Class 8: Spread of disease in networks

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Sociology 204: Social Networks, Spring 2021
Princeton University

2/3: Networks and sexually transmitted diseases

Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks[1]

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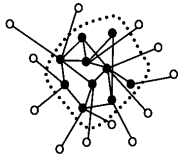
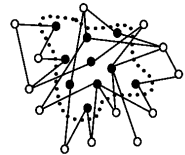
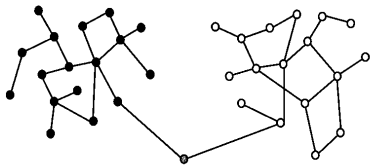


Panel A: Core Infection Model



Panel B: Inverse Core Model



Panel C: Bridge Between Disjoint Populations

Panel D: Spanning Tree

FIG. 1.—The network structure of four models of infection

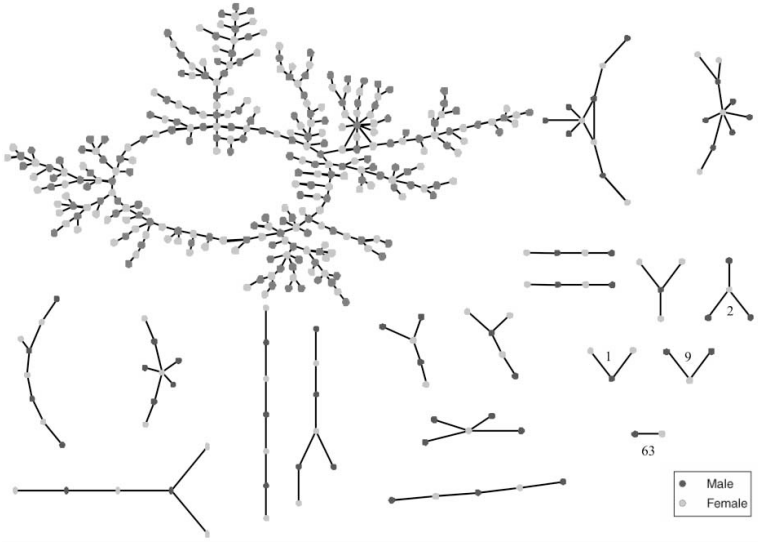


FIG. 2.—The direct relationship structure at Jefferson High

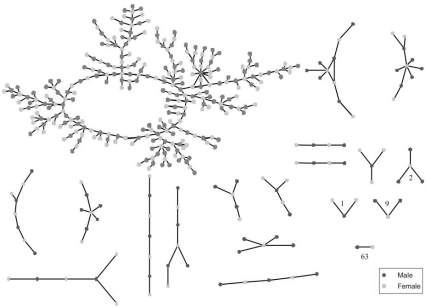
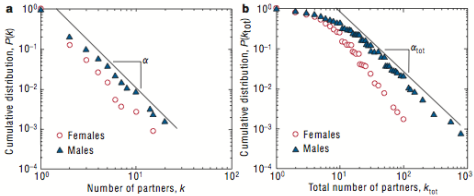


FIG. 2.—The direct relationship structure at Jefferson High

(a) Complete network data



(b) Ego-centric network data

What about time?

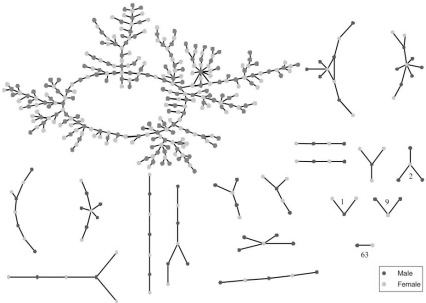
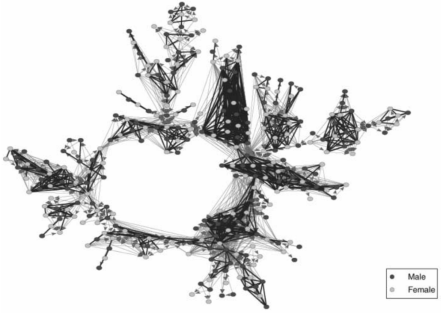


FIG. 2.—The direct relationship structure at Jefferson High

(a) Time flattened



(b) Accounting for time

Generate 1,000 simulated networks with the same number of nodes and degree distribution, but where ties are formed completely randomly. How does these simulated networks compare to the observed network?

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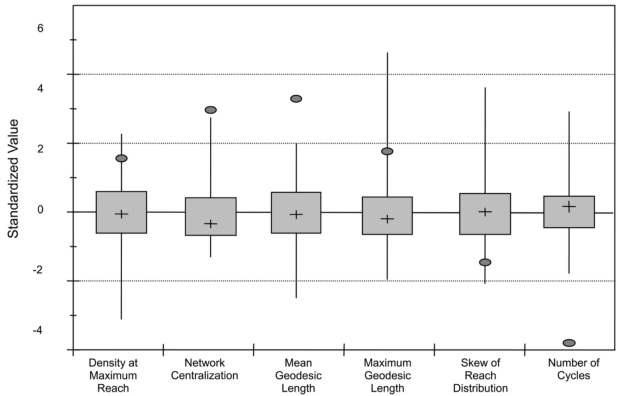
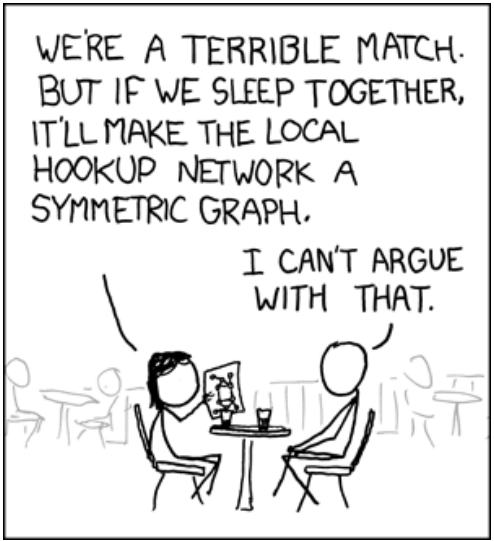


If this pattern did not arise randomly how did it come about?



https://xkcd.com/403/

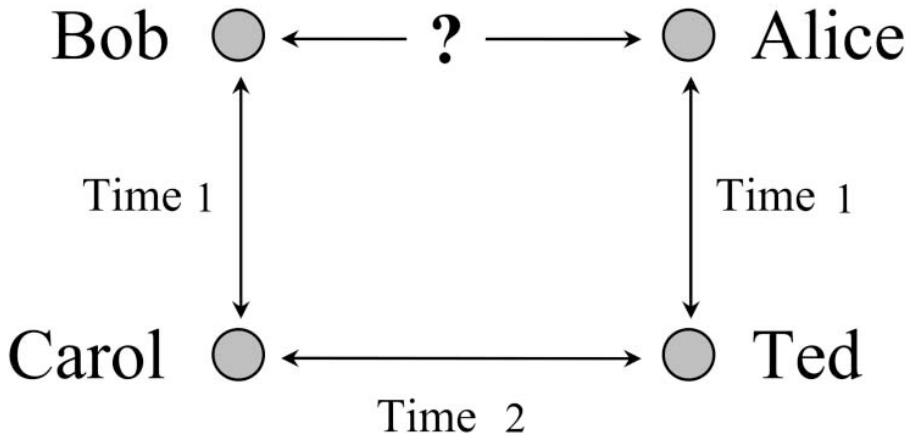


FIG. 8.—Hypothetical cycle of length 4

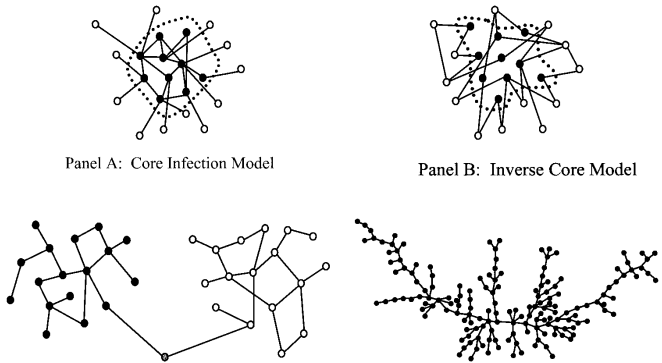


FIG. 1.—The network structure of four models of infection

Policy implication: targeting might be important in a core network, but not as important in a spanning tree

Is this the same everywhere? In other words, what are the *scope conditions* for this pattern?

If we were able ethically and accurately measure the entire sexual network of Princeton students, do you think we would find a spanning tree?

1. yes
2. no