



# HYPOTHESIS TESTING

 $H_0$ 

Our default hypothesis. Indicative of no change, no difference, no effect

 $H_a$ 

The alternative hypothesis. The hypothesis we take on when we reject our null hypothesis

Term	Formula / Symbol	Description
Null Hypothesis	$H_0$	The "default" hypothesis; usually no change, no effect, etc
Alternative Hypothesis	$H_1$ or $H_a$	
Significance Level, False Positive Rate	$\alpha$	$P(\text{FP}) = P(\text{Type I Error})$
Statistical Power	$1 - \beta$	$P(\text{Reject } H_0 \text{ when } H_0 \text{ is false})$
False Negative Rate	$\beta$	$P(\text{FN}) = P(\text{Type II Error})$
p-value	$p$	$P(\text{We observed this result due to chance} \mid H_0 \text{ is true})$

## HOW TO KNOW

## TYPE I AND TYPE II ERROR

I determined that the things were different but they were not actually different. I made a prediction of something that wasn't actually the case. A False positive. I said it was going to rain and it did not rain.

I determined that things were approximately the same when they were in fact different. I failed to make a prediction that was actually the case. A False negative. I predicted weather would remain fair when it actually changed to rain

	$H_0$ True	$H_0$ False
Reject $H_0$	Type I Error	Correct Rejection
Fail to Reject $H_0$	Correct Decision	Type II Error



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