

# Hypothesis Testing

## Type 1 and Type 2 Errors

Believing something is true about the population that is really not true can have severe consequences.

Why does this happen?

- Sample Data Biased
- Sample Data Does not meet assumptions
- Sample Data was not reflective of population due to Sampling Variability.

### Type 1 Error "False Positive"

- Low P-value from biased Sample Data.

- Reject  $H_0$  Support  $H_A$  but neither is true in the population.

$H_0$  correct  
 $H_A$  wrong  
in Pop.

- Significance Level ("Alpha"  $\alpha$ ) is probability of making a type 1 error.

- To decrease chance of Type 1 Error?

Lower the Significance Level

### Type 2 Error "False Negative"

- High P-value from biased Sample data

- Fail to reject  $H_0$  Not Support  $H_A$  but neither is true in the population.

$H_0$  wrong  
 $H_A$  correct  
in Pop.

- Beta Level is the probability of making a type 2 error.

To decrease chance of type 2 Error?

Increase Sample Size  
(collect more data)



10% Sig. level



1% Sig level



5% Sig Level with Large Random Sample

Both Errors Relatively Low