

## LESSON 27: CRITICAL VALUES

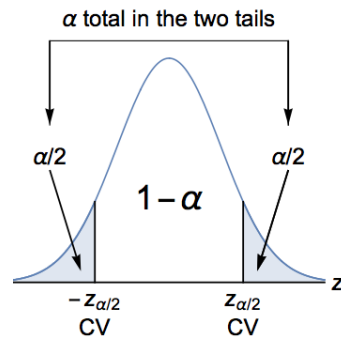
### How Do Confidence Levels Affect a Confidence Interval?

#### PART A: CRITICAL VALUES (“CVs”)

We use two critical values (“CVs”) to construct a  $(1-\alpha)$  confidence interval (CI).

If we are using a  $z$  distribution, we denote the CVs  $\pm z_{\alpha/2}$ .

- Here, “ $\pm$ ” means “plus **and** minus.”
- $\alpha$  is the **total** probability (area) in the **two tails**, and  $\alpha/2$  is the **individual** probability (area) in **each tail**.
- When graphing, we normally **shade in the tails**, even though the CI corresponds to the middle piece.

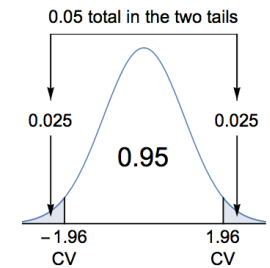


If we are using a  $t$  distribution, we denote the CVs  $\pm t_{\alpha/2}$ .

We handle the  $\chi^2$  distribution differently.

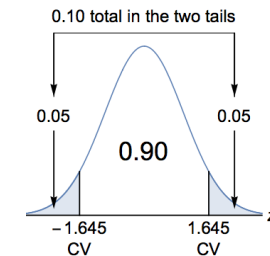
#### PART B: COMMON “CVs” FOR THE $z$ DISTRIBUTION

The most common confidence level is **95%**. For the  $z$  distribution, the corresponding CVs are about  $\pm 1.96$ .



- Remember the “**68-95-99.7%**” **Empirical Rule**. About 95% of approximately **normal** data will lie within **2 SDs** of the mean. Actually, “**1.96 SDs**” would be more accurate.

For a **90%** confidence level, the CVs are about  $\pm 1.645$ .



For a **99%** confidence level, the CVs are about  $\pm 2.58$ .

