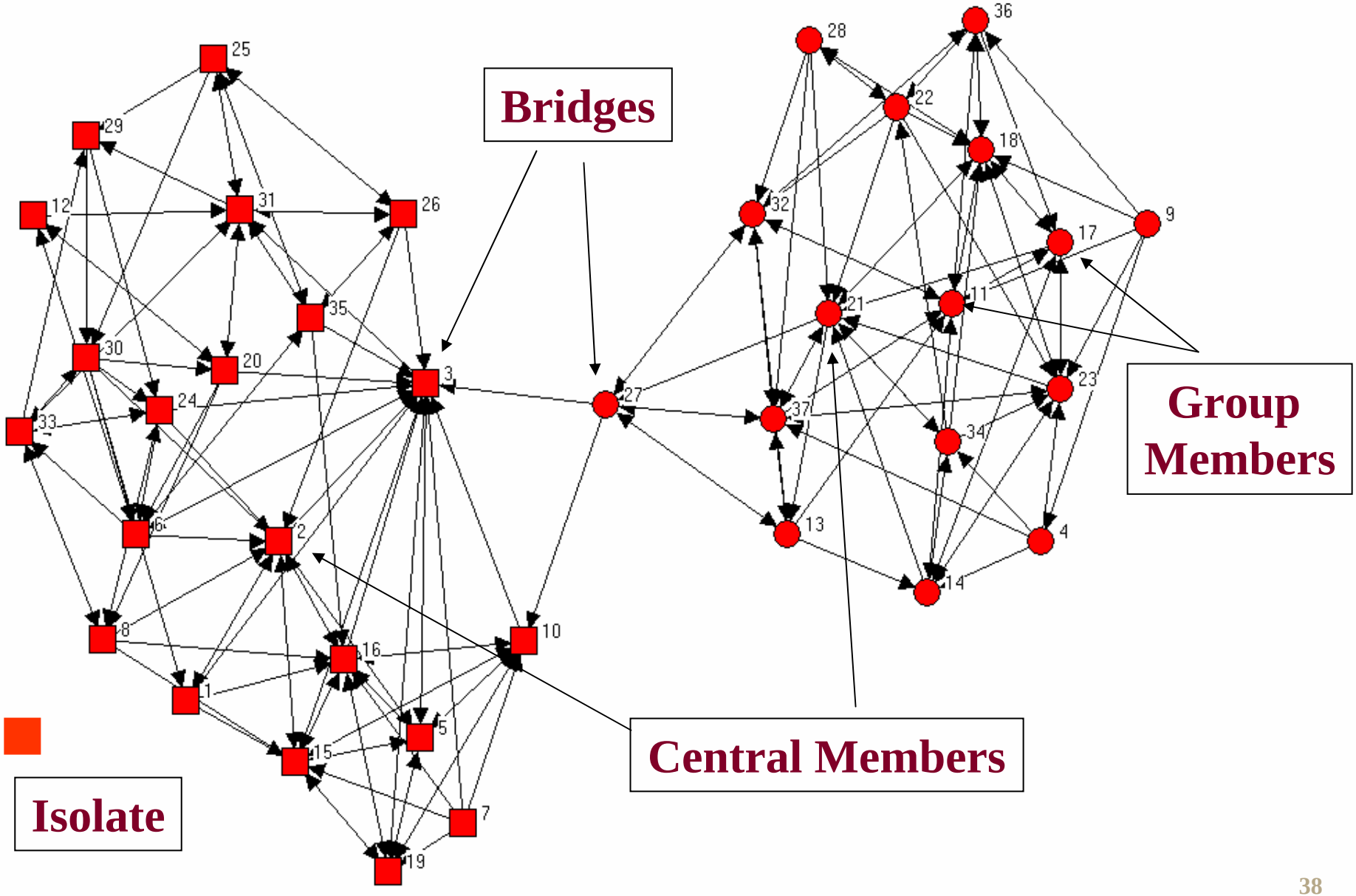
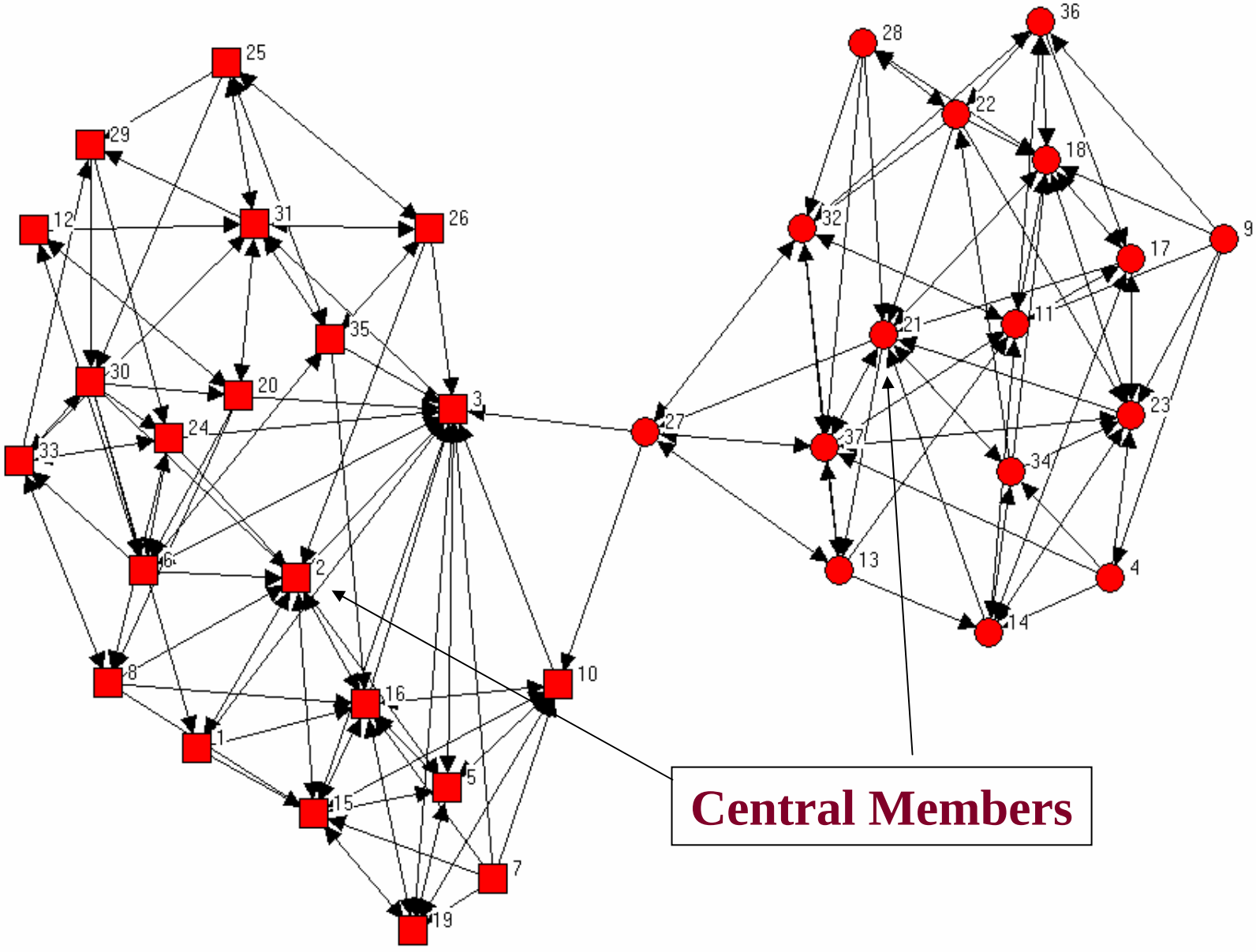
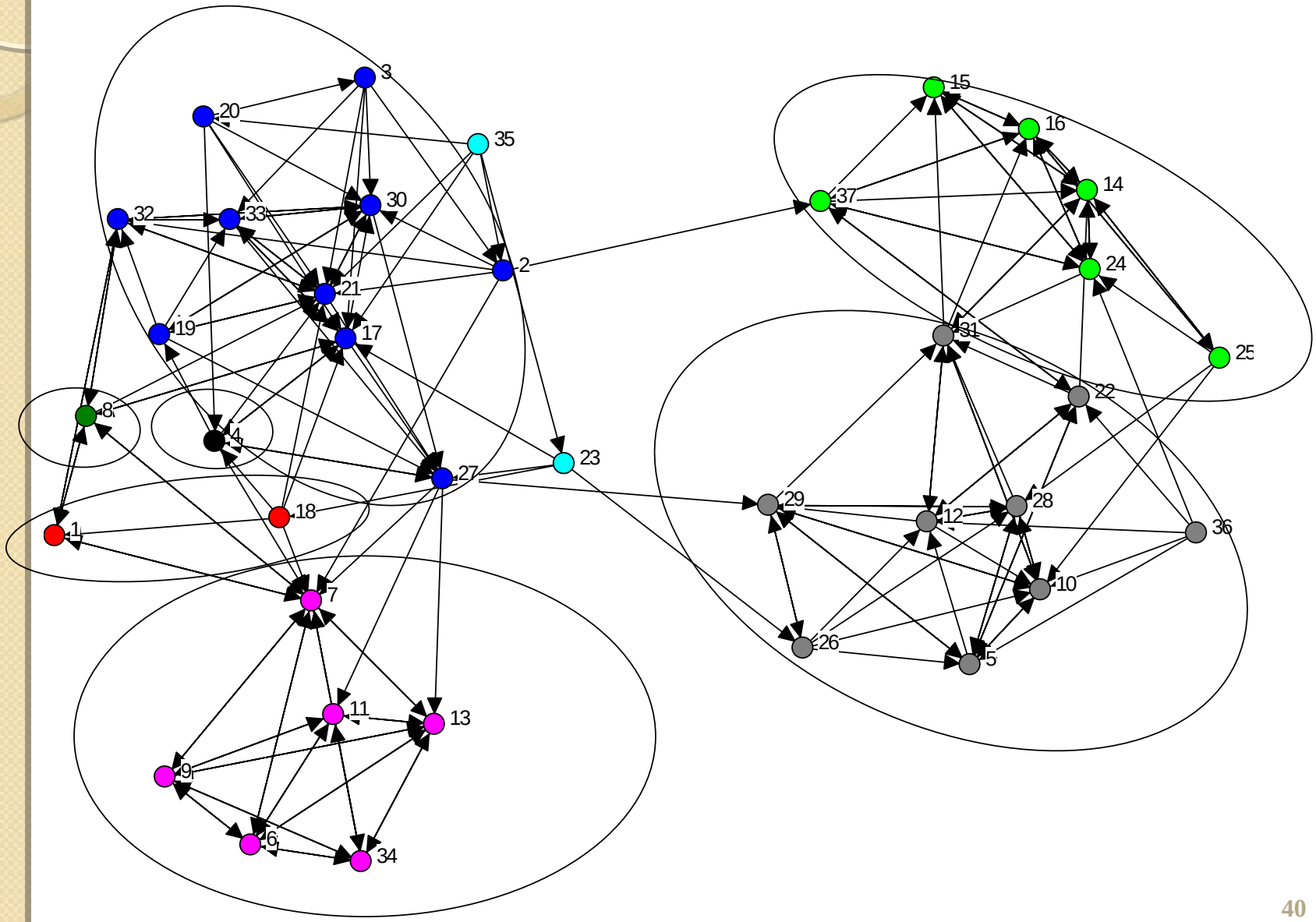
Network Positions



Central Members act as Opinion Leaders

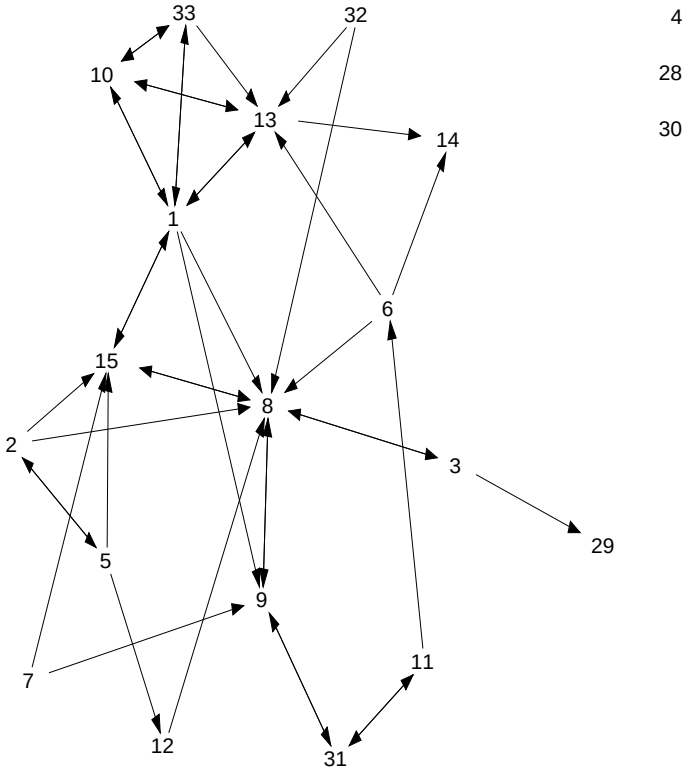


Subgroups within the Network



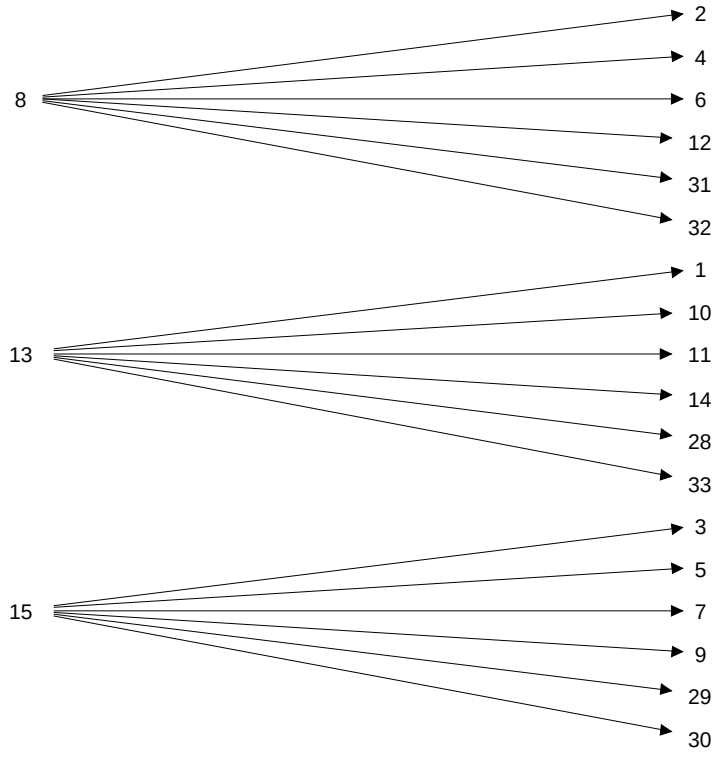
Matching Leaders to Groups

Sociogram based on ties



1(a)

Optimal leader/learner matching



1(b)

Comparison of 3 Conditions

Condition	Description
Opinion Leader & Random	Leaders chosen by students and randomly assigned to groups
Teacher	Leaders and their groups are defined by the teacher
Networked	Leaders chosen by students and assigned to groups of students that chose them

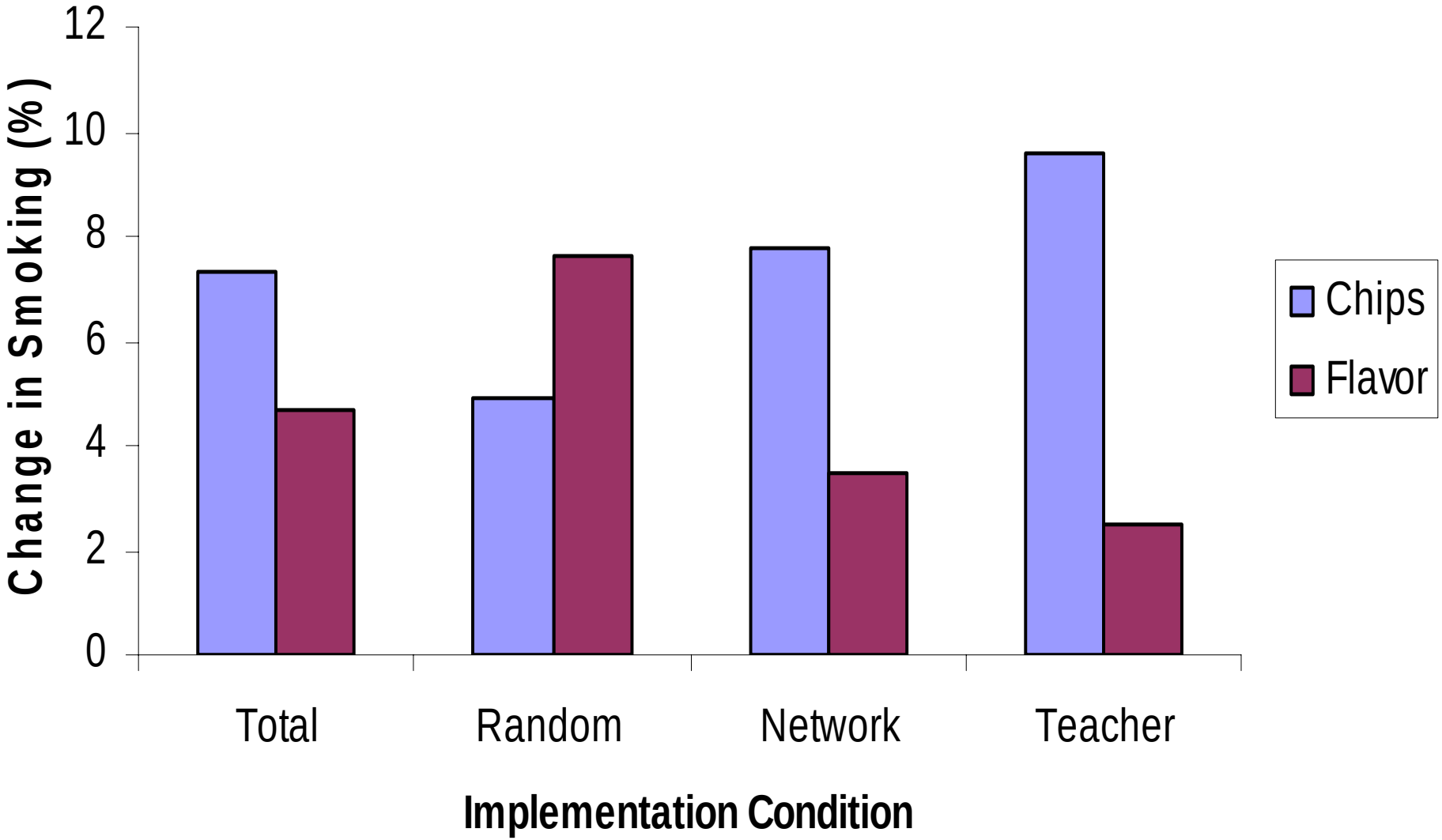
Study Design

	Chips			Flavor			Total
Schools	**8**			**8**			**16**
	Opinion Leader	Teacher	Network	Opinion Leader	Teacher	Network	
Classes	**15**	**12**	**13**	**16**	**16**	**15**	**87**
Students	**359**	**281**	**310**	**363**	**349**	**298**	**1960**

Regression Results on Post Program Attitudes (Lower Scores Better, Beta Coefficients)

	Smoking Attitude	Self Efficacy	Social Cnsquencs	Intention To Smoke AOR
OL /Random	Ref.	Ref.	Ref.	Ref.
Teacher	-0.04	0.01	0.0	0.95
Network	**-0.07***	**-0.09****	**-0.01**	**0.44*****
Network* FLAVOR	0.06	0.04	0.01	2.17*
R^2	39	29	31	

1-Year Change in Smoking by Curricula & Implementation Condition



TND Network

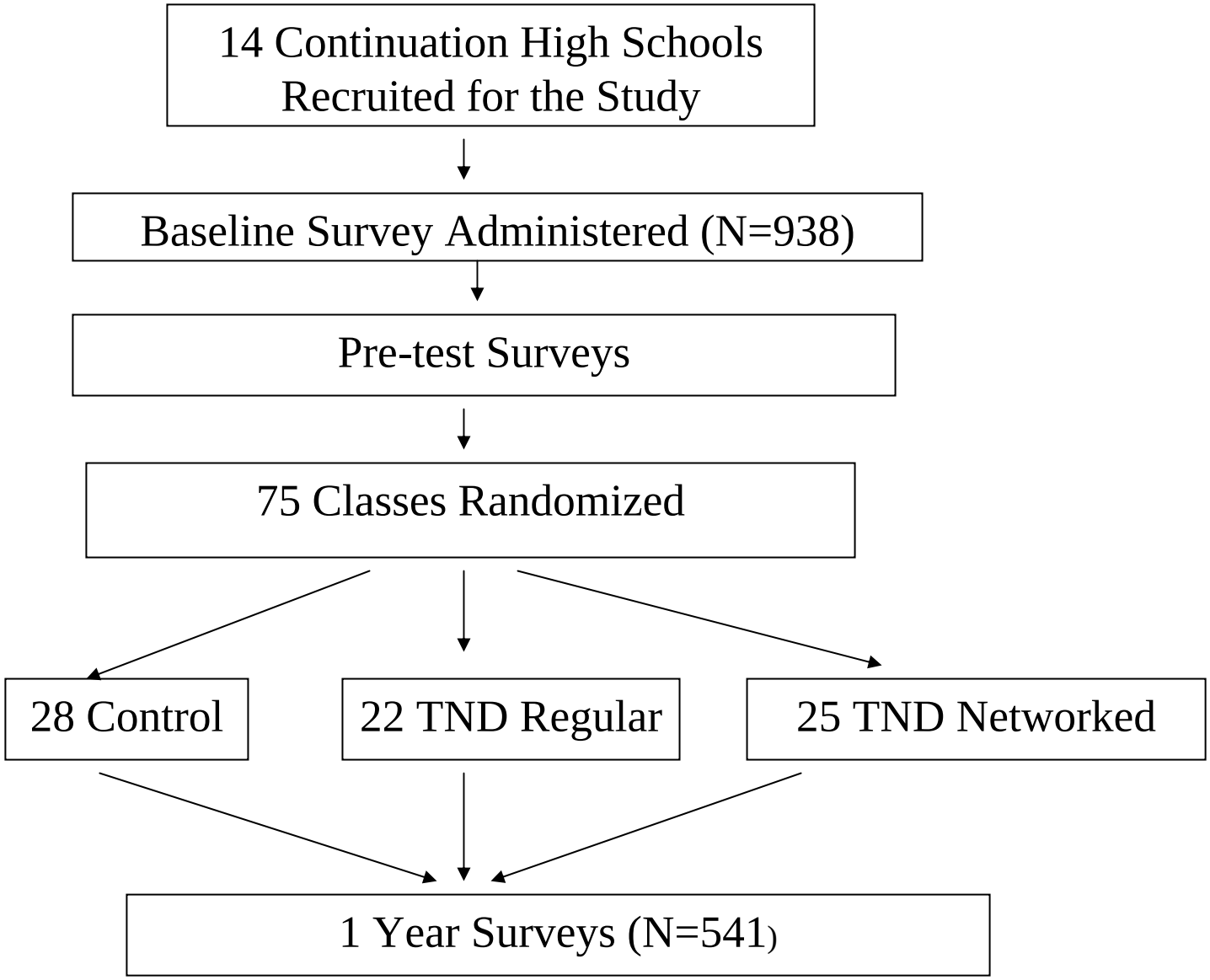
Background

- TND – evidence based program for reducing substance abuse among adolescents in school.
- TND Network – modified TND to be more interactive, led by trained peer opinion leaders.

Objectives

- Determine whether TND Network was effective at reducing current use
- Would it create deviancy training?

Study Design



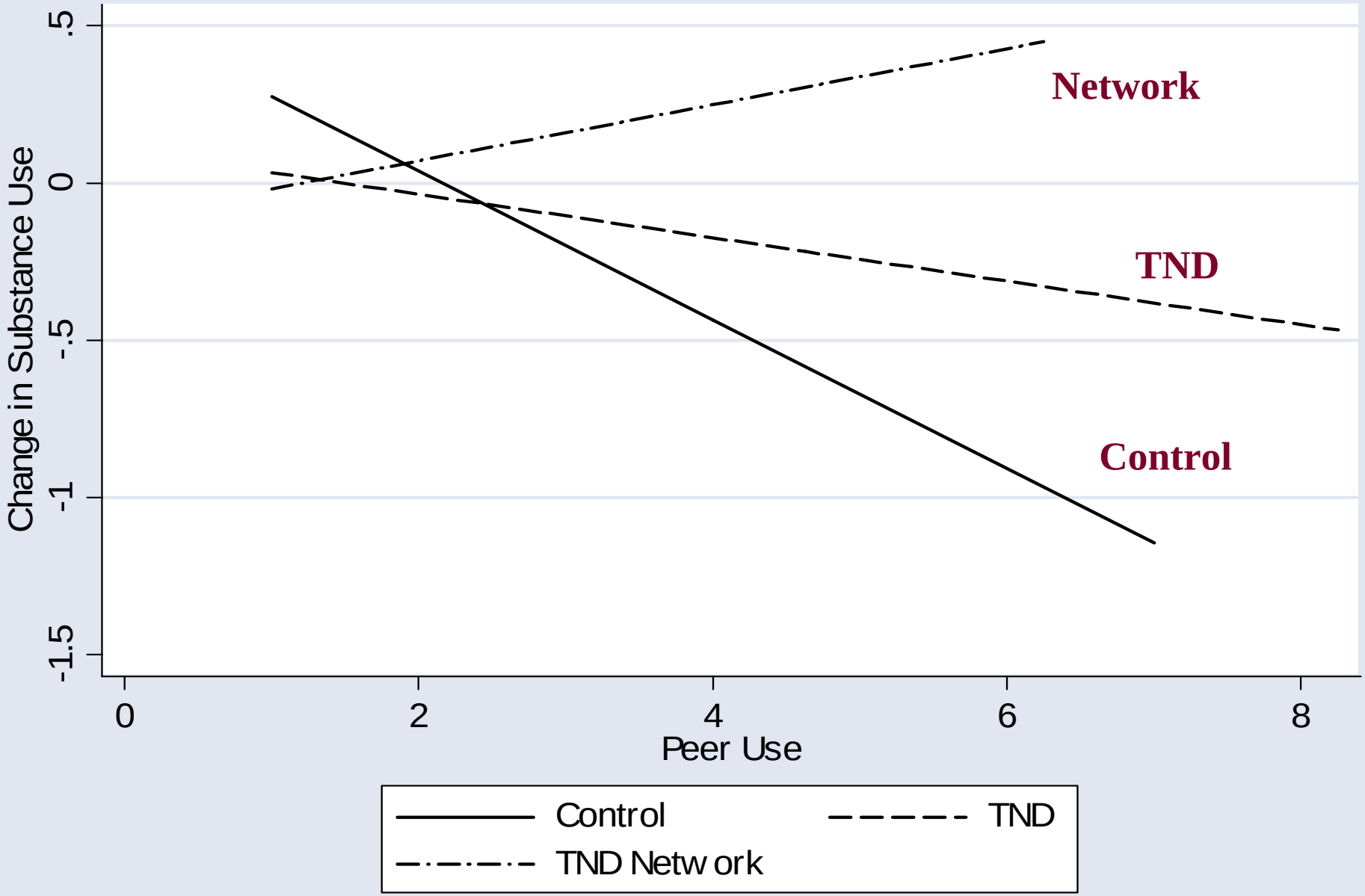
Associations (β Coefficients) for Study Conditions on Current Substance Use

	Tobacco	Alcohol	Marijuana	Drugs	Total
TND	0.07	0.21	0.09	0.03	0.06
Network	-0.40	-0.23	-0.64**	-0.37**	-0.37**
Network* Peer Use	0.16	0.25	0.34*	0.28*	0.19**

*p<0.05; **p<0.01

Regression controls for baseline level, age, grade, gender, ethnicity, # friends, # friends in school, ties sent, ties received, social support, # friends who engage in behavior.

TND Network Increased Substance Use for Students with Peer Users



Network Interventions (cont.) Rewiring Networks

- Make more cohesive by selecting links to add or change
- Optimize the network on other properties such as centralization or clustering.
- Find links or nodes that need support

Bridges & Potential Bridges

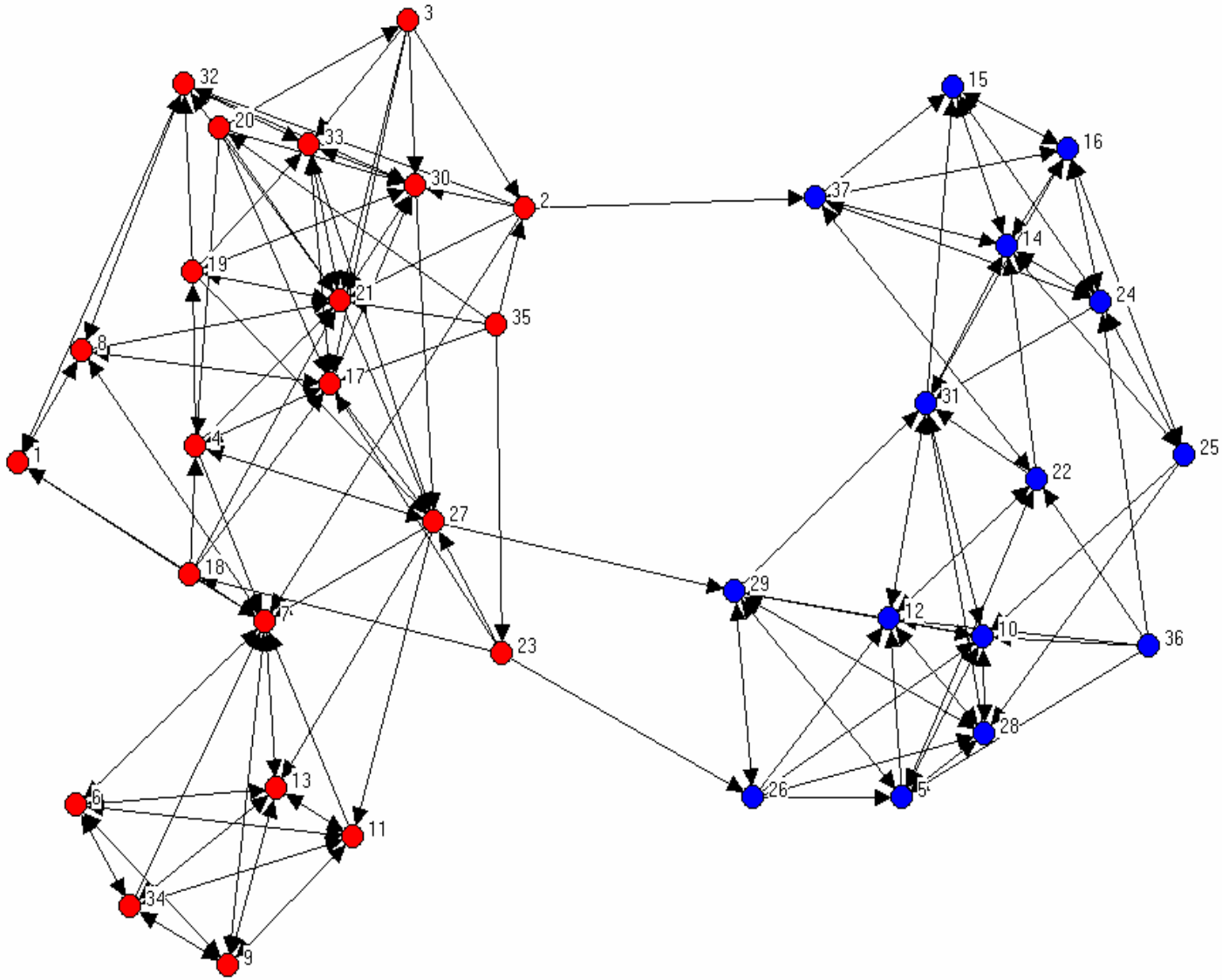
Bridges

- Systematically delete each link
- Calculate change in APL
- Sort links by the degree of change

Potential Bridges

- Systematically add each possible link
- Calculate change in APL
- Sort links by the degree of change

Friendship Links in 1 Class



Link Changes that Maximally Affect Network

Link Deletions that Fragment the Network

2.00	37.00	1.00	0.00	0.01
37.00	2.00	1.00	0.00	0.01
27.00	29.00	1.00	0.00	0.01
29.00	27.00	1.00	0.00	0.01
7.00	2.00	1.00	0.00	0.00
2.00	7.00	1.00	0.00	0.00
23.00	26.00	1.00	0.00	0.00
26.00	23.00	1.00	0.00	0.00
29.00	31.00	1.00	0.00	0.00
31.00	29.00	1.00	0.00	0.00

Link Additions that Make Network More Cohesive

7.00	31.00	0.00	1.00	-0.01
31.00	7.00	0.00	1.00	-0.01
7.00	24.00	0.00	1.00	-0.01
24.00	7.00	0.00	1.00	-0.01
14.00	7.00	0.00	1.00	-0.01
7.00	14.00	0.00	1.00	-0.01
25.00	7.00	0.00	1.00	-0.01
7.00	25.00	0.00	1.00	-0.01
7.00	10.00	0.00	1.00	-0.01
10.00	7.00	0.00	1.00	-0.01

Bridging Nodes

Measure	Top Five				
Betweenness	27	29	7	31	8
Bridge	27	29	26	2	7
Bridge From	27	29	7	2	31
Bridge To	29	26	2	3	8
Potential Bridge From	31	14	10	16	12
Potential Bridge To	35	20	23	3	21
Potential Bridge	31	14	16	35	12

Issues

- Simply re-wiring links will probably not work easily
- Networks are as they are
- Network dynamics – people come and go and this will affect overall network properties

Summary

- Social networks influence how behaviors are perceived and adopted.
- Network effects exist at the individual, organizational, and community levels.
- There is are individual-network interactive effects.
- Network theories and methods can be used for health interventions.

Summary (2)

- The effects are non-linear and may be counter-intuitive
  - Thresholds not mere exposure.
  - Coalition density impeded adoption indicating network structural influences not linear.
  - Network based interventions are promising new area of development but may interact with the type of intervention.

A New Paradigm

- Science of networks and behavior starting to develop.
- This science can be applied to many arenas in health care delivery and public health.