

Erdos, Cars and Goats, and Bayes' Theorem

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During his last visit in Santa Rosa, for some unknown reason I mentioned the Cars and Goats problem to Erdos:

Suppose you are on a game show, and the Master of Ceremonies gives you the choice of three doors. Behind one door is a Cadillac; behind the others (odorless) goats. If you pick the right door, you get the Cadillac. You pick a door — say No. 1 — and the MC who knows what is behind the doors, opens another door — say No. 3 — which has a goat. The MC then says to you, “Do you want to pick door No. 2?” Is it to your advantage to switch your choice?

I told Erdos that the answer was to SWITCH, and fully expected to move to the next subject. But Erdos to my surprise said no, that is impossible, it should make no difference.

At this point I was sorry I brought up the problem, because it was my experience that people get excited and emotional about the answer, and I end up with an unpleasant situation. But there was no way to bow out so, I showed him the decision tree solution I used in my undergraduate Quantitative Techniques of Management course. To my amazement it did not work with him. He wanted a straightforward explanation. I was in for it.

I have seen many individuals convinced by verbal arguments (either to switch or not to switch) but have never seen a single explanation that convinced many. I came to the conclusion that unless you are educated in using decision trees and Bayesian probability, it is hopeless. I told this to Erdos and walked away.

An hour later he came back to me really irritated. “You are not telling me, why to SWITCH. What is the matter with you”. I said I am sorry, but I do not really know why, and only the decision tree analysis convinces me. He got even more upset.

The reaction to people to the problem baffles me. Suppose you pose the following problem to people:

Draw a right triangle with the sides 3 and 4 feet. How long is the hypotenuse? Some people know that it is 5 feet, some others do not. But nobody knows why, nobody has the proof, and nobody is concerned or upset. Why are people upset when they hear that they should switch?

Anyway, going back to Erdos, I showed him the Monte Carlo simulation program in Excel, and that convinced him. A few days later he called me on the

phone and told me that Ron Graham of AT&T explained it to him and now he understood it. I could not understand the explanation, but he did.

Later, I got more insight by reading the article "Nation's Mathematicians Guilty of 'Innumeracy'" in the SKEPTICAL INQUIRER (Vol. 15, Summer 1991, p.p. 342-345.) The problem was submitted to vos Savant, Marilyn, and in her column she answered "Yes, you should switch," and gave her explanation. In a later column she published signed letters from 4 PhD's (some quite nasty and sardonic) who severely chastised her for misleading, and corrupting the public. Later she gave an alternate explanation. In a still later column she published letters from another 5 PhD's who gave her hell.

What surprised me was not that the PhD's did not know the answer, but that they did not know that Marilyn is always right. However, apparently I was wrong about the need for decision trees. She is so smart that she does not need bayesian analysis. Or maybe she does know about Bayes?

Erdos, His Mother, and Women

To appreciate the following story about how Erdos' mother protected Erdos from women, you need an Aside.

Start of Aside. Hungarian apartment houses are built around a rectangular, interior court or well. If you want to visit a person, say on the third floor, you go into the court, climb THREE floors, or take the elevator/lift, exit to the balcony running around the court and go to the apartment. End of aside.

The story.

I met Erdos in the City Park of Budapest. My girl friend Aranka was with me. Together we walked to Erdos' apartment house, close to the City Park. As we entered the court, to start the climb, a sudden scream reverberated throughout the court, to be heard by all: "WHO IS THAT WOMAN?" it was Erdos' mother yelling in total panic. "Just Vazsonyi's girlfriend Aranka," said Erdos humbly, and she calmed down. A girlfriend of a friend was safe, she was absolutely out of bounds for all others.