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# Network Interventions & Policy Considerations

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CRJ 523

Network Criminology



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# Learning Goals

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- ❖ Understand the logic of **network interventions** and the various approaches.
- ❖ Discuss various principles of **network interventions**.



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# Network Interventions

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- ❖ Throughout the semester we have studied *whether* and *how* networks matter.
- ❖ Knowing that network structure matters, what can you do about it?
  - ❖ **Network Interventions**



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# Network Interventions

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- ❖ [Valente \(2012\)](#)

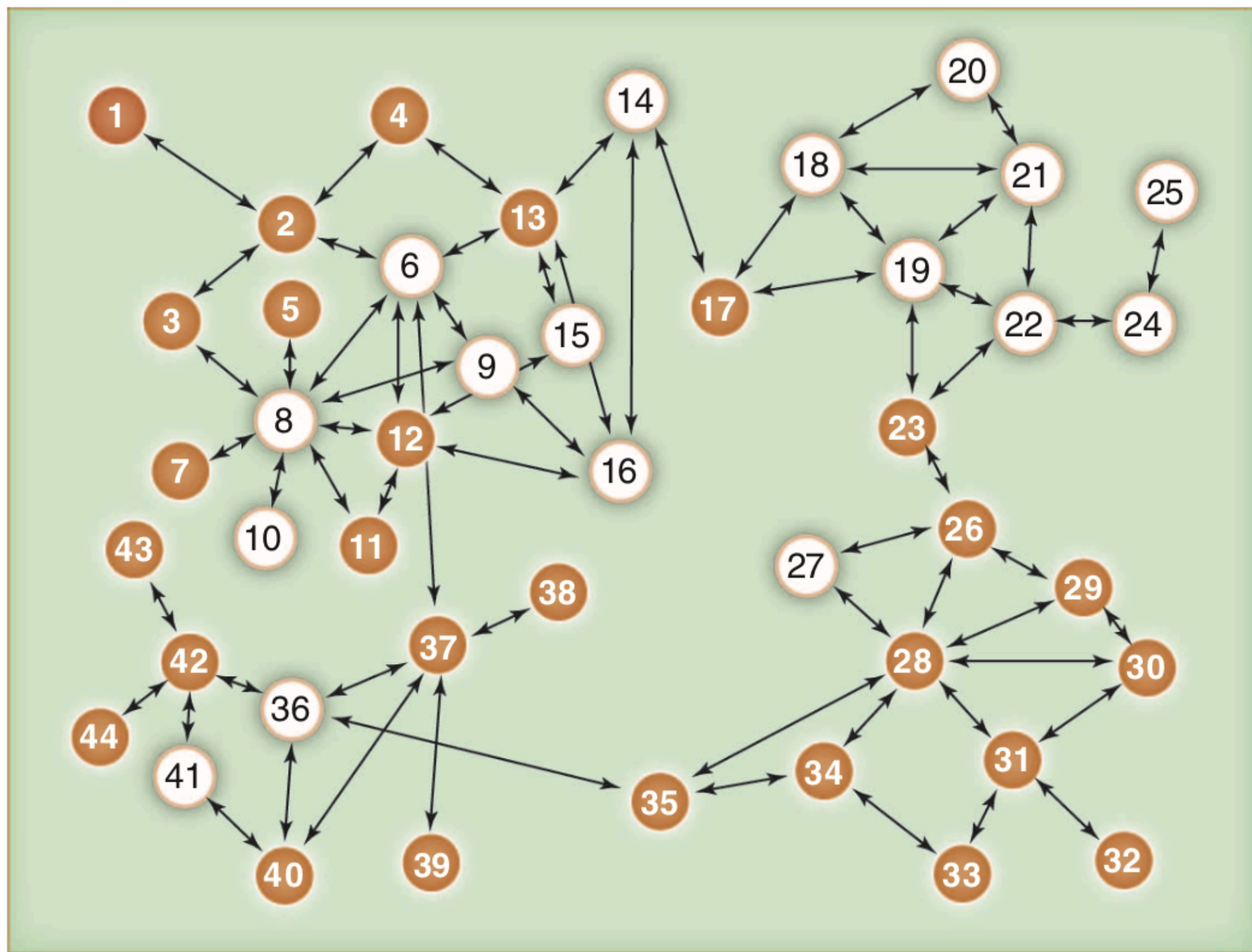
- ❖ What are *network interventions*?

- ❖ p. 49: “Network interventions are purposeful efforts to use social networks or social network data to generate social influence, accelerate behavior change, improve performance, and / or achieve desirable outcomes among individuals, communities, organizations, or populations.”

- ❖ Network Interventions are build on the logic of “diffusion”: the “**networks as pipes**” metaphor.



# Network Interventions





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# Network Interventions

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- ❖ You all have just lived through one of the biggest network interventions in history...



# Network Interventions

- ❖ You all have just lived through one of the biggest network interventions in history...
- ❖ Social distancing





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# Network Interventions

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- ❖ [Valente \(2012\)](#)

- ❖ p. 49 “Though diffusion and other mechanisms of social influence explain the process of change, they do not provide guidance on how to use that information to accelerate change.”
- ❖ Provides four strategies:
  - ❖ Identifying individuals
  - ❖ Segmentation
  - ❖ Induction
  - ❖ Alteration



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# Identifying Individuals

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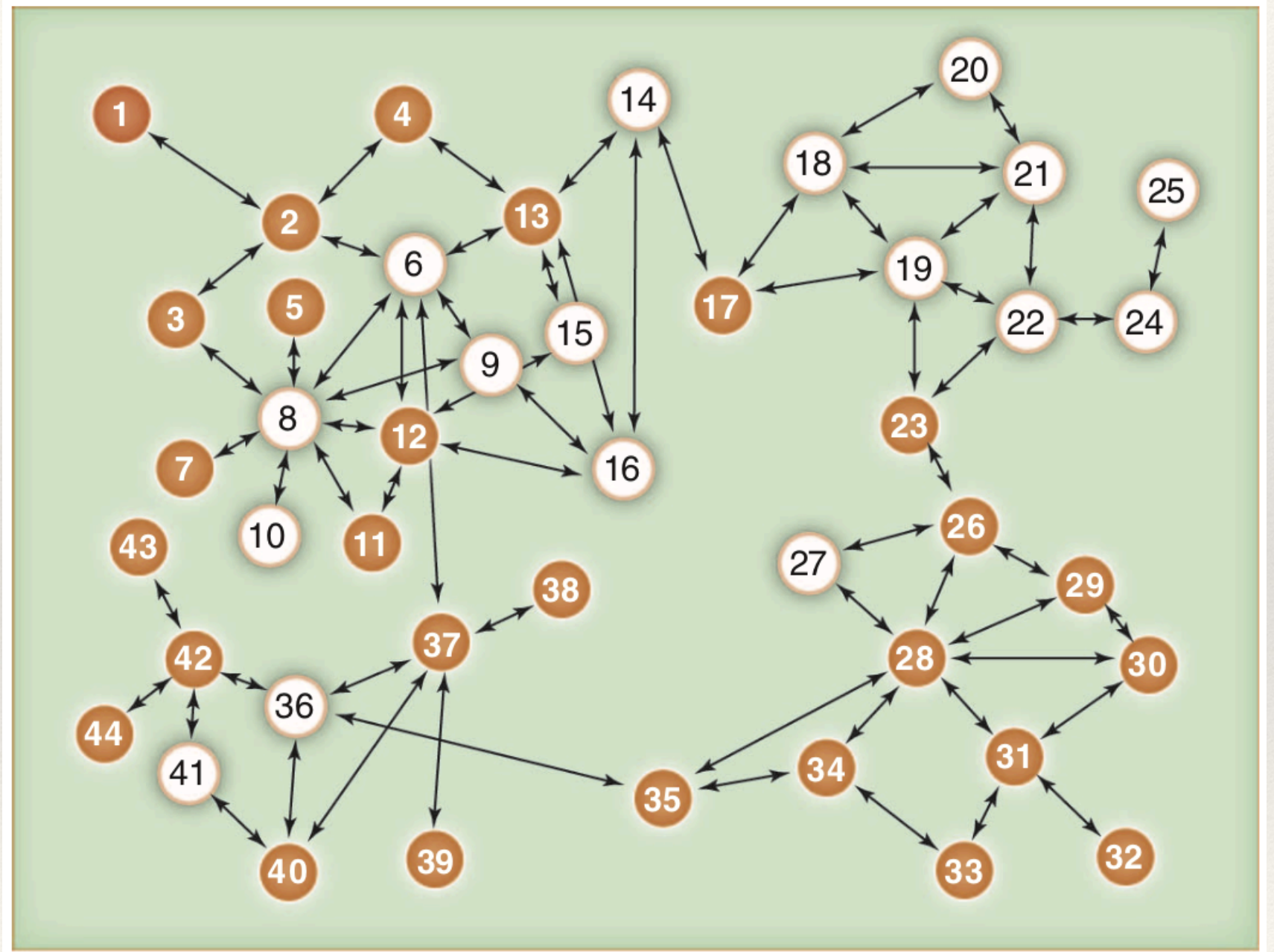
- ❖ Identifying influential individuals to “champion” the intervention.



# Identifying Individuals

Who are the  
influential  
individuals?

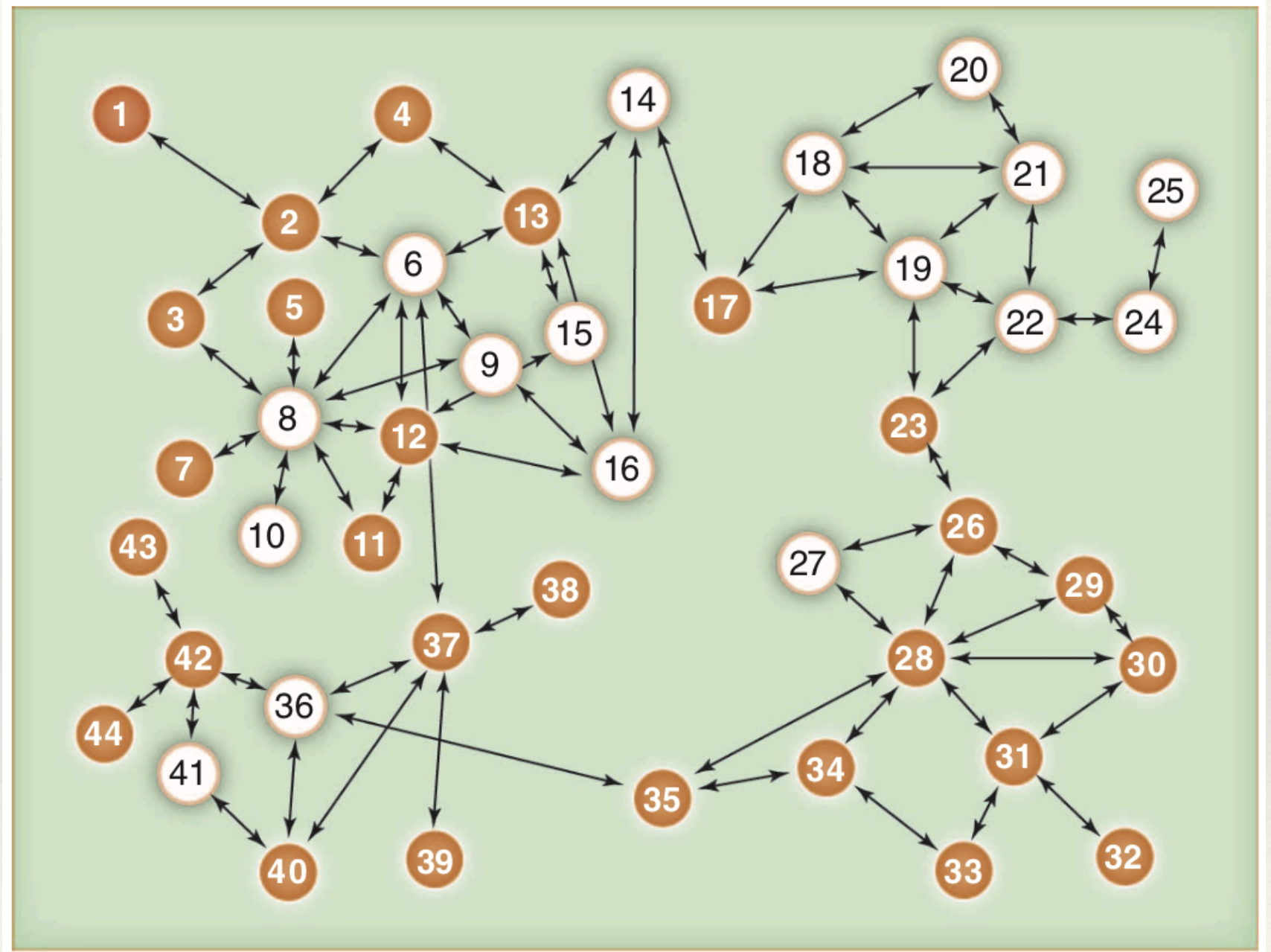
Why do you say  
so?





# Identifying Individuals

Depends on  
what you mean  
by “influential”

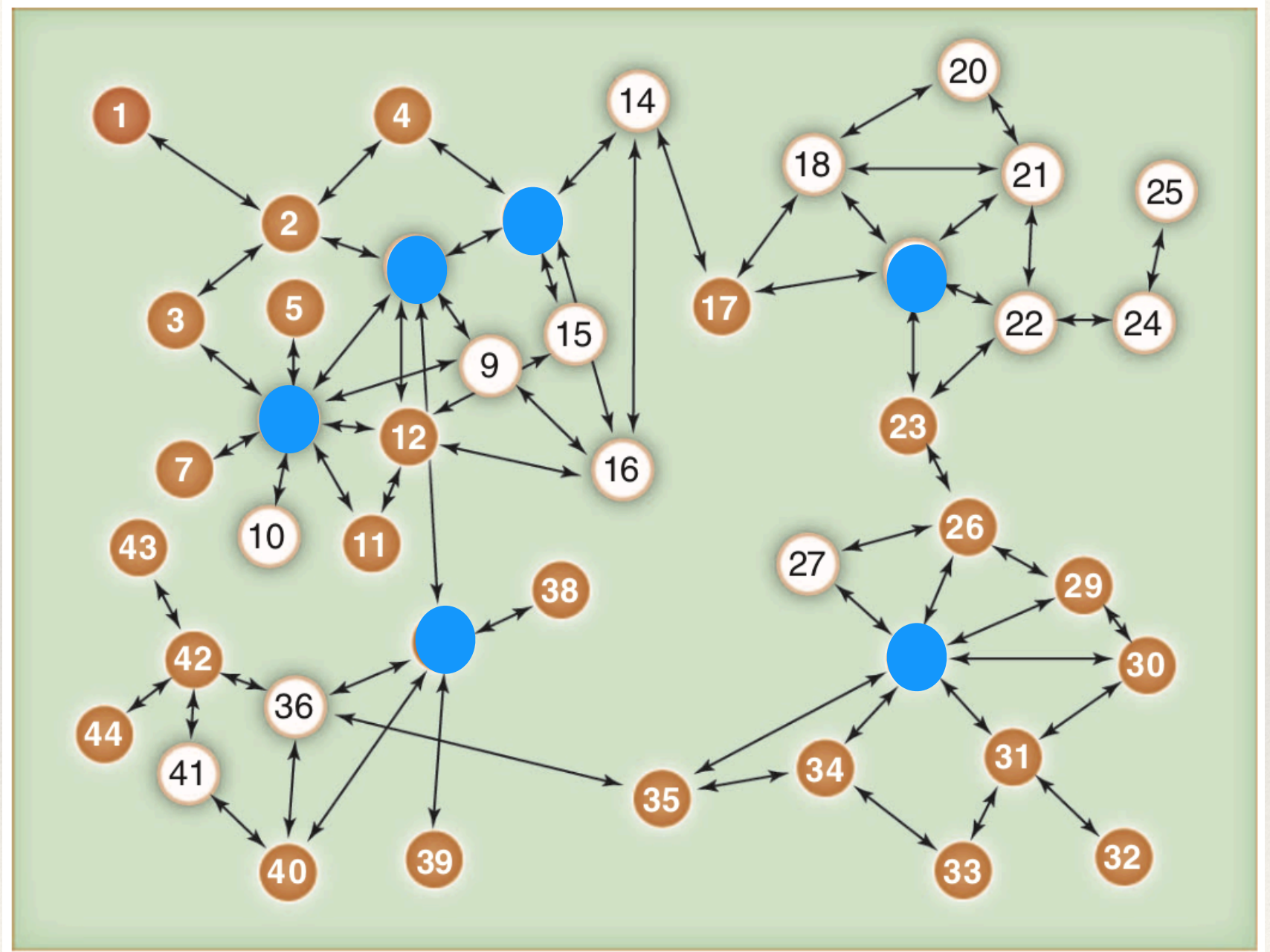




# Identifying Individuals

Take those with  
the most ties...

*Degree  
centrality*

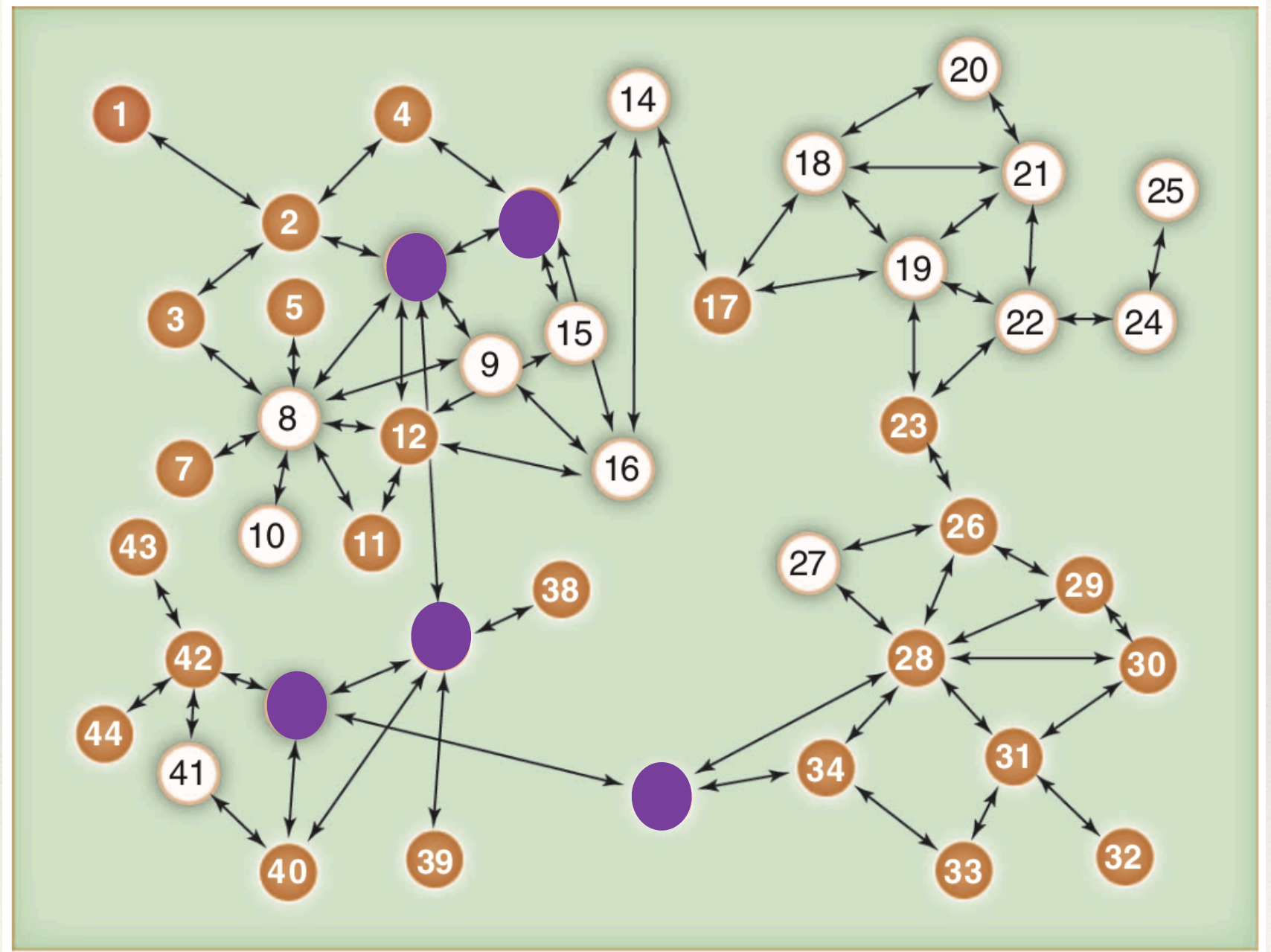




# Identifying Individuals

Take those who  
are close to  
others....

*Closeness  
centrality*

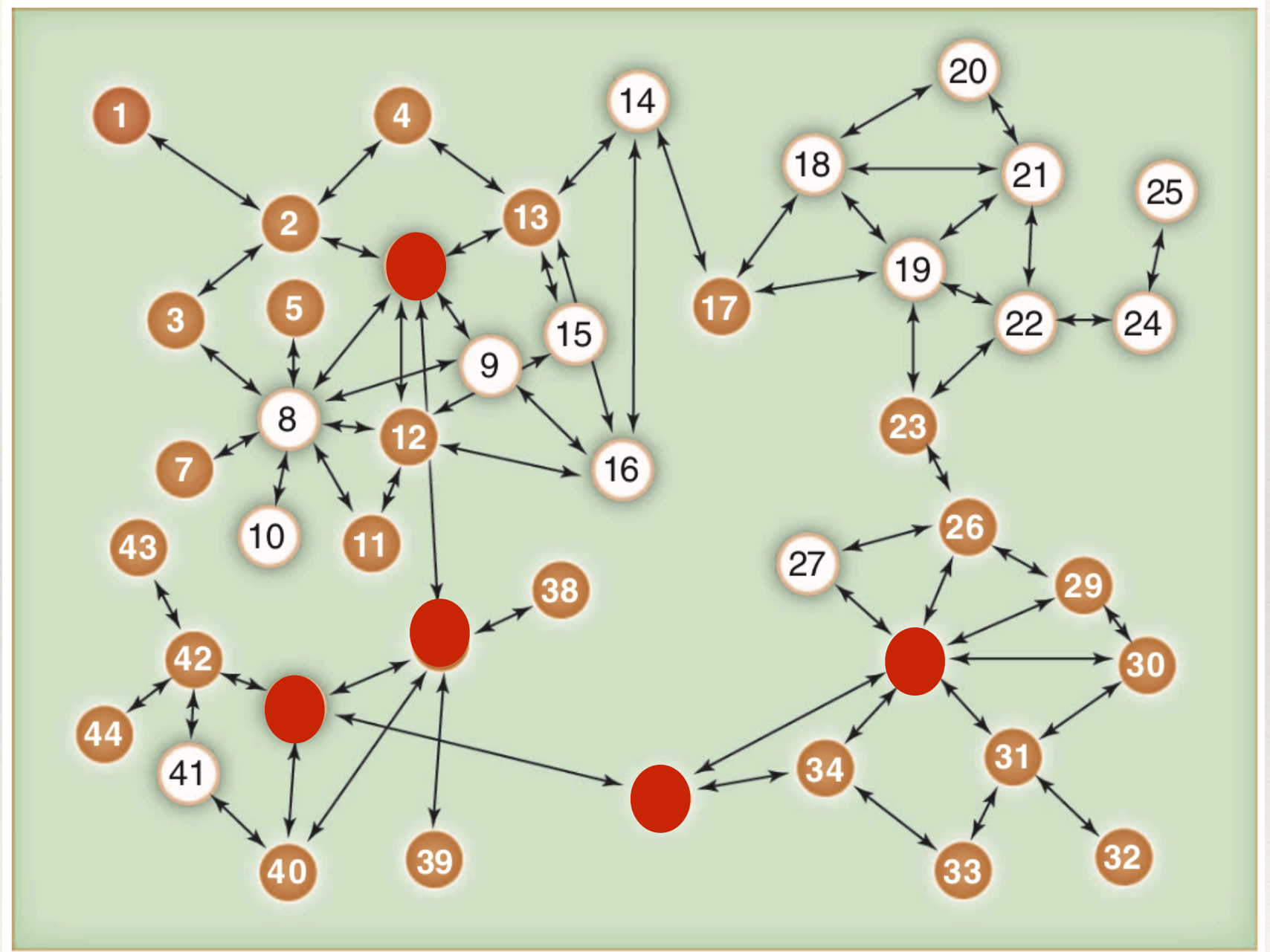




# Identifying Individuals

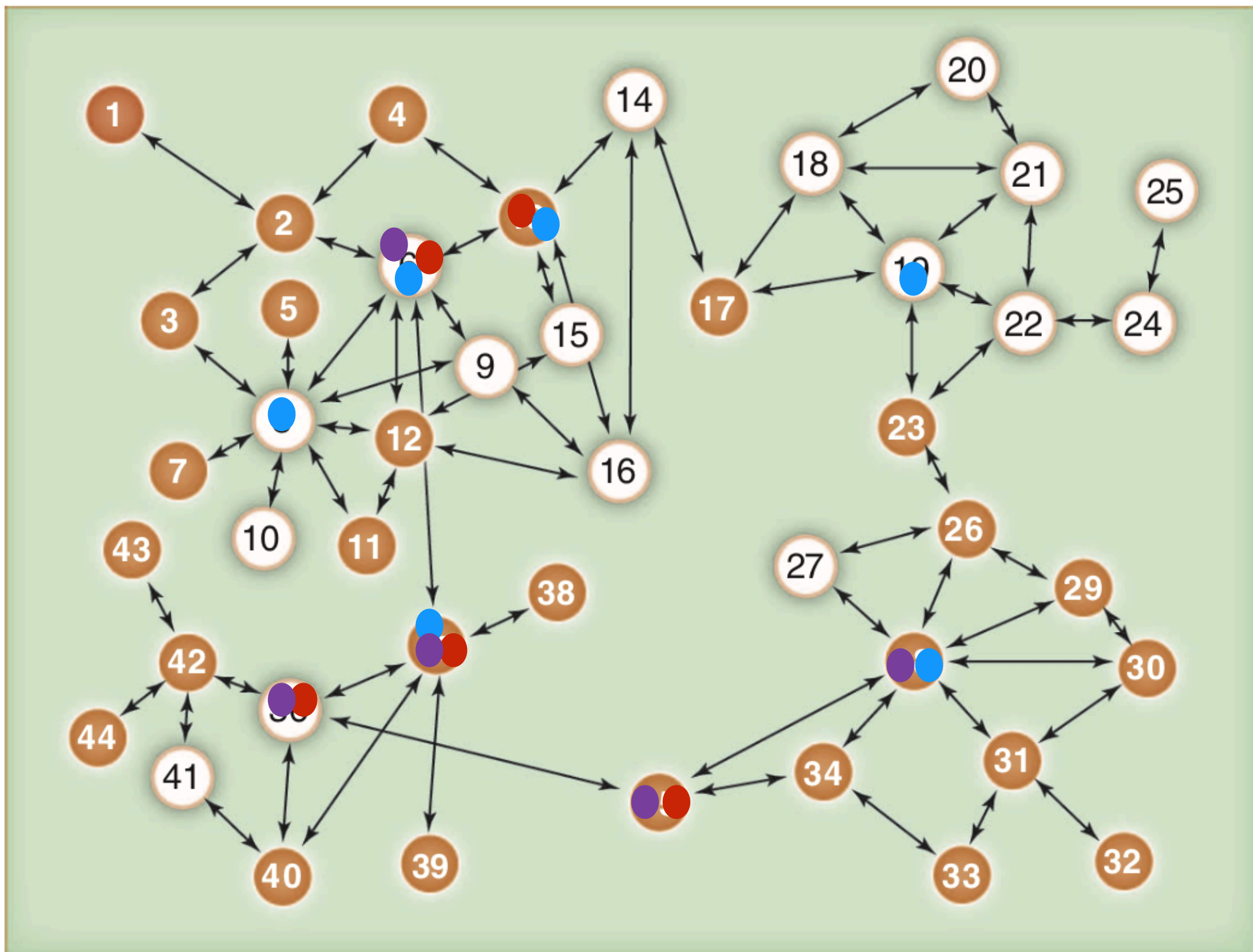
Take those who  
are between  
people....

*Betweenness  
centrality*





# Identifying Individuals





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# Identifying Individuals

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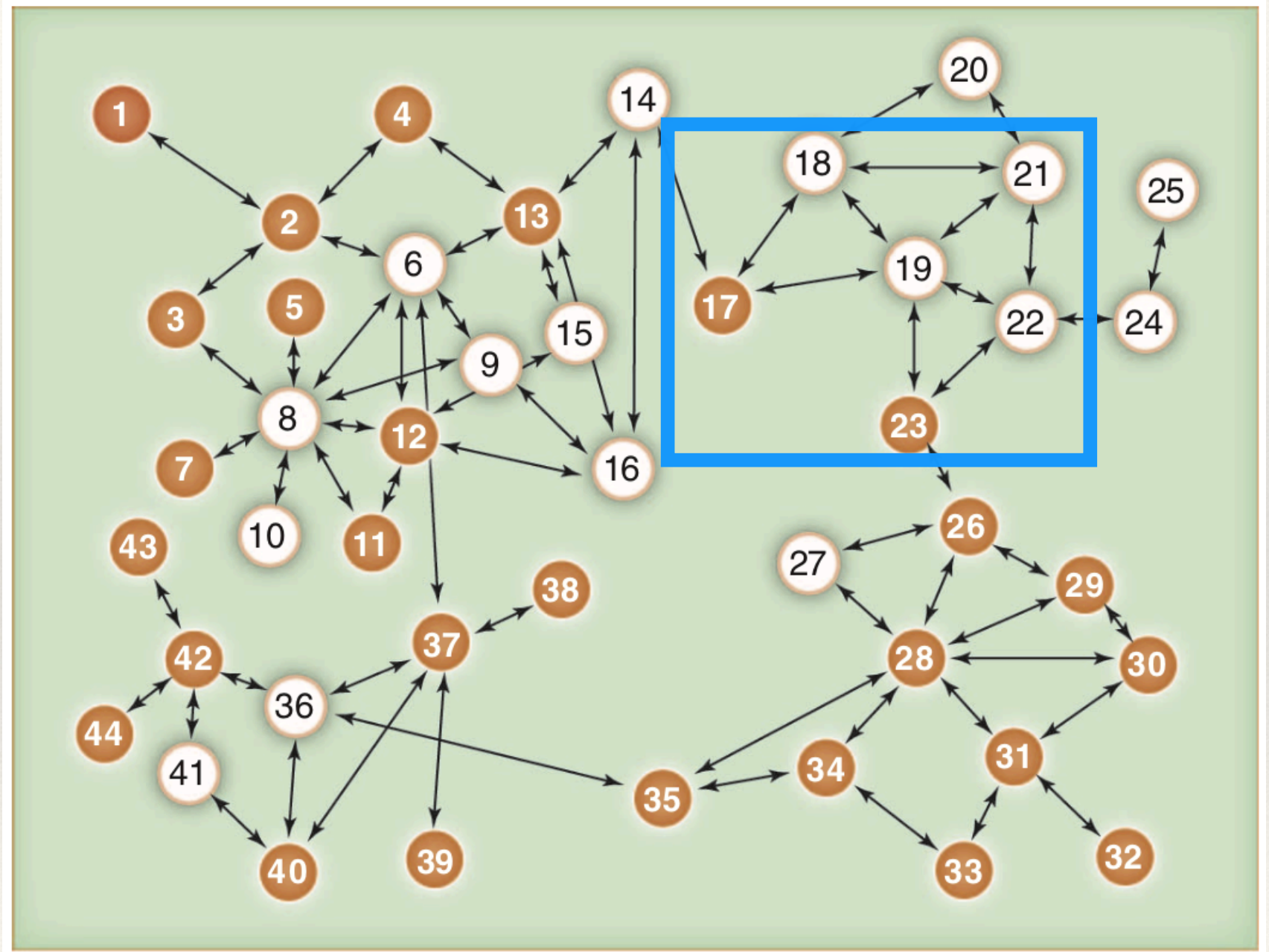
- ❖ Another approach: Identifying people based on having a “low-threshold” of change.



# Identifying Individuals

19 has 5 ties:

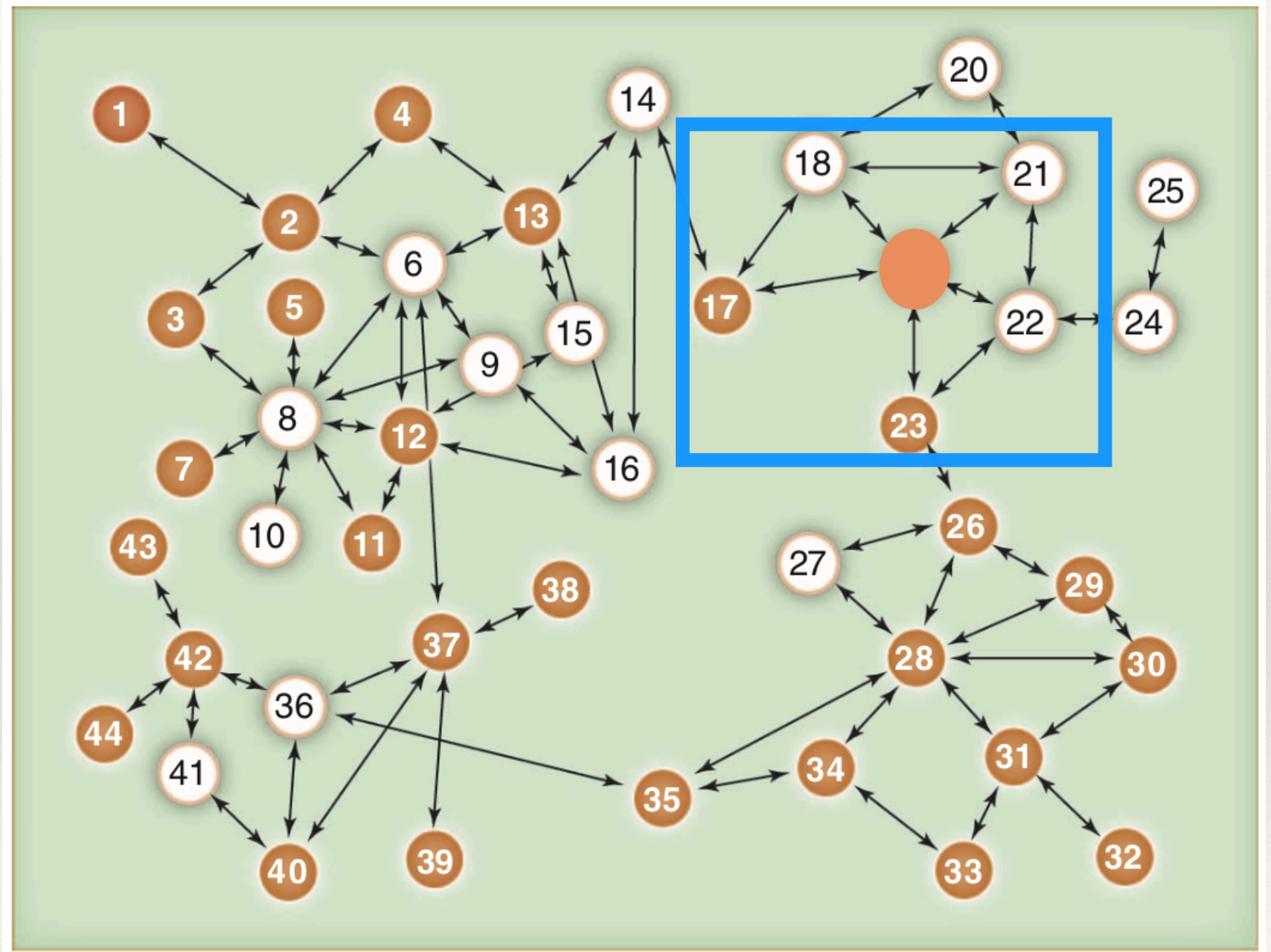
3 non-adopters  
and 2 adopters.





# Identifying Individuals

If 19 adopts,  
then he/she had  
an adoption  
threshold of  
40% (i.e. 2/5).

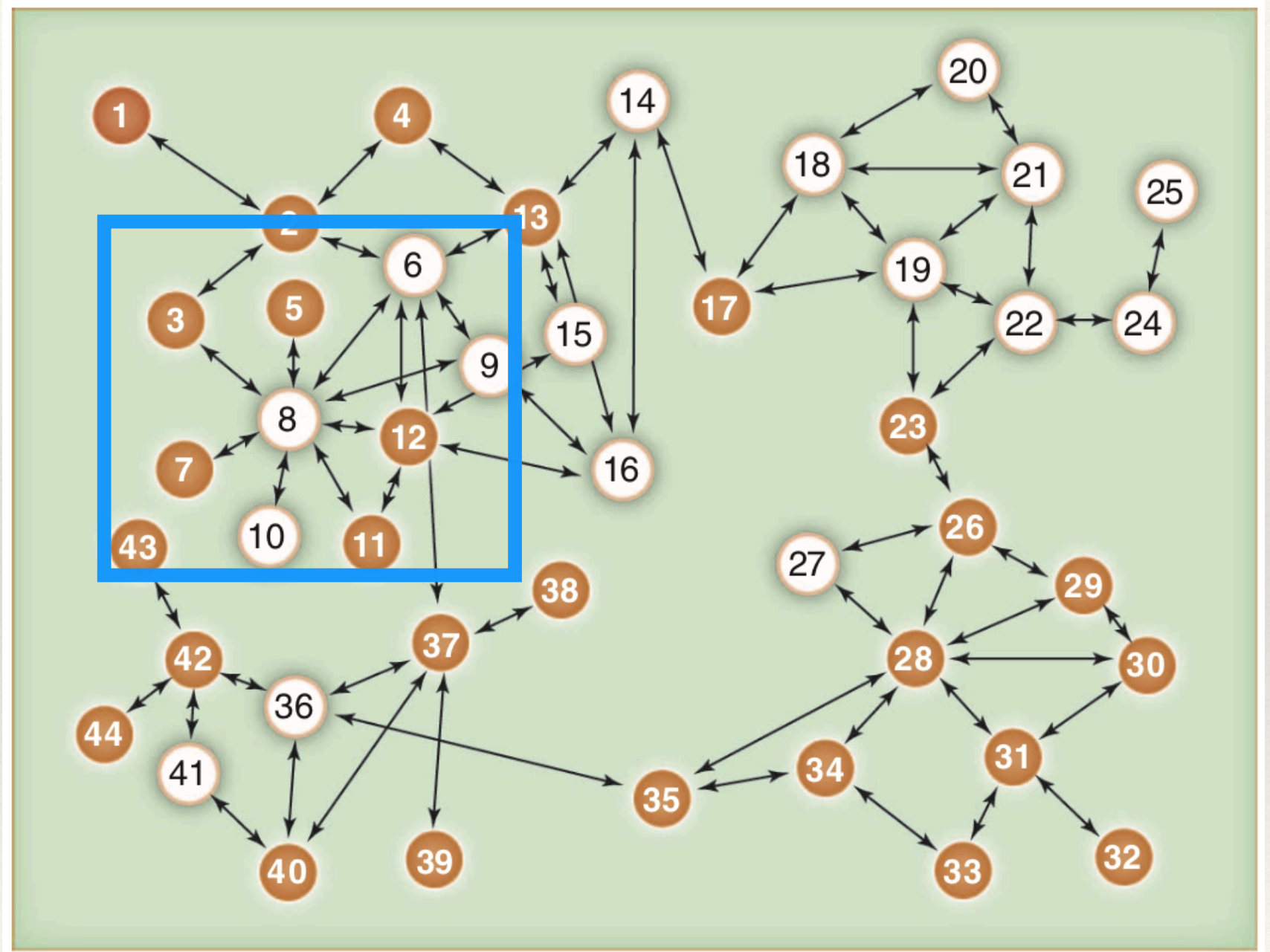




# Identifying Individuals

8 has 8 ties:

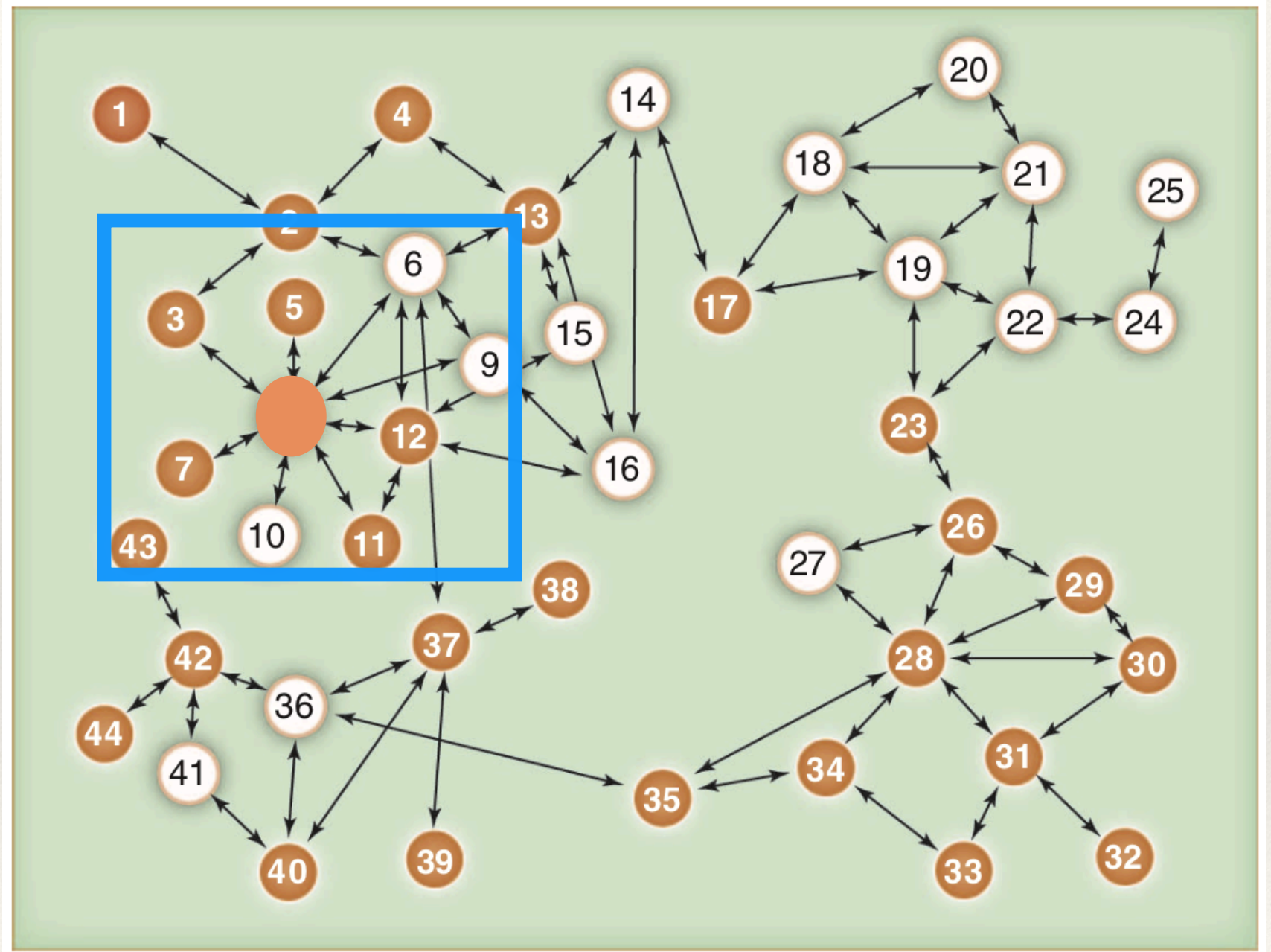
5 non-adopters  
and 3 adopters.





# Identifying Individuals

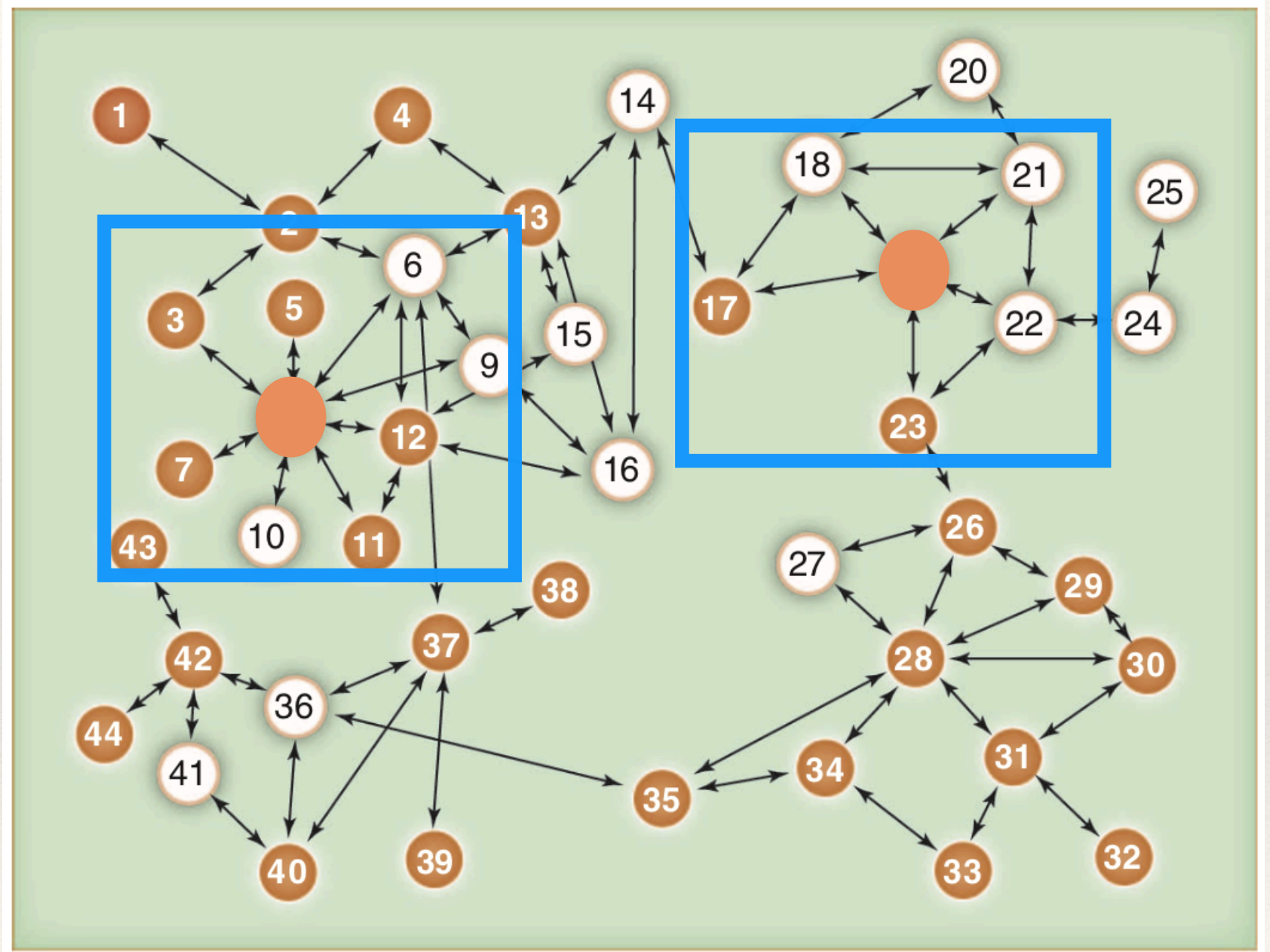
If 8 adopts, then  
he/she had an  
adoption  
threshold of  
62% (i.e. 5/8).





# Identifying Individuals

The lower adoption threshold for 19 vs. 8 may make the intervention diffuse faster.





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# Segmentation

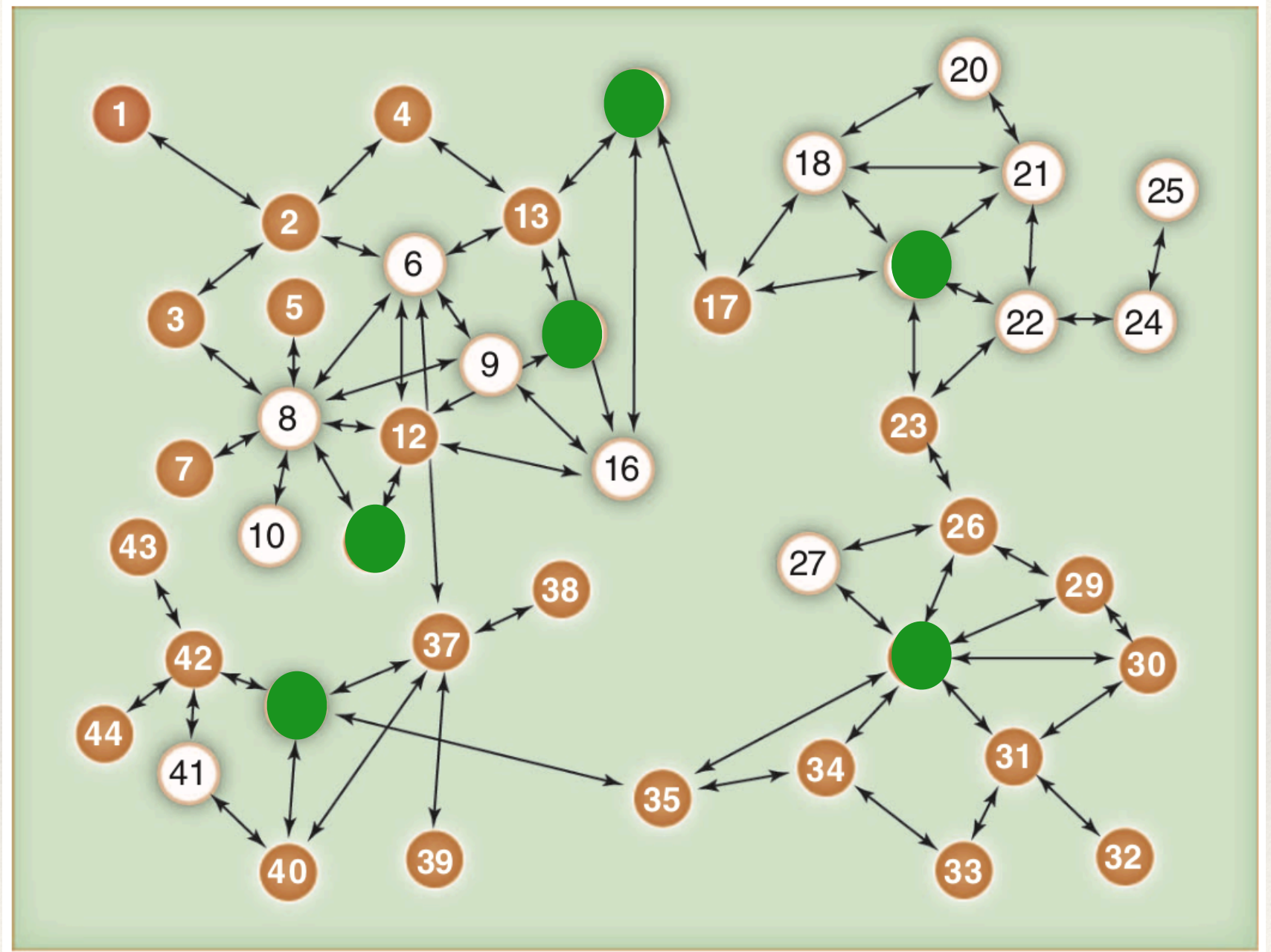
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- ❖ Rather than targeting specific individuals, identify groups of people.
- ❖ Some interventions may require everyone to be involved.
- ❖ Some may require different design for different groups.



# Segmentation

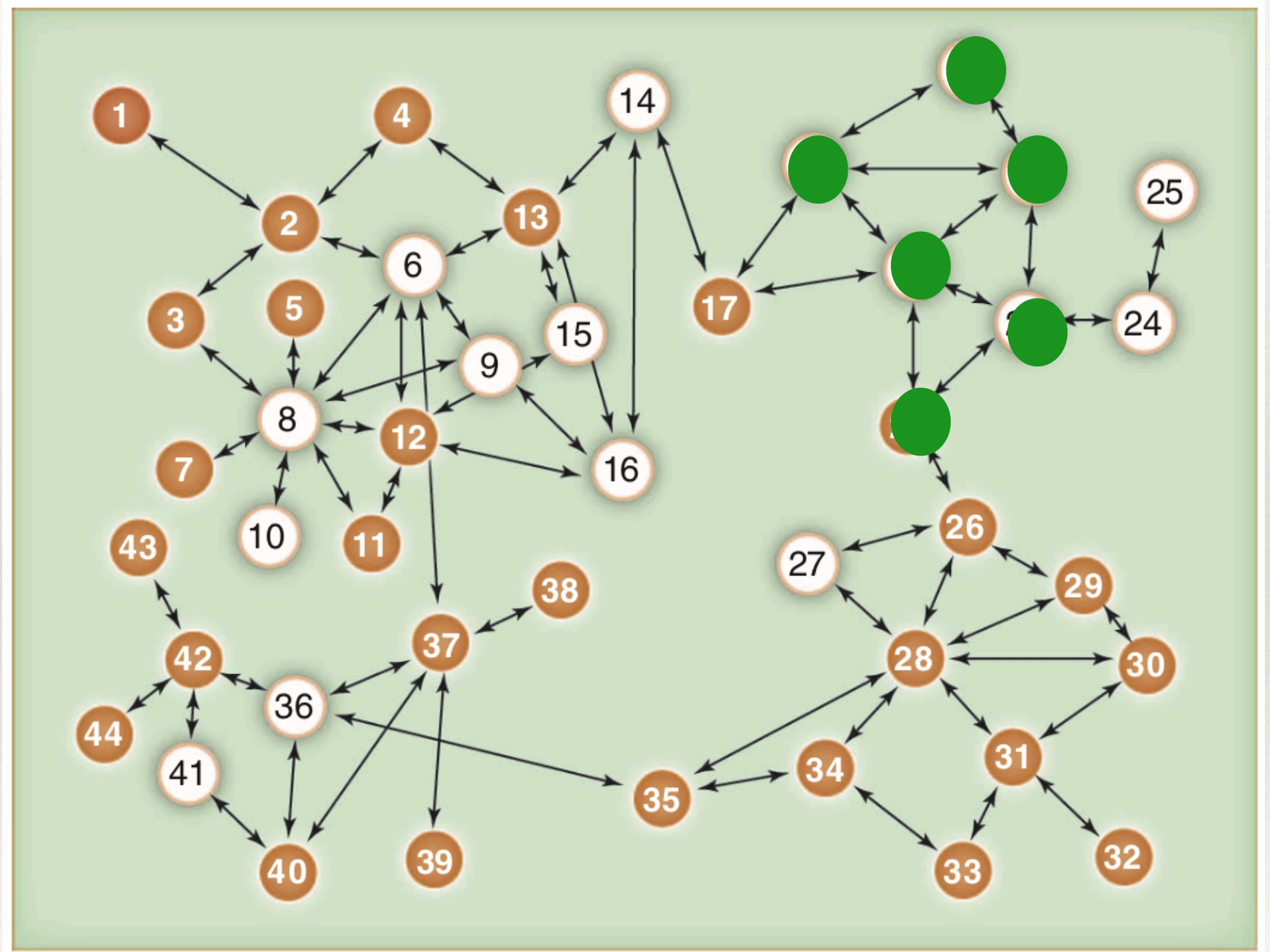
This might not  
work....





# Segmentation

But this might...

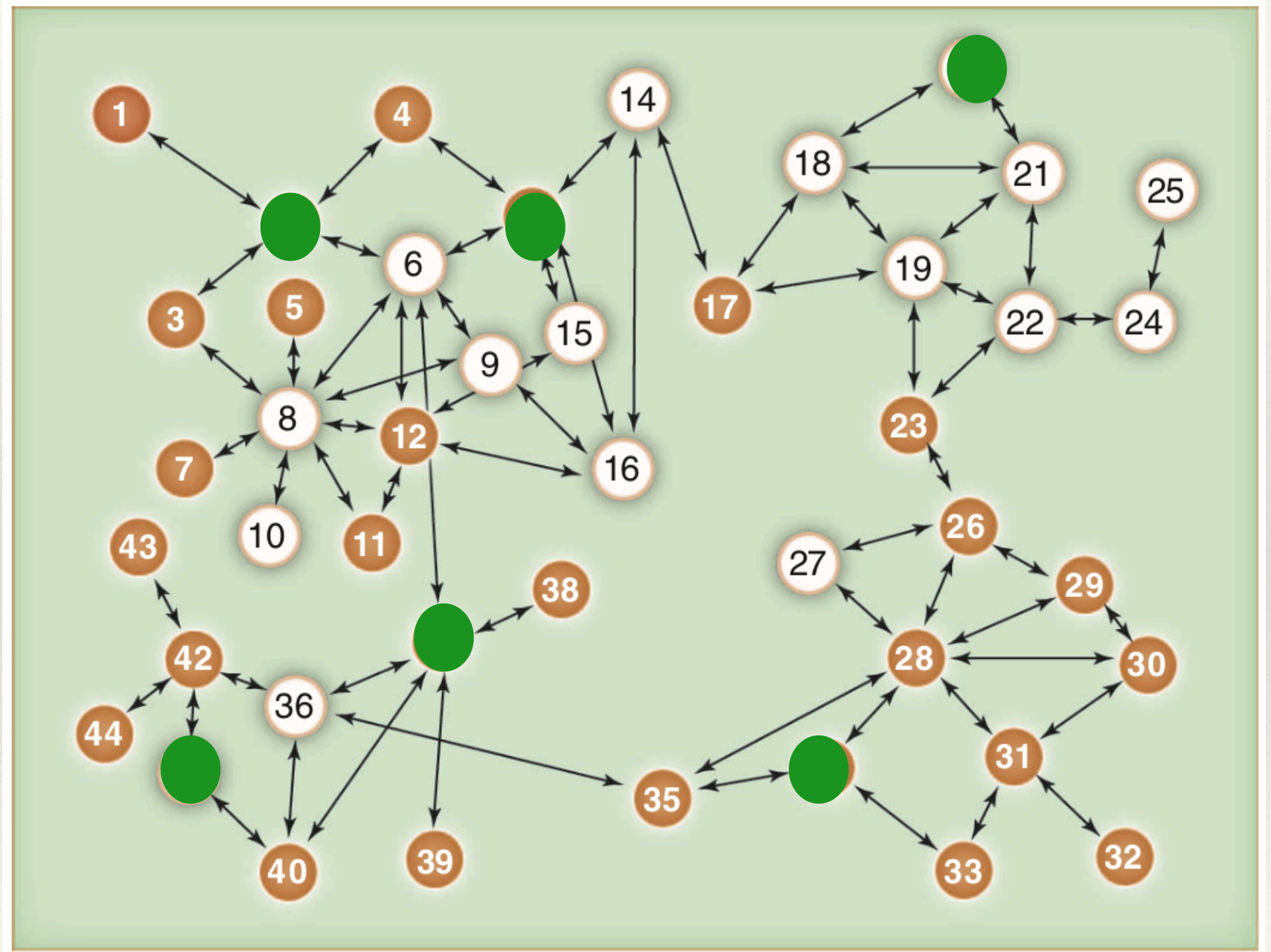




# Segmentation

Example:  
Social  
Distancing

Does this  
structure work?

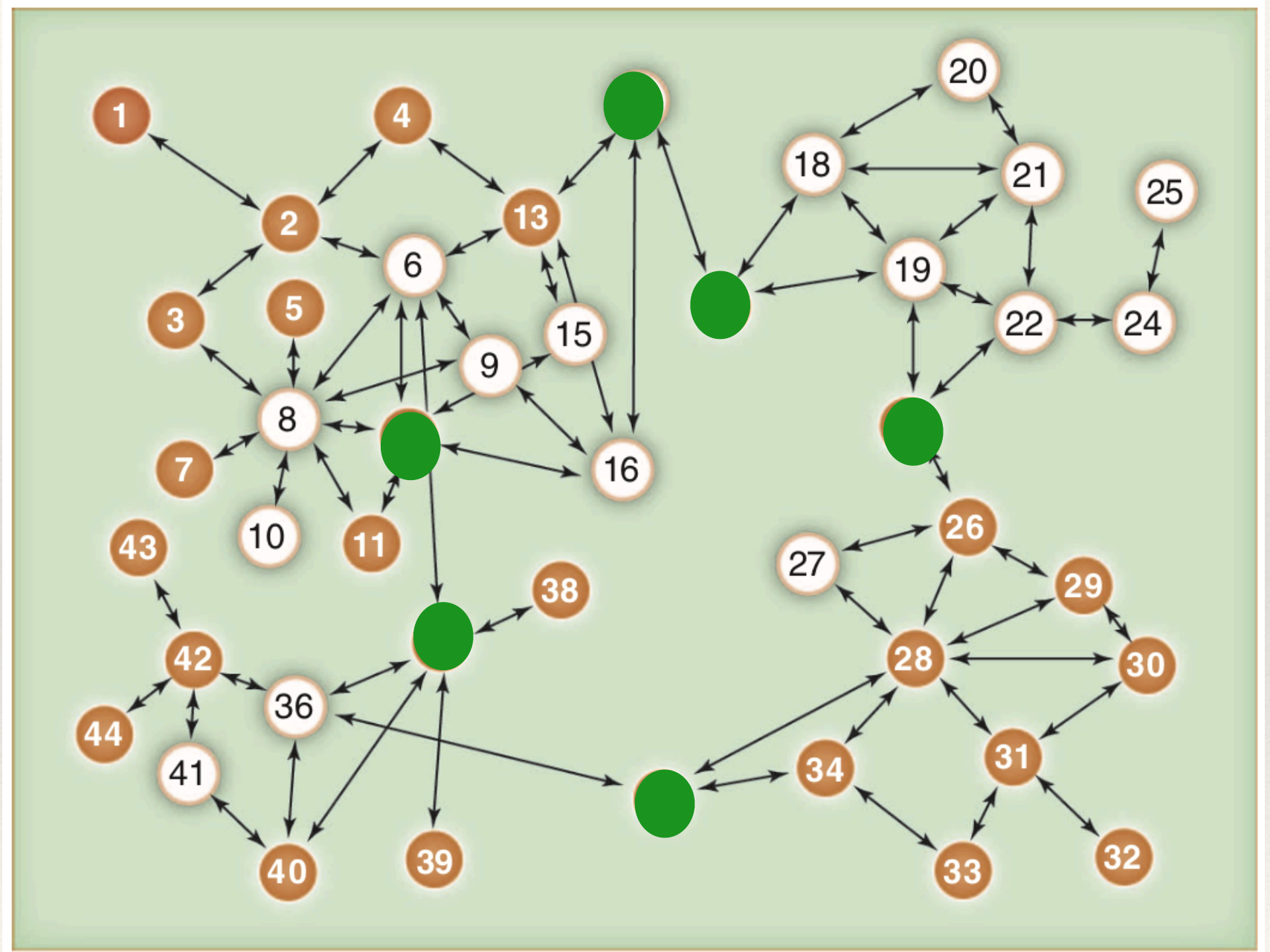




# Segmentation

Example:  
Social  
Distancing

Does this  
structure work?

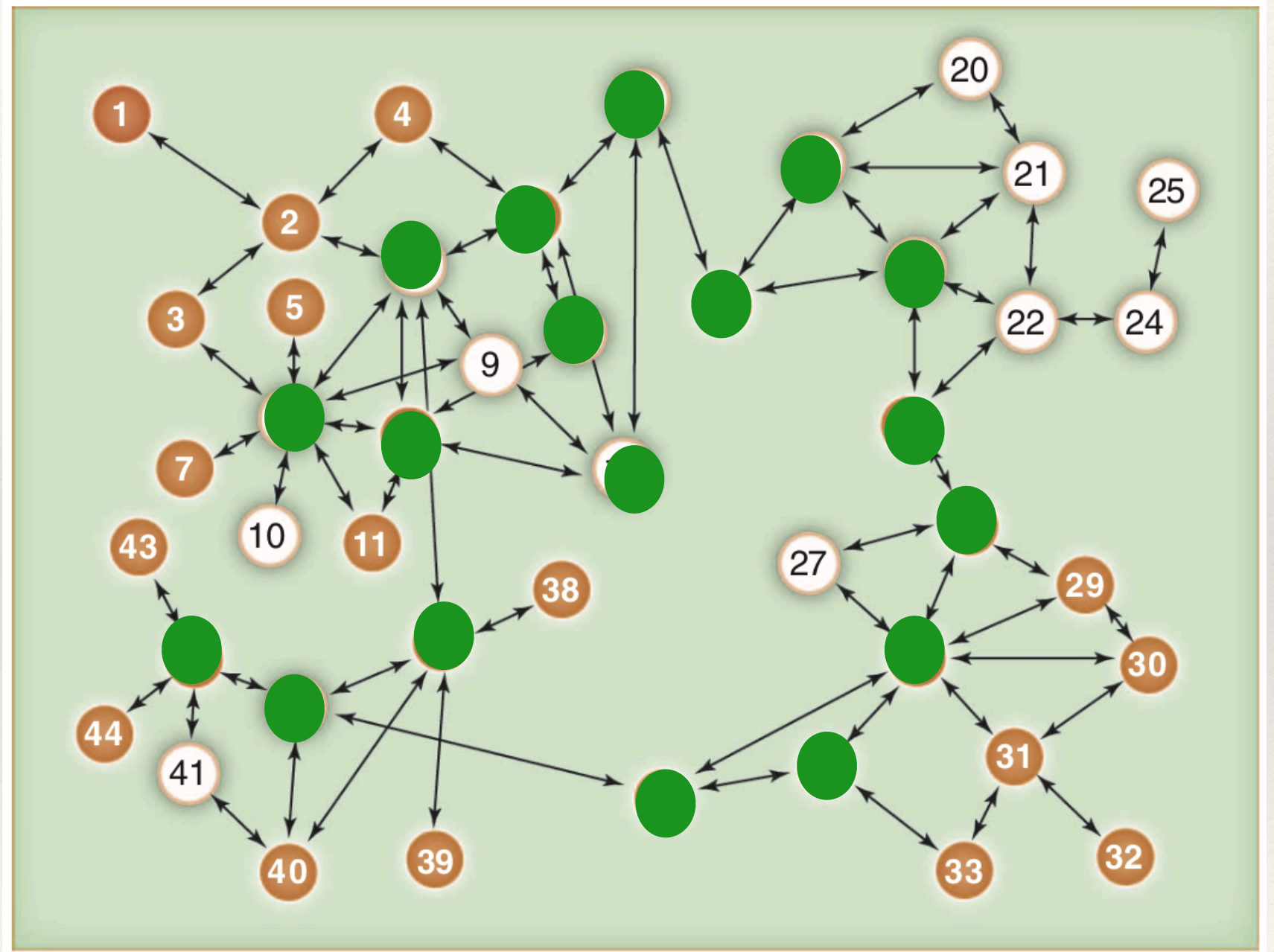




# Segmentation

Example:  
Social  
Distancing

Does this  
structure work?





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# Induction

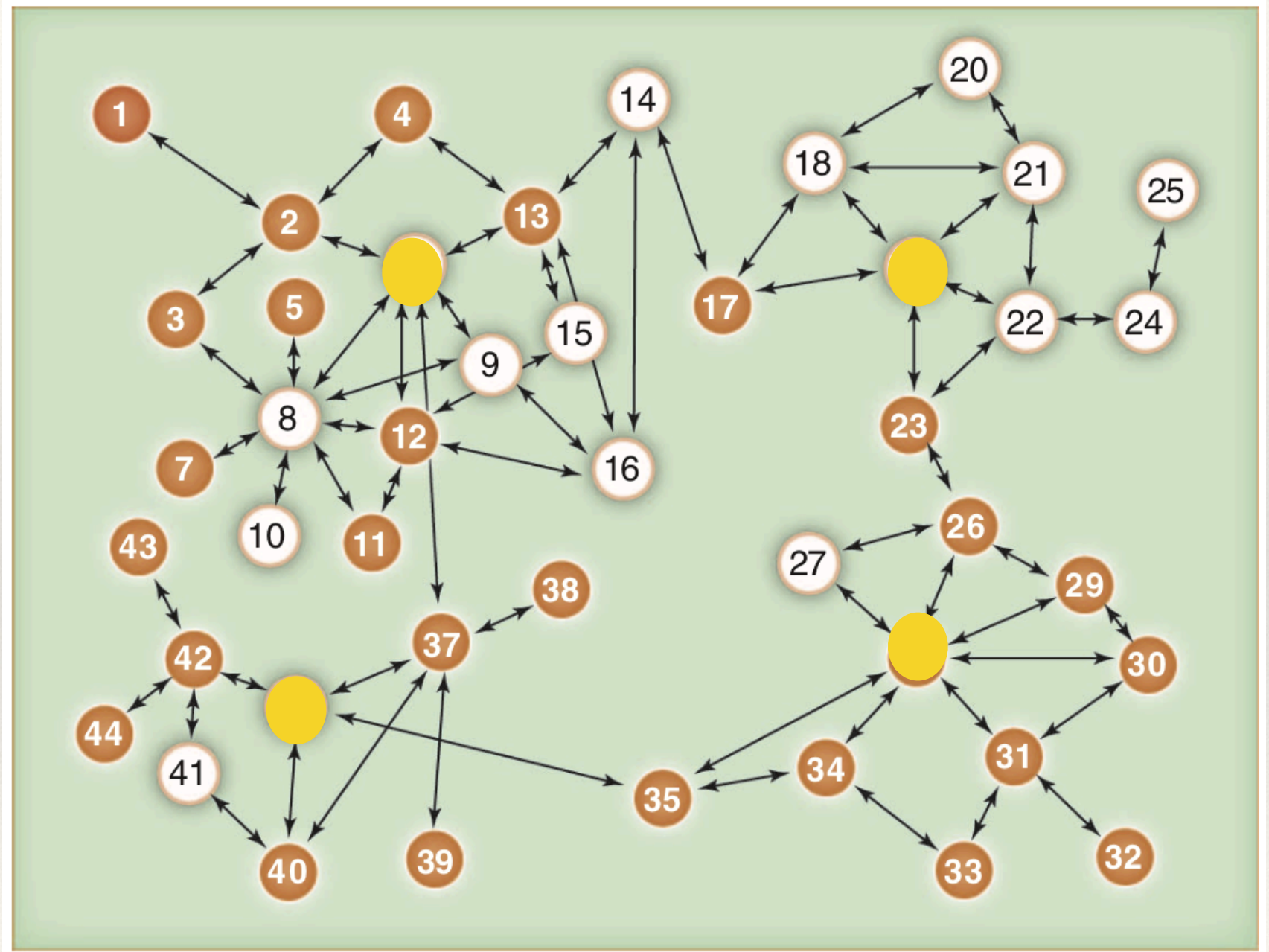
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- ❖ Use existing ties to spread the innovation.
- ❖ Word of mouth and active recruitment.



# Induction

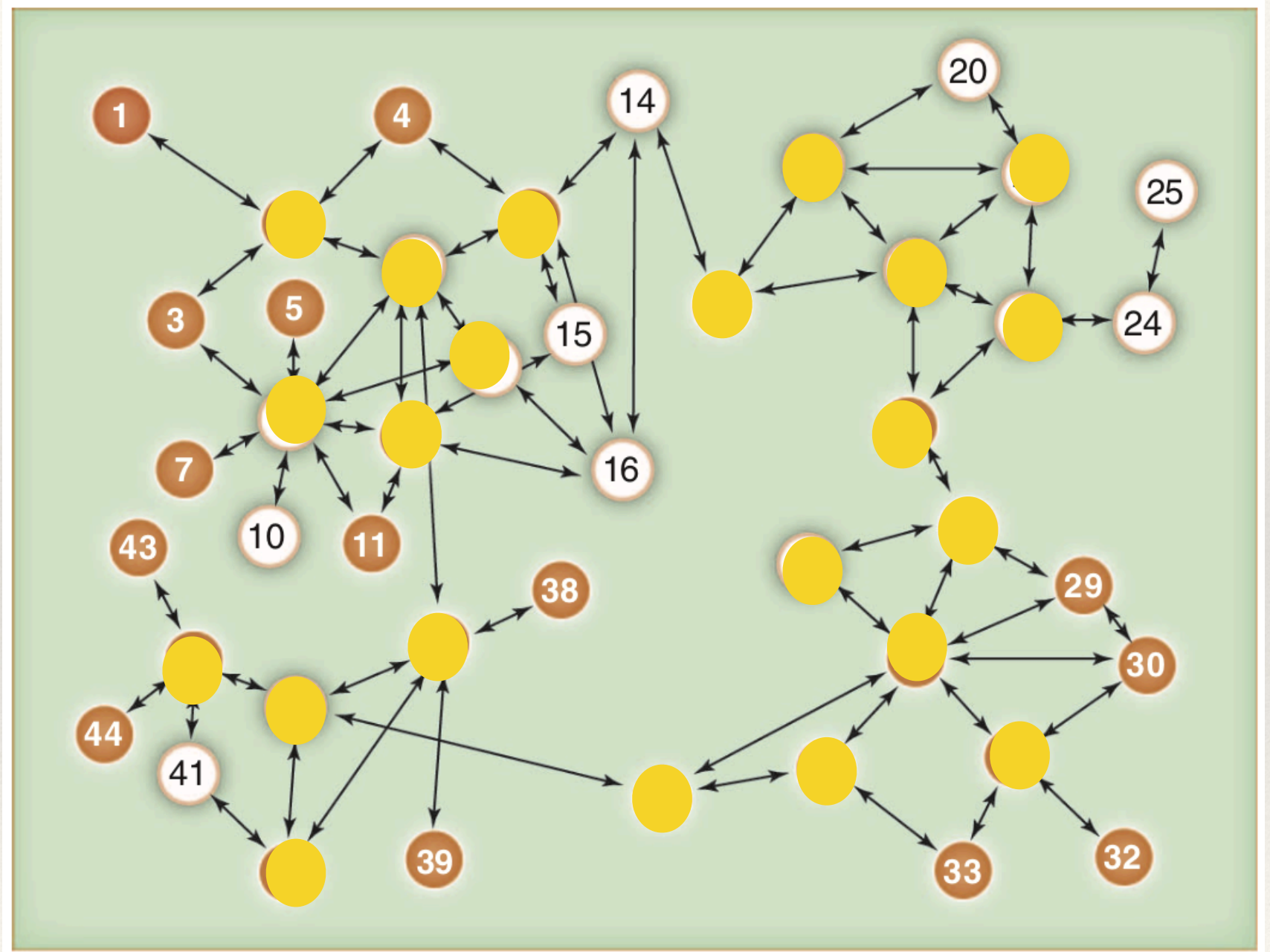
Here is a trial  
version of this  
product...





# Induction

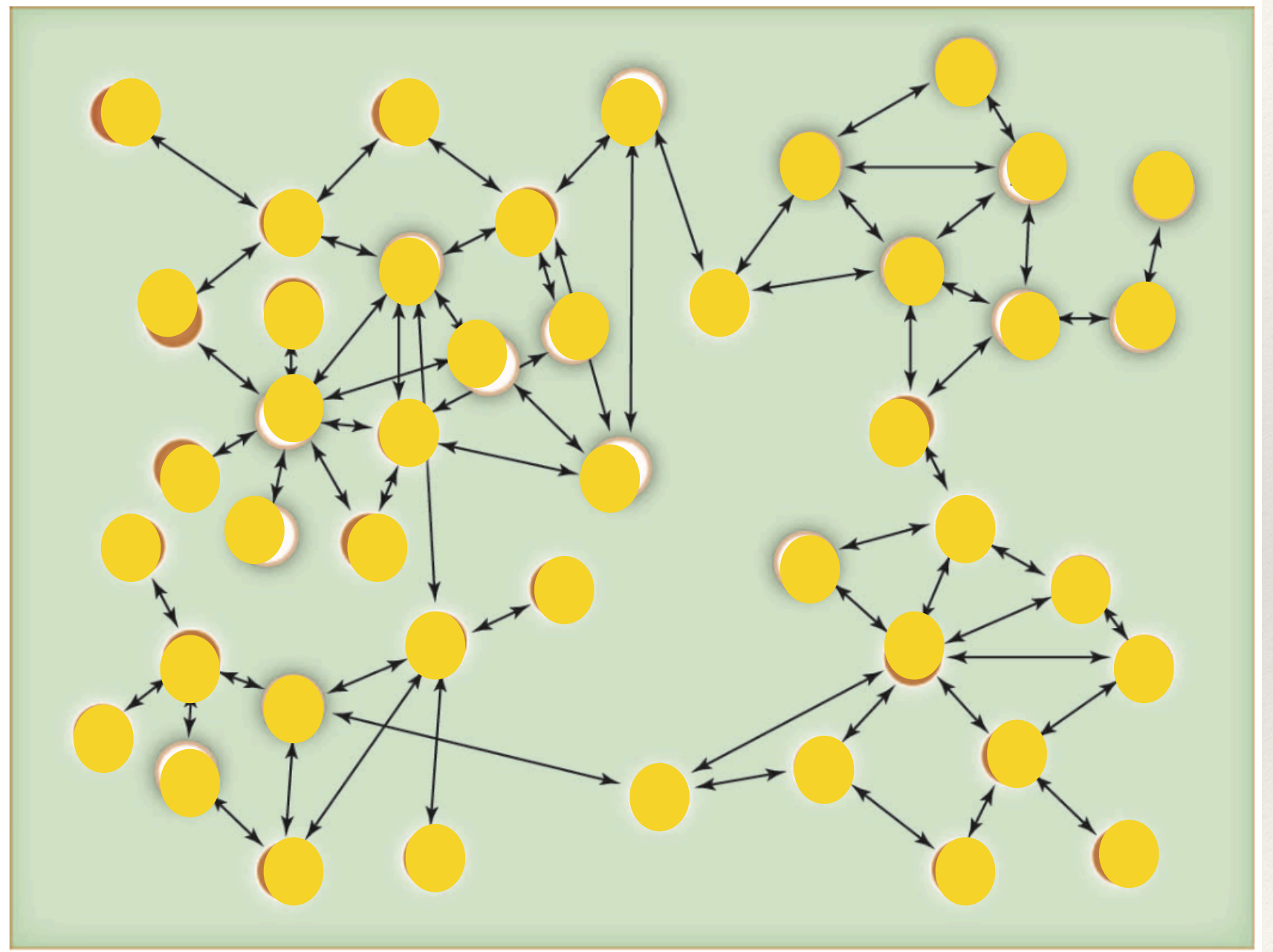
Tell your friends  
and they can  
activate their  
trial version as  
well...





# Induction

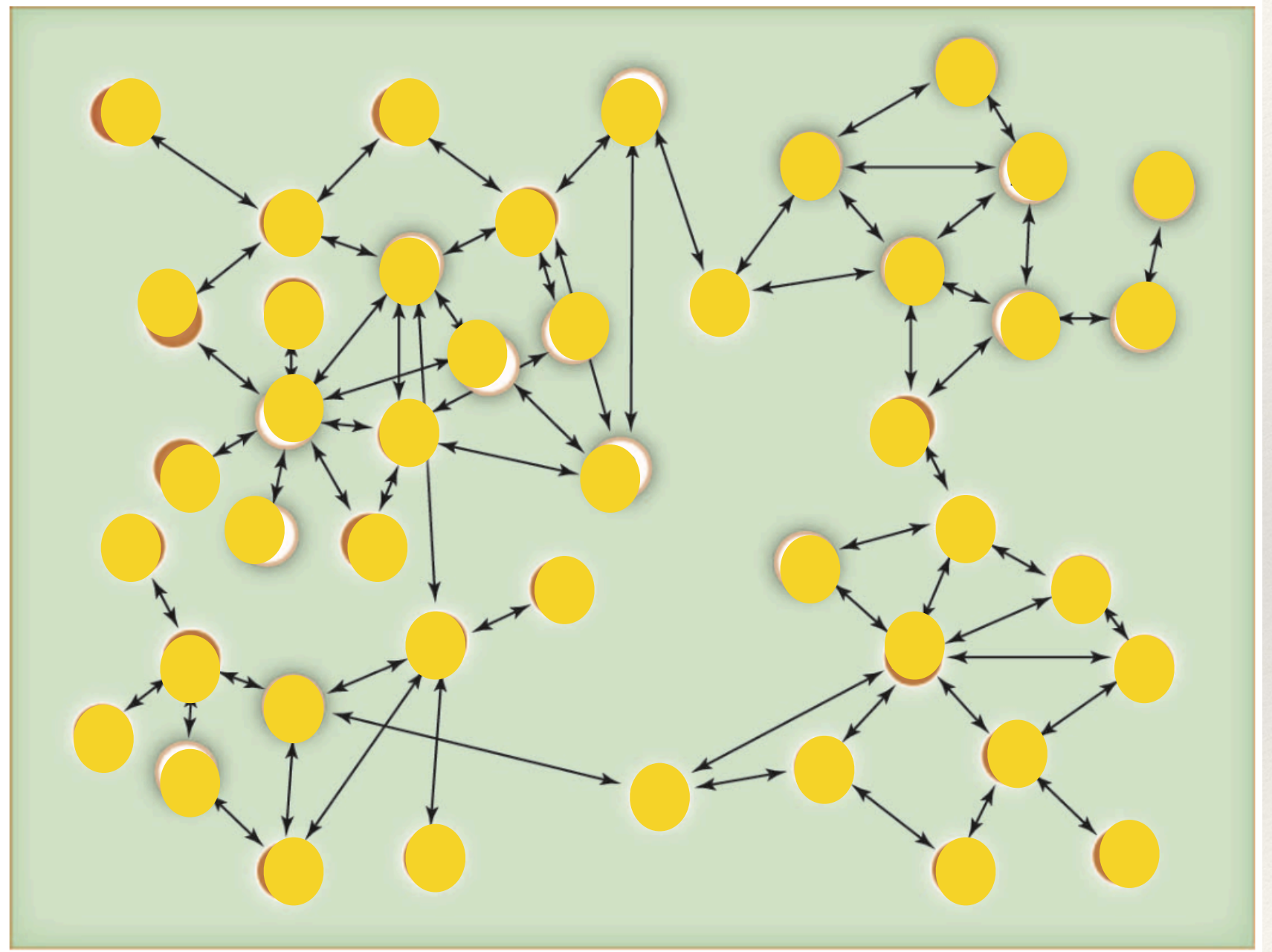
Tell them to tell  
their friends...





# Induction

This looks like  
viral spread.





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# How Behavior Spreads

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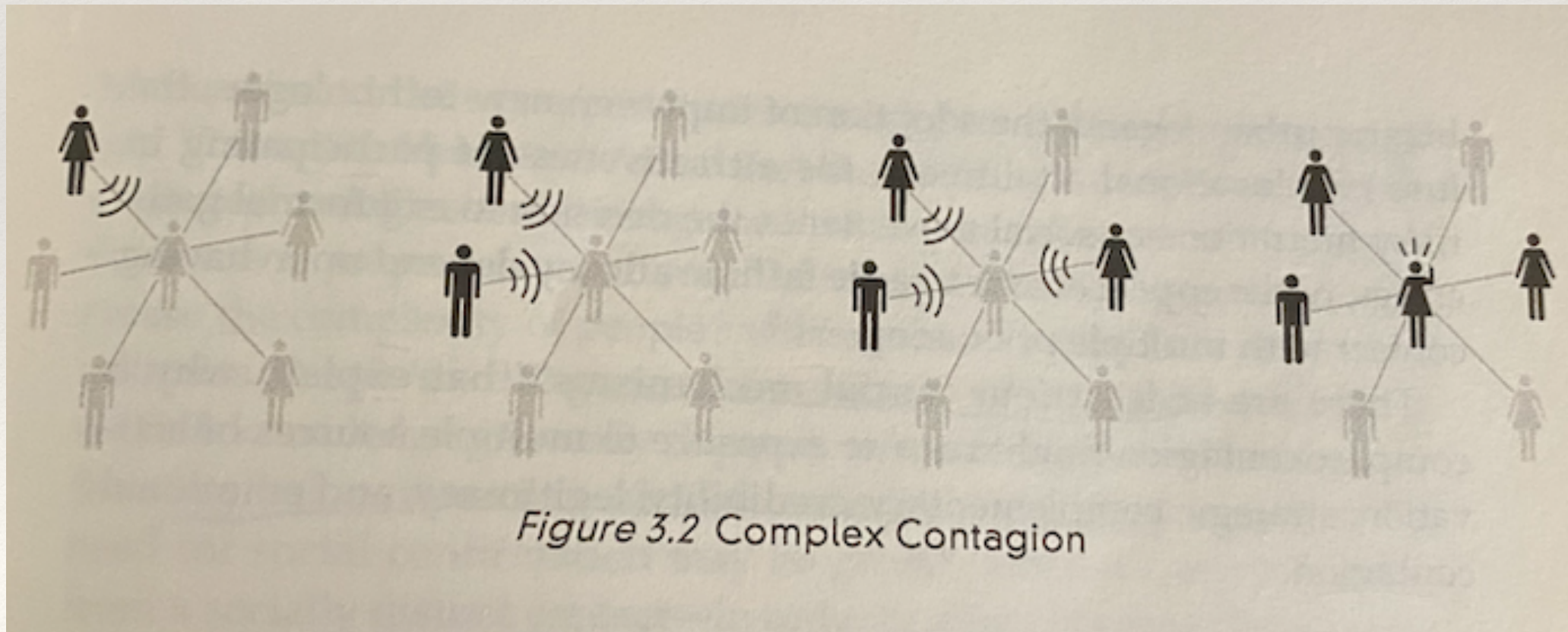
- ❖ Centola (2018)
  - ❖ Research on diffusion assumes a **viral** model of transmission:
    - ❖ A single exposure, and you get it.
    - ❖ Weak ties facilitate spread.





# How Behavior Spreads

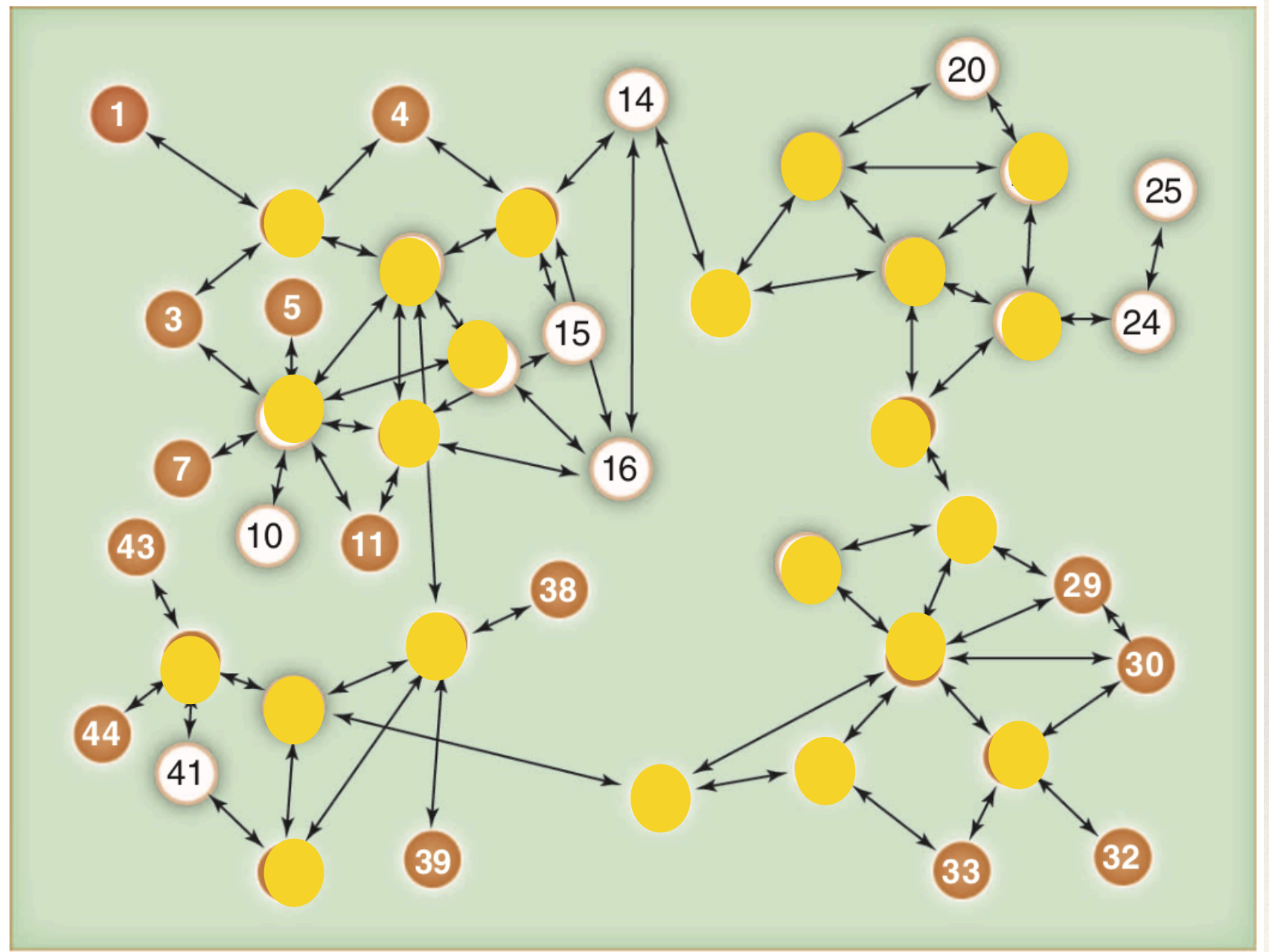
- ❖ Centola (2018)
  - ❖ But, research on *behavior* spread does not spread this way.
  - ❖ Behavior requires a “threshold” of exposure.





# Induction

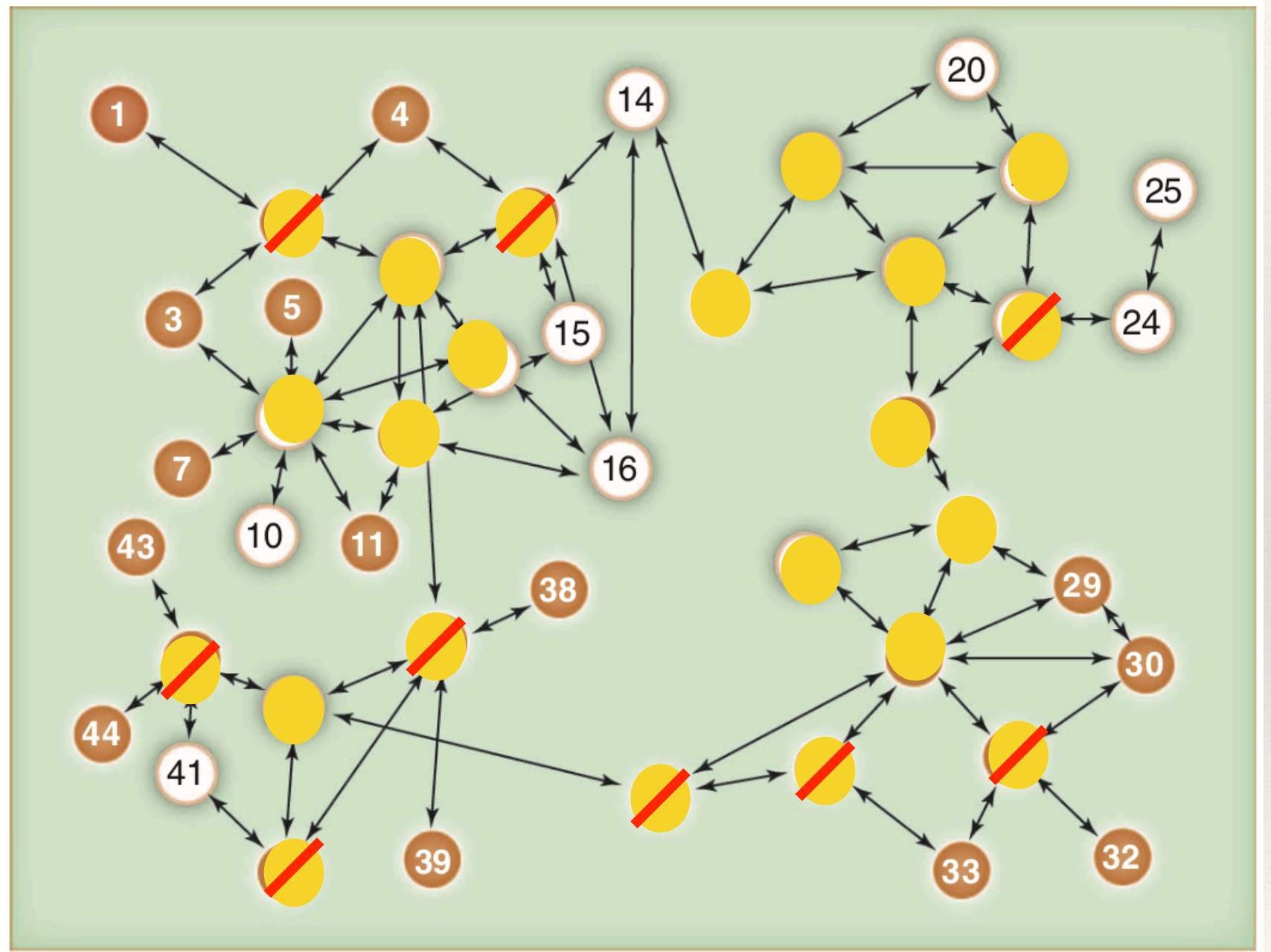
Tell your friends  
and they can  
activate their  
trial version as  
well...





# Induction

Might not work  
as well with a  
different  
distribution of  
adoption  
thresholds...





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# Alteration

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- ❖ Adding or removing nodes
- ❖ Adding or removing edges
- ❖ “Rewiring” existing edges



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# Network Interventions

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- ❖ Principles to consider:
  - ❖ What are the program goals?
  - ❖ What is the theory of behavioral change?
  - ❖ Who are the stakeholders?



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# Program Goals

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- ❖ What are you trying to do?
  - ❖ Increase cohesion? Fragment the network?
  - ❖ Increase centralization? Decrease it?
    - ❖ **Point:** the intervention is dependent on the content.



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# Behavioral Theory

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- ❖ Why do nodes change their behavior?
  - ❖ Do you want to increase it? Decrease it?
  - ❖ Why do people do things (motivations)? Why don't people do things (barriers)?
    - ❖ **Point:** an intervention needs a clear model of behavioral change.



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# Stakeholders

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- ❖ Who does this help and who is involved?
- ❖ “Insider” and “Outsider” knowledge.
- ❖ *Design Thinking* approach.



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# Learning Goals

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- ❖ Understand the logic of **network interventions** and the various approaches.
- ❖ Discuss various principles of **network interventions**.



Questions?



Break



# Discussion



## Network Theories and Theories of Networks\*

NETWORK THEORIES ("networks as <i>cause</i> ")			THEORIES OF NETWORKS ("networks as <i>effects</i> ")
<i>Explanatory Goal</i>			<i>Explanatory Goal</i>
<i>Explanatory Model</i>	Social Capital/ Performance ("why are the benefits?")	Homogeneity ("why are nodes similar?")	Network Structure ("why is the network this way?")
<b>Network Flow</b> (ties as pipes)	<u>Capitalization</u>  Definition: Acquisition to resources through ties and this influences human capital which contributes to performance.  Examples: Access to unique information via bridging ties. Information control benefits of structural holes. Solving problems through access to diverse knowledge.	<u>Contagion</u>  Definition: Nodes become similar through a process of "infection" where various "bits" are passed from one node to the other.  Examples: Diffusion of innovations. Peer influence. Disease transmission.	Examples: Homophilous Selection ("why do people with the same attitudes cluster together? They sort into these groups")
	<u>Cooperation</u>  Definition: Networks provide benefits that can coordinate multiple nodes in order to bring all their resources to bear on a problem.  Examples: Unionization. Collective efficacy in neighborhoods.	<u>Convergence</u>  Definition: Nodes adapt to their environments, and as a result nodes with similar structural environments will demonstrate similarities.  Examples: Administrative assistants have higher levels of communication in organizations.	Examples: Popularity ("why do some individuals receive more ties than others?")

\*Adapted From Borgatti and Halgin (2011) and adams (2020).