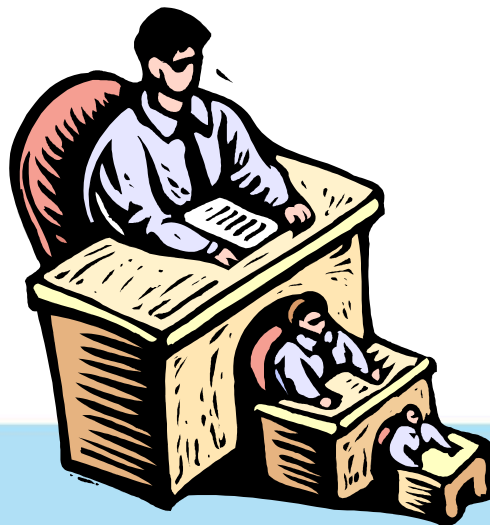


# Social Network Analysis as a Tool for Assessing Respondent Burden, Measurement Error and Nonresponse in Establishment Surveys



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*U.S. Census Bureau*

# Outline

Establishment surveys and multiple  
respondents

Social network analysis (SNA)

Research questions

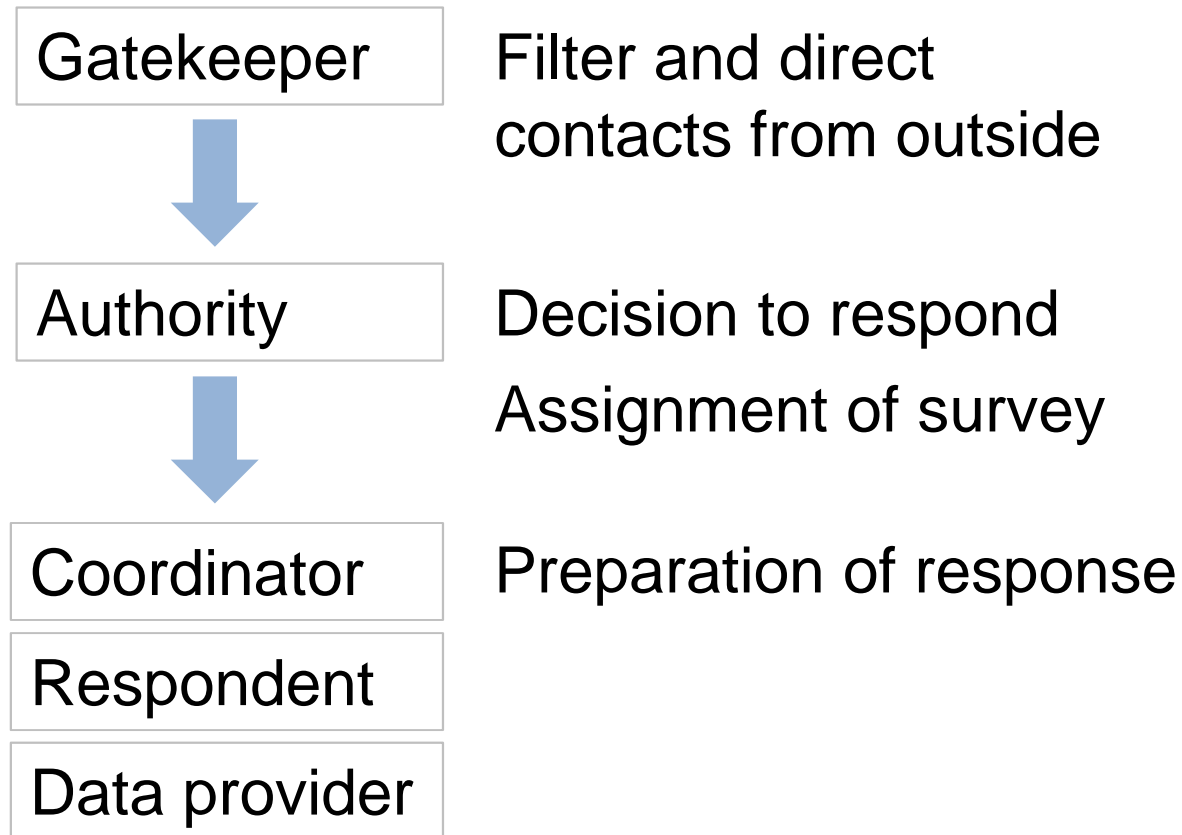


# One response, multiple respondents

Requested information is often distributed throughout an organization

- Role differentiation
  - Specialized topical knowledge, responsibilities
- Multiple information systems
  - Selective access
- Levels of consolidation
  - Establishment vs. division vs. enterprise

# Roles and processes



# Roles and processes *continued*

## Preparation of response

Coordinator

Ensures completion of survey

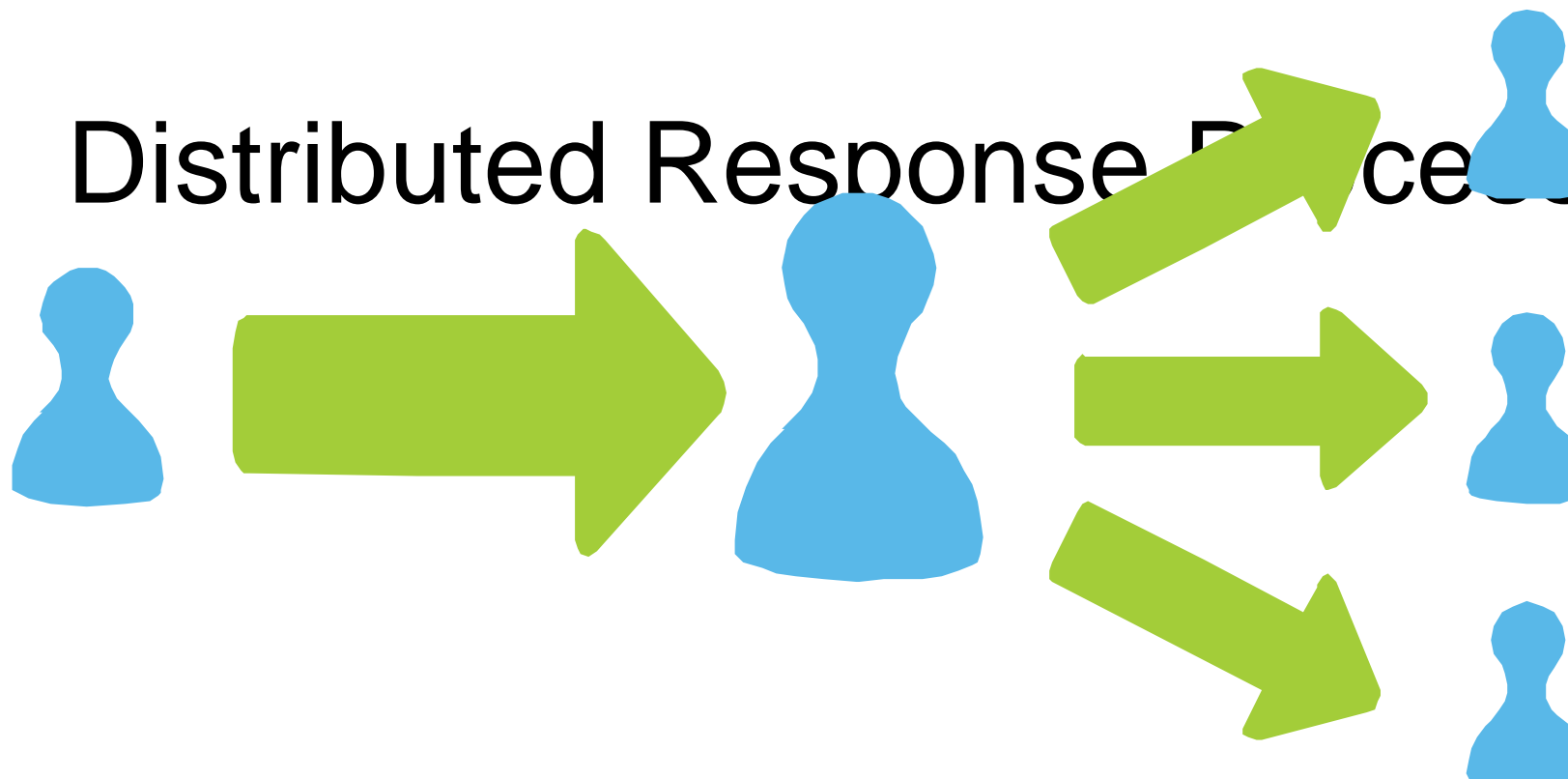
Respondent

Interacts with questionnaire

Data provider

Provides specific data upon request – no interaction with questionnaire

# Distributed Response Process



## Organizational norms *(Tuttle, 2009)*

- Coordinators want control
- Technical employees don't fill out forms

## Evidence

### Size matters – larger businesses

- Named contact person delegates survey response *(Ramirez, 1997)*
- “Passive” coordinators associated with poorer data quality *(Keller et al., 2011)*

### Hierarchy matters

- Higher-level respondents more likely to estimate or round figures *(citation)*

# Consequences

Response burden

Unit / item nonresponse

Measurement error



# Survey coordination

Find and obtain cooperation of respondents  
and data providers

Transmit request

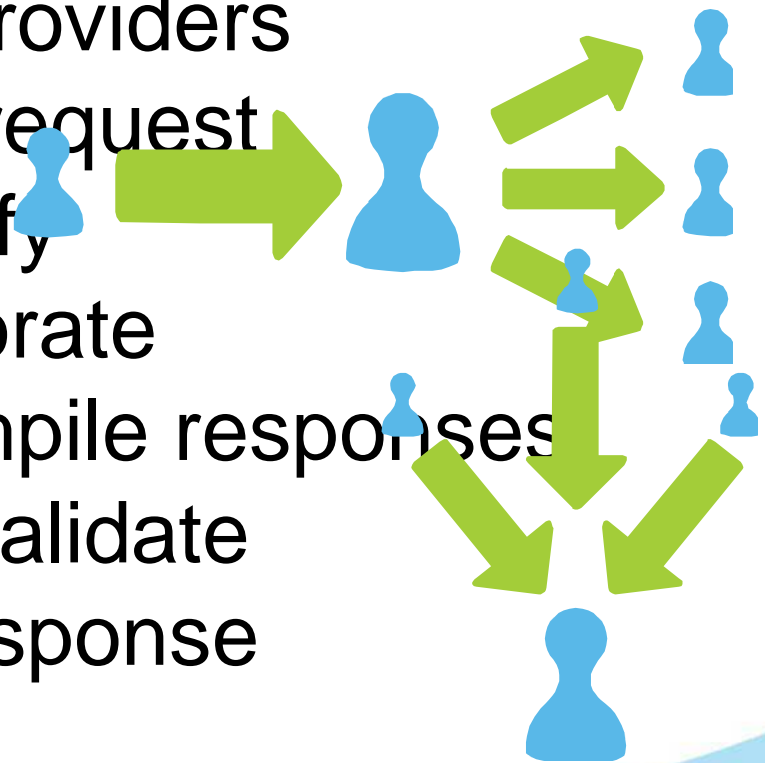
Clarify

Collaborate

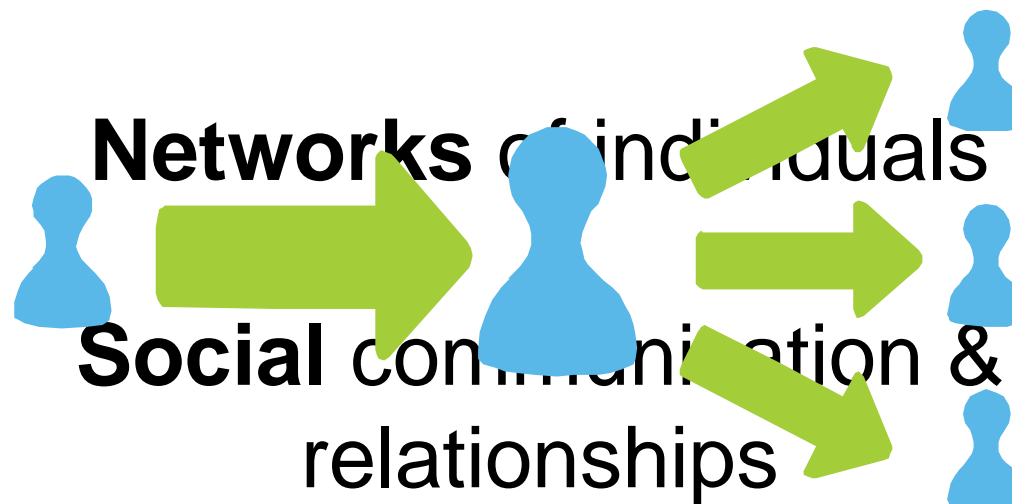
Receive data; compile responses

Review, validate

Submit response



# Distributed response process



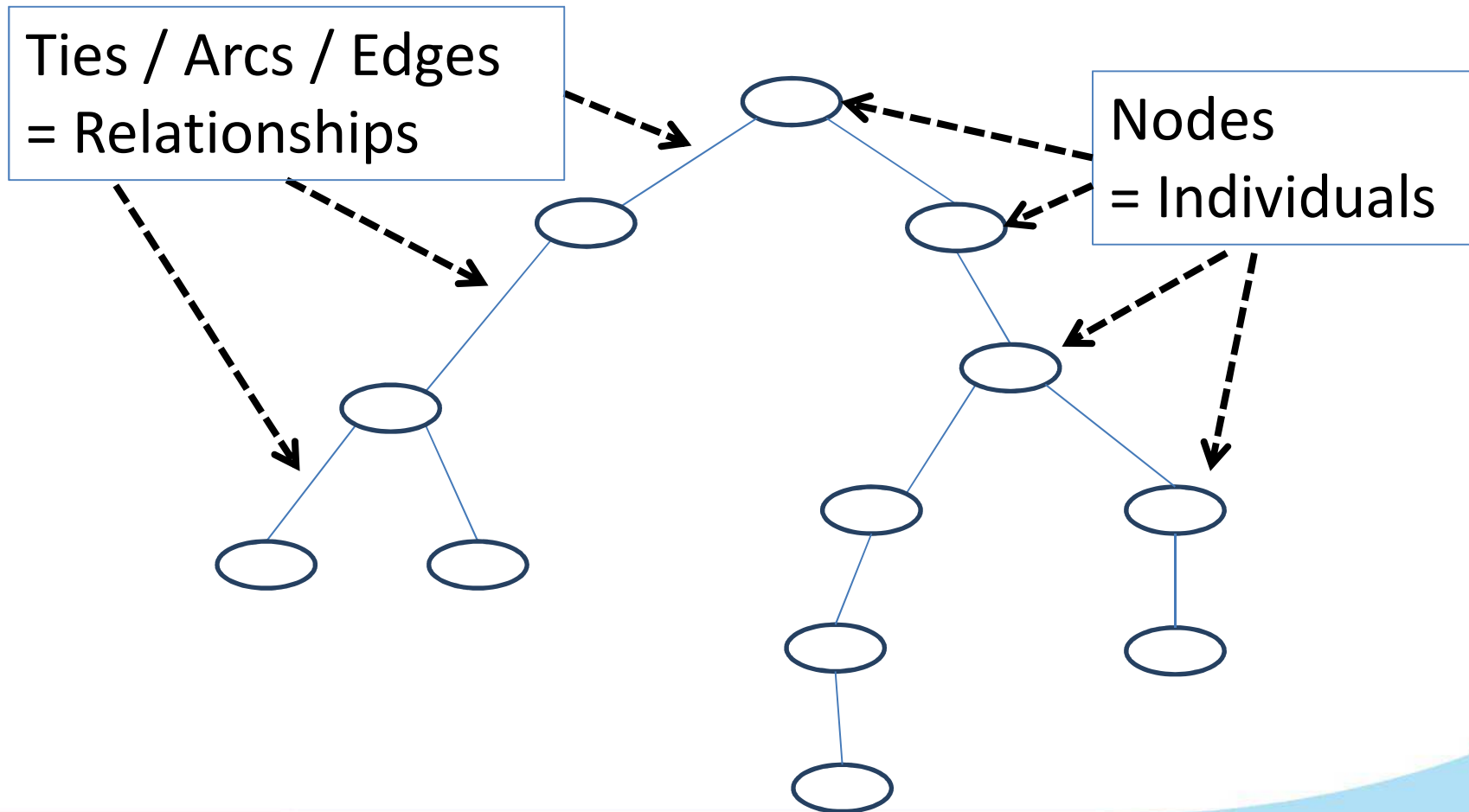
# Social Network Analysis (SNA)

Measure and characterize networks

Work processes, flows of information

Amenable to quantitative analysis

# SNA: basic terminology



# Social Network Analysis (SNA)

Interactions between network members

- Exchanges of information, influence

## Relationships

- Strength, common perception of relationship, mutual connections

## Structural characteristics

- Number of members in network, clustering, degrees of separation, stability, centrality, isolation/connection

# Types of networks in establishment survey response process

- “Broad” – Functional divergence
  - Specific type of knowledge
- “Deep” – Traverses levels of organization and/or accounting
  - Granular data

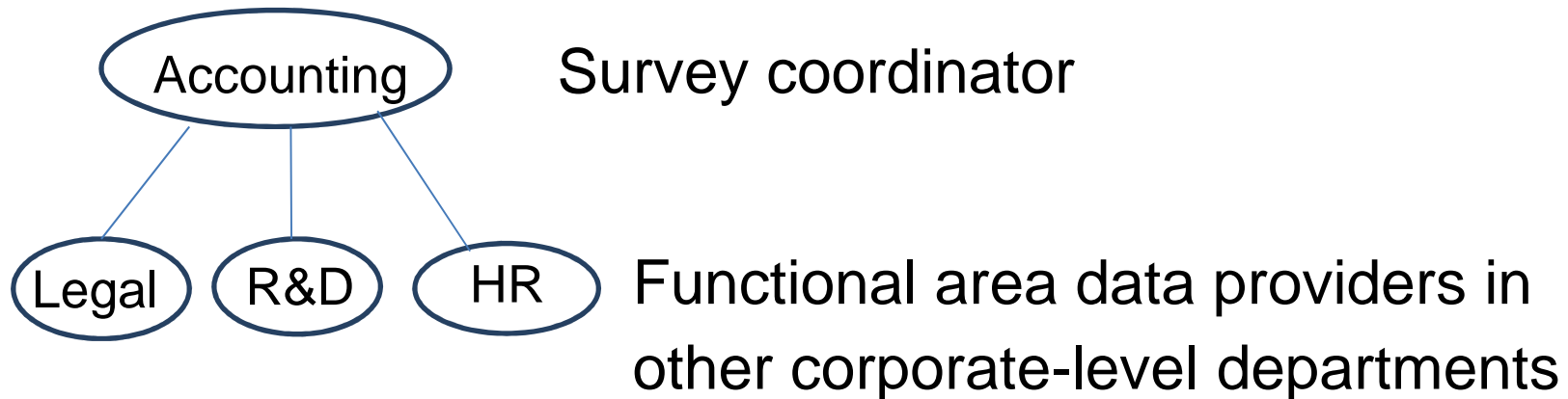
# “Broad” network

## *Business R&D and Innovation Survey*

Multiple topics

- Finance, R&D, patents, employees

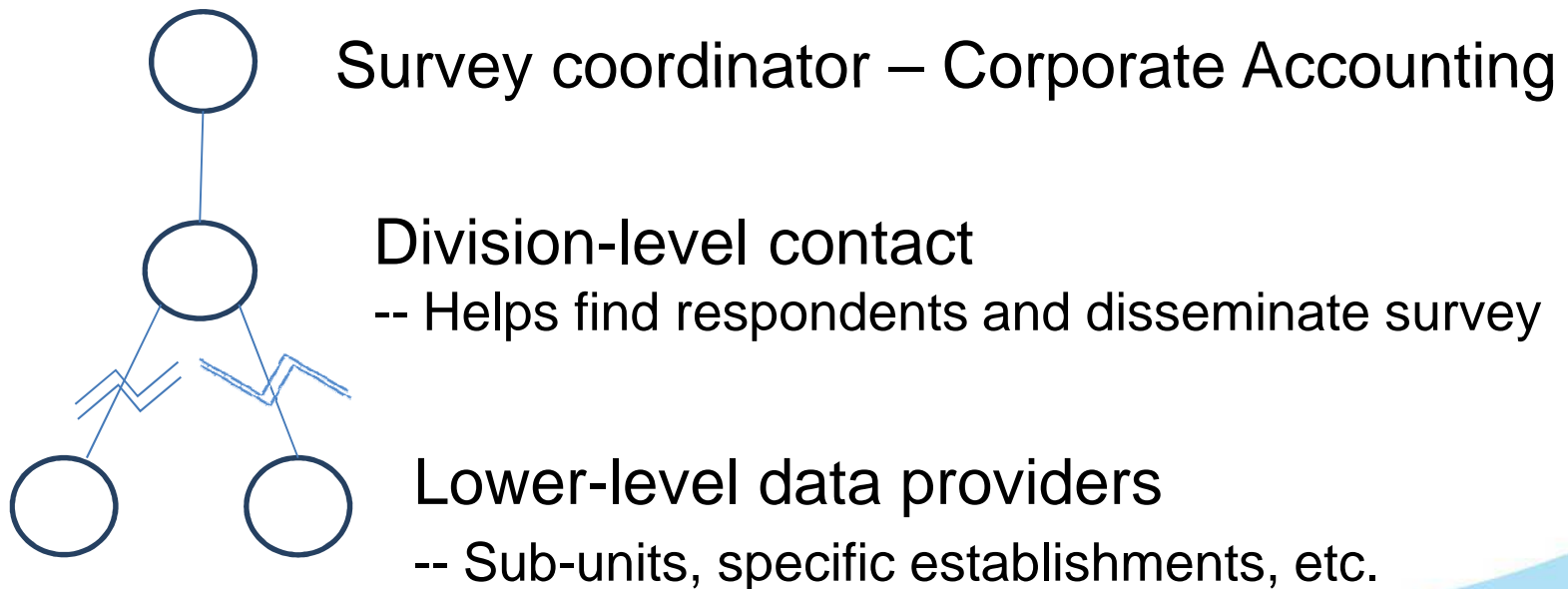
Functional divergence



# “Deep” network

## *Report of Organization*

- Detailed information about specific locations
- “Local” knowledge is required





# Research questions

Can we quantify respondent  
***burden?***

- How many steps does a survey take from coordinator to respondent / data provider?
- More nodes / edges, more burden?

Can we characterize networks that are

Research questions more / less associated with – continued

- **Measurement error**
- **Unit / item nonresponse rates**
- **Nonresponse bias**

Can we quantify **trade-offs** between burden, measurement error, nonresponse error / bias relative to characteristics of networks?

Are there ***interactions*** among network characteristics, error sources / sizes, and business attributes (e.g., size, industry, organizational structure)?

**Research questions** *continued*

Position of survey coordinator in corporate

Research variables hierarchy  
Secondary respondents and data providers

- Number and positions
- Motivation and cooperativeness
- Which items they assisted with

Prior or new relationships

Requests for assistance – attempts,  
outcomes

# Research variables *continued*

Degree and type of involvement  
of survey coordinator (active vs.  
passive)

Knowledge of business  
activities and records of all  
participants

# Application of SNA results to survey design and analysis

Leverage efficient organizational processes

Identify weak points in organizational processes

# Application of SNA results to survey design and analysis *continued*

Examine respondent SNA metrics relative to indicators of data quality

- Edit failure/imputation rates
- Error propensities

Identify weak points in survey networks

- Opportunities to adapt survey design to business processes
- Forecast problems and enable targeted interventions

# Thank you!

Questions, suggestions?

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