

# Lecture 4: Closure, Structural Holes, and Social Capital

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- There is a lot of further insight to be gained by asking about the roles that different nodes play in this structure as well.
- In social networks, access to edges that span different groups is not equally distributed across all nodes: *some nodes are positioned at the interface between multiple groups, with access to boundary-spanning edges, while others are positioned in the middle of a single group.*
- What is the effect of this heterogeneity?

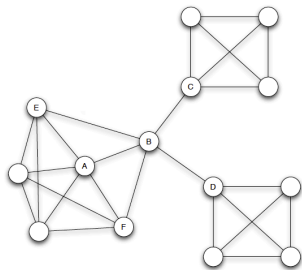


Figure 3.11: The contrast between densely-knit groups and boundary-spanning links is reflected in the different positions of nodes *A* and *B* in the underlying social network.

- Following the expositional lead of social-network researchers including Ron Burt, we can formulate an answer to this question as a story about the different experiences that nodes have in a network like the one in Figure 3.11.
- We can explain the contrast between the experience of a node such as A, who sits at the center of a single tightly-knit group, and node B, who sits at the interface between several groups.

# Embeddedness

- Consider node A.
- Node A's set of network neighbors has been subject to considerable triadic closure; A has a high clustering coefficient.
- Recall that the clustering coefficient is the fraction of pairs of neighbors who are themselves neighbors.

- To talk about the structure around A it is useful to introduce an additional definition.
- We define the *embeddedness* of an edge in a network to be the number of common neighbors the two endpoints have
- For example, the A-B edge has an embeddedness of two, since A and B have the two common neighbors E and F.

- First, the embeddedness of an edge is equal to the numerator in the ratio that defines the neighborhood overlap.
- Second, we observe that local bridges are precisely the edges that have an embeddedness of zero- since they were defined as those edges whose endpoints have no neighbors in common.
- A long line of research in sociology has argued that if two individuals are connected by an embedded edge, then this makes it easier for them to trust one another, and to have confidence in the integrity of the transactions (social, economic, or otherwise) that take place between them.

- Indeed, the presence of mutual friends puts the interactions between two people “on display” in a social sense, even when they are carried out in private; in the event of misbehavior by one of the two parties to the interaction, there is the potential for social sanctions and reputational consequences from their mutual friends.



- No similar kind of deterring threat exists for edges with zero embeddedness, since there is no one who knows both people involved in the interaction.
- In this respect, the interactions that B has with C and D are much riskier than the embedded interactions that A experiences.
- Moreover, the constraints on B's behavior are made complicated by the fact that she is subject to potentially contradictory norms and expectations from the different groups she associates with.

# Structural holes

- A related line of research in sociology, catalyzed by influential work of Burt, has argued that network positions such as node B's, at the ends of multiple local bridges, confer a distinct set of equally fundamental advantages.
- The canonical setting for this argument is the social network within an organization or company, consisting of people who are in some ways collaborating on common objectives and in other ways implicitly competing for career advancement.

- Empirical studies of managers in large corporations has correlated an individual's success within a company to their access to local bridges.
- At a more abstract level, the central arguments behind these studies are also supported by the network principles we have been discussing, as we now explore further.
- Let's go back to the network in Figure 3.11, imagining the network to represent the interaction and collaboration among managers in a large company.

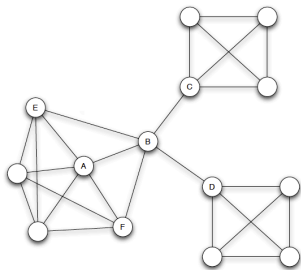


Figure 3.11: The contrast between densely-knit groups and boundary-spanning links is reflected in the different positions of nodes *A* and *B* in the underlying social network.

- In Burt's language, node B, with her multiple local bridges, spans a structural hole in the organization-the "empty space" in the network between two sets of nodes that do not otherwise interact closely.
- The argument is that B's position offers advantages in several dimensions relative to A's.

- The first kind of advantage is an informational one: B has early access to information originating in multiple, non-interacting parts of the network.
- Any one person has a limited amount of energy they can invest in maintaining contacts across the organization, and B is investing her energy efficiently by reaching out to different groups rather than basing all her contacts in the same group.

- A second, related kind of advantage is based on the way in which standing at one end of a local bridge can be an amplifier for creativity.
- Experience from many domains suggests that innovations often arise from the unexpected synthesis of multiple ideas, each of them on their own perhaps well-known, but well-known in distinct and unrelated bodies of expertise.

- Thus, B's position at the interface between three non-interacting groups gives her not only access to the combined information from these groups, but also the opportunity for novel ideas by combining these disparate sources of information in new ways.



- Finally, B's position in the network provides an opportunity for a kind of social "gatekeeping"-she regulates the access of both C and D to the tightly-knit group she belongs to, and she controls the ways in which her own group learns about information coming from C's and D's groups.
- This last point highlights a sense in which the interests of node B and of the organization as a whole may not be aligned.

- Ultimately, then, there are trade-offs in the relative positions of A and B.
- B's position at the interface between groups means that her interactions are less embedded within a single group, and less protected by the presence of mutual network neighbors.
- On the other hand, this riskier position provides her with access to information residing in multiple groups, and the opportunity to both regulate the flow of this information and to synthesize it in new ways.

# Forms of Social Capital

- All of these arguments are framed in terms of individuals and groups deriving benefits from an underlying social structure or social network; as such, they are naturally related to the notion of *social capital*.
- Social capital is a term in increasingly widespread use, but it is a famously difficult one to define.

- The term “social capital” is designed to suggest its role as part of an array of different forms of capital, all of which serve as tangible or intangible resources that can be mobilized to accomplish tasks.
- James Coleman and others speak of social capital alongside physical capital-the implements and technologies that help perform work-and human capital- the skills and talents that individual people bring to a job or goal.

- The writings of Coleman and others on social capital emphasize the benefits of triadic closure and embedded edges for the reasons discussed above: they enable the enforcement of norms and reputational effects, and hence can help protect the integrity of social and economic transactions.
- Burt, on the other hand, discusses social capital as a tension between closure and brokerage-with the former referring to Coleman's conception and the latter referring to benefits arising from the ability to "broker" interactions at the interface between different groups, across structural holes.