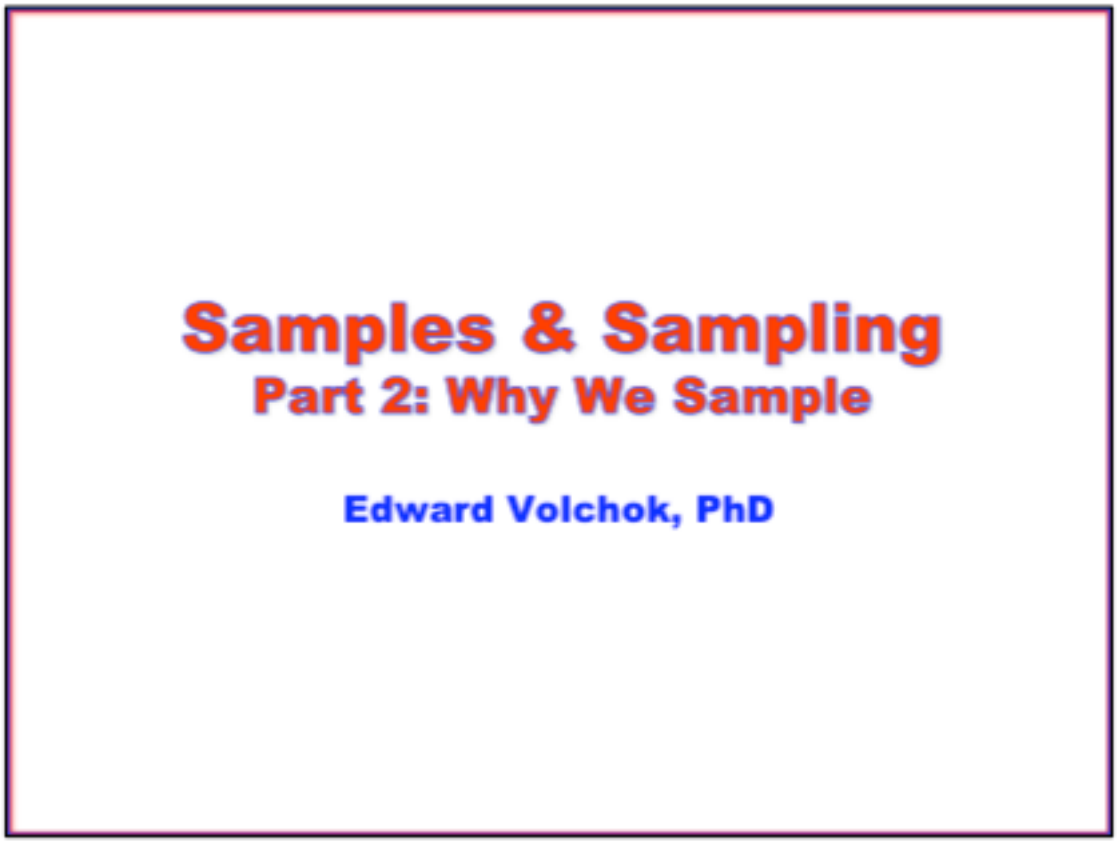
Samples & Sampling

Part 2: Why We Sample

Edward Volchok, PhD

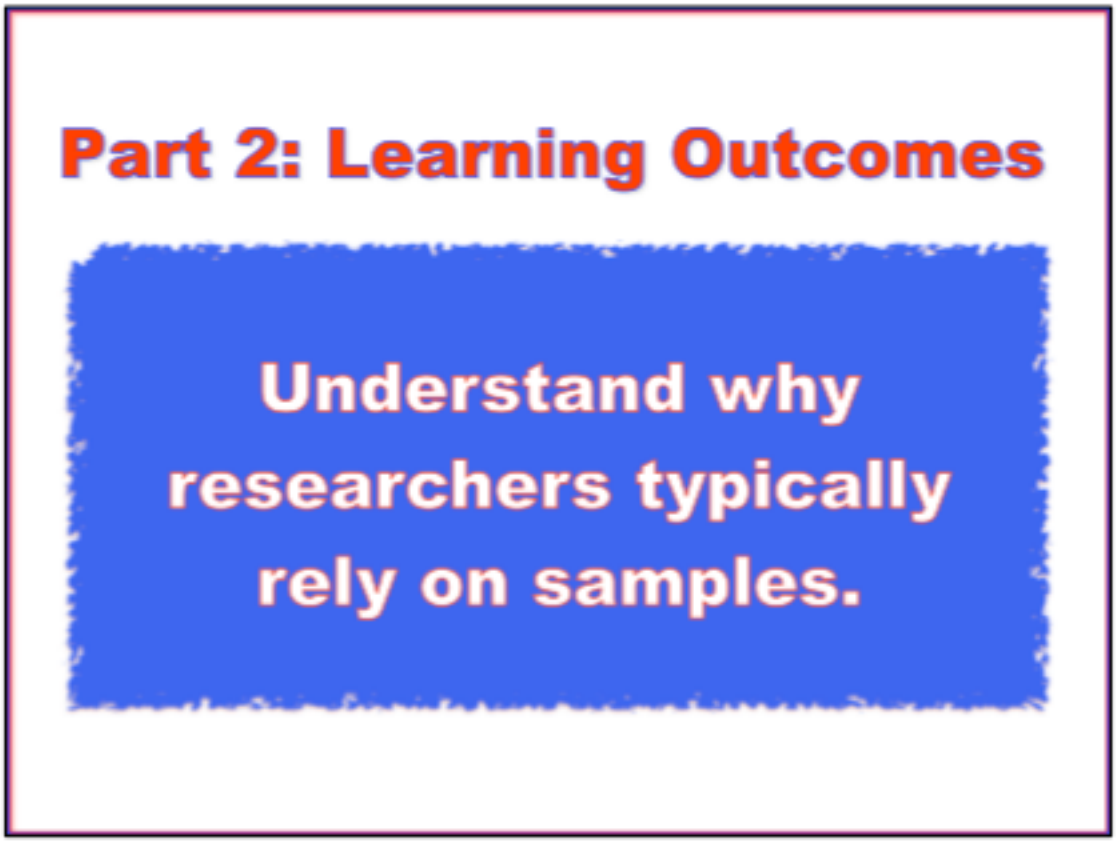


Video

Image of Title screen.

Audio

Hello, this is Edward Volchok. Welcome to my lecture on Samples and Sampling. This video presents Part 2 of this lecture. In Part 2, we will review why we rely on samples.



Video

Graphic showing the text of the video lecture's learning outcome.

Audio

After completing Part 2, you will understand why researchers typically rely on samples instead of populations.

For a variety of practical reasons, we rarely work with population data; censuses are typically not a practical option for researchers.

Video

Photograph of a clock with the words, “Save Time.”

Audio

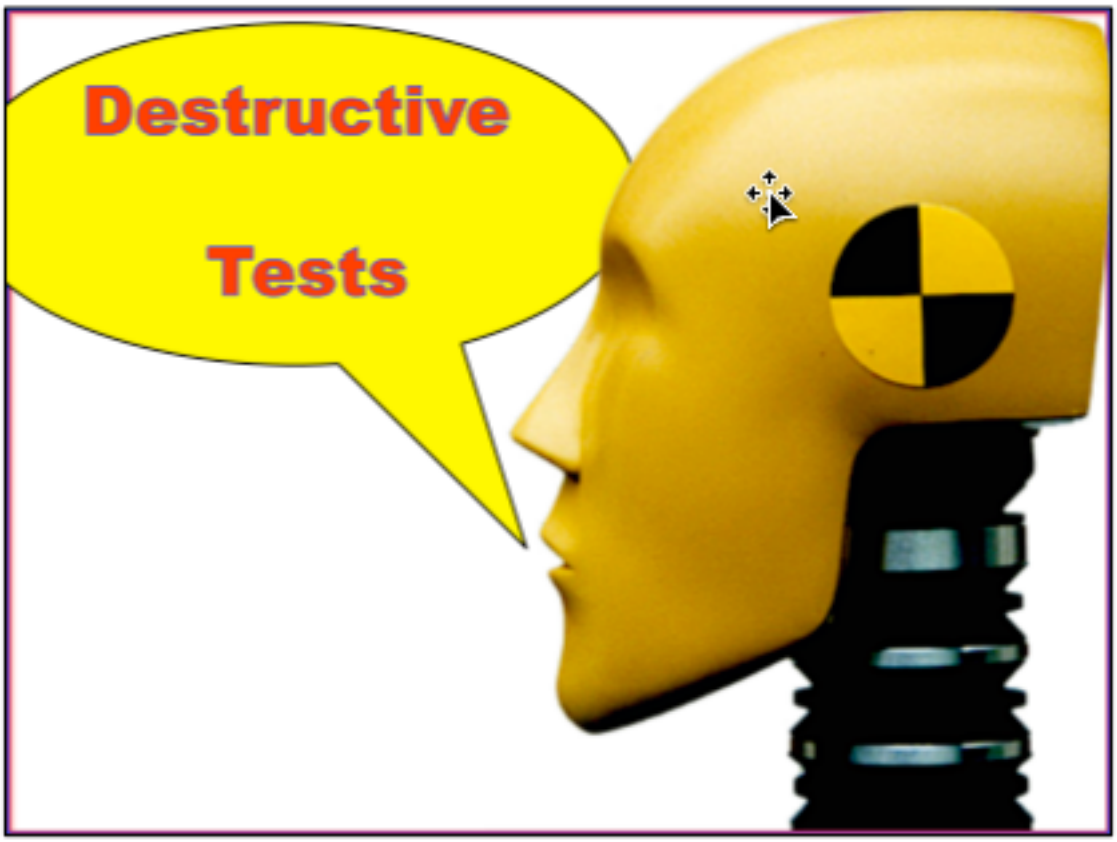
We use samples to save time. Because surveys based on samples are conducted among a small proportion of a population, samples can be planned, executed, and analyzed far faster than a census taken from a larger population.

The 2010 U.S. Census, for example, took over 3 years to plan and execute. An accurate sample of the American population could have been completed is a couple of weeks.

Video
Photograph of $40,000 stacked in $100 bills.

Audio
We use samples to save money. Conducting a census is far more costly that sampling. With a sample only a sub-set of the population is contacted. Consequently, the expenses to produce a reliable sample are a small fraction of the costs of conducting a census.

The 2010 U.S. Census cost $13 billion, or around $42 per person for the 308.7 million people counted. Approximately 635,000 temporary census workers were hired to complete the census. It is estimated that the cost of conducting the U.S. Census doubles every ten years. Given that rate, the 2020 Census will cost $26 billion.



Video

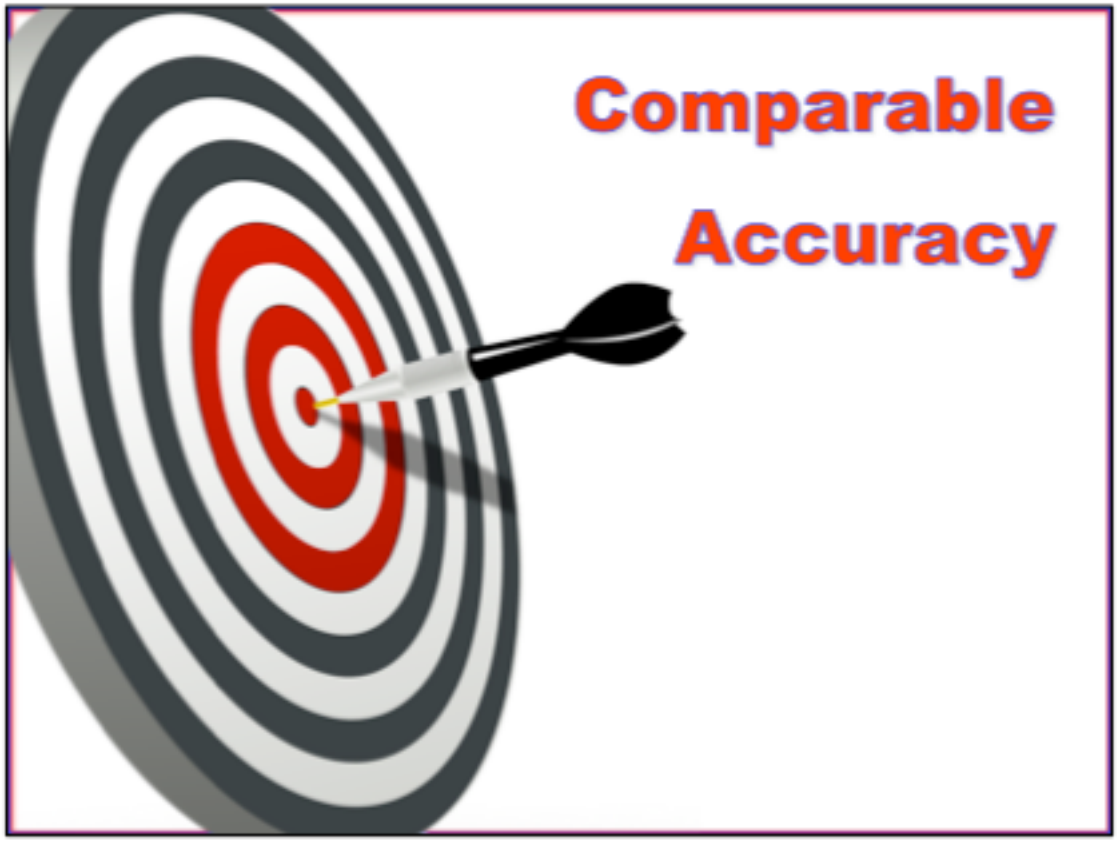
Profile of a crash test dummy with the words, “Destructive Tests.”

Audio

We use samples because we sometimes conduct destructive tests.

Video
Photograph of a test car crashing into a barrier.

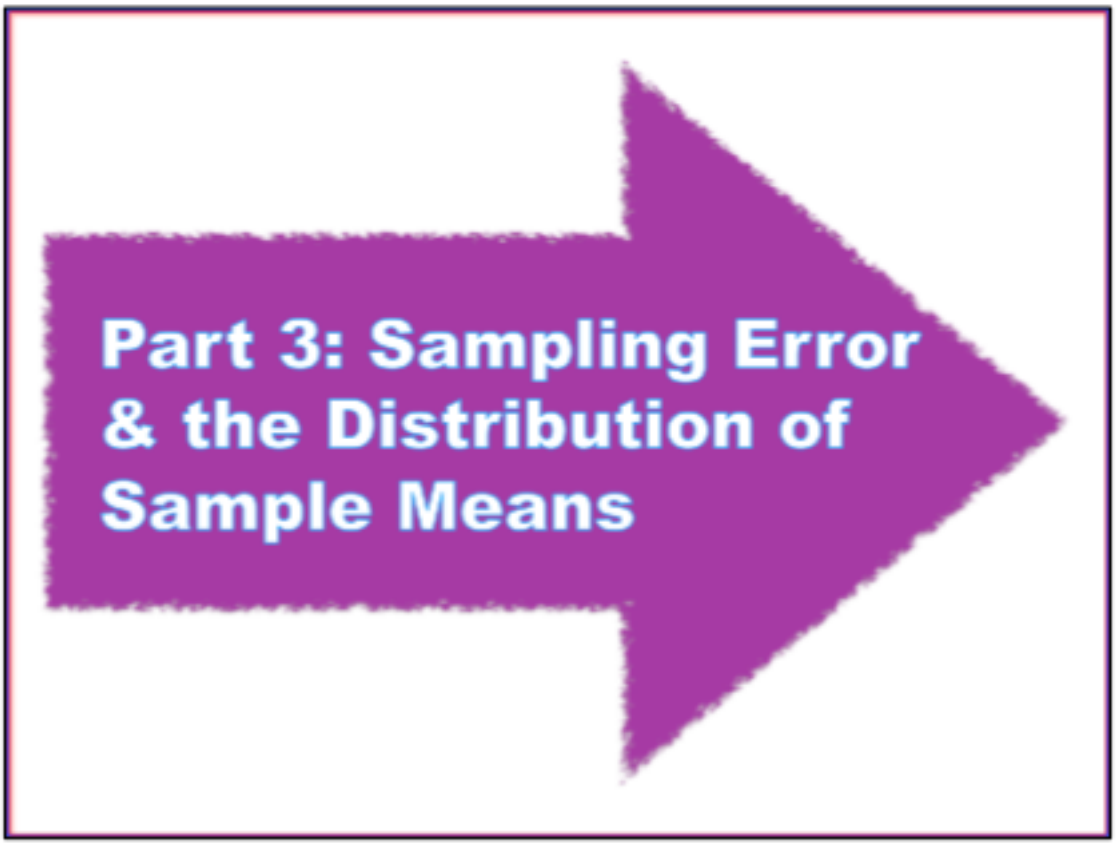
Audio
New cars are subject to crash tests. These tests are expensive. After all, they involve destroying a new automobile. Automobile manufacturers, therefore, conduct these tests using the smallest samples possible to draw accurate conclusions about the safety and repair costs of their vehicles.



Video
Illustration of a dart striking the Bull's Eye of a target with the words, "Comparable Accuracy."

Audio
When properly constructed, a sample can be at least as accurate as a census if the census suffers from systematic errors like non-response bias.

The US census, for example, is frequently faulted for undercounting immigrants, the poor, and people of color.



Video

Image of an arrow with the words, "Part 3: Sampling Error & the Distribution of the Sample Means."

Audio

Let's move on to Part 3 where we will discuss Random Sampling Error and the Sampling Distribution of Sample Means. The Sampling Distribution of Sample Means is an easy way to show that the risk of Sampling Error is always present whenever we conduct a sample.