Social Inequality and the Spread of Misinformation

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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
- 1993: 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: 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

ALL NEWS ABOUT POLITICS
Learning

Knowledgeable Agent

Learning Agent

Social Learning
Social Inequality

Relatively even access

Unequal Access

How does this inequality affect learning?
Model

Nature

Safe

Risky

Principal

Organic

Costly messages

Timeline

| t=0 | t=1 | t=2 | t=3 | t=4 |

Timeline
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

\[ \pi \text{ is the belief of the correct state (S)} \]

Privileged Community

Marginalized Community

Belief vs. \( p_s \)
**Theorem 1.** If society $(p_s, p_d, m)$ is susceptible to manipulation and has less inequality than society $(p'_s, p'_d, m')$, then society $(p'_s, p'_d, m')$ is also susceptible to manipulation.
Different Island Sizes

- Privileged Community
- Marginalized Community
- Large Community

\( \pi \) is the belief of the correct state (S)
Strategic Trade-offs: High Cost of Targeting

Privileged Community
- 3%
- 97%

Marginalized Community
- 100%

Average Community
- 1%
- 99%

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

### Diagram

- **Belief vs. $p_s$**
  - Privileged $\pi$
  - Average $\pi$
  - Marginalized $\pi$

- **Scenarios**
  - 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