



# Main tenants of Statistics

Light side of the Force -

- Achieve significance
  - How to go from, “I think this is better” to “I know™ this is better”
- Understand your sample audience, understand how to generalize
- Measure Quantitatively
  - But it's hard...can't we measure a subjective data point quantitatively?



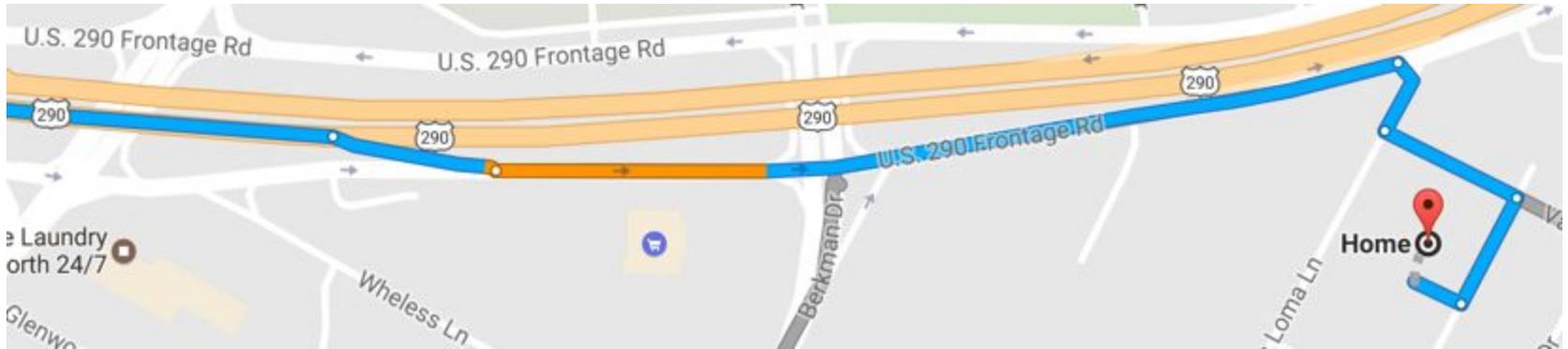
# Main Tenants of Statistics

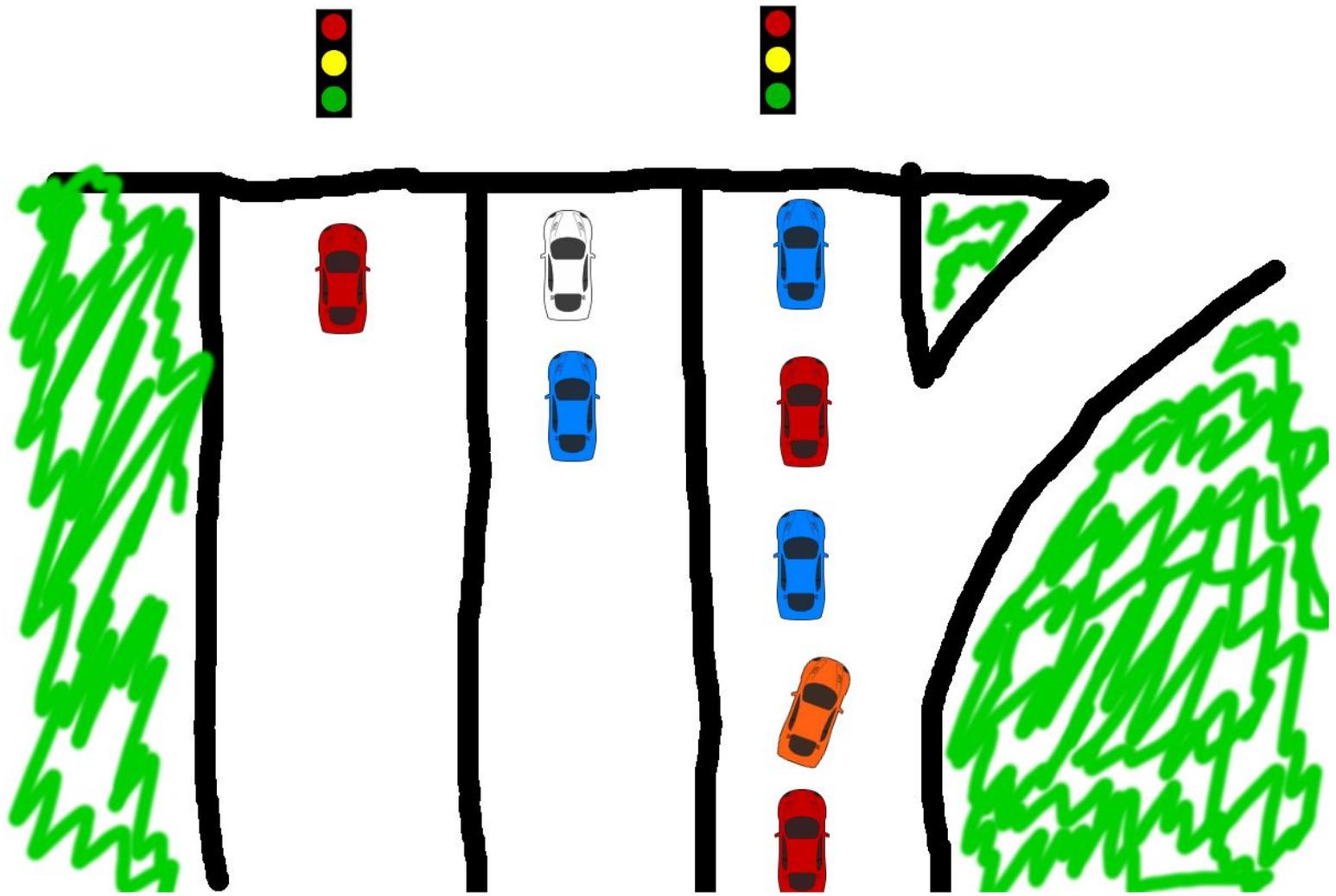
Dark side of the force -

- Significance is guaranteed if you have a big enough sample size
  - As sample size  $n \rightarrow \infty$ .... standard deviation  $\rightarrow 0$
- Generalizing beyond your scope
  - This works for one scenario, it must work in all scenarios!
- Unconscious bias coming in clouds judgement
  - I really wanted A to imply B.....
  - “If you want to see the truth, hold no opinions” - Iron Fist (actually from something in Chinese history, attributed to Jianzhi Sengcan)

# Dougal's Commute Story

Berkman exit from 290





# Two Bad Outcomes

- Get in the right lane too early - Get held up by people turning right, Miss the light (happens probably 10-20% of the time™)
- Yolo in the middle/left lane, no one turns right, now I can't get over to the right lane in time to make my turn-off (happens about 10% of time™, less likely than above scenario)

# Binomial Distribution

Fancy terminology for flipping a coin. Professionally

Car number	Individual Chance to turn right	Combined chance (at least 1 car will turn right)
1	25%	$1 - 0.75 = 25\%$
2	25%	$1 - 0.5625 = 43\%$
3	25%	$1 - 0.422 = 58\%$
4	25%	$1 - 0.316 = 68\%$
5	25%	$1 - 0.237 = 74\%$

# My successful “experiments”

Can I make this light from where I am now?

- If I see the light switch from red to green, I'll have enough time
- If I see the light is green, and cars haven't started moving yet, I'll have enough time
- If I see the light is green and most cars are out of the intersection, not worth it

# My successful “experiments”

Left lane, middle lane, or right lane?

- All of this assumes I’m going to make the light if I take the left/middle lane
  - Are there less than 3 cars in the right lane?
    - Use that, you’ll still make it through
  - Are there more than 5 cars in the right lane?
    - Are there less than 5 cars in the middle lane?
      - Take the middle lane, switch right after one of the cars inevitably turns right
    - Are there more than 5 cars in the middle lane?
      - Feeling Yolo? Go left lane, get ready to change 2 lanes in ½ a mile. Good luck
      - Wanna live to see tomorrow? Go middle or right lane (depending on how many cars will be left over) and just make the next light. Life isn’t THAT short