

# Calculating One-Population Mean Confidence Intervals

Example: Random Sample  
Body Temp. of F  
 $\bar{x} = 98.26^\circ\text{F}$   
 $S = 0.765$   
 $n = 50$   
 $df = 50 - 1 = 49$

## Confidence Levels

(Degree of Confidence)  
90%, 95%, 99%

↑  
most common

Def: Confidence Interval  
Two numbers that we think the population parameter might be in between.

Sample Statistic  $\pm$  Margin of Error

Sample Statistic  $\pm$  (Z  $\times$  Standard Error)

( $\bar{x}$ ) Sample Mean  $\pm$  (T  $\times$  Standard Error)

$$\bar{x} \pm \left( T \times \frac{S}{\sqrt{n}} \right)$$
$$98.26 \pm \left( 2.010 \times \frac{0.765}{\sqrt{50}} \right)$$

$\underbrace{\hspace{10em}}_{0.1082^\circ\text{F}}$

$$98.26 \pm \underbrace{0.2175}$$

$$(98.04^\circ\text{F}, 98.48^\circ\text{F})$$

95% conf. Level

Standard Error

$$\underbrace{0.108^\circ\text{F}}$$

Margin of Error?

$$\underbrace{0.218^\circ\text{F}}$$

Def: Margin of Error  
How far off we think a sample statistic could be from the population parameter

Critical Value

T-Score  $df = 49$

95% conf level

$$T = \pm 2.010$$

(Statkey Theoretical Distrib.)

## Assumptions

- ① Random Sample
- ② Individuals Independent
- ③ Sample size at least 30 OR Normal