

GER1000 2018 Sem 2  
Quiz 4 and solutions

1. The following is an excerpt from a paper with the title, “Cannabis as a substitute for prescription drugs – a cross-sectional study”.

In the measurement section of the paper, we read the following:

### **Data sources and measurement**

Prescription drug substitution was evaluated by asking survey respondents, “Have you ever used cannabis as a substitute for prescription drugs (yes/no)?” If the respondent answered in the affirmative, an open-ended response field was available with the instructions, “Please list prescription drugs that you have substituted cannabis for.”.

Imagine there is a certain fraction of the population that indeed have used cannabis as a substitute for prescribed medicine. Do you anticipate the proportion measured in this way to be likely different than the actual proportion? Answer this question by considering the potential illegal perception of substance use by the survey responder.

a) We anticipate the reported fraction to be the same as the actual fraction

b) We anticipate the reported fraction to be different from the actual fraction

Answer:

Due to “desire to please” pitfall, survey responders may refrain from answering yes to this question. Please look at slide 26 of measurement chapter.

2. Determine the types of the following variables.

Sex, age, stress level on a scale of 1 to 3, speed of a car

a) Categorical nominal, numerical, categorical ordinal, numerical

b) Categorical ordinal, numerical, numerical, numerical

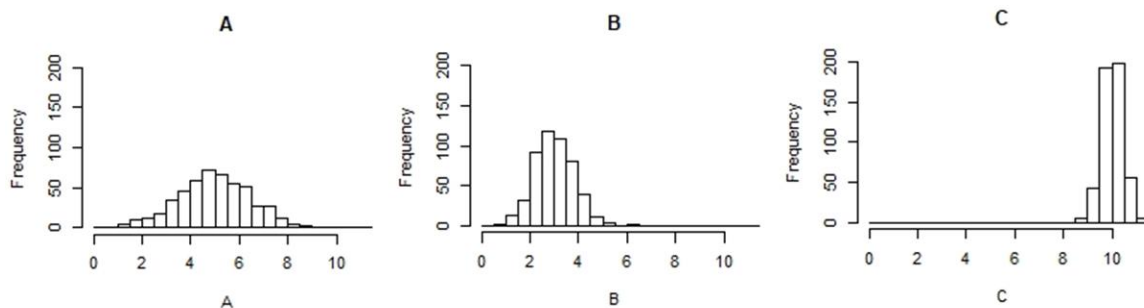
c) Categorical nominal, numerical, numerical, numerical

d) Categorical ordinal, numerical, categorical ordinal, numerical

Answer:

Please refer to Chapter 3 slide 10.

3. Three instruments, A, B and C are used to measure the temperature of a dessert that does not change over time. The following figure depicts the histogram of 500 measurements of each instrument, where the x-axis shows temperature in Celsius (it's a cold dessert), and the y-axis shows the number of measurements within each little rectangle. Assume that instrument A does not have any systematic error. Which of the following statements are true?



I) Instrument A is free of error.

II) It is possible to determine which of the instruments B or C have a smaller bias.

A) I only

B) II only

C) Neither I nor II

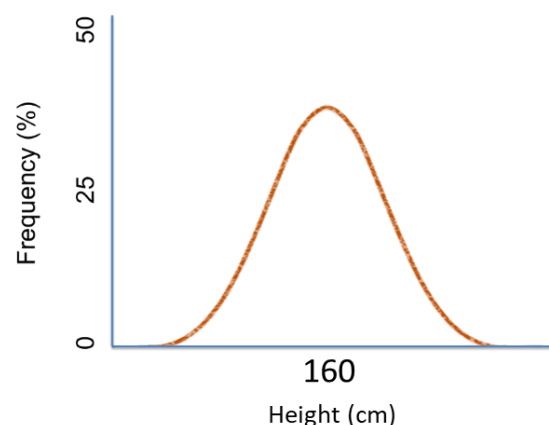
D) Both I and II

Answer:

Although instrument A does not have systematic error, as it can be seen in the figure, it has random error. Please look at Chapter 3 slide 17.

With the assumption that instrument A is bias free, instrument B and C can be compared to A to determine which one has a smaller bias. Please look at Chapter 3 slide 16.

4. The height of 1000 randomly selected NUS students are measured and presented via a histogram. What factors contribute to the variability in the 1000 measurements as shown in the diagram?



A) Natural Variability

B) Random error

C) Systematic error

D) Natural Variability and Random error

Answer:

The two sources of variability are natural variability and random error. Please look at Chapter 3 slides 18 and 19.

5. In the example provided in the slide 3 of unit 1, the differences observed in the two polls between the portions that support the Common Core State Standards can be due to the \_\_\_\_

I) Differences between the questions asked.

II) Differences between the groups of people the surveys are taken from.

A) Only I

B) Only II

C) Both I and II

D) Neither I nor II

Answer:

In the slides after Chapter 3 slide 3, we further explained that the differences observed between the two polls can be due to the differences in the questions asked and/or the differences between the characteristics of the people these questions are directed to.