Exploring the Impact of Social Network Density and Agent Openness on Societal Polarization
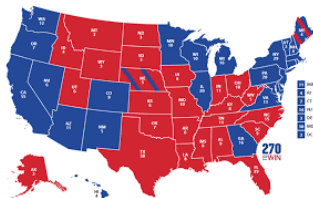
CSS 2021 — Santa Fe, New Mexico (sorta)

Justin Mittereder, Robert S. W. Carroll, Brandon Frulla, Stephen Davies

Dept of Computer Science
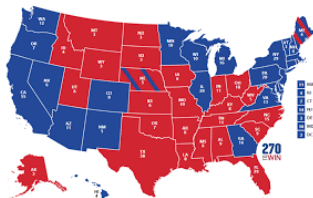University of Mary Washington
Fredericksburg, Virginia, USA

Defining polarization

"America is becoming increasingly polarized..."
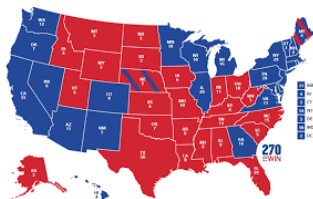
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What does this actually mean?

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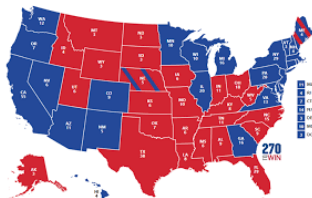

What does this actually mean?

► People's views becoming more *extreme*?

Defining polarization

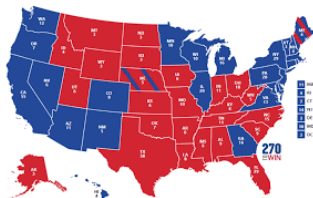"America is becoming increasingly polarized..."

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Defining polarization

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What does this actually mean?

► People's views becoming more *extreme*?

► People becoming more *stubborn*? (less willing to reconsider views)

► People only associating with like-minded others?

Proxy #1: Assortativity coefficient

Justin TODO: This is an old slide from a previous talk, in which I talk about nominal (binary/categorical; i.e., red and blue) opinions instead of continuous opinions. You can reuse any of this, or just throw it away, and replace with content about aggregate assortativity over continuous opinions.

A graph's *(nominal) assortativity coefficient* is the fraction of edges that are between same-valued nodes, compared to what we would expect if the edges were dispersed at random.

▶ 1 — "perfect" assortative mixing (all edges are between nodes of the same value)
▶ 0 — no assortative mixing (node values have no impact on whether nodes will connect)
▶ a negative number — (nodes tend to connect to nodes of *different* values)

Assortativity coefficient
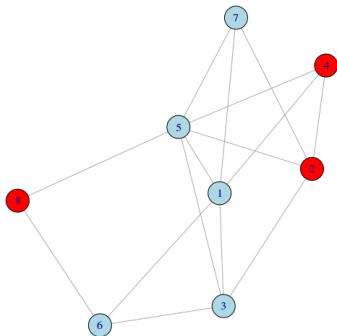
7 blue–blue edges and 1 red–red edge
7 red–blue edges
Assortativity coefficient: 0.111

Proxy #2: Issue Alignment

We define **Issue Alignment** (IA) as the tendency for people who agree on one issue to also agree on other (unrelated) issues.

Stephen TODO:

- Illustrative list of typical left vs. right positions
- Ask: in your experience, does this hold true?

One possible explanation for IA

Stephen TODO:

Perhaps there is some deep underlying principle to people's ideologies that connects seemingly unconnected issues. (Maybe for some deep reason it actually makes sense that people who are pro-life are also pro-gun, and anti-tax, and anti-vacc.)

Another possible explanation for IA

Stephen TODO:

Perhaps a small number of popular media outlets each articulates a number of opinions on various issues. The people who listen to them are naturally influenced to each of these different opinion values, and thus become "issue aligned."

A third possible explanation for IA

We define **Cross-Issue Influence** (CI2) as the effect that a person's social contact can have on one of their opinions based on their agreement (or disagreement) on a different issue.

Stephen TODO:

We wish there was more justification in the social psych lit for this, but we have to fall back on (1) homophily and (2) common sense.

Big idea: even without any underlying ideological connection between issues, and even without media influence, IA will naturally develop solely due to CI2. In other words, CI2 is sufficient for IA. (Wide reaching implications on how we interpret the causes of the polarization phenomenon, and what societal changes might be necessary to reduce it.)

CI2 in detail

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