

Social Networks

Food for thought

Prof. Amalya Oliver
Department of Sociology
The Hebrew University

Introduction

We live in a connected world:

“To speak of social life is to speak of the association between people – their associating in work and in play, in love and in war, to trade or to worship, to help or to hinder. It is in the social relations men establish that their interests find expression and their desires become realized.”

Peter M. Blau

Exchange and Power in Social Life, 1964

"If we ever get to the point of charting a whole city or a whole nation, we would have ... a picture of a vast solar system of intangible structures, powerfully influencing conduct, as gravitation does in space. Such an invisible structure underlies society and has its influence in determining the conduct of society as a whole."

J.L. Moreno, *New York Times*, April 13, 1933

These patterns of connection form a *social space*, that can be seen in multiple contexts:

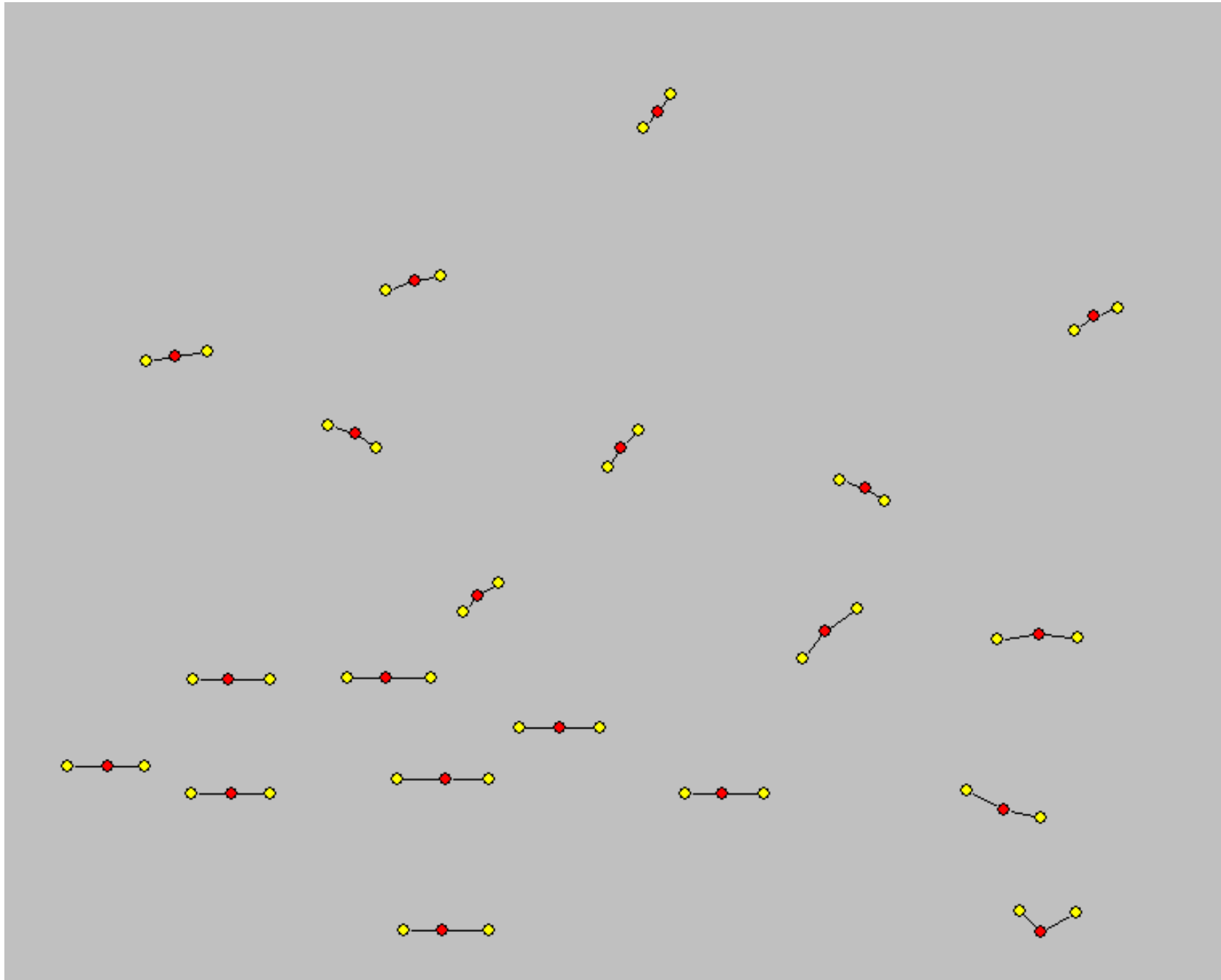
Popular approaches to Social Networks assume:

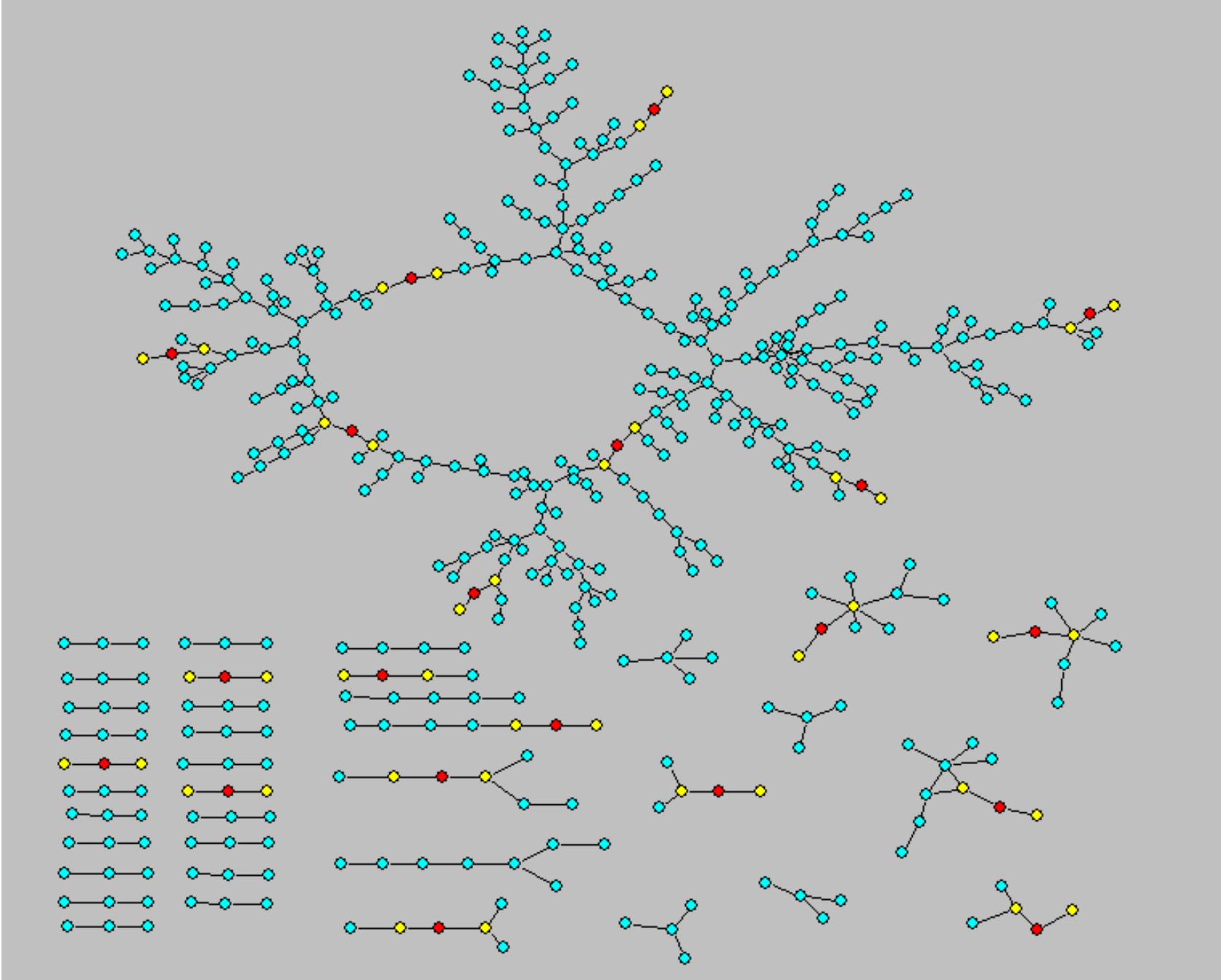
1. Connections are important - meaning?
2. The more connections, the better...
3. Connections are with other with human beings- only?
4. The focus is on EGO networks - Can we know more?
5. Actors are self motivated and rational - Always?
6. Actor's identity is independent of the networks - So?

Introduction

Why do Networks Matter?

Local vision

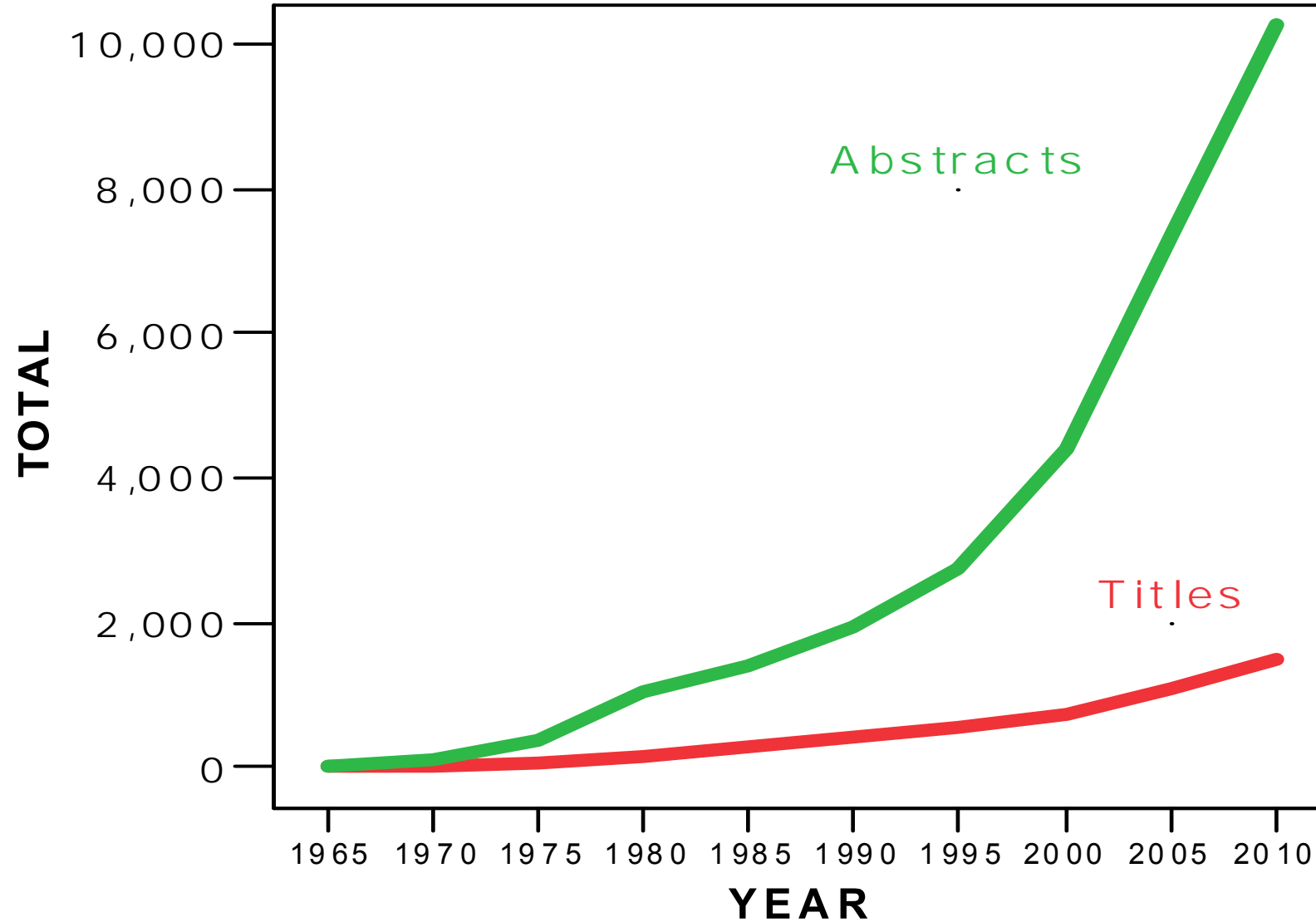




Growth of Social Networks in Social Sciences

Five-year totals for 14 literature indexes

Keyword search for "social" + "network*"



Why do networks matter?

- Information

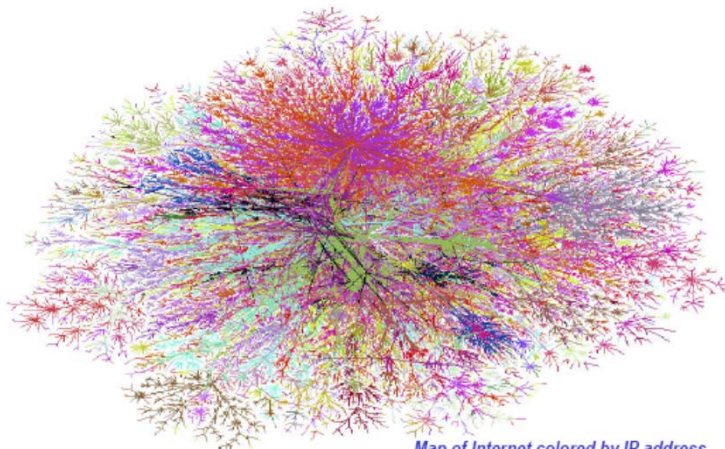
- Collective information – standardized, freely available

- Private information – trust-based

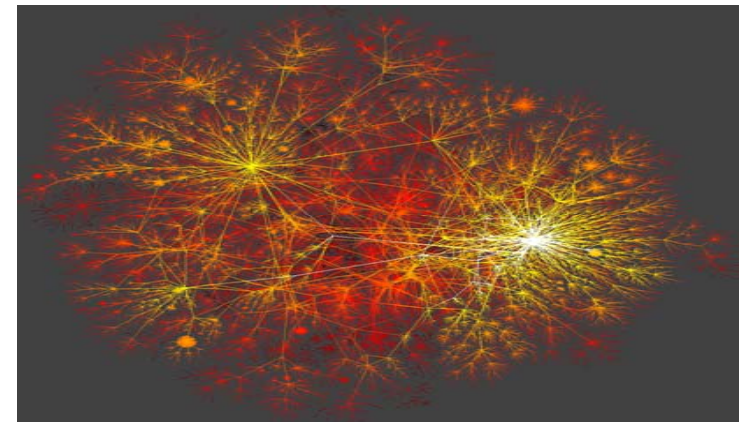
- The challenge: create trust

- The wisdom of crowds

- The challenge: connect multiple social circles



Map of Internet colored by IP address
(Bill Cheswick & Hal Burch, <http://research.lumeta.com/ches/map>)



Why do networks matter?

- Power, reputation, control
 - The challenge: create structural holes
 - Identify, and connect with hub
- Access to information, good ideas, new knowledge
 - The challenge: identify key people
 - Establish trust relations
 - Keep network closed

How did we get here?

- Psychology – Jacob Moreno, 1934



**EMOTIONS MAPPED
BY NEW GEOGRAPHY**

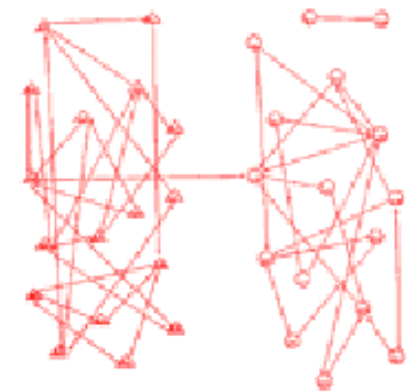
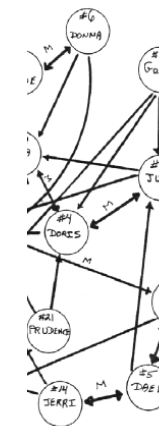
Charts Seek to Portray the
Psychological Currents of
Human Relationships.

FIRST STUDIES EXHIBITED

Colored Lines Show Likes and
Dislikes of Individuals
and of Groups.

MANY MISFITS REVEALED

Dr. J. L. Moreno Calculates There
Are 10 to 15 Million Isolated
Individuals in Nation.



Friendship choices among
4th graders (Moreno 1934)

Z02-4404. 0 10 202000

22

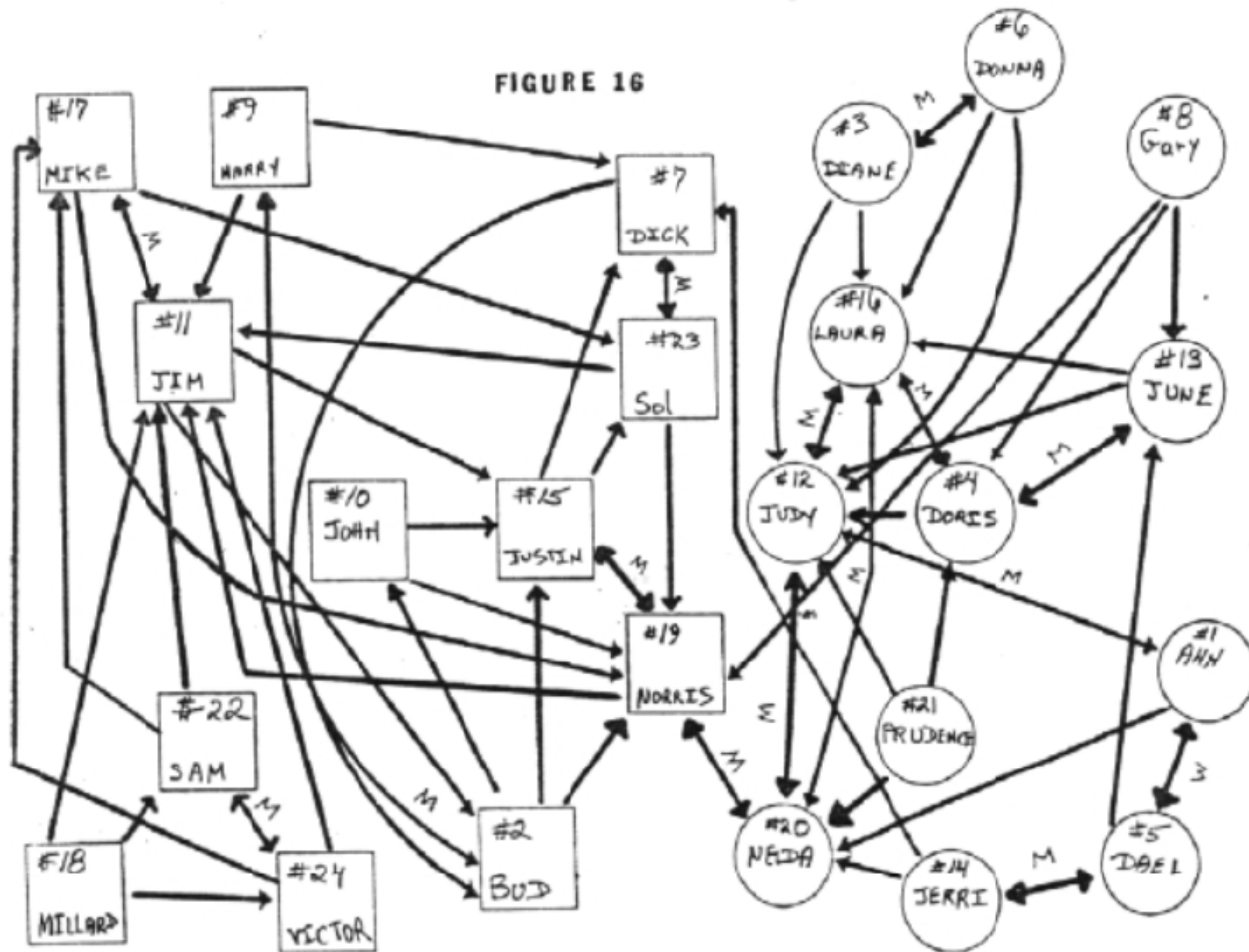
Moreno's sociomatrix ...

CLASS: _____ QUESTION: _____
 NOMINEES' ID NUMBERS

ZNOM
 IZMOM
 S'NOHYA
 U
 ZCZ
 M
 ZCZ
 U
 S'NOHYA
 ZNOM

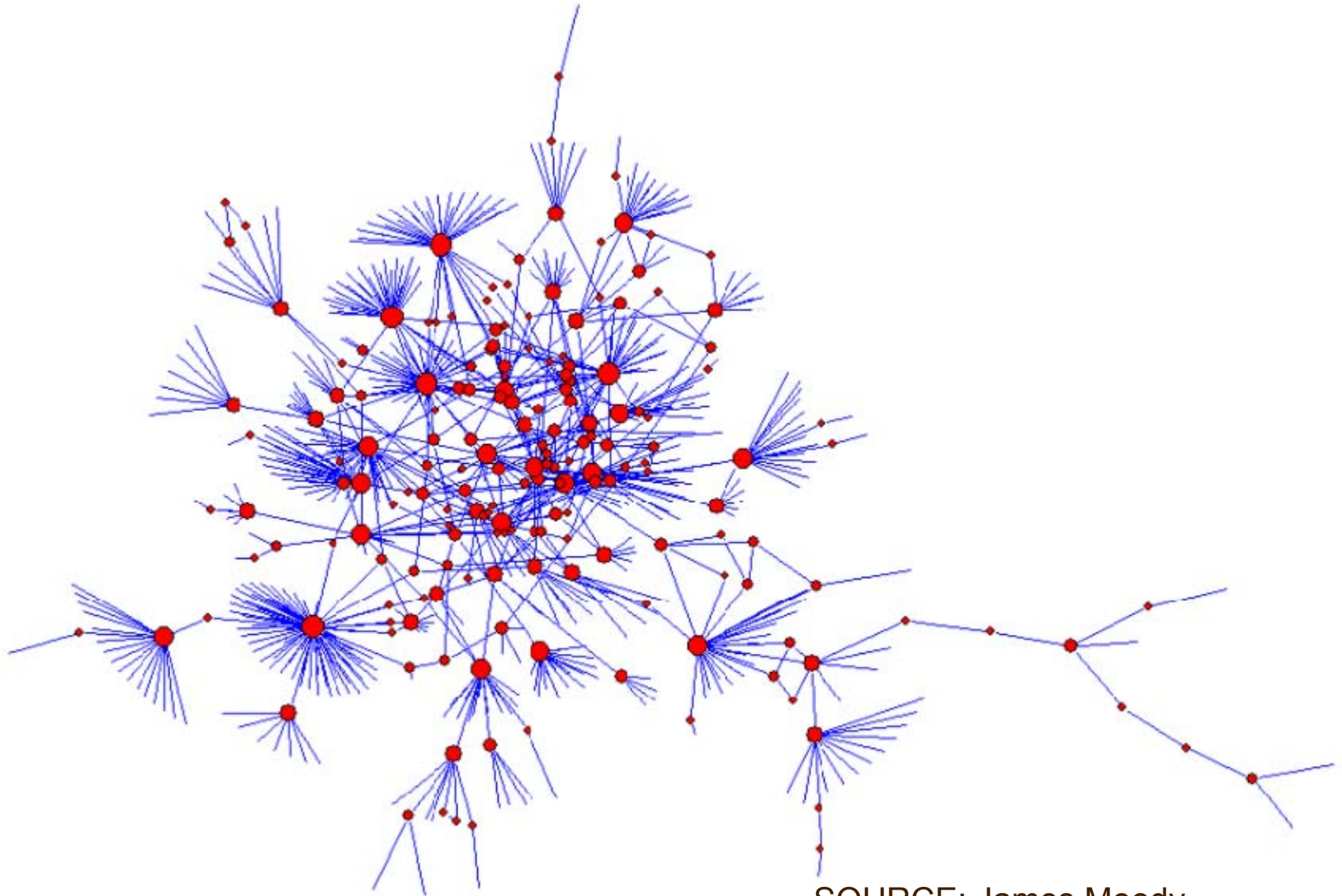
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F	1	■				+				-	-		+								+	-				
M	2	-	■							+						+					+			-	-	
F	3			■			+	-				+					+						-			
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F	5	+				■							+	+							-	-				
F	6	-		+			■					+				-	+							-		
M	7		+					■				-	+								-			-	+	
F	8				+				■					+						-	+				-	
M	9		+					+		■		+			-										-	
M	10		+							■		-					+				+			-		
M	11		+								■						+		+		-	-				
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M	22											+						-	+					■		+
M	23	-										+									+				■	
M	24											+									+				■	
TOTAL		+	2	4	1	5	2	1	4	0	1	0	8	8	3	1	4	6	3	0	7	6	0	2	3	2
TOTAL		-	4	2	0	1	0	4	4	0	4	9	1	1	1	2	3	1	2	0	7	6	10	4	3	3

... displayed as a sociogram



What structure is evident in his arrangement of squares and circles?

Colorado Springs Sexual Contact Network



SOURCE: James Moody.
<http://www.soc.sbs.ohio-state.edu/jwm/>

The 9-11 Hijacker Network

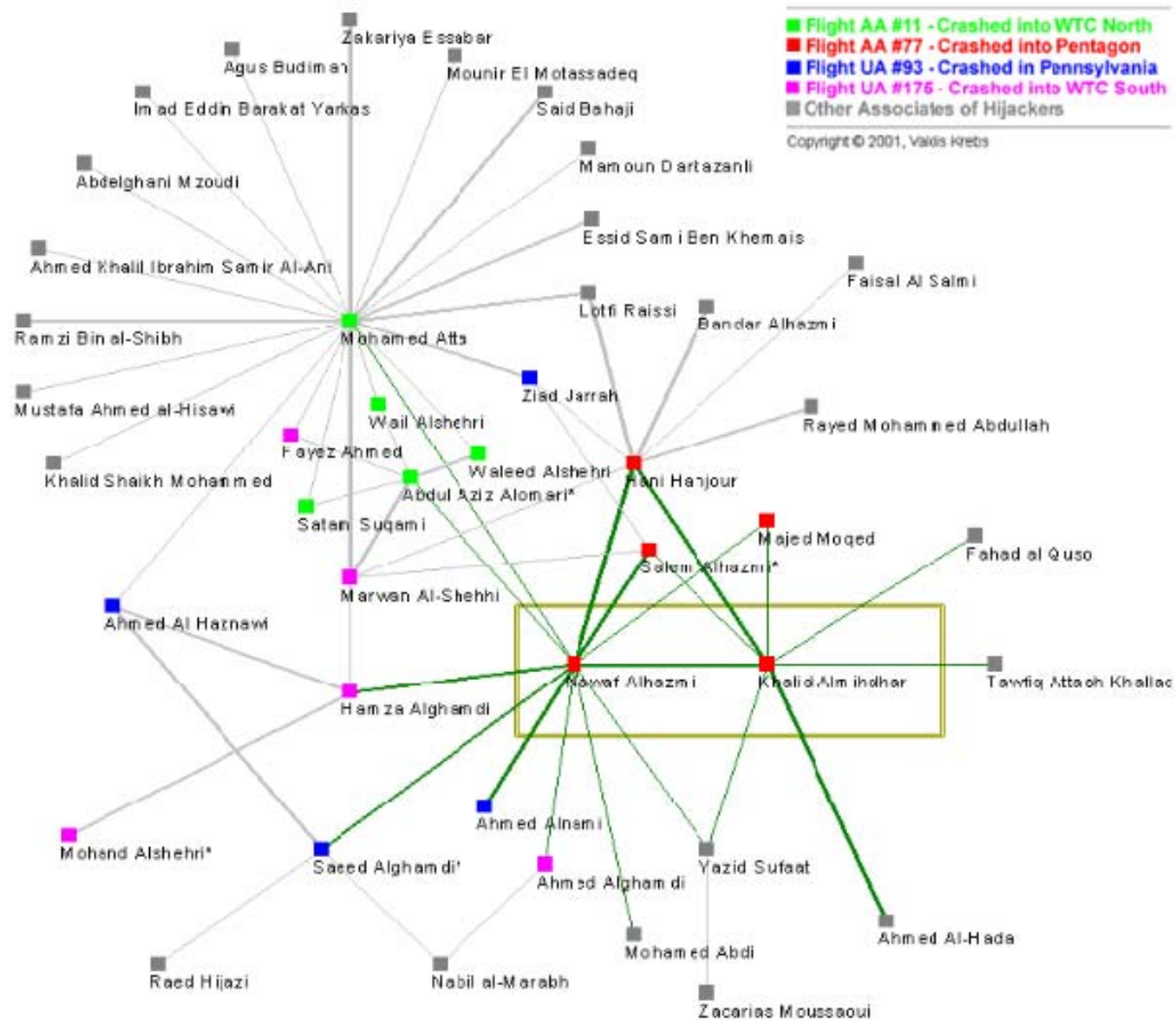
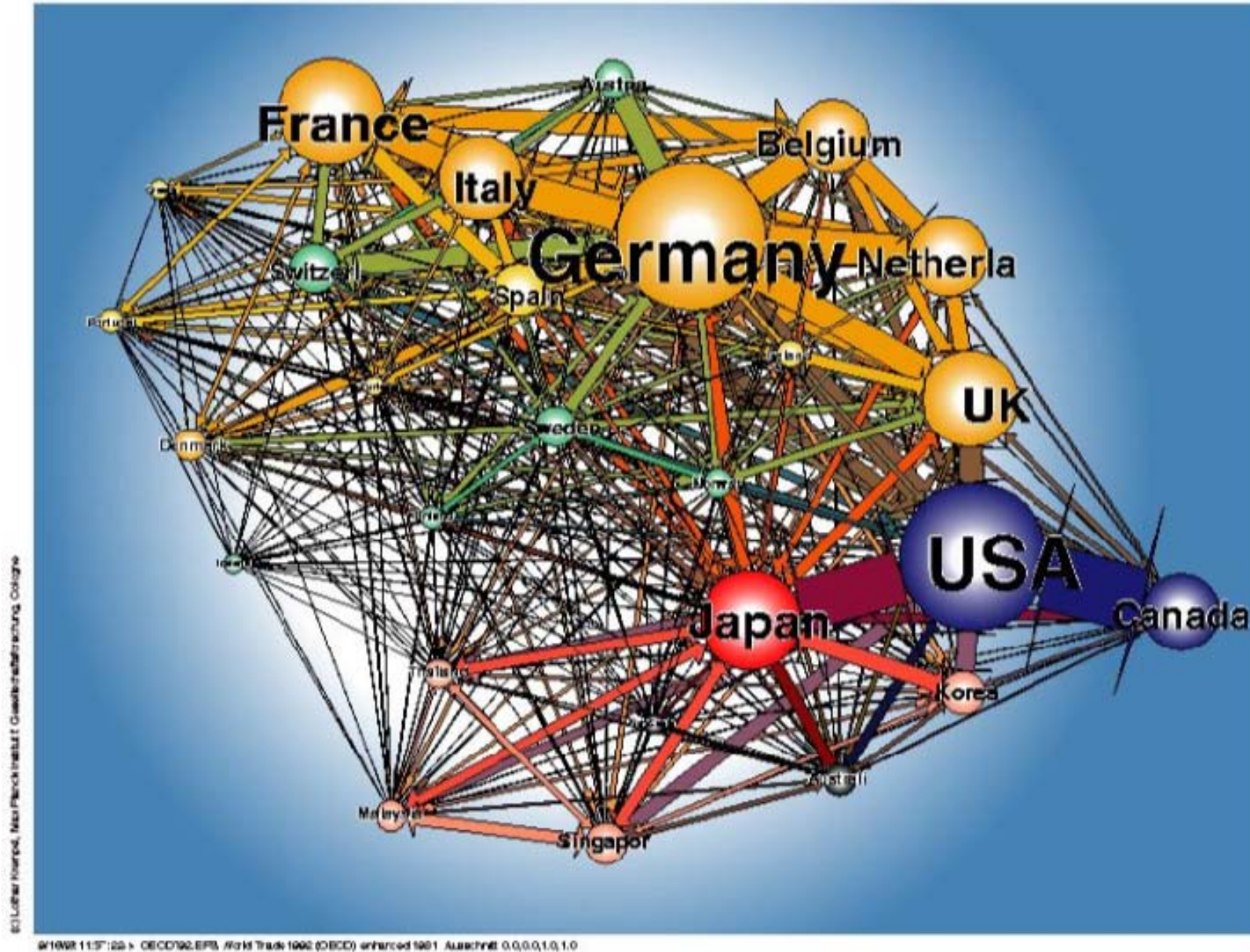


Figure 3 - All 2 step links from two known suspects

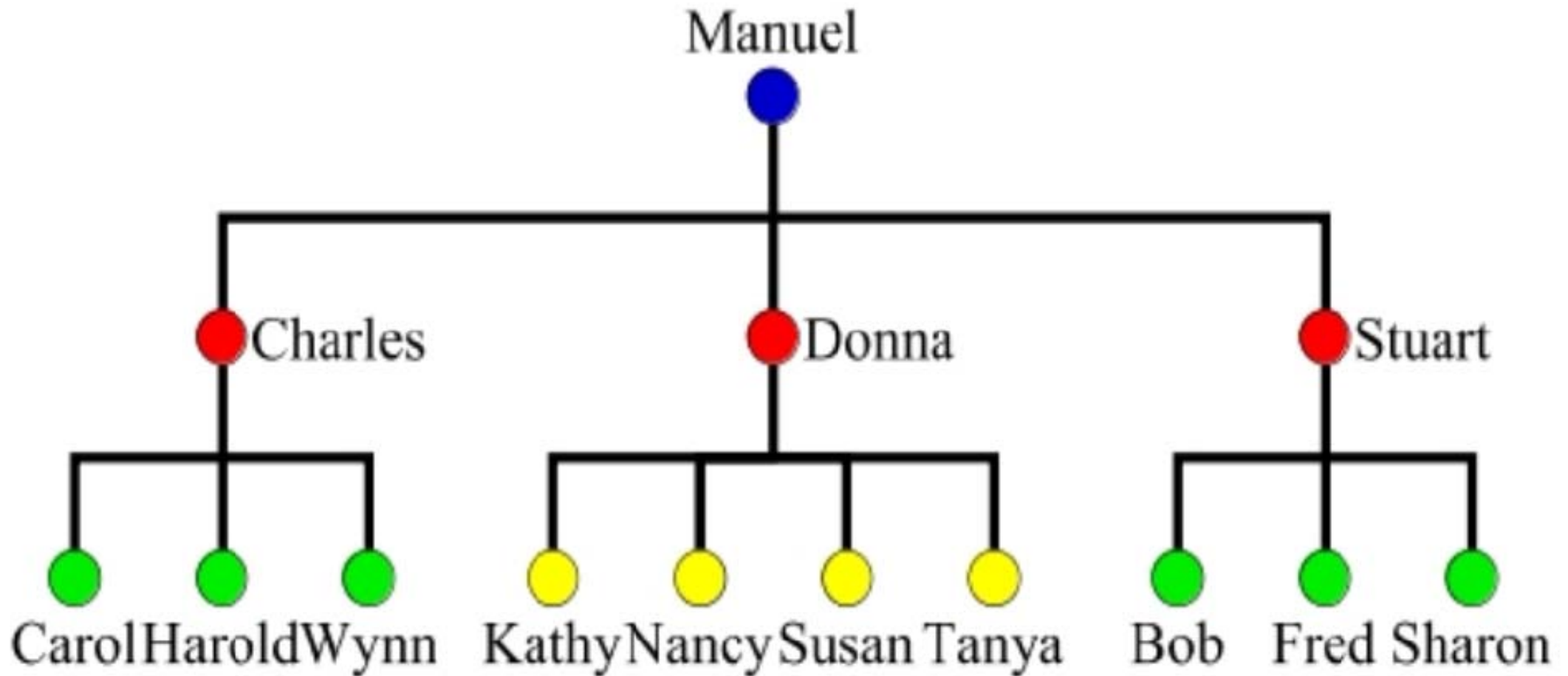
SOURCE: Valdis Krebs
<http://www.orgnet.com/>

OECD Trade Flows 1981-1992



SOURCE: Lothar Krempel <http://www.mpi-fg-koeln.mpg.de/~lk/netvis.html>

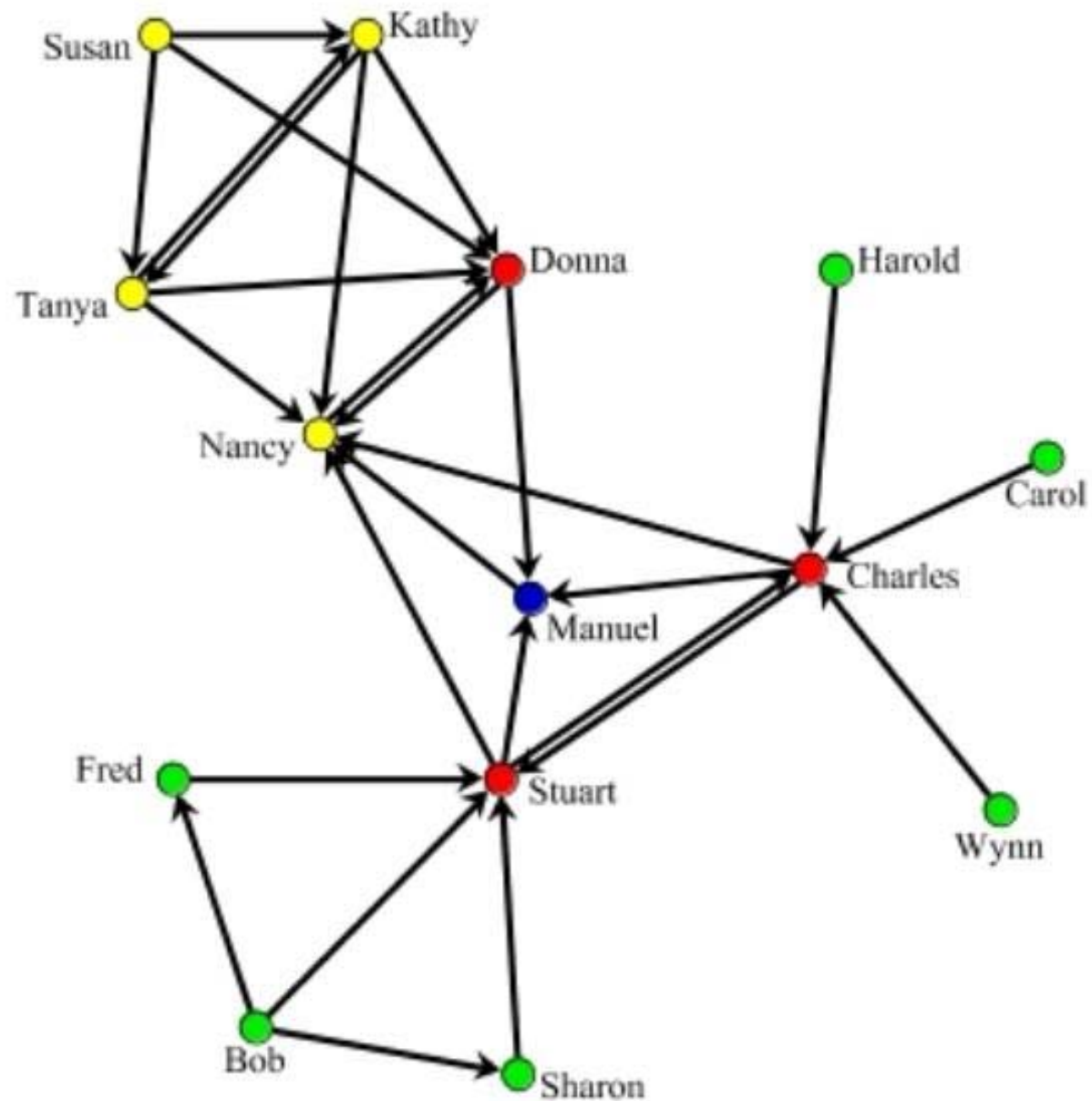
Org-chart shows how authority ties *should* look...



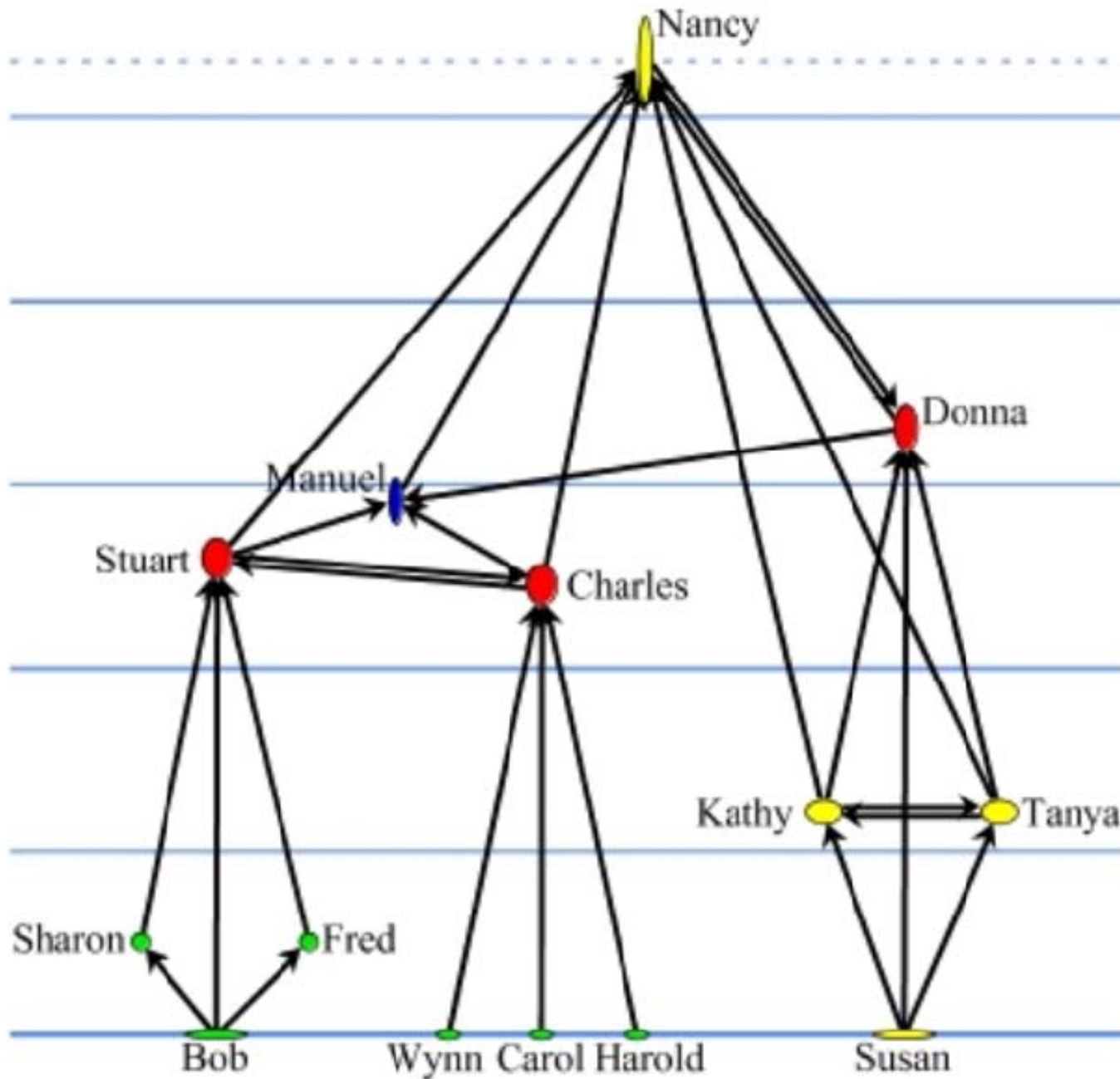
SOURCE: Brandes, Raab and Wagner (2001)

<<http://www.inf.uni-konstanz.de/~brandes/publications/brw-envsd-01.pdf>>

... but the digraph of *actual* advice-seeking ...



... can be restructured to reveal the “real” hierarchy!



The Strength of Weak Ties

Mark Granovetter's (1973) classic article on finding a job argued that **weak-tie relations** (casual, indirect) give actors better access to new information and opportunities. But, **strong ties** (emotionally intense, frequent, direct) restrict the flow of new information from diverse, distant sources.



- ▶ Intimates (kin, close friends) widely share same knowledge, norms, beliefs
- ▶ Although strong ties offer beneficial social support (“haven in a heartless world”), they also result in impacted information & coercive conformity to the social circle's expectations (folkish society)
- ▶ Weak relations (acquaintances, coworkers) serve as **bridges** to other social groupings having information & resources unavailable within one's intimate social circle; provide opportunities of individual **autonomy** via unique structural location [Simmelian cross-cutting]
- ▶ Persons with many weak ties can gain speedy advantages in learning about – and cashing in on – new **entrepreneurial opportunities**
- ▶ Irony that weak ties actually provide stronger form of **social capital** for career advancement, financial dealings, conference invitations

Closure vs. Structural Holes

James Coleman: High trust in communities with **full closure** networks (i.e., a graph “strong component”), whose strong ties foster mutual assistance obligations & socially control deviant behaviors (e.g., of children)



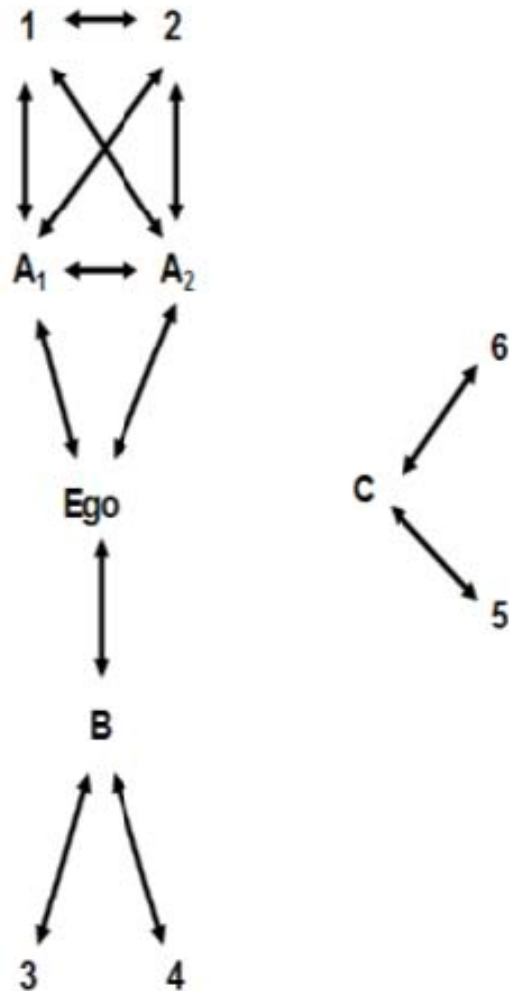
Ronald Burt: Ego gains numerous competitive advantages and higher investment returns if ego's weak, direct-tie relations span **structural holes**, thus serving as bridge between its alters

Holes create social capital via brokerage opportunities

- ▶ Ego actor gains earlier access to flows of valuable information
- ▶ Ego fills structural holes by forging new ties linking its unconnected alters, extract “commission” or “fee” for providing brokerage services
- ▶ Low network constraints result in high performance rewards
- ▶ Ego maximizes its self-interests by controlling & exploiting information, playing one actor against another (“*tertius gaudens*”)

Structural Holes in an Ego-Centric Net

To gain information and control benefits from structural holes, players must identify bridging / brokering opportunities and fill in those gaps



A typical office-politics situation:

- Ego fills a structural hole between B and both A' s, extracts commission
- Ego can' t fill any hole between A' s
- Indeed, maintaining ties to both A' s is redundant (and costly)
- If Ego cuts a tie to one A, where should it invest time & energy forging a new tie that will maximize its entrepreneurial opportunities?

Lin' s Social Capital Theory

Nan Lin' s general theory of social capital comprises a set of propositions, applicable under scope conditions for pyramidal status structures (actors in higher positions control more capital) and actions that “evoke other actors as intermediaries” (2001:59).



Core social capital propositions:

1. Success of an action is positively associated with social capital
2. Better the origin position, more likely to access and use “better” SC
3. Stronger the tie, greater SC positive effect on expressive action success
4. Weaker the tie, greater access to better SC for instrumental action
5. Proximity to a network bridge, better SC access for instrumental action

Networks in the context of FCE

- Networks as cognitive maps
- Networks as structures of connections between actors
- Networks as connecting the event to other events
- Networks as connecting the event to other institutions and actors
- Networks within FCE and their change over time

Measures of interest

Centrality: degree, closeness, betweenness,
Bonacich

Cliques

Centralization

Connectivity

Structural holes/closure

Degrees of separations

Ego networks: diversity, range, intensity

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Degrees of separations

Ego networks: diversity, range, intensity

Possible questions

- How centralized a FCE is?
- Who are the main ‘opinion leaders’ (degree)?
- Who are the institutional entrepreneurs (brokers)?
- Are there cliques of ideas or of people?
- Is the network changing between two events?
- What are the relations between positive and negative ties between people and/or between ideas?