

Practice IRAT for 29 October (bias and how to deal with it)

1. X and Y are correlated. What can we conclude?
 - a. X caused Y, or Y caused X.
 - b. X and Y are associated, but they are not causally related.
 - c. When X goes up, Y also goes up.
 - d. X and Y might be causally related; it would be good to investigate further.
2. Which of the following about cognitive biases is FALSE?
 - a. We are so full of cognitive biases (>100) that good reasoning is not possible.
 - b. It is unclear to what degree we can overcome cognitive biases.
 - c. Cognitive biases may lead to wrong conclusions being drawn.
 - d. Cognitive biases may lead to other biases, such as prejudice or selection bias.
3. Which of the following lines of code could NOT produce the output H T H H H?
 - a. `sample(c('T', 'H', 'H', 'H', 'H'), size = 5, replace = TRUE)`
 - b. `sample(c('T', 'H', 'H', 'H', 'H'), size = 5, replace = FALSE)`
 - c. `sample(c('H', 'T'), size = 5, replace = TRUE)`
 - d. `sample(c('H', 'T'), size = 5, replace = FALSE)`
4. Why is it often helpful to quantify results?
 - a. It is difficult, if not impossible, to lie with statistics.
 - b. Quantification allows us to escape all rhetorical and logical fallacies.
 - c. Quantification helps us to discriminate amongst competing hypotheses.
 - d. Only conclusions drawn from numbers are valid.
5. Suppose you believe that most people's favorite color is red, but you want to find out whether you are correct. What is the problem with asking people who happen to be wearing red "your favorite color is red, right?"
 - a. There's confirmation bias because most people's favorite color actually is red.
 - b. There's confirmation bias because of whom you asked and how you asked.
 - c. There's confirmation bias because you had no control group.
 - d. There's no problem here.

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Answers:

1. D. Although you cannot conclude that a causal relationship exists (or does not exist) between X and Y, the presence of a correlation is a clue. It would be best to investigate further to determine the type of relationship.
2. A. Although we have many biases, most have small and narrow effects. And even though they are present, we still *can* reason effectively, especially with time and training.
3. D. Without replacement, the sample() function will return an error when size is greater than the number of items in the set to draw from.
4. C. Quantified results can allow for better assessment of differences and variance, and they force one to be specific and concrete. (That needs to be done well, of course!)
5. B. Confirmation bias is the tendency to seek out information that is consistent with what you already believe to be true. People wearing red might have a higher chance of having red as a favorite color, and phrasing a question in a leading manner might get more “yes” responses than a more neutrally worded question (e.g. “what is your favorite color?”).