Type I vs Type II Error

The two ways of being wrong when testing a hypothesis, and the power of a study

Type I error (alpha)

I

false positive: seeing an effect that is not there (rejecting a true null hypothesis)

Type II error (beta)

II

false negative: missing an effect that does exist

Power of the study

1-β

ability to detect a real effect · rises with sample size and effect size

Significance level

α

usually set at 0.05 · a p value below alpha leads to rejecting the null hypothesis

Alpha
"False alarm": an effect that is not real

Beta
"Missed the real one": an effect that exists

Power = 1 - beta
Rises as the sample grows

Lowering alpha without enlarging the sample raises beta · a 95% confidence interval that includes the null value means a non-significant result