

Church and Political Polarization: An Agent-Based Model Approach

Vision Statement

We are living in an age marked by deep cultural and political polarization. Churches are not immune to this discord; it seeps into congregational life through individual behaviors, group dynamics, and even the content of sermons. As a result, some members disengage entirely or seek out communities that more closely align with their political or cultural views. This agent-based model project aims to illuminate the underlying mechanisms that drive such polarization and identify opportunities for strengthening unity within faith communities. Specifically, we are interested in the conditions under which diversity within a church community remains stable. Are there conditions in which declining perceived fit leads to nonlinear levels of polarization? It's important to note that rather than offering prescriptive solutions, we aim to empower church leaders with insights that help them navigate these challenges with wisdom and care. We recognize the limitations of such a model: it cannot fully capture the richness of individual faith journeys, the role of theology, or the complexity of spiritual life. It is also constrained by the assumptions we embed in the model and the data available to us. However, by visualizing the invisible social dynamics that often go unnoticed, we hope to offer a valuable tool for reflection and conversation.

Background

While parallel research has been conducted related to this topic — for example, *The Great Dechurching* (Davis & Graham, 2023) and “Religious Exiting and Social Networks: Computer Simulations of Religious/Secular Pluralism” (Cragun, McCaffree, Puga-Gonzalez, Wildman, & Shults, 2021) — to our knowledge ABM's have not yet been applied to the study of political polarization within church communities. Foundational works such as “The Dissemination of Culture” (Axelrod, 1997) demonstrate how agent-based modeling has been used to study polarization and cultural fragmentation amongst those who do not necessarily share a deep collective identity. However, to our knowledge, ABM's have not yet been applied to the study of political polarization within church communities.

Rather than modeling polarization occurring between two distinct ideological camps, our model intends to examine polarization within a community characterized by a collective identity. Considering that there is a shared theological identity amongst churchgoers, we recognize that there is a complex, pre-existing relational web which exacerbates the social cost of leaving the church community. In our case, we investigate whether polarization-driven decline in perceived fit produces nonlinear levels of disengagement and exit from the church. As such, we will take great care in constructing our model, taking into account these influences and grounding it in empirical studies and statistics that do exist related to the field. This existing body of work provides a valuable foundation from which we can adapt established methods to the unique dynamics of religious settings.

Normative and Ethical Considerations

Cultural Appropriateness - While we intend to design a model that generalizes to a broad range of churches, we ought to strive to account for the various idiosyncrasies and unique characteristics of each church and take steps toward preventing any sort of stereotyping and bias.

Transparency - We recognize that the methods incorporated in this process may seem convoluted and foreign to our target demographic. To counter this, we commit to emphasizing interpretability and to providing documentation to defend our design decisions.

Social - This research is intended to serve as an educational piece as to the underlying dynamics of political polarization within the church. It is not our intent for our research to be used in a way to reinforce preconceived notions about opposing political views or to justify further polarization from those whom people may politically disagree with. Rather, we hope that this research will act as a catalyst to begin to help heal polarization within congregations.

Stewardship - We recognize that the audience's time and attention are valuable resources. With this in mind, we seek to design a system that respects these resources via an emphasis on presenting our findings concisely and avoiding unnecessary jargon/complexity. We want to foster dialogue rather than stress and confusion within church communities.

Aesthetics - We strive to deliver digestible results via integration of user-friendly components, including, but not limited to, data visualizations and concise verbiage.

Justice - Modeling within social behavioral sciences has the tendency to develop biases during model formation and testing, so we must take steps to ensure equity in conjunction with precision.

Caring - Through the long-term development of tools and strategies to be used to help mitigate political polarization within church communities, we hope our research fosters environments where a shared-identity in Christ triumphs over partisan allegiances.

Trust - We recognize that many are tempted to take the findings of mathematical modeling as gospel. While the long-term goal of this project is to develop strategies to combat political polarization, it is not our intention for congregations and pastors to overly rely on these mathematical findings and statistical methods at the expense of faith and prayer.

Product Success Criteria

A successful outcome for this project will be defined by the development of a functional, research-informed Agent-Based Model that offers meaningful insights into the dynamics of polarization and church fragmentation. Specifically, success will be measured by the following criteria:

1. Functionality and Validity of the Model

Minimum:

- The model operates well for some scenarios
- Design decisions are thoroughly documented and justifiable

Stretch:

- The model operates reliably across a range of inputs and scenarios
- All components and agent behaviors are clearly grounded in empirical research or well-supported theoretical frameworks

2. Transparency and Defensibility of Assumptions

Minimum:

- Every modeling decision—including the inclusion or exclusion of specific variables, interaction rules, or thresholds—must be carefully considered, explicitly stated, and logically defensible
- Limitations are acknowledged in final report

Stretch:

- Assumptions are integrated into an interactive interface allowing users modify assumptions
- Assumptions should be traceable to literature or documented observations in real-world congregational contexts

3. Insights

Minimum:

- The model should generate outcomes that offer interpretive value to researchers and practitioners

Stretch:

- Model and results are presented to congregations/church networks or leaders

Approach and Implementation

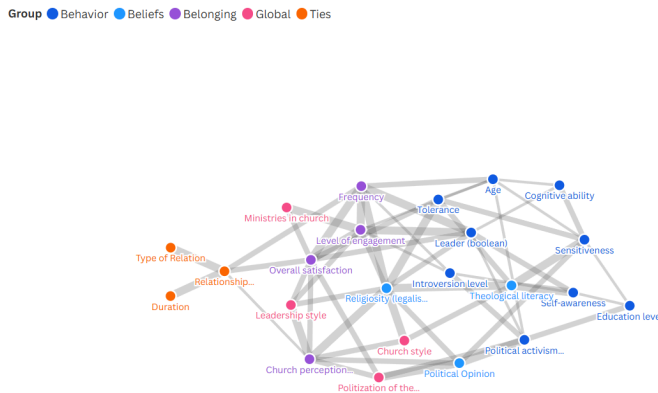


Fig. 1. A diagram of possible variables to include and their relationships to others

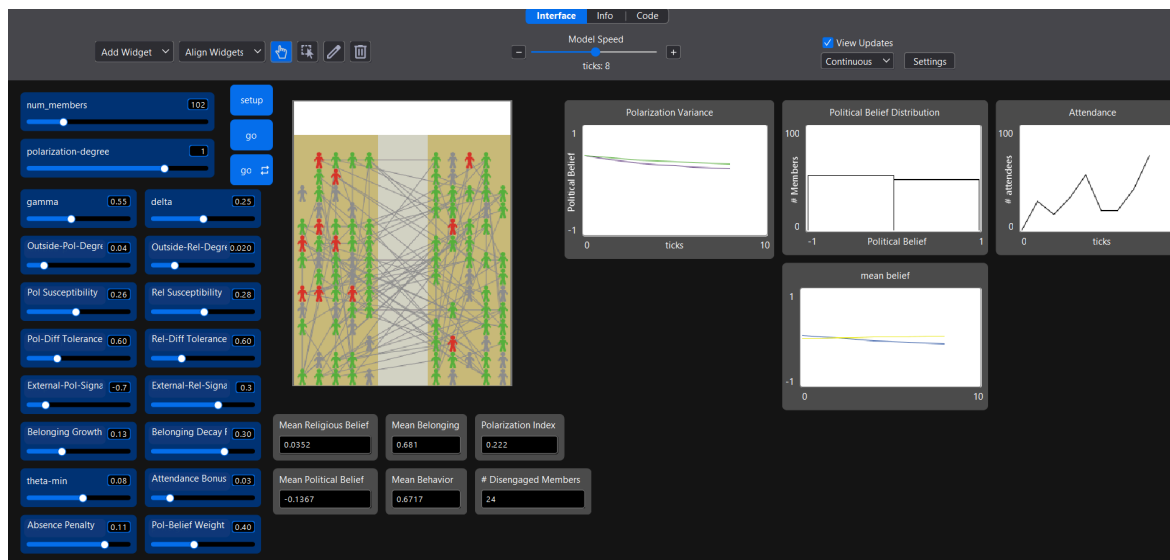
Before designing the model, extensive research was conducted to support the design decisions and assumptions used throughout development. We aimed to create a model that reflected real-life situations while maintaining a level of simplicity appropriate for the initial version. All design decisions, assumptions, and modeling results are documented in our report.

The model was created using the NetLogo interface and programming language. Development involved periodic testing of key output variables to ensure proper model behavior, along with an automated simulation process that ran the model repeatedly using a variety of parameter inputs. Overall, the results generally aligned with our expectations.

One of the main challenges during development was interpreting outcomes we did not anticipate, such as consistently high “belonging” scores across a wide range of parameter values, including polarization (see y-axis of figure 2). We then had to determine what factors might be causing these results and whether the model was functioning as intended.

Results

Interface and model mid-run



We were able to meet the majority of our goals stated in the rubric. Specifically:

- Design decisions are thoroughly documented and justifiable
 - Every modeling decision—including the inclusion or exclusion of specific variables, interaction rules, or thresholds—must be carefully considered, explicitly stated, and logically defensible
 - Limitations are acknowledged in final report
 - The model operates well for some scenarios
- In addition to those a few “stretch” goals were partially achieved such as:
- All components and agent behaviors are grounded in empirical research or well-supported theoretical frameworks
 - Assumptions are integrated into an interactive interface allowing users modify assumptions

Regarding the term “partially achieved,” many of our modeling decisions were based on well-supported theoretical frameworks, although empirical research supporting those decisions is currently somewhat limited. Additionally, some decisions were made to reduce the complexity of the final model and ensure functionality, even when that meant sacrificing potentially more realistic design choices.

One goal we did not explicitly meet was: “The model should generate outcomes that offer interpretive value to researchers and practitioners.” While we hope our model provides value to researchers and practitioners, we were unable to confirm this due to time constraints.

To ensure the model was functioning as intended, additional evaluation was performed to determine whether the results generally aligned with our expectations. Across many simulations, we observed that as polarization increased, members felt less like they belonged within the church, as shown in Figure 2. Additionally, Figure 2 shows a sharp increase in the number of members who left the church as polarization increased. Both of these outcomes aligned with our expectations for the model. Similarly, when variables such as tolerance and susceptibility were adjusted, we observed corresponding changes in the extent to which members’ political and religious views differed. A graph of political tolerance versus political belief can be seen in Figure 3.

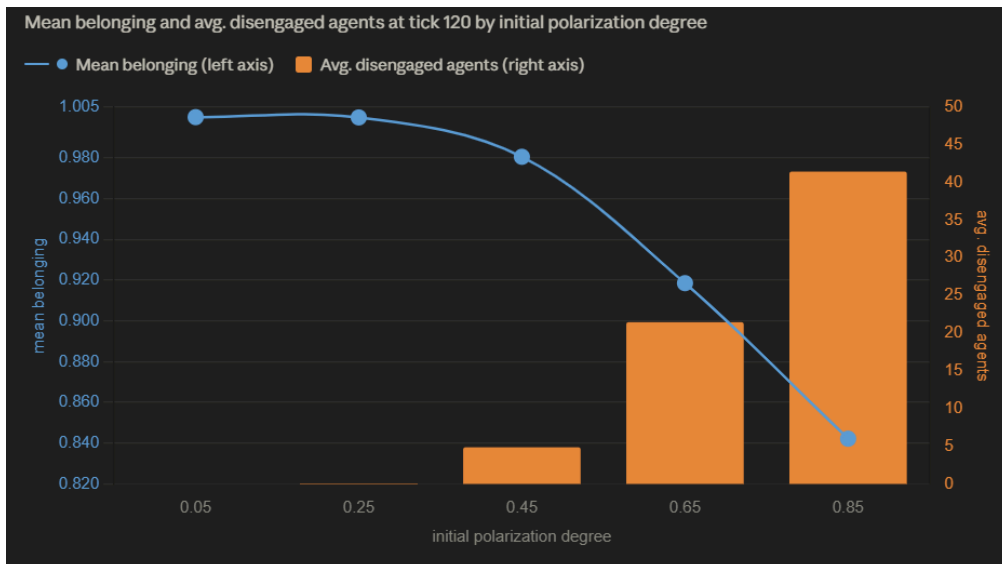


Fig. 2.

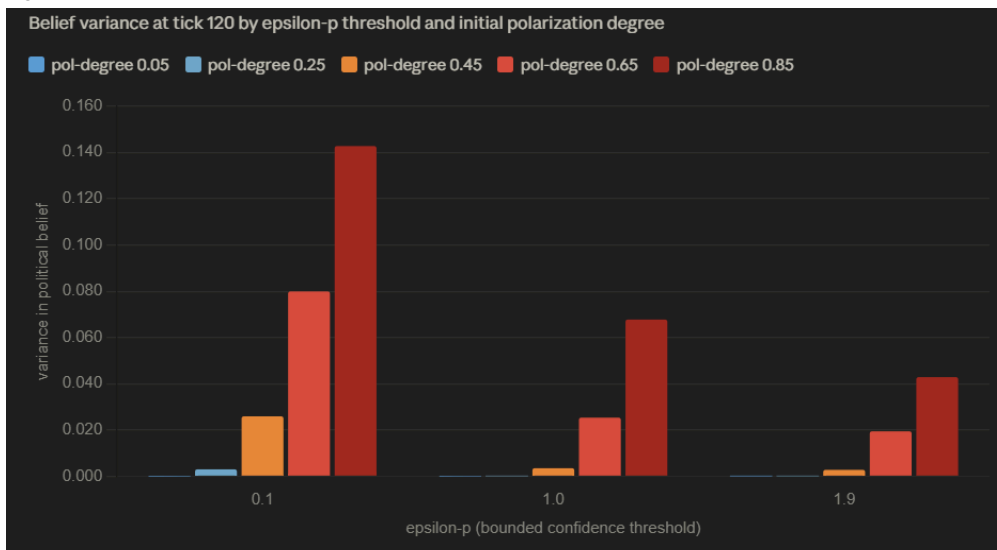


Fig. 3.

Professor Araújo has already found another student eager to continue the work that has been done. Professor Araújo has also secured funding to gather data from Brazil and Kenya to help validate the model, with a focus on church polarization in the Global South.

Conclusion

The key accomplishment of our project is building a preliminary working model for future students to contribute to and improve upon. Over the course of this project, we have built up a vast array of literature that the model rests upon for future reference and use as well. All members were involved in this research and planning process for the model. This includes the reading of many books and articles, attending planning meetings, and working through model equations among other things. Members all also were involved in the making of this report, as well as the slides and presentation of the project. Any additional individual work is listed below
Katelin - Coded the netlogo model based on determined specifications (found in the article "Should I stay or should I go?"), analyzed final model, determined relevant conclusions and results.

Ryan - Assembled and organized the content for the project's website. Will be presenting the project and model with Professor Araujo at the first ever user Netlogo conference in July.

We would like to acknowledge our advisor and mentor in this project, professor Eric Araújo, who developed the idea and supported us in countless ways throughout the process. He provided substantial guidance on the research and theoretical foundations of the model, as well as on its more technical, equation-based components. We are deeply grateful for his guidance and support throughout this project.

Appendix

A report titled "Should I stay or should I go?" can be found in the project submission