The Central Limit Theorem

Data Science for Quality Management: Sampling Distributions, Error and Estimation

with **Wendy Martin**

Learning objective:

Describe the Central Limit Theorem

The Central Limit Theorem

- The mean of the RSD of means will equal the population mean, μ, even if the parent population is not normally distributed.

The Central Limit Theorem

- As the sample size (n) increases, the RSD of the means will approach normality, regardless of the shape of the process distribution.

The Central Limit Theorem

- Based upon this theorem, we can use sample statistics to make inferences about population parameters.

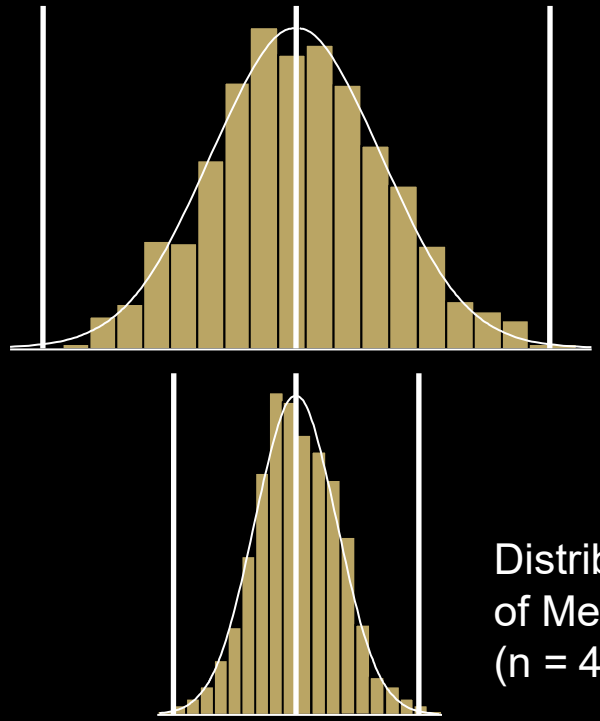
The Central Limit Theorem

- This applies even without our knowing anything about the shape of that population other than what we can gather from the sample (in most cases).

RSD of the Means

(from a Normally Distributed Population)

Distribution of Individuals

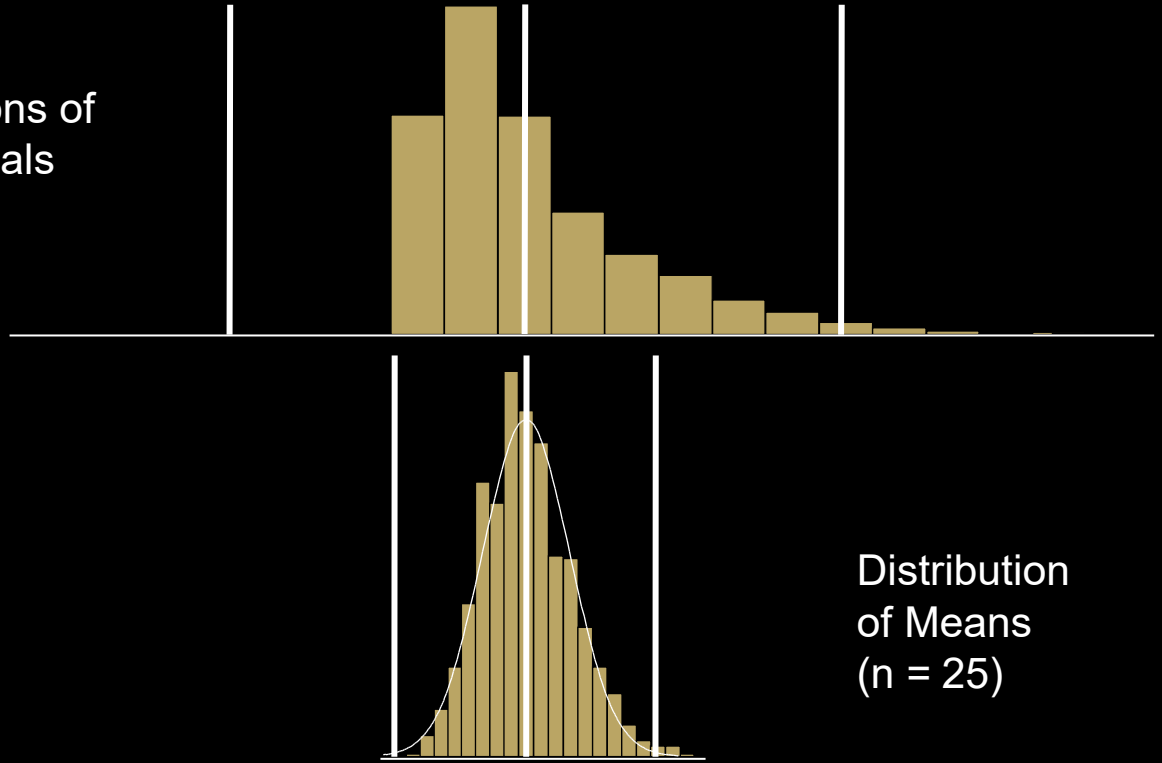


Distribution of Means (n = 4)

RSD of the Means

(from an Exponentially Distributed Population)

Distributions of Individuals



Distribution of Means (n = 25)

Sources

- Luftig, J. An Introduction to Statistical Process Control & Capability. Luftig & Associates, Inc. Farmington Hills, MI, 1982