

DTP-Math-Circle: Session 3—Conditional probability

Sept 30 2022

3 Math or biology student?

(Adapted from the Psychology book "Thinking, fast and slow" by Daniel Kahneman)

Your friend has gone to a summer camp for biology and math students and met a new person, and described that person as "Raghu is very shy and withdrawn, invariably helpful but with little interest in people or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail."

If 40% of the mathematics students and 10% of biology students are known to fit the above description, what is the probability that Raghu is a mathematics student?

Without any more information about what kind of camp he has gone to, what would your answer be? Of course, this will depend on some assumption you make about the camp. Let your answer be p .

The assumption you use to come up with this is answer p is an example of what is called a "prior". Sometimes, priors have to be used to obtain a quantitative answer if information is missing. But priors can be modified if new information is provided.

For example, if your friend tells you that there are 20 biology students to every mathematics student in this summer camp, how will you modify your prior to get a new answer?