Title: Scapegoat: A NetLogo Agent-Based Model of Scapegoating in Coevolving Networks

Abstract:
Collective violence in social systems often exhibits a distinct topological signature: a diffuse tension that rapidly converges onto a single target, followed by a sudden restoration of cohesion. This paper introduces "Scapegoat," an Agent-Based Model (ABM) developed in NetLogo that formalizes René Girard's Mimetic Theory as a dynamic process on adaptive networks. Unlike static contagion models, Scapegoat implements a co-evolutionary feedback loop where agent states (tension) and network topology (links) recursively influence one another. We hypothesize that the "Sacrificial Crisis" described by Girard corresponds to a specific topological phase transition: a shift from a modular Small-World structure to a "Unanimous Mimetic Equilibrium" (UME), a limiting star-like configuration characterized by the extreme centralization of accusation ties; in a structural-balance reading, hostility collapses onto one node while cohesion is restored among the rest.
Using NetLogo's dynamic link primitives to model tension transfer and state-dependent rewiring, the simulation reveals a counter-intuitive "Paradox of Friendliness": highly connected populations are more efficient at synchronizing hostility, leading to higher victim lethality, whereas "skeptical" agents act as topological firebreaks. To assess the model's generative sufficiency, we specify an empirical validation pathway comparing simulation outputs to longitudinal data from high-profile online "pile-on" episodes on X/Twitter, focusing on emergent signatures such as the synchronization of the Gini coefficient of attention with Freeman centralization.
By adhering to the ODD protocol and integrating an explicit validation pathway, this work illustrates NetLogo's capacity to bridge Computational Social Science and Anthropological Theory. The model offers a novel quantitative definition of "scapegoating" not as a moral failing, but as a deterministic attractor in stress-responsive networks. Beyond research, Scapegoat supports modeling literacy: students can manipulate population size, friendliness, and skepticism and observe how network structure shapes bullying-like dynamics and collective harm.

Keywords: Agent-Based Modeling; Adaptive, Coevolving Networks; Mimetic Theory; NetLogo; Small-World Networks; Phase Transition; Structural Balance.

Chapter 1. Introduction: Modeling Scapegoating

Collective violence often changes its surface while preserving its dynamics. From ritual expulsion to contemporary online pile-ons, one recurrent pattern is the rapid concentration of diffuse social tension onto a single target, followed by a temporary relief. René Girard described this process as the scapegoat mechanism. Yet, despite its descriptive power, mimetic theory has remained difficult to test computationally because its central claims are usually expressed in philosophical and anthropological terms rather than as explicit interaction rules.

This paper approaches scapegoating as a generative problem in agent-based modeling. Rather than treating scapegoating as a metaphor for public condemnation or as a purely moral category, we examine it as a recurrent network process that may emerge when stressed agents coevolve with the ties connecting them. The core question is not simply why a crowd condemns a target, but how local acts of accusation, imitation, and isolation can reorganize an entire social network around a victim.

To address this problem, we introduce *Scapegoat*, a NetLogo agent-based model in which individual tension and network topology recursively influence one another. Agents are embedded in a small-world-like network and exposed to an exogenous environmental stressor represented by a polluted well. As tension accumulates, agents may accuse, recruit neighbors, sever ties, or become isolated themselves. Leaders and victims are not predefined. They emerge from stochastic interactions under environmental and topological constraints. We use the term sacrificial convergence to describe the resulting victim-centered reorganization of the network: hostility contracts around one node, ties are pruned near the focal event, and a short-lived reduction of collective tension follows a decisive rite.

The paper deliberately keeps the explanation close to the implemented model. The current version of *Scapegoat* operates on undirected, unweighted links; it encodes roles through agent states and shapes; and it uses local shortest-path routines and stochastic rewiring to simulate victim isolation and network adaptation. This focus is methodologically important. It allows the paper to advance a minimal, inspectable, and reproducible process model rather than a broader theoretical synthesis that extends beyond what the code actually implements. It also makes the model especially suitable for NetLogo as a research and teaching environment, since coevolving network dynamics can be visualized, perturbed, and compared in a transparent way.

This study makes three main contributions. First, it translates a mimetic account of scapegoating into an explicit ABM organized according to the ODD protocol, turning a largely qualitative theory into a reproducible simulation framework. Second, it identifies a set of experimentally tractable mechanisms and observables—such as tension escalation, time to rite, role-specific mortality, victim isolation, average path length, and clustering—that make the model suitable for systematic analysis. Third, it proposes a compact empirical bridge to four Brazilian online pile-on episodes on X/Twitter, using a small set of network-compatible indicators to compare simulated and observed episodes of concentrated hostility.

The emphasis of the paper is explanatory rather than predictive. The model is not intended to reproduce the semantic content of accusations or to reconstruct any particular case in detail. Instead, it tests whether a simple coevolving-network mechanism is sufficient to generate a recognizable pattern of collective targeting. In that sense, *Scapegoat* functions as a computational laboratory: it allows us to vary environmental stress, population size, friendliness, and skepticism, and to observe how these parameters alter the probability, speed, and severity of sacrificial convergence.

Three research questions guide the analysis. Under what conditions does a stressed small-world-like population converge on a single victim rather than dispersing hostility across multiple targets? How do friendliness, skepticism, and population size shape the likelihood, speed, and lethality of that convergence? And to what extent do the structural signatures generated by the model resemble those observed in digital pile-on episodes, especially in terms of attention concentration and network centralization?

The remainder of the paper is organized as follows. Section 2 presents the conceptual mechanism together with an ODD-oriented summary of the NetLogo model. Section 3 reports the main simulation results and discusses how key parameters reshape the dynamics. Section 4 offers a brief empirical bridge to four Brazilian cases from X/Twitter using a deliberately small set of comparable network signatures. Section 5 turns to model evaluation and an expanded experiment agenda, outlining verification checks, sensitivity analysis, and additional NetLogo experiments that can further strengthen the contribution of the model.

Chapter 2. From Mimetic Mechanism to NetLogo Model

2.1 A minimal mimetic mechanism

The simulation was implemented in the NetLogo environment, allowing for the observation of accusation propagation, group formation, and the emergence of the sacrificial mechanism. Each agent is represented as a node in the network, connected to other agents according to the Small-World structure.

The model enables the programming of autonomous agents based on simple rules that, throughout the simulation, lead to emergent behaviors not explicitly programmed. The model starts with a variable number n of agents, organized in a Small World structure, connected only to their immediate neighbors. This structure aims to reflect small-scale societies, where the scapegoat phenomenon occurs more explicitly.

Agents start in a default state of health and green color. In the center of the network, there is a blue water well. As the simulation progresses, the well becomes contaminated, changing color on a scale up to brown, indicating maximum contamination. The inclusion of the well in the model represents water contamination, a recurrent event in witch persecutions or, in medieval Europe, the persecution of Jews.

As the well becomes contaminated, agents experience increased tension. Tension is symbolized by color change, on a scale from green to red, from lower to higher tension. A tensioned agent attempts to transfer tension to another agent, changing its color from calmer to hotter, while the transferring agent returns to normal color. This transfer of tension aims to illustrate how tension spreads through the network. Agents under tension lose health, which may lead to death beyond a certain threshold. When contamination and tension reach their peak, a sacrificial crisis occurs. All agents turn red, losing all differentiation. At this moment, one agent becomes the leader, changing shape from circular to square. The leader accuses a victim: one of the agents, randomly chosen, becomes a star, the symbol used for the victim. After this accusation, all agents return to normal (green color), except for the leader and the victim, who remain marked. The goal of this exchange of accusations (or tension) is to illustrate the functioning of the victimary mechanism, which consists solely of substituting one accused agent with another until the sacrificial crisis occurs, at which point the leader substitutes themselves for the victim to manipulate the crisis in their favor.

After the sacrificial crisis, agents are programmed to try to connect with the leader and disconnect from the victim, based on probabilities. Connecting with the leader serves as protection, while disconnecting from the victim reduces the probability of being accused in the future. This dynamic repeats throughout the simulation, with occurrences of dynamic equilibria, meaning several leaders and victims exist simultaneously in the model until the ritual moment. The ritual is essentially the same phenomenon as the sacrificial crisis, but this time only one leader and one victim remain, with the latter becoming the ultimate scapegoat.

2.2 Agent Strategies in the Simulation

The simulation not only reproduces the logic of the scapegoat mechanism but also allows for the observation of different strategies adopted by agents to survive within the dynamics of sacrifice. These strategies emerge from agent interactions and vary probabilistically according to their position in the social network, their tension level, and the influence of accusing leaders.

2.2.1 Méconnaissance: Social tension in the model is triggered by the well's contamination. The well serves as a metaphor for the fact that the trigger of tension among agents remains more or less unconscious. As we will see, agents exchange accusations, and leaders and victims emerge without resolving the true cause of tension, which is either competition among agents or the well's contamination. As argued by Dumouchel (2014), the dynamics of mimetic desire often intertwine with the perception of scarcity, creating a cycle of competition and rivalry. In our model, this méconnaissance manifests when agents, driven by the growing tension caused by the contaminated well, direct aggression and accusation toward other members of the network, without recognizing the primary source of the crisis. The search for a scapegoat, therefore, becomes a strategy for dealing with a diffuse and poorly understood threat, obscuring the roots of social instability.

2.2.2 **Triangulation and Structural Balance:** The exchange of accusations among the agents in the simulation can be formalized through Balance Theory, originally proposed by Fritz Heider (1946). In this framework, the coevolutionary dynamics of the network are guided by the search for consistency in triadic structures. When agent "A" accuses agent "B" (establishing an edge of negative valence), a state of tension and local imbalance is generated. To alleviate this dissonance and avoid being the continuous target, "B" redirects the accusation to a third agent, "C". In doing so, "B" signals a shared aversion towards "C", seeking to establish an alliance relationship with "A". This rule translates the classic premise of structural balance where "the enemy of my enemy is my friend"; that is, the relationship between A and B tends to become cooperative if both sustain negative ties with C. The introduction of this third node radically alters the topology of the system. In network analysis, the transition from purely dyadic interactions to triadic structures enables triadic closure, where possibilities of coalitions and blame redirection arise that do not exist in strictly bilateral configurations. Two actors may temporarily ally against a third, transferring the responsibility for failures in the environment to this external node in order to achieve a state of structural balance. The triangulation dynamic, central to the local rules of the model, reflects the adaptive reorganization of ties to mitigate systemic stress. Fritz Heider (1958), when formulating the psychology of interpersonal relations, emphasizes that unbalanced triads generate friction, motivating the agents to alter the sign of their relations to restore stability. In the simulation, the triangulation — the initial accusation against B followed by the redirection against C — illustrates exactly this process. By converging the accusation to a third agent (C), A and B resolve the tension of their initial dyad, consolidating a coalition founded on shared hostility and propelling the evolution of the network through the mechanism of exclusion.

2.2.3. Sacrificial Mechanism: This triangulation unfolds throughout the simulation, driving the emergence of both highly centralized nodes and heavily targeted nodes (victims). Agents dynamically rewire their edges—connecting and disconnecting—in an attempt to minimize their local structural stress and escape the victimary position. Within the framework of Balance Theory, the sacrificial mechanism operates as a special, limiting case of systemic stabilization: a state of unanimous equilibrium.

Building on the initial A-B-C triangulation, this mechanism is catalyzed by the continuous expansion of the network. Consider the introduction of a subsequent agent, "D", into this localized topology. When D interacts with the group, it is structurally "cheaper"—generating far less relational friction—to direct a negative tie toward the already-targeted agent "C" than to attack "A" or "B". Forming a negative tie with "C" immediately closes balanced triads with the A-B coalition, whereas attacking "A" or "B" would disrupt existing balanced structures and generate new tension.

As this local rule iterates, it triggers a form of preferential attachment for negative valences. It is consistently easier for subsequent agents to align with the growing coalition by attacking the isolated node. This accumulation of negative edges directed at "C" generates a massive *sacrificial convergence*. Thus, the scapegoat mechanism—historically understood as containing violence through violence—manifests in our model as a purely structural cascade. At the peak of the systemic crisis, the overwhelming convergence of negative edges onto a single victim rapidly absorbs the collective tension, resolving unbalanced triads across the network and creating an illusion of global cohesion through the unanimous exclusion of one agent.

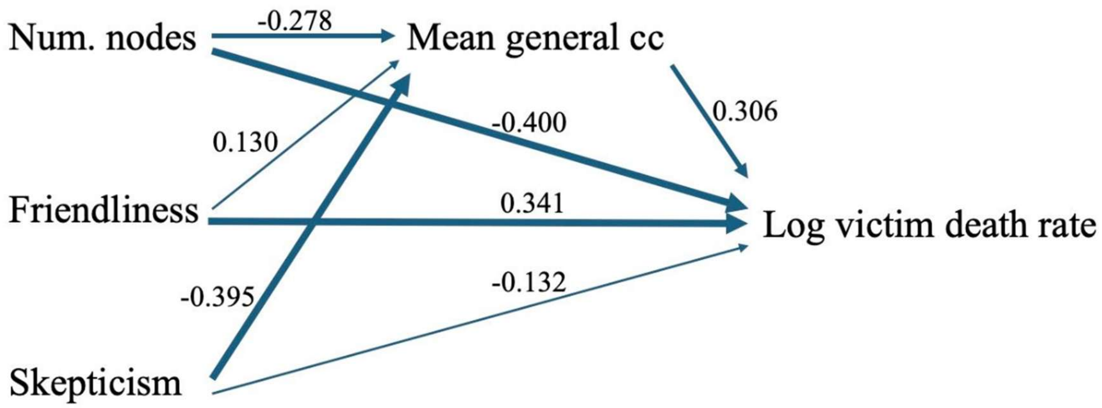
In summary, *Scapegoat* is a deliberately minimal coevolving-network model in which stress, accusation, rewiring, and role differentiation are sufficient to generate a victim-centered pattern of collective targeting. By placing the ODD-oriented summary inside the main text, the paper makes the logic of the model more transparent and better aligned with its empirical ambitions. The next section therefore shifts from specification to behavior: what the model actually does when those mechanisms interact across repeated runs.

Chapter 3. Simulation Results

The data analysis was conducted based on the simulation records, extracting metrics on tension propagation, accusation formation, and recurrence of the sacrificial mechanism.

Graph 1: Influences on Victim Mortality Rate

This graph analyzes how different variables and measures influence the mortality rate of victims:



Model Variables:

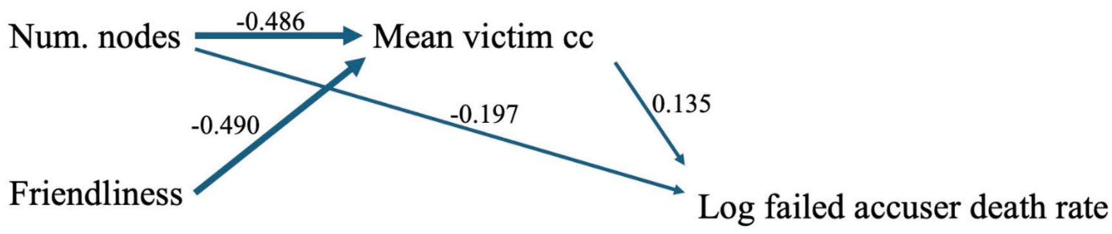
- Number of Nodes (-0.278): The negative correlation indicates that larger networks reduce victim mortality. In larger networks, tension is more evenly distributed, decreasing individual impact.
- Number of Friendly Agents (0.130): The positive correlation shows that more friendly agents increase mortality. Friendly agents form more connections, facilitating the spread of tension.
- Number of Skeptical Agents (-0.395): The negative correlation suggests that more skeptical agents reduce mortality. Skeptics limit the spread of tension as they are less likely to transfer it.

Additional Measures:

- Average Clustering Coefficient of Victims (-0.400): A negative correlation with mortality rate. Less cohesive networks (lower clustering) can protect victims, as lower cohesion hinders tension propagation.
- Logarithmic Mortality Rate (0.306): Allows comparison of mortality in networks of different sizes, helping identify mortality patterns related to structural changes. The positive correlation indicates that network changes directly affect mortality.

Graph 2: Influences on Failed Accusers' Mortality Rate

This graph examines the factors influencing the mortality of failed accusers:



Model Variables:

• Number of Nodes (-0.486): A strong negative correlation indicates protection in larger networks. A broader distribution of tension reduces individual mortality.

• Number of Friendly Agents (-0.197 to 0.135): Variable impact on mortality. In some cases, they help redistribute tension; in others, they may facilitate its spread.

• Number of Skeptical Agents (Decreasing Trend): Consistent reduction in mortality over time. Skeptics help stabilize the network and limit tension propagation.

Additional Measures:

• Average Clustering Coefficient of Accusers: Negative correlation with mortality. Lower cohesion protects failed accusers, as less dense networks hinder tension spread.

• Logarithmic Mortality Rate (Decreasing Trend): Allows analysis across different network scales. It shows the system's adaptation over time, indicating that failed accusers develop protection mechanisms.

3.2. Integrated Conclusion

The combined analysis of the graphs reveals important patterns in the model:

• Effect of Network Size: Larger networks protect both victims and failed accusers due to better distribution of tension in larger systems.

• Impact of Network Composition: Skeptical agents have a consistent protective effect, while friendly agents can either protect or increase vulnerabilities.

• Role of Network Structure: Lower cohesion (clustering) generally protects agents, and network reorganization influences mortality rates.

• Temporal Dynamics: The system adapts over time, with a tendency towards stabilization in mortality rates. This analysis demonstrates how structural and behavioral characteristics of the network influence agent survival in the scapegoat model.

3.3 Results The simulation results revealed interesting and complex patterns in victimization dynamics:

• Influence of Parameters: Surprisingly, friendliness led to fewer victims but a higher mortality rate among selected victims. Forming social connections protects 18 against victimization but intensifies punishment for the few chosen as scapegoats. Population size correlated positively with the percentage of victims and negatively with victim mortality. In smaller communities, social pressure concentrates on fewer individuals, resulting in greater lethality. Skepticism showed a weak relationship with the percentage of victims but significantly reduced their mortality, demonstrating the importance of cultural attitudes in mitigating violence.

• Mortality of Failed Accusers: All three parameters negatively influenced failed accuser mortality, in the following order of impact: population size, skepticism, and friendliness. Larger and more friendly communities, as well as more skeptical environments, tend to be more tolerant of those who make unfounded accusations.

• Mortality Rates: The mortality rates of victims and failed accusers were similar, approximately a thousand times higher than that of the general population, indicating the severity of consequences for those directly involved in the victimary mechanism. The overall mortality rate was not strongly affected by the model parameters.

• Influence of Ritual: Variables related to the ritual, despite their theoretical importance, did not significantly impact the simulation results. This finding suggests that the current implementation of the ritual in the model may not fully capture its complexity and social function, pointing to the need for refinements and adjustments in future investigations.

Chapter 4. Empirical Bridge to Four X/Twitter Cases

This section is intentionally compact. Because the current version of *Scapegoat* operates on undirected, unweighted links, abstracts accusation into role changes and local rewiring, and does not model the semantic content of messages, the comparison with X/Twitter should be understood as an **empirical bridge** rather than a one-to-one validation exercise. The aim is not to reconstruct each controversy tweet by tweet, but to ask whether the model and the empirical cases exhibit homologous dynamic signatures: concentration on some agents, centralization around a target, erosion of internal boundaries, and the timing of counter-pressure.

4.1 Translating mimetic theory into network vocabulary

Instead of treating mimetic theory and network science as separate languages, we use a small set of network descriptors to operationalize the sequence described by Girard. In this framing, diffuse tension is not measured as an interior state of a crowd but as a pre-peak rise in collective attention and instability; victim selection becomes concentration of engagement on one node; sacrificial convergence becomes a star-like increase in centralization; and the collapse of distinctions becomes visible as a weakening of community boundaries. Early defense, finally, appears as a competing alignment that interrupts the move toward unanimity.

Mimetic vocabulary	Network-science reading	Empirical indicator
Diffuse tension	rising collective pressure before fixation	Gini coefficient of attention or engagement
Sacrificial convergence	star-like reorganization around a target	Freeman centralization
Collapse of distinctions	accusations crossing prior group boundaries	modularity decline
Counter-mimesis / defense	competing coalition interrupts unanimity	defense lag; defense/accusation ratio
Post-ritual scar	targeting persists after the peak	slow decay of centralization/concentration

4.2 Bridge metrics and case logic

The four Brazilian cases are retained not as a representative sample, but as a compact contrast set spanning different trajectories of concentrated hostility: **Karol Conká (2021)** as near-total convergence, **Monark (2022)** as convergence followed by delayed defense, **Wagner Schwartz (2017)** as partial recovery, and **Eduardo Bueno (2025)** as early containment. This keeps the empirical section short while preserving its comparative value.

4.3 Comparative reading of the four cases

Case	Dominant network signature	Mimetic-network Reading	Closest model regime
Karol Conká	Gini and centralization rise together; defense near zero	near-complete sacrificial convergence	low skepticism, high coordination
Monark	sharp early concentration; defense arrives late	decisive convergence first, contestation later	rite-like event followed by rehabilitation
Wagner Schwartz	moderate concentration with partial recovery of boundaries	incomplete sacrificial convergence	accusation chain partially interrupted

Case	Dominant network signature	Mimetic-network Reading	Closest model regime
Eduardo Bueno	early defense, weaker concentration, multi-polar structure	contained convergence	higher skepticism and stronger counter-pressure

Karol Conká and Monark occupy the strong-convergence end of the spectrum. In both cases, attention narrows quickly onto a single target and the network becomes more centralized around that target. The key difference is temporal. Karol Conká approximates the clearest case of sacrificial convergence in the dataset: concentration and centralization rise together with almost no effective defense. Monark follows a similar initial path, but defense appears later, after the decisive sanction has already occurred. In mimetic language, unanimity is established before counter-mimesis can stabilize; in network language, star-likeness forms before the system can recover plurality.

Wagner Schwartz and Eduardo Bueno are more useful as interruption cases. In Wagner Schwartz, defense is reactive rather than immediate, and the episode shows only a partial move toward full convergence before some structural differentiation returns. Eduardo Bueno goes further in the direction of containment: defense appears early enough to keep the discussion multi-polar, preventing the stable collapse into a star-like configuration. These two cases are especially important for the revised article because they give an empirical analogue to what the ABM already suggests about skepticism and local support: not every accusation event becomes a sacrificial event, and timing matters as much as intensity.

4.4 What this bridge supports

The conclusion is that it reproduces a recognizable **pattern family**. In both the simulation and the empirical episodes, severe pile-ons are marked by the joint movement of **concentration** and **centralization** around one target. Conversely, contained or partially contained episodes show either earlier defense, weaker concentration, or a less complete erosion of prior community structure. In mimetic terms, unanimity fails to stabilize; in network terms, star-likeness and boundary collapse are interrupted.

This is enough for the purposes of the present paper. The empirical section is not meant to carry the whole argument; it is meant to constrain and clarify the model. It shows that the outputs worth pursuing in NetLogo are not only role counts and mortality rates, but also observables that travel more easily between simulation and empirical networks, such as concentration, centralization, victim isolation, and the timing of counter-pressure. That observation motivates the next section, which turns back to the model and outlines a stronger experiment agenda based on verification checks, sensitivity analysis, and new NetLogo experiments.

5. The Structural Scar: From Simulated to Empirical Persistence

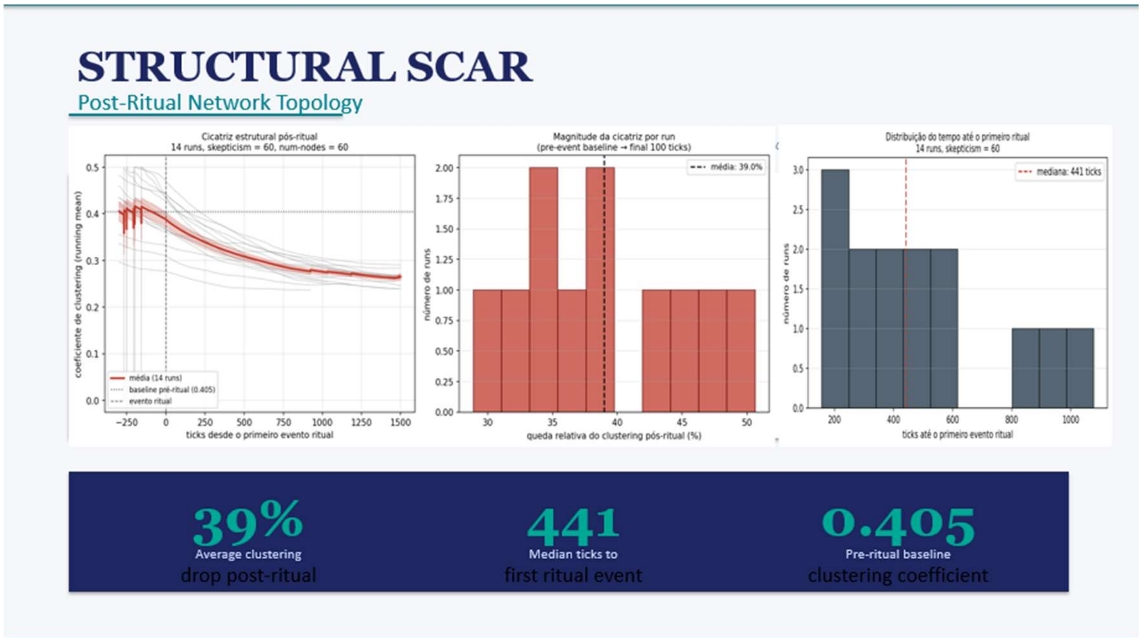
5.1 What Section 4 leaves open

The comparative reading in Section 4 establishes that severe pile-on episodes on X/Twitter share a recognizable dynamic signature with the Scapegoat simulation: when attention concentrates sharply on one node and centralization rises in a star-like fashion, with defense either absent or arriving too late, unanimity crystallizes and the episode approximates sacrificial convergence. Karol Conká and Monark occupy this end of the spectrum; Wagner Schwartz and Eduardo Bueno illustrate how earlier or stronger counter-pressure interrupts the move to star-likeness and keeps the discussion multi-polar. The empirical bridge thus confirms that concentration (Gini of attention), centralization (Freeman's), and the timing of defense are the right observables to travel between the synthetic and the empirical side of the argument.

What Section 4 does not yet settle is what happens after the peak. The mimetic-network vocabulary introduced in Section 4.1 already anticipates a fifth category — the post-ritual scar, defined there as "targeting persists after the peak" and indexed by a "slow decay of centralization/concentration." In the four Brazilian cases, this slow decay is visible as the residual hostility that continues to shape the public perception of the target long after the sanction has taken place: Karol Conká's reputational trajectory, Monark's marginalization after the delayed defense, and, more weakly, the partial recoveries seen in the other two cases. The question that remains open is whether the same post-peak persistence shows up structurally in the simulation, and, if so, whether it provides a network-level analogue of the cultural intuition that the community that emerges from the crisis is never the same community that entered it.

This section argues that the answer is affirmative and can be stated in precise topological terms. The structural scar observed in the NetLogo experiments is, in our reading, the synthetic counterpart of the residual concentration and centralization observed in the empirical cases — and it is this result that closes the loop between Section 2's coevolving mechanism, Section 3's overall behavior, and Section 4's empirical bridge.

5.2 The structural scar as a NetLogo result



To isolate the post-ritual topology from the noise of the accusation phase itself, we ran a dedicated BehaviorSpace-style experiment on the Scapegoat model, fixing skepticism at 60 and population size at 60 nodes, with fourteen independent replications. In each run we recorded the global clustering coefficient of the accusation network over time and aligned the resulting trajectories on the first ritual event — that is, on the moment when a single leader and a single victim remain and the sacrificial configuration is confirmed.

Three quantitative regularities emerge from this experiment. First, the pre-ritual baseline clustering coefficient stabilizes around 0.405, a value compatible with the Watts–Strogatz small-world regime used to initialize the network and consistent with the clustered topology observed during the escalation phase. Second, the median time to the first ritual event is 441 ticks, with substantial variability across replications, as expected from the stochastic nature of tension transfer and rewiring. Third, and most importantly, the ritual event produces an abrupt and persistent drop in clustering: the coefficient falls by approximately 39% and stabilizes around 0.27 in the post-ritual regime, without returning to its pre-ritual baseline within the observation window.

We interpret this decline as a structural scar. During victim isolation, the rewiring rules prune ties in the neighborhood of the focal event and reallocate a portion of the remaining links toward the leader. Once the ritual is consummated, the background churn of tie formation and dissolution is insufficient to restore the local triadic density that sustained the pre-ritual small-world clustering. The network does not simply cool down; it reorganizes around the memory of the event. In mimetic terms, this is consistent with Girard's insight that the sacrificial mechanism produces a temporary catharsis but leaves behind traces that become the basis for ritual repetition: the community that exits the crisis is topologically primed for the next one. From the standpoint of structural balance, it is the collapse of previously balanced triads around the victim that is not undone, even after global tension has been restored.

Two features of this result deserve emphasis. The scar is generic within the experiment: all fourteen replications exhibit a post-ritual clustering below the pre-ritual baseline, despite the stochastic variability of the time-to-rite. And the scar is asymmetric: it is much easier to break the clustered substrate through a single sacrificial cascade than to rebuild it through ordinary, non-coordinated interactions. These two properties — genericity and asymmetry — are what make the structural scar a candidate signature for comparison with the empirical cases analyzed in Section 4.

5.3 A bridge between synthetic and empirical signatures

The structural scar closes the empirical bridge initiated in Section 4 in three complementary ways. First, it adds a fifth observable to the small set of network descriptors used to translate mimetic theory into network vocabulary. Concentration, centralization, modularity decline, and defense timing describe the approach to unanimity; clustering loss after the peak describes its residue. In the mimetic-network reading proposed in Section 4.1, this corresponds exactly to the post-ritual scar indicator, and it gives that row of the translation table a concrete and measurable referent both in the simulation and in the empirical series.

Second, the scar reconciles two observations that would otherwise stand in tension with one another. On the synthetic side, Section 3 already showed that higher friendliness increases victim lethality while skepticism reduces it; and Section 4 showed that contained episodes are characterized by earlier or stronger counter-pressure. Taken together, these results could suggest that, once counter-pressure has done its work, the system simply returns to the status quo ante. The structural scar shows that this is not the case. Even in the intermediate regime used in the experiment (skepticism = 60, a value that already allows ritual to occur but is far from the zone where friendliness suppresses it entirely), the ritual event leaves a persistent topological trace. By analogy, in the four Brazilian cases, the fact that defense eventually arrives — late in Monark, earlier in Wagner Schwartz, earliest in Eduardo Bueno — does not imply that the network of attention returns to its pre-controversy configuration. The residual centralization around the target is the empirical fingerprint of the same mechanism that, in the simulation, keeps the clustering coefficient anchored near 0.27.

Third, the scar clarifies what kind of claim the bridge between Scapegoat and the X/Twitter episodes actually supports. We do not argue that the synthetic clustering coefficient and the empirical Freeman centralization measure the same thing. We argue that they behave as homologous indicators of a single underlying mechanism: the coevolution of accusation ties and collective tension generates a star-like reorganization at the peak and a persistent topological asymmetry after the peak. In both cases, a single sacrificial cascade produces more lasting structural change than the background rate of interaction can undo. This is what it means to say that the model reproduces a pattern family rather than any specific case: the scar is not a prediction about a particular individual, but a structural consequence of the class of dynamics to which the Brazilian cases — and, arguably, many other pile-on episodes — belong.

Chapter 6. Conclusion and Future Work

This paper presented Scapegoat, a NetLogo agent-based model that reformulates Girard's mimetic theory as a dynamic process on adaptive networks. By coupling agent tension with state-dependent rewiring, the model turns an essentially philosophical account of collective violence into an explicit, inspectable generative mechanism. Three results organize the contribution. First, systematic BehaviorSpace sweeps revealed the *Paradox of Friendliness* — the same parameter that promotes cohesion also amplifies the synchronization of hostility — and identified skepticism as the strongest topological firebreak against sacrificial convergence. Second, a compact empirical bridge to four Brazilian pile-on episodes on X/Twitter showed that the dynamic signatures generated by the model — joint rise of concentration and centralization, and the differential timing of counter-pressure — are recognizable in real-world controversies. Third, the structural scar reported in Section 5 (a persistent ~39% drop in clustering after the ritual event) supplied the post-peak observable that makes the bridge between synthetic and empirical signatures bi-directional: sacrifice leaves a measurable topological mark that ordinary interaction does not erase.

Read together, these results support a compact claim: scapegoating can be operationalized as a deterministic attractor of stress-responsive coevolving networks, rather than as a moral category or a purely cultural narrative. The attractor is not universal — it depends on the balance between friendliness (amplifier), skepticism (firebreak), and population size (diluter) — but it is generic within a broad region of the parameter space, and its signatures travel between simulation and data with a small set of network descriptors.

6.1 Limitations

The model is intentionally minimal. It operates on undirected, unweighted links; it abstracts accusation into role changes and local rewiring; and it does not represent the semantic content of messages, the heterogeneity of agent attributes beyond friendliness and skepticism, or the platform-level algorithmic amplification that shapes real online pile-ons. The empirical bridge, in turn, rests on four Brazilian cases deliberately chosen as a contrast set rather than a representative sample. These choices are methodologically productive — they keep the mechanism inspectable and the comparison tractable — but they also delimit the scope of the claims that can be made on the basis of the current implementation.

6.2 Directions for future research

Four extensions seem especially promising. **(i) Signed and weighted ties.** Moving from undirected links to signed and weighted accusation edges would allow a direct engagement with structural balance theory at the triadic level and a finer measurement of the sacrificial cascade. **(ii) Expanded sensitivity analysis and verification.** Global sensitivity methods (e.g., Sobol or Morris screening), additional BehaviorSpace sweeps over the friendliness × skepticism × population cube, and replication-level robustness checks would sharpen the regime map and quantify the genericity of the structural scar beyond the intermediate regime reported here. **(iii) Broader empirical validation.** Extending the bridge beyond the four Brazilian cases — to cross-platform episodes, to other linguistic and cultural contexts, and to longer post-peak windows — would test whether the joint movement of concentration, centralization, and clustering loss is a robust pattern family or an artifact of the current sample. **(iv) Intervention design.** Because skepticism acts as a mechanistic firebreak in the simulation, the model provides a natural testbed for evaluating interventions — moderation policies, friction mechanisms, or educational strategies — aimed at increasing resistance to accusation uptake before sacrificial convergence stabilizes.

Beyond these extensions, the model also invites a methodological conversation about how computational social science and anthropological theory can be productively coupled. Scapegoat does not replace the interpretive work that mimetic theory performs; it translates one of its central claims into a simulation artifact that can be perturbed, measured, and compared with empirical series. In that sense, the NetLogo implementation is less a final answer than a shared object — a small, reproducible laboratory in which a long-standing theoretical intuition can be tested, refined, and, where appropriate, revised against data.