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Let's Make a Deal!
By Monty Hall
Since 1963

## The Setup

- You are presented with 3 doors (A, B, C) only one of which has something valuable to you behind it (the others are bogus)
- You do not know what is behind any of the doors



## O Showtime

1. You choose a door
2. Monty then counters by showing you what is behind one of the other doors (which is a bogus prize).
3. And asks you if you would like to stick with the door you have, or switch to the other unknown door


- Question 1

Should you switch or not?

- Question 2

Does it matter?

## ※ ANSWER: You should switch!

September, 1990, "Ask Marilyn" column in Parade
Marilyn vos Savant, puzzle columnist gave this
 answer in 1990.

Take a look at this matrix of possibilities:

|  | Door |  |  |
| :---: | :---: | :---: | :---: |
| Case | A | B | C |
| 1 | Goat | Goat | Ferrari |
| 2 | Goat | Ferrari | Goat |
| 3 | Ferrari | Goat | Goat |

Step 1. You choose door A - You have a 1/3 chance of a good prize.
Step 2. Monty eliminates doors B (in case 1) or C (in case 2) (which happen to be the only remaining bad door) so a good door is only left.

Step 3. Only in case 3 (you lucked out in your original 1 in 3 chances) does switching hurt you.

Finally, your probability goes up from $1 / 3$ to $2 / 3$, if you switch after being shown a bad door.

Caveat: Of course, this only works if Monty knows what is behind each door and is guaranteed to show you a bad door every time after you choose a door, something that was not assured in the original game show.

Simulation:

|  | \# of Players | Winners | Percent Winners |
| :---: | :---: | :---: | :---: | :---: |
| Switched | 309 | 219 | 70.9 |
| Didn't Switch | 254 | 77 | 30.3 |

http://math.ucsd.edu/~crypto/Monty/monty.html

