SOCI 424: Networks & Social Structures

Sept. 16

1. Structure and homophily
2. Dyads and triads

Structure & homophily

Structure and homophily

Homophily

McPherson, Smith-Lovin, and Cook (2001)

- (Canonical) review of research on types, rates, and causes of homophily
- Almost 20 years old

Baseline homophily

- Homophily just based on who is available to connect with in some large population
- E.g., baseline homophily on country of birth for Canadian residents would be about 78.55% *for those born in Canada*

"Inbreeding" homophily

- ***Choice***: preference to form, e.g., trust relations with people with similar experiences
- ***Structural***: increased opportunities to form ties with similar alters due to, e.g., residential segregation, religious practices, homogenous professional networks, etc.

Structure and homophily

Homophily as *cause* or *consequence* of ties?

Similarity can lead to relations

- People with similar interests, experiences, tastes, beliefs may prefer to form and maintain ties with each other

Relations can lead to similarity

- People who are tied together in a social network may converge in characteristics
- E.g. transmission of behavior (smoking) or shared experiences (joining the same club)

Structure and homophily

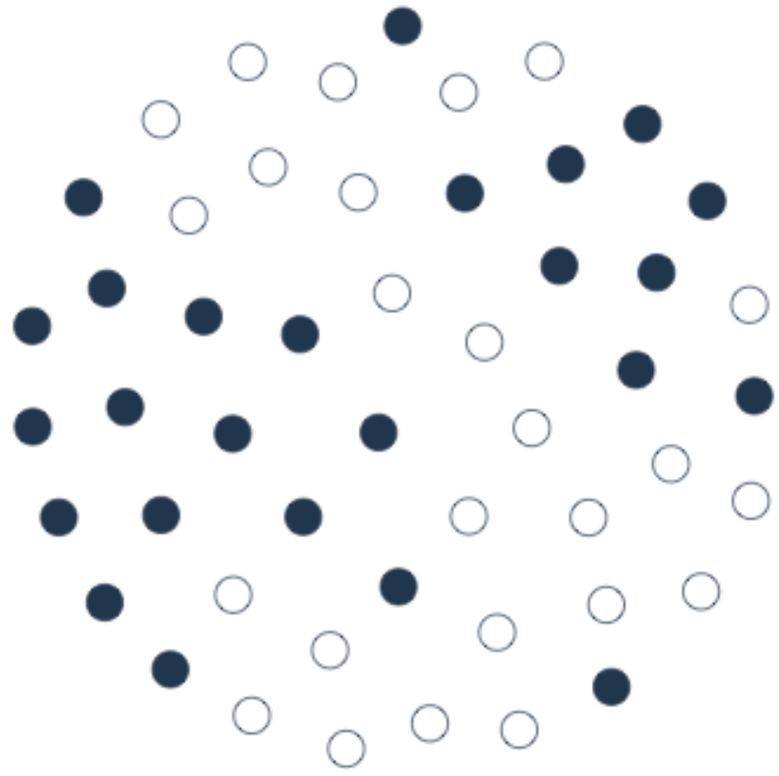
Homophily as structuring force

Tendency toward homophily can influence the overall structure of a network

- Dense ties within categories
- Sparse ties between categories

Simple example

- 50 nodes, ties are 9 times more likely within categories than between
- Quickly leads to bifurcated network
- This structure has consequences for the flow of information, opportunities, epidemiology, etc.



Structure and homophily

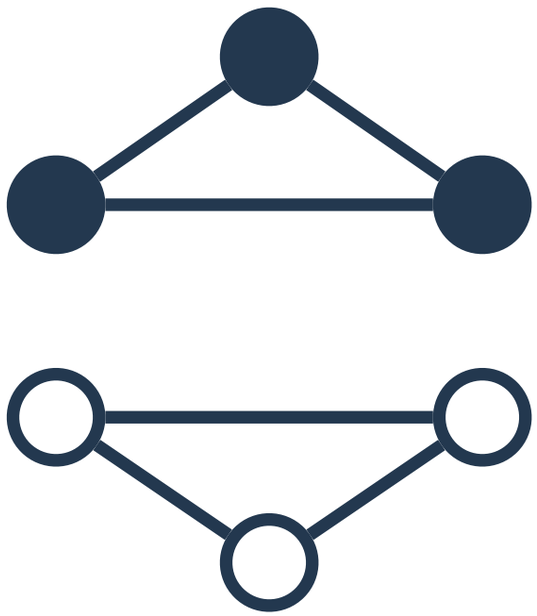
Measuring homophily

How similar are nodes at either end of a relation?

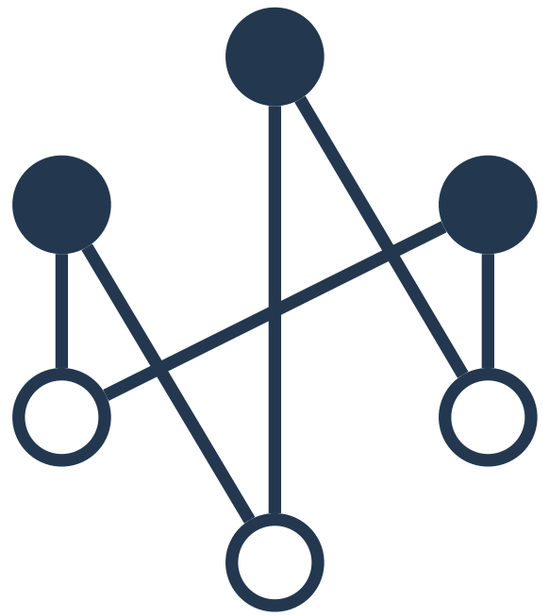
- Are friendships more common among people of similar age?
- Are sexual relations less common among people of the same gender?

Assortativity

- Assortativity is one common measure of homophily in a network
- Measure of *correlation* between attributes of different nodes
- Ranges from 1.0 (perfectly assortative) to -1.0 (perfectly *dis*assortative)



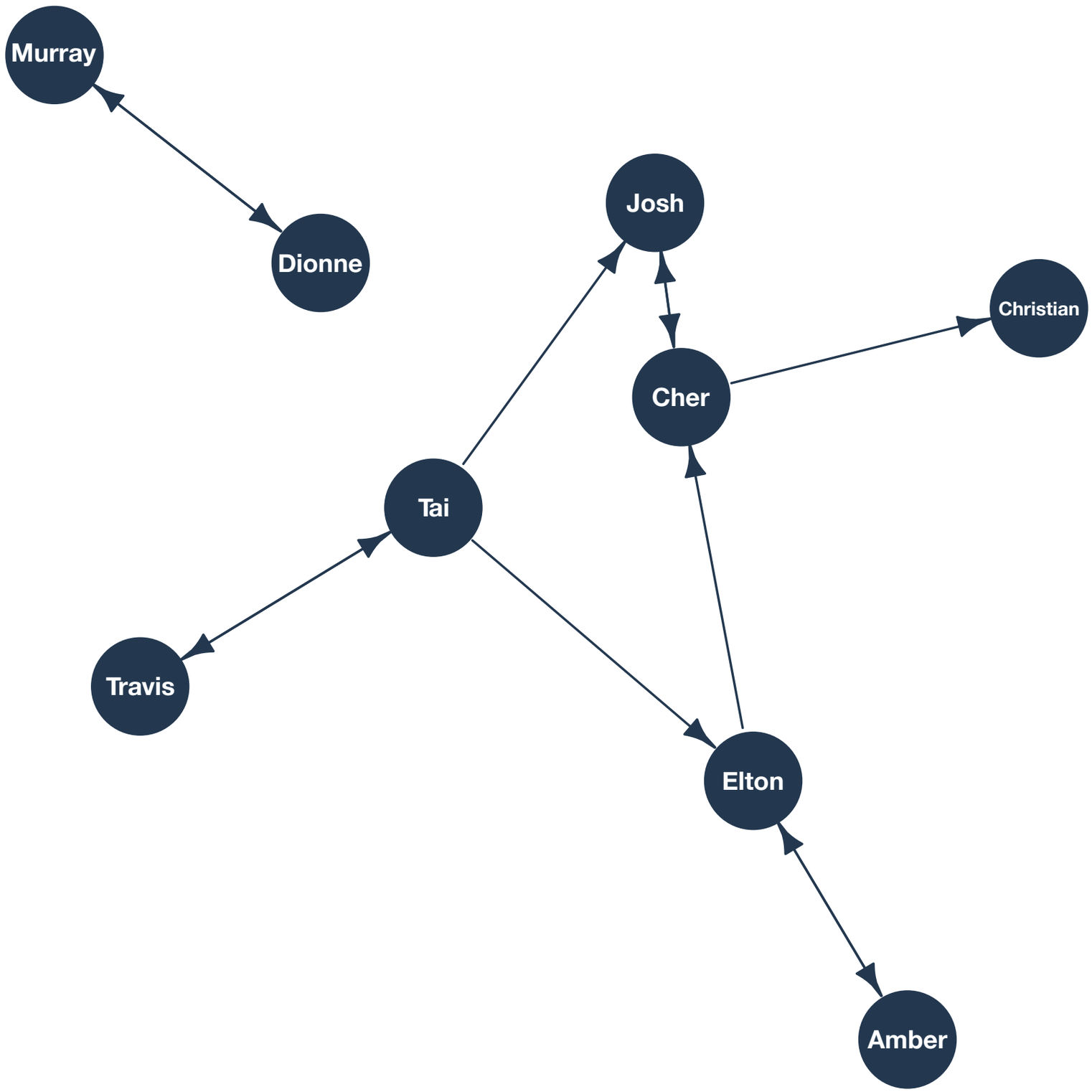
A = 1.0



A = –1.0

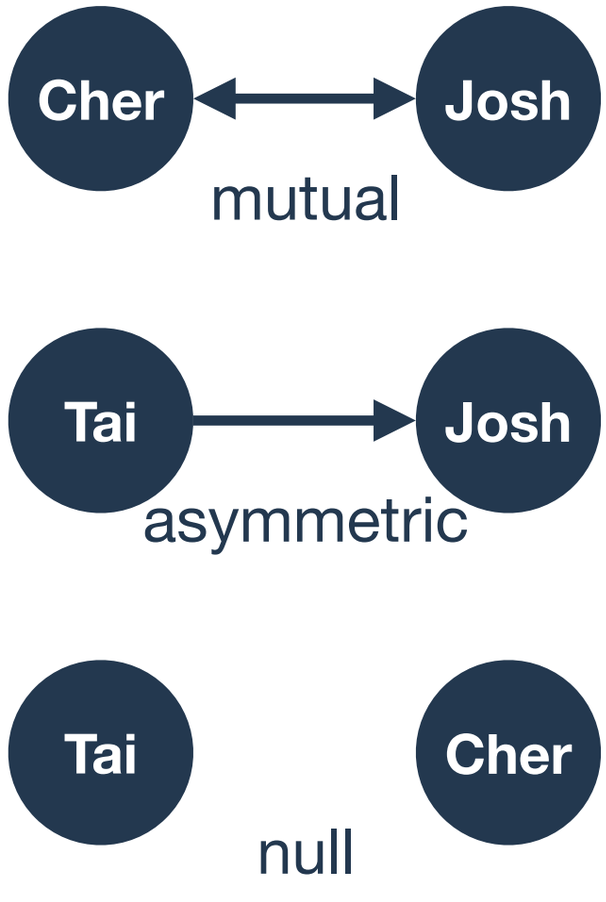
Dyads & triads

Dyads

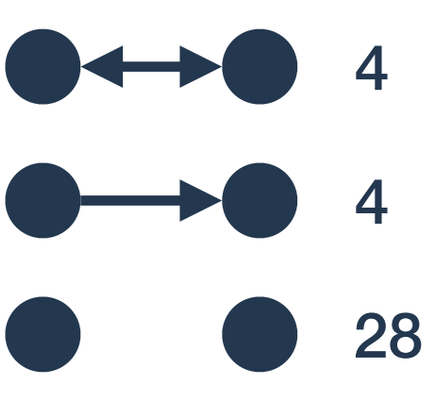


Romantic interest network from *Clueless (1995)*

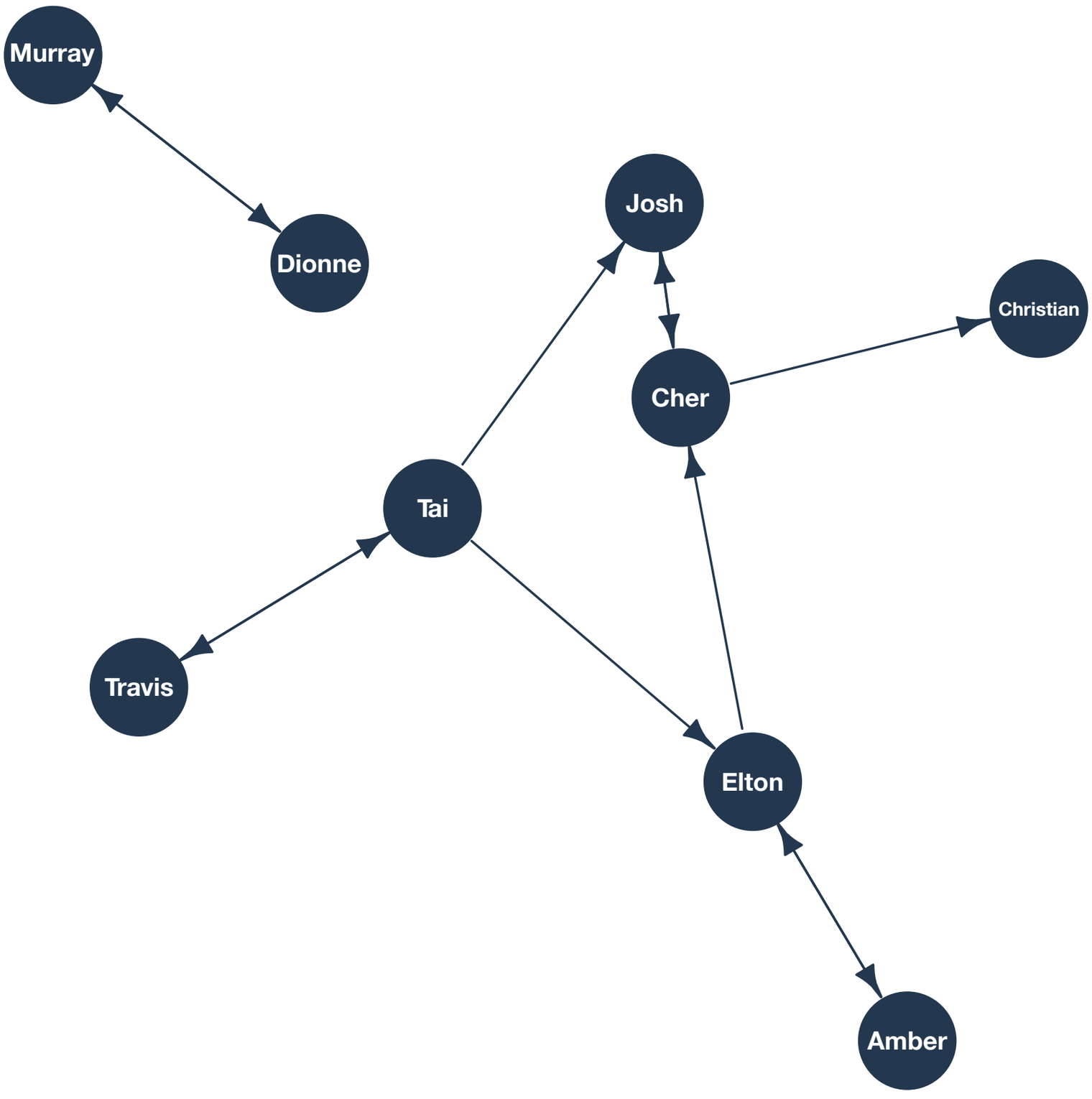
Types of dyads



Dyad census



Dyads

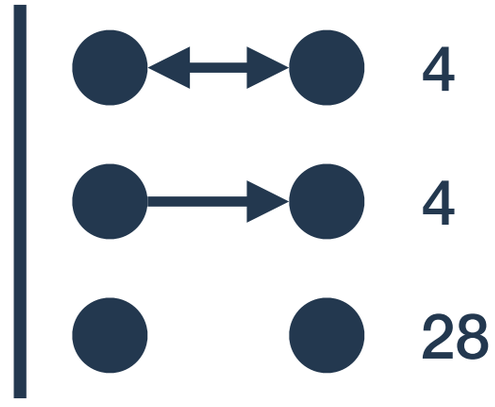


Reciprocity:

Probability that a directed edge is reciprocated

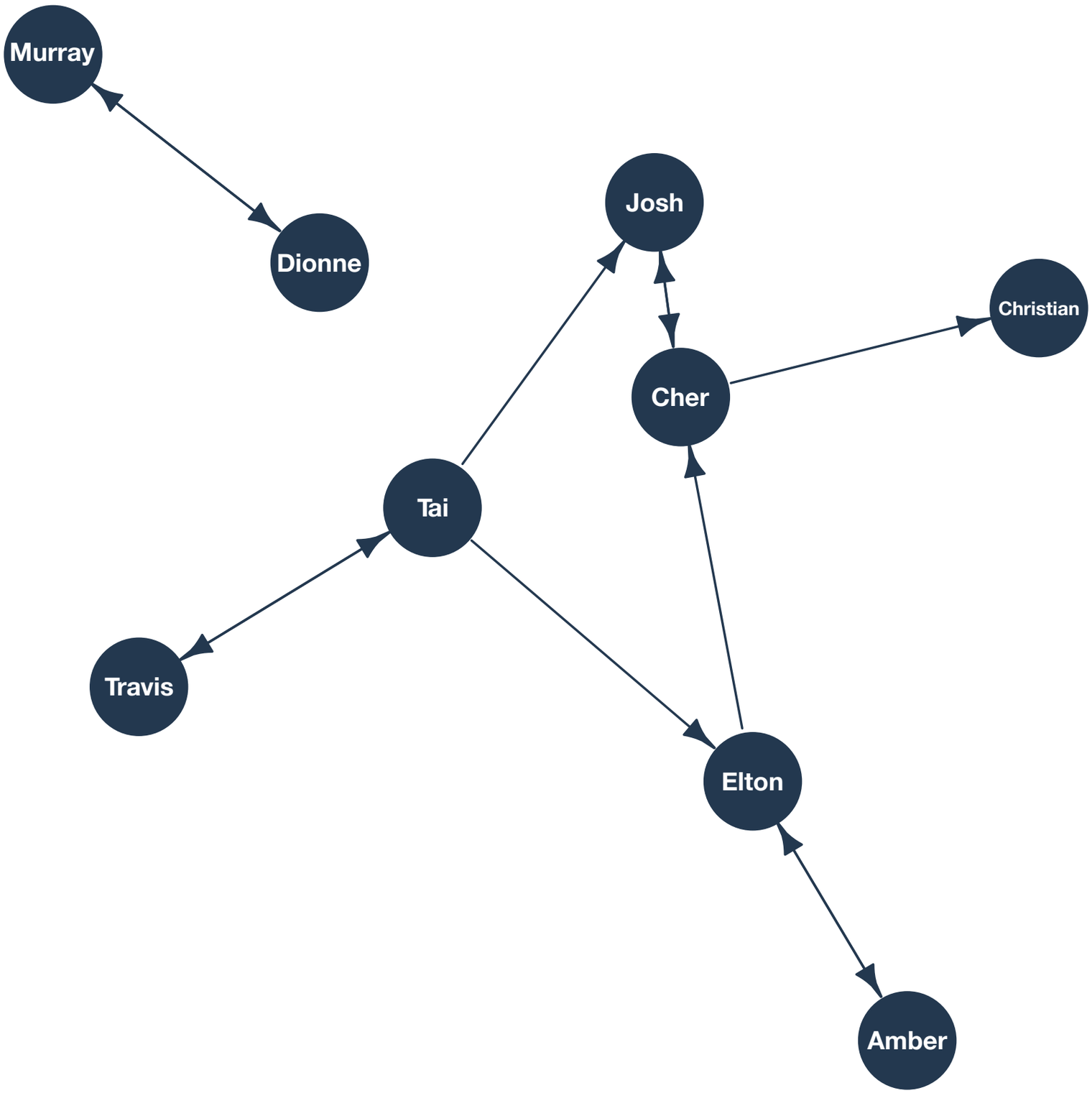
$$\frac{2 \times \updownarrow}{2 \times \updownarrow + \uparrow} = 2/3$$

Dyad census



Romantic interest network from *Clueless (1995)*

Triads



Types of triads

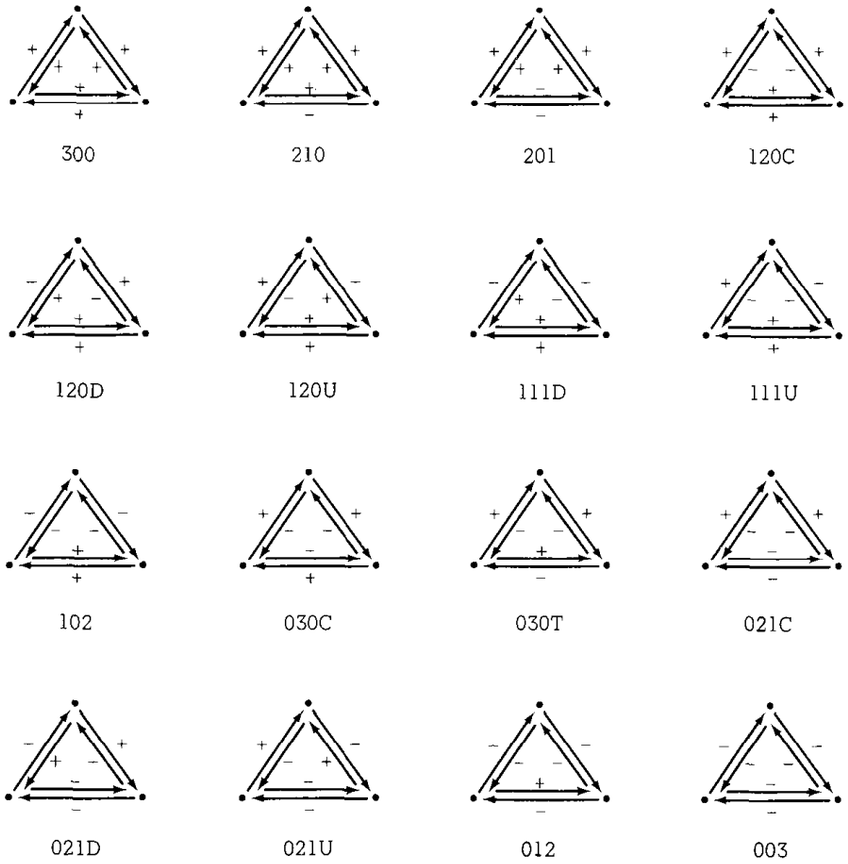
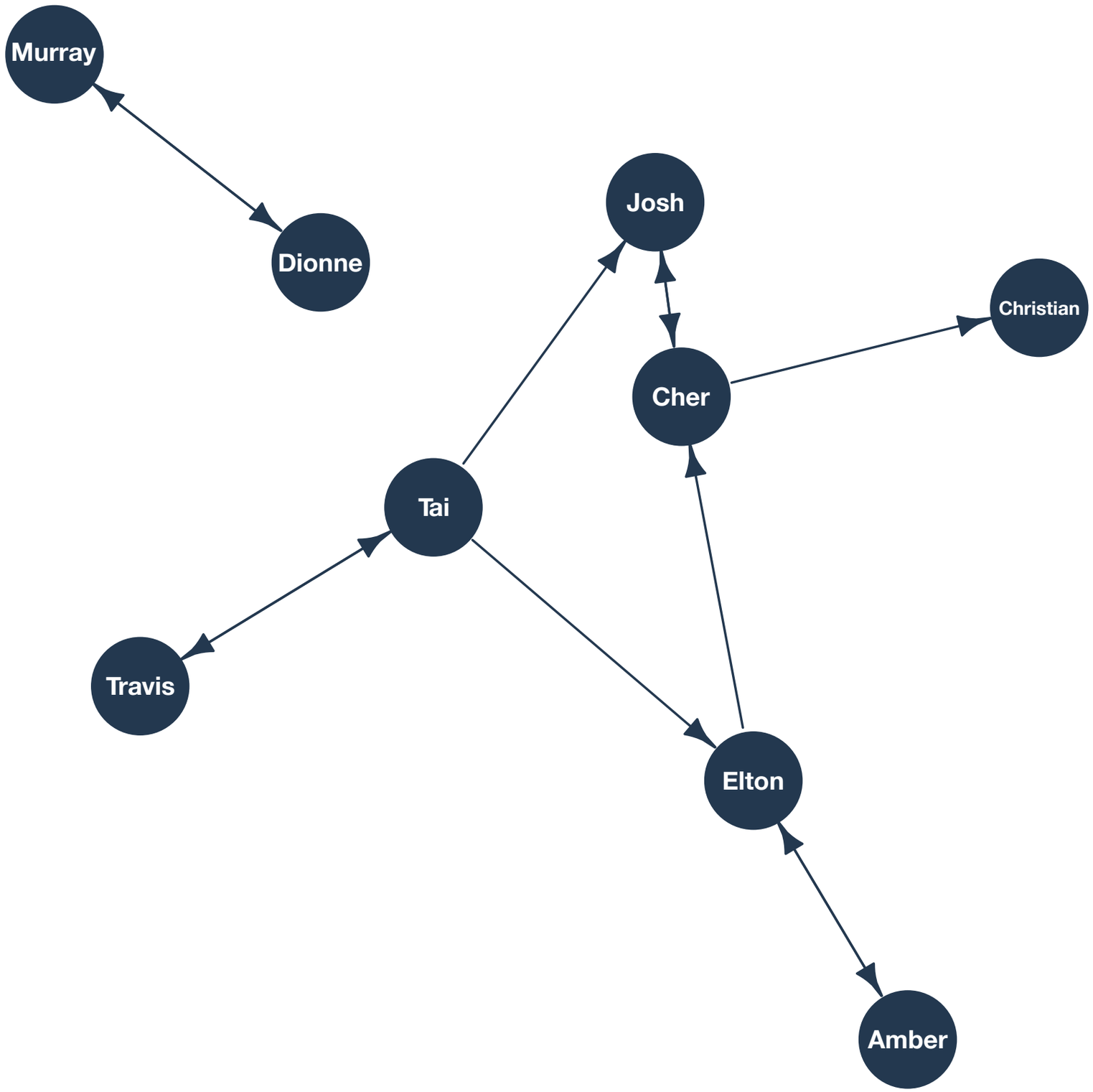


Fig. 1. The 16 triad types.

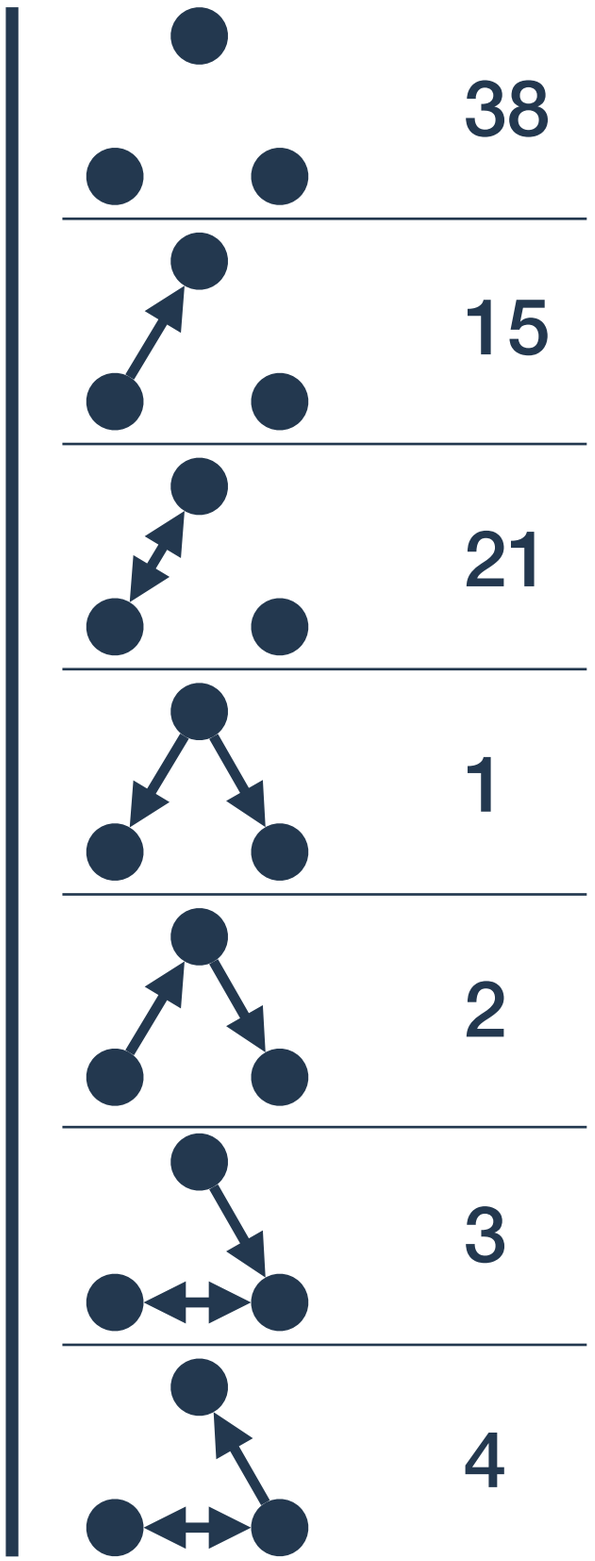
Johnsen, Eugene C. 1985. “Network Macrostructure Models for the Davis-Leinhardt Set of Empirical Sociomatrices.” *Social Networks* 7 (3): 203–24.

Romantic interest network from *Clueless (1995)*

Triads

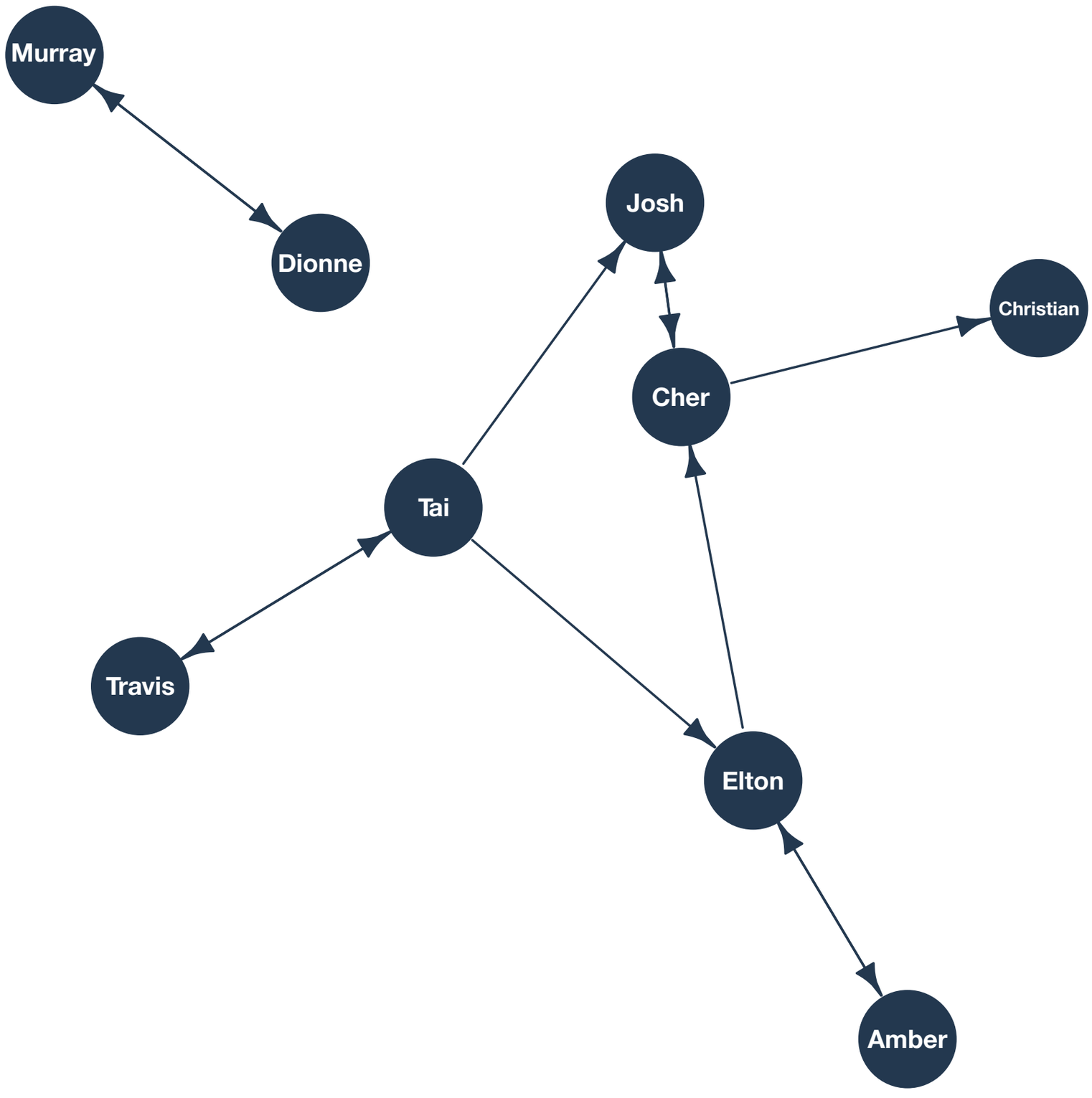


Triad census



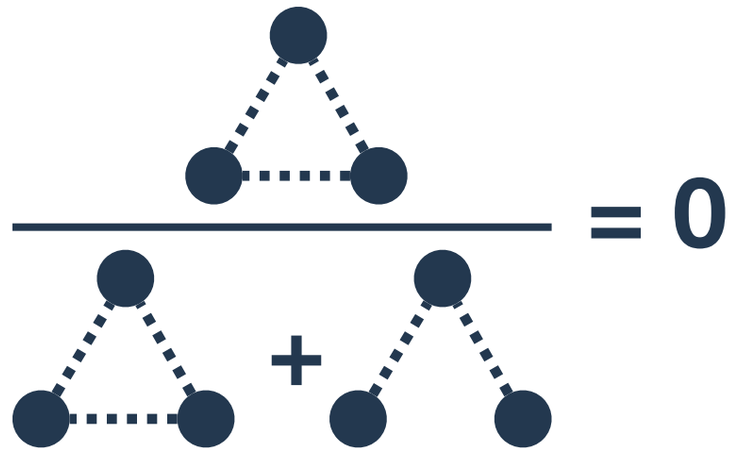
Romantic interest network from *Clueless (1995)*

Triads



Transitivity:

Probability that a the neighbors of a node have an edge between them



Romantic interest network from *Clueless (1995)*

Triads, so what?

Triads can be explained in terms of behavior

- E.g. transitivity of close friendships
- E.g. intransitivity of hetero relationships
- (Always at most a *tendency*)

(Near) absence of certain types of triads limits overall social structures

- Theories of ‘structural balance’
- Whole body of literature on “forbidden triad” sets and their analytically implied structures
- E.g. “ranked clusters” (Davis and Leinhardt 1972)

Meaningful, but incomplete

- Does not describe specific relations, individual positions, etc.
- Strictly limited triads almost never occur in empirical networks