CASE 1: A researcher wanted to examine whether the educational level of participants (3 levels of the independent variable) has an effect on sustained attention. Three hundred people between 30 and 35 years old were recruited, 100 with primary education, 100 with secondary education, and 100 with university studies. The participants had to detect, in 1000 trials, the letter F in matrices containing (or not) the letter E on a computer screen. The researcher measured the reaction time in each trial (in milliseconds) as a marker of attention.

- **1.** The study described in CASE 1 is:
 - a) Correlational-Observational, because this research follows the usual correlationalobservational approach in which the Pearson coefficient is computed.
 - b) Experimental, because the independent variable is directly manipulated and the logic of the research is to examine its impact on the dependent variable.
 - c) Quasi-experimental, because the three groups of the independent variable have been formed naturally rather than by random assignment.
- 2. (CASE 1) What type of variable is "Educational Level"?
 - a) Ordinal
 - b) Qualitative (nominal)
 - c) Quantitative (discrete)
- 3. (CASE 1) What type of variable is "Reaction Time"?
 - a) Quantitative (continuous)
 - b) Quantitative (discrete)
 - c) Ordinal
 - **4.** What measure of association would you use to assess the relationship between the variables "Gender" (male, female, other) and "Religion" (Christian, Muslim, other religions, non-believer)?
 - a) Pearson Correlation
 - b) Spearman Correlation
 - c) Cramer's V Correlation
 - **5.** If the relationship between two variables X and Y is very high (e.g., a Pearson's coefficient of 0.96), we can conclude that
 - a) The variable X has a causal relationship on the variable Y
 - b) Both variables covariate very highly
 - c) The variable X follows the normal distribution
 - **6.** If we have the JASP (or SPSS) output of a simple regression equation and we want to know the Pearson correlation coefficient (i.e., r), the preferred optionis
 - a) To only look at R—the slope in standardized scores does not provide the sign
 - b) To only look at the slope in standardized scores (R does not provide the sign).
 - c) To look at R or the slope in standardized scores (i.e., both will provide the same value).

- **7.** Peter is in the 99th percentile on a standardized psychological test that measures anxiety. From the following range, what z-score is most likely to correspond to him?
 - a) z-score of approximately 0.99
 - b) z-score less than 0.99
 - c) z-score greater than 0.99
- **8.** If we have a symmetric distribution that has more density (height) in the center and at the ends than the normal distribution, we will presumably be looking at a
- a) Mesokurtic distribution
- b) Platikurtic distribution
- c) Leptokurtic distribution

Descriptive Statistics				
	MATHEMATICS	CHEMISTRY	DRAWING	
Valid	224	224	224	
Mean	8.321	8.089	5.953	
Median	9.000	8.000	6.000	
Std. Deviation	XXX	XXX	XXX	
IQR	XXX	XXX	XXX	
Skewness	-0.996	-0.638	-0.179	
Std. Error of Skewness	0.163	0.163	0.163	
Kurtosis	0.673	-0.392	0.032	
Std. Error of Kurtosis	0.324	0.324	0.324	
Minimum	2.000	3.000	3.000	
Maximum	10.000	10.000	8.000	
25th percentile	7.000	7.000	5.400	
50th percentile	9.000	8.000	6.000	
75th percentile	10.000	10.000	6.500	

OUTPUT 1 (Math, Chemistry and Technical Drawing grades of 224 students) Descriptive Statistics

9. (OUTPUT 1) Which of the 3 variables shows the least degree of asymmetry?

- a) Mathematics
- b) Technical Drawing
- c) All 3 show exactly the same degree of asymmetry

10. (OUTPUT 1) Which of the 3 variables appears to have a shape more similar to the normal distribution?

- a) Mathematics
- b) Technical Drawing
- c) Chemistry

11.(OUTPUT 1) Which variable has the least variability attending to the range of the box in the "box plot" (i.e., the interquartile range)?

- a) Mathematics
- b) Technical Drawing
- c) Chemistry

12. (OUTPUT 1). If we were to add the constant 0.5 to each observation...

- a) The mean and standard deviation would vary, but not the asymmetry index
- b) The mean, standard deviation, and the asymmetry index would vary
- c) The mean would vary, but not the standard deviation or the asymmetry index

OUTPUT 2. Linear Regression (Marks in Technical <u>Drawing as the dependent variable. The predictors are the</u> marks in Math, Foreign Language, and Spanish Language)

Model Summary - DRAWING								
Model	R	R²	Adjusted R ² RMSE					
H₀	0.000	0.000	0.000	0.864				
H₁	0.611	0.374	0.365	0.689				

Coefficients

							Collinearity Statistics	
Mod	el	Unstandardized	Standard Error	Standardized	t	р	Tolerance	VIF
H₀	(Intercept)	5.953	0.058		103.117	XXX	x	
H₁	(Intercept)	2.940	0.339		8.669	XXX	x	
	MATHEMATICS	0.236	0.032	0.448	7.456	XXX	x 0.787	1.271
	FOREIGN_LANGUAGE	0.384	0.052	0.412	7.419	XXX	x 0.925	5 1.081
	SPANISH_LANGUAGE	-0.110	0.035	-0.192	-3.182	хххх	0.778	8 1.285

13. (OUTPUT 2) What is the best predictor in the multiple regression equation?

- a) Mathematics
- b) Foreign Language
- c) Spanish Language
- **14.** (OUTPUT 2) What is the percentage of variance of "Technical Drawing" can explain the regression equation?
 - a) Approximately 61%
 - b) Approximately 37%
 - c) Approximately 69%
 - **15.**(OUTPUT 2) Do you think there could have been collinearity problems in the regression equation?
 - a) Not particularly serious, the highest VIF is 1.285
 - b) There are serious problems because all VIFs are over 1.000
 - c) There are serious problems because each VIF offers a different value.
- **16.** (OUTPUT 2). Using the regression equation, what score would you predict in "Technical Drawing" (direct scores) for someone who has a 0 in Mathematics, Foreign Language and Spanish Language?
 - a) **2.940**
 - b) 5.593
 - c) 0.339

- **17.** What theoretical distribution has degrees of freedom in the numerator and the denominator?
 - a) chi-square
 - b) Fisher's F
 - c) Student t
- **18.** We have a probability density distribution in a continuous random variable X, where f(x)=1.5 for a given value of X. Is that possible?
 - a) Yes, because f(x) is not a probability.
 - b) No, because f(x) is bounded between -1 and 1.
 - c) No, because f(x) is bounded between 0 and 1.
- 19. If we answer a multiple-choice exam composed of 20 questions, each with three alternatives (one correct and two incorrect), totally at random, what is the probability of getting at least one correct answer?
 a) 1-(2/3)²⁰

b) 1-(1/3)²⁰

c) (1/3) + (2/3)¹⁹

20. The greater the number of degrees of freedom, the chi-square distribution

- a) is more and more similar to a standardized normal distribution N(0,1)
- b) decreases its positive asymmetry
- c) increases its positive asymmetry