WHAT IS STATISTICS?

(Part 3)

What is an *observational study?*

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In an *observational study* we observe and measure specific characteristics, but we don't attempt to modify the subjects being studied.

What is an *experiment?*

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In an *experiment*, we apply some *treatment* and then proceed to observe its effects on the subjects.

What is a *systematic sample?*

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Example: If I select every third person in the class for participation in a survey, then I have taken a *systematic sample*.

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Example: If I divide the class into two groups based on gender and take a sample from each group, then I will have created a *stratified sample.*

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Example: Furthermore, if I'm smart about it, then I'll construct a *proportional stratified sample.* In other words, if the class contains twice as many males as females, then I should be certain that my sample also contains twice as many males as females.

What is a *cluster sample?*

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Example: If five math classes are selected at random from the population of all SCC math classes and given a survey, then we have created a *cluster sample.* The *clusters* in this case are the individual math classes.

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The primary purpose of random, systematic, stratified, and cluster sampling is to eliminate bias!

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Example: At major universities, Psychology Departments would like to do experiments involving adults of all ages. However, freshmen psychology students are often the only subjects that are *convenient.* Furthermore, since the students often get to pick which experiments they will participate in, the result is also a *voluntary response sample.*

What is *multistage sampling?*

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In *multistage sampling*, the sample is selected in stages, and a different sampling method might be used for each stage.

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Example: If we do a survey at a particular point in time to determine a political leader's popularity, that is a *cross-sectional study.*

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Example: If we analyze historical trends in inflation, that would be a *retrospective study.*

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Example: If we give vaccinations to one group and withhold them from another, and then collect data on longevity several years later, that is a *prospective* or *longitudinal* or *cohort study.*

What is the *placebo effect?*

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When an untreated subject shows improvement, this is called the *placebo effect.*

What is an *extraneous variable?*

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An *extraneous variable* is one that is not one of the independent variables in the study, but is thought to affect the dependent variable.

What is a *confounding variable?*

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A *confounding variable* is one whose effects on the dependent variable cannot be distinguished from one or more of the independent variables in the study.

What is a *lurking variable?*

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A *lurking variable* is one whose effects on the dependent variable cannot be distinguished from one or more of the independent variables in the study, AND IS NOT INCORPORATED INTO THE DESIGN OF THE STUDY.

What is *blinding?*

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Blinding is a technique in which the subject doesn't know whether he or she is receiving a treatment or a placebo.

What is a *double-blind experiment?*

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In a *double-blind experiment* neither “doctors” nor “patients” know which treatment group the patient belongs to.

What is a *triple-blind experiment?*

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In a *triple-blind experiment* neither “doctors” nor “patients” nor the “person” evaluating the response to treatment know which treatment group the patient belongs to.

What is *randomization?*

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Randomization is used when subjects are assigned to different groups through a process of random selection.

What is *replication?*

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Replication is the repetition of an experiment on more than one subject.

What is a *completely randomized experimental design?*

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This is an experiment in which subjects are assigned to different treatment groups through a process of random selection.

What is a *randomized block design?*

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Example: A simple example would be to create two *blocks*, male and female, and assign subjects randomly within the two different groups.

What is a *rigorously controlled design?*

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Example: We might, for instance, control the effect of age by making sure that subjects of all ages are assigned to the different treatment groups.

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Example: If we have two treatment groups and if we make sure that for every person in one group there is a person of the same age and gender in the other group, then we have a *matched pairs design.*

What is *sampling error?*

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A *sampling error* is a difference due to random chance between the sample result and the true population result.

What is *nonsampling error?*

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A *nonsampling error* occurs when the sample data are incorrectly collected, recorded, or analyzed.

What is *nonrandom nonsampling error?*

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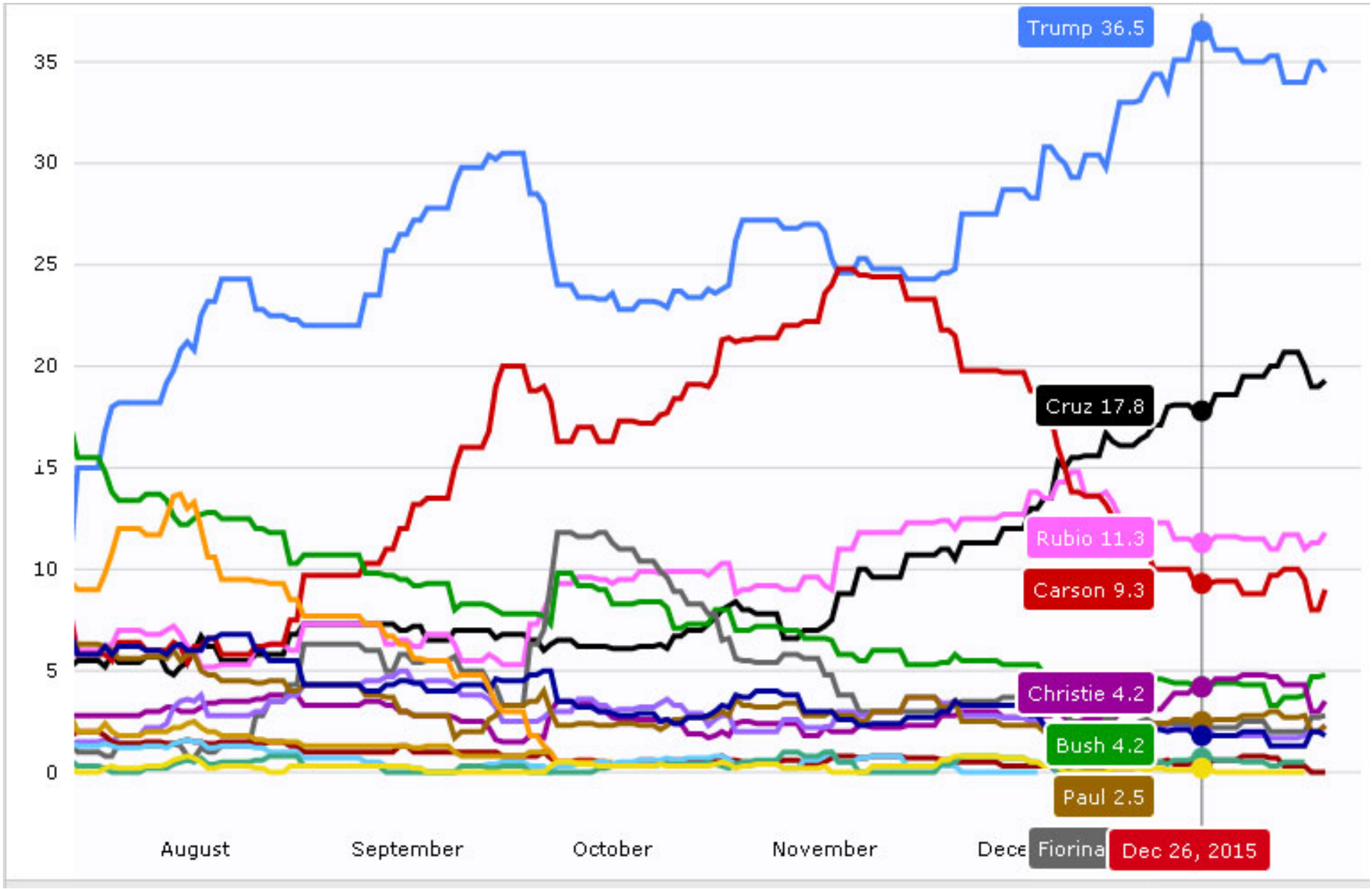
A *nonrandom nonsampling error* is the result of using a sampling method that is not random, such as using a convenience sample or a voluntary response sample.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Cruz 17.8
Rubio 11.3
Carson 9.3
Christie 4.2
Bush 4.2
Paul 2.5
Fiorina
Dec 26, 2015
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