

V13 - Sampling

Distribution Theory - Part

8

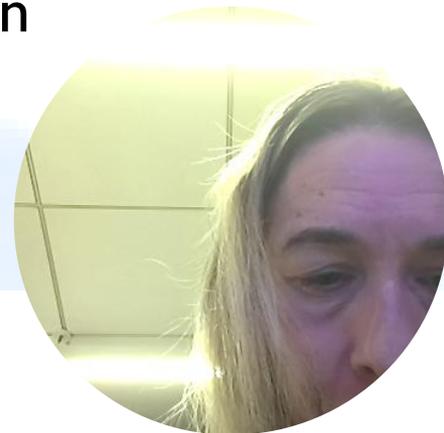
Course: Statistical Testing & Regression

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Descriptive Statistics – Part 8

- Central Limit Theorem



Shape of \bar{X}

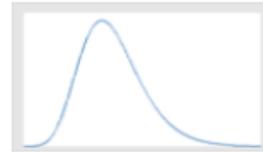
- ❖ If parent population of X is normally distributed, then \bar{X} is:

- ❖ What if X is not normally distributed?

Q: Is \bar{X} normally distributed?

A:

Right-Skewed



Shape of \bar{X}

Q: Why is this relevant?

A: If _____ normally distributed, can standardize and use Z table for _____

$$Z = \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

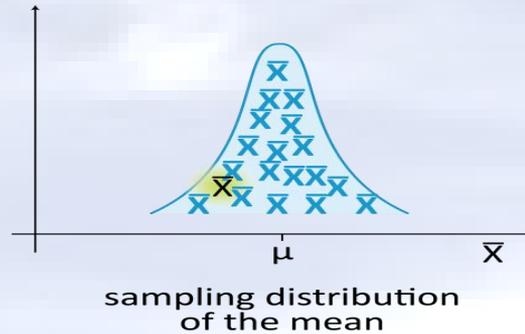
mean	variance	standard deviation*
$\mu_{\bar{X}} = \mu$	$\sigma_{\bar{X}}^2 = \frac{\sigma^2}{n}$	$\sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$

A: Possibly: \bar{X} will become **normally distributed** even if parent population X not normally distributed as _____ increases



Central Limit Theorem

Sample means _____ will be approximately **normally distributed** for sufficiently *large* sample sizes _____



What sample size is this?



Central Limit Theorem

❖ What is “sufficiently large” for $\bar{X} \sim N$?

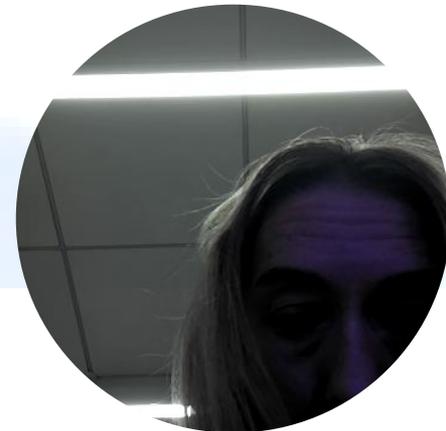
- Statisticians say $n =$ _____ sufficient for most parent populations
- The more parent population of _____ differs from _____, the larger _____ will need to be.
- If parent population _____ is strongly skewed, may need n _____ 30.





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THE END

