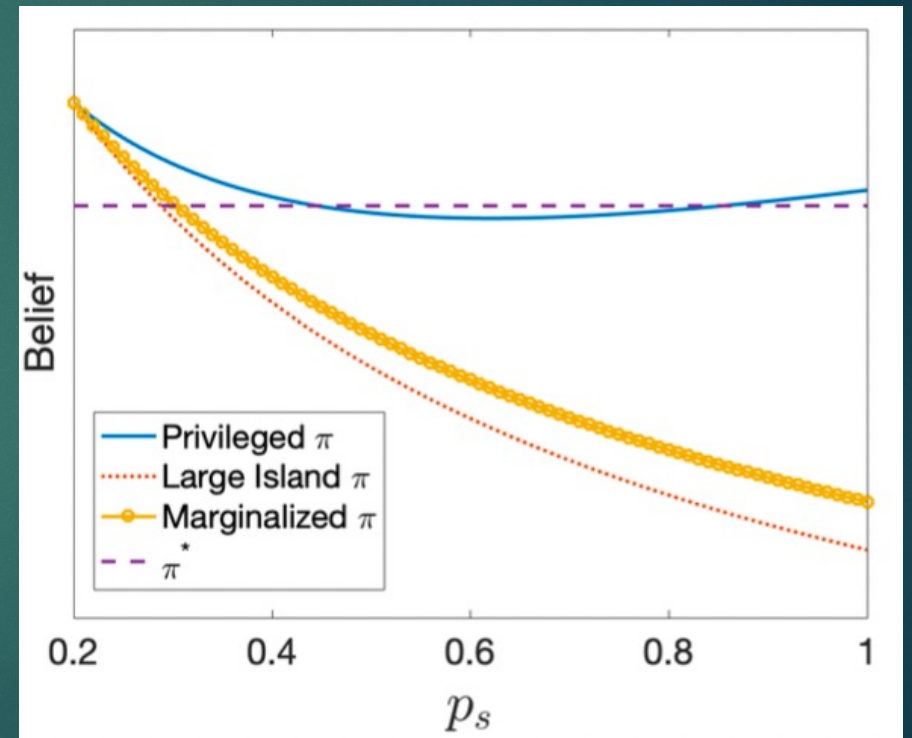
Extreme Inequality

Different Island Sizes

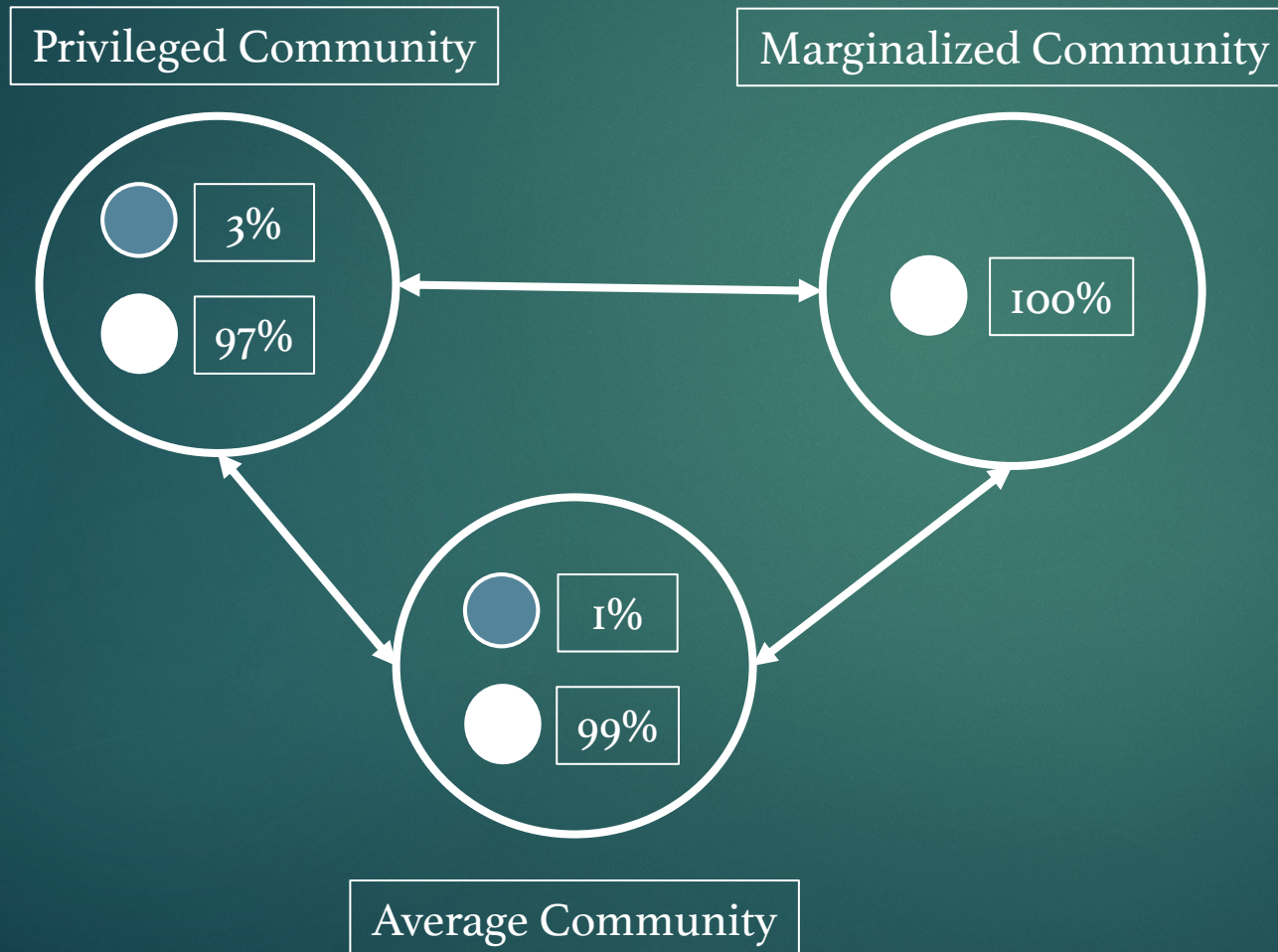Privileged Community

Marginalized Community

Large Community

π is the belief of the correct state (S)

Strategic Trade-offs: High Cost of Targeting

Privileged Community

3%

97%

Marginalized Community

100%

1%

99%

Average Community

What happens when the cost of manipulating the agents via misinformation is **costly**?
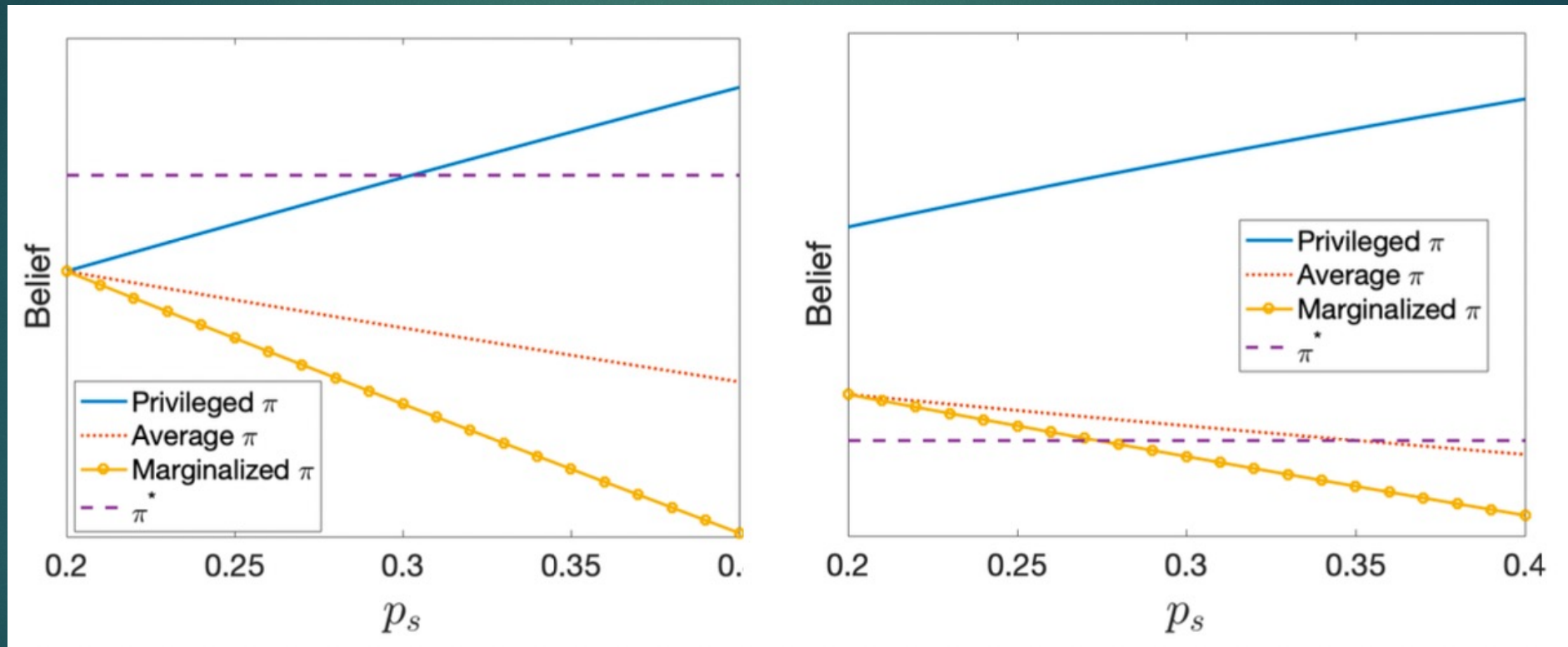
- Difficult to reach many agents, may require **more resources** to manipulate more people.

- May be more profitable to target **"influential"** groups with strong "word of mouth" effects.

- How does inequality affect **strategic** decisions?

Optimal Manipulation Strategy

****Cost of manipulating one agent is $\varepsilon \in (4/5, 1)$

Target everyone in the population
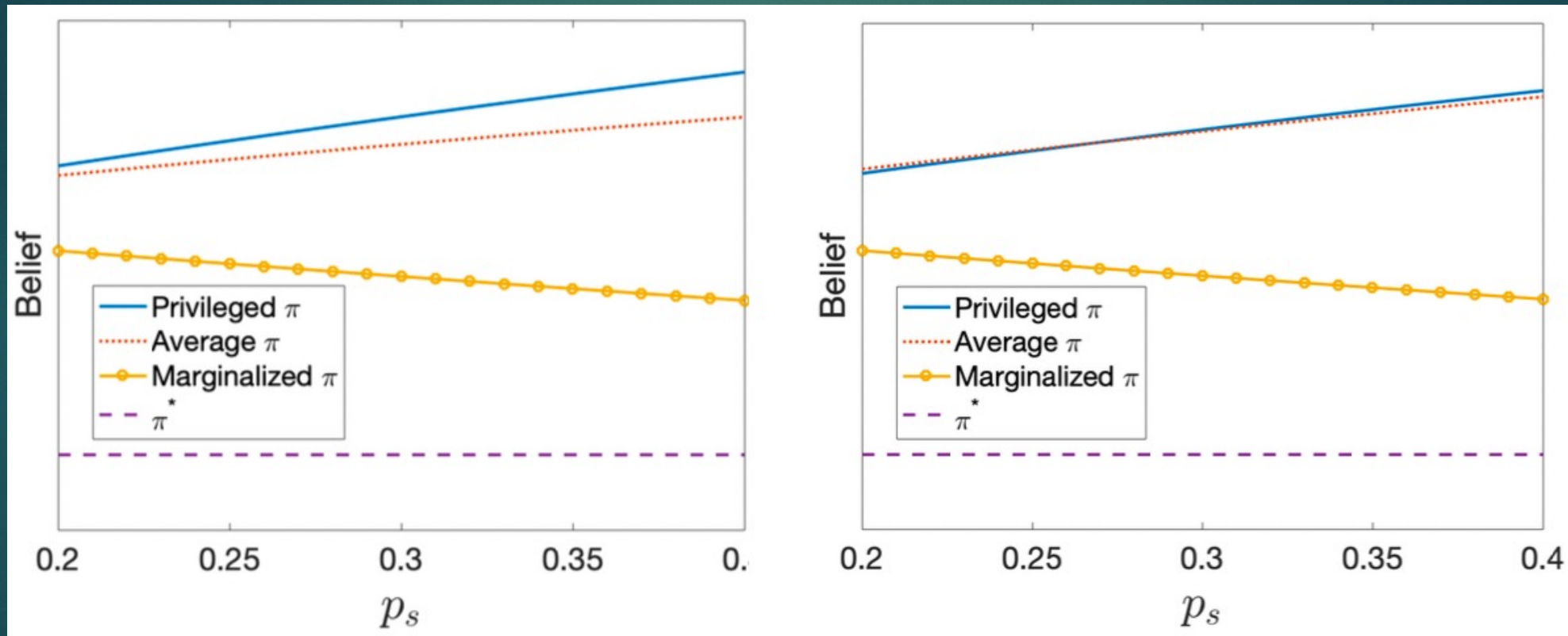
Target both susceptible islands

Manipulate everyone   Manipulate 2 islands   Manipulate 2 islands   1 island   No one

Optimal Manipulation Strategy, cont.

With **intermediate inequality**, no profitable strategy exists!

Policy Implications

▶ #1: Inequality hurts **marginalized communities** and hurts society as a whole, BUT…

▶ #2: If a policymaker cannot completely eradicate inequality, simply decreasing it can have **undesirable outcomes**.

▶ #3: Resources that are taken from the larger community and hoarded by a privileged community hurts everyone. It is incentive-compatible for the privileged community to **"donate" resources** to bigger community.

▶ #4: **Strategic forces** can influence how the principal spreads misinformation; decreasing inequality can have unintended consequences.
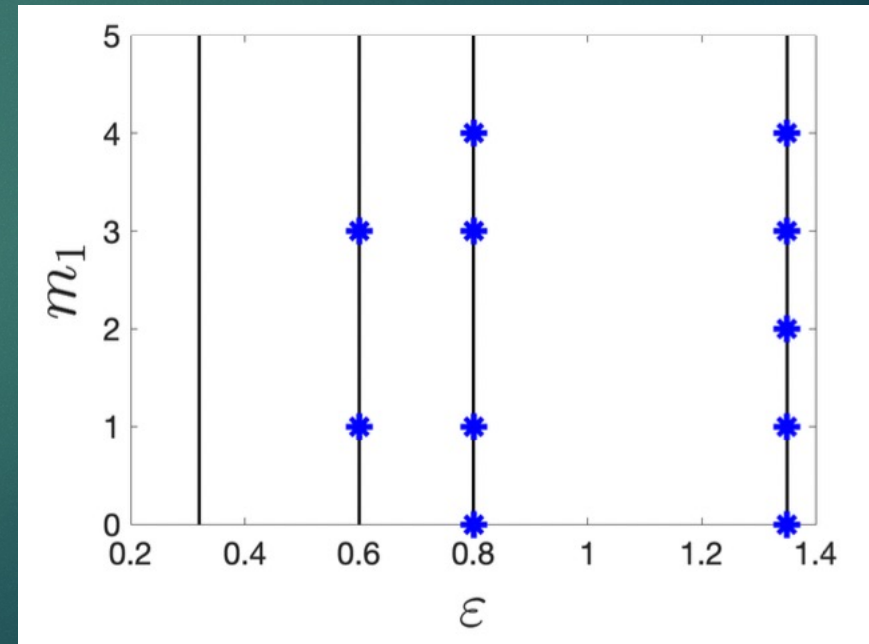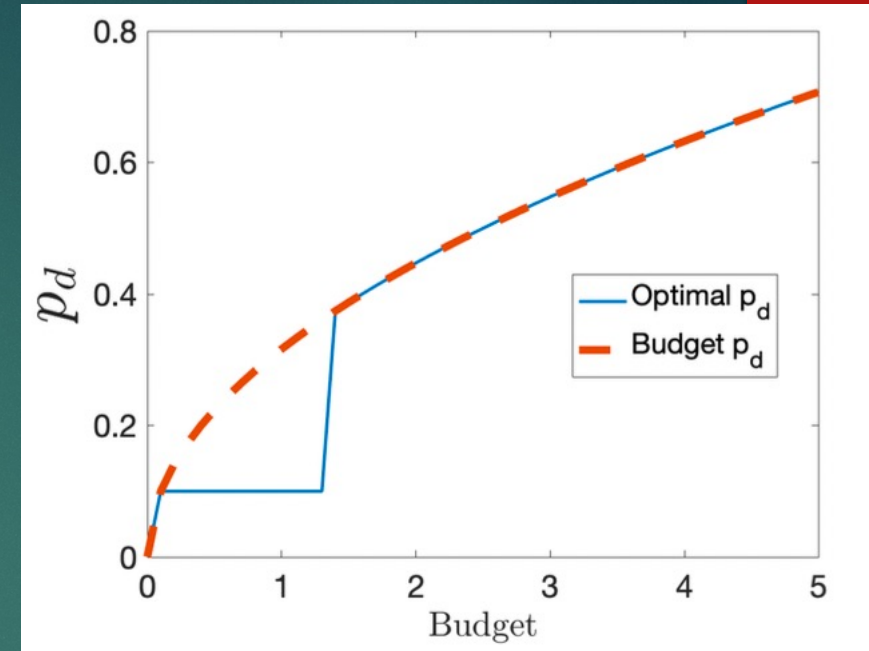
Conclusion

- Inequality in access to knowledgeable agents who know the true state.

- Strategic actor who injects costly misinformation.

- Results:
  - Privileged (but small) communities should (selfishly!) prefer to give up resources
  - Reducing inequality can lead to worse learning. Why?
    - More integrated network can help the principal spread more misinformation
    - Strategic considerations of the principal