

Lesson 10 - Size of Effect - Confidence Intervals (Quantitative)

Lesson Objectives: 1. Confidence interval for quantitative variable

	Recall Categorical	Quantitative	
Parameter	π	μ, σ	$S \rightarrow$ sd of single sample. (variability is \$- from car to car)
Statistic	\hat{p}	\bar{x}, s	$\frac{S}{\sqrt{n}} \rightarrow$ sd of sample means (variability in average \$ from sample to sample)
Standardized Statistic	$z = \frac{\hat{p} - \pi}{\sqrt{\frac{\pi(1-\pi)}{n}}}$	$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$	

Confidence Interval	$\hat{p} \pm M \times \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$	<p>* one sample t-interval*</p> <p>new material</p> $\bar{x} \pm M \times \frac{s}{\sqrt{n}}$
	$M = qnorm(1 - \frac{\alpha}{2})$	$M = qt(1 - \frac{\alpha}{2}, n-1)$
	Where M is the multiplier and α is the significance level	

Factors that influence confidence interval: $\text{Statistic} \pm \text{mult} \times (\text{sd of statistic})$

Categorical

$$\hat{p} \pm qnorm(1 - \frac{\alpha}{2}) \times \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Significance level

Sample size

Quantitative

$$\bar{x} \pm qt(1 - \frac{\alpha}{2}, n-1) \times \frac{s}{\sqrt{n}}$$

Significance level

Sample size

Sample standard deviation

Validity Conditions -

Categorical CI

- ≥ 10 successes
- ≥ 10 failure

Quantitative CI

- Symmetric distribution
- OR
- ≥ 20 observations and the sample distribution not strongly skewed

* Confidence level: indicates the long run percentage of confidence intervals that would succeed in capturing the (unknown) value of the parameter