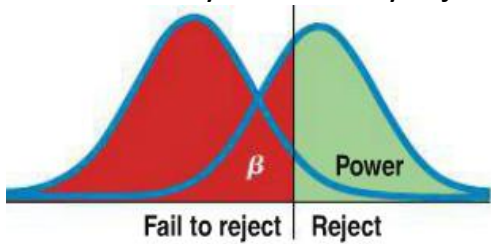# Ch. 20 More About Tests & Intervals Reference Sheet

P-Value = P(data l H_0)

The P-Value is the conditional probability of the data given the null hypothesis is true. It is NOT the probability the H_0 is true.

If a P-value is small, it means the data is rare given the null hypothesis is true; therefore reject the null hypothesis because the results are "statistically significant".

Interpreting P-Value	Details
Alpha Level (α)	The significance level (P-Value) in which you determine if you reject the null hypothesis. *(probability of a Type I error)* **Common Alpha Levels:** *α = 0.05, 0.10, 0.01, 0.001* ***P-Value Less than α:*** *Reject H_0 when test is significant at that level* ***P- Value Greater than α:*** *Fail to Reject H_0 when the data have failed to provide sufficient evidence to reject H_0* **Connect to Confidence Intervals:** 95% confidence interval means α = 5% ***Confidence Intervals:*** *α = 100 – C% (two sided)* *(100 - 2α)% (one sided)*
β	The probability that a test fails to reject a false null hypothesis. *(probability of a Type II error)*
Power (1 – β)	A test's ability to correctly reject a false null hypothesis. *β* Power Fail to reject | Reject
Effect Size	The distance between p_0 (the null hypothesis parameter) and p (the actual parameter). The farther p_0 is from p, the greater the power of the test.

Errors: common mistakes made when hypothesis testing

- **Type I Error**: The null hypothesis is true, but we reject the null hypothesis. (not guilty found guilty)
- **Type II Error:** The null hypothesis is false, but we fail to reject the null hypothesis.(guilty found not guilty)
  - Reduce errors by collecting more data (evidence).

The Truth

	H_0 True	H_0 False
Reject H_0	Type I Error	OK
Fail to reject H_0	OK	Type II Error

My Decision

Suppose the Null Hypothesis is true.

Type I Error

α

p_0

Suppose the Null Hypothesis is not true.

Type II Error

β

Power

p

Fail to reject H_0 | Reject H_0

$p*$