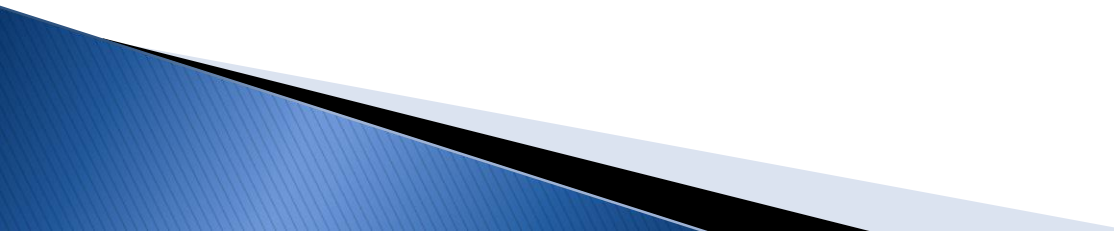


# Network Fundamentals– Basic SNA

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# Outline for Today's Training

- ▶ What is Social Network Analysis?
  - ▶ Conceptual Foundations: Meaning in Nodes and Lines
  - ▶ Types of SNA
  - ▶ Data Collection and Management in SNA projects
  - ▶ Data Entry Example Using UCINET
  - ▶ Resources
  - ▶ Practice Example
- 

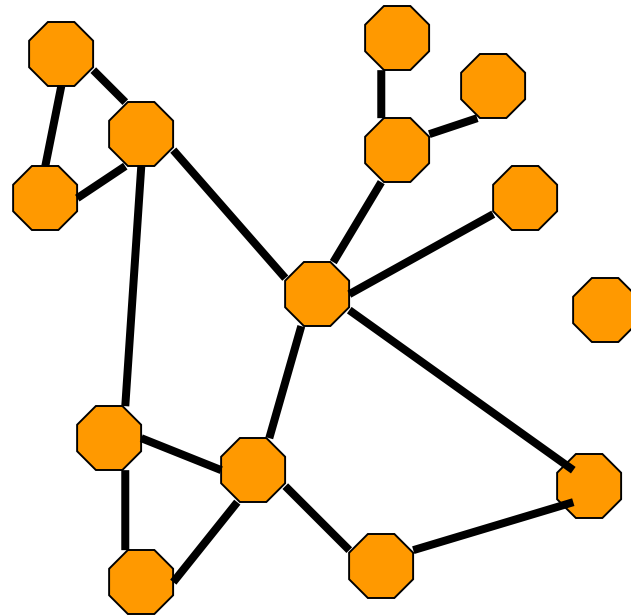
# What is Social Network Analysis?

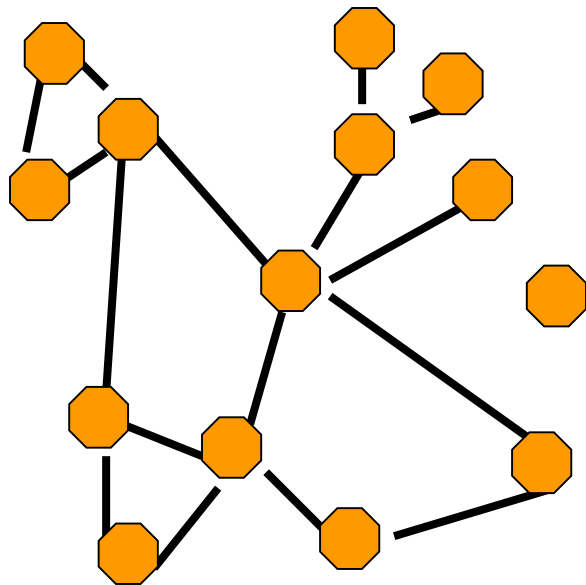
# Social Network Analysis

Social Network Analysis (SNA) is a tool used to gather and analyze data to explain the degree to which network actors connect to one another and the structural makeup of collaborative relationships (Scott, 1991).

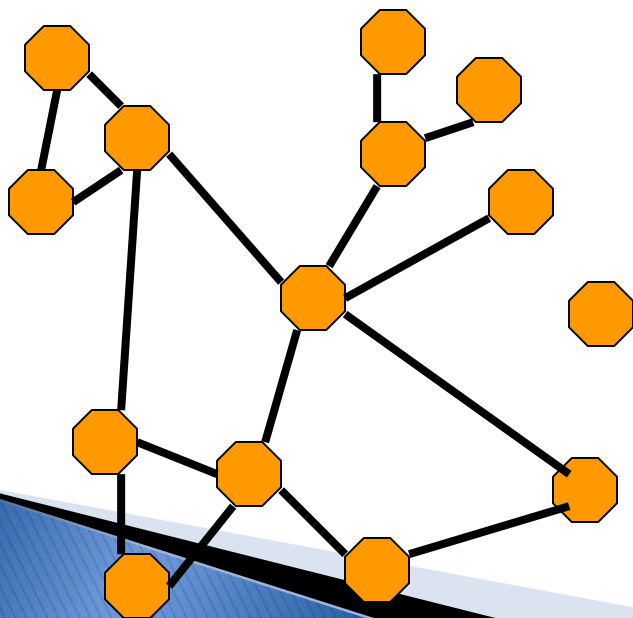
# What is a Network?

- ▶ A set of nodes (or actors) along with a set of ties of specified type that link them.

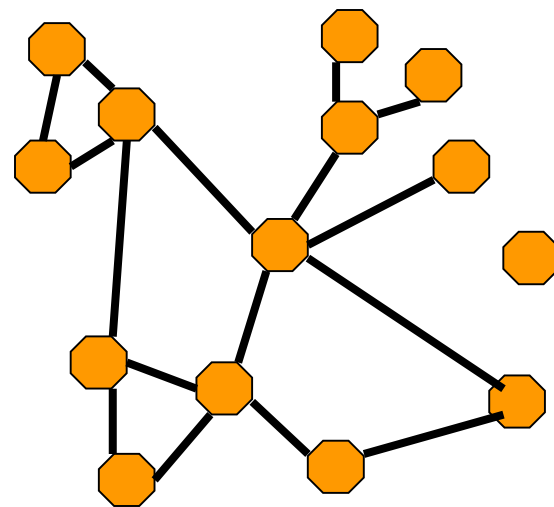




OUTCOME



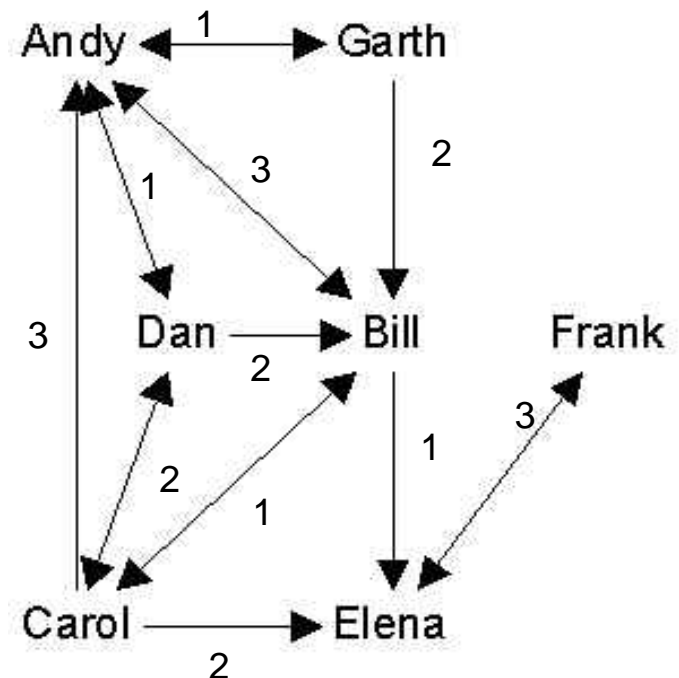
OUTCOME



# Elements of a Network

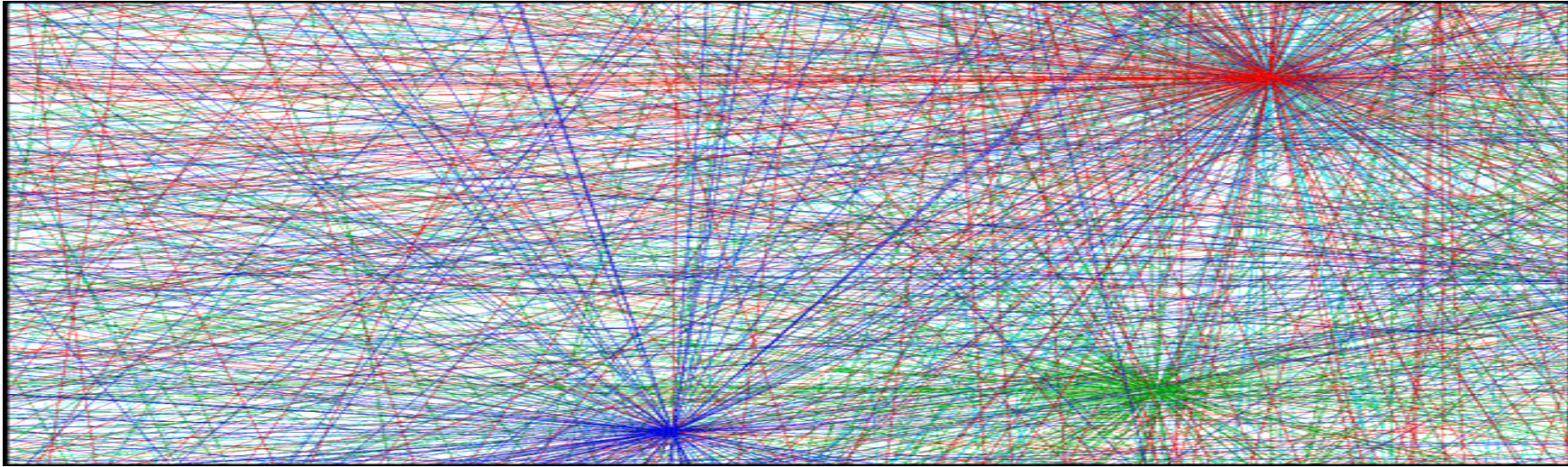
- ▶ Collects data on who is connected to whom
- ▶ How those connections vary and change
- ▶ Focus on patterns of relations

- ▶ Nodes (People, Orgs, Etc)
- ▶ Lines (Relationships)





# We Dream in Graphs...



# And Analyze in Matrices.

	A	B	C	D	E	F
A	0	0	0	1	0	0
B	0	0	1	0	0	0
C	0	1	0	1	0	0
D	1	0	1	0	1	2
E	0	0	0	1	0	1
F	0	0	0	2	1	0

Figure 4.3. Matrix representation ( $P$ ) of Figure 4.1.

	1	2	3	4	5
1	0	1	0	0	0
2	1	0	1	1	1
3	0	1	0	2	1
4	0	1	2	0	1
5	0	1	1	1	0

Figure 4.4. Matrix representation ( $G$ ) of Figure 4.2.



# Network Data = Matrix Data

- ▶ Matrices are tables
  - Sort numbers
  - Rows and Columns (2-way matrix)
    - 1 mode
    - 2 mode
- ▶ Matrix Algebra: Matrices can be added, multiplied, etc.
  - But must have equal rows/columns

# Data Entered Into Adjacency Matrices

		R										A																					
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9			
1	R1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	
2	R2	0		1	1	1	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
3	R3	1	1		0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
4	R4	1	1	1		1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	
5	R5	1	1	1	0		1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
6	R6	0	1	1	1	0		1	1	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	
7	R7	1	1	1	1	1	1		1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
8	R8	1	1	0	1	1	0	1		0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
9	R9	0	1	0	1	1	0	0	1		1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	R10	1	1	1	0	1	1	1	0	1		0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	
11	R11	1	1	1	1	1	1	1	0	0	0		1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
12	R12	1	1	1	1	1	1	1	1	1	1		1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
13	R13	0	1	1	1	1	1	1	1	1	1	1		1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
14	R14	1	1	1	0	0	1	1	1	1	1	1	1		1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	R15	1	1	1	1	0	1	1	1	1	1	1	1	1		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	A2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1		1	0	1	1	0	1	0	1	1	1	1	1	1	1
18	A3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1		1	1	0	0	1	1	1	1	1	1	1	1	0
19	A4	0																															

Question: Who do you work with?

A “1” indicates the presence of a relationship.

A “0” represents the absence of a relationship.

# Network Data: Two Ways

Relational Data

	Scot	Sam	Amy	Kate
Scot	–	1	2	0
Sam	1	–	2	0
Amy	2	2	–	1
Kate	0	0	1	–

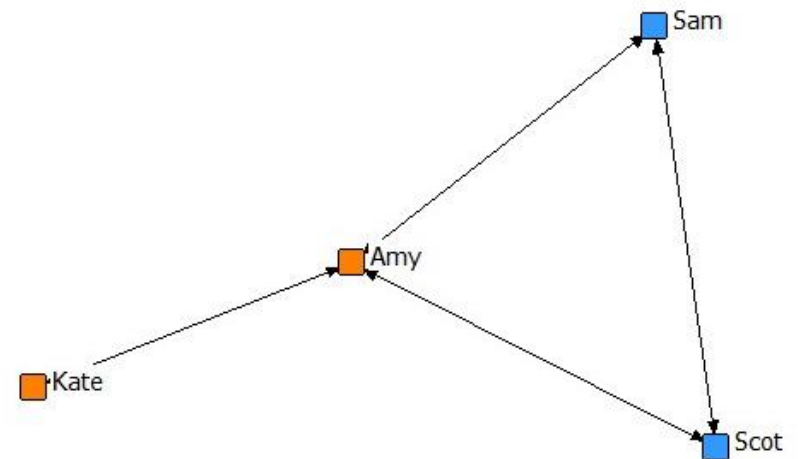
Attribute Data

	Gender	Member	Tenure
Scot	1	1	1
Sam	1	0	5
Amy	2	0	1
Kate	2	1	3

# Network Data: Two Ways

Relational Data

	Scot	Sam	Amy	Kate
Scot	–	1	2	0
Sam	1	–	2	0
Amy	2	2	–	1
Kate	0	0	1	–



# Types of SNA

# Whole vs. Ego Networks

## ▶ Whole Network

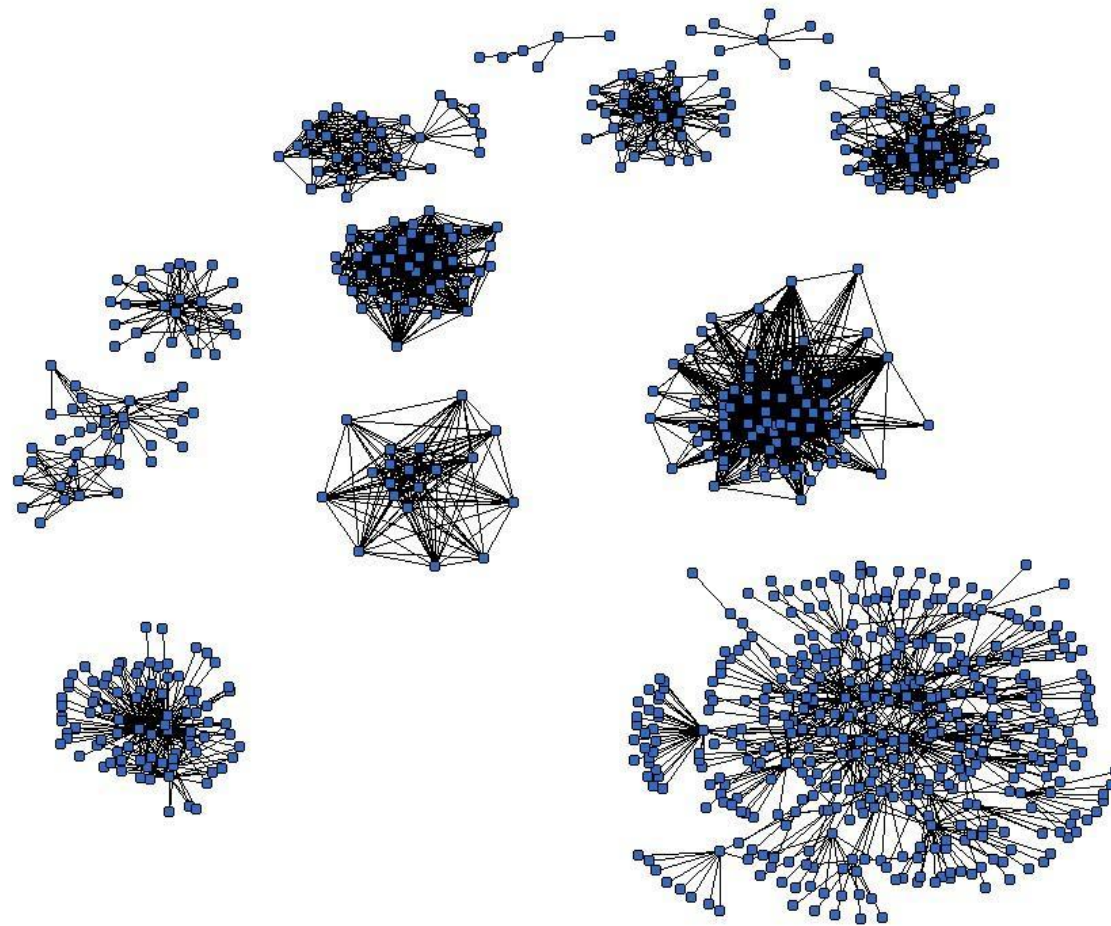
- A complete set of bounded actors
- Example: All members in a tobacco coalition, all public health departments in the country, all clients in a health delivery network

## ▶ Ego/Personal Network

- Randomly sample people from a population
- Ask only about their alters (no roster)
- Ask a sample of patients about who the members of their personal support network are

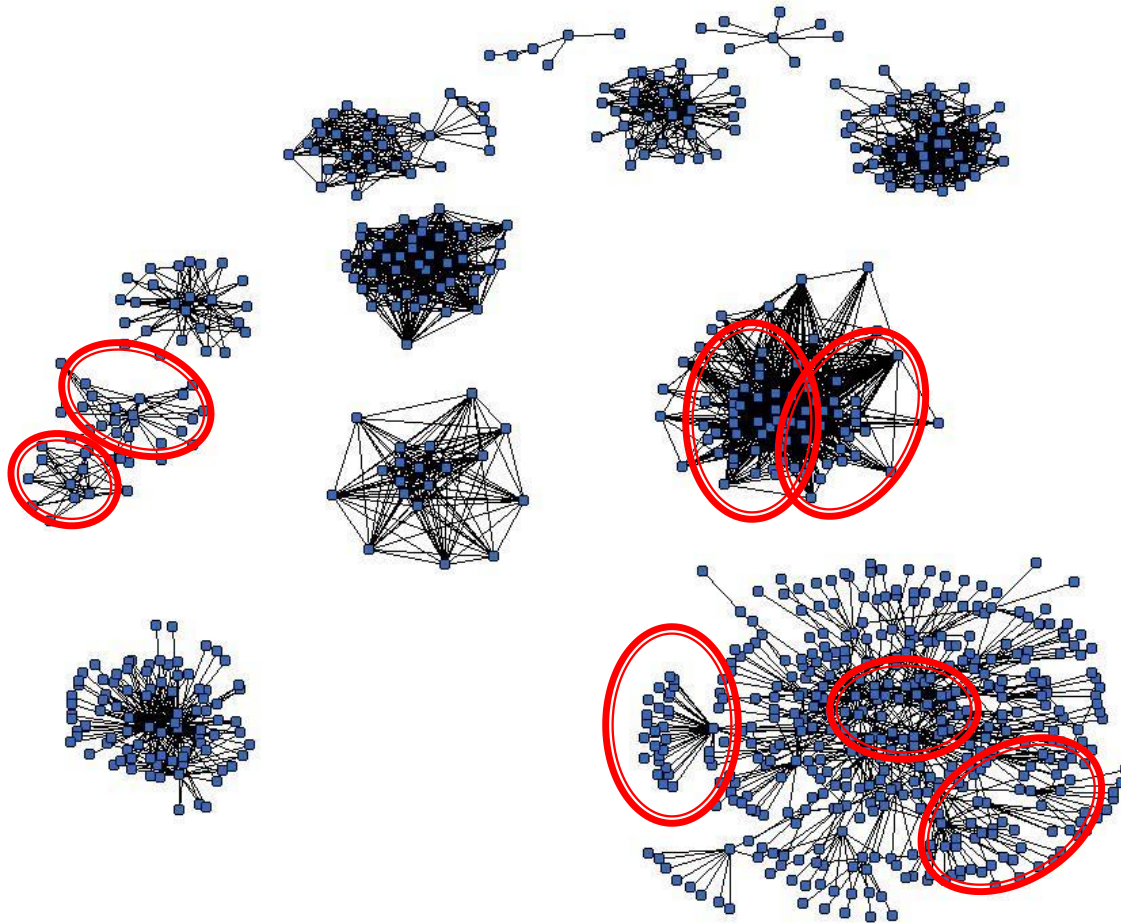


# Unit of Analysis: Whole/Sociocentric Level



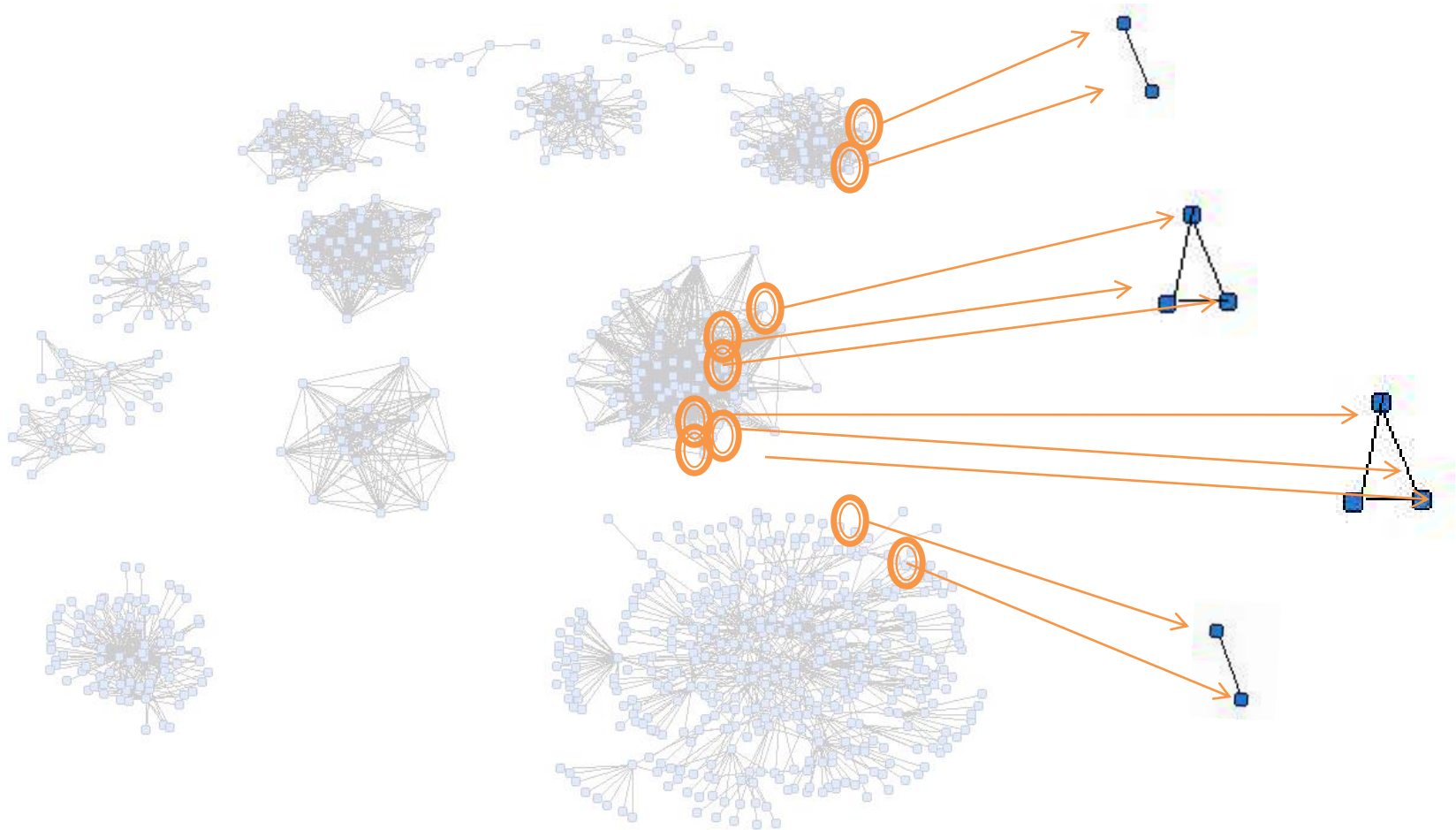
Networks  
Vary in Size,  
Shape, and  
Composition

# Unit of Analysis: Subgroup Level

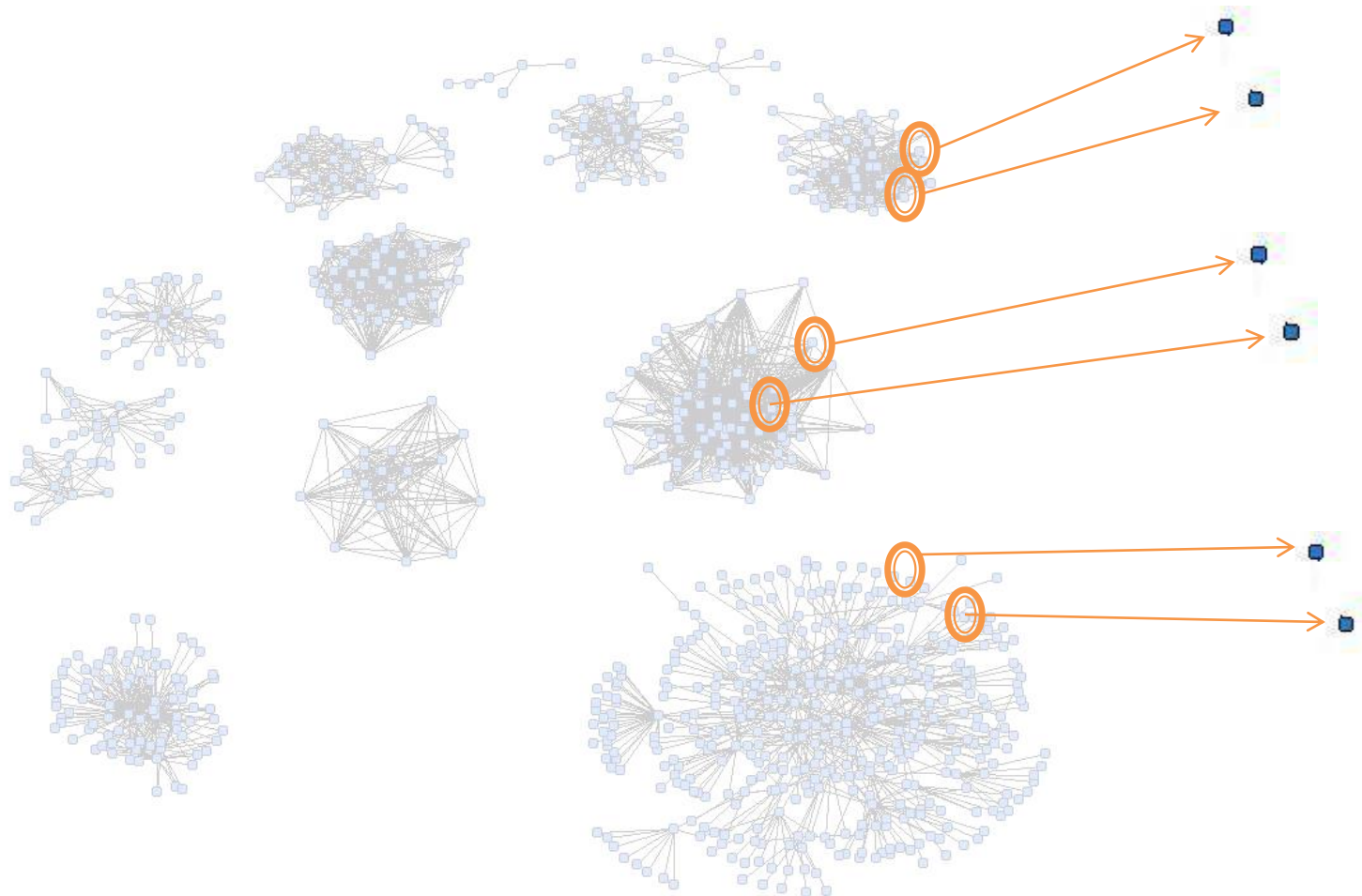


Subgroups  
are a subset  
of the  
graph  
based on  
certain  
nodes or  
links

# Unit of Analysis: Dyads/Triads



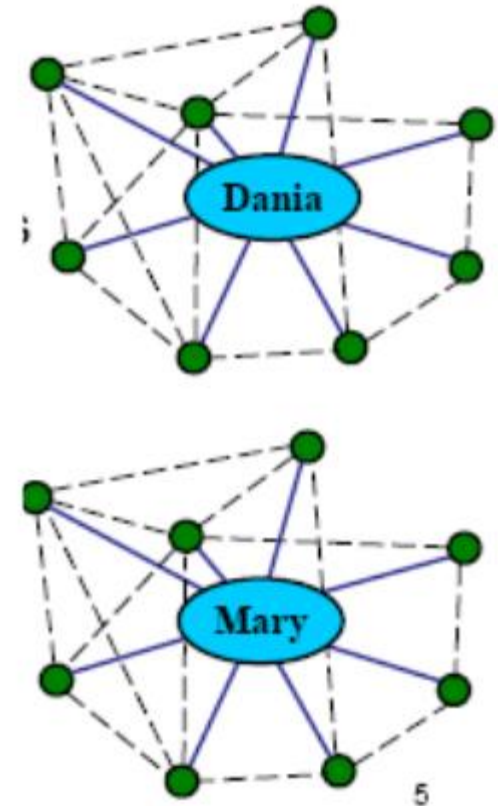
# Unit of Analysis: Individual Nodes (Ego-Centric)





# Ego Centric Analysis

- ▶ Combines the network perspective with mainstream social science
  - Random Sample of “Nodes”
  - Each Person is asked to list their “alters”
  - Then they are usually asked about attributes of the alters
  - Then the relationships between the alters are identified.



\*2012 LINKS Center Summer SNA  
Workshop: Analyzing Track

# Example Ego-Centric Survey Questions

No.	Name	Relationship with householder	Existence, non-existence of residence	Date of birth (specify Lunar or Solar)	Age Animal symbol of year	Full age	Sex	Marital status
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								



# Ego Centric Analysis: Social Isolation in America

- ▶ (McPherson, Smith–Lovin, & Brashears, 2006) found that Americans indicated fewer numbers of relationships to people that they discuss important matters with than they did on average nine years prior.
- ▶ Data Collection: In the 2004 General Social Survey study:
  - From time to time, most people discuss *important matters with other people*. Looking back over the last six months—who are the *people with whom* you discussed matters important to you? Just tell me their first names or initials.

# Ego Centric Analysis: Social Isolation in America

## ▶ Results:

- mean network size of a respondent was 2.08, while in 1985, this average was 2.94.
- More alarming is that the modal respondent in 2004 now reports having no confidants while in 1985 the modal respondent indicated three confidants.

## ▶ Discussion:

- while American's core social network, made up of strongly connected relationships may be shrinking, their actual social networks are probably growing, albeit with weaker (possibly more diverse) relationships due to technological advances.
- Or survey error!

# Table of Results from Ego-Centric Analysis

Isolation.pdf - Adobe Reader

File Edit View Window Help

6 / 23 182%

Tools Sign Comment

## 358 AMERICAN SOCIOLOGICAL REVIEW

**Table 1.** Size of Discussion Networks, 1985 and 2004<sup>b</sup>

Network Size	Total Discussion Network		Kin Network <sup>a</sup>		Non-Kin Network <sup>a</sup>	
	1985	2004	1985	2004	1985	2004
0	10.0%	24.6%	29.5%	39.6%	36.1%	53.4%
1	15.0%	19.0%	29.1%	29.7%	22.4%	21.6%
2	16.2%	19.2%	21.0%	16.0%	18.1%	14.4%
3	20.3%	16.9%	11.7%	9.4%	13.2%	6.0%
4	14.8%	8.8%	5.8%	4.0%	6.8%	3.1%
5	18.2%	6.5%	2.8%	1.3%	3.4%	1.4%
6+	5.4%	4.9%	—	—	—	—
Mean	2.94	2.08	1.44	1.12	1.42	.88
Mode	3.00	.00	.00	.00	.00	.00
SD	1.95	2.05	1.41	1.38	1.57	1.40

*Note:* N (1985) = 1,531; N (2004) = 1,467.

<sup>a</sup> Information on kinship was collected on the first five alters cited. Therefore, the sum of kin and non-kin alters is not equal to the overall network size distribution.

<sup>b</sup>In all tables for this paper, cases are weighted to reflect the population. Weight variable for 1985 is a function of

# Table of Results from Ego-Centric Analysis

**Table 2.** Respondents Who Had Various Relationships with at Least One Confidant

Type of Relationship to Respondent <sup>a</sup>	1985, % (N = 1,531)	2004, % (N = 1,467)
No Confidant	10.0	24.6**
Spouse	30.2	38.1**
Parent	23.0	21.1**
Sibling	21.1	14.1**
Child	17.9	10.2**
Other Family Member	18.2	11.8**
Coworker	29.4	18.0**
Comember of group	26.1	11.8**
Neighbor	18.5	7.9**
Friend	73.2	50.6**
Advisor	25.2	19.2**
Other	4.5	3.1**
Spouse is only Confidant	5.0	9.2**
At Least One Non-spouse Kin	58.8	42.9**
At Least One Non-kin Confidant	80.1	57.2**

*Note:* The table displays, for example, “What percent of the sample mentioned a spouse/parent/etc. as a person with whom they discussed important matters?”

<sup>a</sup> Since more than one type of relationship can be mentioned for any given discussion partner (e.g., a coworker can also be a co-member of a group, an advisor and a friend), the percentages do not sum to 100.

\*\*  $p < .01$  (two-tailed tests).

**Table 3.** Structural Characteristics of Core Discussion Networks

	1985 (N = 1,167 <sup>a</sup> )	2004 (N = 788 <sup>b</sup> )
Network Density		
<.25	9.9%	7.3%
.25–.49	18.5%	11.8%
.50–.74	37.9%	39.5%
>.74	33.7%	41.4%
Mean	.60	.66
SD	.33	.33
Mean Frequency of Contact (days per year)		
6–12	3.7%	3.0%
>12–52	15.3%	10.6%
>52–365	81.0%	86.4%
Mean	208.92	243.81
SD	117.08	114.86
Length of Association (in years)		
>0–4.5	12.1%	10.7%
>4.5–8+	87.9%	89.3%
Mean	6.72	7.01
SD	1.34	1.00
Age Heterogeneity (standard deviation of age of alters)		
<5	25.8%	29.1%
5–<10	24.6%	19.7%
10–<15	24.3%	23.9%
>15	25.3%	27.3%
Mean	10.35	10.34
SD	6.96	8.1
Population Age Heterogeneity	20.89	18.37
Education Heterogeneity (standard deviation of alters' educations)		
0–1	31.9%	34.7%
>1–2.5	41.0%	45.2%
>2.5	27.0%	20.1%
Mean	1.77	1.48
SD	1.52	1.38
Population Educ Heterogeneity	3.59	3.17
Race Heterogeneity (Index of Qualitative Variation) <sup>c</sup>		
0	91.1%	84.5%
>0	8.9%	15.4%
Mean	.05	.09
SD	.18	.26
Population IQV	.34	.53
Sex Heterogeneity (Index of Qualitative Variation)		
0	23.8%	24.2%
.01–.90	39.9%	37.6%
>.90	36.3%	38.1%
Mean	.67	.68
SD	.43	.46
Population IQV	.99	1.00

<sup>a</sup> Density and heterogeneity measures are meaningful only for respondents who mentioned more than one alter. The actual Ns for different analyses vary somewhat because of missing data, ranging from 1167 for race and sex to 1132 for education.

Table 4. Differences by Age, Education, Sex and Race in Network Size and Kin/Nonkin Composition

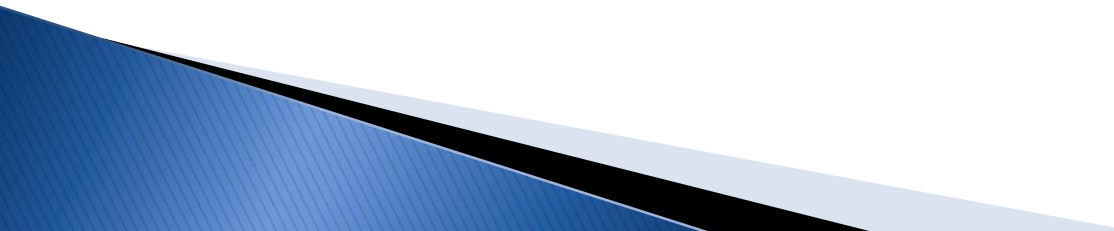
Independent Variables	Dependent Variables									
	Network Size		# of Kin		# of Non-Kin		Proportion Kin		Density	
	1985	2004	1985	2004	1985	2004	1985	2004	1985	2004
Age										
Age	.02 <sup>NS</sup>	.02 <sup>NS</sup>	-.02 <sup>NS</sup>	.01 <sup>NS</sup>	.03	.00 <sup>NS</sup>	-.01	.00 <sup>NS</sup>	-.00 <sup>NS</sup>	-.01
Age <sup>2</sup>	-.00	-.00 <sup>NS</sup>	.00 <sup>NS</sup>	-.00 <sup>NS</sup>	-.00	-.00 <sup>NS</sup>	.00	-.00 <sup>NS</sup>	.00 <sup>NS</sup>	.00
Constant	3.15	1.65	2.06	.86 <sup>NS</sup>	1.17	.88 <sup>NS</sup>	.69	.48 <sup>NS</sup>	.60	.82
R <sup>2</sup>	.07	.00 <sup>NS</sup>	.01	.00 <sup>NS</sup>	.07	.00 <sup>NS</sup>	.03	.00 <sup>NS</sup>	.02	.01
Education										
Educ (yrs)	.19	.15	.02	.05	.15	.08	-.03	-.01	-.02	-.01
Constant	.57	.03	1.15	.45	-.47	-.28	.87	.79	.86	.86
R <sup>2</sup>	.12	.05	.00	.01	.12	.04	.05	.01	.05	.02
Sex										
Sex (f=1)	-.05 <sup>NS</sup>	.19 <sup>NS</sup>	.28	.23	-.30	-.02 <sup>NS</sup>	.07	.01 <sup>NS</sup>	.04 <sup>NS</sup>	-.00 <sup>NS</sup>
Constant	3.02	1.78	1.28	1.00	1.59	.89	.49	.59	.58	.67
R <sup>2</sup>	.00 <sup>NS</sup>	.00 <sup>NS</sup>	.01	.01	.01	.00 <sup>NS</sup>	.01	.00 <sup>NS</sup>	.00 <sup>NS</sup>	.00 <sup>NS</sup>
Race/ethnic (White is reference category)										
Black	-.78	-.66	-.58	-.53	-.19 <sup>NS</sup>	-.12 <sup>NS</sup>	-.08 <sup>NS</sup>	-.08 <sup>NS</sup>	.02 <sup>NS</sup>	.00 <sup>NS</sup>
Other	-.43 <sup>NS</sup>	-.64	-.45	-.49	.00 <sup>NS</sup>	-.11 <sup>NS</sup>	-.08 <sup>NS</sup>	-.11	.07 <sup>NS</sup>	.05 <sup>NS</sup>
Constant	3.03	2.22	1.51	1.23	1.44	.91	.54	.61	.60	.66
R <sup>2</sup>	.02	.02	.02	.03	.00 <sup>NS</sup>	.00 <sup>NS</sup>	.00 <sup>NS</sup>	.01 <sup>NS</sup>	.00 <sup>NS</sup>	.00 <sup>NS</sup>

Note: Data show unstandardized OLS regression coefficients of network variables on respondents' demographic characteristics. All coefficients significant at  $p < .01$ , unless indicated as not significant (NS). Marsden (1987) also analyzed differences in network size and kin composition by size of place, but this variable has not yet been coded for 2004 so comparable analyses are not possible at this time. (The size of place variable is added to the data set after the data are collected, using the respondents' addresses and current Census tract information.)



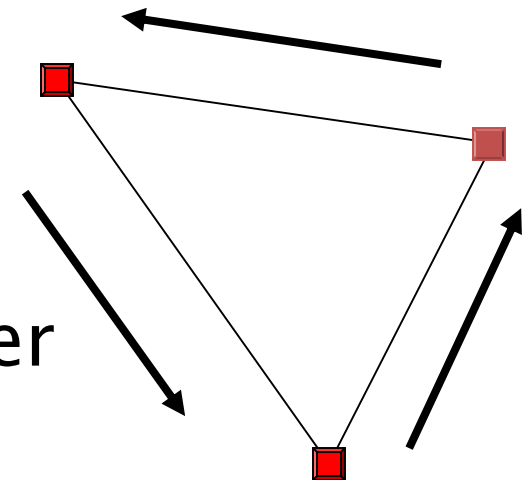
# Whole Network Analysis: Describing Networks

# Measures to Describe Networks

- ▶ Size
  - ▶ Inclusiveness (all minus isolates)
  - ▶ Component (largest connected subset)
  - ▶ Connectivity – reachability
  - ▶ Density
  - ▶ Centralization
  - ▶ Symmetry
  - ▶ Transitivity
- 

# Transitivity

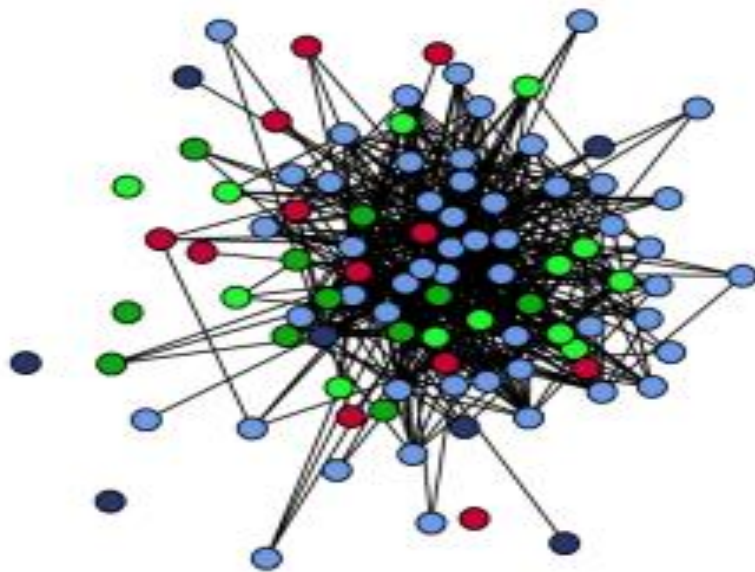
- How information flows based on transitive triples
- How many transitive triples exist?
- Matrix with *greatest* number of transitive triples has higher *TRANISTIVITY*.
- Units with higher transitivity have better information flow.



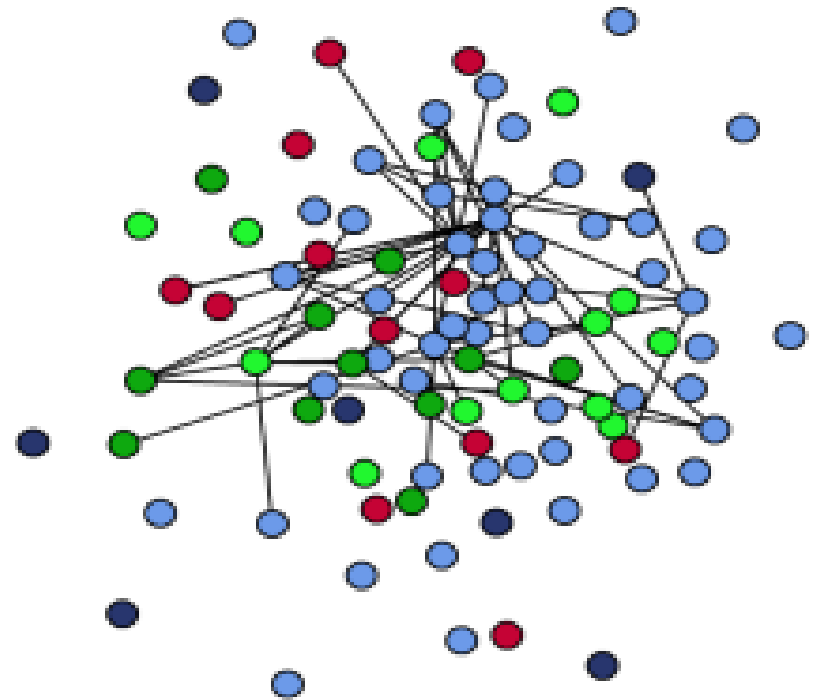
*"FRIEND OF A FRIEND"*

# Density

High Density

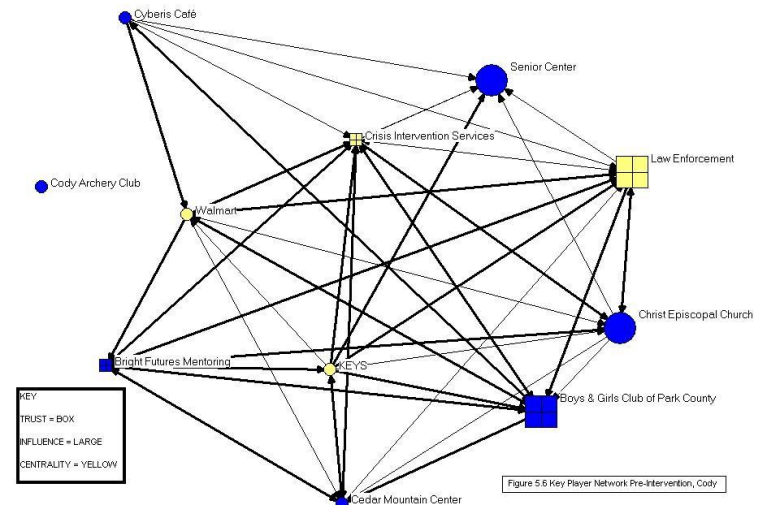
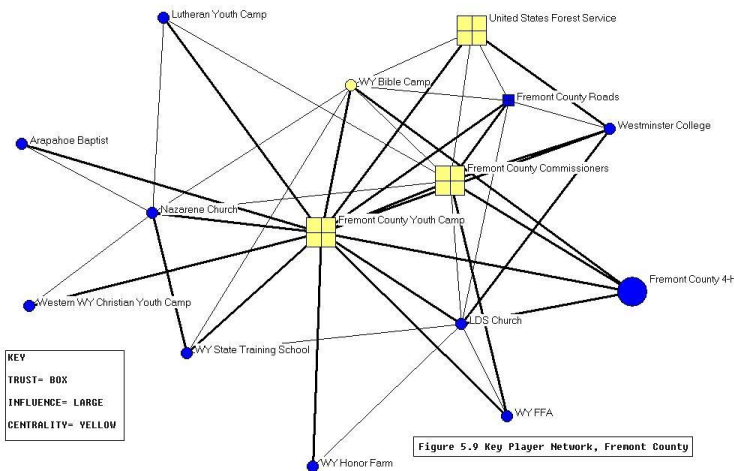


Low Density



# Centralization

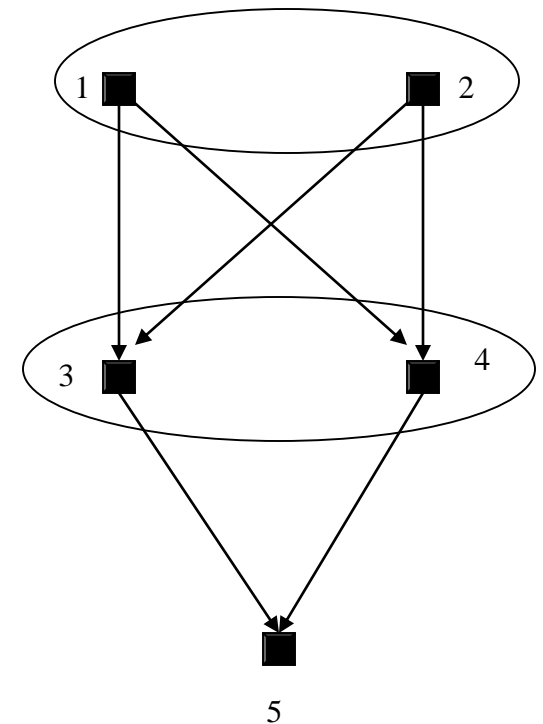
- ▶ Extent to which a network revolves around a single node
- ▶ Most networks start out centralized, become decentralized over time



# Structural Equivalence

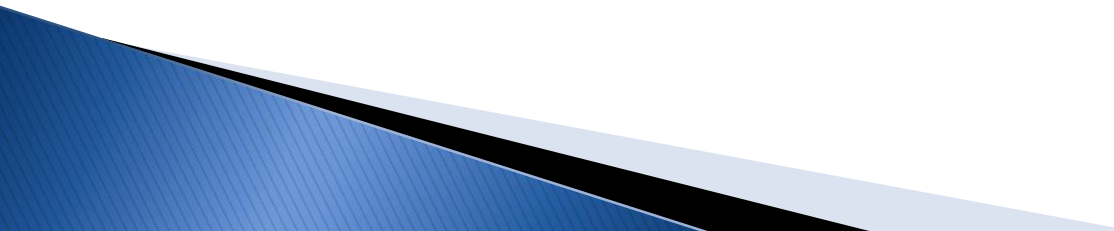
- Structural Equivalence measured by Correlation Coefficient
- All ties from one actor are equivalent to the other
- If they are structurally equivalent, then they are *substitutable*

Sociomatrix					
	1	2	3	4	5
1	-	0	1	1	0
2	0	-	1	1	0
3	0	0	-	0	1
4	0	0	0	-	1
5	0	0	0	0	-



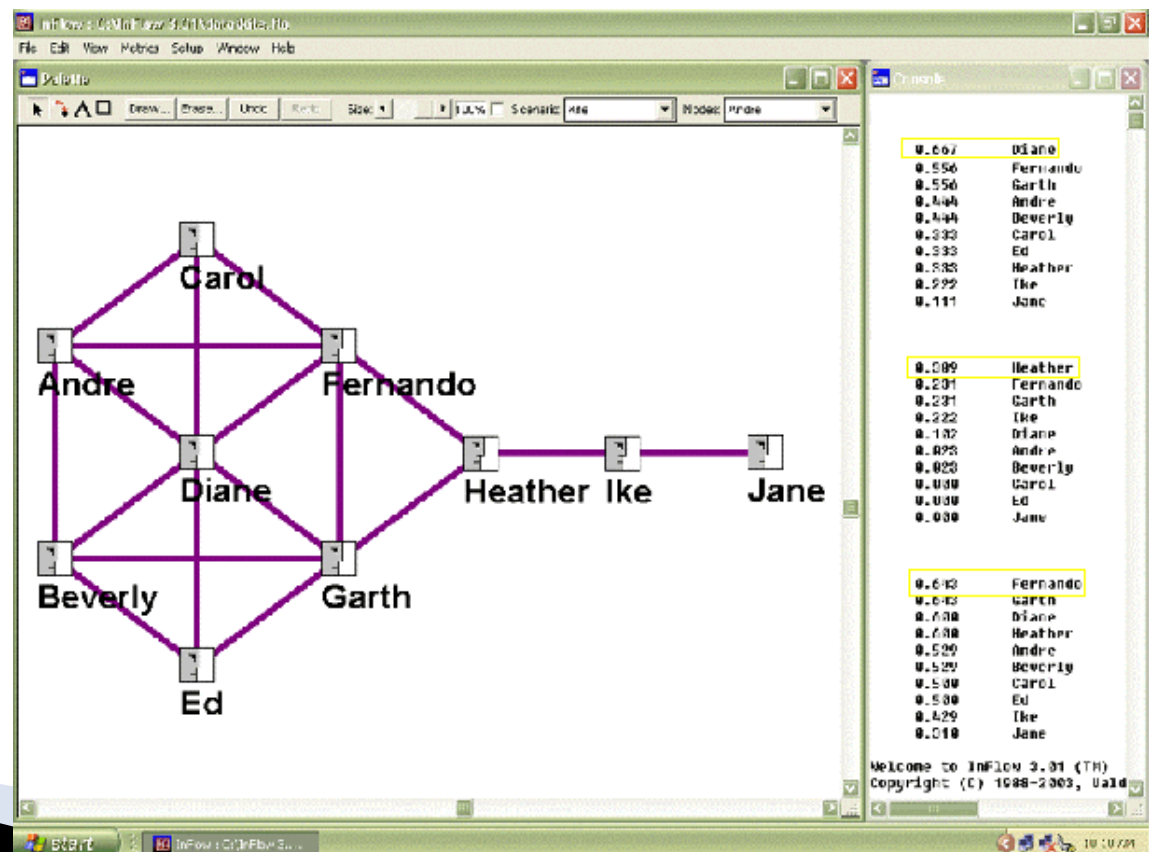


# Measures to Describe Ties

- ▶ Indirect Links
  - ▶ Frequency
  - ▶ Multiplexity
  - ▶ Strength
  - ▶ Direction
  - ▶ Symmetry (Reciprocity)
- 

# Measures to Describe Individual Actors

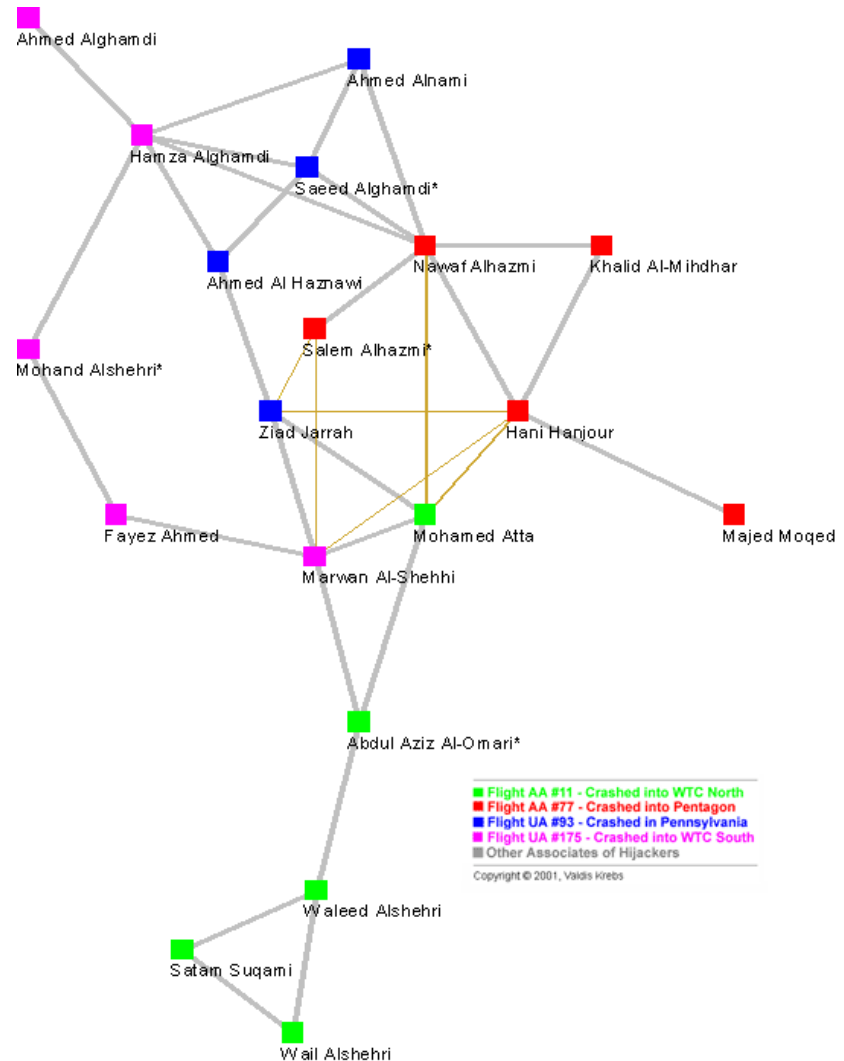
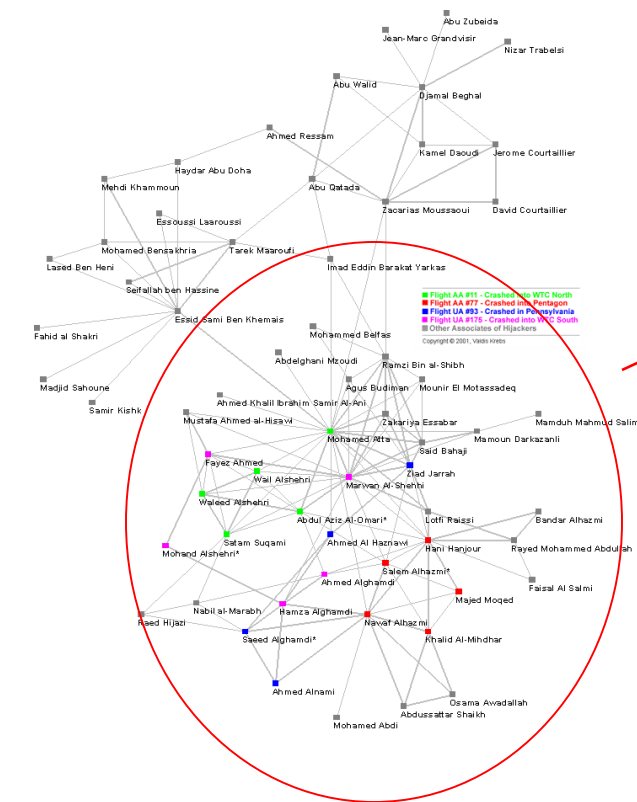
- ▶ Degree
- ▶ In-Degree
- ▶ Out-Degree
- ▶ Centrality



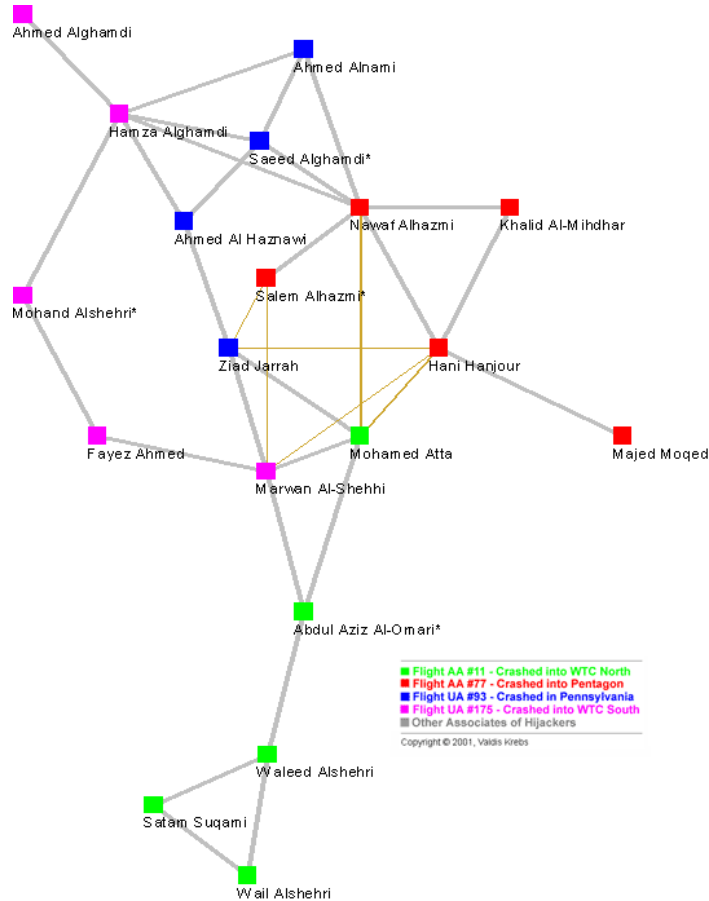
## A decorative graphic on the left side of the slide, featuring a blue textured area that tapers to the right, meeting a black diagonal line. To the right of this line is a light blue area. In the upper right corner, there is a small network diagram with four nodes: Ahmed Alnami, Abdussattar Shaikh, Osama Awadallah, and Mohamed Abdi. Lines connect Ahmed Alnami to Abdussattar Shaikh, and Abdussattar Shaikh to both Osama Awadallah and Mohamed Abdi.



# The 9-11 Terrorist Network



# The Terrorist Network

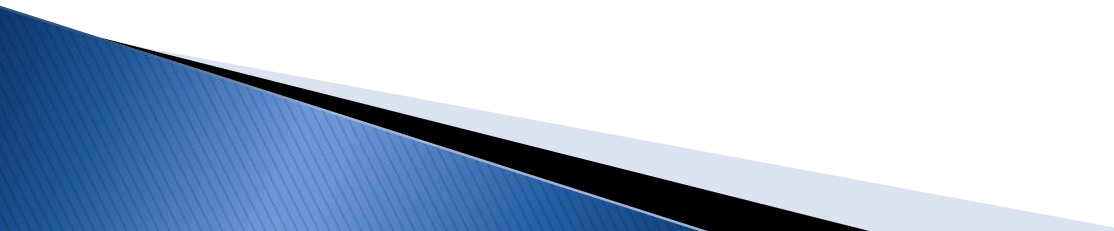


Degree		Betweenness		Closeness	
0.361	Mohamed Atta	0.588	Mohamed Atta	0.587	Mohamed Atta
0.295	Marwan Al-Shehhi	0.252	Essid Sami Ben Khemais	0.466	Marwan Al-Shehhi
0.213	Hani Hanjour	0.232	Zacarias Moussaoui	0.445	Hani Hanjour
0.180	Essid Sami Ben Khemais	0.154	Nawaf Alhazmi	0.442	Nawaf Alhazmi

# Inferential Network Analysis



# Can We Use Networks to Explain Behaviors?

- ▶ H1. Individuals who report communicating with one another are also perceived by others in the network to communicate with one another.
  - ▶ H2. Individuals who are in similar positions within the emergent communication network are also perceived by others in the network to communicate with one another.
- 

# QAP: Quadratic Assignment Procedure

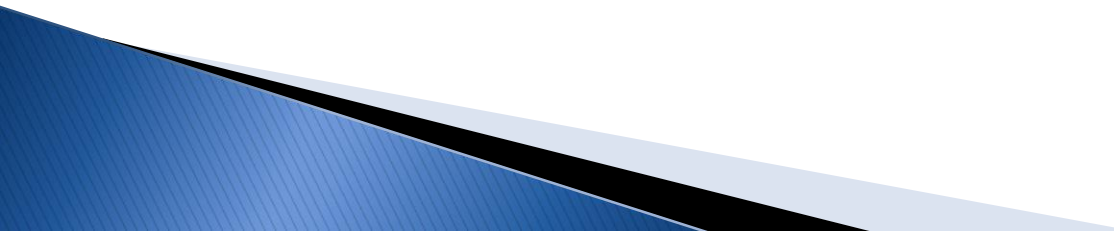
- ▶ Pearson's correlation coefficient between corresponding cells of the two data matrices.
- ▶ Columns and rows are randomly permuted and the correlations are recomputed.
  - This happens hundreds (or thousands, 5000 in this example) of times in order to compute the proportion of instances when a random measure will be larger than or equal to the observed measure.
- ▶ A low proportion ( $< 0.05$ ) suggests a strong relationship between the matrices that is unlikely to have occurred by chance.

# ERGM's (Exponential Random Graph Models)

- ▶ A way to identify whether a “structural signature” is likely to occur in your network.
- ▶ Methods uses modeling of random networks to look for the probability of a “signature” occurring.
- ▶ “Signatures” are algorithms established by methodologists in the field (around 17 validated at this time).
  - Most often done in R.

# How Can You Do SNA? Data Collection and Management in SNA projects

# Steps to SNA Study

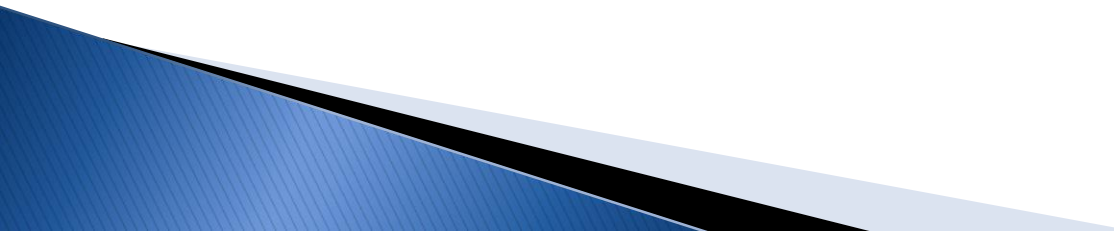
1. Identify the population
    - Bounding the network, gaining access
  2. Determine the data sources
    - Archival, interviews, observations, surveys
  3. Collect the data
    - Survey design
- 

# Step 1: Identify the Population

- ▶ Probably the most difficult part of preparing a network analysis
- ▶ Is the question: What is the network?
- ▶ What are the network boundaries?
  - Natural boundary?
  - Attribute based?
  - Relational based?
  - Formally based?
- ▶ Gaining Access
  - It helps to have help from a network member
  - Presenting to the group ahead of time increases response rate



# Step 2: Determine Data Sources

- ▶ Archival Data
    - Covert Networks
    - Citation Networks
    - Meeting Minutes
  - ▶ Surveys
    - Online
    - Paper
    - Interviews
  - ▶ Observations
  - ▶ Data Mining
- 

# Sampling

- ▶ Can you use a sampling method to study complete networks? In general, the answer is no.
  - Exception: Egocentric
- ▶ However, certain kinds of hypotheses can be tested with sample data. For example, it is possible to estimate the density of a network by looking at ties among a sample of nodes.

# Step 3: Collect the Data

- ▶ What questions will you ask?
  - It depends?
- ▶ How will you format your survey?
  - Paper vs. Online
  - Open-Ended vs. Closed List
- ▶ Ethnography helps

# Data Collection

- ▶ **Relation-based:** starts with a relation of interest, such as emotional support, and then asks all the people that the respondent has this particular relationship with.
  - “Which of your fellow employees do you obtain emotion support from?”
- ▶ **Affiliation-Based:** asks people to identify others that they know through a specific affiliation.
  - “Which of the following people do you go to church with.”
  - “Which of the following people do you work with?”

# Data Collection

## ▶ Name Generator.

- unlimited in scope: the respondent may name anyone from any sphere of life: neighbors, kin, friends, coworkers, etc.
- After obtaining a large list of names, the interviewer typically goes over each name, asking the respondent about the nature of their relationship with that person (what social relation) and asking about attributes of that person (sex, race, income, etc.).

## ▶ Bounded List

- Pre-defined list
- Entire network must be identified before data collection starts
- Sometimes boundaries are clear (e.g. classrooms, organizational departments)
- Sometimes not clear; might need to implement name generator approach first

# Whole Network

## Data Collection Methods

### ▶ Questionnaires.

- Row-based: each questionnaire forms one row in the adjacency matrix of the group as a whole.
- Use the whole matrix analytically
- Each row obtained from a different source
- Each could have its own measurement idiosyncracies

### ▶ Wording Issues

- “Friendship” does not mean the same thing to everyone
- Provide clear definitions of relationship meaning



# Example Survey Questions: Name Generator

**Please list up to 10 people you go to for advice regarding important health care decisions?**

*Please write in the first and last name of each person.*

[illegible]

## Example Survey Questions: Bounded List

**Which of the following organizations do you refer clients to?**

*Please place an “X” in the box for organizations that can you refer clients to.*

[illegible]

# Example Survey Questions

Please answer the following question for each partner you selected in Question 10:

11. How frequently does your organization work with this organization/program/department on issues related to the goals of the NH Regional Network?

	Never/We only interact on issues unrelated to the collaborative	Once a year or less	About once a quarter	About once a month	Every Week	Every Day
Capital Area Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Center for Excellence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Greater Manchester Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater Nashua Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater Rockingham County Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lakes Region-Mount Washington Valley Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Monadnock Regional Network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
National Guard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

# Example Survey Questions

We are interested in determining whether various leaders from CITY know each other. Below you will find a list of names of coalition members with whom you may have come into contact during the last six months. Please check the box which best represents how often you communicated with each person in the last six months (e.g. in writing, over the phone, face-to-face, or in meetings). If you don't know the person, check the box marked "Don't Know Person."

	<u>Don't Know</u> <u>Person</u>	<u>Not at</u> <u>All</u>	<u>Less than</u> <u>Monthly</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Daily</u>
1.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
2.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
3.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
4.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
5.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
6.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~

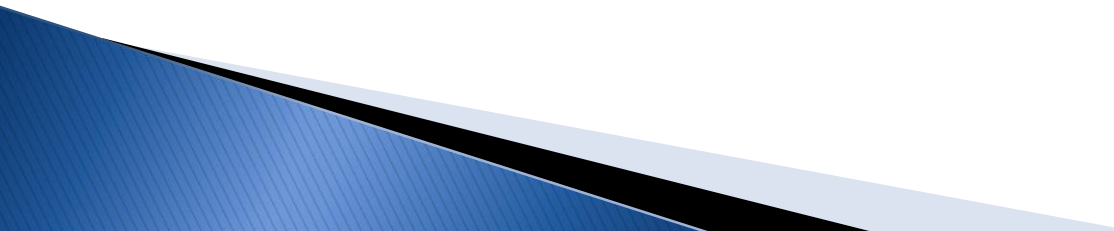
If you feel there is anyone that should be included in the above list, add his/her name in the space/s below

16.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
17.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
18.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
19.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~
20.	1 ~	2 ~	3 ~	4 ~	5 ~	6 ~

# Example Survey Questions

<b>WHO:</b> Name of other organization or 'group partnership'? Get specifics, e.g., dept or unit, location, contact name(s). Also note name of the partnership itself (if it has one).	<b>TIMING:</b> How long has the partnership been going? Is it <u>ongoing</u> vs. <u>past work</u> ? If ended, when and why?	<b>CONTENT:</b> What kinds of activities does the Partnership entail? Mark all that apply from response to question. Do <u>not</u> read each category below, but may use them to prompt respondent if having difficulty answering.	<b>ROLES:</b> Is there a lead agency or set of agencies in the partnership?	<b>RESOURCES:</b> Is there any dedicated funding for the Partnership, either within the partner organizations or from sources outside the Partnership? Focus on type of support (and sources for outside support), but not on amount of funding.	<b>OUTCOME:</b> How successful has it been and why? (specific to the individual partnership listed below)
# ____	a Years ____ b Months ____ 1 Ongoing 2 Ceased When & Why?	1 Conduct research      9 Tools Develop 2 Conference              10 Training 3 Educational program      11 Tech Assistance 4 Info Dissemination      12 Legal/Regul Change 5 Intellectual Exchang 13 New Technologies 6 Fund Research      14 Data Repositories 7 Standards Develop      15 Advocacy/Awareness 8 Guidelines Develop      16 Other: _____	1 No 2 Yes : _____ _____ _____	1 Monetary –either org 2 In-kind support only (default) 3 Monetary—outside source Source(s): _____ _____	1 Successful 2 Somewhat successful 3 Not successful 4 Too early to tell
Notes:					

# Issues with SNA Data

- ▶ Response Bias
  - ▶ Asymmetry
  - ▶ Missing Data
  - ▶ Accuracy
  - ▶ Ethics
- 



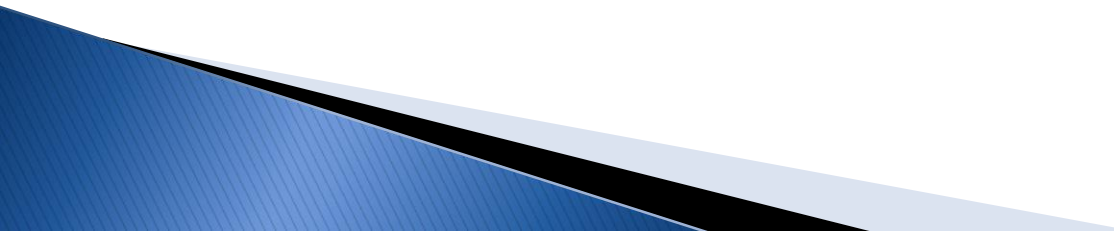
# Data Collection Limitations

- ▶ **Informant accuracy**
- ▶ Can people really tell you about their social networks? Marketing researchers have found that consumers can barely tell you what they had for lunch yesterday. Bernard, Killworth and Sailer investigated informant accuracy systematically and found that about 52% of what they said was wrong.
- ▶ Based on the work of Freeman, Freeman and Romney, as well D'Andrade, DeSoto, and many others, it appears that people's recall of their interactions with others is systematically biased toward what is normal and/or logical.

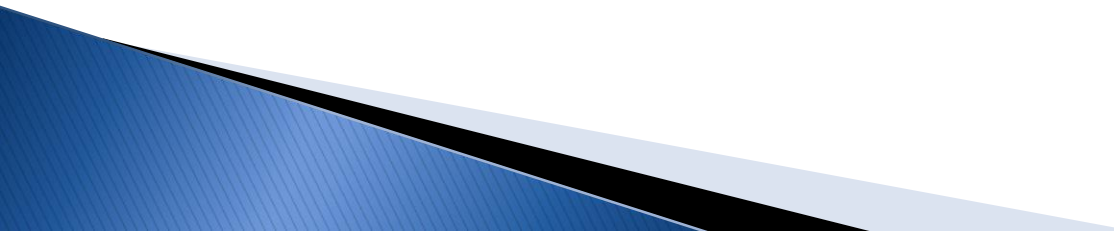
# Data Collection Limitations

- ▶ People also tend to remember interactions with people who are important, while forgetting interactions with people that are not.
- ▶ Some respondents will lie to make themselves look good, since people judge others on who they associate with.
- ▶ As with any questionnaire, there are also problems with how people interpret the questions. What "friend" means to one person may be very different from what "friend" means to others.

# Data Collection Limitations

- ▶ Can we “solve” this problem?
  - ▶ Krackhardt's solution to all this is to get everyone's opinion of everyone's relationship with everyone. So that if a person claims to be friends with everyone, but everyone else agrees that they are friends with no one, we have a clue that they might be lying or misunderstanding the question.
- 

# Ethical Issues

- ▶ Respondents cannot be anonymous
  - ▶ Non-respondents are still included
  - ▶ Missing data can be powerful
  - ▶ Data could be mis-interpreted
- 

# When to pick which method?

- ▶ Depends on what question you want to answer.
  - And what is available for data collection.
- ▶ Ego-Centric Questions
  - How do patients characterize their personal networks?
  - Do people with more intense friendships have better health outcomes?
- ▶ Whole network questions
  - How centralized is the network?
  - How active is the network?
  - What is exchanged in this network?

# Resources

# SNA Professional Organization (Sunbelt Conference)

► [www.INSNA.org](http://www.INSNA.org)

International Network for Social Network Analysis - Windows Internet Explorer

http://insna.org/

Google IKNOW noshir contractor Search Share Bookmarks Check Translate AutoFill IKNOW noshir Sign In

File Edit View Favorites Tools Help McAfee SiteAdvisor

2002 pop-up camper http://www.sna.unimelb.edu... International Network for... Hotmail - dvogen@hotmail.co...

## INTERNATIONAL NETWORK FOR SOCIAL NETWORK ANALYSIS

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### Featured Members

Picture Not Available	Picture Not Available
<a href="#">Douthwaite, Joss</a> Health and Social Services	<a href="#">Ramasco, Jose Javier</a> ISI Foundation

### Featured Bibliographic References

Opsahl, T. & Hogan, B. (2010). Growth mechanisms in continuously-observed networks: Communication in a Facebook-like community. *arXiv:1010.2141*

Seierstad, C. & Opsahl, T. (2011). For the few not the many? The effects of affirmative action on presence, prominence, and social capital of female directors in Norway. *Scandinavian Journal of Management*, 27 (1).

INSNA proudly announces the election of two of our members, H. Russell (Russ) Bernard and Larissa A. Lomnitz to The National Academy of Sciences.

[Click Here](#) for more information.

### Recent INSNA News

March 24, 2011	Website Update to fix Bibliography Search	0 comments
March 10, 2011	Sunbelt XXXI 2011 Video Files Posted	0 comments
February 21, 2011	Sunbelt XXXI Conference Abstract PDF Updated	0 comments
February 01, 2011	Sunbelt XXXI Conference Updated Program Posted	0 comments
January 25, 2011	Sunbelt XXXI Workshop Registration Deadline Extension	0 comments

### CONNECTIONS

Volume 30 Issue 2 - 2010

#### Cover

#### Structural Redundancy and Multiplicity in Corporate Networks

Barnes, Roy  
Burkett, Tracy

This research presents an intuitive and straight forward method of capturing both structural redundancy and the multiplicity of social ties in a small network of 20 corporate directors across four dif...

#### A Configurational Approach to Homophily Using Lattice Visualization

Schaefer, David, R

This research approaches homophily as a multidimensional concept and uses combinatorial logic to investigate the patterns of homophily that exist in relations from different substructures. Particular ...

#### What You Believe Travels Differently: Information and Infection Dynamics Across Sub-Networks

Grim, Patrick  
Reade, Christopher  
Singer, Daniel, J.  
Fisher, Steven

### Sunbelt XXXI

St. Pete Beach, FL, USA  
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# Comprehensive List of Courses

- ▶ <http://socialnetworkcourses.wordpress.com/2010/11/11/list-of-snsna-courses/>



Home About Christopher (Rusty) Tunnard

## List of SN/SNA Courses

Here's a link to a spreadsheet list of undergraduate and graduate courses on social networks and social network analysis that I compiled in the fall of 2010. I don't intend to update it, but hopefully someone from the INSNA (International Network of Social Network Analysts) will post it on their website and allow people to add and amend courses.

The short answer: 91 courses (that I could find) and growing.

Social Network Courses as of October 2010

Ads by Google  
**Email Marketing Webinar**  
Increase Lead Generation with Email Free Webinar,  
Sign-up Now.  
[www.HubSpot.com](http://www.HubSpot.com)

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**Facebook HHL**  
journals learning outcomes  
**Media Online**  
**Social**

# Office of Behavioral and Social Sciences Research

- ▶ [http://obssr.od.nih.gov/scientific\\_areas/methodology/systems\\_science/index.aspx](http://obssr.od.nih.gov/scientific_areas/methodology/systems_science/index.aspx)

U. S. Department of Health & Human Services [www.hhs.gov](http://www.hhs.gov)

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**METHODOLOGY**

Community Based Participatory Research

Systems Science

**NEWS**

[National Collaborative on Childhood Obesity Research \(NCCOR\) Catalog of Surveillance Systems](#)

["Doctor in the Pocket" Aims to Increase Exercise in Overweight Youth](#)

[The 'contagion' of social networks](#)

[NIH Seeks to Break New Ground in Reducing Health Disparities](#)

[Home](#) > [Scientific Areas](#) > [Methodology](#) > Systems Science

## Systems Science

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- [Funding Opportunity Announcements in Systems Science](#)
- [Systems Science Videocasts and Slide Presentations](#)
- [Systems Science and Health Resources](#)
- [Institute on Systems Science and Health \(ISSH\)](#)
- [Behavioral and Social Sciences \(BSSR\)-Systems Science Listserve](#)

### Background

There is a growing recognition that most major threats to the public's health - including cardiovascular disease, pulmonary disease, cancer, diabetes, mental health problems, HIV, substance abuse, violence, emerging infectious diseases, obesity, sedentary lifestyle, poor diet, sleep disorders, and more—are complex in the sense that each one arises from an intricate mix of behavioral, economic and social factors interacting with biological factors, as well as each other, over the lifespan and across an array of settings (e.g., home, school, workplace, neighborhood, etc.). For example, tobacco use and successful cessation are influenced by a host of interrelated factors, including: the tobacco product itself (e.g., percent free-base nicotine content,

# List of Recommended Readings

- ▶ [http://obssr.od.nih.gov/pdf/valente\\_recomen\\_readings.pdf](http://obssr.od.nih.gov/pdf/valente_recomen_readings.pdf)

## Recommended Reading on Network Analysis - Valente

Barabási, A-L. (2002). Linked: The new science of networks. Cambridge MA: Perseus

Bearman PS, Jones J, & Udry JR. The National Longitudinal Study of Adolescent Health: Research Design. Available from: [URL: http://www.cpcp.unc.edu/projects/addhealth/design.html](http://www.cpcp.unc.edu/projects/addhealth/design.html)

Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2005). Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

Brandes, U., & Erlebach, T. (2005). Network analysis: Methodological foundations. Berlin, Germany: Springer.

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Coleman, J. S., Katz, E., & Menzel, H. (1966). Medical Innovation: A Diffusion Study. New York: Bobbs Merrill.

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Degene, A. & Forse, M. (1999). Introducing social networks (Translated by A. Borges). Thousand Oaks,

# UCINET

► <http://www.analytictech.com/ucinet/>



Home | [Versions](#) | [Purchase now](#) | [Documentation](#) | [Analytic Technologies](#) | [Support](#)

Overview	<h2>Welcome to the UCINET website</h2> <p>UCINET is a social network analysis program developed by <a href="#">Steve Borgatti</a>, <a href="#">Martin Everett</a> and <a href="#">Lin Freeman</a>. The program is distributed by <a href="#">Analytic Technologies</a>. UCINET works in tandem with freeware program called NETDRAW for visualizing networks. NETDRAW is installed automatically with UCINET.</p> <p>A <a href="#">free trial version</a> is available (very useful for giving workshops!). The trial version is identical to the regular version -- except that it has an expiration data. We also offer deep discounts for students and site licenses (click on <a href="#">pricing</a> for more information). The program may be <a href="#">purchased online</a>.</p> <p>For documentation, <a href="#">tech support</a>, and so on, visit the <a href="#">learning page</a>.</p> <p>Click on <a href="#">overview</a> to learn more.</p> <p style="text-align: right;"><a href="#">more ...</a></p>
Downloading	
Purchasing	
Updating	
Learning	
Contact	



# Online SNA Text (UCINET)

- ▶ <http://www.faculty.ucr.edu/~hanneman/nettext/>

---

Robert A. Hanneman and Mark Riddle

Introduction to social network methods

Table of contents

---

About this book

This on-line textbook introduces many of the basics of formal approaches to the analysis of social networks. The text relies heavily on the work of Freeman, Borgatti, and Ever (authors of the UCINET software package). The materials here, and their organization, were also very strongly influenced by the text of Wasserman and Faust, and by a graduate seminar conducted by Professor Phillip Bonacich at UCLA. Many other users have also made very helpful comments and suggestions based on the first version. Errors and omissions, of course, are the responsibility of the authors.

You are invited to use and redistribute this text freely -- but please acknowledge the source.

Hanneman, Robert A. and Mark Riddle. 2005. [Introduction to social network methods](http://www.faculty.ucr.edu/~hanneman/). Riverside, CA: University of California, Riverside ( published in digital form at <http://faculty.ucr.edu/~hanneman/> )

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[3. Using graphs to represent social relations](#)

[4. Working with Netdraw to visualize graphs](#)

[5. Using matrices to represent social relations](#)

[6. Working with network data](#)

[7. Connection](#)

[8. Embedding](#)

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# PARTNER

## (Program to Analyze, Record, and Track Networks to Enhance Relationships)

► [www.partnertool.net](http://www.partnertool.net)



The screenshot shows the PARTNER website homepage. The header features a globe icon with network lines and the title 'PARTNER' with the subtitle 'Program to Analyze, Record, and Track Networks to Enhance Relationships'. A navigation bar includes links for HOME, ABOUT, RESOURCES, SUPPORT, ANALYSIS TOOL, SURVEY, and CONTACT. The main content area describes the tool's purpose and provides a 'register' link. A 'Benefits' section is highlighted with an image of hands and a list of three points. The right sidebar contains sections for 'Projects', 'Web Demos: Using PARTNER', 'Upcoming Demos' (with a demo icon and RSVP information), and 'Meet Danielle Varda' (with a photo and bio).

**PARTNER**  
Program to Analyze, Record, and Track Networks to Enhance Relationships

HOME ABOUT RESOURCES SUPPORT ANALYSIS TOOL SURVEY CONTACT

PARTNER is a social network analysis tool designed to measure and monitor collaboration among people/organizations over time. The tool is designed for use by members of a collaborative (that is, three or more partners) to demonstrate how members are connected, how resources are leveraged and exchanged, the levels of trust, and to link outcomes to the process of collaboration. The tool includes an online survey that you can administer to collect data and an analysis program that analyzes these data.

PARTNER is a free tool and demonstrations of how to use it are provided to help you get started. Various levels of [consulting](#) are available to help you collect and analyze data, report your findings, and strategize action steps for improvement.

To get started, [register](#) as a "Manager" here.

**Benefits**

1. Evaluate how well your collaborative is working in terms of identifying the "right" partners, leveraging resources, and strategizing for how to improve the work of the collaborative.
2. Demonstrate to partners, stakeholders, evaluators, and funders how your collaborative is progressing over time and why working together is making tangible change.
3. Engage in strategic collaborative management to develop action steps and implement change to reap the benefits of social networking.

**Projects**

**Web Demos: Using PARTNER**

**Upcoming Demos**

Live PARTNER Demos are available to help you get started in taking advantage of the PARTNER tool.

To RSVP please [contact Dr. Varda](#).

**Meet Danielle Varda**

The PARTNER tool was developed by Dr. Danielle M. Varda, an Assistant Professor at the School

# Questions?

[danielle.varda@ucdenver.edu](mailto:danielle.varda@ucdenver.edu)