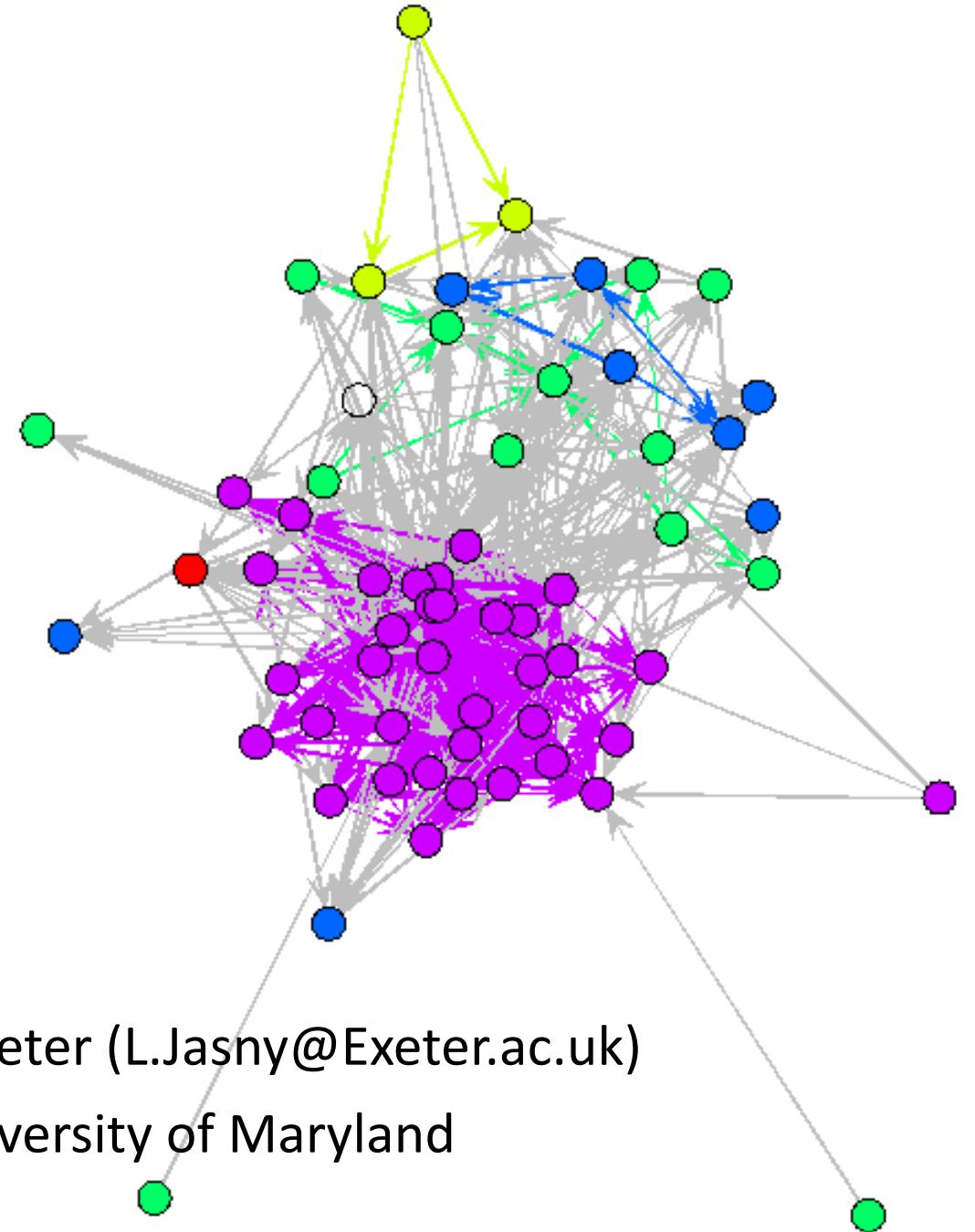


Echo Chambers in Climate Science



Lorien Jasny, University of Exeter (L.Jasny@Exeter.ac.uk)

And Dana Fisher, University of Maryland

How do elite policy actors get information, what do they believe?

- Surveys in 2010, 2016 and 2017
 - Who are your “sources of expert scientific information about climate change”?
 - Human activities are an important driver of current global climate change (Anthropogenic)
 - There should be an international binding commitment on all nations to reduce GHG emissions (Binding)

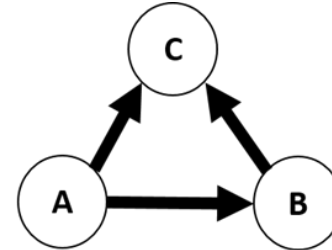
Structure

Edges



A sends information to B.

Chamber



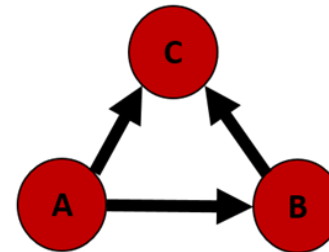
Transitive triad such that A sends information to B and C, and B also sends information to C. The smallest example of a 'chamber.'

Homophily/Echo



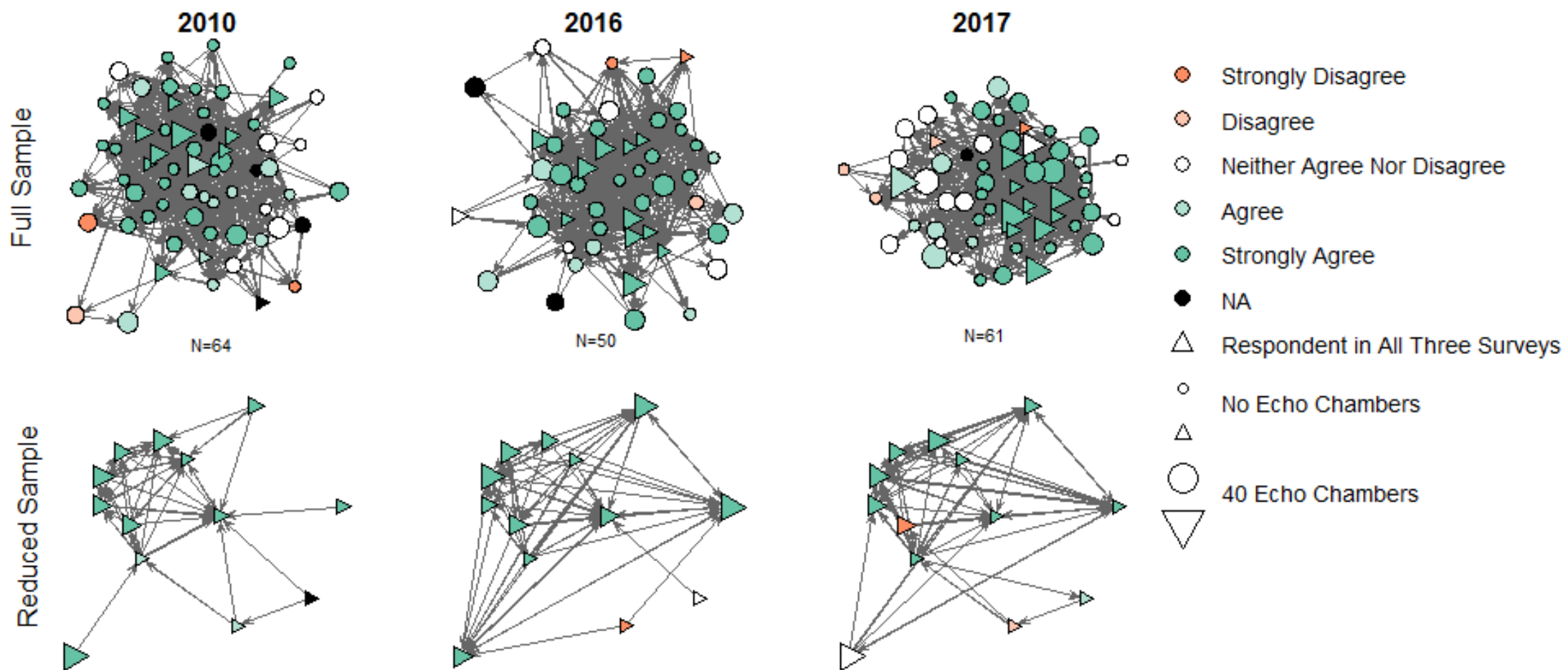
A and B agree so A's information echoes B's understanding.

Echo Chamber

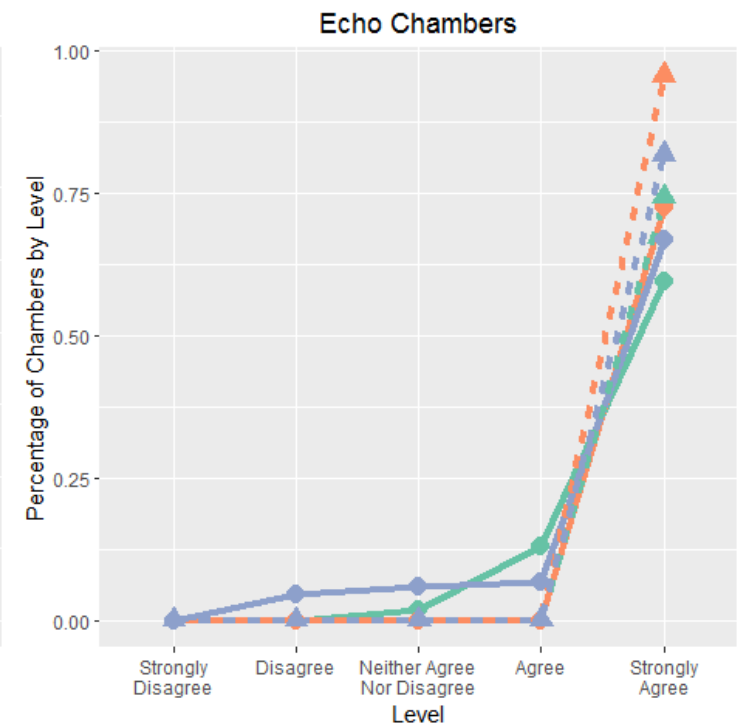
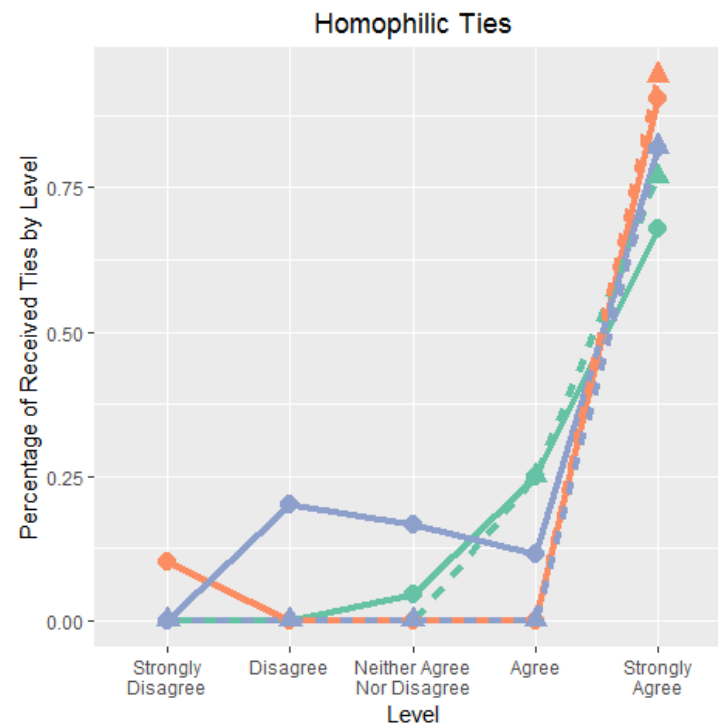
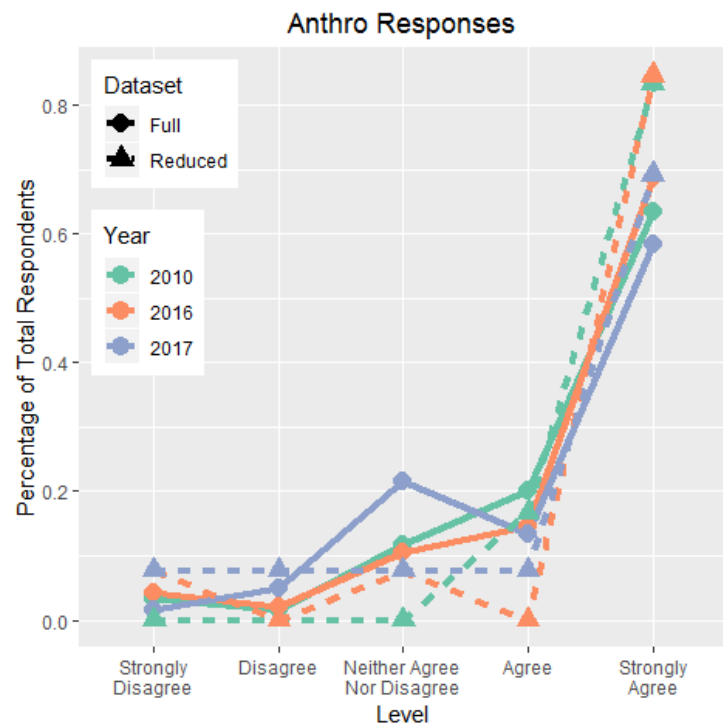


A transitive triad where each actor already holds the same position – an echo chamber.

Network data



Descriptives



Methods: Exponential Random Graph Models

- Accounts for the interdependence of ties through specified terms (MCMC)

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Methods: Exponential Random Graph Models

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- Interpret like a logistic regression (coefficients in log-odds)
- Temporal model – stergm – runs two ERG models (formation and persistence)

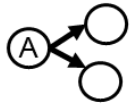
Methods: Exponential Random Graph Models

Structural Terms

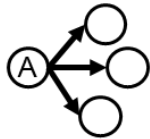
a) Edge The probability of a tie
(presented expressed in
log-odds). Functions like an
intercept term. Information
flows from A to B



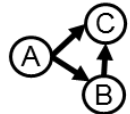
b) Out 2-Star Popularity of A as a source
of information



c) Out 3-Star Added popularity – usually
negative and works as a
check on Out 2-Star to help
with convergence

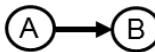
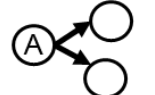
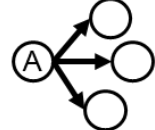
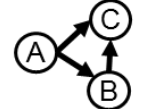


d) Chamber A transitive triad where C
receives information from A
directly, but also possibly
indirectly through B

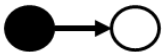
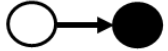
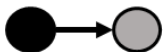



Methods: Exponential Random Graph Models

Structural Terms

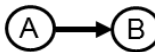
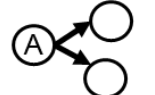
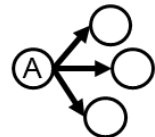
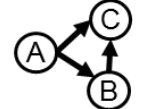
- a) **Edge**  The probability of a tie (presented expressed in log-odds). Functions like an intercept term. Information flows from A to B
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Attribute Terms

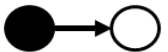
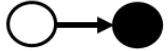
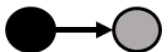

- e) **Sender**  The tendency for those with higher levels of a given attribute to be sources of information
- f) **Receiver**  The tendency for those with higher levels of a given attribute to seek out information
- g) **Heterophily**  The tendency for ties to occur among respondents with very different values on a given attribute. Negative values interpreted as homophily.
- h) **Echo Chamber**  A chamber where all participants agree on a specific attribute

Methods: Exponential Random Graph Models

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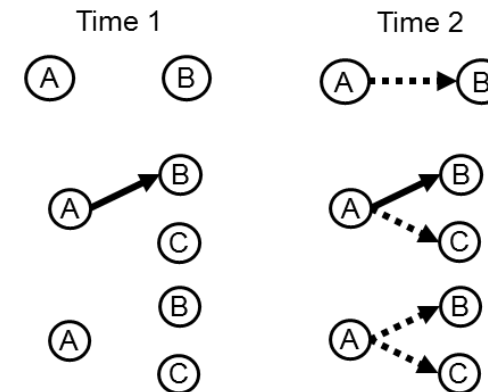
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Temporal Terms

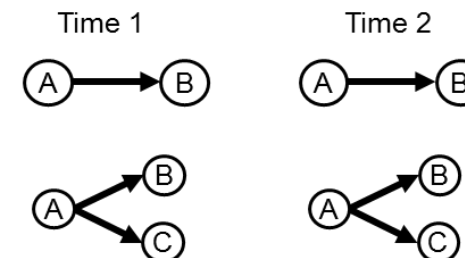
Examples using Edge and 2-Star (all other terms work the same way)

i) Formation Model

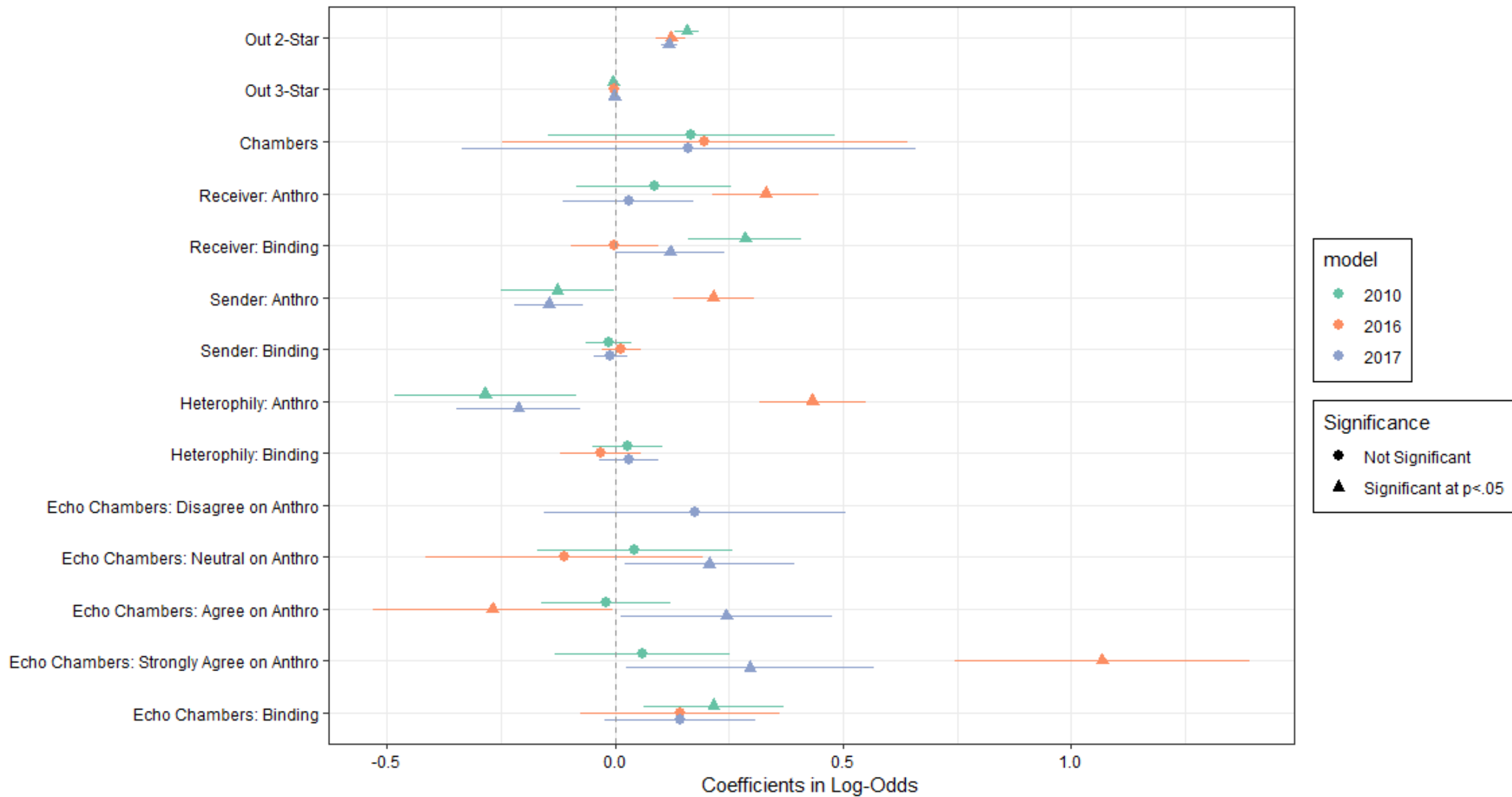


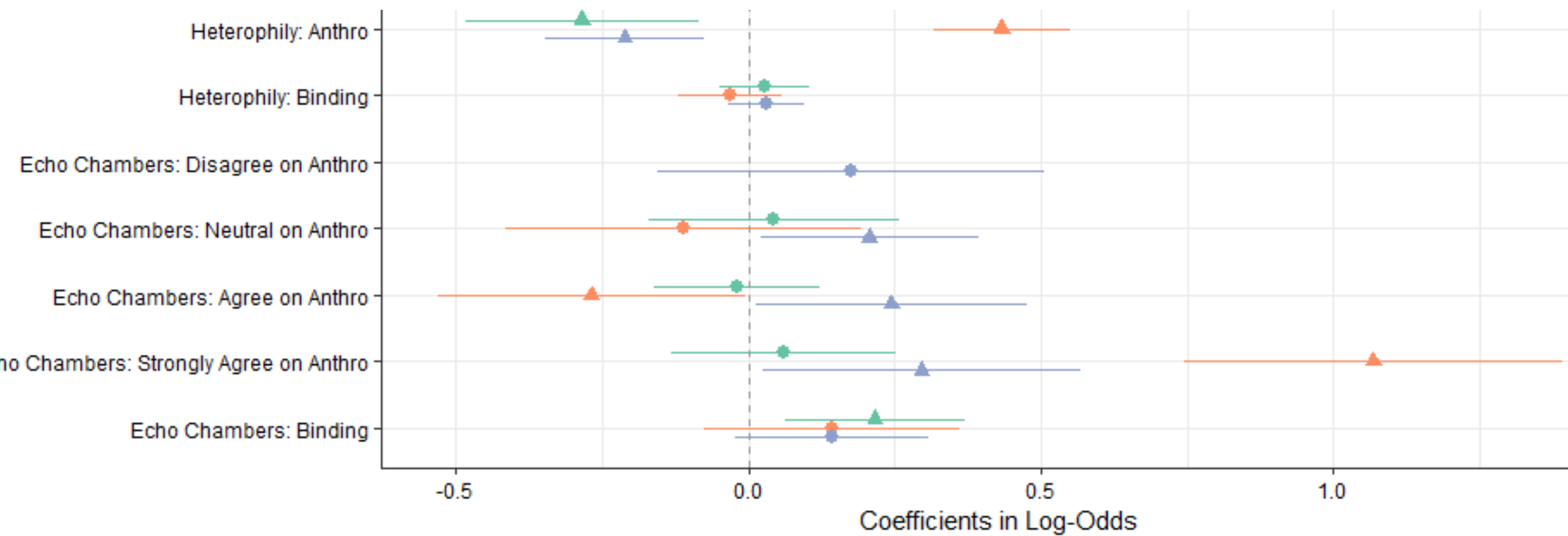
The formation model measures the increase of counts for each of the standard statistics conditioning on the edges present at Time 1 using the new edges at Time 2. Only new structures containing edges formed at Time 2 are included.

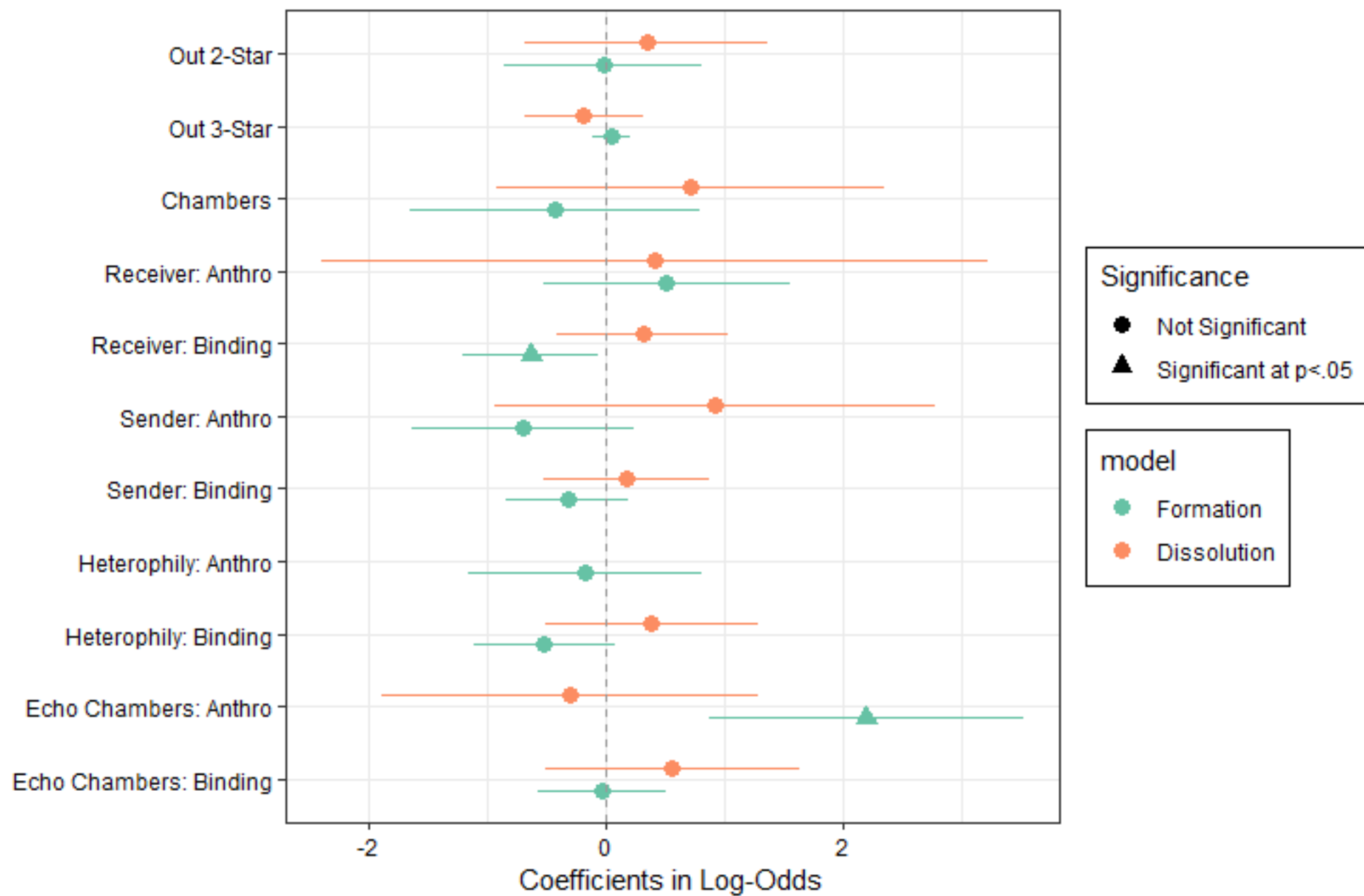
j) Persistence Model



Positive coefficients mean these structures are more likely to 'persist' over time. The persistence model measures the decrease of counts for each of the standard statistics conditioning on the edges present at Time 1 minus the counts where edges disappear at time 2. No structures containing edges formed at Time 2 are included.







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- Increasing doubt of 'Anthro' among policy elite

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- Echo chambers significant at all measurable levels of 'Anthro'
- Echo chambers significant in adding new ties

Conclusion



- Information is politically selected
- Information network is getting more polarized
- Increasing doubt of Anthro -> echo chambers don't drive out minority viewpoints