Assessment of Bacon's Puzzle

Back to Bacon's Puzzle

Now that we have discussed the Three Prisoners Puzzle I would like to return to the problem of understanding how it is that the $P_1, P_2, P_3, \ldots$ is able to increase its probability of collective success in Bacon's Puzzle, even though it is not clear that any individual member of the group is able bring her probability of success over 50%.

A useful way of addressing this point is to draw on an analogy between the Three Prisoners Puzzle and Bacon's Puzzle. In each case, the group improves its chances of collective success not by increasing the chance of success of individual answers, but by coordinating successes and failures in a certain kind of way.

Recall that in Bacon's Puzzle $P_1, P_2, P_3, \ldots$ are able to identify the cell containing the actual hat distribution, and that everyone agrees to answer on the assumption that their actual hat color is as described by the representative of that cell. Because everyone knows which cell contains the actual hat distribution, and because they're all agreed on a representative for that cell, they are able to *coordinate* their individual successes and failures so as to make sure that their answers form a sequence which is included in the same cell as the actual distribution of hat colors. And since members of the same cell differ at most finitely, this guarantees that at most finitely many people answer incorrectly, even if none of the $P_1, P_2, P_3, \ldots$ increases her chances of guessing correctly beyond 50%.

This concludes my response to Bacon's Puzzle. I have proceeded in two steps. The first step is to note that although it would be very surprising if someone could increase her probability of individual success by following the proposed strategy, the proposed strategy does not presuppose such increase. All it requires is that the group increase its probability of *collective* success by following the strategy. The second step is to explain how the group is able to increase its probability of collective success even if no member of the group increases her probability of individual success. I have suggested that this is possible because, as in the case of the Three Prisoners Puzzle, individual members of the group to *coordinate* their successes and failures in the right sort of way.

One final question: what is the probability that an individual who follows the strategy will answer correctly? I don't know the answer to this question, but I suspect that when one follows the strategy one's probability of success is best thought of ill-defined. A little more specifically: I doubt there is a reasonable way of assigning a probability to the proposition that the representative of a given cell has a 1 in its kth position, and therefore to the proposition that P_k guesses correctly, given that she guesses in accordance with the strategy.

If it is true that there is no reasonable way of assigning a probability to the proposition that someone acting accordance with the hat strategy will answer correctly, then Bacon's Puzzle brings out an important limitation of standard ways of thinking about probability theory. That is why I think Bacon's Puzzle deserves a paradoxicality grade of 7. (I'll return to the problem of ill-defined probabilities when we talk about non-measurable sets, in Lecture 6.)

Discussion

Hide Discussion

Topic: Week 3 / Assessment of Bacon's Puzzle

Add a Post

Show all posts | by recent activity

On "what´s the probability that an individual who follows the strategy will answer correctly? "
I think that individual probabilities remain exactly the same: 50%. Proposed experiment: There ar... 1

On Bacon's Puzzle Strategy vs Probability:
On Bacon's Puzzle Strategy vs Probability:

 I'm going to call "outcome w-sequence" ... 1