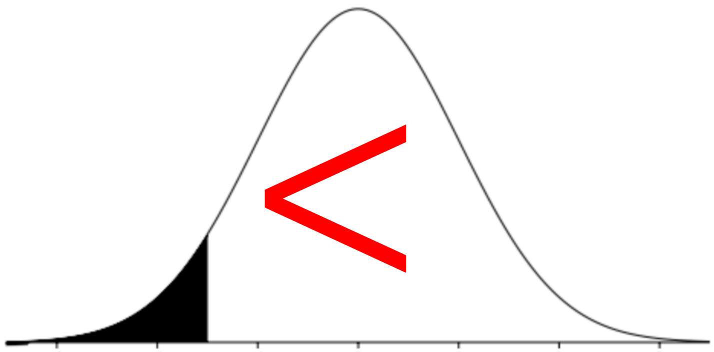
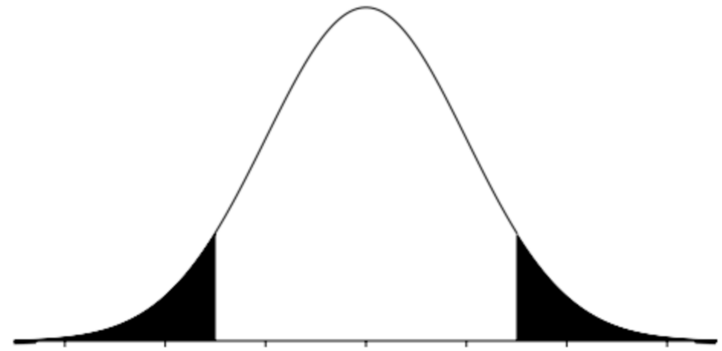
STATING HYPOTHESES

NULL Hypothesis	$H_o : \begin{array}{lcc} p & = & \# \\ \mu & = & \# \end{array}$
ALT (Alternate) Hypothesis	$H_a : \begin{array}{l} p\left(\neq, <, >\right)\# \\ \mu\left(\neq, <, >\right)\# \end{array}$

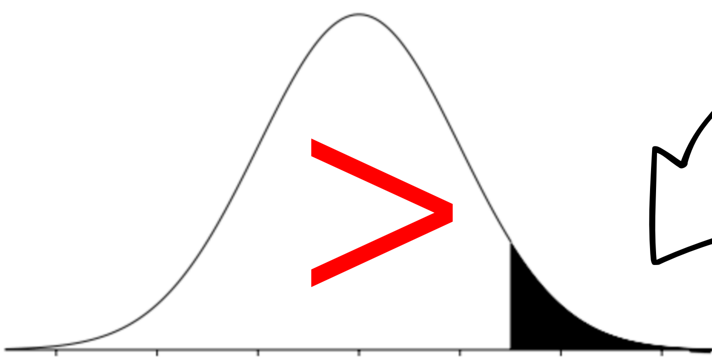
1-SIDED vs. 2-SIDED



$$H_a: p < p_o$$



$$H_a: p \neq p_o$$



$$H_a: p > p_o$$

AREA

under curve

= p-value

P-Value

Assuming H_0 to be true...

$$= P\left(\begin{array}{c} \hat{p}/\bar{x} \text{ is } (>, <, \text{ or } \neq) \\ \hat{p}/\bar{x} \text{ of the sample} \end{array} \right)$$

Direction is specified by H_a.

Drawing (**Conclusions**)

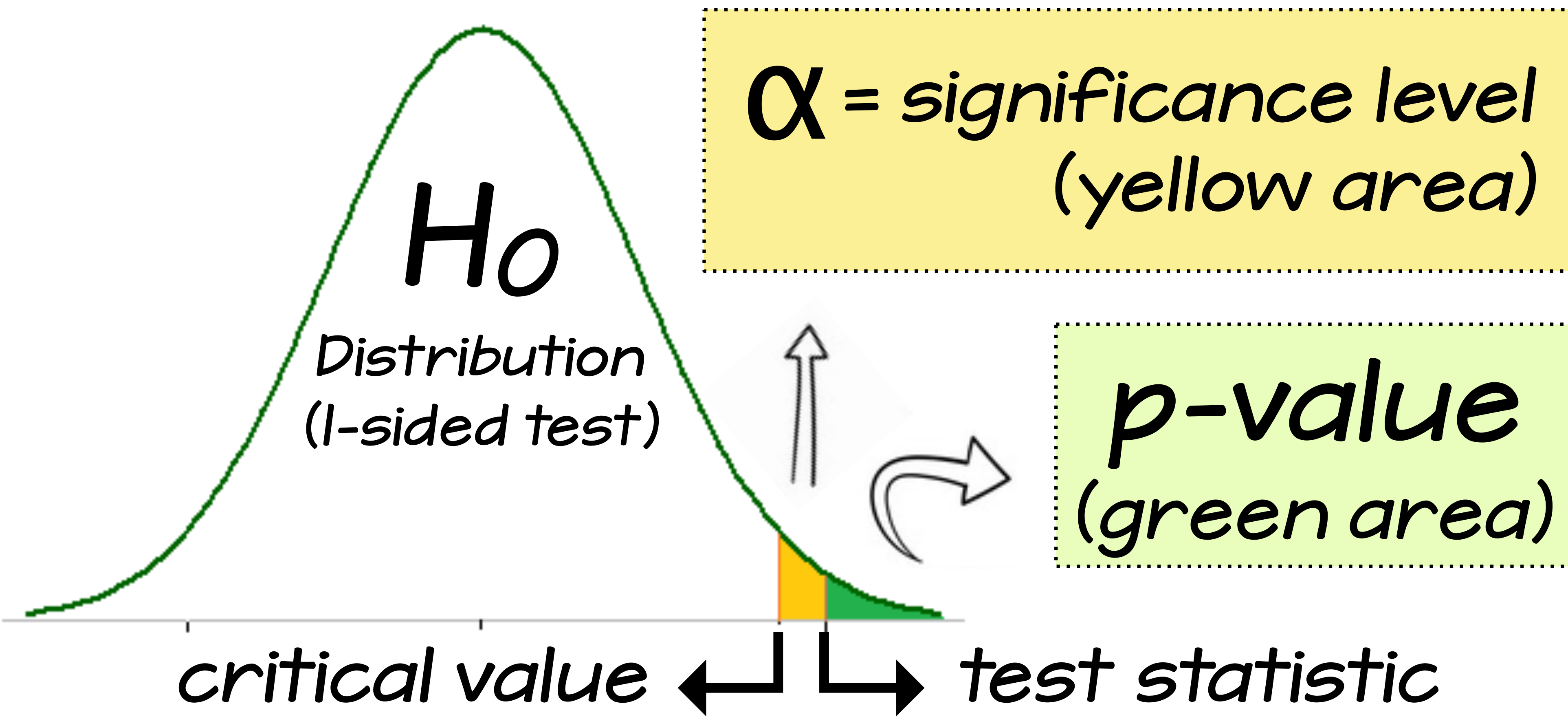
If $\mathbf{p} < \boldsymbol{\alpha}$ … REJECT the H_0

CONVINCING evidence for H_a

If $\mathbf{p} \geq \boldsymbol{\alpha}$… FAIL REJECT the H_0

<u>NOT</u> CONVINCING evidence for H_a

STATISTICAL SIGNIFICANCE



Test Statistic

$$\left(\frac{\text{statistic} - \text{parameter}}{\text{standard error}}\right)$$

PROPORTION

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1 - p_0)}{n}}}$$

MEAN

$$t = \frac{\bar{x} - \mu}{\left(\frac{s_x}{\sqrt{n}}\right)}$$

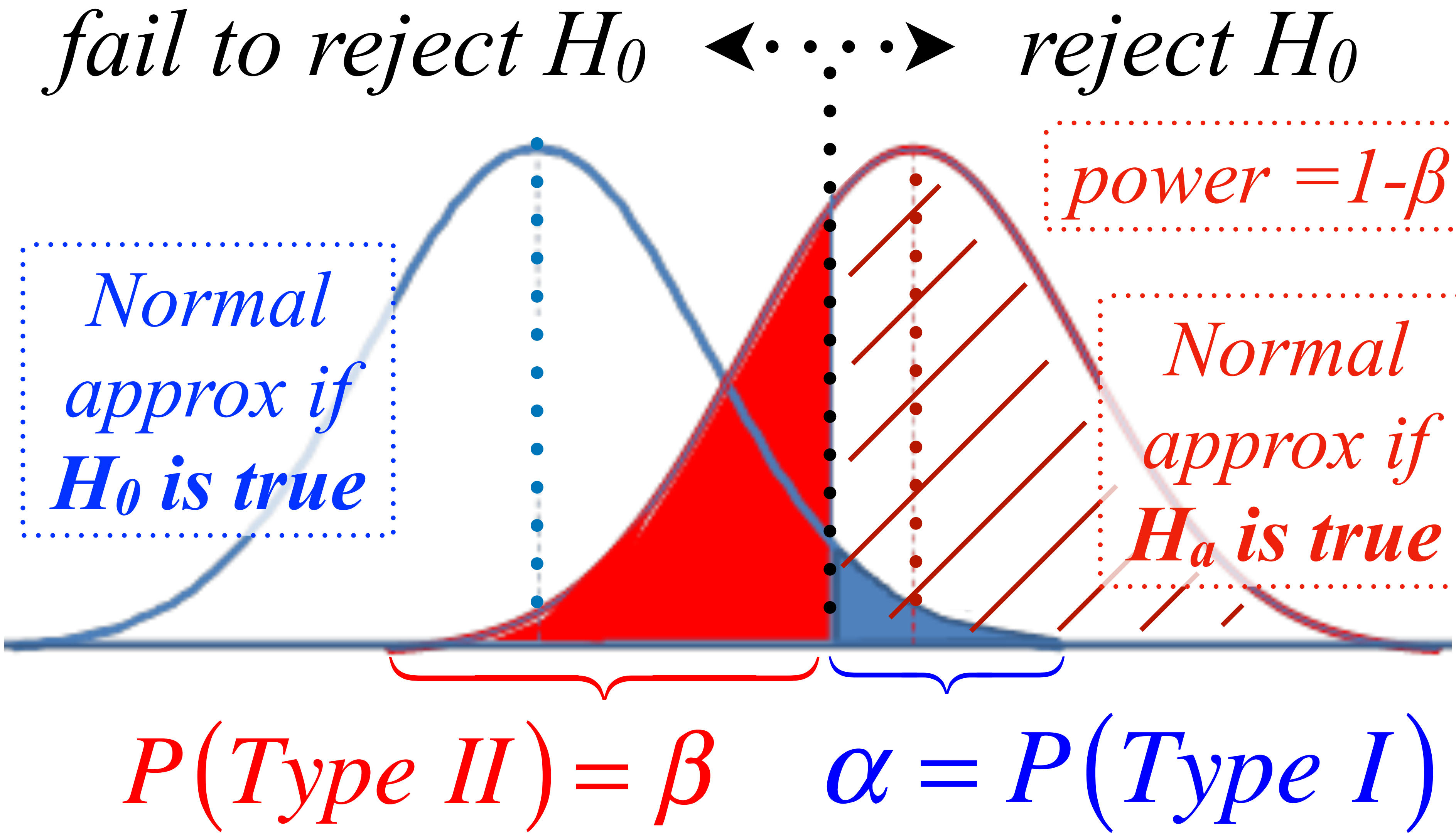
Conditions for Inference

	$\hat{p}$	$\bar{x}$
Random	Data from a random sample.	
Independent	10% Condition:	$n \le \frac{1}{10}N$
Normal	<u>Large Counts</u>: $n\hat{p} \ge 10$ $n(1-\hat{p}) \ge 10$	<u>Must meet ONE</u>: (1) Pop dist. is ~Normal. (2) CLT: n ≥ 30 (3) Sample dist. is not skewed & no outliers

Types of ERRORS	H_0 TRUE	H_0 FALSE
REJECT H_0	TYPE I P(Type I) = α	CORRECT NO Error
FAIL TO reject H_0	CORRECT NO Error	TYPE II P(Type II) = β

(α = significance level ; 1- β = power of test)

POWER & ERRORS



INCREASE

Significance Level (α)

DECREASES

prob. of Type II Error

INCREASE

Sample size (n)

DECREASES

spread of H_0 & H_a dist.

Increases **POWER**