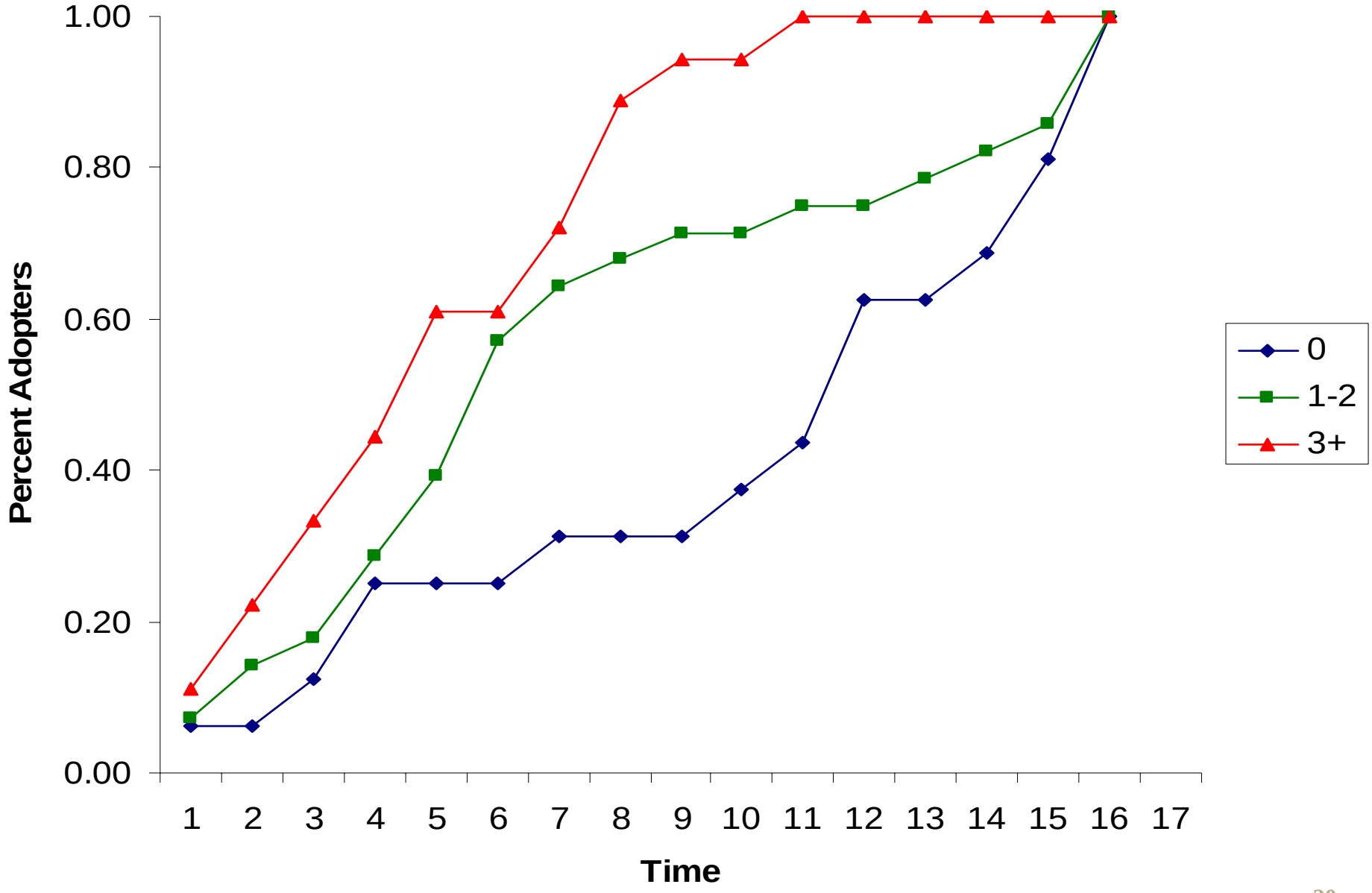
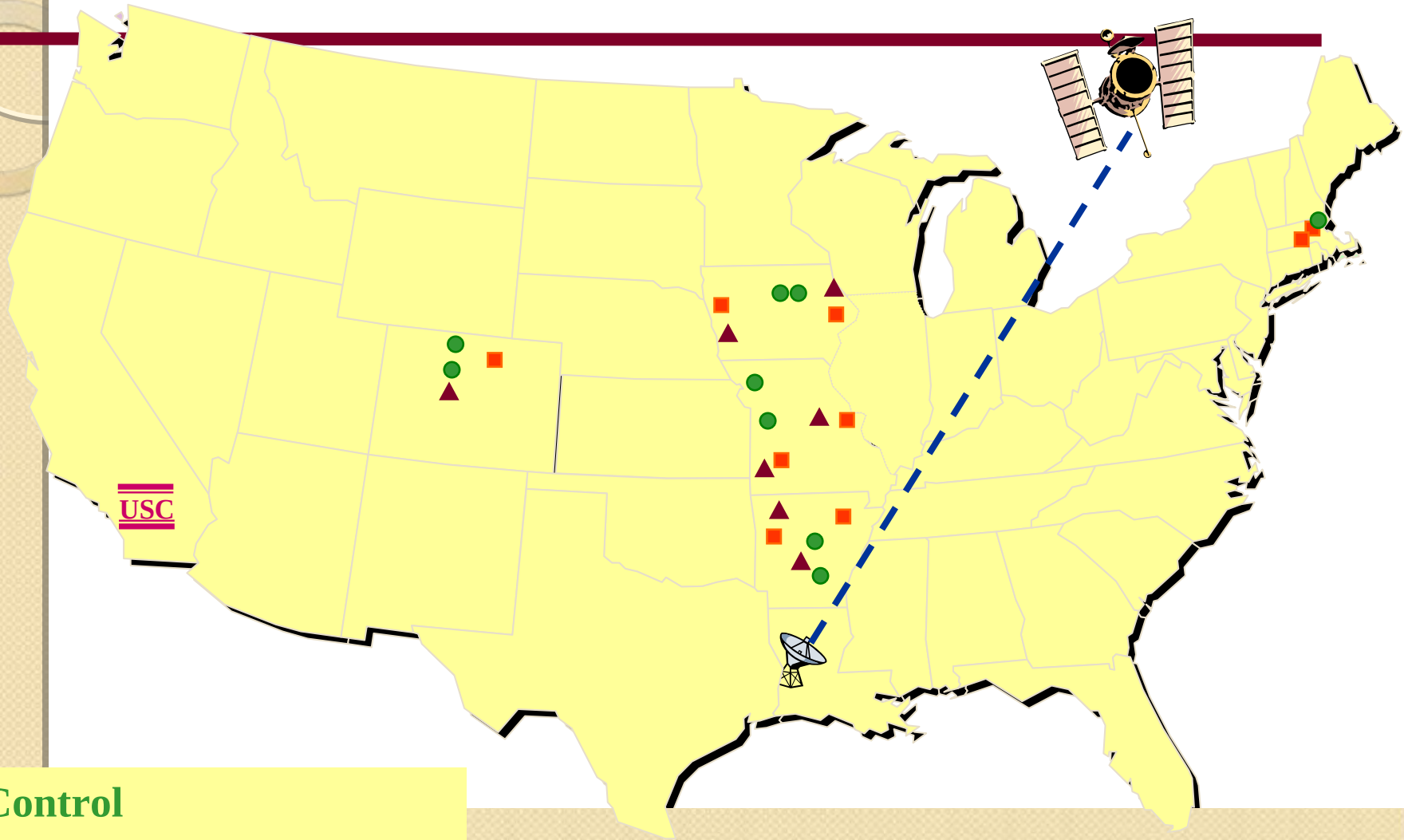
2. Network Level Effects

- Density associated with more rapid diffusion (Valente 1995)
- Centralization associated with more rapid diffusion (1995)
- Clustering speeds/slows diffusion (Watts 2002)
- Bridges accelerate diffusion (Granovetter, 1973)

Diffusion of Tetracycline for Marginal versus Integrated Doctors



STEP Project Communities



● Control

▲ Prevention Training

■ Prevention Training + Technical Assistance

Community-level Networks – Coalitions & Inter-organizational Relations

- 24 Communities being trained in substance abuse prevention (STEP)
- Assigned to 3 conditions:
  - Control
  - Satellite TV training
  - Satellite TV training + TA
- In each coalition, social networks of community leaders in coalitions were measured
- Outcomes: Adoption of evidence-based programs

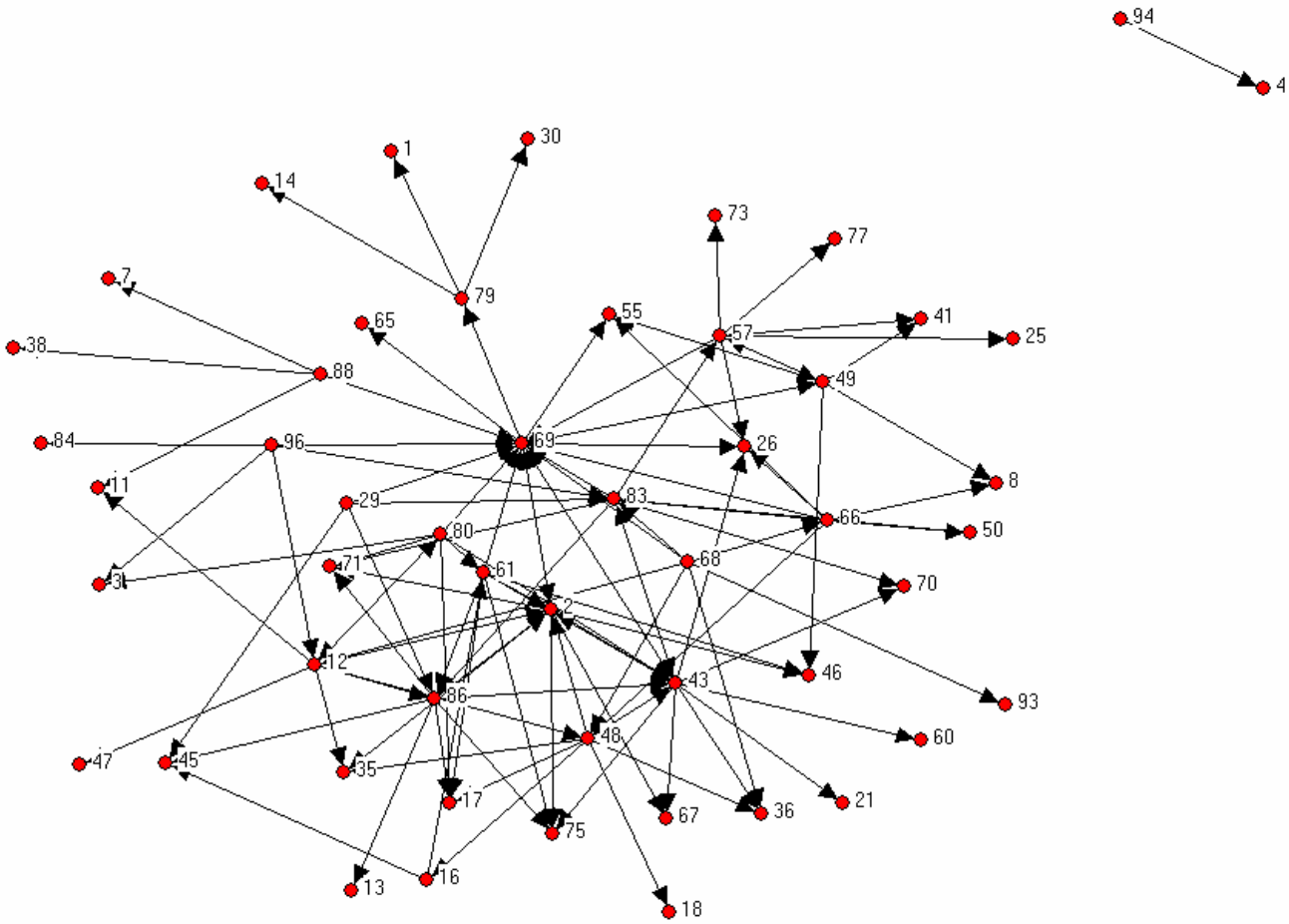
Structure & Adoption

- Density is associated with more rapid diffusion (Valente 1995)
- Centralization is associated with more rapid diffusion (Bavelas, 1955; Valente, 1995)
- Lower clustering faster diffusion (Watts, 1999)

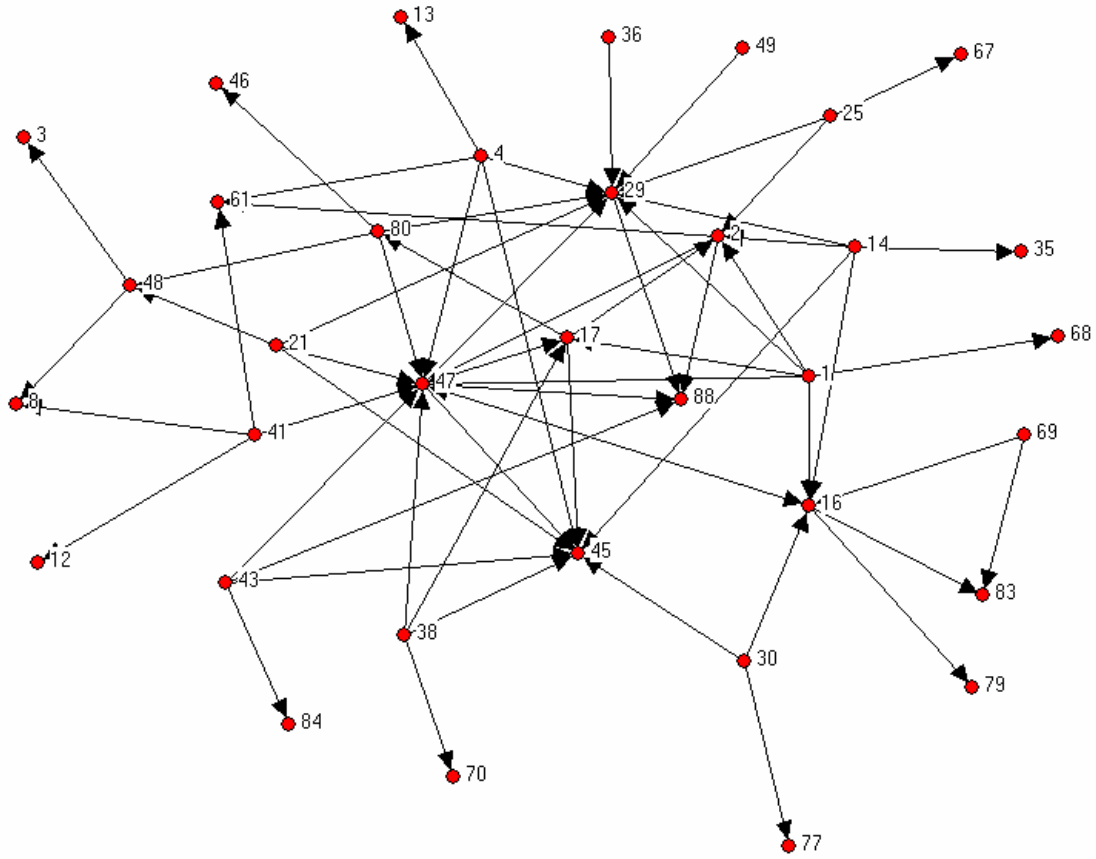
Of course, in these settings this might not hold:

- Density can overwhelm functioning
- Centralized decision-making would be less egalitarian
- Clustered networks provide reinforcement for adoption decisions

Coalition with High Density



Coalition with Low Density



Intervention Effects Mediated by Density

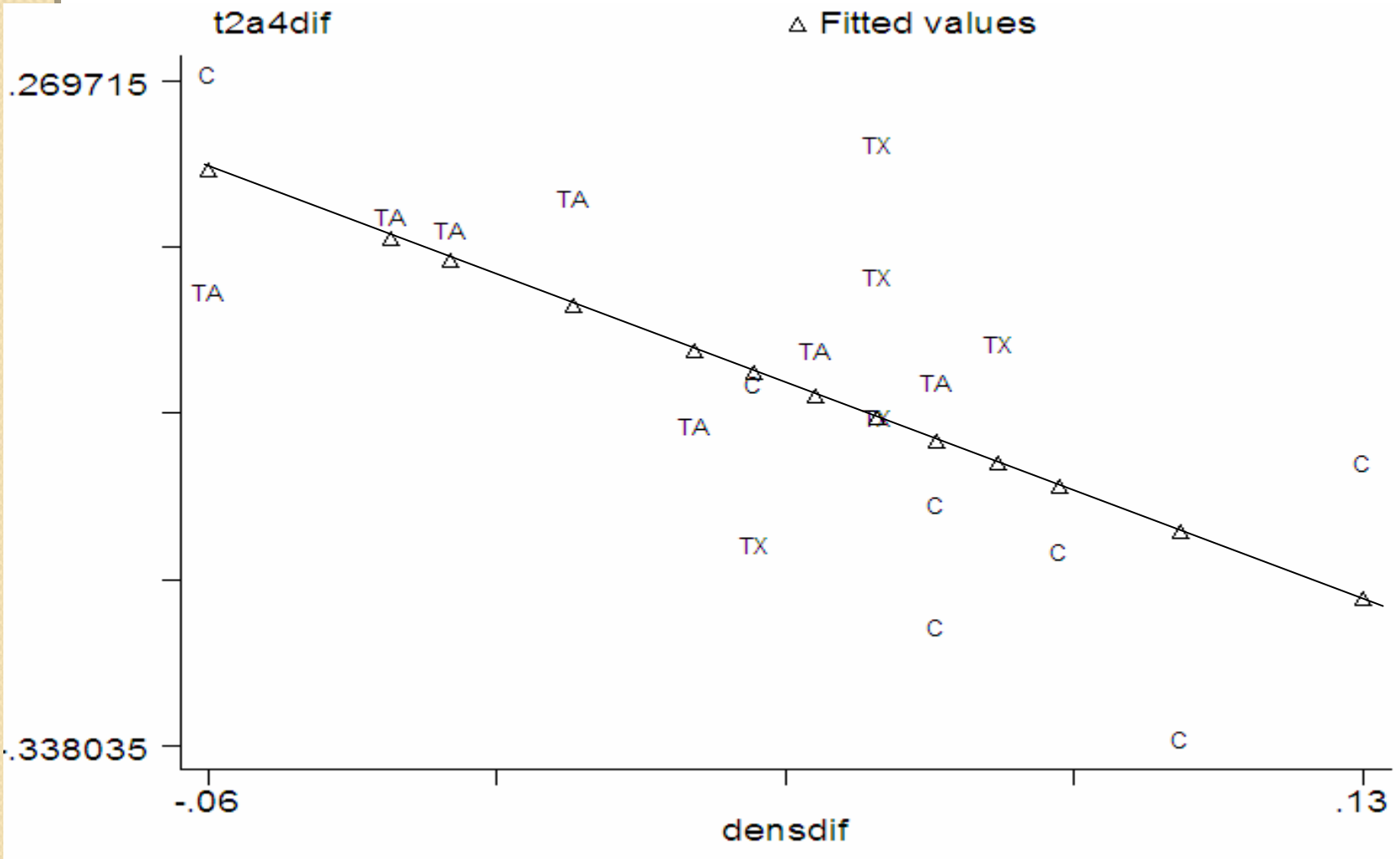
	Attitudes & Practices Total		
	Unmatched (N=821)	Unmatched (N=821)	Matched (N=255)
Baseline Att. & Pract.	0.69**	0.73**	0.75**
Treatment (TV+TV/TA)	0.33*	0.14	0.19
Baseline Density		0.25	0.20
Follow up Density		-0.31*	-0.39*
Adjusted R^2	43%	59%	50%

*p<0.05; **p<0.01

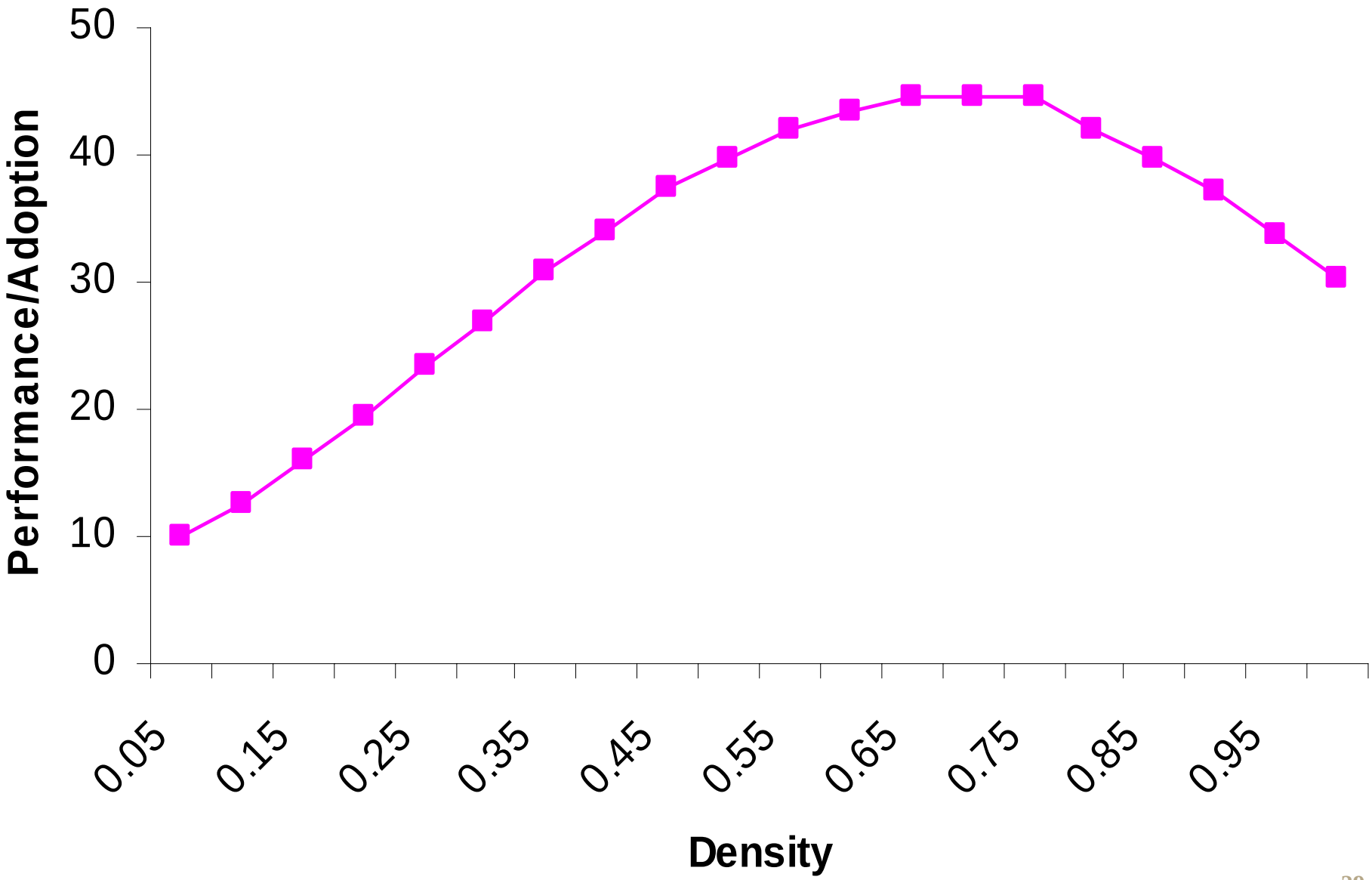
Centraliz. & Clustering

- No main or mediation effects of Centralization or Clustering
- No association between network diameters and outcomes
- No association between network clustering and outcomes

Increasing Density Inhibits Adoption



Curvilinear Association between Density and Performance



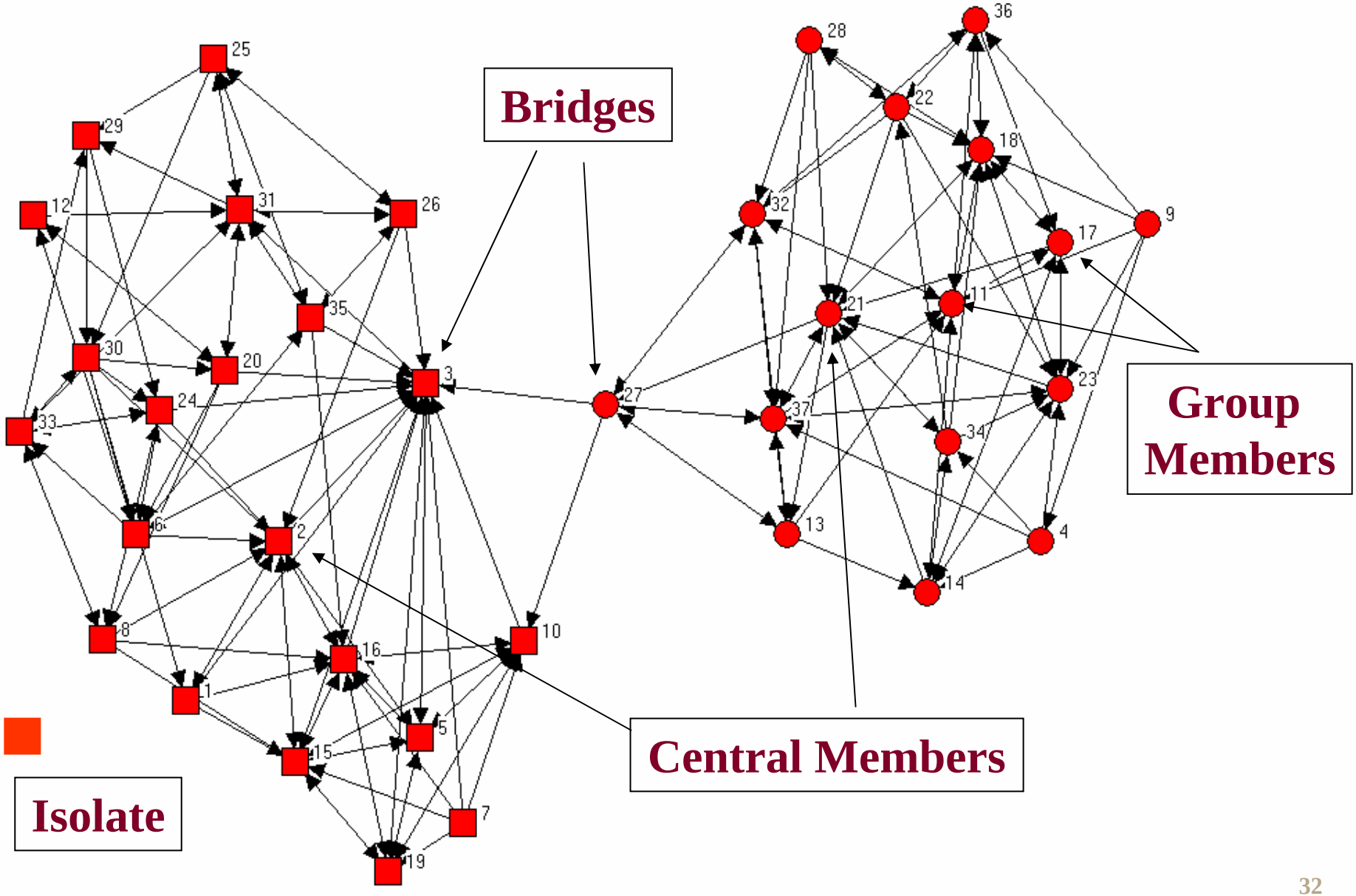
Considerable Variation in Coalition Network Indicators (N=24)

	Mean	Standard Deviation	Range
Size	22.2	8.6	4 – 41
Size (Connected)	16.3	6.9	2 – 31
Ave. Path Length	2.2	0.5 steps	1 – 3.1 steps
Density	13 %	6.5 %	5.6 % – 33.3 %
Clustering	14.0 %	5.6 %	4.1 – 27.5 %
Transitive Percent	9.2 %	6.9 %	0 – 23.6 %
Centralization	37.2 %	13.6 %	17.1 – 66.7 %

3. Individual-Network Interactions

- Individual network effects are captured by the immediate personal network
- When the complete network is mapped, individual positions within the network can be determined:
  - Leaders
  - Isolates
  - Bridges
  - Group members

Network Positions



Popular Students Began Smoking

	Smoking Susceptibility	Ever Smoked
Baseline Susceptibility	4.94**	2.34**
Baseline Ever Smoked	2.15**	15.0**
Popularity: Percent other Students Named R as Friend (mean=0.15, SD=.08)	**5.17****	**5.49***
*p<0.05; **p<0.01 Regression controls for age, gender, school smoking prevalence, ethnicity, academic achievement, and nominations made.		

Peer Networks and Adolescent Cigarette Smoking: Adolescent Health Survey (Bearman, Udry, et al.)

- Randomly selected schools in which all students were surveyed and asked to name 10 best friends (5 male and 5 female).
- 13 schools (2,590 students) collected sociometric data once.
- Some outcomes measured in the household data only.

Smoking Last 30-days (Data are from Adolescent Health Study, N=2,525).

	Smoking	
	AOR	AOR
Peer Network Smoking 1 – 49%	1.07	1.03
Peer Network Smoking >= 50%	1.91**	1.89**
Best Friend Smoking (1 or 2)	2.00**	2.01**
School Smoking Prevalence	1.02	0.76
Popularity (In-degree)	**1.73****	**1.49****
Popularity*School Prevalence		**1.08***
*p<.01; **p<.001 Controls for sex, age, ethnicity, parental education, school, and cigarettes in the home		

How To Speed diffusion?
4. Network Interventions

- Identify opinion leaders or key players to act as change agents
- Create network informed groups
- Identify leaders within groups or match leaders to groups
- Rewire Networks
  - More cohesive
  - More centralized
  - More dense
  - Less dense
- Identify low threshold adopters

Work with Opinion Leaders

- Identify them
- Recruit them
- Convert them (if need be)
- Use them