

$$X = \begin{cases} 1 & \text{correct} \\ 0 & \text{wrong} \end{cases} \rightarrow X \sim \text{Bern}(p) \quad p_X(x) = \begin{cases} p & x=1 \\ (1-p) & x=0 \end{cases}$$

$$H(X) = \mathbb{E} \left[\underbrace{\log \frac{1}{p_X(x)}}_{= \log(p_X(x))} \right] = -(1-p) \log(1-p) - p \log p$$

$Y \backslash X$	1	2	3	4	P_Y
1	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{4}$
2	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{32}$	$\frac{1}{32}$	$\frac{1}{4}$
3	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{4}$
4	$\frac{1}{4}$	0	0	0	$\frac{1}{4}$

$$H(X) = -\frac{1}{2} \log\left(\frac{1}{2}\right) - \frac{1}{4} \log\left(\frac{1}{4}\right) - \frac{1}{8} \log\left(\frac{1}{8}\right) - \frac{1}{8} \log\left(\frac{1}{8}\right)$$

$$= 1.213 \text{ bits.}$$

$$H(Y) = \left(-\frac{1}{4} \log\left(\frac{1}{4}\right)\right) \times 4 = 1.38 \text{ bits.}$$

$$P_X \quad 1 \quad \frac{1}{2} \quad \frac{1}{4} \quad \frac{1}{8} \quad \frac{1}{8}$$

$$H(X, Y) = -\frac{1}{8} \log\left(\frac{1}{8}\right) - \frac{1}{16} \log\left(\frac{1}{16}\right) + \dots = -\frac{1}{4} \log\left(\frac{1}{4}\right) - \frac{1}{8} \log\left(\frac{1}{8}\right) \times 2 =$$

$$= \frac{1}{16} \log\left(\frac{1}{16}\right) \times 6 - \frac{1}{32} \log\left(\frac{1}{32}\right) \times 4$$

$$= 1.6725 \text{ bits.}$$

$$H(X|Y) = H(X, Y) - H(Y) = 0.29$$

$$H(Y|X) = H(X, Y) - H(X) = 0.46$$

$$I(X, Y) = H(X) - H(X|Y) = 0.923$$

$$\bar{X} - \bar{Y} \sim N(\mu_X - \mu_Y, \frac{\sigma_X^2}{m} + \frac{\sigma_Y^2}{n})$$

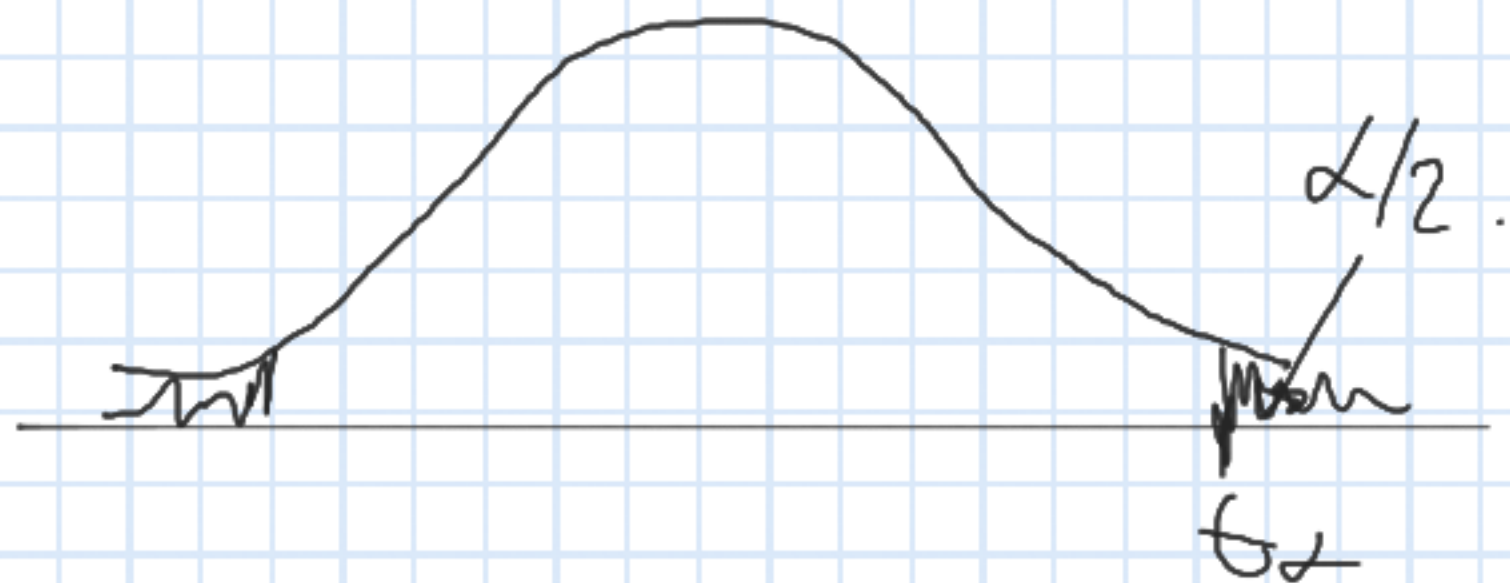
$$N(\mu_X, \frac{\sigma_X^2}{m})$$

$$N(\mu_Y, \frac{\sigma_Y^2}{n})$$

$$\frac{m\sigma_X^2 + n\sigma_Y^2}{m+n} =$$

$$S^2 = \frac{\sum (X_i - \bar{X})^2}{m-1}$$

$$\sum_{m+n-1} (X_i - \bar{X})^2 + \sum_{m-1} (Y_i - \bar{Y})^2$$



$$S(X) = \left| \frac{\bar{X} - \bar{Y}}{SP \sqrt{\frac{1}{m} + \frac{1}{n}}} \right| > t_\alpha$$

x	y
	0 =
	1 -
	1 5
1	2
1	1
1	0

	Maradona	Messi	Riquelme
No. Partidos en Selección	91	142	51
Goles Promedio en Selección	0.37	0.5	0.33
Desvío estándar Goles en Selección	4.6	5.9	3.4

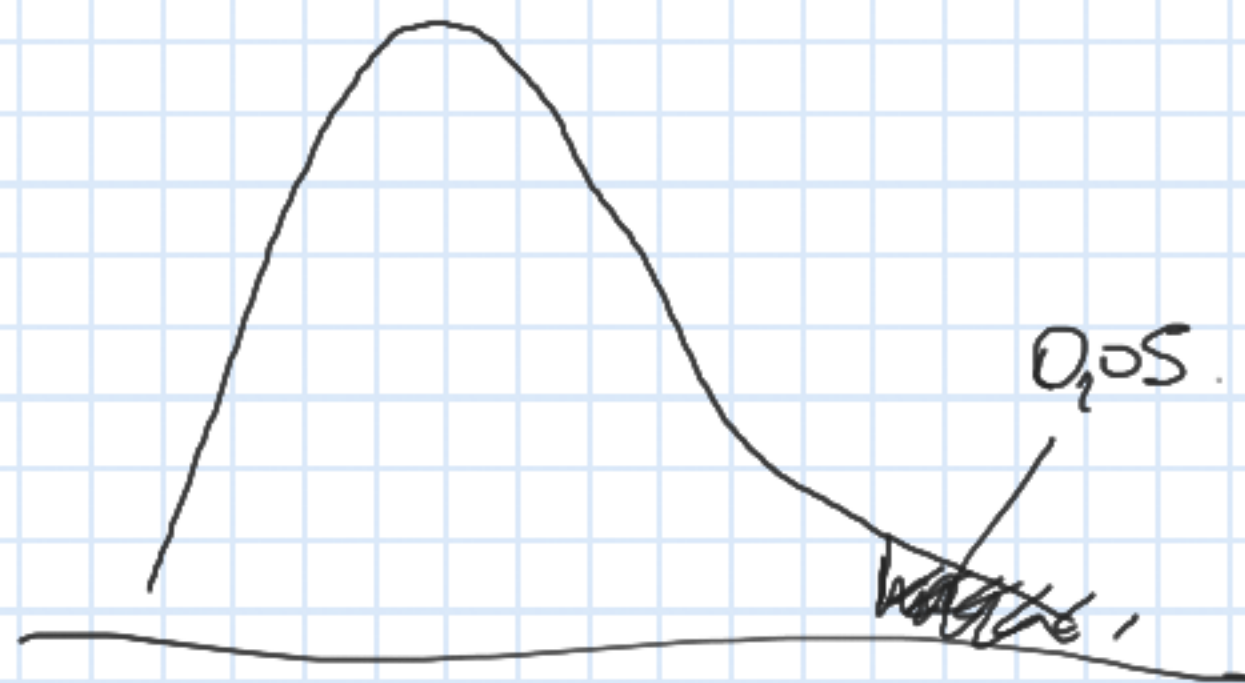
$H_0: \mu_{Me} = \mu_{Ma} = \mu_R$
 μ
 $k=3$

$$\bar{x} = \frac{91 \cdot 0.37 + 142 \cdot 0.5 + 51 \cdot 0.33}{91 + 142 + 51} = 0.43$$

$$S_e^2 = \frac{91(0.37 - 0.43)^2 + 142(0.5 - 0.43)^2 + 51(0.33 - 0.43)^2}{2} = 0.94$$

$$S_d^2 = \frac{90 \cdot 4.6^2 + 141 \cdot 5.9^2 + 50 \cdot 3.4^2}{91 + 142 + 51 - 3} = 26.3 \quad \sqrt{F} = \frac{S_e^2}{S_d^2} = 0.036$$

$$S(\underline{X}_{\mu a}, \underline{X}_{\mu e}, \underline{X}_R) = \mathbb{1}_{\mathcal{I}} \rightarrow \text{Rejection}$$



$$\text{Bajo } H_0 \quad F \sim F_{2, 281}$$

Genio del Fútbol	Goles Selec. Nacional	Goles Equipos
Maradona	34	320
Messi	71	741

$$\chi = \sum_{i,j} \frac{O_{ij} - E_{ij}}{E_{ij}}$$

$$E_{Na, GE} = 322,12$$

$$34 - 1166 \left(\frac{34+71}{1166} \cdot \frac{34+320}{1166} \right) \quad n=1166$$

$$21,88 = E_{Na, SN}$$

$$\frac{34 - 21,88}{21,88} + \frac{320 - 322,12}{322,12} + \frac{741 - 738,88}{738,88} + \frac{71 - 73,12}{73,12} = 0,034$$