

PRÁCTICA TEMA 6 (2ª PARTE), SOLUCIONES

EJERCICIO 1

$$r_{yx_1} = 0'7$$

$$r_{yx_2} = 0'6$$

$$r_{x_1x_2} = 0'1$$

$$z_{x_1} = 1$$

$$z_{x_2} = 0$$

$$a) \quad z_{y'} = b_1^* z_{x_1} + b_2^* z_{x_2} \rightarrow z_{y'} = 0'65 z_{x_1} + 0'5 z_{x_2}$$

$$b_1^* = \frac{r_{yx_1} - r_{x_1x_2} r_{yx_2}}{1 - r_{x_1x_2}^2} = \frac{0'7 - 0'1 \cdot 0'6}{1 - 0'1^2} = 0'65$$

$$b_2^* = \frac{r_{yx_2} - r_{x_1x_2} \cdot r_{yx_1}}{1 - r_{x_1x_2}^2} = \frac{0'6 - 0'1 \cdot 0'7}{1 - 0'1^2} = 0'54$$

$$z_{y'} = 0'65 \cdot 1 + 0'5 \cdot 0 = 0'65$$

$$b) \quad R^2_{y, x_1, x_2} = \frac{r_{yx_1}^2 + r_{yx_2}^2 - 2 r_{yx_1} r_{yx_2} r_{x_1x_2}}{1 - r_{x_1x_2}^2} = \frac{0'7^2 + 0'6^2 - 2 \cdot 0'7 \cdot 0'6 \cdot 0'1}{1 - 0'1^2} = 0'77$$

$$c) \quad CA_{y, x_1, x_2} = \sqrt{1 - R^2_{y, x_1, x_2}} = \sqrt{1 - 0'77} = 0'48$$

$$d) \quad CVP = 1 - CA = 1 - 0'48 = 0'52$$

EJERCICIO 2

- PUNTO DE CORTE  $Y > 12$

$$r_{yx_1} = 0'72$$

$$\bar{x}_1 = 20$$

$$s_{x_1} = 8$$

$$r_{yx_2} = 0'76$$

$$\bar{x}_2 = 50$$

$$s_{x_2} = 3$$

$$r_{x_1x_2} = 0'3$$

$$\bar{y} = 10$$

$$s_y = 2$$

$$x_1 = 16$$

$$x_2 = 50$$

$$n.c. = 99\% \rightarrow z_{\alpha \text{ unilateral}} = 2'33$$

$$Lim = Y' \pm E_{max} = 9'44 \pm 1'86 < 11'30 \rightarrow \text{sólo interesa conocer el límite superior}$$

$$Y' = a + b_1 X_1 + b_2 X_2 \rightarrow Y' = -12'8 + 0'14 X_1 + 0'4 X_2$$

$$a = \bar{y} - b_1 \bar{x}_1 - b_2 \bar{x}_2 = 10 - 0'14 \cdot 20 - 0'4 \cdot 50 = 10 - 2'8 - 20 = -12'8$$

$$b_1 = b_1^* \cdot \frac{s_y}{s_{x_1}} = 0'54 \cdot \frac{2}{8} = 0'54 \cdot 0'25 = 0'14$$

$$b_1^* = \frac{r_{yx_1} - r_{yx_2} \cdot r_{x_1x_2}}{1 - r_{x_1x_2}^2} = \frac{0'72 - 0'76 \cdot 0'3}{1 - 0'3^2} = \frac{0'72 - 0'23}{1 - 0'09}$$

$$b_1^* = \frac{0'49}{0'91} = 0'54$$

$$b_2 = b_2^* \cdot \frac{s_y}{s_{x_2}} = 0'59 \cdot \frac{2}{3} = 0'59 \cdot 0'67 = 0'4$$

$$b_2^* = \frac{r_{yx_2} - r_{yx_1} \cdot r_{x_1x_2}}{1 - r_{x_1x_2}^2} = \frac{0'76 - 0'72 \cdot 0'3}{1 - 0'3^2} = \frac{0'76 - 0'22}{1 - 0'09}$$

$$b_2^* = \frac{0'54}{0'91} = 0'59$$

$$Y' = -12'8 + 0'14 \cdot 16 + 0'4 \cdot 50 = -12'8 + 2'24 + 20 = 9'44$$

$$E_{max} = z_c \cdot S_{y \cdot x_1, x_2} = 2'33 \cdot 0'8 = 1'86$$

$$S_{y \cdot x_1, x_2} = S_y \sqrt{1 - R_{y \cdot x_1, x_2}^2} = 2 \sqrt{1 - 0'84} = 0'8$$

$$R_{y \cdot x_1, x_2}^2 = \frac{r_{yx_1}^2 + r_{yx_2}^2 - 2r_{yx_1} r_{yx_2} r_{x_1x_2}}{1 - r_{x_1x_2}^2} = \frac{0'72^2 + 0'76^2 - 2 \cdot 0'72 \cdot 0'76 \cdot 0'3}{1 - 0'3^2} = 0'84$$

12 > 11'30 → No puede considerarse que el niño tenga alguna patología gráfexica con un nivel de confianza del 99%.

### EJERCICIO 3

$$N = 8$$

a) El 4', con el que sólo encontraríamos un error de clasificación (el participante D)

FAMILIA (CRITERIO)	TEST (X)			
	NO	SÍ		
SÍ	0 C	5 A	5	
NO	2 D	1 B	3	
	2	6	8	

$$b) p_{cc} = \frac{A+D}{A+B+C+D} = \frac{5+2}{8} = 0'88$$

$$S = \frac{A}{A+C} = \frac{5}{5} = 1$$

$$E = \frac{D}{B+D} = \frac{2}{3} = 0'66$$

$$K = \frac{F_c - F_a}{N - F_a} = \frac{7 - 4'5}{8 - 4'5} = \frac{2'5}{3'5} = 0'71$$

$$F_c = A+D = 5+2 = 7$$

$$F_a = \frac{\text{NO test} \cdot \text{NO criterio}}{N} + \frac{\text{SÍ test} \cdot \text{SÍ criterio}}{N} = \frac{2 \cdot 3}{8} + \frac{6 \cdot 5}{8} = \frac{6}{8} + \frac{30}{8} = 4'5$$

$$RE = \frac{A}{A+B} = \frac{5}{6} = 0'83$$

$$RI = \frac{A+C}{A+B+C+D} = \frac{5}{8} = 0'63$$

$$RS = \frac{A+B}{A+B+C+D} = \frac{6}{8} = 0'75$$

#### EJERCICIO 4

$$S_x^2 = 49 \rightarrow S_x = 7$$

$$s_x = 2 \rightarrow s_x^2 = 4$$

$$r_{xy} = 0.49$$

$$R_{xy} = \frac{S_x r_{xy}}{\sqrt{S_x^2 r_{xy}^2 + (1 - r_{xy}^2) s_x^2}} = \frac{7 \cdot 0.49}{\sqrt{49 \cdot 0.49^2 + (1 - 0.49^2) \cdot 4}} = 0.89$$

#### EJERCICIO 5

$$\frac{S_y^2}{S_x^2} = 0.85 = r_{xx'}$$

$$r_{xy} = 0.9$$

$$r_{yy'} = 0.95$$

$$a) r_{v_x v_y} = \frac{r_{xy}}{\sqrt{r_{xx'}} \sqrt{r_{yy'}}} = \frac{0.9}{\sqrt{0.85} \cdot \sqrt{0.95}} = 1$$

$$b) r_{v_x y} = \frac{r_{xy}}{\sqrt{r_{xx'}}} = \frac{0.9}{\sqrt{0.85}} = 0.98$$

$$c) r_{x v_y} = \frac{r_{xy}}{\sqrt{r_{yy'}}} = \frac{0.9}{\sqrt{0.95}} = 0.93$$

#### EJERCICIO 6

$$r_{xy} = 0.65$$

$$r_{xx'} = 0.8$$

$$r_{yy'} = 0.6$$

$$R_{xx'} = 0.85$$

$$R_{yy'} = 0.75$$

$$R_{xy} = \frac{r_{xy}}{\sqrt{\frac{r_{xx'} r_{yy'}}{R_{xx'} R_{yy'}}}} = \frac{0.65}{\sqrt{\frac{0.8 \cdot 0.6}{0.85 \cdot 0.75}}} = 0.75$$

#### EJERCICIO 7

$$EI = 20$$

$$r_{xx'} = 0.66$$

$$EF = 60$$

$$r_{xy} = 0.68$$

$$n = \frac{EF}{EI} = \frac{60}{20} = 3$$

$$R_{xy} = \frac{r_{xy} \sqrt{n}}{\sqrt{1 + (n-1) \cdot r_{xx'}}} = \frac{0.68 \sqrt{3}}{\sqrt{1 + (3-1) \cdot 0.66}} = 0.78$$

## EJERCICIO 8

$$EI = 20$$

$$r_{xy} = 0.8$$

$$r_{vxy} = 0.9$$

$$R_{xy} = 0.85$$

ÍTEMS A AÑADIR?

$$n = \frac{(1 - r_{xx'}) R_{xy}^2}{r_{xy}^2 - (R_{xy}^2 r_{xx'})} = \frac{(1 - 0.79) \cdot 0.85^2}{0.8^2 - (0.85^2 \cdot 0.79)} = 2.2$$

$$R_{vxy} = \frac{r_{xy}}{\sqrt{r_{xx'}}} \rightarrow 0.9 = \frac{0.8}{\sqrt{r_{xx'}}$$

$$0.9 \sqrt{r_{xx'}} = 0.8 \rightarrow \sqrt{r_{xx'}} = \frac{0.8}{0.9} = 0.89$$

$$r_{xx'} = 0.89^2 = 0.79$$

$$n = \frac{EF}{EI} \rightarrow 2.2 = \frac{EF}{20} \rightarrow 2.2 \cdot 20 = EF \rightarrow EF = 44$$

$$EF - EI = 44 - 20 = 24. \quad \text{Habrá que añadir 24 ítems al test inicial}$$