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Materia: Estadística inferencial en
nutrición

Problema 1

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

$$\bar{x} = \frac{80+100+90+85+110+95}{6} = 93.33$$

$$\bar{y} = \frac{60+65+62+61+67+63}{6} = 63$$

X	Y	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
80	60	-13.33	-3	39.99	177.68	9
100	65	6.67	2	13.34	44.48	4
90	62	-3.33	-1	-3.33	11.08	1
85	61	-8.33	-2	16.66	69.38	4
110	67	16.67	4	66.68	277.88	16
95	63	1.67	0	0	2.78	0
				$\sum = 140$	$\sum = 583.28$	$\sum = 34$

$$583.28 \times 34 = 19,831.52$$

$$\sqrt{19,831.52} = 140.82$$

$$\frac{140}{140.82} = 0.994176933 \approx 99.41769635\%$$

Problema 2

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

$$\bar{x} = \frac{2.0+2.5+1.8+3.0+2.2+2.7}{6} = 2.36$$

$$\bar{y} = \frac{0.5+0.7+0.4+0.9+0.6+0.8}{6} = 0.65$$

$(x_i - \bar{x})$	$(y_i - \bar{y})$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
-0.36	-0.15	0.054	0.1296	0.0225
0.14	0.05	0.007	0.0196	0.0025
0.56	-0.25	-0.14	0.3136	0.0625
0.64	0.25	0.16	0.4096	0.0625
-0.16	-0.05	0.008	0.0256	0.0025
0.34	0.15	0.051	0.1156	0.0225
		$\sum = 0.11$	$\sum = 0.97$	$\sum = 0.16$

$$0.97 \times 0.16 = 1.552$$

$$\sqrt{1.552} = 1.246$$

$$\frac{0.11}{1.246} = 0.088$$

Problema 3

$$x^2 = \sum \frac{(o_i - E_i)^2}{E_i}$$

$$E_1 = \frac{(40)(27)}{80} = 13.5 \text{ Hombre Pref. Voz}$$

$$E_2 = \frac{(40)(25)}{80} = 12.5 \text{ Hombre Pref. Prot.}$$

$$E_3 = \frac{(40)(23)}{80} = 11.5 \text{ Hombre Pref. CA}$$

$$E_4 = \frac{(40)(22)}{80} = 11.0 \text{ Mujer Pref. Voz}$$

$$E_5 = \frac{(40)(30)}{80} = 15 \text{ Mujer Pref. Prot.}$$

$$E_6 = \frac{(40)(23)}{80} = 11.5 \text{ Mujer Pref. CA}$$

$o_i - E_i$	$(o_i - E_i)^2$
12 - 13.5 = -1.5	2.25 ÷ 13.5 = 0.16
18 - 15 = 3	9 ÷ 15 = 0.6
10 - 11.5 = -1.5	2.25 ÷ 11.5 = 0.19
15 - 13.5 = 1.5	2.25 ÷ 13.5 = 0.16
12 - 15 = -3	9 ÷ 15 = 0.6
13 - 11.5 = 1.5	2.25 ÷ 11.5 = 0.19

$$0.16 + 0.6 + 0.19 + 0.16 + 0.6 + 0.19 = 1.9$$

$$1.9 \div 3.84 = 0.4947$$

Problema 4

$$x^2 = \sum \frac{(o_i - E_i)^2}{E_i}$$

$$E_1 = \frac{(40)(35)}{140} = 10 \text{ Sedentaria Baja Frec}$$

$$E_2 = \frac{(40)(60)}{140} = 17.1 \text{ Sedentaria Media Frec}$$

$$E_3 = \frac{(40)(5)}{140} = 1.4 \text{ Sedentaria Alta Frec}$$

$$E_4 = \frac{(50)(35)}{140} = 12.5 \text{ Moderado Baja Frec}$$

$$E_5 = \frac{(50)(60)}{140} = 21.4 \text{ Moderado Media Frec}$$

$$E_6 = \frac{(50)(45)}{140} = 16.0 \text{ Moderado Alta Frec}$$

$$E_7 = \frac{(50)(35)}{140} = 12.5 \text{ Activo Baja Frec}$$

$$E_8 = \frac{(50)(60)}{140} = 21.4 \text{ Activo Media Frec}$$

$$E_9 = \frac{(50)(45)}{140} = 16.0 \text{ Activo Alta Frec}$$

Problema 5

X	Y	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
80	60	-13.33	-3	39.99	177.68	9
100	65	6.67	2	13.34	44.48	4
90	62	-3.33	-1	-3.33	11.08	1
85	61	-8.33	-2	16.66	69.38	4
110	67	16.67	4	66.68	277.88	16
95	63	1.67	0	0	2.78	0
				$\sum = 140$	$\sum = 583.28$	$\sum = 34$

$$\bar{y} = B_0 + B_1x$$

$$B_0 = \bar{y} - B_1\bar{x}$$

$$B_1 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$B_1 = \frac{140}{583.28} = 0.24$$

$$B_0 = 63 - 0.24 = 62.76$$

$$B_0 = 63 - 0.24(93.33) = 40.61$$

$$Y = 40.61 + 0.24X$$

$o_i - E_i$

$o_i - E_i$	$(o_i - E_i)^2$
20 - 10 = 10	100 ÷ 10 = 10
15 - 17.1 = -2.1	4.41 ÷ 17.1 = 0.25
5 - 1.4 = 3.6	12.96 ÷ 1.4 = 9.25
10 - 12.5 = -2.5	6.25 ÷ 12.5 = 0.5
25 - 21.4 = 3.6	12.96 ÷ 21.4 = 0.60
15 - 16.0 = -1	1 ÷ 16.0 = 0.06
5 - 12.5 = -7.5	56.25 ÷ 12.5 = 4.5
20 - 21.4 = -1.4	1.96 ÷ 21.4 = 0.09
25 - 16.0 = 9	81 ÷ 16.0 = 5.06

$$10 + 0.25 + 9.25 + 0.5 + 0.60 + 0.06 + 4.5 + 0.09 + 5.06 = 30.31$$

$$30.31 \div 3.84 = 7.8932$$

Problema 6

X	Y	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
2.0	0.5	-0.36	-0.15	0.054	0.1296	0.0225
2.5	0.7	0.14	0.05	0.007	0.0196	0.0025
1.8	0.4	-0.56	-0.25	0.14	0.3136	0.0625
3.0	0.9	0.64	0.25	0.16	0.4096	0.0625
2.2	0.6	-0.16	-0.05	0.008	0.0256	0.0025
2.7	0.8	0.34	0.15	0.051	0.1156	0.0225
				$\sum = 0.415$	$\sum = 0.97$	$\sum = 0.164$

$$B_1 = \frac{0.415}{0.97} = 0.427$$

$$B_0 = 0.65 - 0.42 = 0.23$$

$$B_0 = 0.65 - 0.42(2.36) = -0.3412$$

$$Y = -0.34 + 0.42X$$