

UNL STEM Faculty Networks

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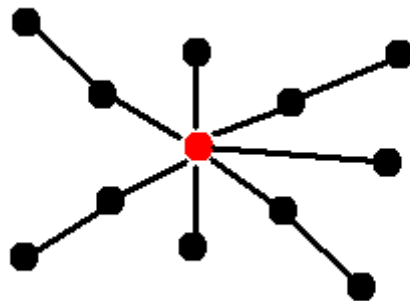
Response Rates to Network Survey

- **Faculty**
 - 274 out of 452 UNL STEM (60.6 %)
- **Departmental**
 - range from < 15% to 95%
 - 15 out of 26 departments with a response rate high enough for conducting network analysis

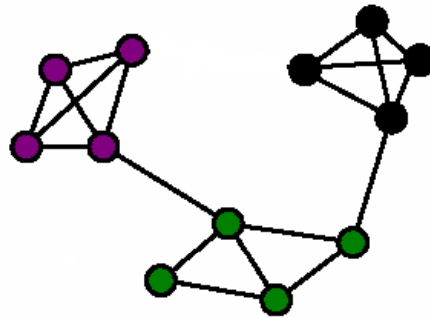


Social Network Analysis

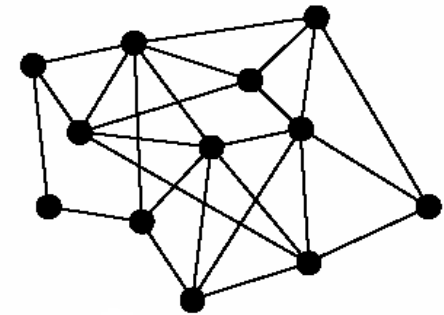
a set of *relational* methods for systematically identifying connections among actors in a network



Centralized



Clustered



Dense



Research Questions

- What is the network structure of STEM departments?
 - How are departmental network structures associated with academic climate?
- Does a faculty member's location within departmental networks vary by gender and race?
 - What is the association between actor location and perceptions of climate?



Network Survey Questions

- **Research Exchange**

- provide or receive research help, advice, or equipment

- **Social Connections**

- non-work related interactions: spent free time together or discussed personal matters

- **Committee Co-membership**

- serve on a UNL service or graduate student committee together



Department Network Structure Measures

- **Density**

- the percentage of possible ties within an network that are actual ties (range: 0% to 100%)

- **Clustering**

- the tendency towards dense local neighborhoods in a network (range: 0= no clusters to 1= high clustering)

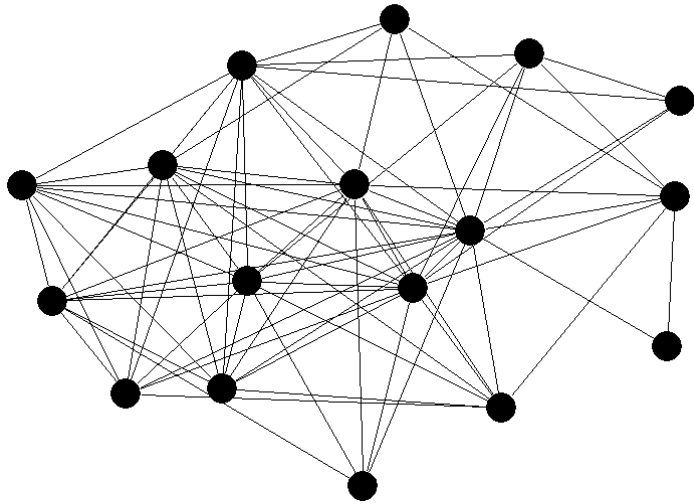
- **Centralization**

- the extent to which one actor in the network is more prominent than the other actors in the network
 - » range: 0 = not centralized to 1 =centralized



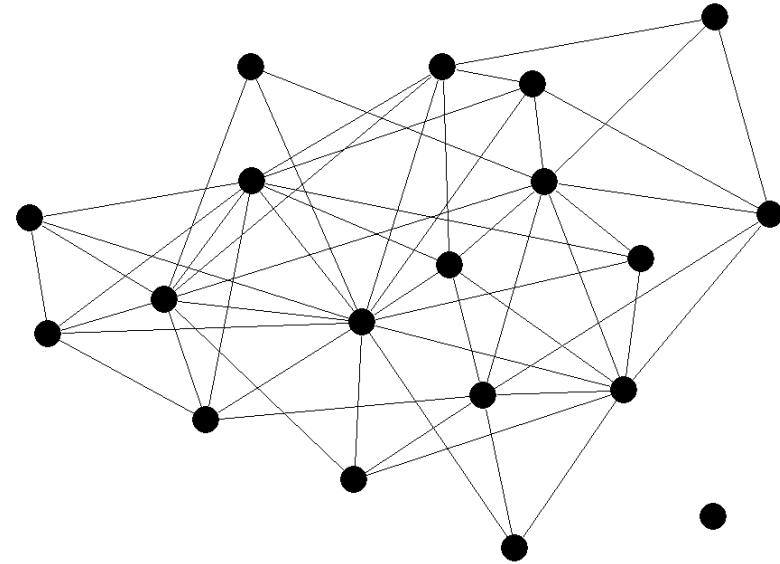
Committee Co-membership

den. = 55%



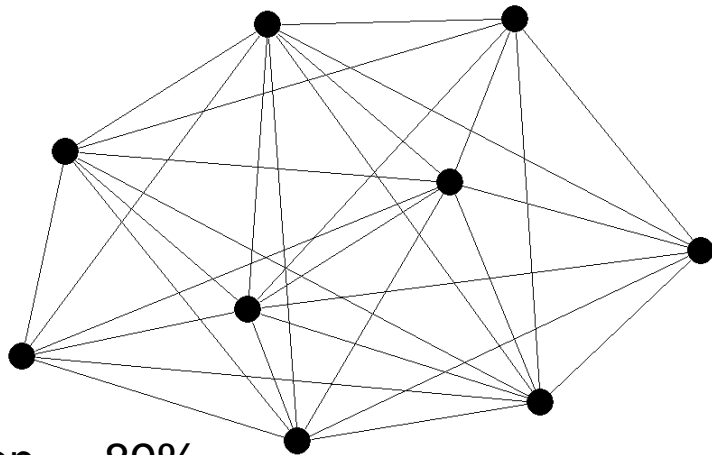
high density

den. = 32%

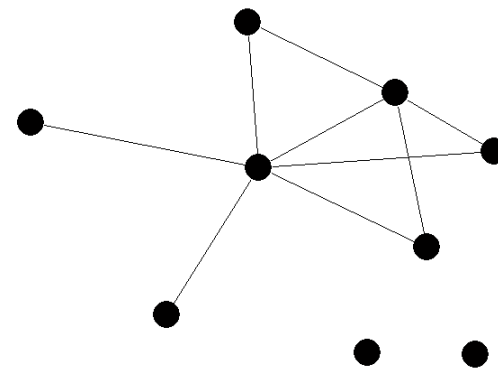


low density

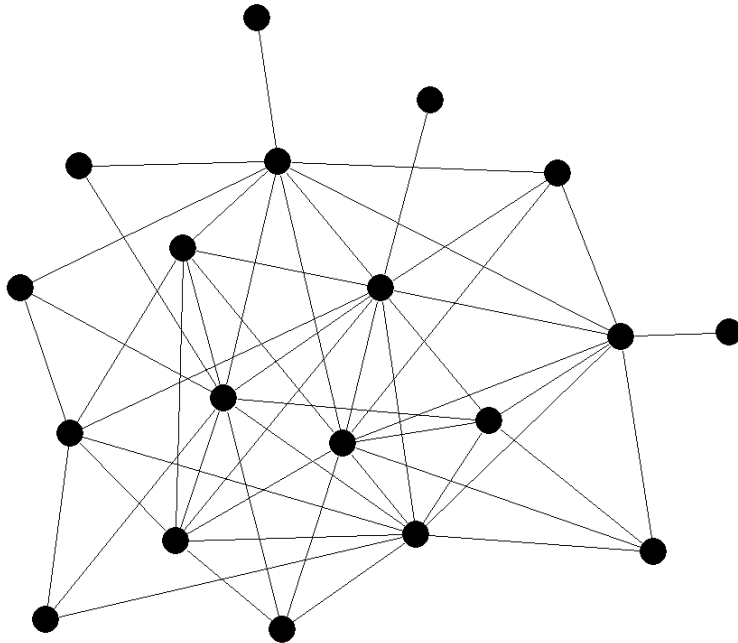
den. = 89%



den. = 25%

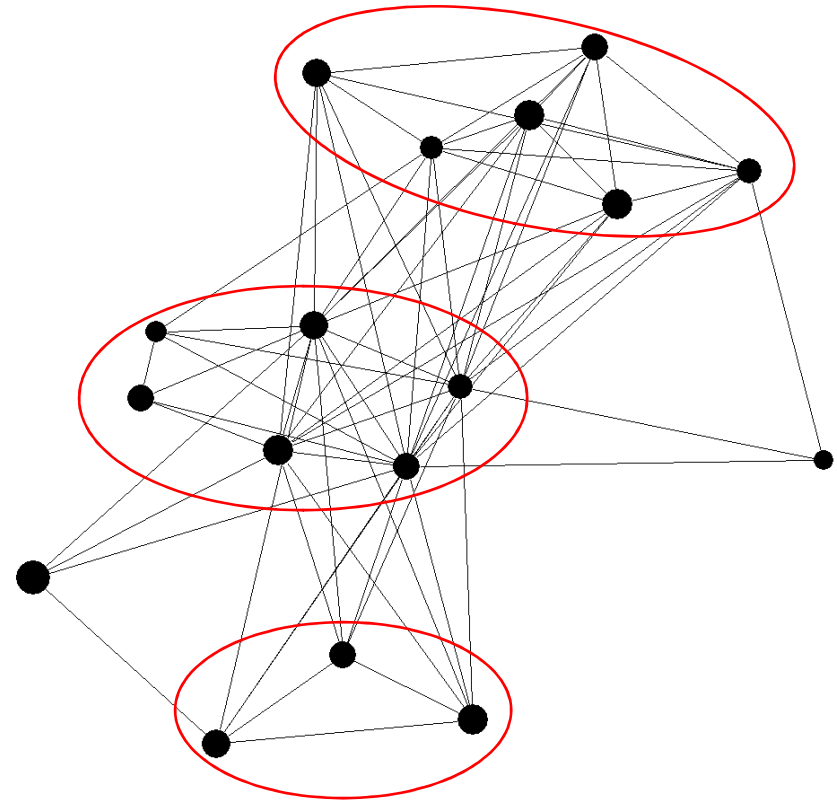


Research Exchange



moderate clustering

clust. = .49



very high clustering

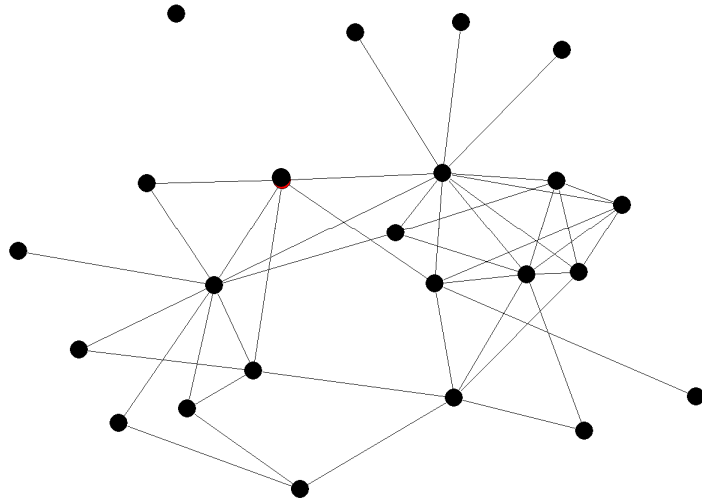
clust. = .77



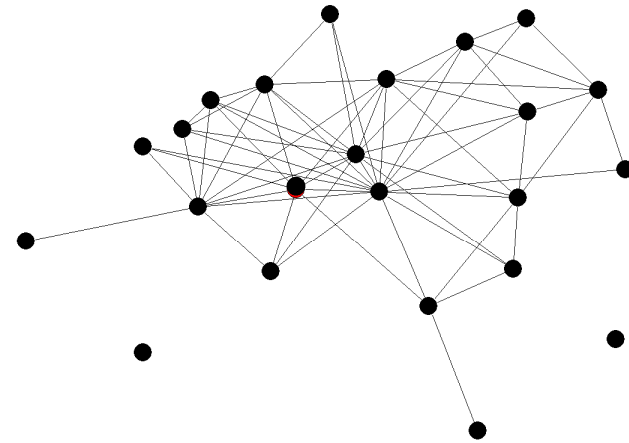
cent. = .36

Social Connections

cent. = .57

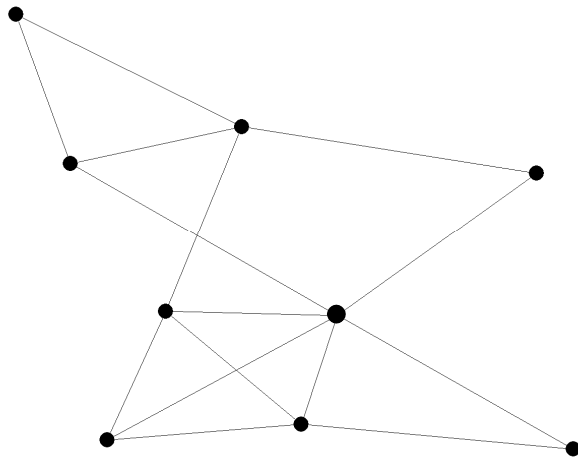


moderate centralization

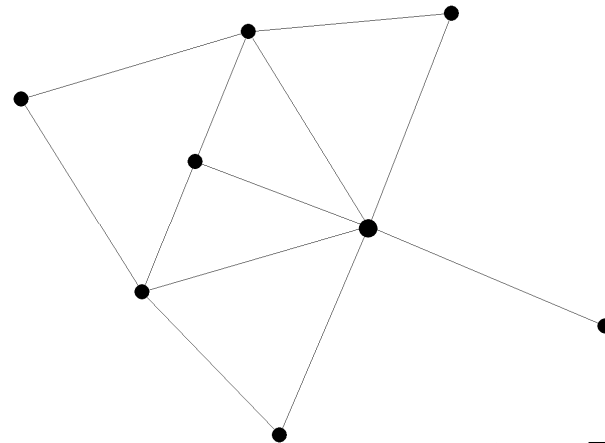


high centralization

cent. = .29



cent. = .57



Academic Climate Measures

- **Work Value**

- The value faculty in your department place on your work

- **Job Satisfaction**

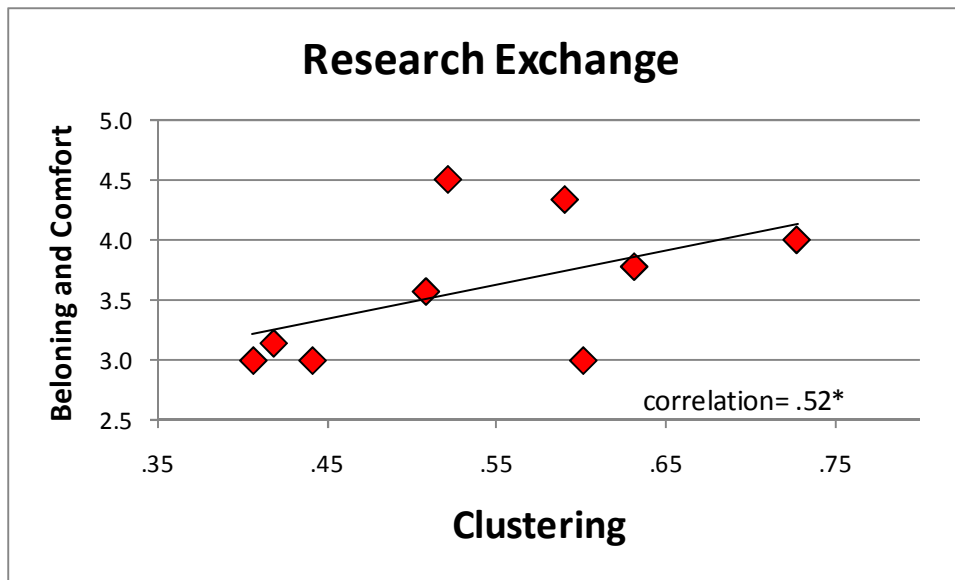
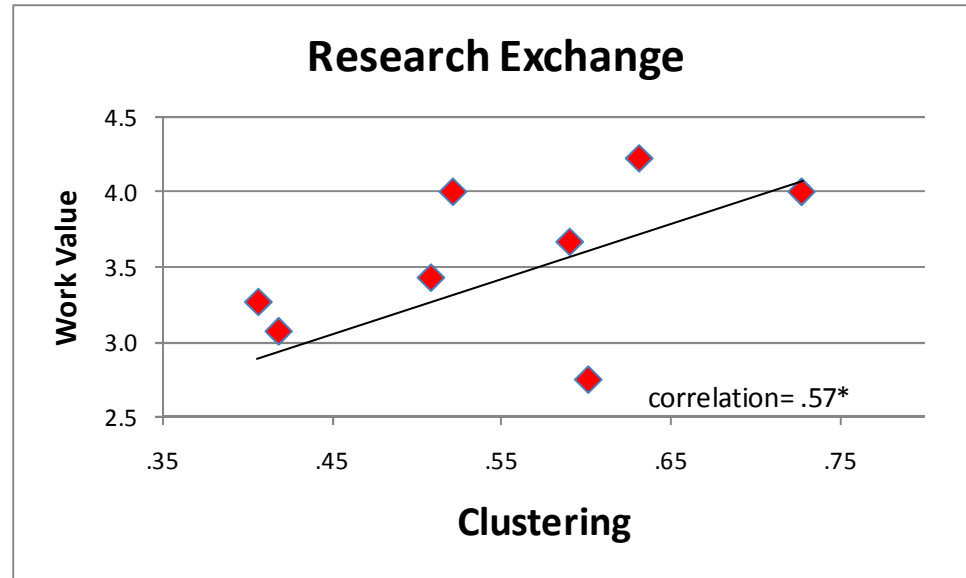
- All things considered, how satisfied or dissatisfied are you with your department as a place to work?

- **Belonging and Comfort**

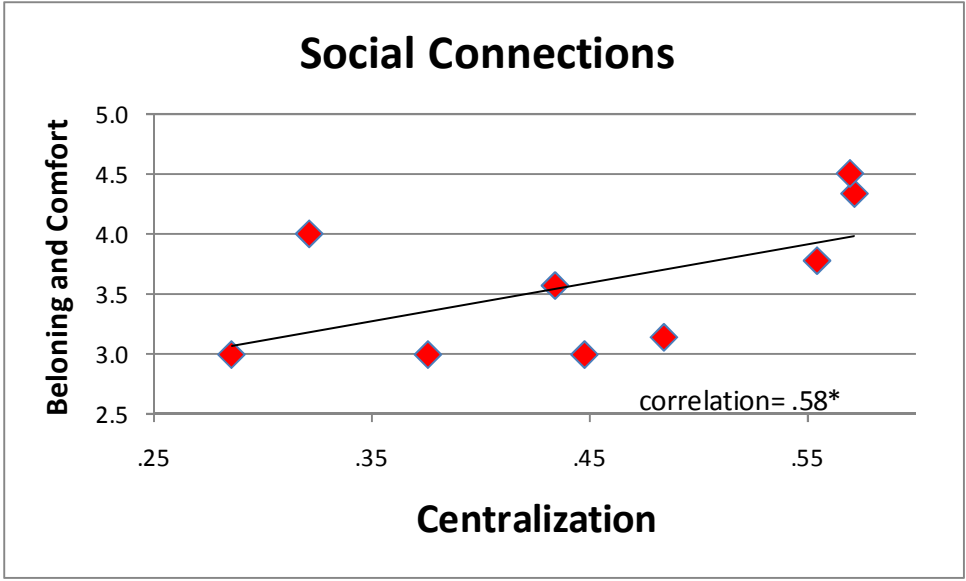
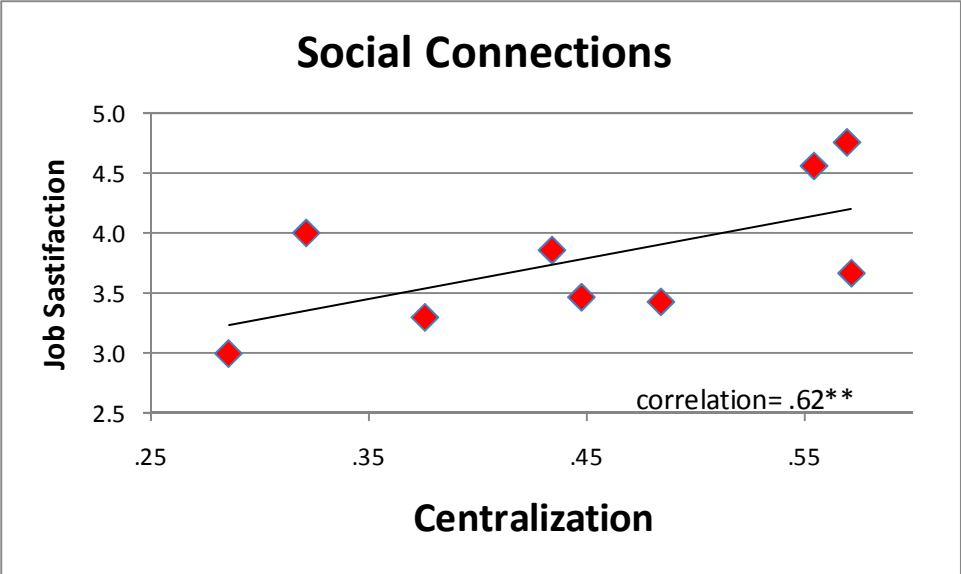
- How well you "fit" (e.g., your sense of belonging, your comfort level) in your department



Clustering within Research Exchange networks and climate



Centralization within Social Connection networks and climate



Summary

- UNL STEM Department Networks :
 - tend toward local clustering
 - and have moderate to high levels of centralization
- climate perceptions are more positive in departments with:
 - higher clustering in research exchanges
 - higher centralization in social connections



Research Questions

- What is the network structure of STEM departments?
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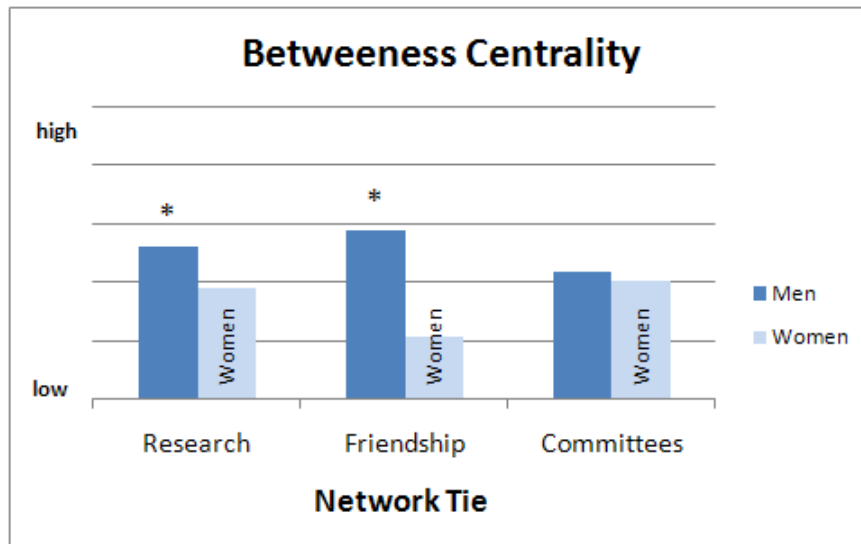
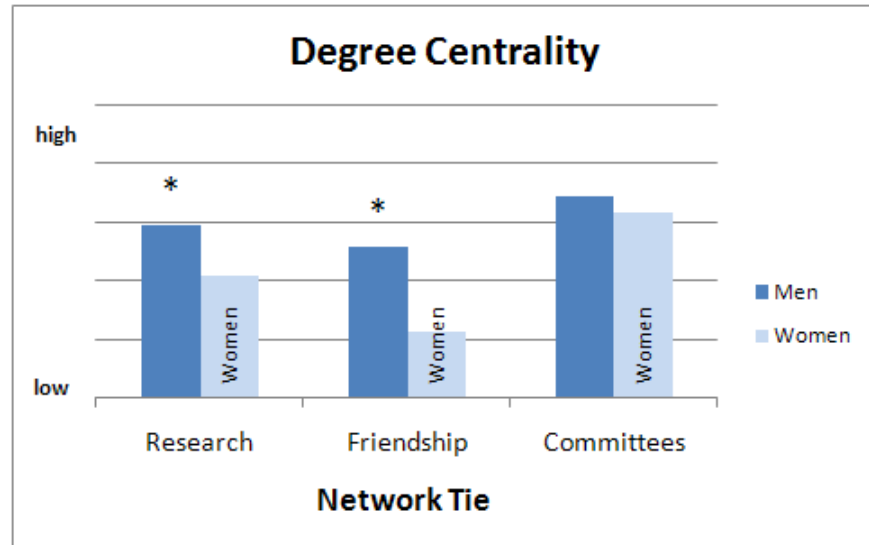


Actor Location Measures (prominence)

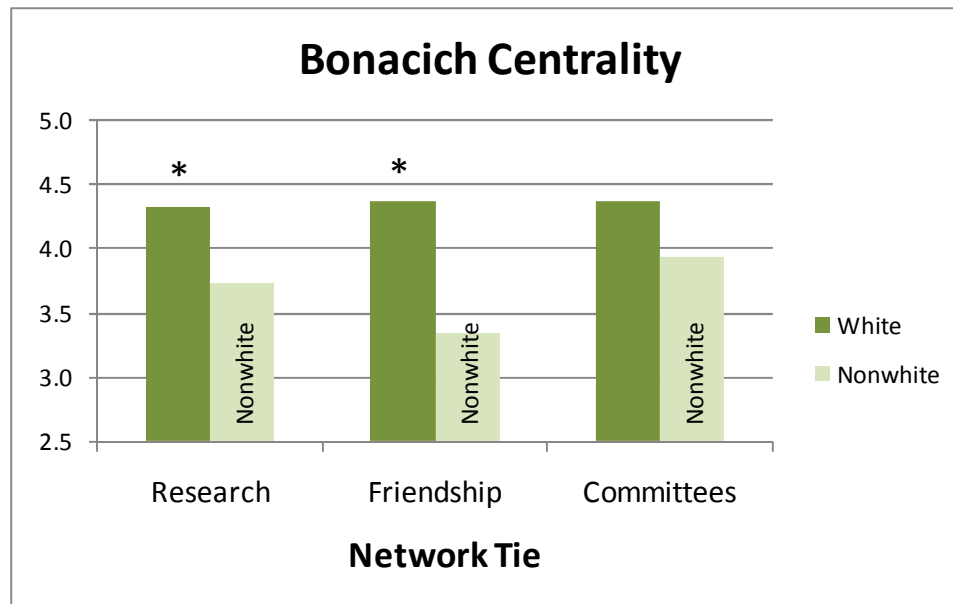
- Degree Centrality
 - the number of direct ties
- Betweenness Centrality (intermediary)
 - number of times that an actor lies along the shortest path between two unconnected actors
- Bonacich Centrality
 - the extent to which an actor is well connected to actors who are also well connected



Centrality by Gender



Centrality by Race



Actor location and climate perceptions

	Work Value	Belonging & Comfort	Job Satisfaction
Research Exchange			
Degree	+	+++	+
Betweenness	+	+++	+
Bonacich	+++	+++	+++
Social Connections			
Degree	++	+++	++
Betweenness	+	+++	+
Bonacich	+++	+++	+++
Committees			
Degree	++	++	
Betweenness			
Bonacich	++	+	++



Summary

- peripheral actors in the network have less positive climate perceptions
- women and non-white faculty are more likely to be peripheral actors
 - women have fewer connections and are less often intermediaries in the network
 - non-white faculty are less likely to be connected to well connected actors

