

Multiple testing

H_0, \dots, H_m ^{will} many hypotheses
 p_1, \dots, p_m p-values

Simplest possible ~~if~~ p_j is "sig"
 if $< \frac{\alpha}{m}$ $m=100 \quad \alpha=0.05$

i.e. $p < .0005$

Bonferroni correction

"Family-wise error rate" FWER controlled at $\alpha = 0.05$

		Decision		
		H_0 not rej.	H_0 rej. rej.	
Actual	H_0 true	$m_0 - a$	a <i>pr = type I e.</i>	m_0
	H_0 false	$m - m_0 - b$	b <i>pr = power</i>	$m - m_0$
		$m - R$	R	m <u>1</u>

$$\text{FDR} = E\left(\frac{a}{R}\right)$$

$\frac{0}{0} = 0$

$R = \# \text{ rejections}$
 $a = \# \text{ false rejections}$

ASIDE

$$\text{FWER: } \Pr\left(\bigcup_{i: H_{0i} \text{ true}} p_i^{\text{obs}} \leq \frac{\alpha}{m}\right)$$

$$\leq \sum \Pr\left(p_i^{\text{obs}} \leq \frac{\alpha}{m}\right) = m_0 \frac{\alpha}{m} \leq \alpha \quad \Bigg]$$

$m_0 \# \text{ true } H_{0i}$ (unk.)
 $m \# \text{ of tests}$