# Social Network Analysis

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What is SNA?
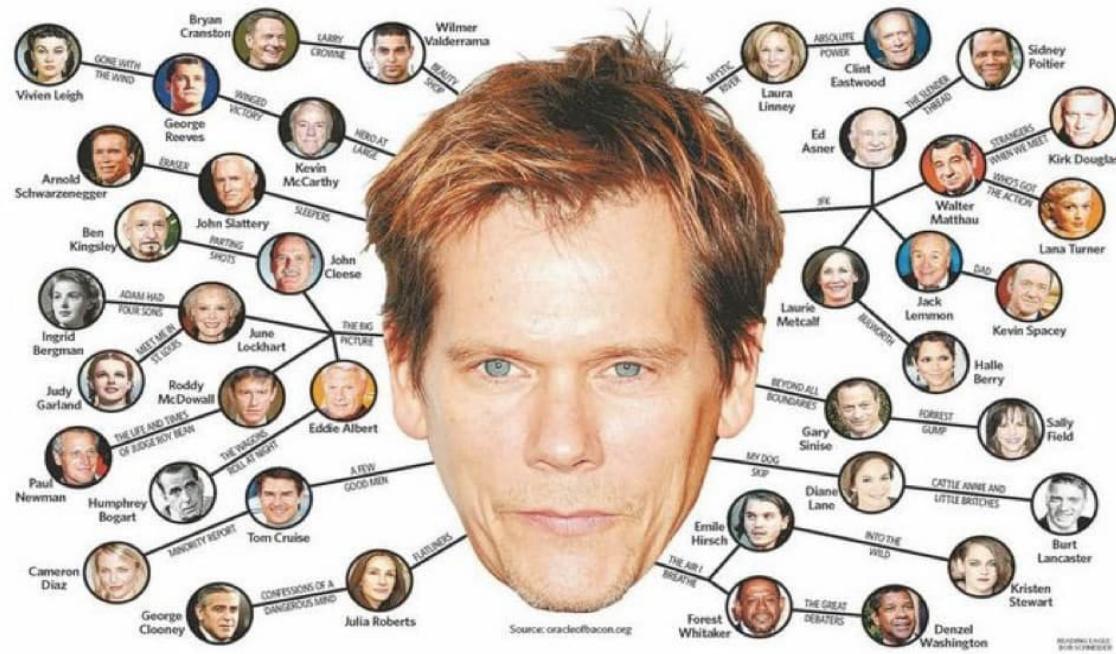
Social Network Analysis ("SNA") began as sociometry in the 1930s, with mathematical methods emerging in the 50s.

If you've heard of the "Six Degrees of Separation" phenomenon, congrats, this is SNA!

SNA is a way to visualize and study relationships among individuals, organizations, or systems using nodes and edges.

Why use SNA in child welfare policy?

Reveals hidden relationships

Identifies key connectors and bottlenecks

Supports strategic decision-making

Policy and Program insights

Drives real world impact!

Data Collection Process

- Voting data is captured as a bipartite (actor x bill) network.

- Each vote is recorded and subsequently weighted to reflect both simple counts and relative importance.

- Attribute data gathered on party registration, years in body, leadership, district, and varying political campaign contributions.

Vote	Weight
Aye	+1
Nay	-1
PNV	0.5
ENV	0

BILLS CONSIDERED FROM 2025 LEGISLATIVE SESSION							
LB13	LB22	LB41	LB48	LB65	LB380	LB89	LB104
LB141	LB149	LB150	LB153	LB189	LB192	LB217	LB224
LB257	LB258	LB264	LB306	LB339	LB363	LB376	LB380
LB383	LB415	LB442	LB492	LB530	LB552	LB556	LB698

Entry Level Measurements

ARD (Average Reciprocal Distance): the average of the reciprocals of the shortest distance from one node to all others: $ARD_i = \frac{\frac{1}{n-1}\Sigma_{j\neq i}1}{d(i,j)}$, where $d(i,j)$ is the shortest path.

Betweenness Centrality: shows entities along the shortest paths connecting others, these are "bridges" or "brokers".

Closeness Centrality: how quick a node can access everyone else via the shortest paths. High closeness points to good disseminators.

Degree Centrality: measures the number of direct relationships each individual holds. High degree indicates a well-connected node with the ability to directly influence.

Eigenvector: Measures a node's influence based on both the quantity and quality of its connections (such as links to influential nodes). A high eigenvector centrality suggests broad influence, both directly and indirectly; these nodes are connected to other important or well-connected nodes, not just highly connected themselves.

Vis. 1
Legislators based on introduction and co-sponsorship of child welfare policy during the 2025 Legislative Session

It is common for the returning legislators to act more of a behavior, bipartisan collaborator, negotiator, frequently have an independent spirit
More independent-minded legislators, needs a review of LD history
Prokop = "Maverick" actor
Conrad & Riepe = Negotiator

KEY
Party Registration
Years in Legislature
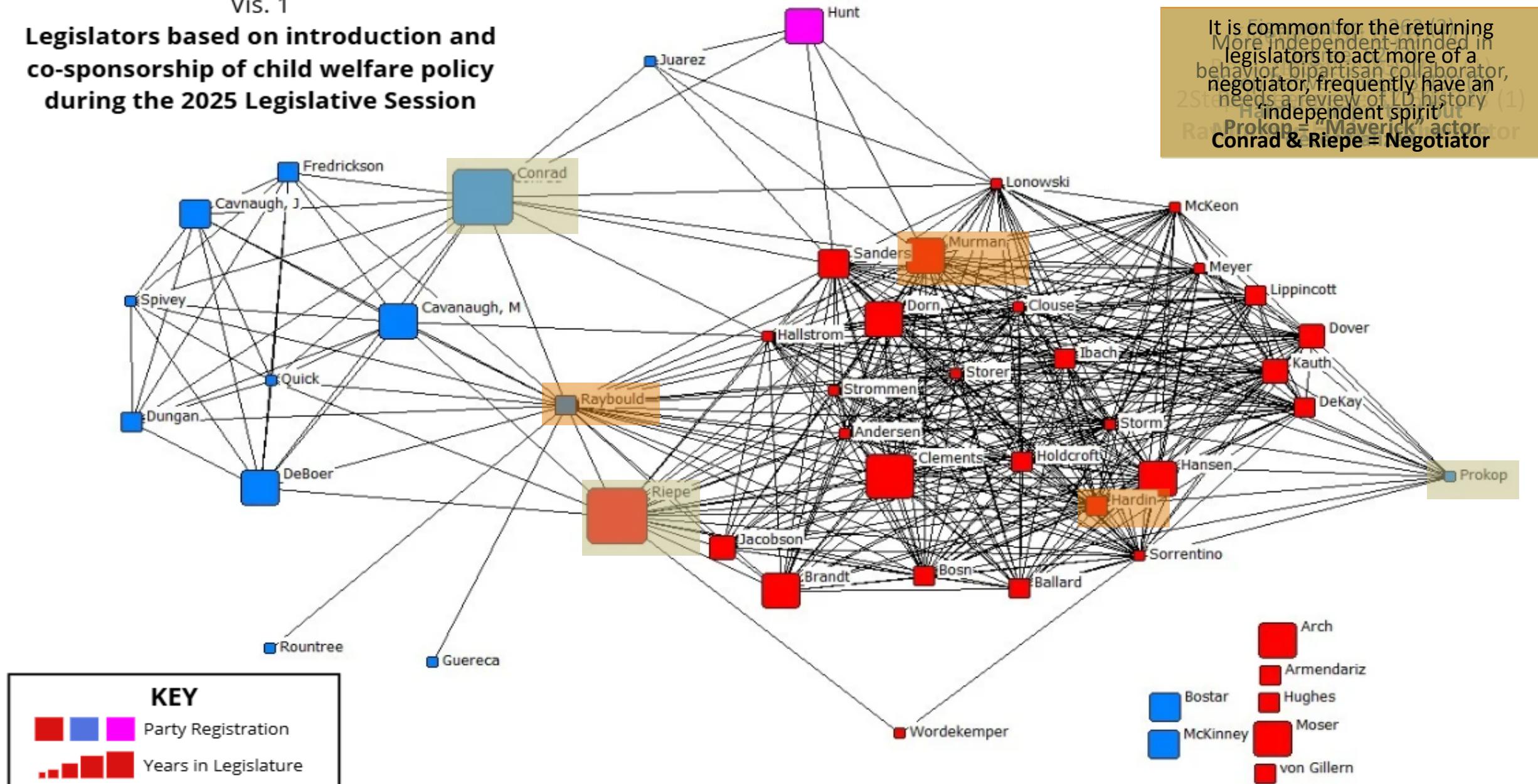
Okay...?

Average Value: 0.601

Partnership between legislators is moderately strong – tend to work together often

Total: 1414

Number of collaborative actions, 1,414 instances where two or more legislators worked together to introduce or co-sponsor a bill

Standard Deviation: 0.951

Large mix of collaboration, some pairs work together a lot, while others do rarely

Average Weighted Degree: 28.857

Average legislator was involved in about 29 bill introductions or cosponsorships in 2025

Vis. 2

Legislators based on campaign contributions to colleagues
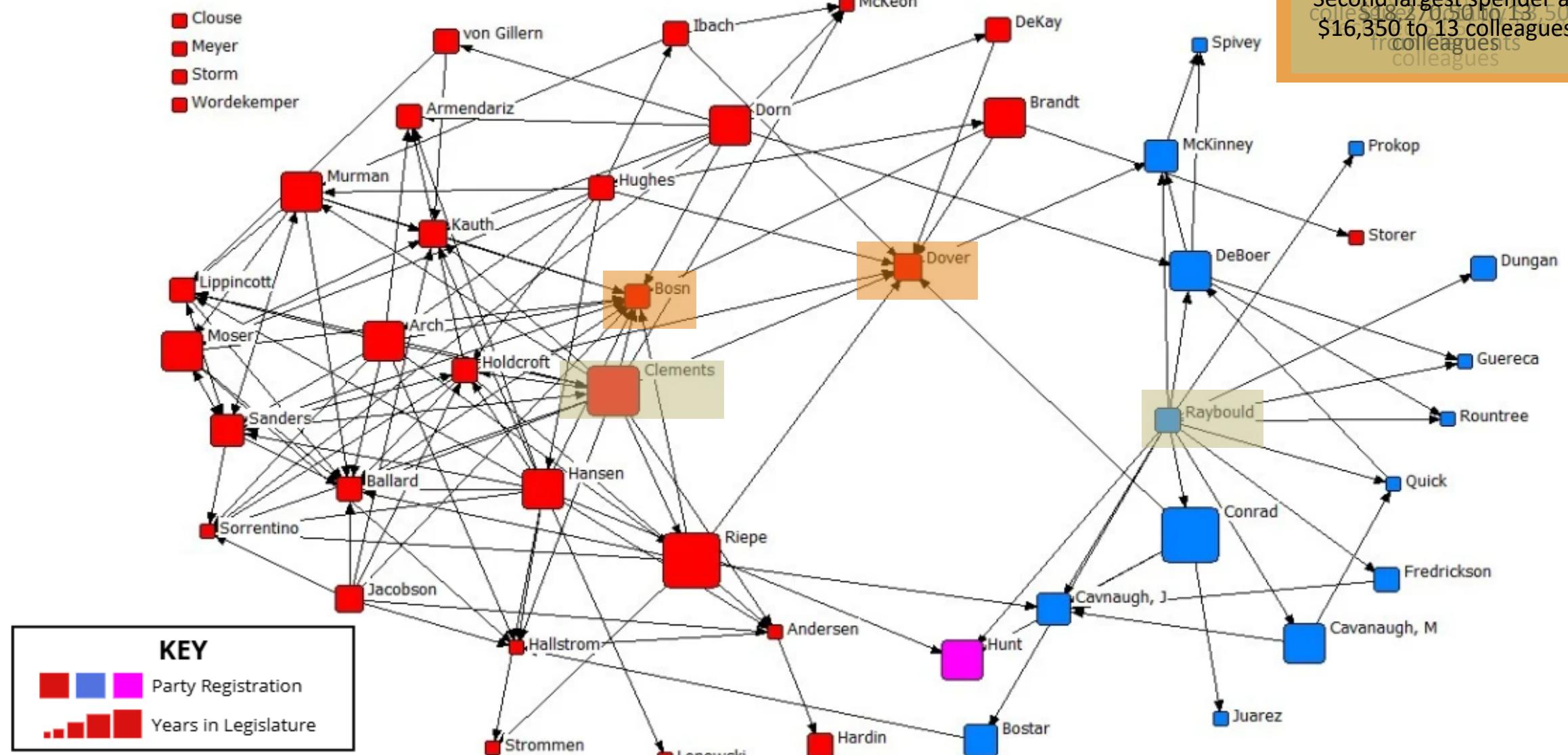
So what?

1. Money shapes influence, but not equally

- Understanding financial hubs indicate who drives legislative power behind the scenes

2. Bridging figures are crucial

- Connectors hold disproportionate sway, serve as brokers or gatekeepers
- Loss of bridges can fracture the body, making compromise and coalition-building hard to do

3. Transparency is key

- Mapping hidden financial ties shines a light on informal power structures

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CLUSTER MODELING

BIG GIVERS

Clements (largest)
Raybould
Hansen
Moser
Dorn
Jacobson
Sanders

- Largest total donations
- Most outgoing edges
- Tie together otherwise disconnected subgraphs
- "capital sources" of the network

TARGETED GIVERS

Arch   **McKinney**
Brandt   **Murman**
Conrad   **Riepe**
DeBoer   **Von Gillern**
Hughes
Ibach

- Mid level out degree
- Some coordination in funding related to Ballard, Dorn, Kauth and Hansen

LOW CONNECTIVITY

Andersen   **Dover**
Ballard   **Fredrickson**   **Lippincott**
Bosn   **Guereca**   **Lonowski**
Bostar   **Hallstrom**   **McKeon**
Armendariz   **Hardin**   **Prokop**
J. Cavanaugh **Holdcroft**   **Quick**
M. Cavanaugh **Hunt**
Clouse   **Juarez**
DeKay   **Kauth**

Wordekemper

- Receiving or not giving
- May have donated once
- Largest cluster with least influence

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SNA makes the invisible visible

Across voting patterns, co-sponsorships, and campaign contributions, this analysis shows that the legislature operates through networks of bridges, influencers, and financial hubs.

We found that:

- **Bridge legislators** (like Raybould) hold power to connect otherwise divided groups.

- **High influence actors** (like Murman) shape information flow and coalition-building

- **Independent or decentralized members** (like Hardin and Prokop) play pivotal and unpredictable roles

- **Collaboration is uneven,** with more than 1,400 joint actions but large clusters of low-connectivity legislators

- **Money amplifies influence**, especially through "big biers" and targeted political donations

Future Research & Next Steps

1. Deeper analysis of external campaign contributions
- Expand network to include remaining data
- Test E-I Index to measure external vs. internal ties
- Examine homophily by party, ideology, geography, leadership, donor type, and other attributes
- Identify whether external funding reinforces or disrupts existing legislative clusters

2. Issue-Specific Network Mapping
- Use specific focus bills to build a policy realm focused legislative network
- Compare collaboration patterns on juvenile justice to overall legislative behavior
- Identify whether bridges and influencers differ across policy realm
- Explore cross-committee influence and specialized coalitions

3. Predictive Modeling
- Use network metrics to forecast bill viability
- Identify which relationships most strongly predict bipartisan success
- Develop early-warning indicators for gridlock or fragmentation