

1- Please specify the type of the following variables:

- i) The colour of one's eye
 - ii) The speed of a car
 - iii) Happiness level on a scale of 1 to 3
- A) Categorical Nominal, Categorical Ordinal, Numerical
 - B) Categorical Ordinal, Categorical Nominal, Numerical
 - C) Numerical, Categorical Nominal, Categorical Ordinal
 - D) Categorical Nominal, Numerical, Categorical Ordinal

Answer: D.

2- True or False?

"In measuring a variable like room temperature, it is possible to have a measurement that is free of any error."

- A) True
- B) False

Answer: B

3- Consider the definition of systematic error presented in unit 3.

"Systematic error can change from a measurement to the next measurement on the same object, using the same procedure."

The statement is

- A) True
- B) False

Answer: B.

4- Three instruments, A, B and C, are used to measure a variable for a large group of subjects and we know for a fact that instrument A has no systematic error, then...

- i) It is possible to determine which of the instruments B or C has a smaller systematic error
- ii) It is possible to determine which of the instruments B or C is more reliable

Which of the above is/are true?

- A) Only (i)
- B) (i) and (ii)
- C) Only (ii)
- D) Neither (i) nor (ii)

Answer: B.

In the case that instrument A has no systematic error, we can compare instrument B and C to A and hence find out which one has a smaller systematic error. To compare the reliability of instruments B and C we only need to check which one has a smaller variability and to do that we can calculate the standard deviation of the measurements done by B and C.

5- Imagine that we are measuring a variable for a group of subjects. Consolidating the data, we see that there is some variability present in the data. What are the sources of such variability?

- i) Random error of the measurement instrument.
- ii) Natural Variability of the variable we have measured.
- iii) Systematic error of the instrument.

- A) (i) and (ii)
- B) (ii) and (iii)
- C) (i) and (iii)
- D) (i) and (ii) and (iii)

Answer: A.

In unit 3 we learnt that there are two sources of variability: Natural variability and random error.