

# Playing with Data

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## Chapter 1

# Reproducibility and Real Data

### 1.1 Some Truth

“All models are wrong, but some are useful.”

– George Box, 1976, *Journal of the American Statistical Association*

### 1.2 Critical Thinking, Analytics, and Reproducibility



## Chapter 2

### Today's agenda

- Vaccines
- Stanford's President
- Target
- Dataset 1 (Marathon Kids; means and correlation)
- Dataset 2 (healthcare; my numbers are in the wrong place)
- Dataset 3 (NFL; 4th down?)
- See if we've had fun





## Chapter 3

# Marathon Kids

### 3.1 About this data

group	x	y
1	55.3846	97.1795
1	51.5385	96.0256
1	46.1538	94.4872
1	42.8205	91.4103
1	40.7692	88.3333
1	38.7179	84.8718

### 3.2 More about this data

group	n
1	142
2	142
3	142
4	142
5	142
6	142
7	142
8	142
9	142
10	142
11	142
12	142
13	142



### 3.3 Some fun data for you

group	x	y
1	55.38460	97.1795000
1	51.53850	96.0256000
1	46.15380	94.4872000
1	42.82050	91.4103000
1	40.76920	88.3333000
1	38.71790	84.8718000
1	35.64100	79.8718000
1	33.07690	77.5641000
1	28.97440	74.4872000
1	26.15380	71.4103000
1	23.07690	66.4103000
1	22.30770	61.7949000
1	22.30770	57.1795000
1	23.33330	52.9487000
1	25.89740	51.0256000
1	29.48720	51.0256000
1	32.82050	51.0256000
1	35.38460	51.4103000
1	40.25640	51.4103000
1	44.10260	52.9487000
1	46.66670	54.1026000
1	50.00000	55.2564000
1	53.07690	55.6410000
1	56.66670	56.0256000
1	59.23080	57.9487000
1	61.28210	62.1795000
1	61.53850	66.4103000
1	61.79490	69.1026000
1	57.43590	55.2564000
1	54.87180	49.8718000
1	52.56410	46.0256000
1	48.20510	38.3333000
1	49.48720	42.1795000
1	51.02560	44.1026000
1	45.38460	36.4103000
1	42.82050	32.5641000
1	38.71790	31.4103000
1	35.12820	30.2564000
1	32.56410	32.1795000
1	30.00000	36.7949000
1	33.58970	41.4103000
1	36.66670	45.6410000
1	38.20510	49.1026000
1	29.74360	36.0256000
1	29.74360	32.1795000
1	30.00000	29.1026000
1	32.05130	26.7949000
1	35.89740	25.2564000
1	41.02560	25.2564000
1	44.10260	25.6410000
1	47.17950	28.7180000



## Chapter 4

**Help: my numbers are in  
the wrong place!**



## Chapter 5

# NFL

### 5.1 Data

NFL Data

### 5.2 Whoa, when do I go for it again, on 4th down?

### 5.3 Reproducibility: Building is better

nflfastR

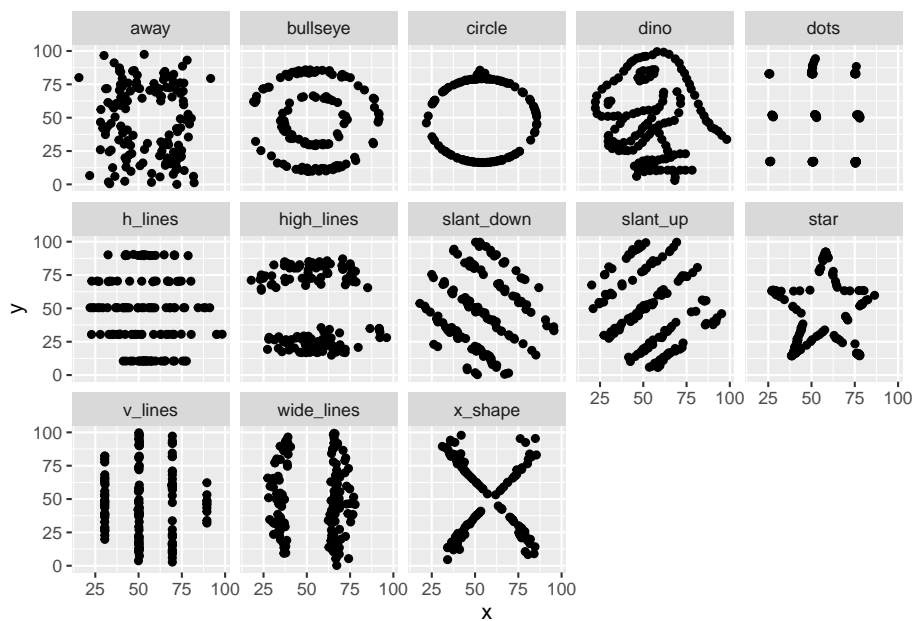




## Chapter 6

# Some Final Thoughts

dataset	mean(x)	mean(y)	cor(x, y)
away	54.26610	47.83472	-0.0641284
bullseye	54.26873	47.83082	-0.0685864
circle	54.26732	47.83772	-0.0683434
dino	54.26327	47.83225	-0.0644719
dots	54.26030	47.83983	-0.0603414
h_lines	54.26144	47.83025	-0.0617148
high_lines	54.26881	47.83545	-0.0685042
slant_down	54.26785	47.83590	-0.0689797
slant_up	54.26588	47.83150	-0.0686092
star	54.26734	47.83955	-0.0629611
v_lines	54.26993	47.83699	-0.0694456
wide_lines	54.26692	47.83160	-0.0665752
x_shape	54.26015	47.83972	-0.0655833



## 6.1 References

Same Stats, Different Graphs: Generating Datasets with Varied Appearance and Identical Statistics through Simulated Annealing Authors: Justin Matejka, George Fitzmaurice. CHI '17: Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems May 2017 Pages 1290–1294 <https://doi.org/10.1145/3025453.3025912>.