

Chapter 11
SAMPLE SURVEYS

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SURVEY

- ✘ A census is where everyone in the population is measured
- ✘ A sample survey is where a subgroup of a population is measured

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PARAMETERS & STATISTICS

- ✘ We can use random sampling to obtain a sample that represents the population
- ✘ A parameter is a numerical measurement describing some characteristic of a population
- ✘ A statistic is a numerical measurement describing some characteristic of a sample

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NOTATION

- ✦ We typically use Greek letters to denote parameters and Latin letters to denote statistics.

Name	Statistic	Parameter
Mean	\bar{y}	μ (mu, pronounced "meeoo," not "moo")
Standard deviation	s	σ (sigma)
Correlation	r	ρ (rho)
Regression coefficient	b	β (beta, pronounced "baytah" ⁵)
Proportion	\hat{p}	p (pronounced "pee" ⁶)

From *Stats Modeling the World* by Bock, Velleman, & De Veaux, 2010, p. 273.

BIAS

- ✦ A biased sample is one that is not truly representative of the population
- ✦ Types of bias:
 - + Selection bias: the method of selecting participants produces a biased sample
 - + Nonresponse bias: a representative sample is chosen for a survey, but a subset cannot be contacted or does not respond
 - + Response bias: Participants respond differently from how they really feel

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SIMPLE RANDOM SAMPLE

- ✦ A simple random sample is one where every possible group of people in the population was equally likely to have been chosen for the sample
- ✦ The sampling frame is the list of individuals from which the sample is selected
- ✦ Sampling variability (error) is the differences in outcomes seen between different samples

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STRATIFIED RANDOM SAMPLE

- ✘ This method divides the population into groups (strata) and takes a simple random sample from each group
- ✘ Advantages:
 - + Results are available separately by strata
 - + Different interviewers may work best with different people
 - + May be able to stratify in such a way that there is little natural variability within each strata

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CLUSTER SAMPLE

- ✘ The population is divided into groups (clusters) and we select a random sample of clusters and measure each individual within those clusters
- ✘ Using this method, one must be mindful of the fact that there are likely similarities among members of each cluster
- ✘ Sampling schemes that combine several methods are called **multistage samples**

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SYSTEMATIC SAMPLING

- ✘ Take the population list and divide it into as many consecutive segments as you need, randomly choose a starting point in the first segment, then sample at that same point in each segment.

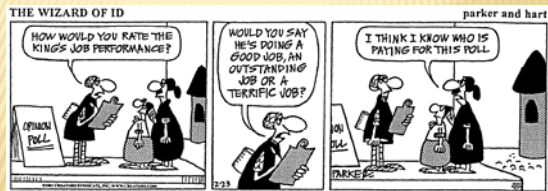
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PROBLEMS WITH SURVEYS

- ✗ Voluntary response bias occurs when participation is voluntary
- ✗ A survey done from a convenience sample does not generalize to a larger population
- ✗ Using an incomplete sampling frame
- ✗ Nonresponse bias
- ✗ Response bias

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RESPONSE BIAS



From *Stats Modeling the World* by Bock, Velleman, & De Veaux, 2010, p. 281.

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