NetSciX2026: International School and Conference on Network Science
February 17^{th}-20^{th}, 2026 - Auckland, New Zealand

Influence of networked partisans on perceptions of media bias

Media bias, Partisans, Opinion dynamics, Antagonistic interaction, Bayesian inference

Extended Abstract

Media bias influences society by affecting the political voting system [1], as the electorate primarily acquires knowledge about political parties and public policies through channels such as print, broadcast, and social media. An individual's viewpoint on media bias is influenced both by consumption of media content and by the peer pressure of their networked political allies and opponents. Modelling the perception of media bias can be approached through network analysis. In this work, we use an idealised model of the perception formation process, based on a network of political allies and opponents inferring the bias of a coin [2]. The model uses a Bayesian probabilistic model in which the agents hold a spectrum of uncertain beliefs at a given instant in time, as opposed to deterministic models that permit an agent to hold only one belief at a time. Within the Bayesian framework, an agent's belief is represented by a probability distribution, which evolves in response to stochastic external stimuli (e.g. daily newspaper editorials) and peer pressure within the network (e.g. peer opinion exchange), leading to drift and diffusion of beliefs. We extend this model by disrupting the network with partisans: obdurate agents who refuse to change their opinion, regardless of external inputs or peer pressure [3].

This work demonstrates that the presence of even a single partisan can destabilises allies-only networks, stops agents from reaching asymptotic learning, and prevents agents from inferring the correct bias. The time evolution of the mean belief of a agent is illustrated in Figure 1. In allies-only networks, the agents' beliefs reach asymptotic learning, inferring the correct coin bias θ_0, as shown by the blue curve. However, the introduction of a single partisan, who stubbornly believes in θ_p, causes the agents' beliefs to vacillate indefinitely between the true bias θ_0 and the partisan's belief θ_p, as shown by the orange curve. The dwell time – the number of time steps over which the agents' beliefs are stable – increases as the number of partisans in the network increases, and decreases when there is disagreement among multiple conflicting partisans. In opponents-only networks, asymptotic learning is achievable regardless of the presence of partisans. The counterintuitive behaviour of persuadable agents reaching the wrong conclusion first, shown in prior work without partisans, occurs in sparsely connected networks. In mixed networks of both allies and opponents, the presence of partisans results in counterintuitive outcomes, which depend sensitively on the placement of the partisans within the network, and the media signal. In a strongly-balanced triad with a partisan, intermittent behaviour is observed, where the belief of persuadable agents undergoes sudden transitions between long intervals of static and vacillating beliefs. Also, counterintuitively, in an unbalanced triad, a persuadable agent can reach asymptotic learning at the true bias if the partisan is strategically positioned, but can be led away from the true bias in the absence of partisans.

The practical impact of the above results on social science applications including media bias is discussed. Links are drawn with the classical social science theory of structural balance. An oral presentation is preferred. The work described in abstract was presented at NetSci2025 as a poster session. While the method is the same, the result will be presented in a different context.

References

[1] James N. Druckman and Michael Parkin. "The Impact of Media Bias: How Editorial Slant Affects Voters". en. In: *Journal of Politics* 67.4 (2005), pp. 1030–1049. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-2508.2005.00349.x.

[2] Nicholas Kah Yean Low and Andrew Melatos. "Discerning media bias within a network of political allies and opponents: The idealized example of a biased coin". en. In: *Physica A: Statistical Mechanics and its Applications* 590 (2022), p. 126722. URL: https://www.sciencedirect.com/science/article/pii/S037843712100933X.

[3] Yutong Bu and Andrew Melatos. "Discerning media bias within a network of political allies and opponents: Disruption by partisans". In: *Physica A: Statistical Mechanics and its Applications* 624 (2023), p. 128958. URL: https://www.sciencedirect.com/science/article/pii/S0378437123005137.

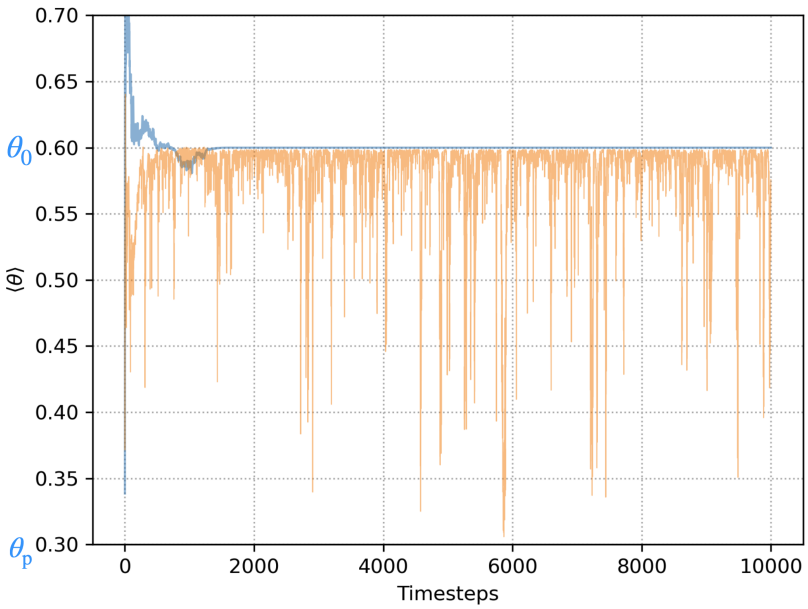

Figure 1: Time evolution of an agent's mean belief in an allies-only network with no partisans (blue curve) and one partisan (orange curve). In the absence of partisans, agents achieve asymptotic learning, correctly inferring the coin bias θ_0. Introducing a single partisan disrupts asymptotic learning, causing the agents' beliefs to vacillate indefinitely between the true coin bias θ_0 and the partisan's fixed belief θ_p. Simulation parameters, including network topology, agents' prior beliefs, and the coin toss sequence, are controlled.