Samples, Good and Bad

Goal of Sampling

We want to make a statement about a large group of individuals (the population), but oftentimes it is not practical or even possible to measure each individual in the population. In this case, we choose a sample of individuals that is (hopefully) representative of the population. What happens when our sample is not representative of the population?

How to Sample Badly

The design of a statistical study is _____ if it systematically favors certain outcomes.

A _____ chooses itself by responding to a general appeal.

-individuals volunteer themselves to be in the sample

-also called a _____

Selection of whichever individuals are easiest to reach is called _____.

-researcher chooses who to ask to participate

-individuals can still choose not to participate

Convenience samples and voluntary response samples are often biased.

Example 1

Ann Landers once asked the readers of her nationally syndicated newspaper advice column, "If you had it to do over again, would you have children?" She received nearly 10,000 responses, almost 70% saying "no." Is it true that 70% of parents regret having children?

Example 2

A student at the university is conducting a survey to find the opinion of her fellow students on the availability of student parking on campus. She stands outside of a dorm and polls fellow students as they leave the dorm. Which bad sampling method is this?

Example 3

The popular radio Ace&TJ Show recently asked fans to vote on their website to the following question

A nurse at KATE MIDDLETON'S hospital who was pranked by two Australian DJs last week was found DEAD in her home on Friday. Police suspect SUICIDE. The DJs are off the air until further notice...a decision they made along with their radio station. Should the radio DJ's be fired?

This is an example of which type of sampling?

The most basic, good sampling method is known as the **Simple Random Sample.** The simple random sample is at the heart of all good sampling schemes. A ***simple random sample (SRS)*** of size *n* individuals from the population is chosen in such a way that:

- Every set of *n* individuals has an equal chance to be the sample actually selected
- Every individual has an equal chance of being chosen for the sample

The easiest way to do this is to place names in a hat (the population) and draw out a handful (the sample).

Step 1: Label. Assign a numerical label to every individual in the population. Be sure that all labels have the same number of digits if you plan to use a table of random digits.
Step 2: Software or Table. Use random digits to select labels at random.

Use software whenever possible – tables are old fashioned!

http://bcs.whfreeman.com/scc7e/ - Choose "Statistical Applets", then "Simple Random Sample". There are lots of other computer generators available: www.randomizer.org, TI-83, 84, and 89 calculators, www.dougshaw.com/sampling, Statistical packages like R, SAS, Minitab, etc....

If you are using a table of random digits....

Population labels must each contain the same number of digits
Spaces in the random digits table have no meaning (they are just place holders)
You can start anywhere you like in the table (across rows, up a column, down a column,...)
Some people start their population labels at 0 and some start them at 1 (be aware)
Skip repeated codes and those outside the range of labels

Example 4

Take a Simple Random Sample (SRS) of 3 people.

Step 1: Label your "population" elements.
Step 2: (Using random sampling generator) **Obtain the sample.**

Bautista	Nemeth
Bolen	Podbov
Clottey	Ray
Counts	Schumacher
Draper	Tower
Hoffman	Walters
Kumar	Wang
Li	Weimer
Lovesky	Yu
Marin	Zhang

Step 2: (Using random digits table) **Obtain the sample.**

Since we are using the pesky table of random digits, be sure each label (code) has the same number of digits!
Use the following line from a random digits table. *Note: In practice you would choose any line you want, but in class we will use the same line so we learn how to use the table.*
05497 12005 13659 81273