



# ***NFL Defensive Relevance***

David McBride

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# Outline:



- **Developing Scientific Question:**

*“Does Defensive strength for an NFL team, based on yards allowed, increase or decrease your probability of making the playoffs in any given season?”*

- **Data Collection/ Manipulation**

- **Exploratory Data Analysis (EDA)**

- **Conducting/ Examining Hypothesis test(s)**

- **Determining Result/ Answering Scientific Question**

# Intent:

- Using open-source data, and statistical analysis to make an accurate conclusion on whether or not “Defense wins Championships”.
- To highlight Defensive roles and responsibilities of the game, and be able to confidently understand their relevance now, given past trends.
- Perform Hypothesis Test with the given data point(s)



# Data Introduction



## Research/ Finding:

- Over 10 websites tested/ evaluated
- Summarized yearly Defensive Statistics

## Broken Down:

- 22 CSV files @ approx. 2.6 kB a piece
- Each file contained yearly defensive stats
- Used pandas to manipulate/ join

## Source(s):

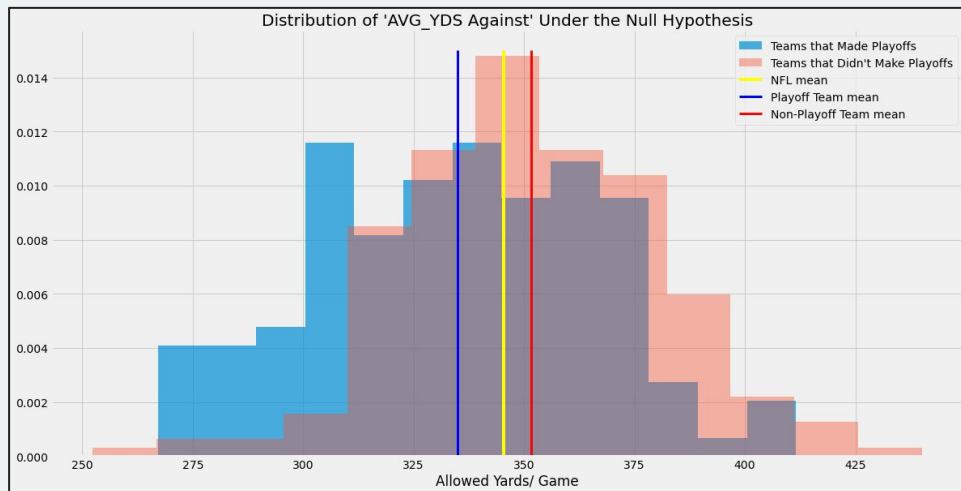
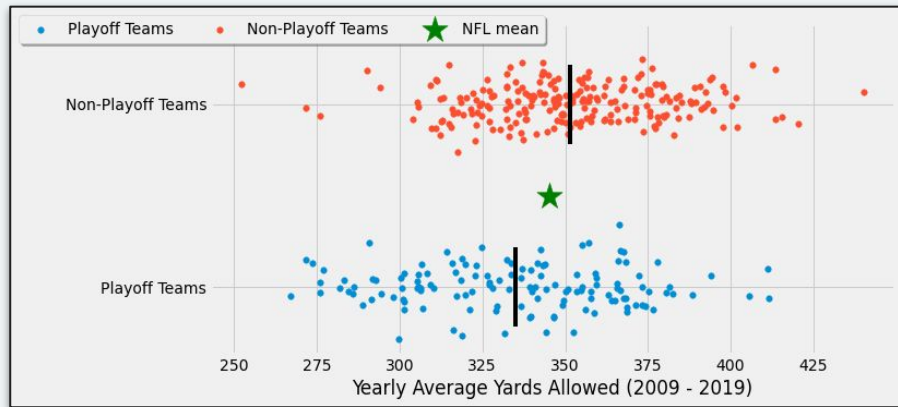
- <https://www.footballdb.com/stats/>

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### 2019 NFL Team Defense Statistics

The following are the 2019 NFL team overall defense statistics, including team rushing yardage, team passing yardage and total team yardage. Figures indicate statistics each team allowed to their opponents.

NFL	2019	Regular Season	Overall	Defense	Entire League	Submit			
Team	Gms	Tot Pts	Pts/G	RushYds	RYds/G	PassYds	PYds/G	TotYds	Yds/G
<a href="#">New England Patriots</a>	16	225	14.1	1528	95.5	2886	180.4	4414	275.9
<a href="#">San Francisco 49ers</a>	16	310	19.4	1802	112.6	2707	169.2	4509	281.8
<a href="#">Buffalo Bills</a>	16	259	16.2	1649	103.1	3123	195.2	4772	298.2
<a href="#">Baltimore Ravens</a>	16	282	17.6	1494	93.4	3315	207.2	4809	300.6
<a href="#">Pittsburgh Steelers</a>	16	303	18.9	1753	109.6	3113	194.6	4866	304.1
<a href="#">Los Angeles Chargers</a>	16	345	21.6	1805	112.8	3204	200.2	5009	313.1
<a href="#">New York Jets</a>	16	359	22.4	1391	86.9	3779	236.2	5170	323.1
<a href="#">Chicago Bears</a>	16	298	18.6	1632	102.0	3554	222.1	5186	324.1
<a href="#">Dallas Cowboys</a>	16	321	20.1	1656	103.5	3576	223.5	5232	327.0
<a href="#">Philadelphia Eagles</a>	16	354	22.1	1442	90.1	3865	241.6	5307	331.7
<a href="#">New Orleans Saints</a>	16	341	21.3	1461	91.3	3868	241.8	5329	333.1
<a href="#">Denver Broncos</a>	16	316	19.8	1783	111.4	3609	225.6	5392	337.0
<a href="#">Los Angeles Rams</a>	16	364	22.8	1809	113.1	3625	226.6	5434	339.6
<a href="#">Minnesota Vikings</a>	16	303	18.9	1728	108.0	3737	233.6	5465	341.6
<a href="#">Tampa Bay Buccaneers</a>	16	449	28.1	1181	73.8	4322	270.1	5503	343.9
<a href="#">Indianapolis Colts</a>	16	373	23.3	1567	97.9	3982	248.9	5549	346.8
<a href="#">Kansas City Chiefs</a>	16	308	19.2	2051	128.2	3543	221.4	5594	349.6
<a href="#">Green Bay Packers</a>	16	313	19.6	1921	120.1	3721	232.6	5642	352.6
<a href="#">Oakland Raiders</a>	16	419	26.2	1570	98.1	4107	256.7	5677	354.8



# Analysis

## Observations:

- Single season testing and comparisons were not conclusive
- Used two different data points to compare
- Through EDA, comparing Avg yards against for the two samples was more definitive

# Hypothesis Test/ Conclusion:

Using the Welch's T-test to compare the avg yards allowed per game over 10 years  
(Playoff Teams mean = Non-Playoff Teams Mean)

***Null Hypothesis was rejected***

$$H_0 : p_M = p_D$$

$$\alpha = 0.02$$

$$\text{p-value} = 0.0000014601$$

$$\text{p-value(Yds/G)} < \alpha$$



# Conclusion Hypothesis Test 2:

Using the Welch's T-test to compare the avg  
points allowed per game over 10 years  
(Playoff Teams mean = Non-Playoff Teams Mean)

***Null Hypothesis was rejected***

$$H_0 : p_M = p_D$$

$$\alpha = 0.02$$

$$pvalue = 5.621094393622213e-25$$

$$p\text{-value}(\text{Pts/G}) < \alpha$$

# Follow-On Analysis:

## Idea 1:

### Given More Time:

I would like to analyze the underlying influences that were highlighted in the comparison of Hypothesis 1 vs. Hypothesis 2

- *Turnovers / 3rd down conversions / Opposition offensive strength*



## Idea 2:

### Given More Time:

It would be interesting to investigate the 'Caliber' of offense it takes to make it to the playoffs with a defense that is mediocre or worse.

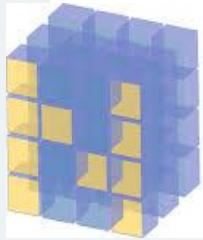




## TECH Used:



BeautifulSoup



NumPy



pandas

matplotlib



# Lessons Learned:

- Don't over-analyze
  - Trust your math/ findings
  - Stay objective
- Keep your plan fluid and adaptable
- Focus on the data you NEED and not all the data you HAVE!



# Thank You

QUESTIONS?

**Email:**

david.mcbride430@yahoo.com

**GitHub:**

<https://github.com/dnm0328/>

**LinkedIn:**

<https://www.linkedin.com/in/david-mcbride-2a33ba10b>

