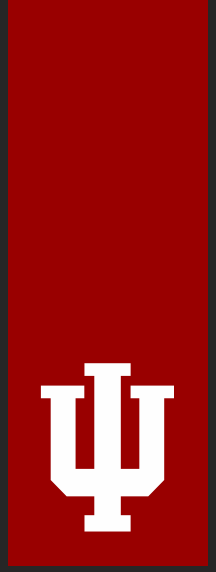


Lilian Yahng & Ashley Clark

Designing and Conducting Quality Research:

What is ‘good research’?: Designing and evaluating quality studies

INDIANA UNIVERSITY BLOOMINGTON
Center for Survey Research

1. Technological tools and best practices for conducting web surveys – Oct. 9
2. ***What is 'good research'?: Designing and evaluating quality studies – Nov. 8***
3. Developing and testing quality data collection instruments – Feb. 27

Part 1

Background

Who we are

- Us
  - Ashley Clark (afbowers@indiana.edu)
  - Lilian Yahng (lyahng@indiana.edu)
- Our organization
  - Center for Survey Research
- Our experience
  - Graduate level training and CE in survey research methods
  - Professional organizations and conferences
  - Experience conducting and consulting on hundreds of projects

Road map

- What we'll cover today
  - Process-task view of surveys
  - Total Survey Error (TSE) framework
  - Sources of error
- Sources for materials
  - Reference list at end + surveys we've worked on
- Didn't cover what you wanted?
  - Stick around and talk or come to consulting hours

Please stop me at any time to share your experiences, ask questions, etc.

Before we dive in...What is a survey?

Systematic method of gathering information from (a sample of) population elements (e.g., adults, schools) with the goal of making inferences to the population

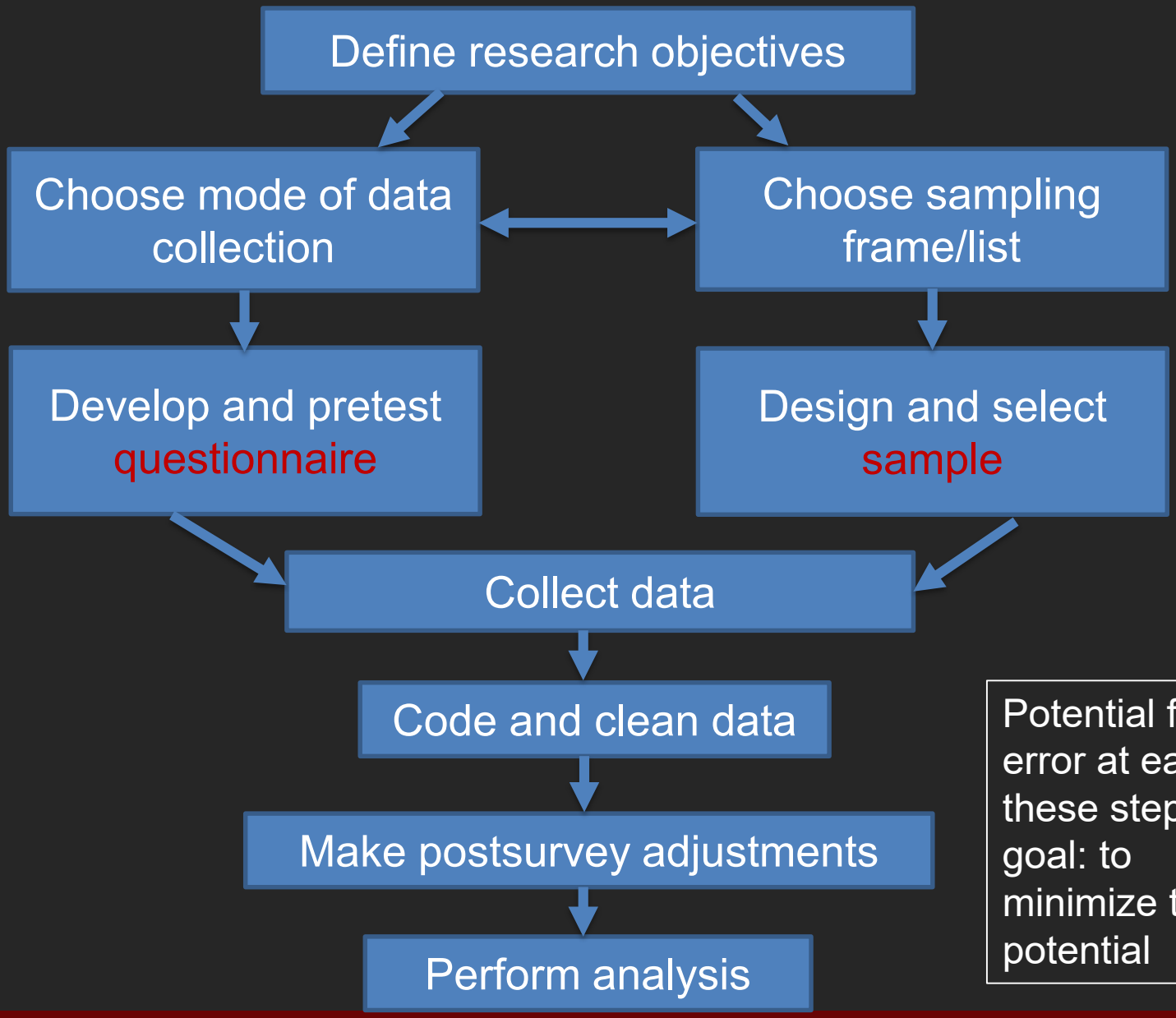
- Usually some form of random sampling
- Usually standardized administration of survey questionnaire

Whoa... but I'm not doing a survey, I'm doing qualitative research, observations, etc.. that's fine too!

Part 2

Process-Task View of Survey/Research Process

Process or task view of survey research (Groves et al., 2009)



Potential for error at each of these steps, our goal: to minimize that potential

Hoosier Life Survey, Environmental Resilience Institute

- Website references:
  - eri.iu.edu/news/hoosier-life-survey.html
  - survey.indiana.edu/HoosierLife/interface

The Environmental Resilience Institute is supported by IU's Prepared for Environmental Change Grand Challenge, which brings together a broad, bipartisan coalition of government, business, nonprofit and community leaders to help Indiana better prepare for the challenges that environmental change brings to our economy, health and livelihood.

How many of you have...

1. Drawn a sample or recruited participants?
2. Developed questions for a survey, interview or focus group guide, observation form?
3. Collected data (in-person, mail, telephone, web) from participants?
4. Coded or cleaned data?
5. Weighted or imputed data?
6. Analyzed data?

So... based on these different tasks/steps in survey/research process...

What are some of the challenges in getting them done well for the Hoosier Life Survey (or any survey)? Take a moment and think of your top 3.

1.

2.

3.

Part 3

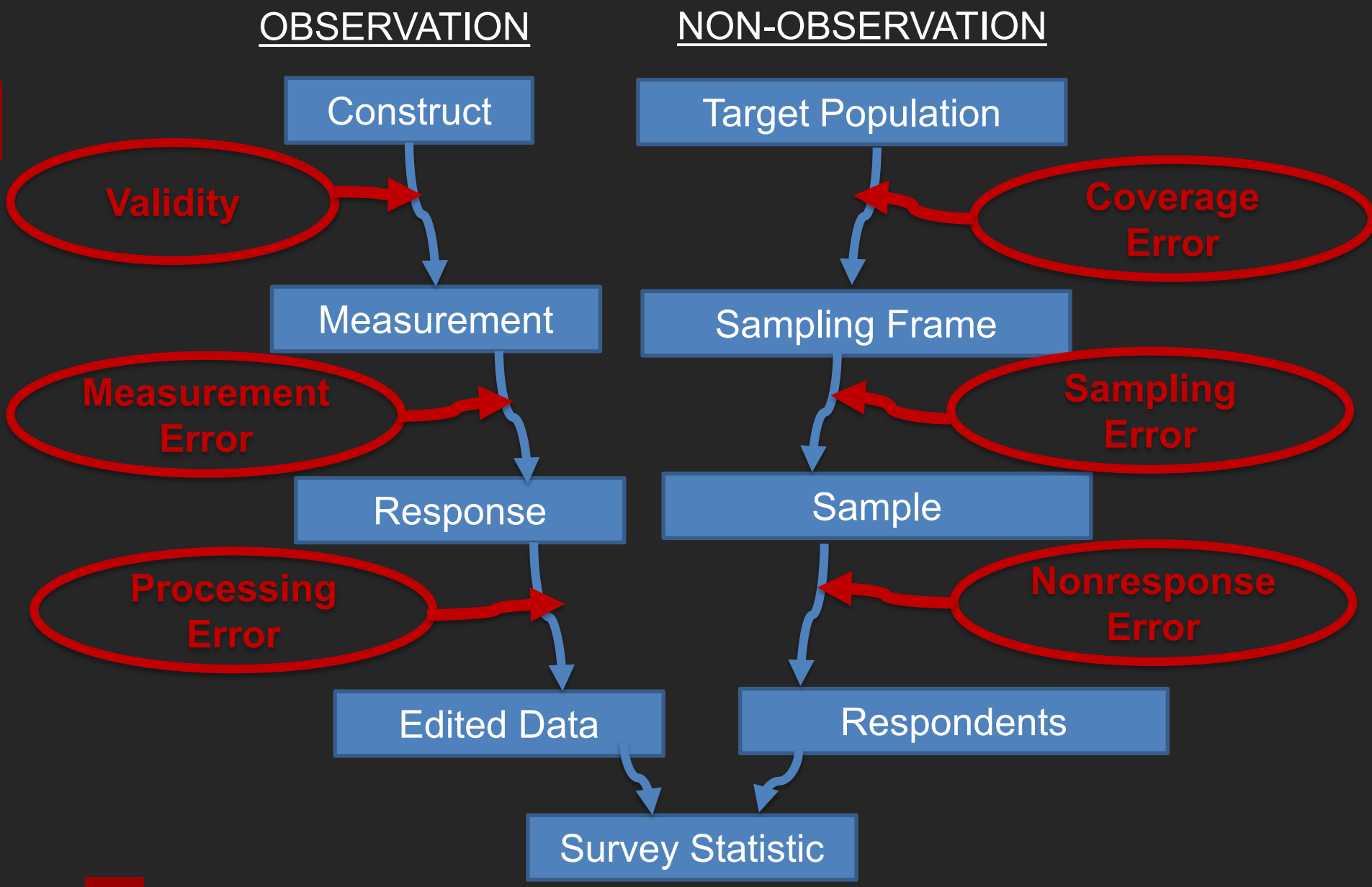
Total Survey Error View of Survey/Research Process

What is "Total Survey Error"?

A widely accepted framework (Groves, 1989) for conceptualizing the sources of potential "error"

- "Error" (survey error) – deviation from what is desired in the survey process or from the "true" statistic in the population
- Assumes some form of random sampling
- Two major categories of survey error:
    1. Errors of Observation – *what* is being measured (focus next time)
    2. Errors of Non-Observation – *who* is being measured/not measured (focus today)

Total Survey Error (Groves, 1989)



TSE – Error Sources (de Leeuw et al., 2008)

- Errors of observation - Departures of survey estimate from population value because of deficiencies in measurement process
  - **Construct validity** – Extent to which measurement instrument measures intended construct
  - **Measurement error** – Error due to discrepancies between response and the true value instrument is designed to measure
    - Respondent
    - Questionnaire
    - Interviewer
    - Mode of data collection
  - **Processing error** – Error introduced due to processing after data collected (e.g., cleaning, data entry, coding, etc.)

TSE – Error Sources (cont'd)

- Errors of nonobservation - Departures of survey estimate from population value because of failures to measure some population members
  - **Coverage error** – Error when sampling frame includes omission, duplication or wrongful inclusion of element from target population
  - **Sampling error** – Error due to taking a sample rather than measuring every unit on the sampling frame
  - **Nonresponse error** – Error due to failure to collect information from all sample members and those who respond are different from the nonrespondents (NRs) on estimate of interest

Additional considerations

- Errors have both bias and variance components
  - Bias: systematic departures between expected value of survey estimate and population value (ex: coverage)
  - Variance: dispersion (over conceptual replications) of departures between survey estimate and expected value of survey estimate (ex: sampling)
- Errors specific to individual survey estimate, not the entire survey
- Techniques to measure and reduce error sources

Hoosier Life Survey

Take a few minutes and think about concerns you might have about the following error sources:

- Coverage error?
- Sampling error?
- Nonresponse error?
- Measurement error?

Other survey quality considerations (beyond TSE)

- Cost — are monetary resources optimized?
- Ethical considerations — is respondent burden minimized?
- Timeliness
- Professionalism — are staff provided with clear behavioral guidelines and professional training, is there demonstration that analyses and reporting have been impartial?
- Design Constraints — are there context-specific constraints on survey design that may have an impact on quality (for example, using a different interviewing approach in one culture than in others)?

Part 4

Error Sources: (1) Coverage Error

Coverage error: Target population → frame

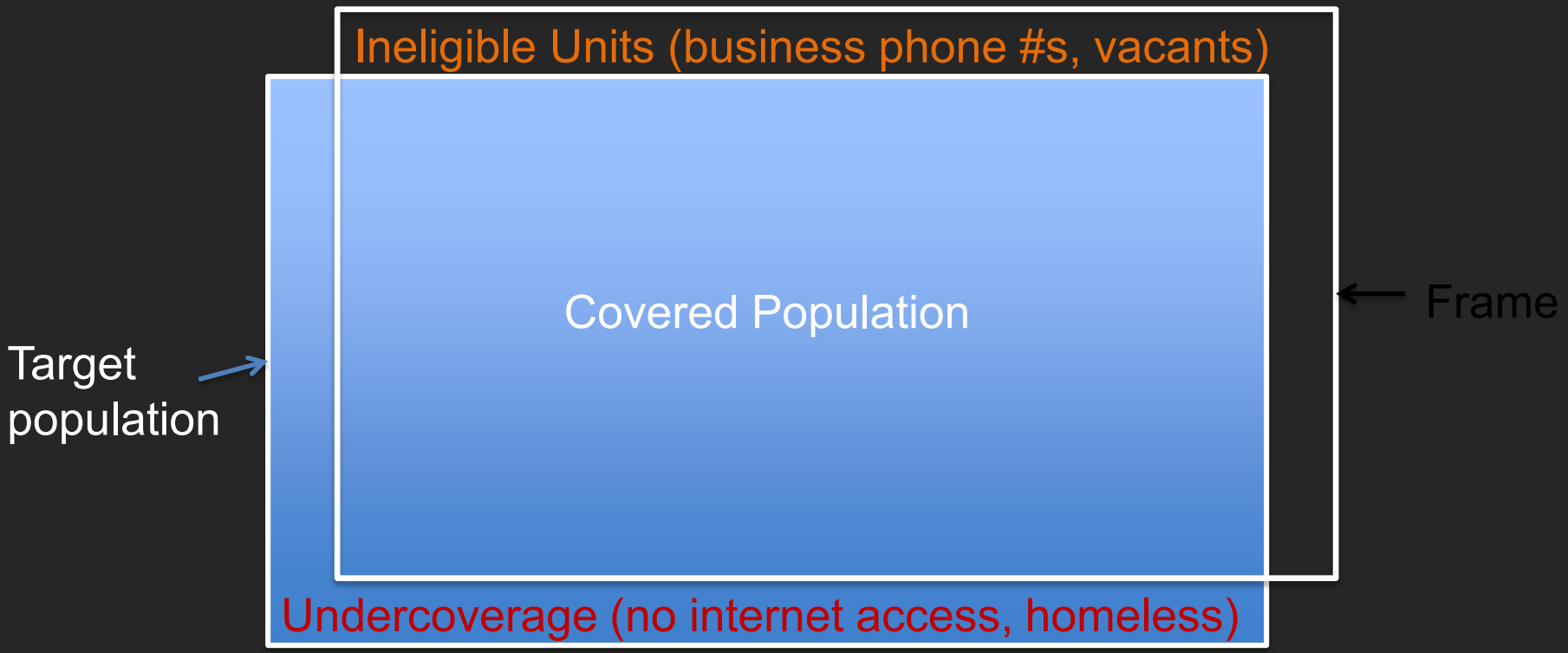
- Elements – fundamental units of population
  - Examples: Persons, teachers, software users, businesses
- Target population – group of elements to which inference will be made
    - (Community needs assessment) Non-institutionalized civilian residents of Monroe County, Indiana living in households who are 18 years of age or older in November 2019
    - (Client needs/satisfaction survey)
      - All clients who have used Monroe County Public Library services…
      - in the past 18 months prior to survey

Coverage error: Target population → frame

- Sampling frame - Materials, procedures, and devices that identify, distinguish, and allow access to the elements of target population (Lessler and Kalsbeek, p. 44)
    - List of telephone numbers based on phone company data
    - United States Postal Service list of addresses
    - List of association members
    - Email list of IU students
    - Indiana Department of Education list of superintendents

Goal: 1:1 match between sampling frame and target population.

Overcoverage and Undercoverage



Coverage Bias of the Mean

$$\bar{Y}_c = \bar{Y} + \frac{N_{nc}}{N}(\bar{Y}_c - \bar{Y}_{nc})$$

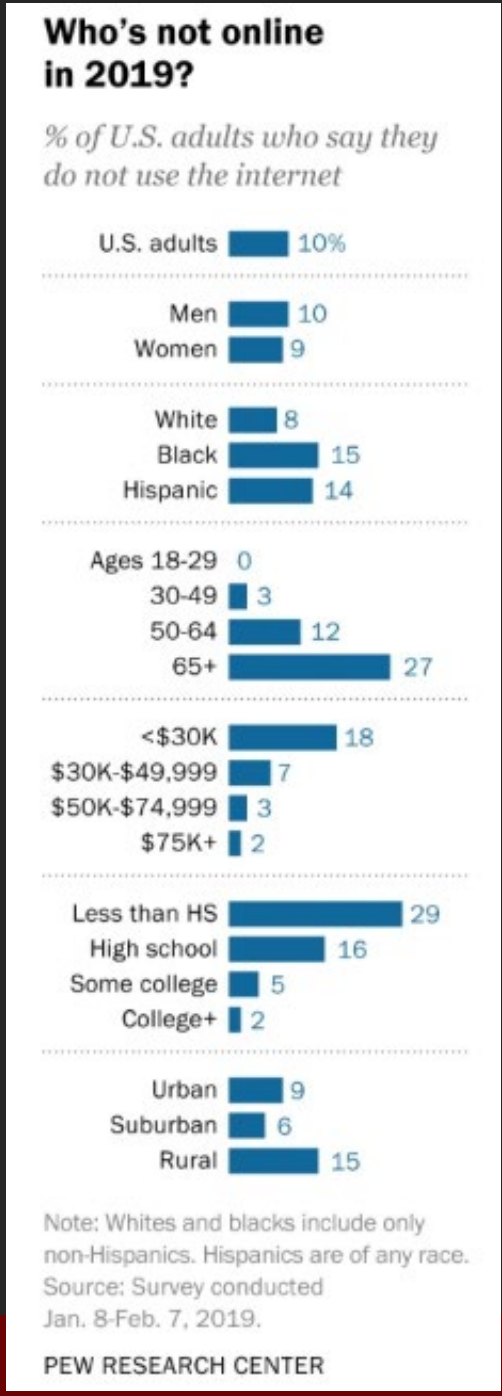
Coverage bias introduced into survey estimates when:

- Noncoverage rate is high (noncovered denoted by “nc”)
- Noncovered population members are different from covered population members (denoted by “c”) on estimate of interest

Assumes there is a sampling frame – but there may not be...

What percent of US adults are not online? (see www.pewresearch.org/fact-tank/2019/04/22/some-americans-dont-use-the-internet-who-are-they/)

1. 65+: 27%
2. <$30K income: 18%



Online Panels

- Based on random sample
  - Households are not permitted to "self-select" into panels
  - Selected using a random sampling method like ABS or RDD
  - Cover households without online access by providing a free computer and Internet service
- Not based on random sample (opt-in)
  - Self-selected
  - Recruited through variety of methods including online communities, social networks, and websites

Wide range of online panels/participant pools, including (but not limited to):

- AmeriSpeak (NORC)
- Ipsos KnowledgePanel
- YouGov
- Harris Poll Online
- Amazon Mechanical Turk
- Qualtrics
- SurveyMonkey
- eRewards

Questions to evaluate potential for coverage error (AAPOR, 2016)

- How is the target population defined and what sampling frame was used to select from the target population?
- Did most members of the target population have a chance to be selected using the frame?
  - Use frames with high coverage, multiple frames (see later slide for Indiana Nonprofits Survey)
- How different are those who had a chance to be selected from those who didn't?
  - Compare and adjust to known population data

Questions to evaluate potential for coverage error (cont'd) (AAPOR, 2016)

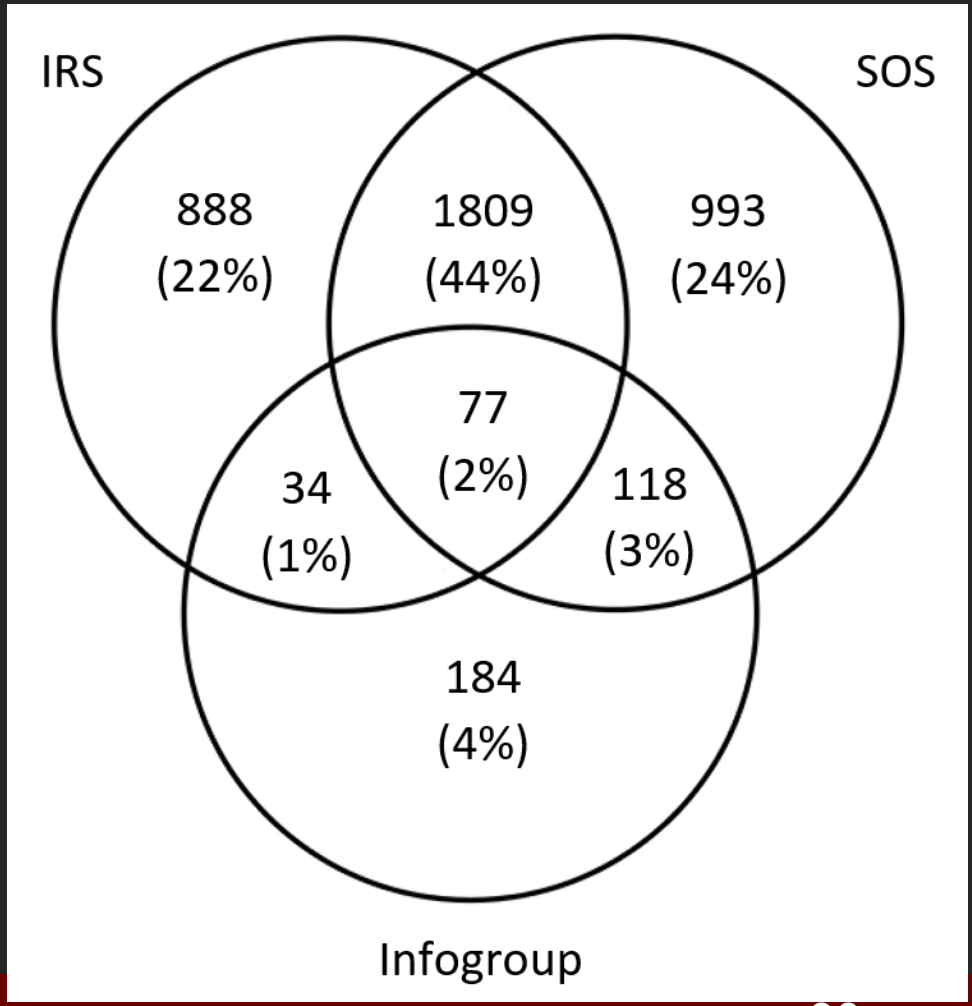
What if there is no sampling frame (opt-in online panel)?

- How were potential respondents identified and recruited?

And...ensure your target population and sampling frame are clearly defined in your research proposal and documentation.

Example: Indiana Nonprofits Survey

- IRS = Internal Revenue Service
- SOS = Secretary of State
- Infogroup = Listing of churches, mosques, synagogues, temples, etc. from Yellow Pages



Part 4

Error Sources: (2) Sampling Error

Sampling error: Frame → sample

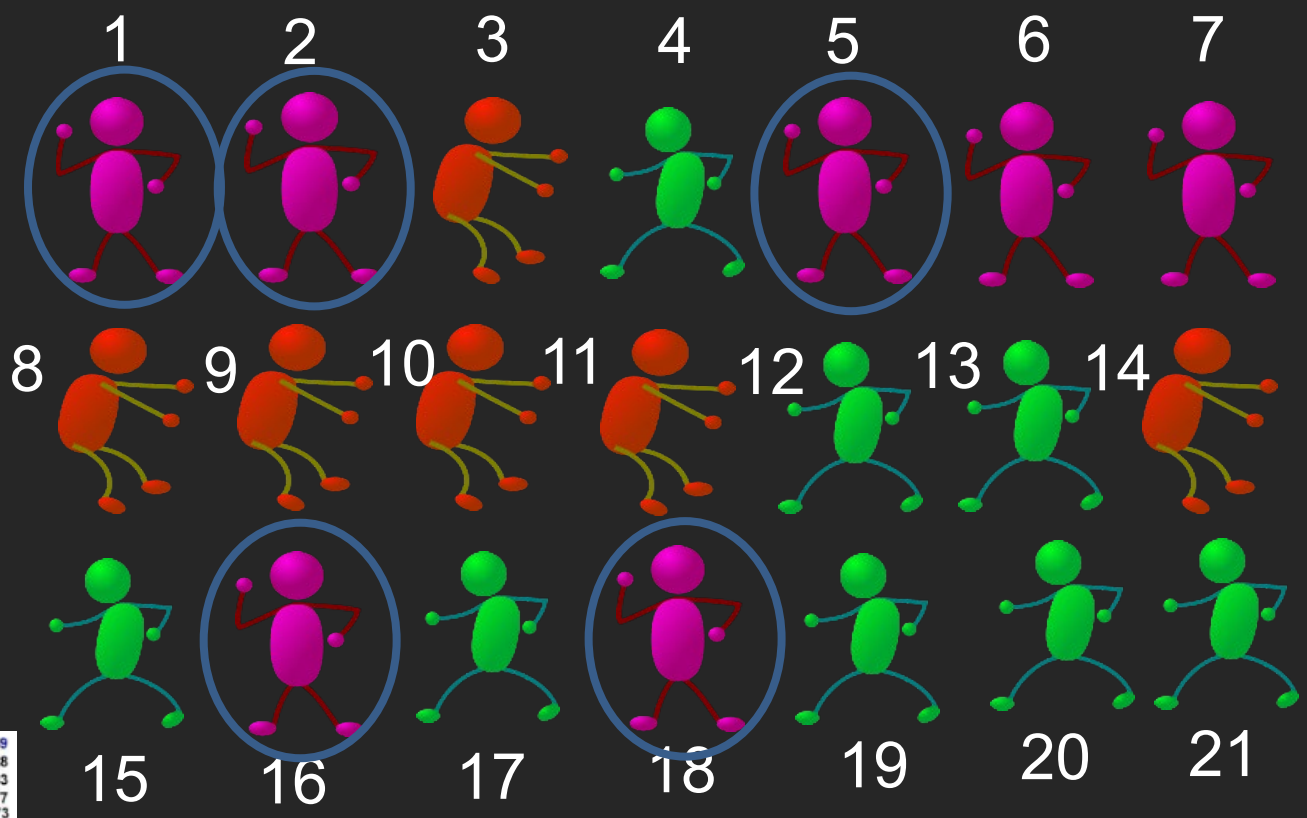
Zero sampling error: When does this happen? Why NOT sample?

- Probability sampling - Each element in sampling frame has probability of selection that is:
  - Known
  - Nonzero
  - Not necessarily equal
- Can use one sample to make estimates about population with a known level of precision
- Non-probability sampling can introduce bias (but advantages and appropriate for particular purposes)

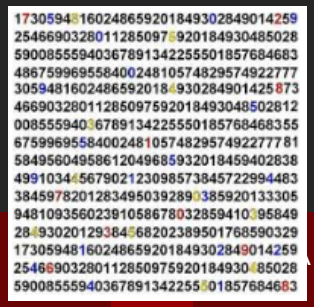
Sampling error: Frame → sample

- Methods
  - Simple random sampling
  - Stratified sampling
  - Cluster sampling
- Sample size – larger sample, reduces sampling error

Simple random sampling



1 16 18 2 5



Number population members 1-21, select 5 at random (w/o replacement)

Stratification

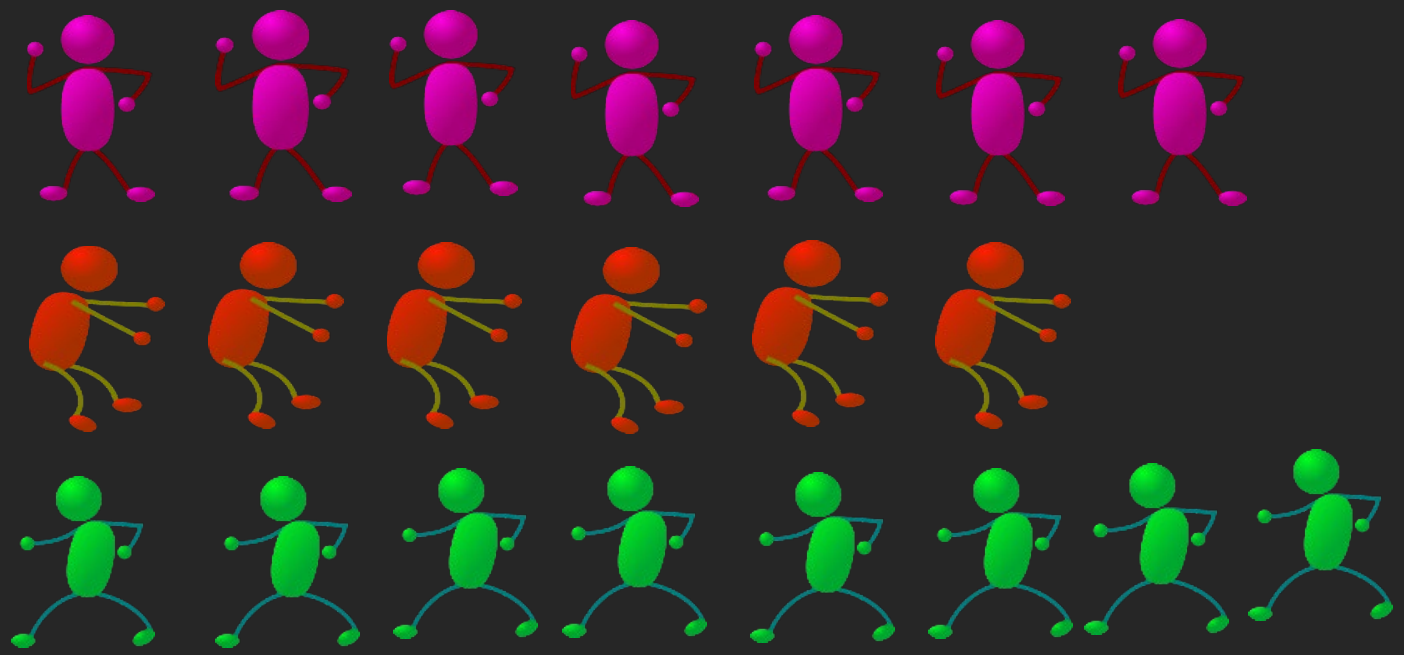
- Stratified Sampling
  - Elements on frame can be divided into separate groups (strata) and separate samples taken from strata
    - Proportionate stratification (ensure representative sample on stratification variables)
  - Identification of and number of stratification variables
  - Reduces sampling error

Stratified sampling

Pink Stratum

Red Stratum

Green Stratum



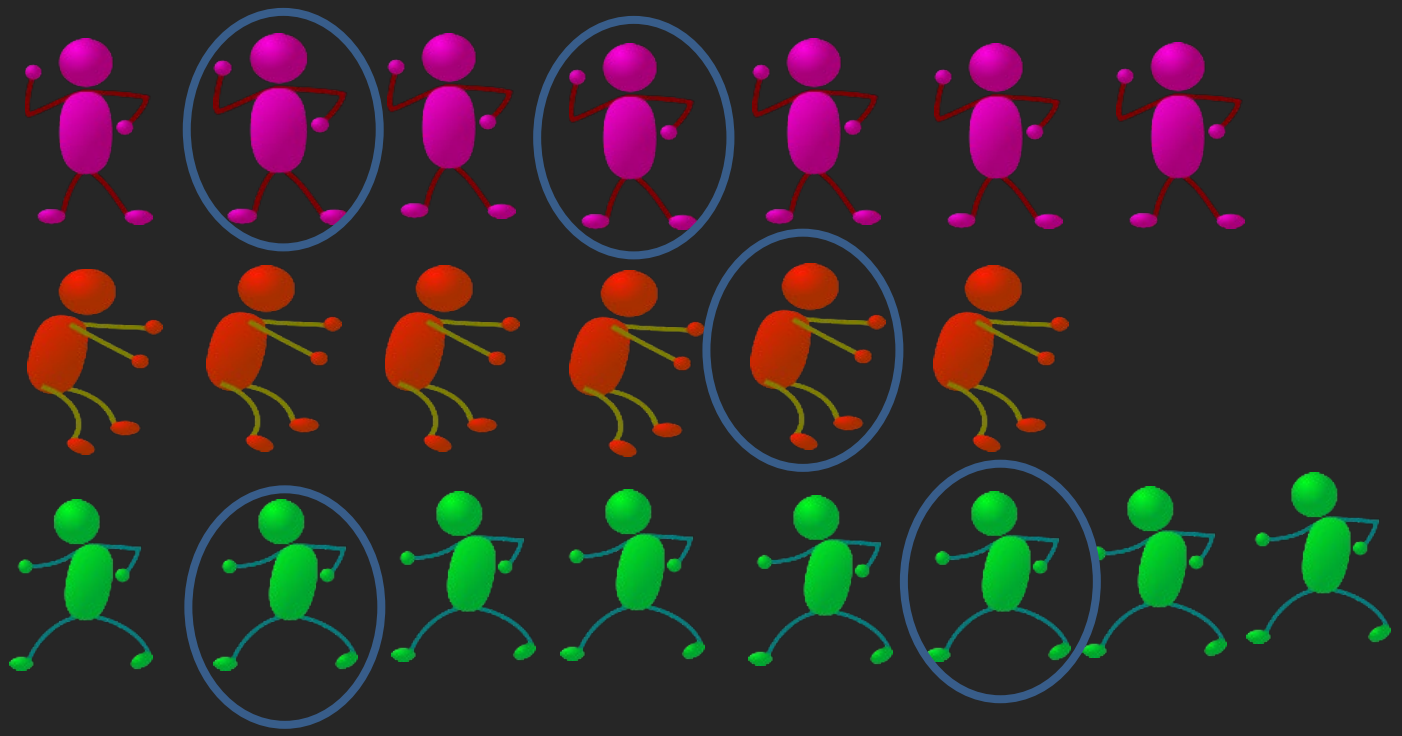
Divide population into strata

Stratified sampling

Pink Stratum

Red Stratum

Green Stratum

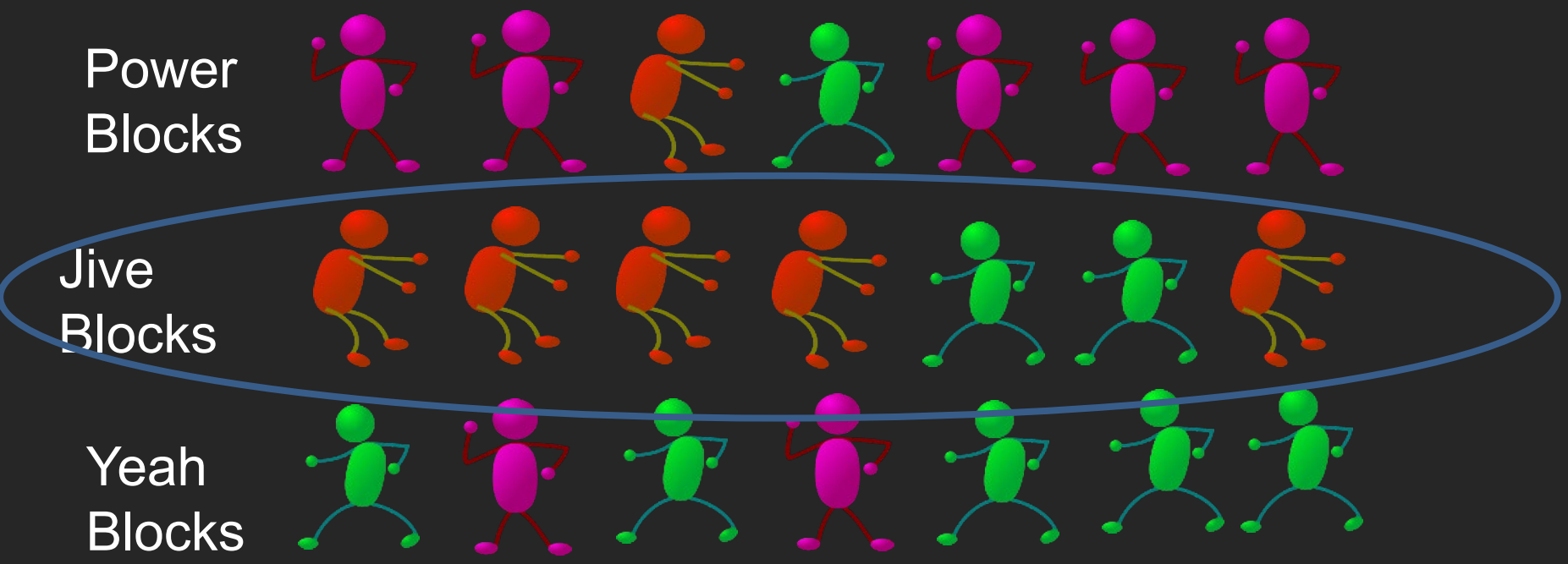


Randomly select exact number of people within the stratum to be representative of population

Cluster Sampling

- Sample clusters or groups of elements (school, neighborhood block, organization), then take all or a sample of elements within cluster
- Clusters – naturally occurring units
- Why?
  - Cannot afford to create an element frame (don't have a list of every teacher in the US)
  - Cannot afford to visit n units drawn randomly from entire area (face-to-face interviewing of households)
- Increases sampling error

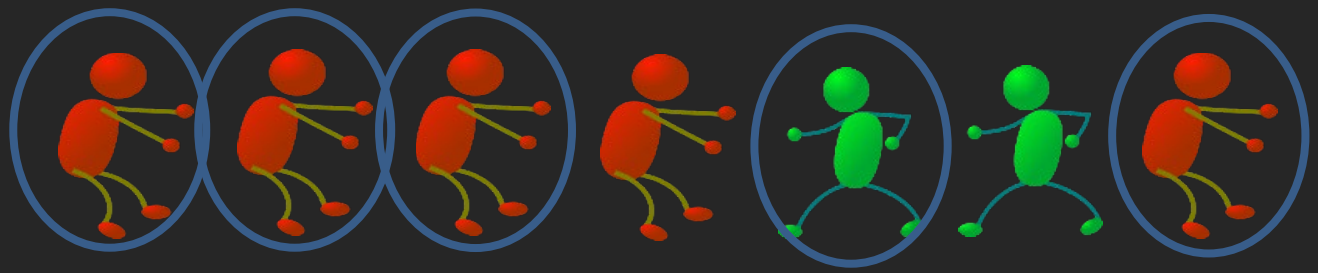
Cluster sampling



Randomly select one cluster

Cluster sampling

Jive Blocks



Take all or a sample within cluster

Questions to evaluate sampling error

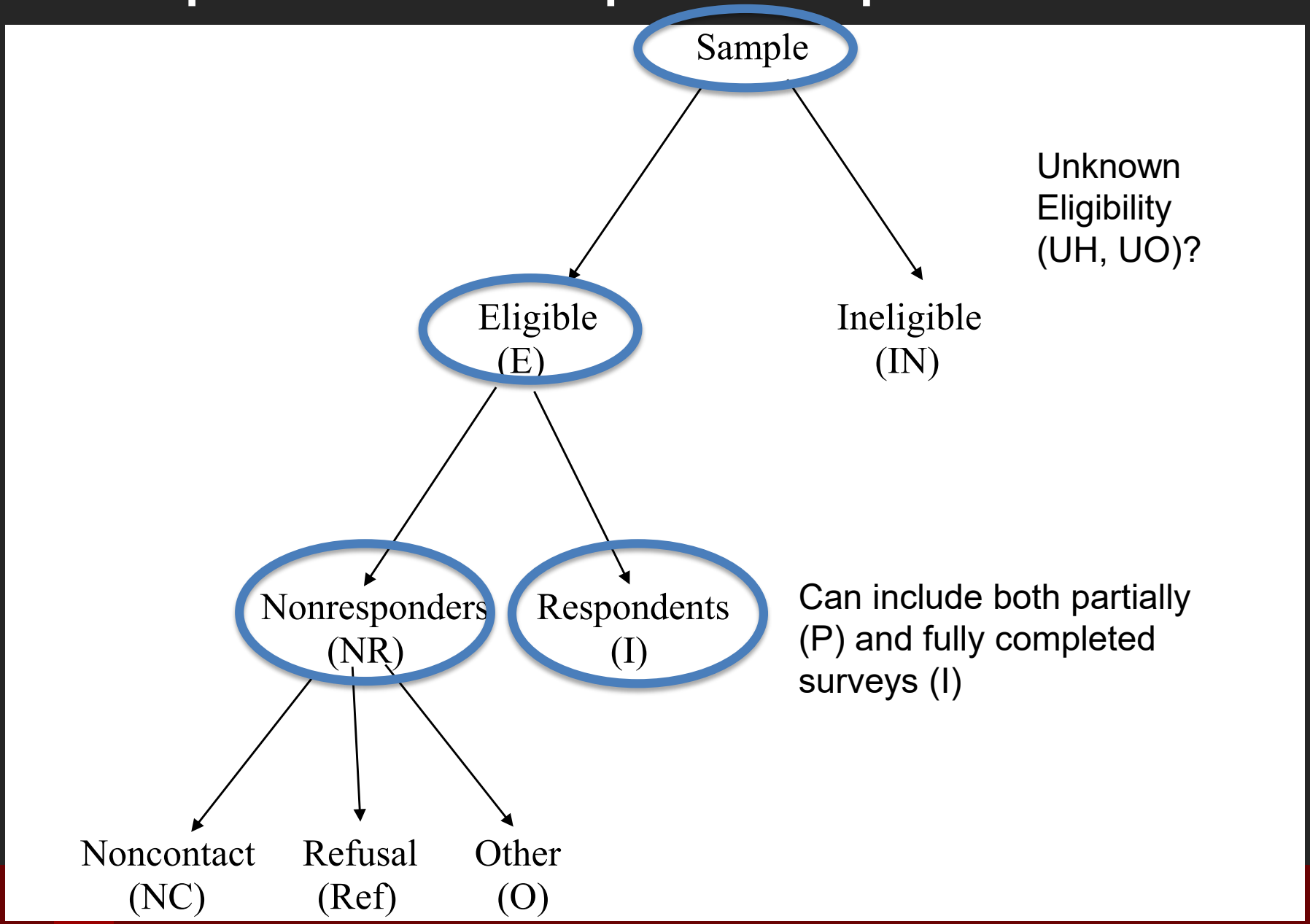
- What is the sample size? (Larger samples, less sampling error, but diminishing returns)
  - See online calculator: www.raosoft.com/samplesize.html
- How was the sample designed? (Stratification/clustering; try to stratify whenever possible)
- Was the sample design accounted for in the analysis?

And...ensure your sample design and sample size are clearly defined in your research proposal and documentation.

Part 4

Error Sources: (3) Nonresponse Error

Nonresponse error: Sample → respondents



Definition of AAPOR Response Rates (see www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf)

$$RR3 = \frac{I}{(I + P) + (R + NC + O) + e(UH + UO)}$$

Nonresponse Bias (roughly speaking)

$$\bar{Y}_r = \bar{Y}_n + \left(\frac{m}{n}\right)\left[\bar{Y}_r - \bar{Y}_m\right]$$

Potential for nonresponse is high when:

- Nonresponse rate is high (nonrespondents denoted by “m”)
- Respondents (denoted by “r”) are different from nonrespondents on measure of interest

IUB Transportation Census: Student Survey

Why did you participate in this survey? Ranked as #1 Reason	IUB Undergrad (%)	IUB Graduate (%)
The topic is important	11.5	**24.4**
A friend or classmate had mentioned it	.3	.4
Participating in IU surveys is important	8.7	9.4
Short length of survey	3.5	3.1
I had some free time	13.9	7.7
To express my views on the topic	14.7	16.7
The cash prize drawing	**41.8**	**28.8**
The topic is interesting to me	2.7	5.8
Other, specify	1.3	1.7
n	*2,558*	*1,245*

IUB Transportation Census: Student Survey

What made you open up and read the email? Please select up to your top two reasons.

	IUB Undergrad (%)	IUB Graduate (%)
It was an IU email	**70.3**	**56.3**
The subject line of the email was interesting	**26.8**	**36.6**
The message (if seen in a preview) looked interesting	13.6	13.8
I recognized the Center for Survey Research	12.4	13.5
I had heard about it from a friend or classmate	2.3	2.2
Other, please specify:	16.2	20.9
n	*2,597*	*1,253*

Findings from Faculty Survey

Please rank the top three best months to send you a survey request. Ranked as #1 month	IUB Faculty (%)
May	**13.6**
June	**10.0**
January	9.6
February	9.3
September	6.4
n	*550*

Techniques to obtain good participation

1. Incentives (cash, gift card, free membership/admission, drawing/lottery, results/data/benchmark report)
2. Publicity
3. Number, timing and type of contact attempts
4. Design of email messages (personalization, signatory) – see previous seminar
5. Peer networks / “peer pressure”
6. Burden (keep survey short)
7. Emphasize how information will be used
8. Assure confidentiality
9. Ask pretest/pilot respondents for ideas on how to maximize participation

Techniques to obtain good participation (cont'd)

1. Take a sample of remaining NRs and apply additional effort (another call attempt, special mailing, etc.) - **subsampling**
2. Think strategically about your target population and design protocol/messages/etc. for them – **tailored design**
3. Monitor your data during data collection & adapt – **"~responsive design"**
   - Look at the survey data: who is responding/not responding, open-response items ("I didn't think this survey applied to me"), etc.
     - Change your approach once you see what is happening in the field (add a reminder, alter text of email message)
     - Try experimenting, particularly if multiple administrations

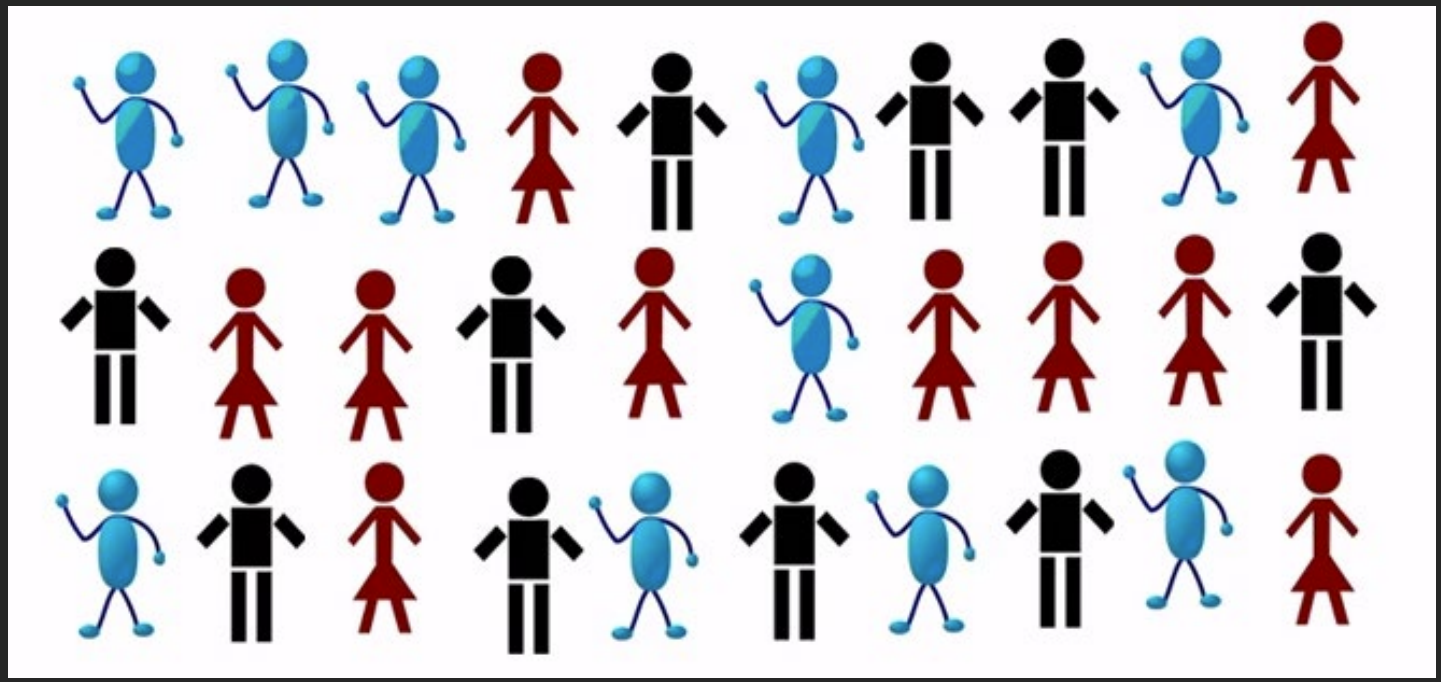
Techniques to assess and remedy difference between respondents and nonrespondents

1. Assess potential for differences. Techniques include:
   - Compare data to benchmarks from Census or other population data
   - Compare response rates in your sampling strata
   - Compare early versus late responders (weaker approach)
   - Conduct nonresponse study
2. Weight data to adjust for differences found in your assessment

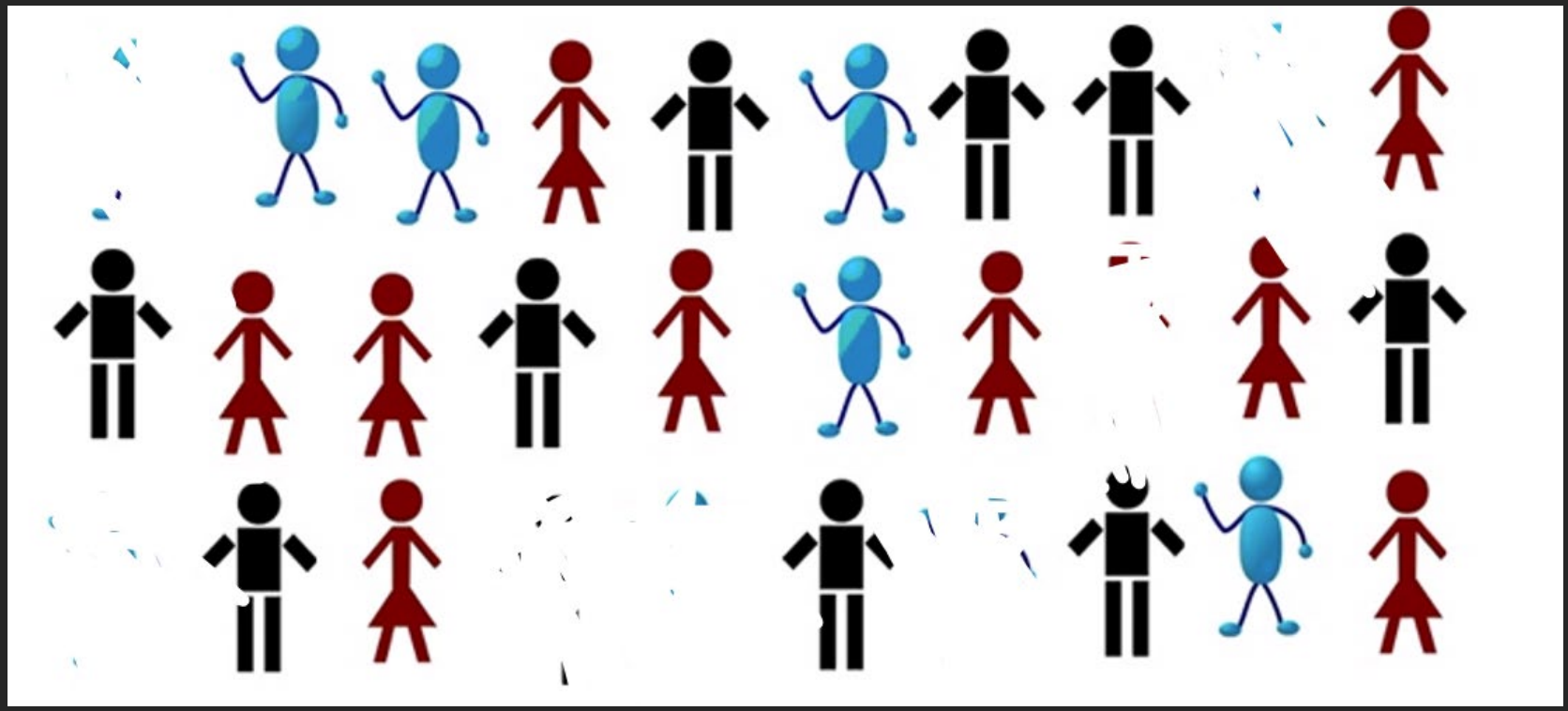
Questions to evaluate potential nonresponse error

- What was the response rate?
- What techniques were implemented to gain participation?
- Was any analysis done to examine the potential for nonresponse error? Were certain types of sample members more likely to respond?
- Was any adjustment made for potential nonresponse error?

And...were data collection procedures, response rates, nonresponse analysis and adjustments clearly defined in the research proposal/documentation?

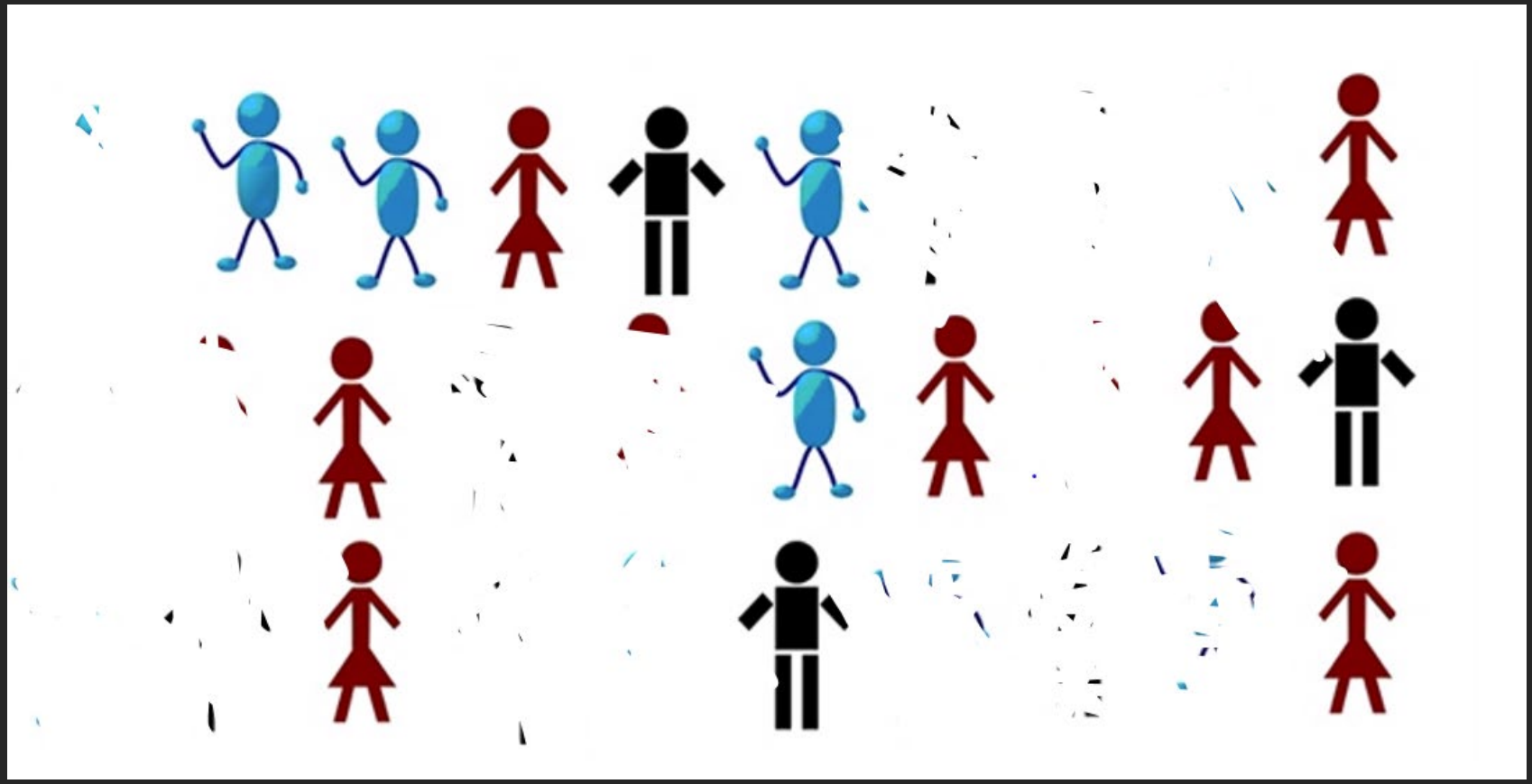


(Target) Population



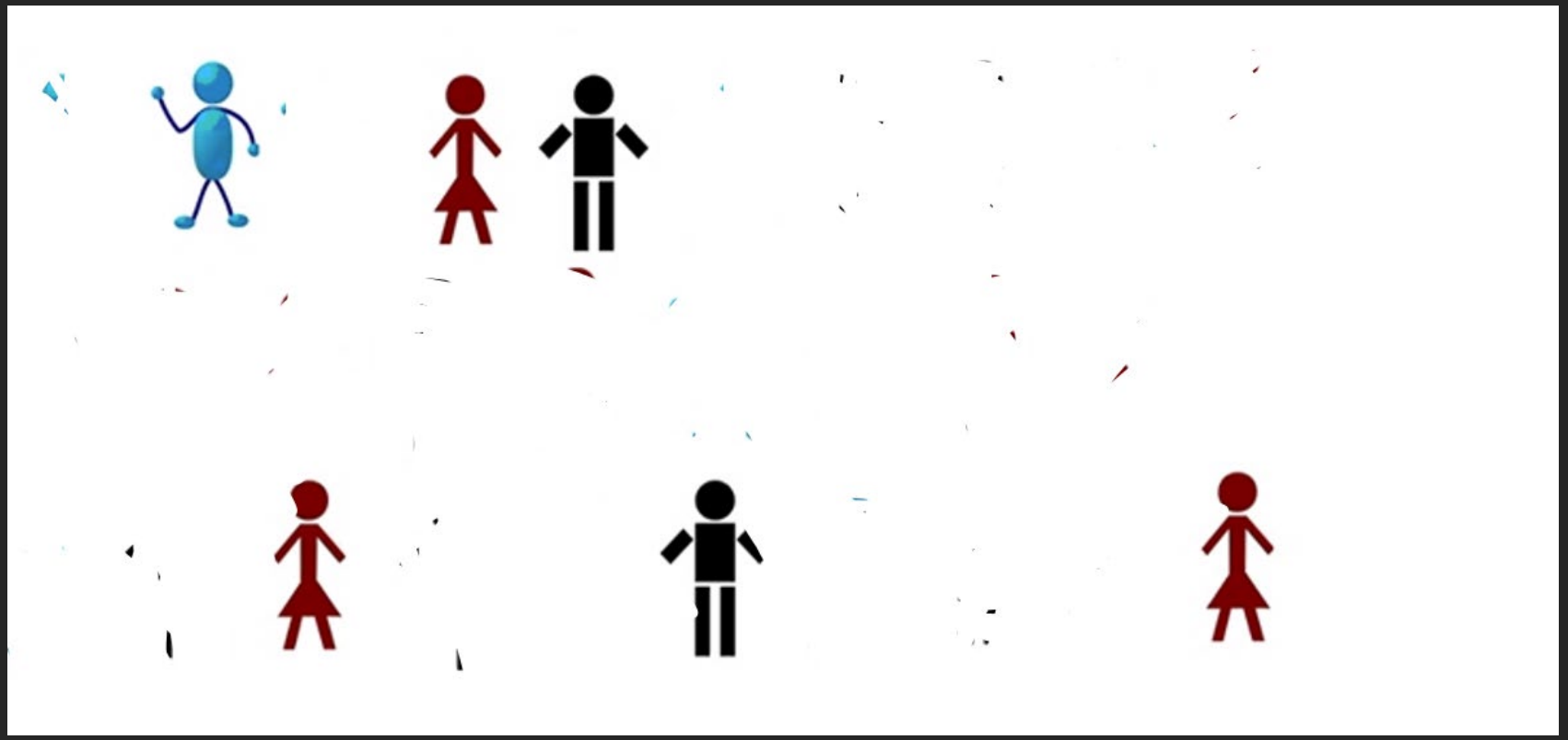
Sampling frame/list

(coverage error – who is missing from your list?)



Sample

(sampling error – if you drew the sample again, how might it be different?)



Respondents

(nonresponse error – who is missing from your survey data?)

Part 4

Error Sources: (4) Measurement Error

Teaser for next session of the series...

What does good questionnaire design involve?

1. Identify measurement objectives
2. Draft questions based on objectives and knowledge of good survey design principles
   - Existing items/question banks
   - Substantive experts
   - Focus groups
3. Refine and test questions
   - Cognitive expert review
   - Cognitive interviewing
   - Pilot run
4. Format questionnaire

Question-Answering Process: An Example

- Since buying this home, have you received any credit cards in the mail that you didn't apply for?
  - **Comprehend** individual words and put them together to understand the question, reference period ("since buying this home"), credit cards vs. credit card offers
  - **Retrieve** any useful information/experiences (got a credit card around Valentine's Day, bought home in early January)
  - Make a **judgment** based on information retrieved (does fit time period)
  - **Format** response using response options (Yes, No)
  - **Edit** answer, social desirability (you're behind on payments, so change answer to No)

Cognitive expert review

10. [ONLY ASK THIS QUESTION IF Q9=WORKING FT OR WORKING PT] Are you employed in private or public sector? (I expect to see that people in the public sector are more involved in informal exchanges than in private sector)

1) Private 2) Public ~~3) Unemployed~~

CSR: Might need to be a little more specific and clarify sector with terms that respondents will be more familiar with– an alternative from the Current Population Survey is: Are you employed by government, by a private company, a nonprofit organization, or are you self-employed or working in the family business?

Cognitive interviewing

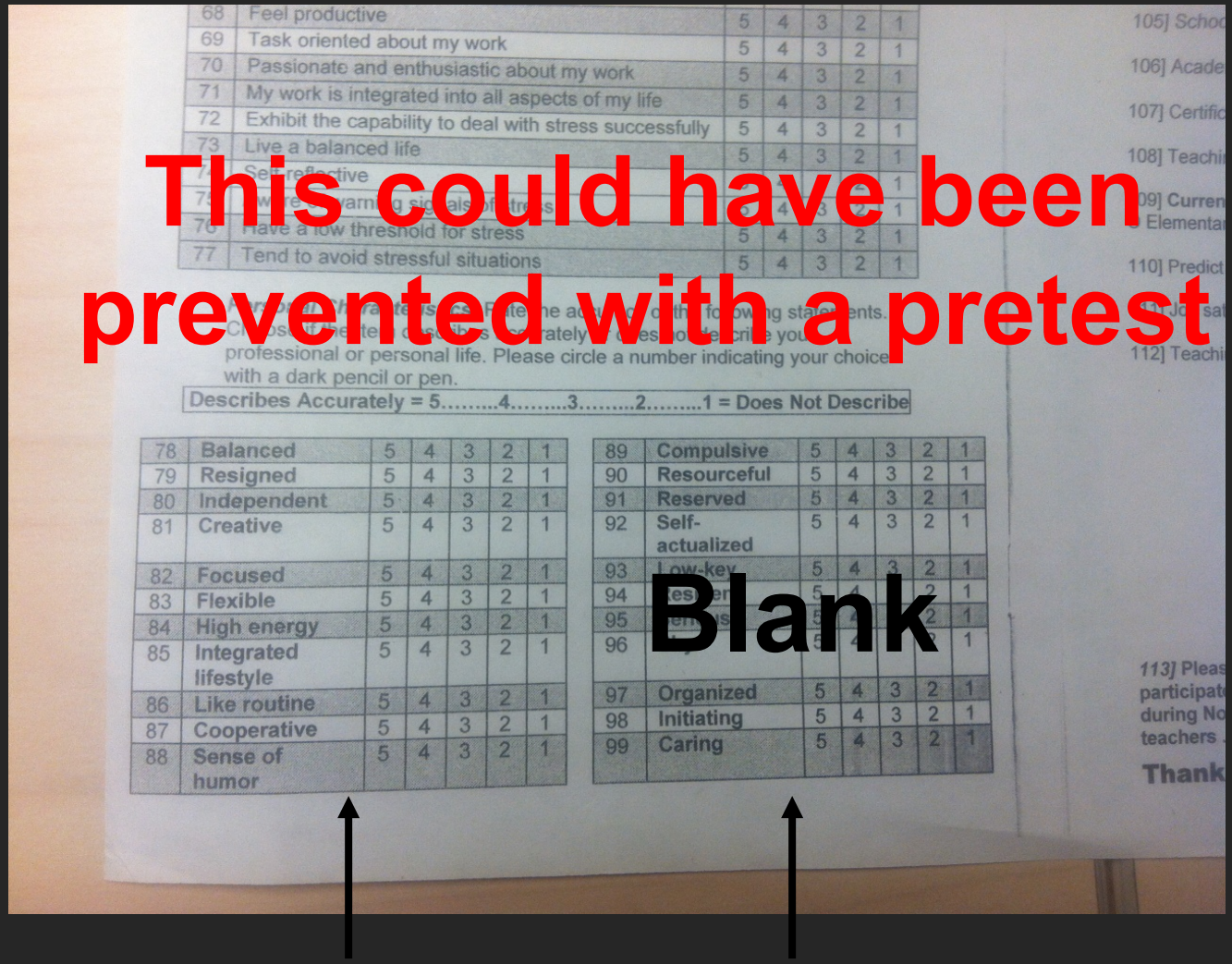
Cognitive interviews recommended as part of an overall method for testing and evaluating questionnaires.

Employs a semi-structured interviewing protocol with item-by-item probes to identify problems.

- Respondents “thinks aloud” as they answer each question (concurrent verbal protocol)
- Interviewer may ask directed probes after questions (retrospective verbal protocol)- What does “sustainable” mean to you?
- Debrief with interviewers, analyze results
- Behavioral coding (how many times question repeated, etc.)

Pilot run/field pretest

- Small scale version of main study
- Mirror procedures of main study
- Ask debriefing questions and analyze to see if respondents are reporting problems
- Examine your survey data


This could have been prevented with a pretest
Blank

Now revisit the Hoosier Life Survey...what questions will you ask about...

1. Coverage error?
2. Sampling error?
3. Nonresponse error?
4. Measurement error?

Part 8

Resources

American Association for Public Opinion Research (AAPOR): Guidelines & Resources

- *Response rate guidelines and calculations:* The American Association for Public Opinion Research. (2016). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 9th edition. AAPOR.* (available here: www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf)
- *Transparency Initiative (TI)* - provides industry-standard disclosure guidelines; organizations pledge to practice transparency in their reporting of survey-based research findings (IU Center for Survey Research is a charter TI organization) (more information available here: www.aapor.org/Standards-Ethics/Transparency-Initiative/FAQs.aspx)
- *Other resources* – available at aapor.org

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