Random Network Models

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Beyond and Below Racial Homophily: EGR Models of a Friendship Network Documented on Facebook

Wimmer, Andreas, and Kevin Lewis. 2010.

Principles of Tie Formation: A Theoretical Framework

Tie Generating mechanism and Sociodemographic Structure

- Availability
  - Potential friends pool and Distribution of individuals over social categories
  - Smaller group(same-race) size, more out-group(cross-race) ties
- Propinquity
  - "Foci" effect especially for spatial proximity
  - Distribution of individuals over institutions and over physical space
- Homophily
  - Operates with regard to any attribute two individuals share
  - Social closure strategy by distribution of resources over social categories
  - Communication ease by distribution of disposition over social categories
- Sociality and Balance Theory
  - Sociality that two individuals being friends due to preference for socialization
  - Balance theory to Reciprocity and Triadic Closure
  - Networking Intersection by distribution of disposition over social categories indirectly
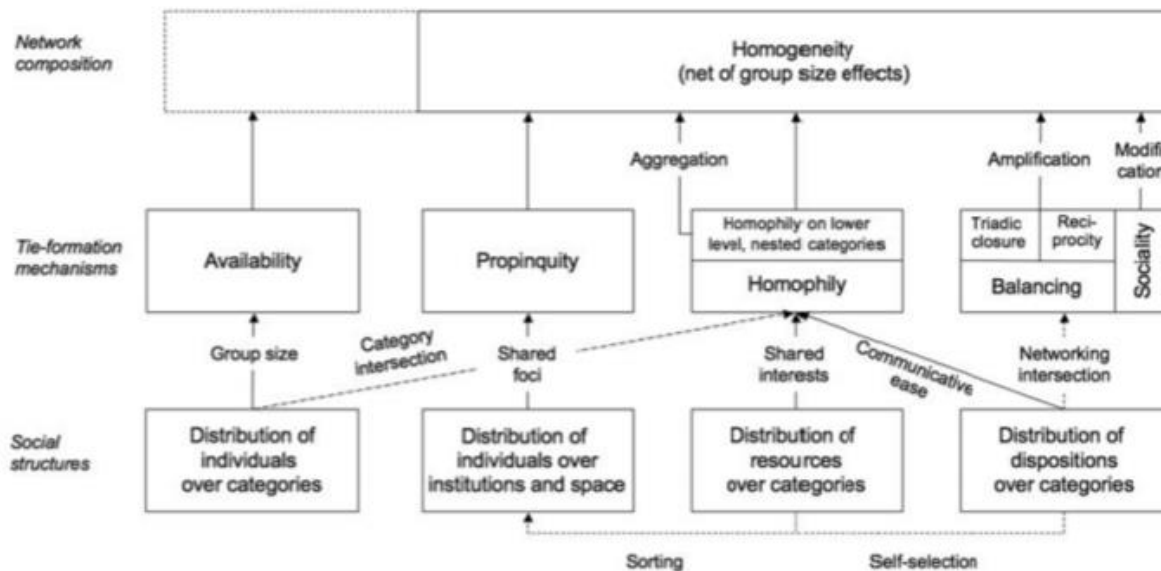- Indirect: Category Intersection and Selection and Sorting

FIG. 1.—Social structures, tie formation mechanisms, and network composition. Indirect effects are represented with dashed lines.

ERG Models and Results

$$\text{prob}\,(\boldsymbol{Y} = \boldsymbol{y}) = \left(\frac{1}{\kappa}\right)\exp\left[\sum_A \eta_A\,g_A(y)\right].$$

Model 1: Racial homophily

Model 2: Racial homophily + Lower levels of ethnic homophily

Model 3: Racial homophily + Balancing mechanism

Model 4: Racial homophily + Sociality of each racial category

Model 5: Racial homophily + Attribute intersection

The Origins of Asymmetric Ties in Friendship Networks:

From Status Differential to Self-Perceived Centrality

An, Weihua and William McConnell. 2015.

Data

- 4094 students, 90 classrooms, 6 middle schools, Central China, Nov. 2010 - Feb. 2011
- 2 surveys
- Self-perceived centrality
  - Report # of friendship
  - Larger or smaller than the mean
- Friendship networks
  - Up to 10 closest friends in school

Status Indicators

- Individual
  - Gender: boy=1
  - Age: older than mean = 1
  - Height: taller than mean =
  - Academic ranking: top ten = 1
  - Personality: optimistic = 1
  - Smoking: smoked within 30 days = 1
- Social positional
  - Parents' education: HS or above = 1
  - Family economic condition: good = 1

ERGMs

- Sender/receiver effect for self-perceived centrality
- Interaction effect btw mutuality and high/low self-perceived centrality
- Tie-mixing patterns for each status indicator
- Test the status-differential mechanism

Network structural terms

- Edges   −6.38
- Gwesp   0.96
- Gwdsp   −0.24
- Gwidegree   0.67
- Gwodegree   −1.65

Table 3. *ERGM results for the formation of friendship ties.*

Variables	Model I					Model II				
	Coef.	SE	P	T	Q	Coef.	SE	P	T	Q
Self-perceived centrality										
Asymmetry × high perception (d)	0.56	0.09	0.00	0.00	0.00	0.51	0.08	0.00	0.00	0.00
Mutuality × low perception (m_0)	1.05	0.04	0.00	0.00	0.00	0.96	0.03	0.00	0.00	0.00
Mutuality × high perception (m_1)	0.82	0.05	0.00	0.00	0.00	0.74	0.04	0.00	0.00	0.00
Sender effect (b)	0.31	0.04	0.00	0.00	0.00	0.29	0.04	0.00	0.00	0.00
Receiver effect	0.22	0.03	0.00	0.00	0.00	0.19	0.03	0.00	0.00	0.04
Status indicators										
Gender 0.0	2.75	0.48	0.00	0.00	0.00	2.70	0.49	0.00	0.00	0.00
Gender 0.1	1.14	0.41	0.01	0.00	0.00	1.15	0.42	0.01	0.00	0.00
Gender 1.1	2.57	0.45	0.00	0.00	0.00	2.54	0.47	0.00	0.00	0.00

Discussion

Q1: Why do results fail to support the prediction for social positional status? Can you choose better measures for social positional status?

Q2: What are the advantages and disadvantages of using friendship network or "picture friends" on Facebook as dataset?

Q3: Are there anything else you think could add to the factors influencing the result for racial homogeneity?