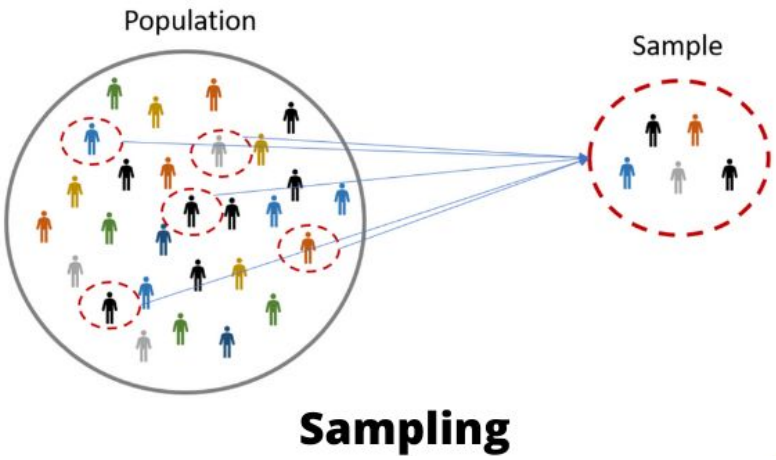
Surveys
Asking Question

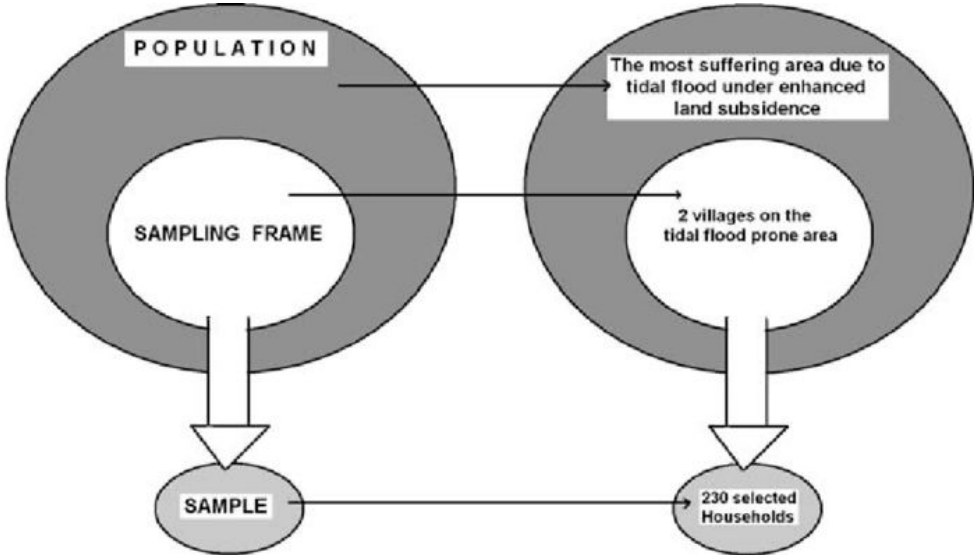
Computational Sociology
25 August 2021

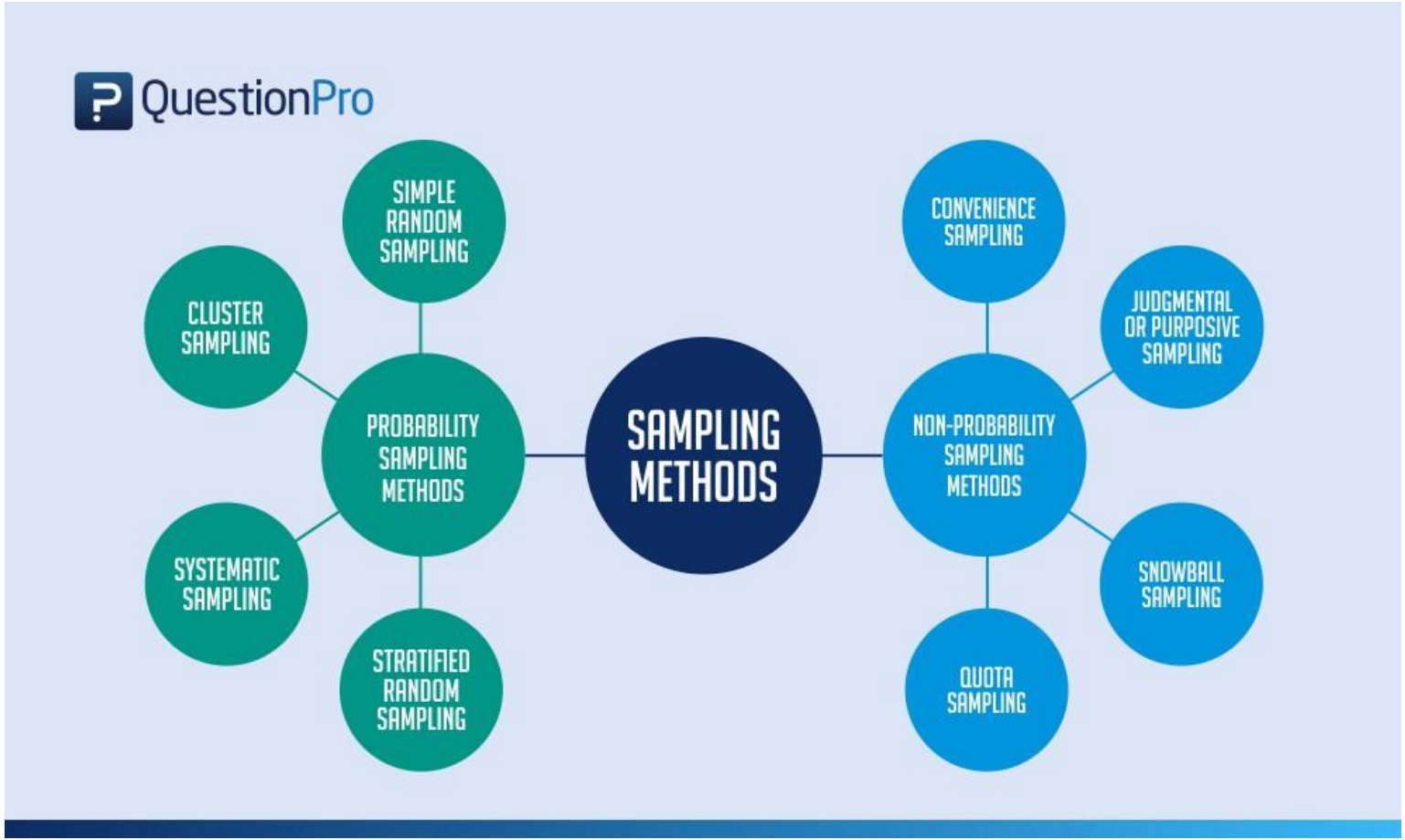
History of survey

- What is sample survey?
- What is the benefit of survey?
- How to conduct survey?
- Three era of sample survey (Groves 2011)
  - 1930s-ftf
  - 1970s-tel-RDD
  - Digital era

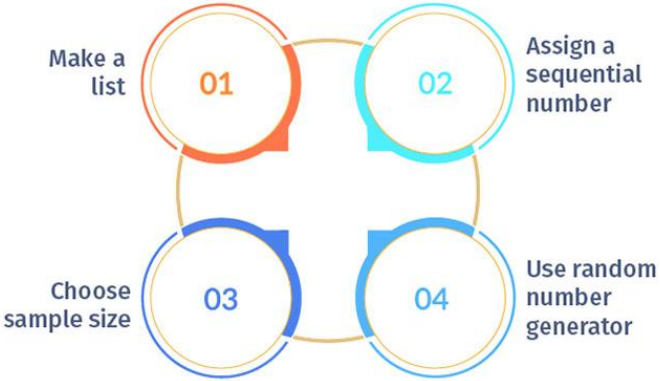
Population, sample and sample frame





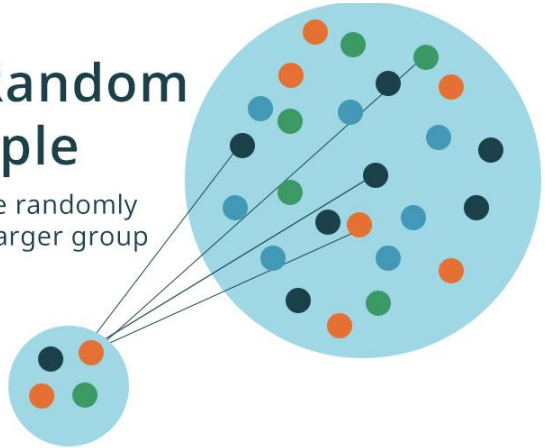

QuestionPro
SAMPLING METHODS
PROBABILITY SAMPLING METHODS
SIMPLE RANDOM SAMPLING
CLUSTER SAMPLING
SYSTEMATIC SAMPLING
STRATIFIED RANDOM SAMPLING
NON-PROBABILITY SAMPLING METHODS
CONVENIENCE SAMPLING
JUDGMENTAL OR PURPOSIVE SAMPLING
SNOWBALL SAMPLING
QUOTA SAMPLING

STEPS TO CONDUCT SIMPLE RANDOM SAMPLING



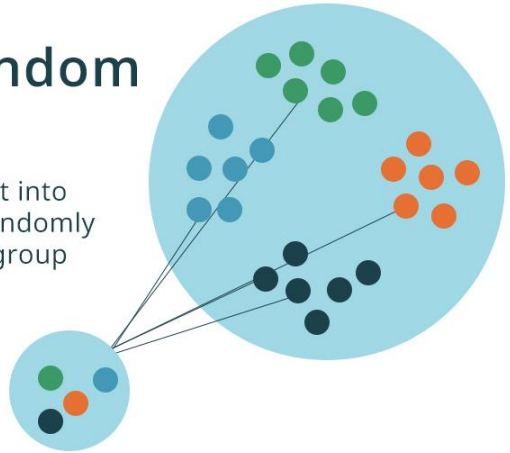
Simple Random Sample

Respondents are randomly selected from a larger group

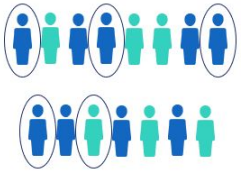


Stratified Random Sample

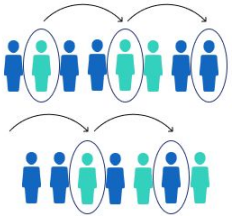
Respondents are split into sub-groupsand then randomly selected from each group



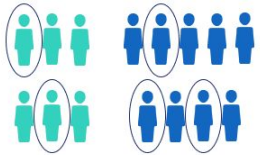
Simple random sample



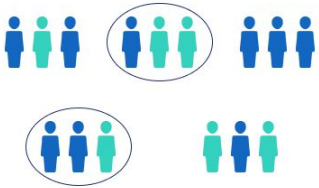
Systematic sample



Stratified sample



Cluster sample



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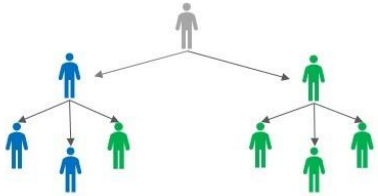
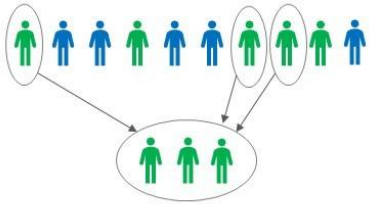
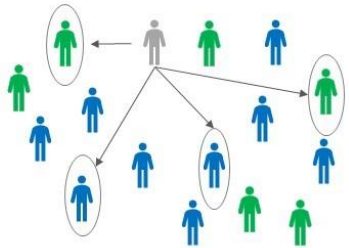
Snowball sample



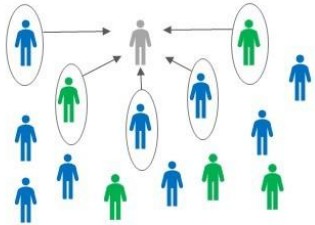
Quota sample



Judgement sample



Convenience sample



Three eras of survey research

	Sampling	Interviewing	Data environment
First era	Area probability sampling	Face-to-face	Stand-alone surveys
Second era	Random-digit-dialing (RDD) probability sampling	Telephone	Stand-alone surveys
Third era	Non-probability sampling	Computer-administered	Surveys linked to big data sources

Asking vs observing

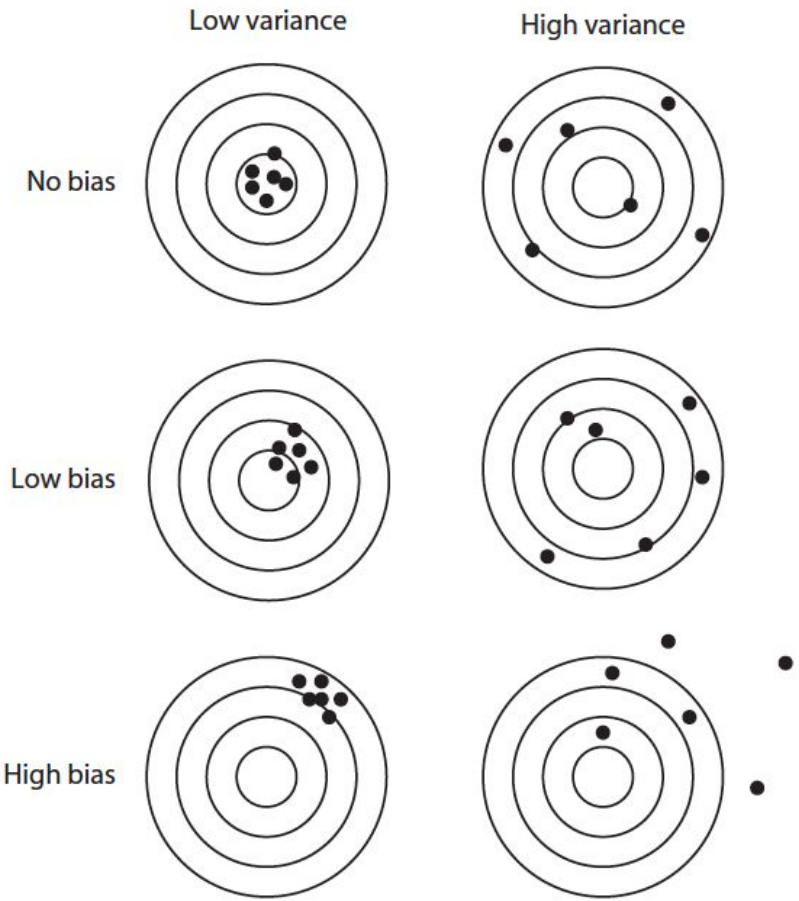
- What to ask?
- Participant observation
- Non-participant observation

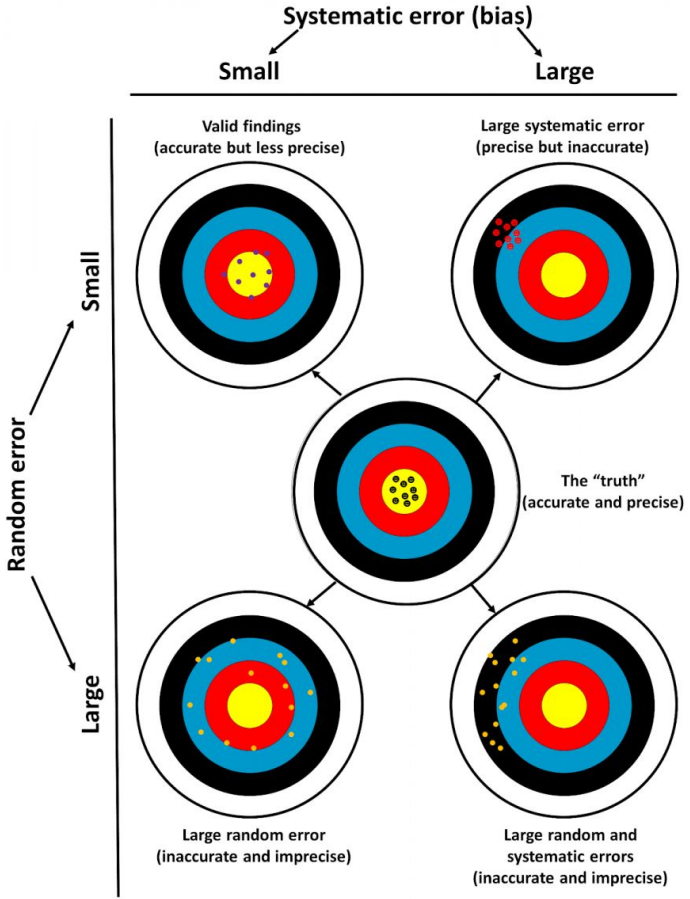
The total survey error framework

Total survey error = representation errors + measurement errors

Bias and Error

- Difference between error and bias: true error is random while bias is systematic error.
- Random sampling error can occur while selecting a population to survey due to uncontrollable issues.
- A probability survey must include a margin of error and a confidence level. This tells us how much effect random sampling error could have on a study's results.
- Bias cannot be measured statistically and it can give a skewed artificial result.

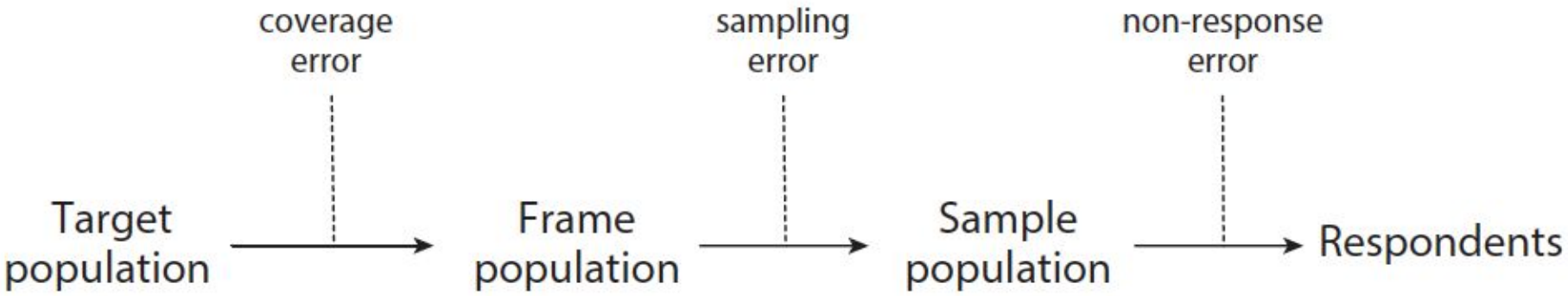

Low variance
High variance
No bias
Low bias
High bias


Systematic error (bias)
Small
Large
Random error
Small
Large
Valid findings
(accurate but less precise)
Large systematic error
(precise but inaccurate)
The "truth"
(accurate and precise)
Large random error
(inaccurate and imprecise)
Large random and
systematic errors
(inaccurate and imprecise)

Representation

Representation is about making inferences from your respondents to your target population.

Representation error



PERSPECTIVE | ECONOMICS

Fighting poverty with data

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Policy-makers in the world's poorest countries are often forced to make decisions based on limited data. Consider Angola, which recently conducted its first postcolonial census. In the 44 years that elapsed between the prior census and the recent one, the country's population grew from 5.6 million to 24.3 million, and the country experienced a protracted civil war that displaced millions of citizens. In situations where reliable survey data are missing or out of date, a novel line of research offers promising alternatives. On page **790** of this issue, Jean *et al.* (*1*) apply recent advances in machine learning to high-resolution satellite imagery to accurately measure regional poverty in Africa.

Traditionally, wealth and poverty are measured through surveys of household income and consumption (*2*). These data provide a critical input to the world's most prominent antipoverty programs, from basic cash transfer programs to multifaceted aid programs designed to target the extreme poor (*3*). However, nationally representative surveys cost tens to hundreds of millions of dollars to collect, and many developing countries go for decades without updating their estimates.

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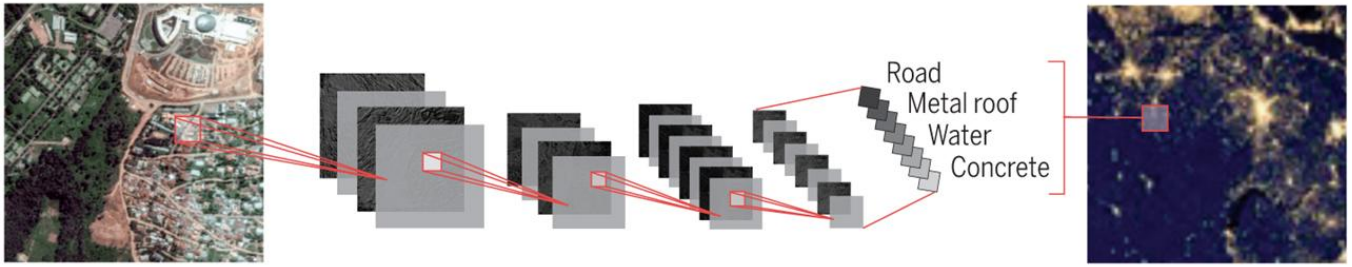
Satellite nightlights are a proxy for economic activity



Daytime satellite images can be used to predict regional wealth

Household survey locations

CNN processes satellite photos of each survey site

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Ridge regression model reconstructs ground truth estimates of poverty