Results

Simulate multiple of the implemented hierarchical networks, the following parameters were used to run 3240 runs using NetLogo's BehaviorSpace:

["max_links" [1 1 3]]

["network" "hierarchical1" "hierarchical2"]

["prop-likelihood" 0.1 0.5 1]

["n_init_believers" 1]

["neut-event-YN" true false]

["prox-YN" true]

["n_agents" [1 1 5]]

["prior-mean" 0.5]

["prior-sd" 0.2]

["no-social-influence" true false]

["p" [0 0.5 1]]

["modulate-weight-by-mean" true]

["expertise_influence" 0 0.2 0.4]

The following reporters were used as metrics to measure the runs:

count turtles

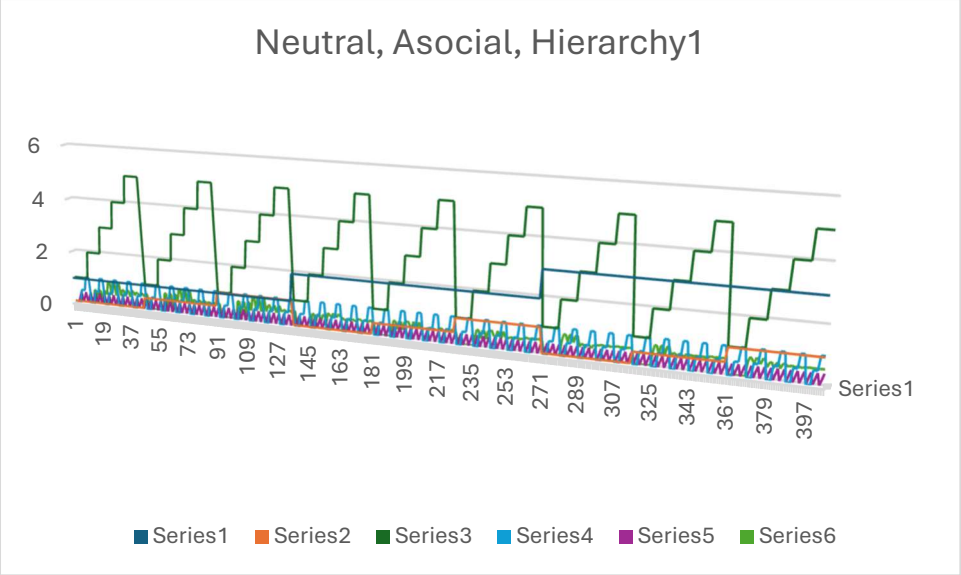
opinion-A-agents

opinion-B-agents

cl-prop-same

ticks

peak-spread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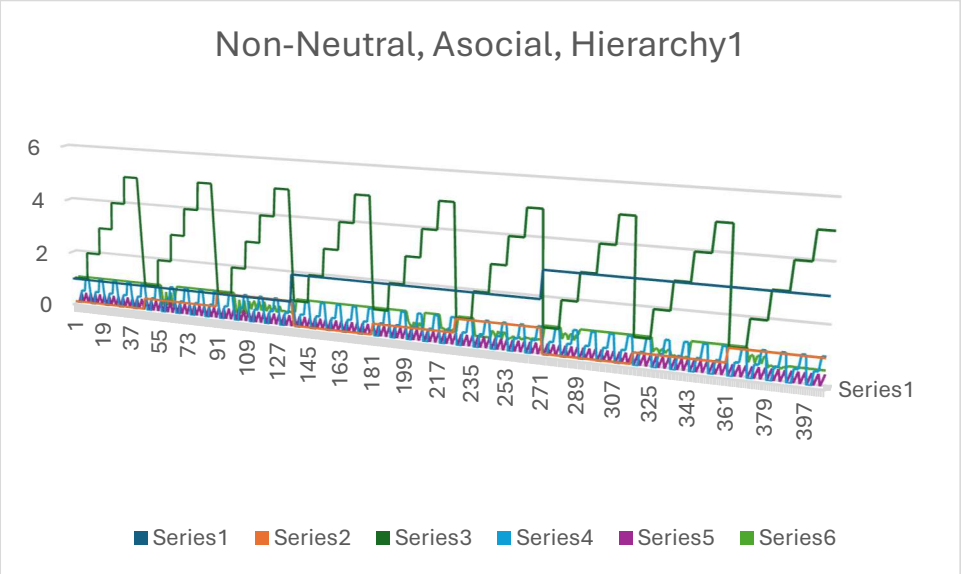
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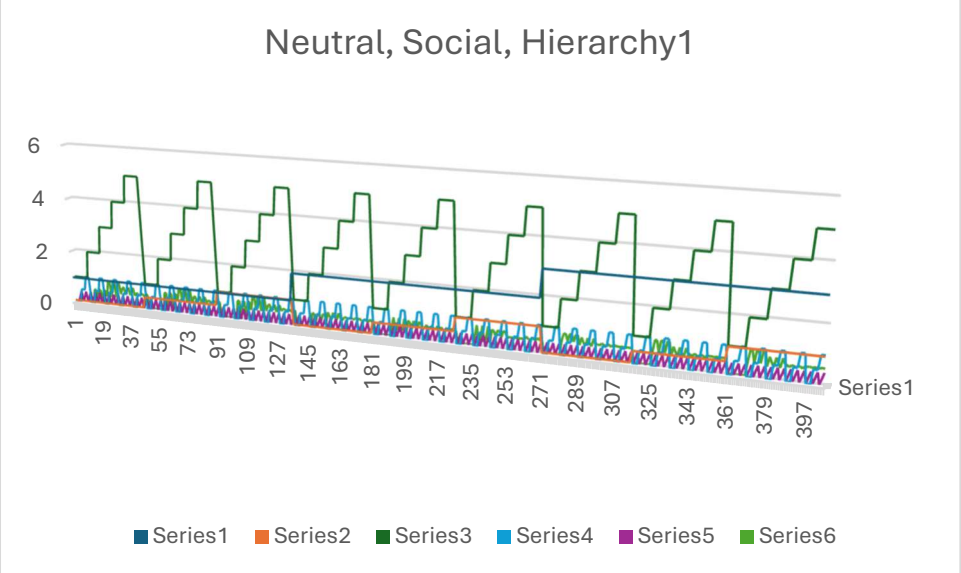
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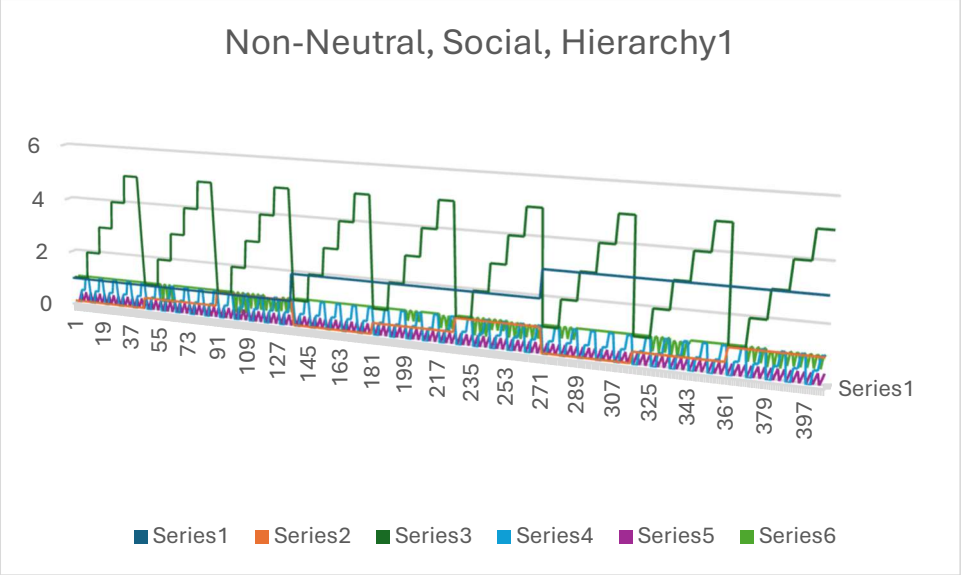
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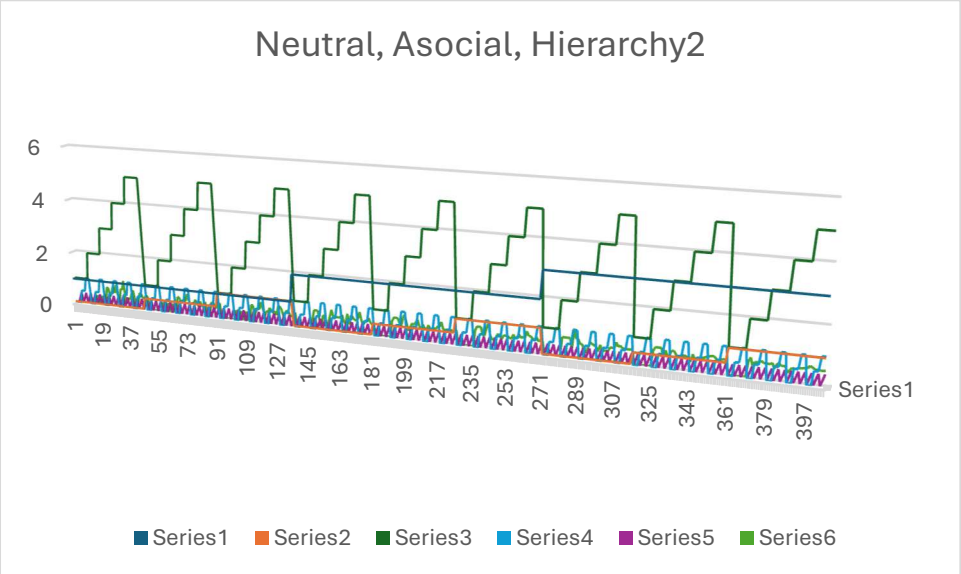
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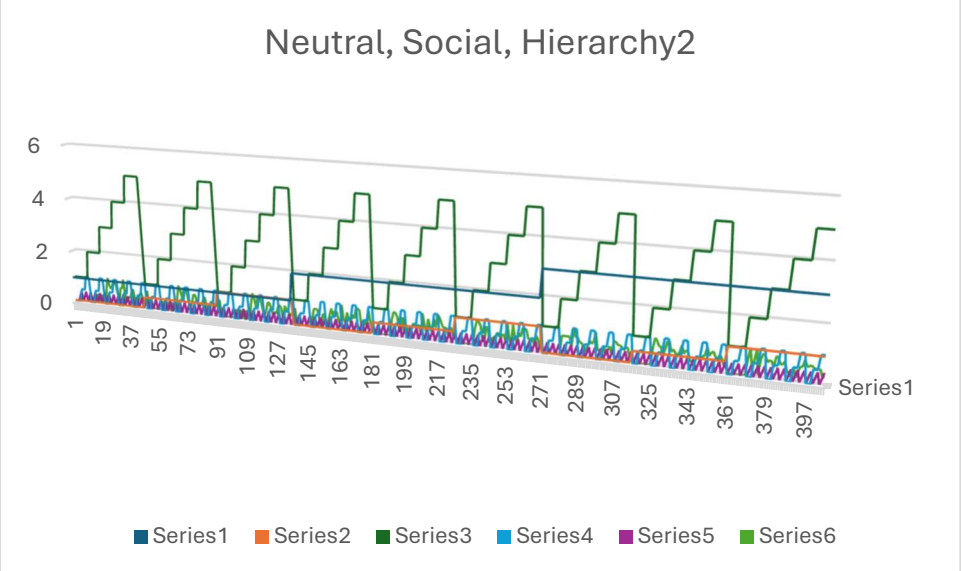
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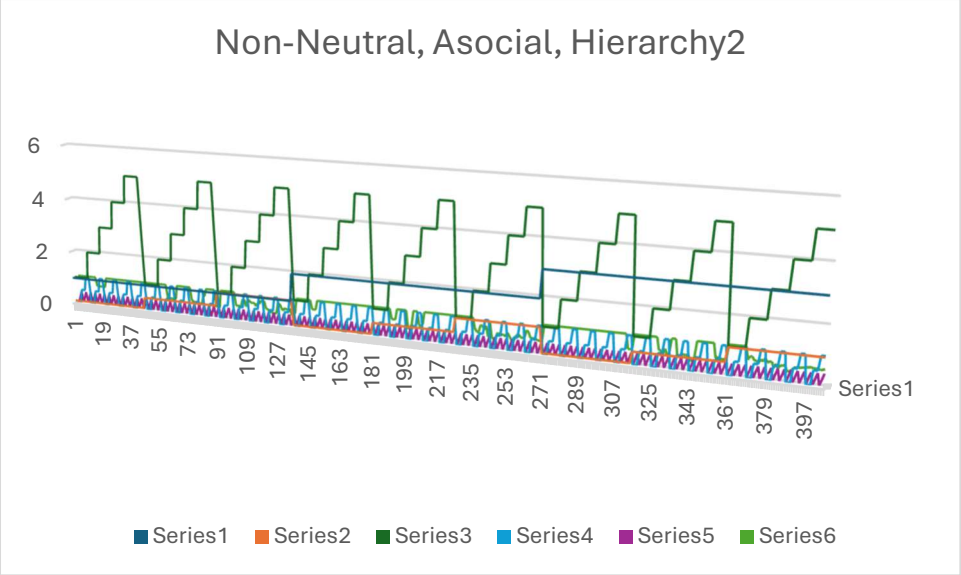

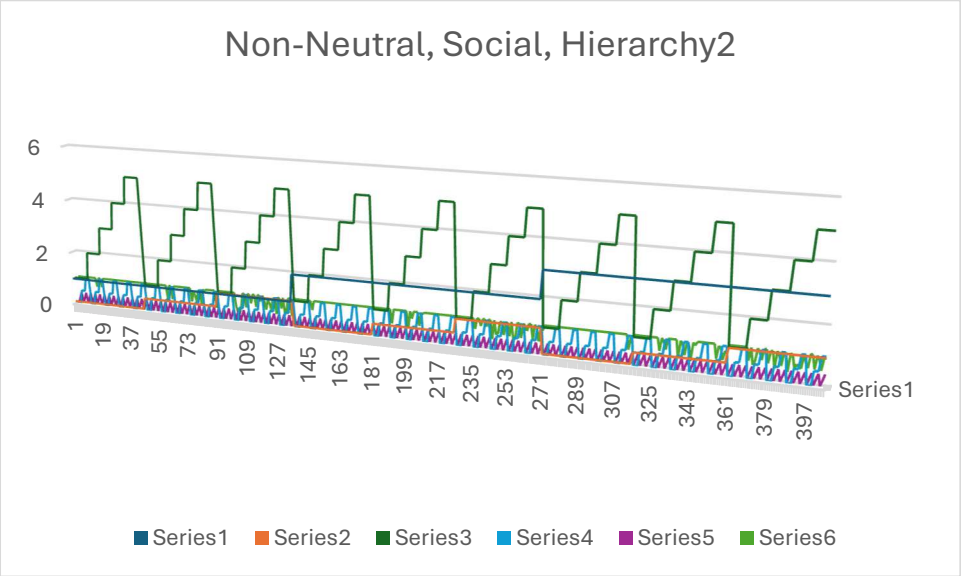

Series1 - max_links

Series2 - prop-likelihood

Series3 - n_agents

Series4 - p

Series5 - expertise_influence

Series6 - percentage

Key Findings

1. **Initial Module Size and Echo Chambers**: When the number of agents in the initial module is low, the formation of echo chambers is not observed. This suggests a critical threshold in agent numbers necessary for echo chamber dynamics to emerge.
2. **Effect of Agent Number and Iterations:** As the number of agents and the number of iterations increase, the propagation rate of opinions also increases. This is attributed to the higher number of nodes within the model, facilitating more extensive network interactions and faster dissemination of opinions.
3. **Central Role of Initial Believer Agent:** The initial believer agent, placed as the central node in the network, plays a pivotal role within the hierarchical structure. This central positioning amplifies its influence on the surrounding nodes, particularly in the initial stages of network formation.
4. **Neutral Initial Believer Agents:** When the initial believer agent holds a neutral stance, the network exhibits a balanced degree of clustering among like-minded neighbors. Consequently, the percentage of opinions within the network tends to average around 50%, reflecting an equilibrium in opinion distribution due to the neutral influence of the central node.
5. **Non-neutral Initial Believer Agents:** In scenarios where the initial believer agent possesses a non-neutral opinion, there is a significant tendency for the majority of agents (over 50%) to adopt this opinion. This indicates the strong persuasive power of the central node when it holds a definitive stance, leading to a more pronounced clustering of similar opinions within the network.