Alpha and Beta in Hypothesis Testing

Notes:

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1. Examples of H0 and H1

H0: Age does not correlate with the frequency of drinking soda.

H1: Age does correlate with the frequency of drinking soda.

2. Definitions of Alpha and Beta

Correct Action	H0 is True Should Not Reject H0	H0 is False Should Reject H0
A Test Rejects H0 (Positive)	α	$1-\beta$
A Test Doesn't Reject H0 (Negative)	$1-\alpha$	β

α = probability of Type I error, known as a "false positive"

β = probability of Type II error, known as a "false negative"

Accordingly,

$1-\alpha$ = "true negative", i.e., correctly not rejecting the null hypothesis

$1-\beta$ = "true positive", i.e., correctly rejecting the null hypothesis

Note that, $1-\beta$ has another name, called power, or statistical power.

3. Common Values of Alpha and Beta

Alpha (α): Common choices for α are 0.05, 0.01, or 0.10. A 5% significance level ($\alpha = 0.05$) is frequently used in many fields.

A commonly used power level ($1-\beta$) is 0.80, meaning you want an 80% chance of correctly rejecting a false null hypothesis.