

Predictors & Effects of Multiplexity in an Interorganizational Network

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Research Questions

- **RQ1:** In an interorganizational network, what endogenous and exogenous characteristics predict multiplex relations?
- **RQ2:** Does multiplexity predict network effectiveness?

Theory, RQ1:

Predictors of Multiplexity

- The embeddedness literature suggests that dyadic *reciprocity* and *network tenure* facilitate multiplex ties
- Organizational learning theories argue that organizational behavior is routine-based and path-dependent, suggesting that organizations may repeatedly initiate ties with familiar partners and a history of *prior ties* facilitates multiplex ties
- Theories of *homophily* propose that homophily is a predictor of uniplex tie formation and may be an even more significant predictor of multiplex ties

Hypotheses, RQ1: Predictors of Multiplexity

Multiplex ties are more likely in an interorganizational dyad with:

- **H1:** Reciprocity
- **H2:** A history of one or more prior ties
- **H3:** A greater degree of homophily
- **H4:** Greater combined network tenure

Theory, RQ2:

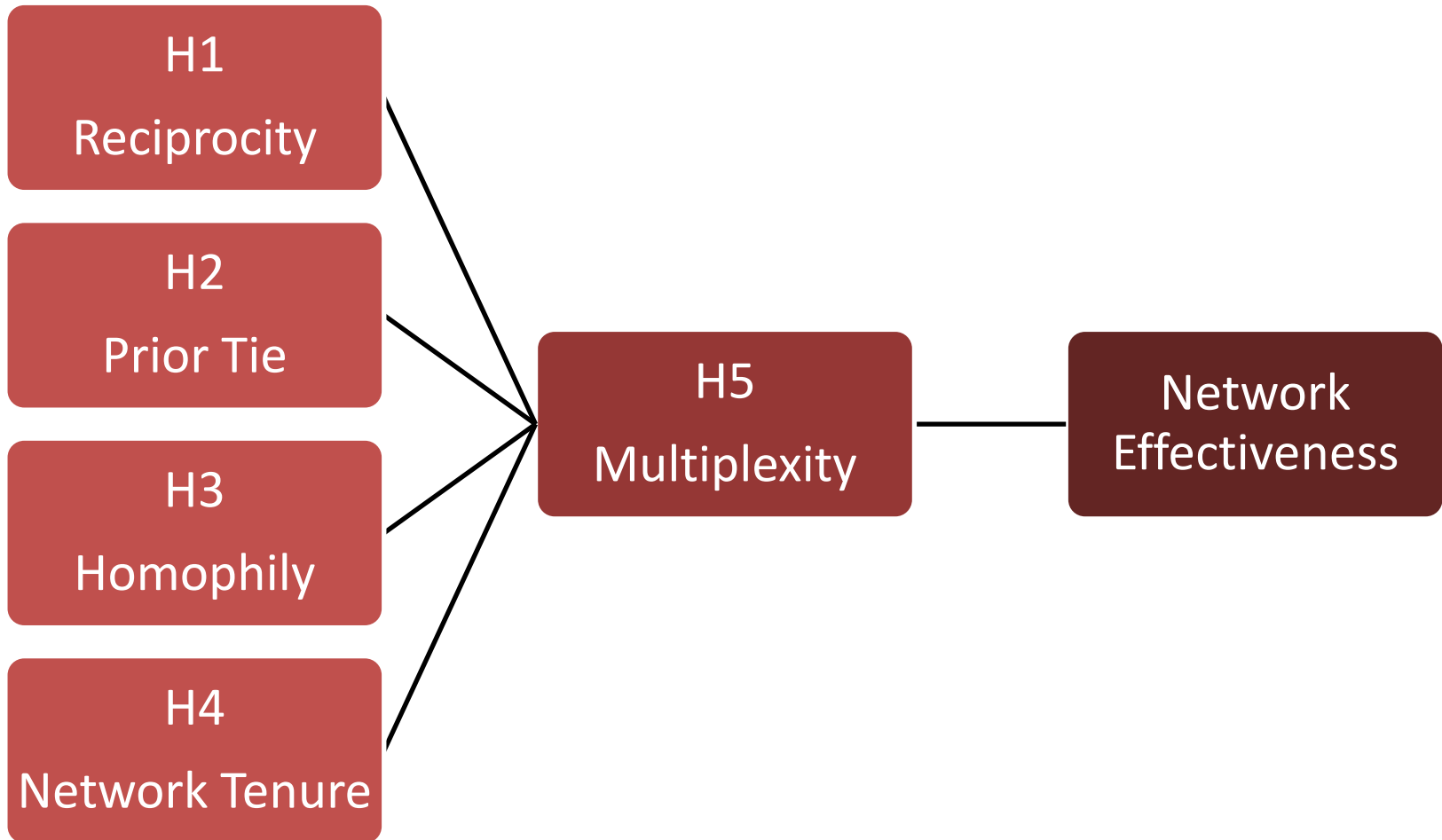
Multiplexity & Effectiveness

- Tie multiplexity may be a measure of the strength and durability of the relationship between two actors, given that if one type of tie between them dissolves, other types of ties remain to connect them (e.g., Provan et al, 2007)
- Therefore, tie multiplexity may be one indicator of network effectiveness (e.g., Provan et al, 2009)

Hypothesis, RQ2: Multiplexity & Effectiveness

- **H5:** Nodes with a greater proportion of multiplex dyads will view the network as more effective than nodes with a lesser proportion of multiplex dyads

Summary of Hypotheses



Sample: An Interorganizational Network for Health Care Access & Quality

- **Tenure:** established in 1997
- **Structure:** formal network with an administrative organization and leadership committees
- **Membership:** public and private non-profit organizations
- **Size:** 63 active members who attended at least 50% (3 of 6) face-to-face network meetings annually

Data Collection

- Network tie and effectiveness variables: 2009 survey of network members
 - 3 sets of questions about types of ties:
 - **Communication** outside of formal, bimonthly network meetings
 - **Expertise-sharing**
 - **Collaboration** (e.g., joint programs & trainings, client referral, collective advocacy)
 - 14 questions measuring members' satisfaction with and perceptions of network effectiveness
 - Response rate: 78% (49 of 63)
- Node attribute variables: 2009 survey and administrative data

Descriptive Statistics

Distribution of Tie Types by Node

Ties	# Nodes
No ties	28
1 Type	
Communication	6
Expertise-sharing	0
Collaboration	0
2 Types	
Communication & Expertise-sharing	3
Communication & Collaboration	6
Expertise-sharing & Collaboration	1
All 3 Types	19

Descriptive Statistics

Network Densities

	Number of Ties	Density
Communication Outside Meetings	185	0.047
Expertise-sharing	83	0.021
Collaboration	112	0.029
Multiplex	98	0.025

Descriptive Statistics

Network Correlations

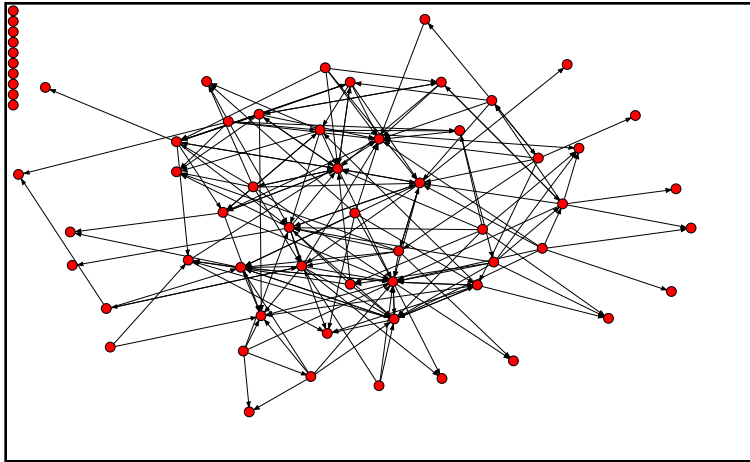
	Communication Outside Meetings	Expertise-sharing	Collaboration	Multiplex
Communication Outside Meetings	1.00			
Expertise-sharing	0.383*	1.00		
Collaboration	0.536*	0.411*	1.00	
Multiplex	0.685*	0.589*	0.806*	1.00

* $p < 0.01$

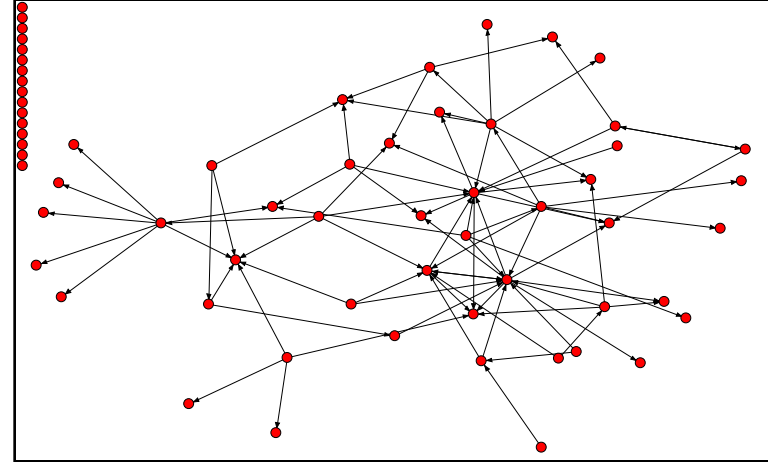
Network Visualization

Uniplex Ties

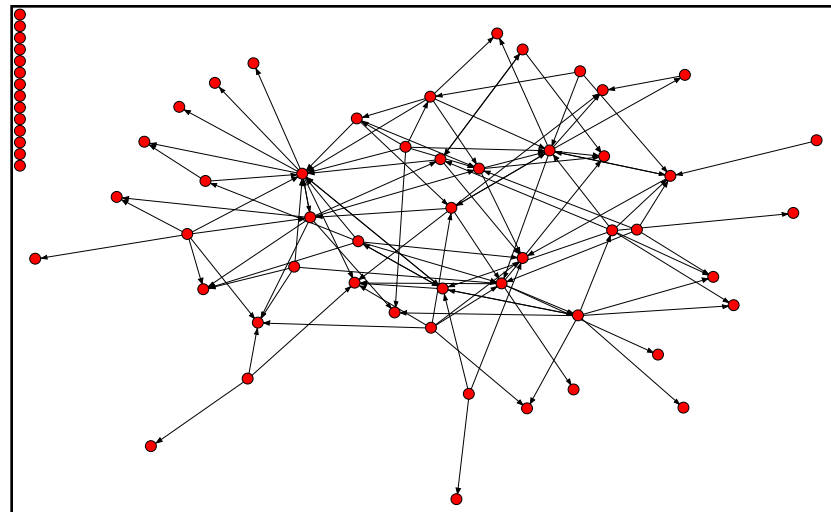
Communication



Expertise-sharing

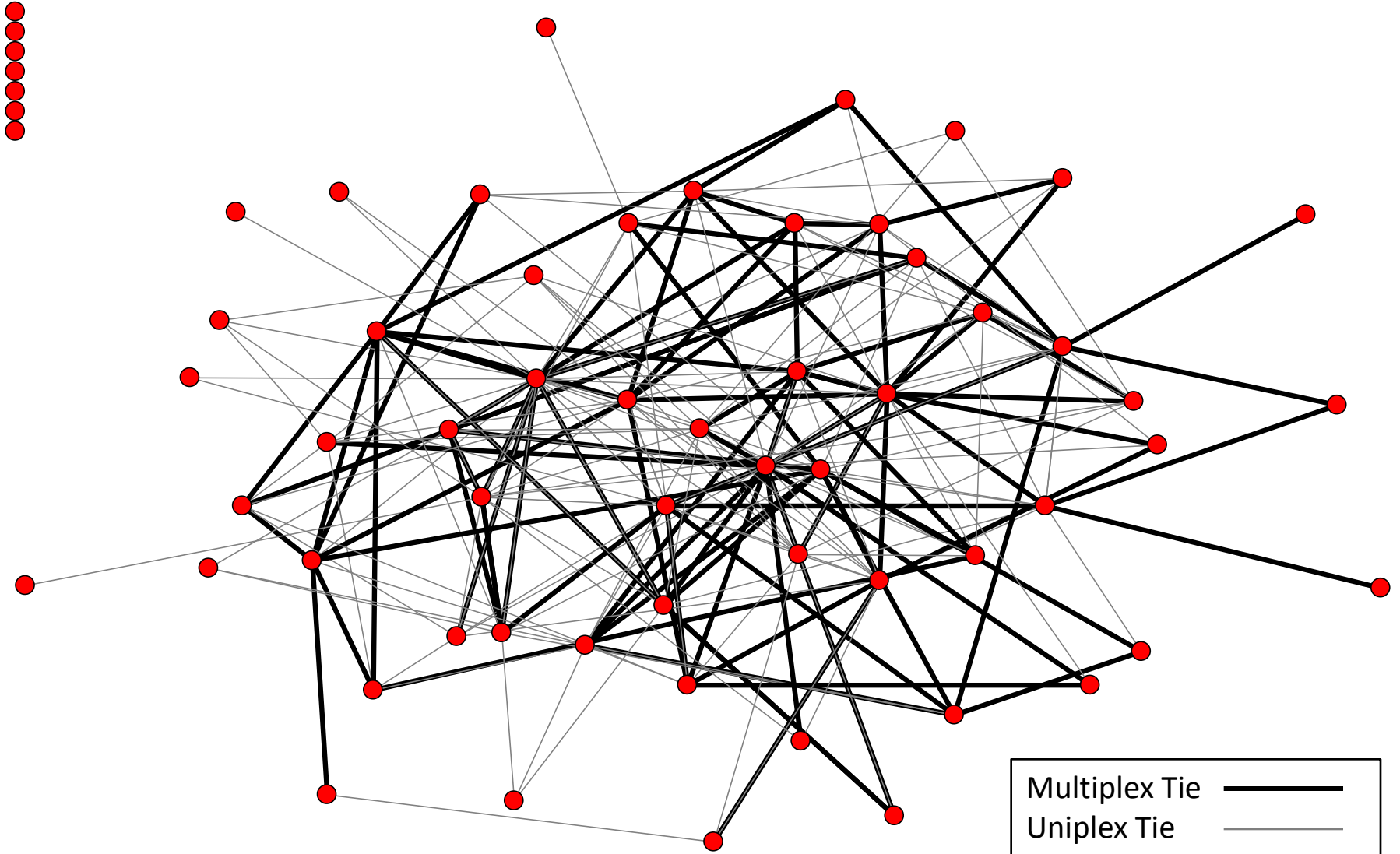


Collaboration



Network Visualization

Multiplex vs. Uniplex Ties



Analysis, RQ1

Predictors of Multiplexity

- MRQAP analysis, n=63
- Dependent variable matrix: dyadic multiplexity
 - 1 = more than one tie present in dyad; 0 = one or zero ties present in dyad
- Independent variable matrices:
 - Reciprocity in at least one tie in dyad
 - History of at least one prior tie in dyad
 - Homophily: number of forms of homophily in dyad, summed
 - Jurisdiction: local, state, national
 - Sector: public, private non-profit, private for-profit
 - Organizational mission: advocacy, service provision
 - Network committee membership
 - Combined network tenure: tenure of both nodes in dyad, summed

Results, RQ1

Predictors of Multiplexity

Model $R^2 = 0.375$

H1	Reciprocity	0.217*
H2	Prior tie	0.505*
H3	Homophily	0.008
H4	Combined network tenure	0.004

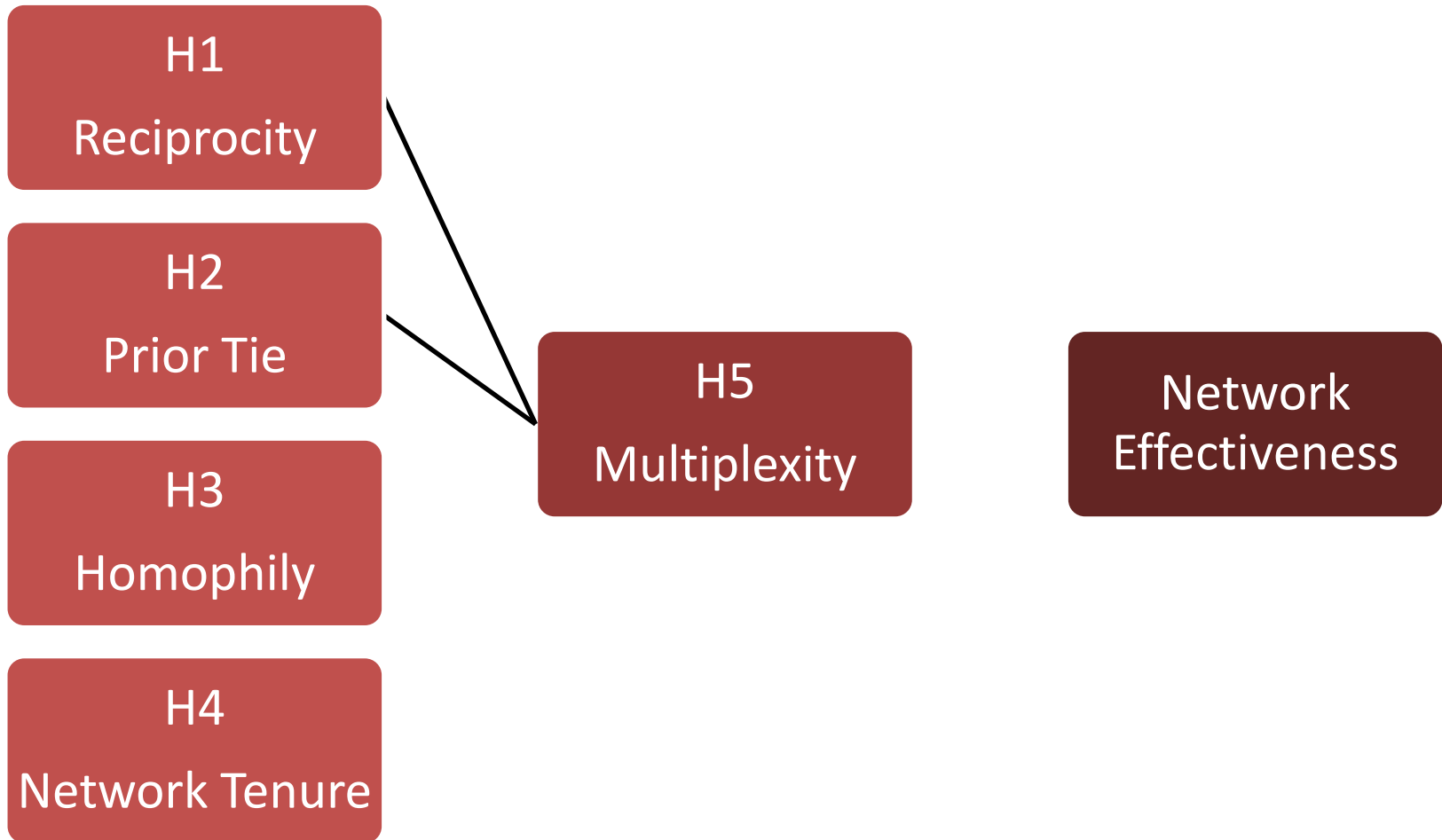
* $p < 0.01$

Analysis & Results, RQ2

Multiplexity & Effectiveness

- Analysis
 - Linear regression, n=49 (after non-respondents deleted)
 - Dependent variable: perceived network effectiveness
 - Factor analysis of 14 survey questions measuring perceived network effectiveness indicated 1 factor, Cronbach's alpha = 0.81
 - Scores for 14 questions summed for each node
 - Independent variable: for each node, proportion of dyadic ties that were multiplex
- Results
 - Not significant

Summary of Results



Conclusions

- The two significant predictors of multiplexity, reciprocity and history of a prior tie, were structural, endogenous predictors.
- Of these, history of a prior tie was the strongest significant predictor.
- Homophily and network tenure did not predict multiplexity.
- Multiplexity did not predict network effectiveness.

Questions & Steps for Future Research

- Test other possible structural predictors of network effectiveness.
- Consider how multiplex relations changes our understanding of network characteristics and measures such as centrality, density, “isolation,” and structural holes. Isolates and central nodes in uniplex networks may not be isolates and central nodes in multiplex networks.
- Use more sophisticated models for multiplex networks involving 3 or more types of relations.

Thank you

