NFL Defensive Relevance

David McBride

30 October 2020

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.

Data Introduction

Research/ Finding:

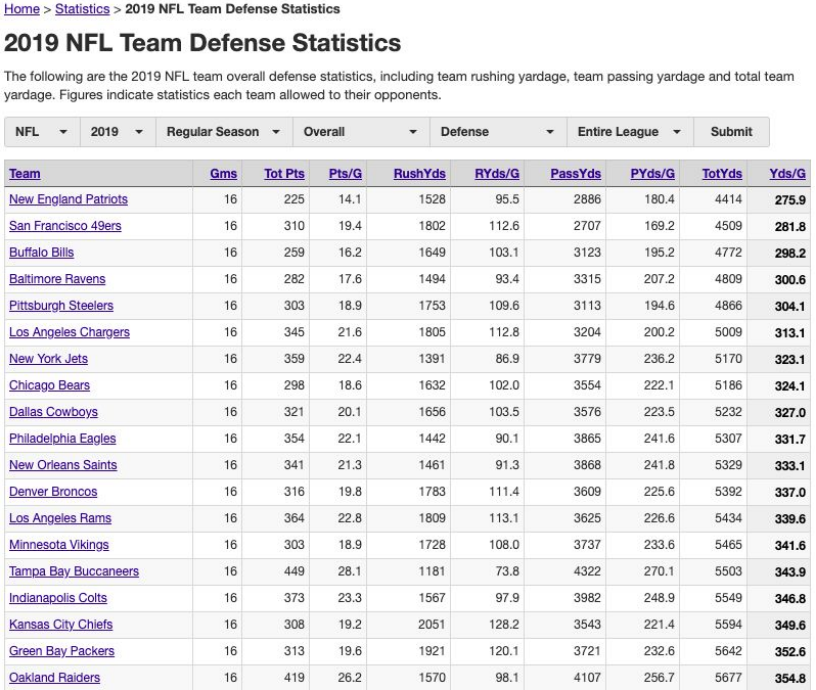
- Over 10 websites tested/ evaluated
- Summarized yearly Defensive Statistics

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/



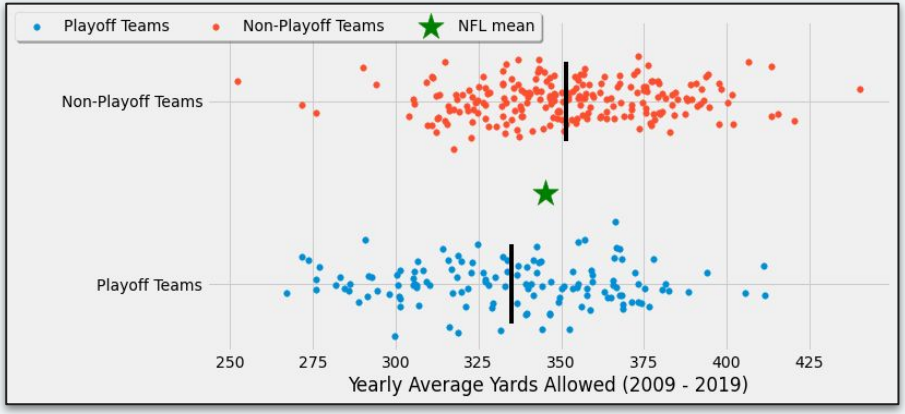
Home > Statistics > 2019 NFL Team Defense Statistics

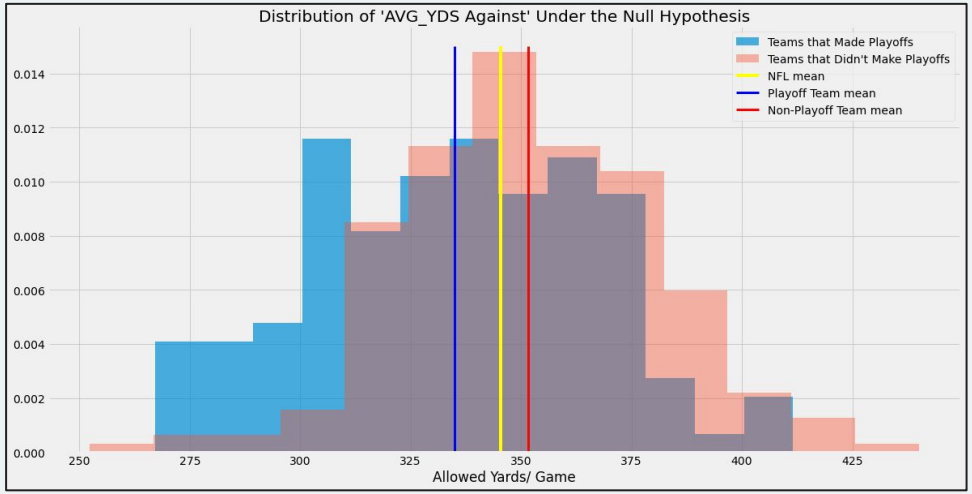
2019 NFL Team Defense Statistics

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

Conclusion Hypothesis Test 1:

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

$H_0 : p_M = p_D$

$\alpha = 0.02$

p-value = **0.0000014601**

p-value(Yds/G) < α

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 = **5.6210943936222l3e-25**

p-value(Pts/G) < α

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:

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