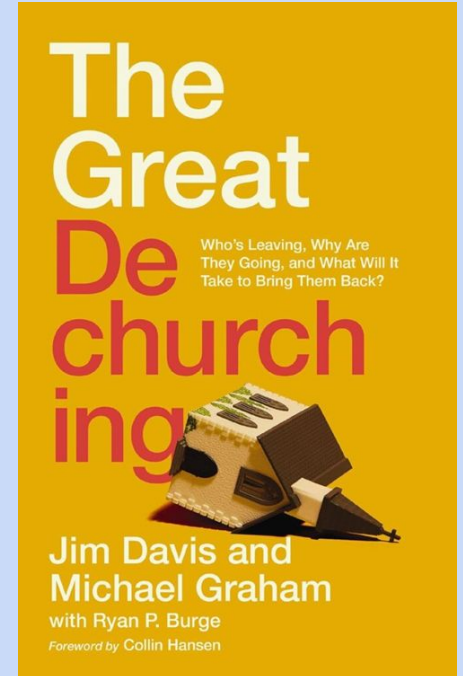
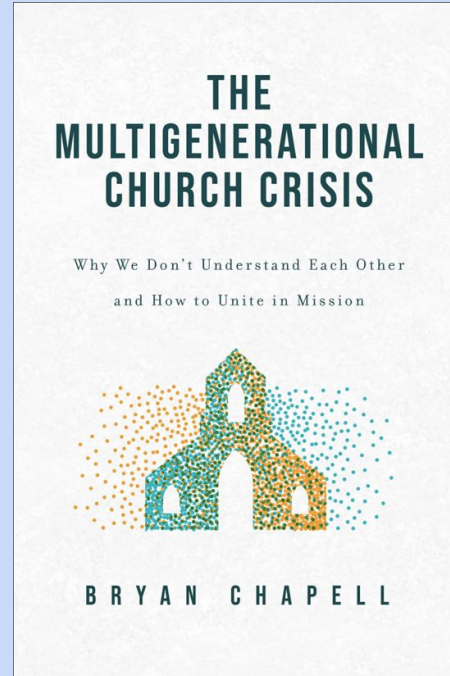
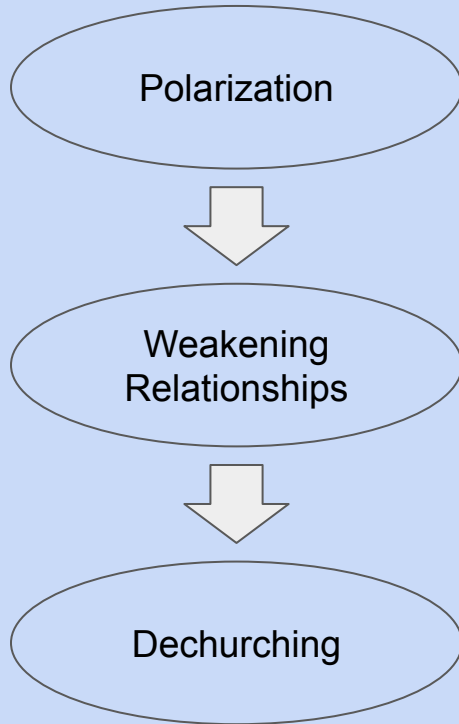


# Church and Political Polarization: An Agent-Based Model Approach

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# Context



Aspect	Older Generation (Fifties and Older)	Younger Generation (Forties and Younger)
Perception	"We are (were) a majority"	"We are a minority"
Mission	Take control of culture	Make credible our faith
Means	Bring a halt to: <ul style="list-style-type: none"> <li>(1) abortion</li> <li>(2) homosexual agenda</li> <li>(3) Pornography</li> <li>(4) illegal drugs</li> <li>(5) Gambling</li> <li>(6) green movement</li> <li>(7) illegal immigration</li> <li>(8) racial discrimination</li> </ul>	Help with: <ul style="list-style-type: none"> <li>(1) adoption and foster care</li> <li>(2) care for and witness to LGBTQ+ persons</li> <li>(3) liberating victims of sex trafficking and sex addiction</li> <li>(4) substance addiction counseling and rescue</li> <li>(5) gaming and gambling addictions</li> <li>(6) creation care</li> <li>(7) refugee compassion and care</li> <li>(8) racial reconciliation and justice</li> </ul>

# Plan

## Vision

- Help church leaders see and understand polarization
- Make invisible social dynamics visible

## Key factors:

- Beliefs
- Social influence
- Sense of belonging

## What We Model

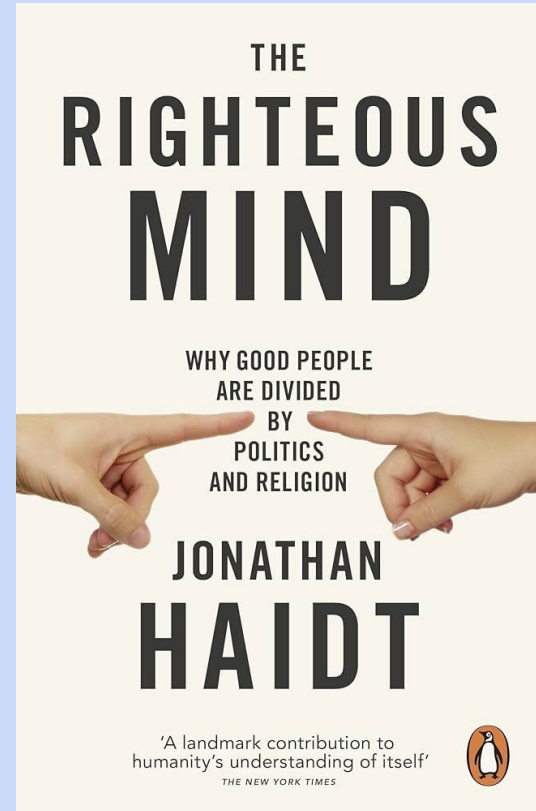
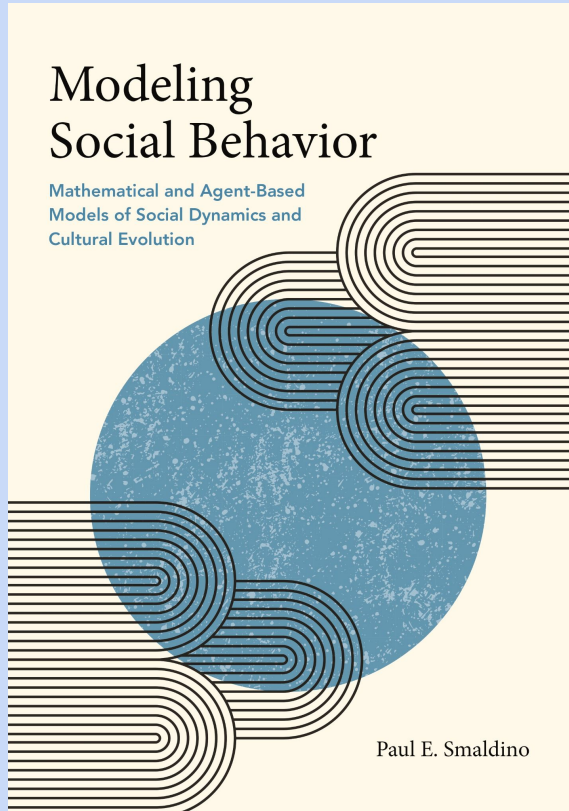
- Individuals as agents

## What This Reveals

- How beliefs and relationships interact over time
- How communities cohere or fragment

An Agent-Based Model is especially suited for this problem. Polarization emerges from many local interactions, which cannot be fully captured through static analysis.

# Accomplishments



# Accomplishments, cont'd

- Implemented a trifold framework of beliefs, belonging, and behavior within a social network, where local interactions between individuals create dynamic feedback loops that shape community outcomes.

# Combined Beliefs

- $C_i$ : The agent's combined belief, representing their overall identity.
- $b_{p_i}$ : The agent's political belief, ranging from -1 (left) to 1 (right).
- $b_{r_i}$ : The agent's religious belief, ranging from -1 (low commitment) to 1 (high commitment).
- $w_p$ : Weight assigned to political belief in shaping overall identity.
- $w_r$ : Weight assigned to religious belief in shaping overall identity.
- $w_p + w_r = 1$ : Ensures the weights are balanced and sum to a full contribution.

$$C_i = w_p \cdot b_{p_i} + w_r \cdot b_{r_i}$$


# Main Behavior Equation

- $P_i(t + 1)$ : The agent's participation rate (likelihood of attending) at the next time step.
- $\gamma$ : Weight that determines the importance of belonging vs. belief alignment in driving behavior.
- $B_i(t + 1)$ : The agent's sense of belonging after updates, reflecting how connected they feel to the community.
- $C_i(t + 1)$ : The agent's combined belief (political + religious).
- $\bar{C}_i(t + 1)$ : The average combined belief of the agent's neighbors.
- $|C_i - \bar{C}_i|$ : The difference between the agent's beliefs and their neighbors', representing misalignment.
- $(1 - |C_i - \bar{C}_i|)$ : The level of belief alignment, where higher values mean greater similarity and comfort.

$$P_i(t + 1) = \gamma \cdot B_i(t + 1) + (1 - \gamma) \cdot (1 - |C_i(t + 1) - \bar{C}_i(t + 1)|)$$




Participation



Belonging



Combined Belief



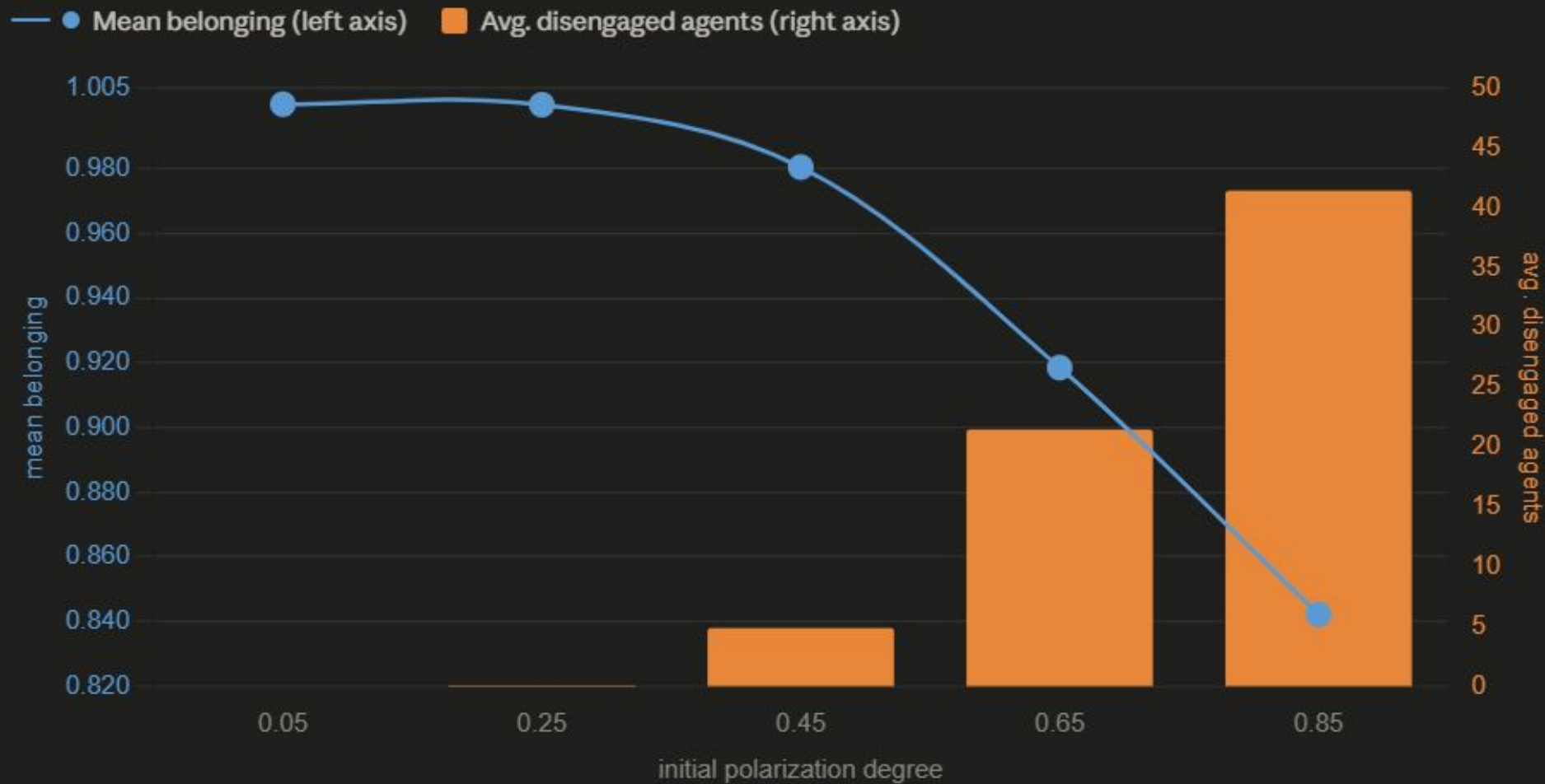
Average combined  
belief of neighbors

# What We Expect to See

- Small differences in beliefs will propagate through social influence, leading to polarization.
- As polarization increases, individuals will lose their sense of belonging within the church.
- A sense of belonging—as well as similarity in belief—is expected to encourage people to attend church.

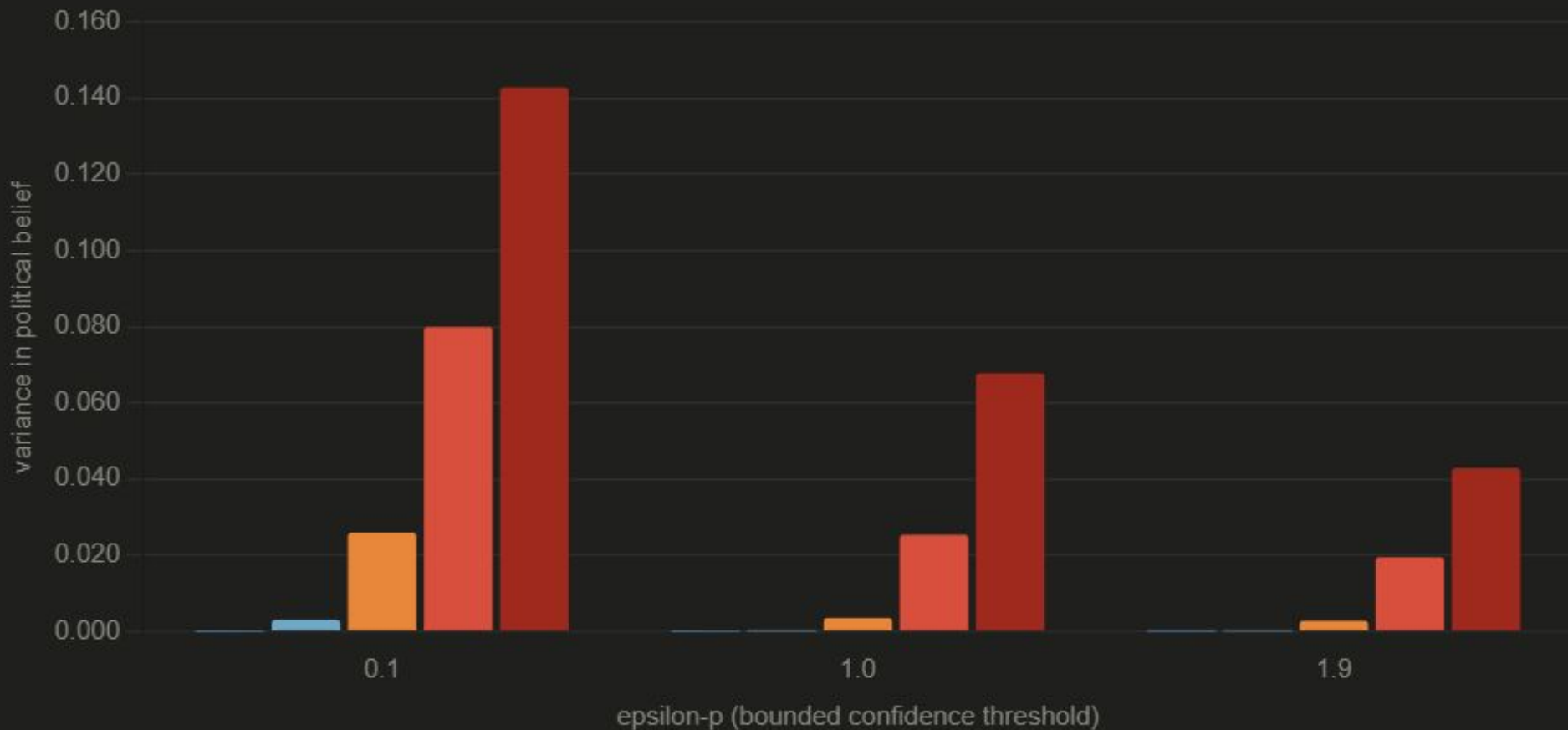
**Demo**

Mean belonging and avg. disengaged agents at tick 120 by initial polarization degree



Belief variance at tick 120 by epsilon-p threshold and initial polarization degree

pol-degree 0.05   pol-degree 0.25   pol-degree 0.45   pol-degree 0.65   pol-degree 0.85



# Design Norms

## Cultural Appropriateness

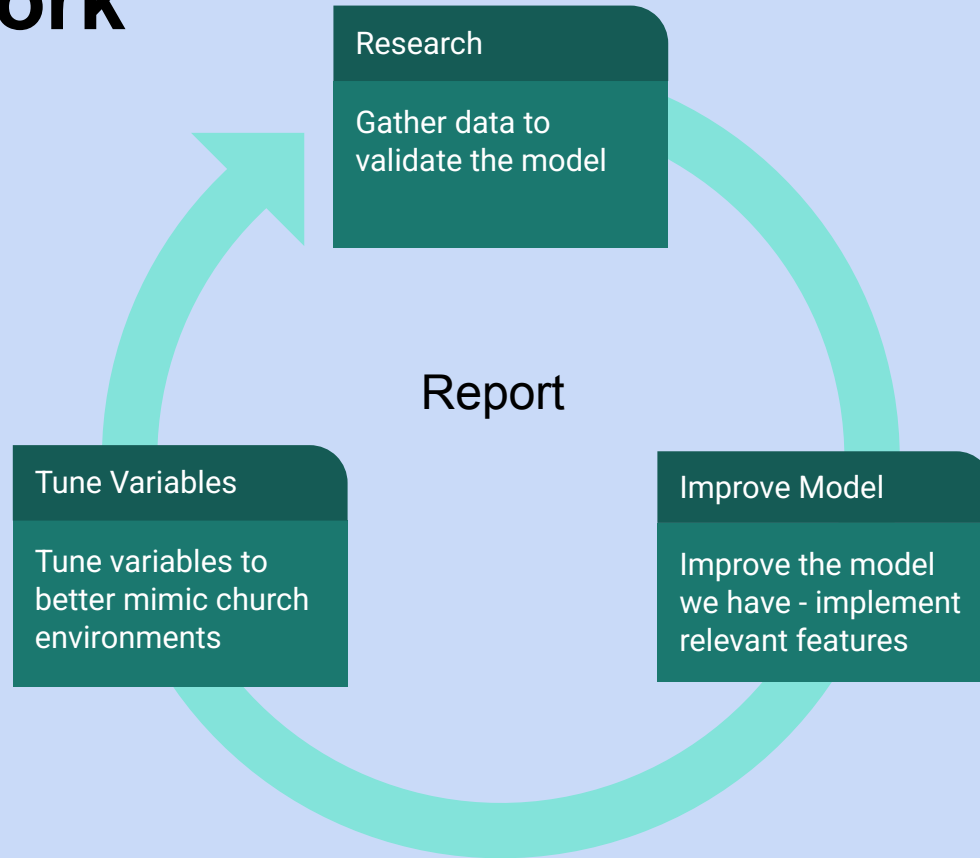
- Represent church differences as variables: political beliefs, religious commitment, tolerance, susceptibility, etc
- Model beliefs as continuous variables rather than fixed categories
- Separate political and religious dimensions

# Design Norms, cont'd

- **Social**

Ensure findings provide insight rather than support any particular viewpoint. This guided us to keep assumptions and outputs neutral, focusing on emergent patterns like polarization, attendance changes, and fragmentation rather than drawing conclusions. This influenced us to avoid embedding any preferred outcome in the model and instead focus on emergent behaviors, allowing users to interpret results rather than drawing conclusions for them.

# Future work



# Future Work

- Funding & Expansion
  - This work is the foundation of something larger
  - Undergraduate students
- Model Validation
  - **Qualitative validation**
  - **Quantitative validation**
- Further Model Development
  - Adapting based on testing

**Thank you for listening**

