SI 508
Brokers and bridges
Bridges

- Bridge – an edge, that when removed, splits off a community
- Bridges can act as bottlenecks for information flow

Network of striking employees:
- Black dots: younger & Spanish speaking
- Gray dots: younger & English speaking
- White dots: older & English speaking
- Orange square: union negotiators

Cut-vertices and bi-components

- Removing a cut-vertex creates a separate component
- bi-component: component of minimum size 3 that doesn’t contain a cut-vertex (vertex that would split the component)

Cut-vertices and bi-components

- Pajek: Net>Components>Bi-Components (treats the network as undirected) *see chapter 7*
  - identifies vertices belonging to exactly one component and isolates
  - identifies # of bridges or bi-components to which a vertex belongs
  - identifies bridges (components of size 2)

Ego-networks and constraint

- ego-network: a vertex, all its neighbors, and connections among the neighbors

Alejandro’s ego-centered network
Alejandro is a broker between contacts who are not directly connected

Ego-networks and constraint

Constraint: # of complete triads involving two people
Low-constraint – many structural holes that may be exploited
High-constraint – removing a tie to any one of the vertices means that others will act as brokers for that contact

Proportional strength of ties

- Strength of tie $\sim 1/(\# \text{ connections for the person})$
- asymmetrical

Dyadic constraint

**dyadic constraint:** measure of strength of direct and indirect ties to a person

Structural holes with Pajek

- Net>Vector>Structural Holes computes the dyadic constraint for all edges and for the network in aggregate.

- To visualize:
  - Options>Values of Lines>Similarities (in the Draw screen)
  - Use an energy layout – high dyadic constraint vertices will be closer together

Brokerage roles in and between groups

coordinator  itinerant broker  representative  gatekeeper  liaison

summary

- brokers *bridge* different communities in networks
- we’ll see them again and study their role when we talk about information diffusion in networks