SCHOOL OF PSYCHOLOGY UNIVERSITY OF SEVILLE
PSYCHOMETRICS (English group)
January, 2014
Partial 2, A

Name: _____
Identification number: _____

Exercise 1. A test conformed by 4 items was applied to a sample of 5 participants. Calculate its reliability using the method of:

a. Guttman-Flanagan.

b. Rulon.

	IT 1	IT 2	IT 3	IT 4
1	0	1	1	0
2	1	0	0	1
3	0	0	0	1
4	1	1	0	1
5	1	1	0	1

Exercise 2. A sample of 80 scholars obtained in a test formed by 20 items a mean of 15, and a standard deviation of 2. The variance of the differences across even and odd items was 0.8. Calculate:

a. The reliability index.
b. The reliability coefficient supposing that we add 5 parallel items to the test.
c. The estimation of the true score (in raw scores) of a participant who scored 12 points in the test, using the regression method (C.L. 95%).

Exercise 3. The table below presents the results obtained in a multitrait-multimethod study where we calculated the correlation between introversion (I), aggressiveness (A) and sociability (S) using two different methods (A and B):

		Method A			Method B		
		I	A	S	I	A	S
Method A	I	0.96					
	A	0.29	0.85				
	S	0.56	0.4	0.93			
Method B	I	0.8	0.33	0.58	0.96		
	A	0.2	0.65	0.44	0.4	0.8	
	S	0.3	0.31	0.63	0.56	0.25	0.2

a. Mark over the table the reliability, convergent validity and discriminant coefficients.
b. Interpret the previous coefficients.

Exercise 4. A 20-item test applied to a normative group obtained that the variance of the true scores was the middle than the variance of the empirical scores; and the correlation between the scores obtained in the test and a criterion was 0.8. How many items do we have to include if we would like to obtain a validity coefficient of 0.95?

JANUARY, 2014

GROUPS A AND C, PARTIAL 2, (EX. 1)

TIPO A

	IT1	IT2	IT3	IT4	X	P	i	p^2	i^2	x^2	p-i	$(p-i)^2$
suj 1	0	1	1	0	2	1	1	1	1	4	0	0
suj 2	1	0	0	1	2	1	1	1	1	4	0	0
suj 3	0	0	0	1	1	1	0	1	0	1	1	1
suj 4	1	1	0	1	3	2	1	4	1	9	1	1
suj 5	1	1	0	1	3	2	1	4	1	9	1	1
					11	7	4	11	4	27	3	3

(a)

$$r_{xx'} = 2\left(1 - \frac{S^2_p + S^2_i}{S^2_x}\right) = 2\left(1 - \frac{0'24 + 0'16}{0'56}\right) = 2\left(1 - \frac{0'4}{0'56}\right) = 2(1 - 0'71) = 2 \cdot 0'29 = 0'58$$

$$S^2_p = \frac{\Sigma p^2}{N} - \bar{p}^2 = \frac{11}{5} - 1'4^2 = 2'2 - 1'96 = 0'24$$

$$\bar{p} = \frac{\Sigma p}{N} = \frac{7}{5} = 1'4$$

$$S^2_i = \frac{\Sigma i^2}{N} - \bar{i}^2 = \frac{4}{5} - 0'8^2 = 0'8 - 0'64 = 0'16$$

$$\bar{i} = \frac{4}{5} = 0'8$$

$$S^2_x = \frac{\Sigma x^2}{N} - \bar{x}^2 = \frac{27}{5} - 2'2^2 = 5'4 - 4'84 = 0'56$$

$$\bar{x} = \frac{\Sigma x}{N} = \frac{11}{5} = 2'2$$

(b) $$r_{xx} = 1 - \frac{S^2_{p-i}}{S^2_x} = 1 - \frac{0'24}{0'56} = 1 - 0'43 = 0'57$$

$$S^2_{p-i} = \frac{\Sigma (p-i)^2}{N} - \left(\frac{\Sigma (p-i)}{N}\right)^2 = \frac{3}{5} - \left(\frac{3}{5}\right)^2 = 0'6 - 0'6^2 = 0'6 - 0'36 = 0'24$$

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GROUPS A AN C, PARTIAL 2
TIPO A

ex 2

(a) $r_{xx'} = 1 - \frac{S^2_{e-i}}{S^2_x} = 1 - \frac{0'8}{4} = 1 - 0'2 = 0'8 \rightarrow r_{xv} = \sqrt{r_{xx'}} = \sqrt{0'8} = 0'89$

(b) $R_{xx'} = \frac{n \cdot r_{xx'}}{1+(n-1) r_{xx'}} = \frac{1'25 \cdot 0'8}{1+(1'25-1)\cdot 0'8} = \frac{1}{1+0'25 \cdot 0'8} = \frac{1}{1+0'2} = \frac{1}{1'2} = 0'83$

$n = \frac{L}{l} = \frac{25}{20} = 1'25$

(c) $V' \pm E_{max} = 12'6 \pm 1'57 \begin{cases} 14'17 \\ 11'03 \end{cases}$

$V' = r_{xx}(x - \bar{x}) + \bar{x} = 0'8(12-15)+15 = 0'8(-3)+15 = -2'4+15 = 12'6$

$E_{max} = S_{vx} \cdot z_c = 0'8 \cdot 1'96 = 1'57$

$S_{vx} = S_x \sqrt{1-r_{xx'}} \sqrt{r_{xx'}} = 2\sqrt{1-0'8}\sqrt{0'8} = 2 \cdot \sqrt{0'2}\sqrt{0'8} = 0'8$

ex 3

FIABILIDAD: Buenos coeficientes excepto en SOCIABILIDAD CON MÉTODO B (0,2, muy malo)

VALIDEZ CONVERGENTE: buenos coeficientes:

- De 0.63 a 0.8
- Siempre + altos q validez discriminante

VALIDEZ DISCRIMANTE: Buenos coeficientes → bajos, siempre + bajos q los d validez convergente

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GROUPS A AND C, PARTIAL 2
TIPO A

(EX 4)

$25^2_V = S^2_X$

$r_{XY} = 0'8$

IT? — $R_{XY} = 0'95$

$$r_{XX'} = \frac{S^2_V}{S^2_X} = \frac{S^2_V}{25^2_V} = \frac{1}{2} = 0'5$$

$$n = \frac{(1 - r_{XX'}) R^2_{XY}}{r^2_{XY} - R^2_{XY} \cdot r_{XX'}} = \frac{(1-0'5) \cdot 0'95^2}{0'8^2 - 0'95^2 \cdot 0'5} =$$

$$= \frac{0'5 \cdot 0'9}{0'64 - 0'9 \cdot 0'5} = \frac{0'45}{0'64 - 0'45} =$$

$$= \frac{0'45}{0'19} = 2'37$$

$$n = \frac{L}{\ell} \longrightarrow 2'37 = \frac{L}{20} \longrightarrow 47'4 = L$$

47'4 − 20 = 27 items have to be included