

HYPOTHESIS TESTING CHEAT SHEET

Hypothesis	NULL The starting point	ALTERNATIVE
Notation	H_0	H_a
Assumption	Assumes status quo	Assumes change
Mathematical expression	Always has $=, \geq, \leq$	Always has $\neq, <, >$
Examples:		
Means	$\mu_1 = \mu_2$	$\mu_1 \neq \mu_2$
Standard dev	$\sigma_1 = \sigma_2$	$\sigma_1 \neq \sigma_2$
Proportion	$P_1 = P_2$	$P_1 \neq P_2$
Confidence level	0.95 typically	0.95 typically
Level of Significance	$\alpha = 0.05$ typically	$\alpha = 0.05$ typically
P value	$P > \alpha$ no change	$P \leq \alpha$ change
P test conclusion	Fail to reject the null	Reject the null

e.g. when comparing two samples a 2 sample t-Test shows

$$P = 0.128 \text{ where } \alpha = 0.05$$

$P > \alpha$, so the means of the samples not statistically different (to 95% confidence level)

Fail to reject (i.e. "accept") the null hypothesis H_0

"When p is low, the null must go"

"When p is high, the null will fly"

DECISION ↓	REALITY	
	Null Hypothesis is True ↓	Null Hypothesis is False ↓
Fail to reject H_0 →	OK 😊 Confidence Level = 1-Alpha	Beta ☹️ Type II Error Escape / Consumer's Risk
Reject H_0 →	Alpha ☹️ Type 1 Error False Alarm / Producer's Risk	OK 😊 Power = 1-Beta

Choose a Hypothesis Test

