

Bias and Levels of measurement

Bias

- We are in section 1.3 of the textbook
- The sample should be a *representative sample*, selected to represent the important characteristics of the population.
- Any reason that the sample is not representative is called *bias*.
- Types of bias
 - Sampling bias
 - Design bias
 - Opportunity bias
 - Volunteer bias
 - Non-response bias
- Bias is unavoidable
 - One goal of experimental design is to reduce any anticipated bias.
 - Managing sampling bias is an important part of statistics.

1. The Educational Longitudinal Study of 2002, ELS:2002, features a nationally representative, longitudinal study of 10th graders in 2002 and 12th graders in 2004. The study consisted of surveys of students, their parents, math and English teachers, and school administrators. Data was collected in 2002 (base year), 2004 (first follow-up), 2006 (second follow-up), 2012 (third follow-up).

Identify at least two types of bias you suspect in the data. Explain your reasoning in sentences.

Levels of measurement

- Each piece of information we collect and study from members of a sample is called a *variable*.
- The level of measurement of the variable tells us what statistics we can do with it.
 - Qualitative variable - non-numeric variable
 - * Nominal - categorical
 - * Ordinal - ordered categories
 - Quantitative variable - numeric variable
 - * Discrete - counting
 - * Continuous - not counting
- Caution! Qualitative variables can be coded with numeric values. We still need to treat them as qualitative.
- SPSS has three variable types (levels of measurement)
 - Nominal - qualitative, categorical
 - Ordinal - qualitative, ordered categories
 - Scale - quantitative (discrete and continuous)

For each of the following data, circle the level of measurement (nominal, ordinal, discrete, or continuous). *No explanation is needed.*

1. The year in which a person was born.

NOMINAL ORDINAL DISCRETE CONTINUOUS

2. Whether a person is married or unmarried.

NOMINAL ORDINAL DISCRETE CONTINUOUS

3. The ranking of a football team in the A.P. football poll.

NOMINAL ORDINAL DISCRETE CONTINUOUS

4. The state in which a person was born.

NOMINAL ORDINAL DISCRETE CONTINUOUS

5. The number of textbooks (print or electronic) you purchased this for your classes this semester.

NOMINAL ORDINAL DISCRETE CONTINUOUS

6. In a poll, people say whether they strongly support, weakly support, weakly oppose, or strongly oppose a proposed new law.

NOMINAL ORDINAL DISCRETE CONTINUOUS