

2017, JANUARY
 DESIGN AND DATA ANALYSIS IN PSYCHOLOGY II
 FINAL EXAM, PARTIAL 2

EXERCISE 1

a) $\hat{y} = 3 + 7x$

$\hat{y}_{\text{AMERICANS}} = 3 + 7 \cdot 0 = 3$

$\hat{y}_{\text{EUROPEANS}} = 3 + 7 \cdot 1 = 10$

$\bar{y}_{\text{TOTAL}} = \frac{3+10}{2} = 6.5$

b)

	SS	df	MS	F
REG	122.408	$k-1$ 1	122.408	48.729
RES	20.092	$N-k-1$ 8	2.512	
TOTAL	142.5	9		

$$R^2 = \frac{SS_{\text{exp}}}{SST} \rightarrow 0.927^2 = \frac{SS_{\text{exp}}}{142.5} \rightarrow 0.859 \cdot 142.5 = SS_{\text{exp}} = 122.408$$

c) $R^2_{xy} = 0.859$

EXERCISE 2

$$a) R^2_{Y(2,1)} = R^2_{Y,12} - r^2_{Y1} = 0.996 - 0.998^2 = 0.996 - 0.996 = 0 \rightarrow R_{Y(2,1)} = 0$$

$$R^2_{Y2,1} = \frac{R^2_{Y,12} - r^2_{Y1}}{1 - r^2_{Y2}} = \frac{0}{1 - 0.975^2} = 0 \rightarrow R_{Y2,1} = 0$$

$$b) \text{Tolerance } X_2 = 1 - 0.972^2 = 1 - 0.945 = 0.055$$

EXERCISE 3

$$a) \hat{y} = 135 - 9X_1 + 3X_2 - 3.6X_1X_2$$

gender $\begin{cases} 0 & \text{women} \\ 1 & \text{men} \end{cases}$

135 - Is the average income for women with age = 0

9 - Is the difference in income between men and women (maintaining age constant (the mean is lower in men))

3 - For each age added, income increases 3 points (without considering the variable gender)

3.6 - For each age added, income increases 3.6 less in men than in women

• None of the coefficients are statistically significant.

$$b) \hat{y} = 135 - 9 \cdot 0 + 3 \cdot 30 - 3.6 \cdot 0 \cdot 30 = 135 + 90 = 225$$

$$c) \hat{y} = b_0 + b_1X_1 + b_2X_2 + b_3X_1X_2 \rightarrow \hat{y} = 126 + 9X_1 - 0.6X_2 + 3.6X_1X_2$$

SITUACION ORIGINAL:

$$\hat{y}_{\text{women}} = 135 - 9 \cdot 0 + 3X_2 - 3.6 \cdot 0 \cdot X_2 = 135 + 3X_2$$

$$\hat{y}_{\text{men}} = 135 - 9 \cdot 1 + 3X_2 - 3.6 \cdot 1 \cdot X_2 = 126 - 0.6X_2$$

EXERCISE 4

GRAPHIC 1:

No problem detected
We could use a parametric test

GRAPHIC 2:

No outliers
Quadratic tendency $e-y$. e and y are related
→ Non-linear fitness
Homocedasticity
We should use a non-parametric test.