The Monty Hall Problem

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Suppose you're on a game show, and you're given the choice of three doors: Behind one door is a car; behind the others, goats. (Your goal, obviously, is to end up with the car).

Hypothesis	Prior
door 1	33.3%
door 2	33.3%
door 3	33.3%

You pick a door, say No. 1, and the host, who knows what's behind the doors, opens another door, say No. 3, which has a goat. He then says to you, "Do you want to pick door No. 2?" Is it to your advantage to switch your choice?

If the car were behind door 1, then the host would randomly pick between doors 2 and 3 to reveal. If the car were behind door 2, the host would have to show you door 3. If the car were behind door 3, then the host couldn't show us that door.

Evidence: shown door 3

Hypothesis	Prior	Likelihood of being shown door 3	Posterior
door 1	33.3%	33.3%	33.3%
door 2	33.3%	66.7%	66.7%
door 3	33.3%	0.0%	0.0%

So we should switch!