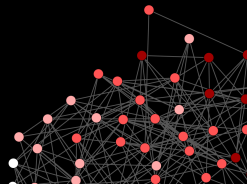
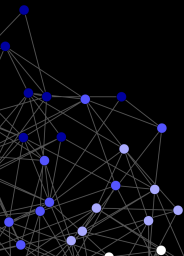


Choice Homophily in Political Discussion Networks:

Evidence from Formal Dynamic Models of the Selectivity Function

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Graduate Technical Intern, Sandia National Laboratories





Choice Homophily

Isolating Causal Mechanisms

Constructing a Dynamic Theory

Agent-Based Modeling

Why ABM?

Agent and Network Characteristics

Selection Strategies (Models)

Results

Does Selectivity Produce Homophily?



Choice Homophily



Homophily:

A tendency for relationships to form between those who are alike in some respect.

“...[T]hey tend to *over-select* similars as friends and, at the extreme, to confine their friendships to individuals of like kinds.”

- Lazarsfeld & Merton, 1954, pp. 23 & 27



Choice Homophily



Choice (Selection)


The individual preference to opt into relationships with similar others – or avoid relationships with dissimilar others

Influence

Over time, a person affects the attitudes of their social contacts (and vice versa) to lower the level of dissimilarity

Structural

Homogeneity on other characteristics (place of work, neighborhood, etc.) increase the likelihood of interaction



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Choice Homophily



These mechanisms are confounded in observational and cross-sectional network studies (Shalizi & Thomas, 2011)

Selection & Influence:

Aral, Muchnik, & Sundararajan, 2009; Eckles, Kizilcec, & Bakshy, 2016; Lewis, Gonzalez, & Kaufman, 2012; Steglich, Snijders, & Pearson (2010)



Choice Homophily



Selection is an inherently communicative process. We convey information about ourselves; others use that information to inform their decisions about our relationship.

- Participation (Mutz, 2002; Nir, 2011)
- Knowledge (Eveland & Hively, 2009)
- Information flow (Bakshy, Messing, & Adamic, 2015; Feezell, 2016)



Choice Homophily




A person considering a political discussion tie with another:

- Present = Discussion
- Absence = Avoidance

Selectivity: the extent to which tie status is associated with the person's perception of similarity with their alter



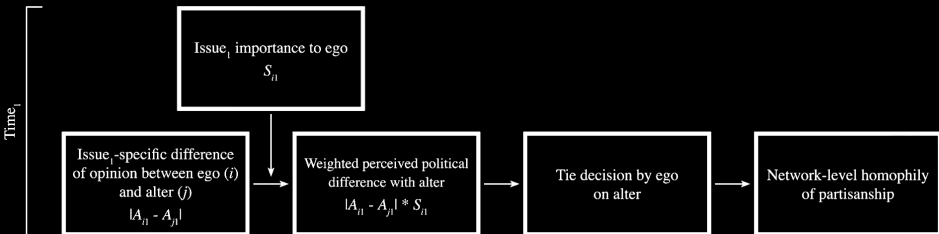
Choice Homophily

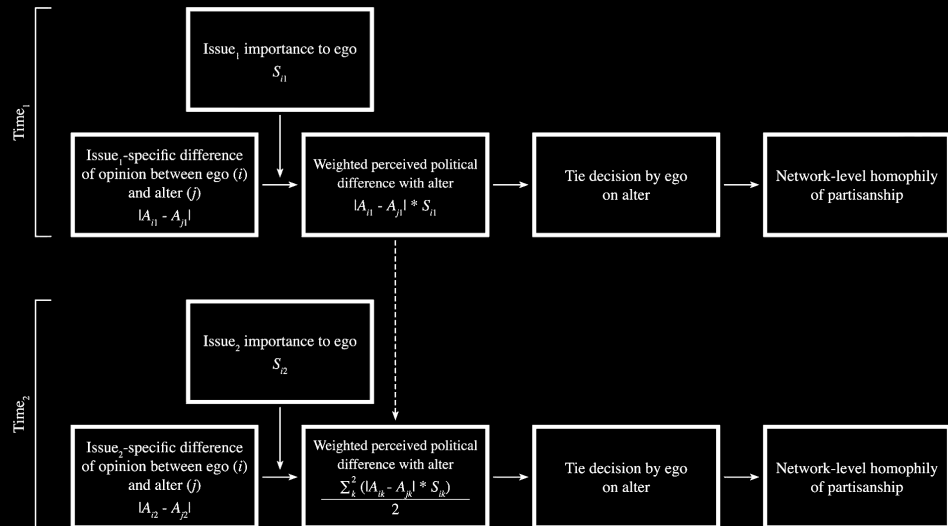


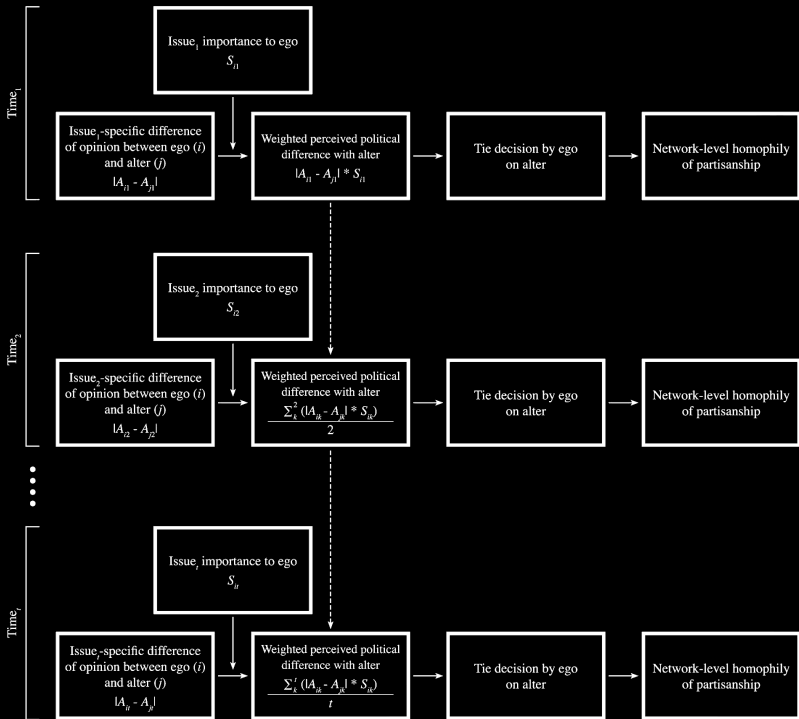
Selective Exposure: People select sources of social information which they anticipate will reaffirm their beliefs in future interactions (Zillman & Bryant, 1985)

Issue Publics: People's political behaviors are guided by the issues which they deem most salient or important (Krosnick, 1990)

Kim, 2009: People are more selective when the information pertains to an issue that is of high importance to them







Agent-Based Modeling



Agent-Based Models: a computational simulation of individuals, programmed with simple interaction rules; assess the effects of changes in rules on the system as a whole

Very useful tool for assessing emergent processes, substituting for human-subjects designs when mechanisms are difficult to observe, or when exploring a theoretical space



Agent-Based Modeling

- $N=50$ agents in each model
- Random party id score, 1-7 scale
 - ▶ Used for homophily measure; not shared with other agents
- Ten opinion scores, Gaussian ($M=\text{partyID}$, $SD=1$), 1-7
 - ▶ $r=.79$, higher among strong partisans (Jacoby, 1988; Peterson, Slothuus, & Togeby, 2010)
 - ▶ Shared with other agents in discussion rounds
- Ten importance scores, 1-7

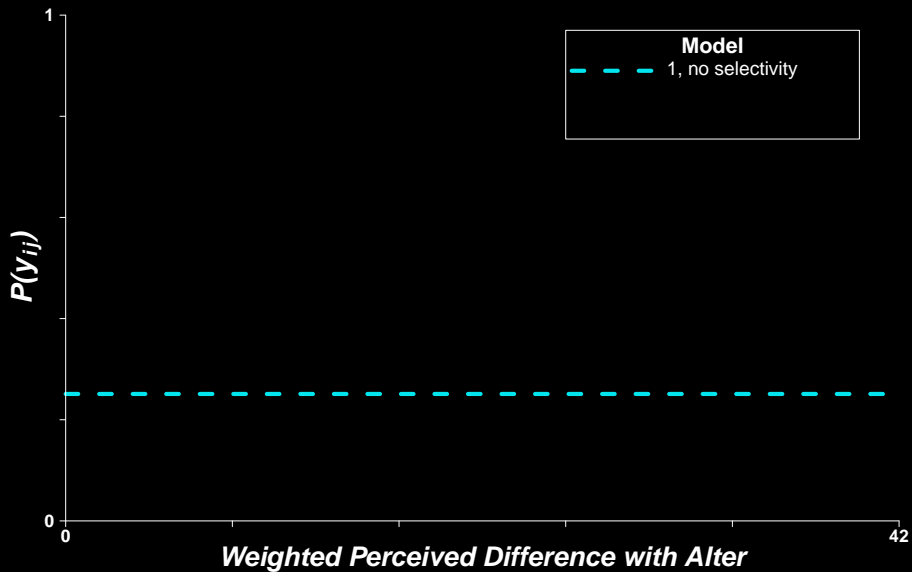
Agent-Based Modeling

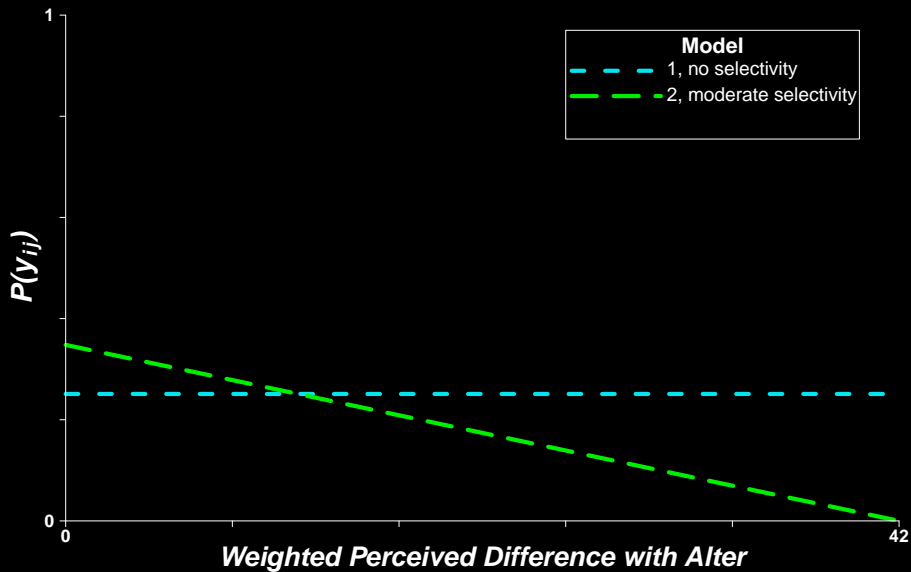


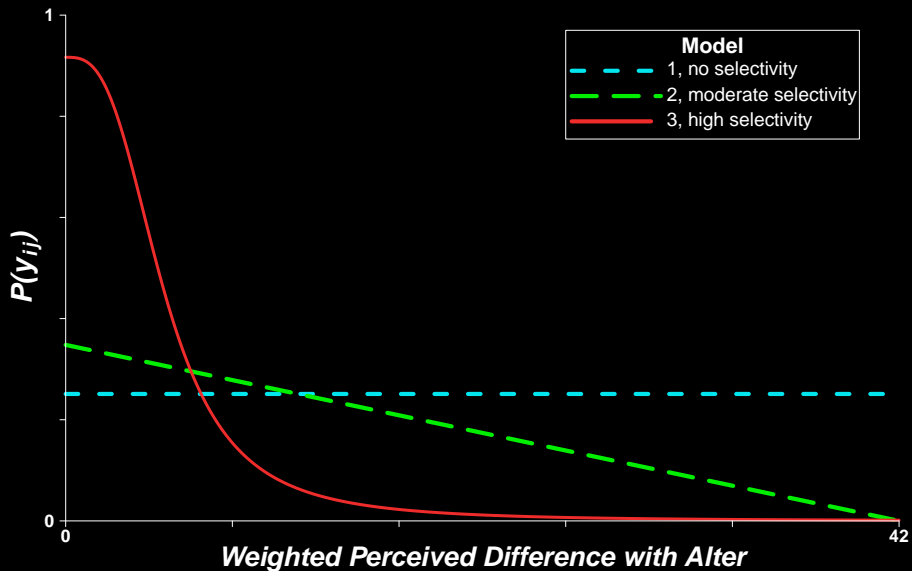
- Erdős-Rényi random graph, 20% connected
 - ▶ networks not homophilous at the outset
- Ten discussion rounds (1 per topic):
 - ▶ Connected dyads share opinions
 - ▶ 40% of **ALL** dyads selected randomly to update
 - ▶ 1 agent makes a tie choice about the other
 - ▶ the same dyad can be selected twice
 - ▶ tie choices use selection strategies of the current model
- Tie choices: associative or dissociative
 - ▶ Affect the status of the relationship going forward





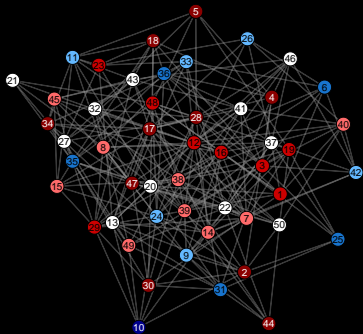




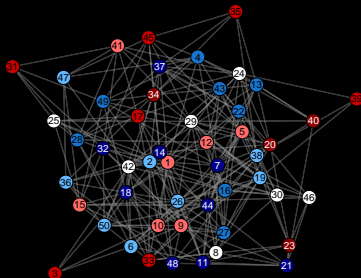


Results - Time 0

Model 1

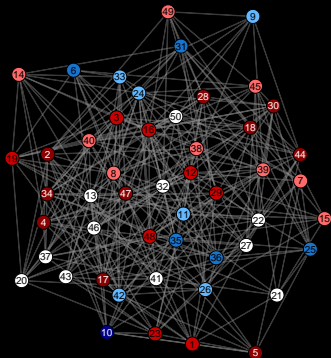


Model 3

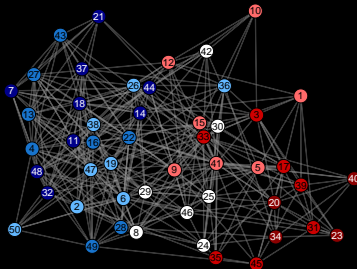


Results - Time 5

Model 1

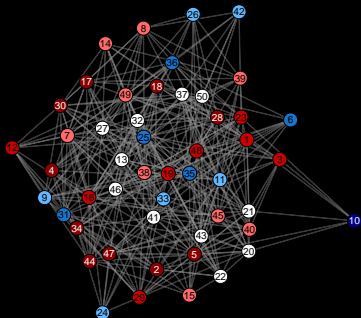


Model 3

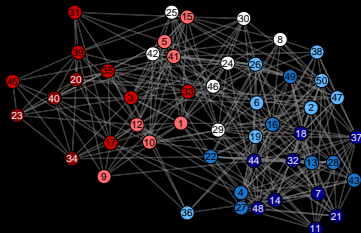


Results - Time 10

Model 1



Model 3



Results - Transitivity

	Model 1	Model 3
Time ₀	0.19	0.19
Time ₁	0.21	0.26
Time ₂	0.25	0.29
Time ₃	0.25	0.31
Time ₄	0.26	0.31
Time ₅	0.27	0.35
Time ₆	0.27	0.36
Time ₇	0.28	0.37
Time ₈	0.33	0.38
Time ₉	0.29	0.34
Time ₁₀	0.28	0.33

Results - Assortativity



	Model 1	Model 3
Time ₀	-0.06	-0.03
Time ₁	-0.15	0.10
Time ₂	-0.11	0.27
Time ₃	-0.09	0.38
Time ₄	-0.09	0.45
Time ₅	-0.12	0.54
Time ₆	-0.10	0.59
Time ₇	-0.04	0.63
Time ₈	-0.05	0.63
Time ₉	-0.06	0.65
Time ₁₀	-0.06	0.68



Results - BTERGM



	Model 1		Model 3	
	θ	CI	θ	CI
Homophily	0.02	$[-0.01, 0.04]$	-0.35	$[-0.44, -0.29]$
Edge Memory	1.62	$[1.59, 1.65]$	1.79	$[1.73, 1.85]$
2-Stars	>-0.01	$[-0.05, 0.06]$	-0.02	$[-0.06, 0.01]$
Triangles	0.04	$[-0.03, 0.11]$	0.10	$[0.02, 0.16]$
4-Cycles	<0.01	$[-0.01, 0.01]$	<0.01	$[-0.01, 0.01]$



Results




Individual selectivity alone can produce network-level homophily

(in the paper:) High selectivity is requires to:

- produce homophily at levels akin to real-world networks
- produce levels of homophily that are robust to model respecification





References and more methodological details are available in
the full paper:

<https://mattsweitzer.com/NCA2019>

Thank You