Monty Hall Exercise

Austin Hart

2024-01-17

1. See my simulation below. I chose 10,000 trials.

```
# Simulation -----------
## set the stage
  doors = c('A', 'B', 'C')

## keep score 10,000
  results = tibble(
    trial = 1:10000,
    winner = rep(NA, 10000)
  )

## simulate the game
  for (i in 1:10000){
    car = sample(doors, 1)  # place car at random
    selection = sample(doors, 1)
    reveal = sample(doors[doors != car & doors != selection], 1)
    switch = sample(doors[doors != reveal & doors != selection], 1)
    results[i, 'winner'] = if_else(car == switch, 'Marilyn', 'Paul')
  }
```

2. See the table below

```
## tabulate wins, calculate win %
  outcome =
    results |>
    count(winner) |>
    mutate(win_per = n / sum(n) * 100)

  kable(outcome)
```

winner	n	win_per
Marilyn	6599	65.99
Paul	3401	34.01

3. See graph.

```r
## Graph
  ggplot(data = outcome, aes(x = winner, y = win_per)) +
    geom_col(fill = 'cornflowerblue', color = 'gray27') +
    labs(
      x = 'Winner is...',
      y = 'Percent'
    ) +
    scale_y_continuous(limits = c(0,100)) +
    coord_flip() +
    theme_minimal()
```

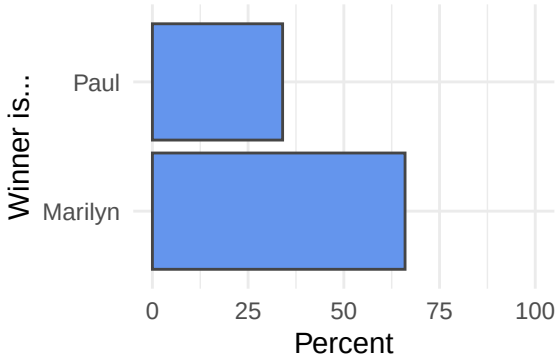

Figure 1: Monty Hall Simulations

4. In 10000 simulations, the contestant who switched won a total of 6599 times. This is consistent with Marilyn's prediction: it's better to switch.