The Value of Running Backs

Our team

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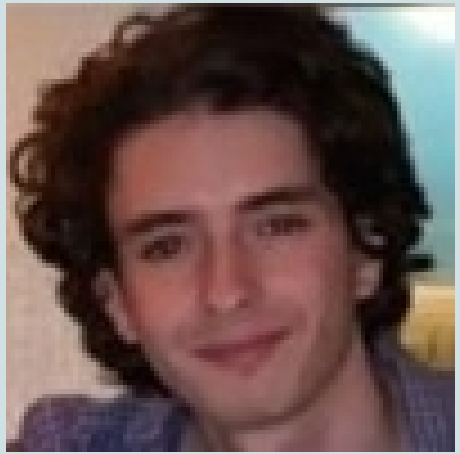


Abe Zaidman

Agenda:

1. Mission/Background
2. Cleaning data
3. Findings and Graphs
4. Additional Sources
5. Conclusion

Our Mission:

Explore the value running backs contribute to success

Background

- The running back generally sets behind the quarterback
- The running backs' roles are to receive handoffs, block, and receive passes
- The yellow path is running back running a power rush

2017 NFL Draft

- Widely considered the most talented running back class of all time
- The list of running backs receiver a combined 27.9million during the first year
- Only 1 Super Bowl ring out of all
    - Only one other Super Bowl appearance

2017 Draft RB Class:

4. Leonard Fournette: 41 TOT TD
8. Christian McCaffrey: 53 TOT TD
41. Dalvin Cook: 49 TOT TD
48. Joe Mixon: 49 TOT TD
67. Alvin Kamara: 70 TOT TD
86. Kareem Hunt: 48 TOT TD
182. Aaron Jones: 58 TOT TD

This class was something ELSE 😳

Collecting and Cleaning

NFL Pass Rush Receive Raw Data

```
'data.frame':   22245 obs. of  70 variables:
 $ game_id                    : chr  "201909050chi" "201909050chi" "201909050chi" "201909050ch
i" ...
 $ player_id                  : chr  "RodgAa00" "JoneAa00" "ValdMa00" "AdamDa01" ...
 $ pos                        : chr  "QB" "RB" "WR" "WR" ...
 $ player                     : chr  "Aaron Rodgers" "Aaron Jones" "Marquez Valdes-Scantling"
 "Davante Adams" ...
 $ team                       : chr  "GNB" "GNB" "GNB" "GNB" ...
 $ pass_cmp                   : int  18 0 0 0 0 0 0 0 0 26 ...
 $ pass_att                   : int  30 0 0 0 0 0 0 0 0 45 ...
 $ pass_yds                   : int  203 0 0 0 0 0 0 0 0 228 ...
 $ pass_td                    : int  1 0 0 0 0 0 0 0 0 0 ...
 $ pass_int                   : int  0 0 0 0 0 0 0 0 0 1 ...
 $ pass_sacked                : int  5 0 0 0 0 0 0 0 0 5 ...
 $ pass_sacked_yds            : int  37 0 0 0 0 0 0 0 0 20 ...
 $ pass_long                  : int  47 0 0 0 0 0 0 0 0 27 ...
 $ pass_rating                : num  91.4 0 0 0 0 0 0 0 0 62.1 ...
 $ rush_att                   : int  3 13 1 0 0 0 0 5 0 3 ...
 $ rush_yds                   : int  8 39 0 0 0 0 0 0 0 11 ...
 $ rush_td                    : int  0 0 0 0 0 0 0 0 0 0 ...
 $ rush_long                  : int  10 9 0 0 0 0 0 5 0 7 ...
 $ targets                    : int  0 1 6 8 5 1 1 2 3 0 ...
 $ rec                        : int  0 1 4 4 3 1 1 2 2 0 ...
 $ rec_yds                    : int  0 0 52 36 30 28 28 15 14 0 ...
 $ rec_td                     : int  0 0 0 0 1 0 0 0 0 0 ...
 $ rec_long                   : int  0 0 47 11 16 28 28 10 9 0 ...
 $ fumbles_lost               : int  0 0 0 0 0 0 0 0 0 0 ...
```

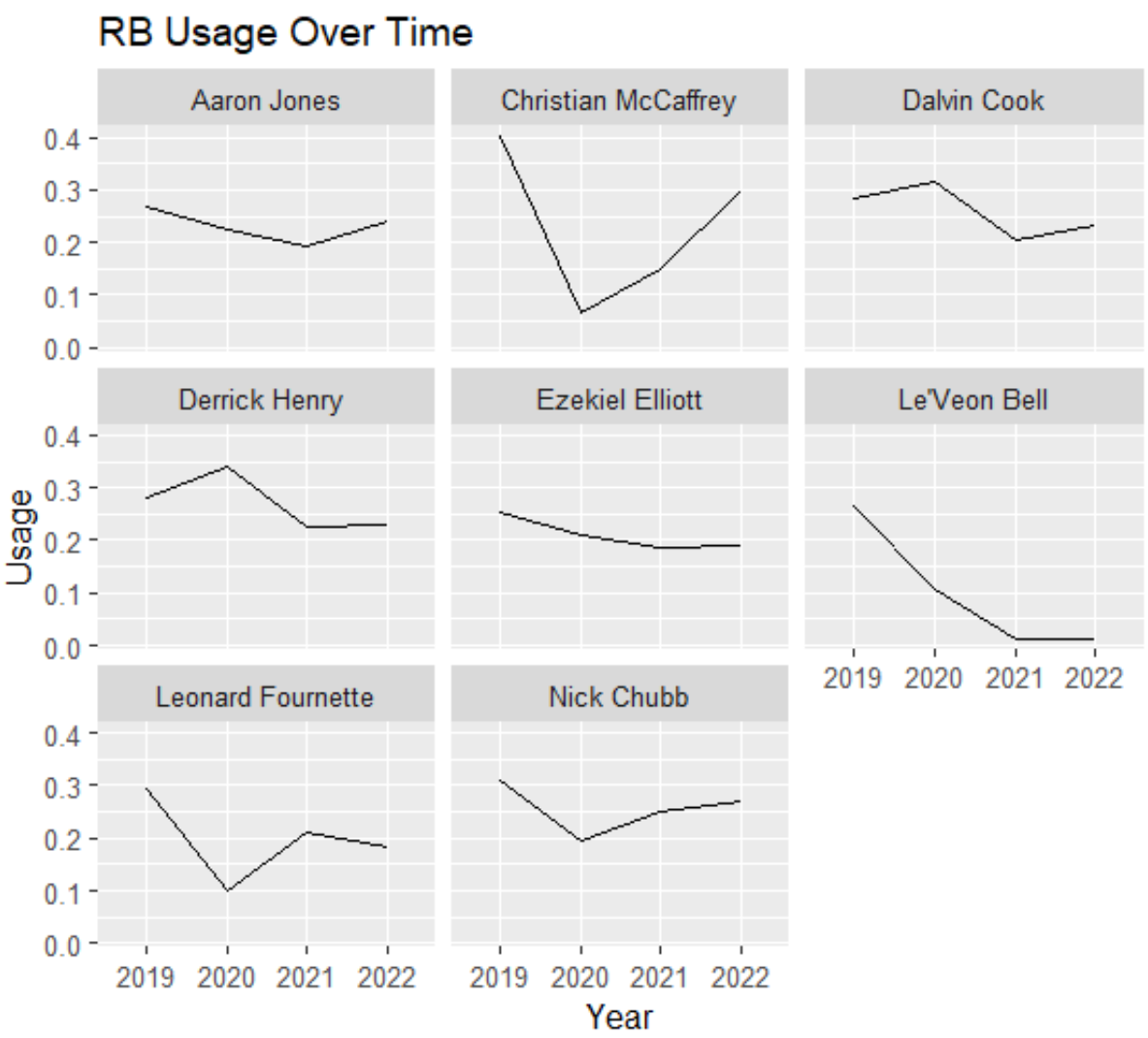
Measure Consistency of Top Performing RBs

NFL Pass Rush Receive Raw Data

- Contains all offensive stats for each offensive player (22,245 in total) in the (QB,RB,WR,TE) positions
- Each row refers to one player and has all their statistics for every game that their team has played from 2019-2022

1. Cleaning the data involved filtering out separate dataframes for each year and filtering for the Running back position. as well as keeping one for all the other positions.
2. Calculating metrics by grouping the running backs on player_id and calculating materials such as YPC, and Total Yards.
3. The data frame with all the positions was grouped by team and metrics such as Total Yards for a team was computed. We then calculated a Usage metric which was Total Yards from a RB/ Total Team Yards

Graph Visualizing 8/10 of the RB with the Highest Usage From 2019



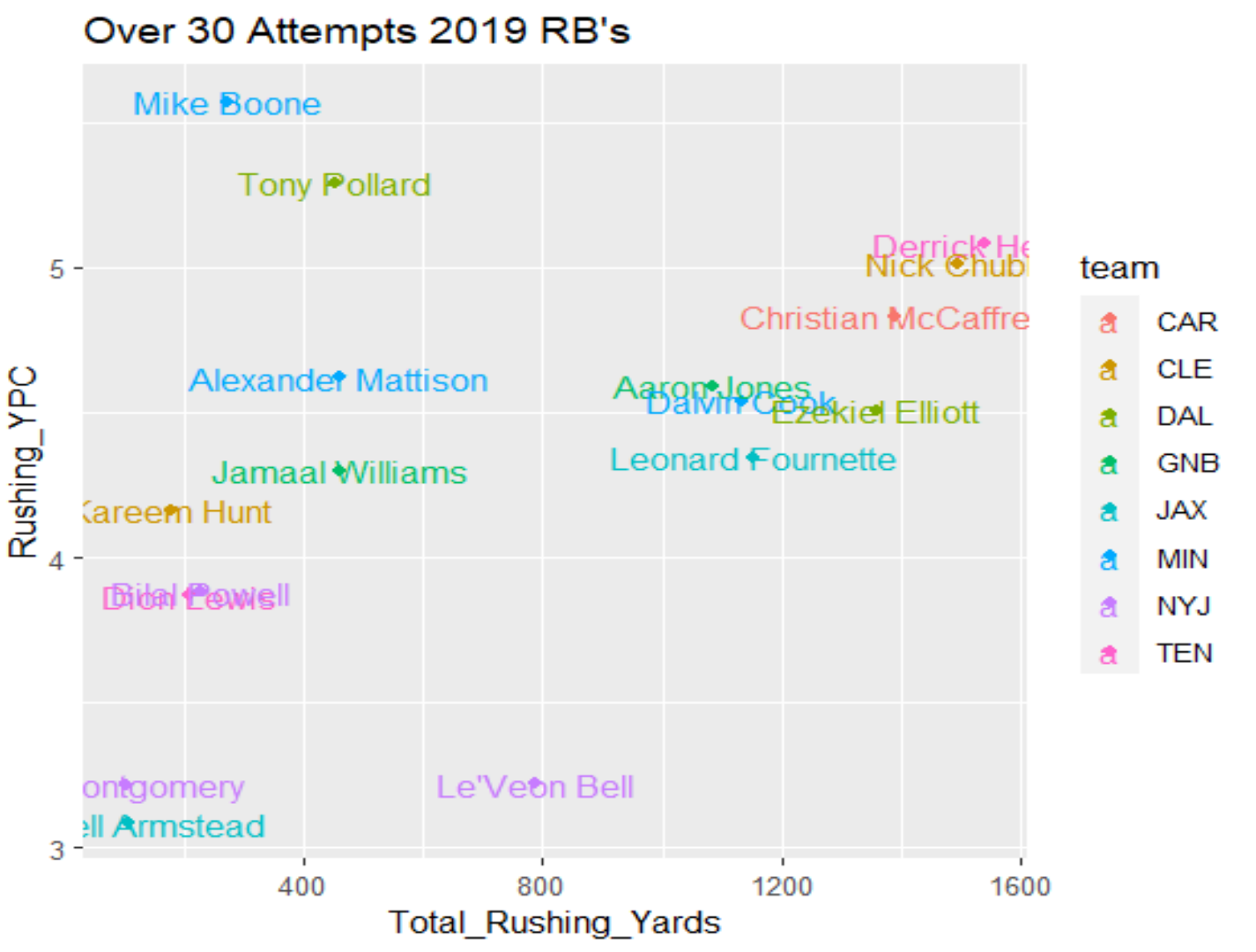
Super Bowl Champs

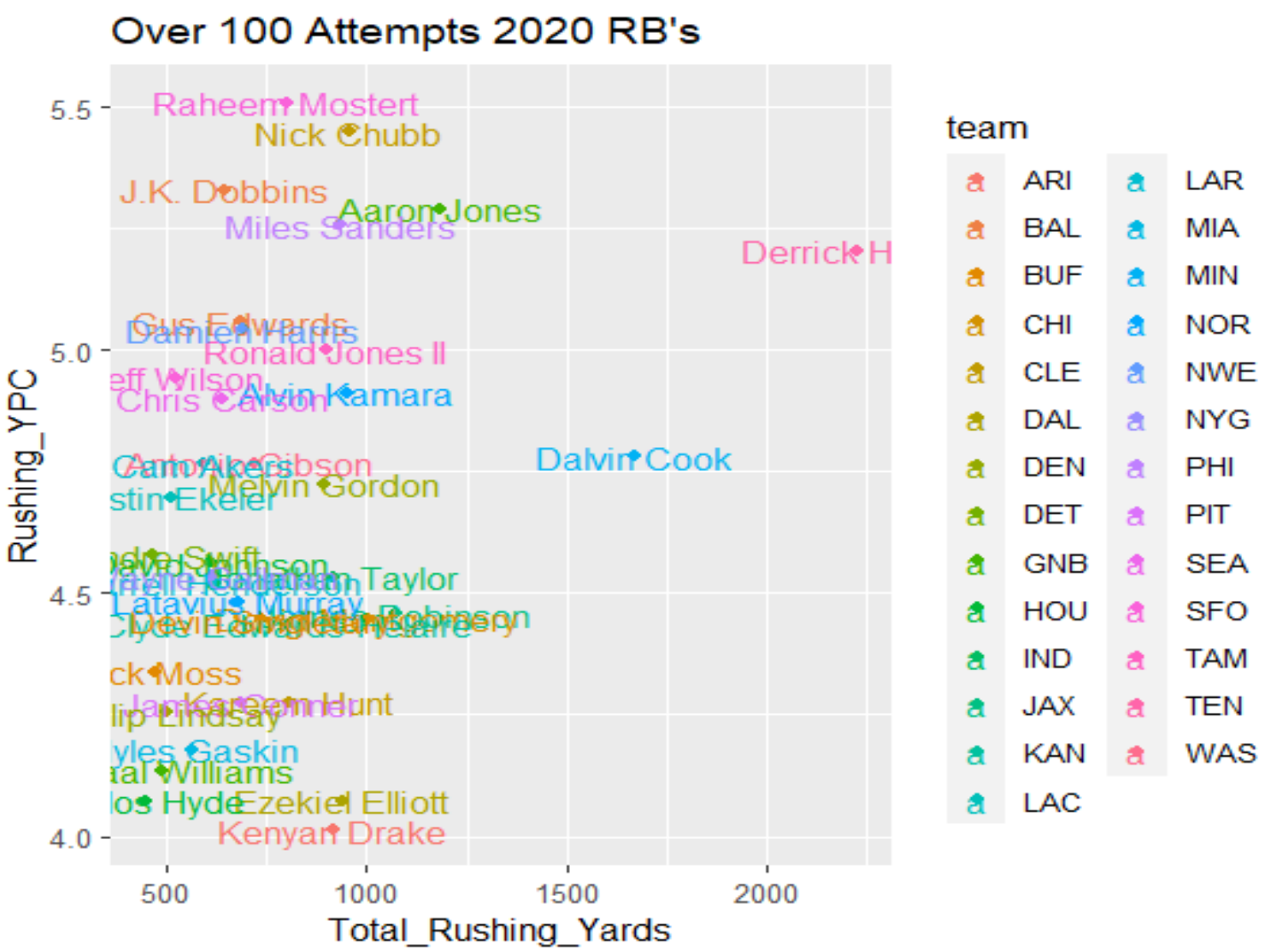
2019 Chiefs Won Super Bowl: RB(Darrel Williams 2019 4.92% Usage)

2020 Bucks Won Super Bowl: RB (Leonard Fournette 2020 9.88% Usage))

2021 Rams Won Super Bowl: RB(Darrell Henderson 2021 12.6% Usage)

Expected 2022 Bills: RB(Devin Singletary 2022 18% Usage)


Over 30 Attempts 2019 RB's
Mike Boone
Tony Pollard
Derrick He
Nick Chub
Christian McCaffre
Alexander Mattison
Aaron Jones
Ezekiel Elliott
Leonard Fournette
Jamaal Williams
Kareem Hunt
Bilal Powell
Le'Veon Bell
Rushing_YPC
5
4
3
400
800
1200
1600
Total_Rushing_Yards
team
CAR
CLE
DAL
GNB
JAX
MIN
NYJ
TEN


Over 100 Attempts 2020 RB's
Rushing_YPC
Total_Rushing_Yards
5.5
5.0
4.5
4.0
500
1000
1500
2000
Raheem Mostert
Nick Chubb
J.K. Dobbins
Aaron Jones
Miles Sanders
Derrick H
Gus Edwards
Damien Harris
Ronald Jones II
Chris Carson
Alvin Kamara
Dalvin Cook
Melvin Gordon
Latavius Murray
Taylor
Moss
Lindsay
Gaskin
Williams
Hyde
Ezekiel Elliott
Kenyan Drake
team
ARI
BAL
BUF
CHI
CLE
DAL
DEN
DET
GNB
HOU
IND
JAX
KAN
LAC
LAR
MIA
MIN
NOR
NWE
NYG
PHI
PIT
SEA
SFO
TAM
TEN
WAS

NFL Team Stats: The Data

```
'data.frame':   5357 obs. of  39 variables:
 $ date                 : Date, format: "2002-09-05" "2002-09-08" "2002-09
 $ away                 : chr  "49ers" "Jets" "Vikings" "Chargers" ...
 $ home                 : chr  "Giants" "Bills" "Bears" "Bengals" ...
 $ first_downs_away     : int  13 18 19 27 24 22 17 15 14 15 ...
 $ first_downs_home     : int  21 26 20 13 24 29 22 27 21 15 ...
 $ third_downs_away     : chr  "4-12" "2-8" "5-13" "6-10" ...
 $ third_downs_home     : chr  "9-16" "7-17" "7-13" "4-11" ...
 $ fourth_downs_away    : chr  "0-0" "0-0" "0-0" "0-0" ...
 $ fourth_downs_home    : chr  "0-1" "2-2" "0-0" "0-0" ...
 $ passing_yards_away   : int  166 193 228 160 276 194 181 206 187 212 ...
 $ passing_yards_home   : int  318 242 288 167 352 273 267 207 320 120 ...
 $ rushing_yards_away   : int  113 73 140 241 194 180 80 51 70 77 ...
 $ rushing_yards_home   : int  43 142 80 36 59 181 61 182 122 145 ...
 $ total_yards_away     : int  279 266 368 401 470 374 261 257 257 289 ...
 $ total_yards_home     : int  361 384 368 203 411 454 328 389 442 265 ...
 $ comp_att_away        : chr  "16-26" "24-30" "16-28" "15-19" ...
 $ comp_att_home        : chr  "28-45" "26-39" "20-33" "18-31" ...
 $ sacks_away           : chr  "0-0" "3-17" "1-6" "1-0" ...
 $ sacks_home           : chr  "3-24" "4-29" "1-9" "4-31" ...
 $ rushing_attempts_away: int  25 14 33 45 30 30 22 19 20 19 ...
 $ rushing_attempts_home: int  22 32 26 13 20 33 25 41 32 36 ...
 $ fumbles_away         : int  0 1 1 0 0 1 1 1 0 0 ...
 $ fumbles_home         : int  0 1 1 0 1 1 3 0 0 0 ...
```

*2000-2021

NFL Team Stats: The Top Rushing Teams

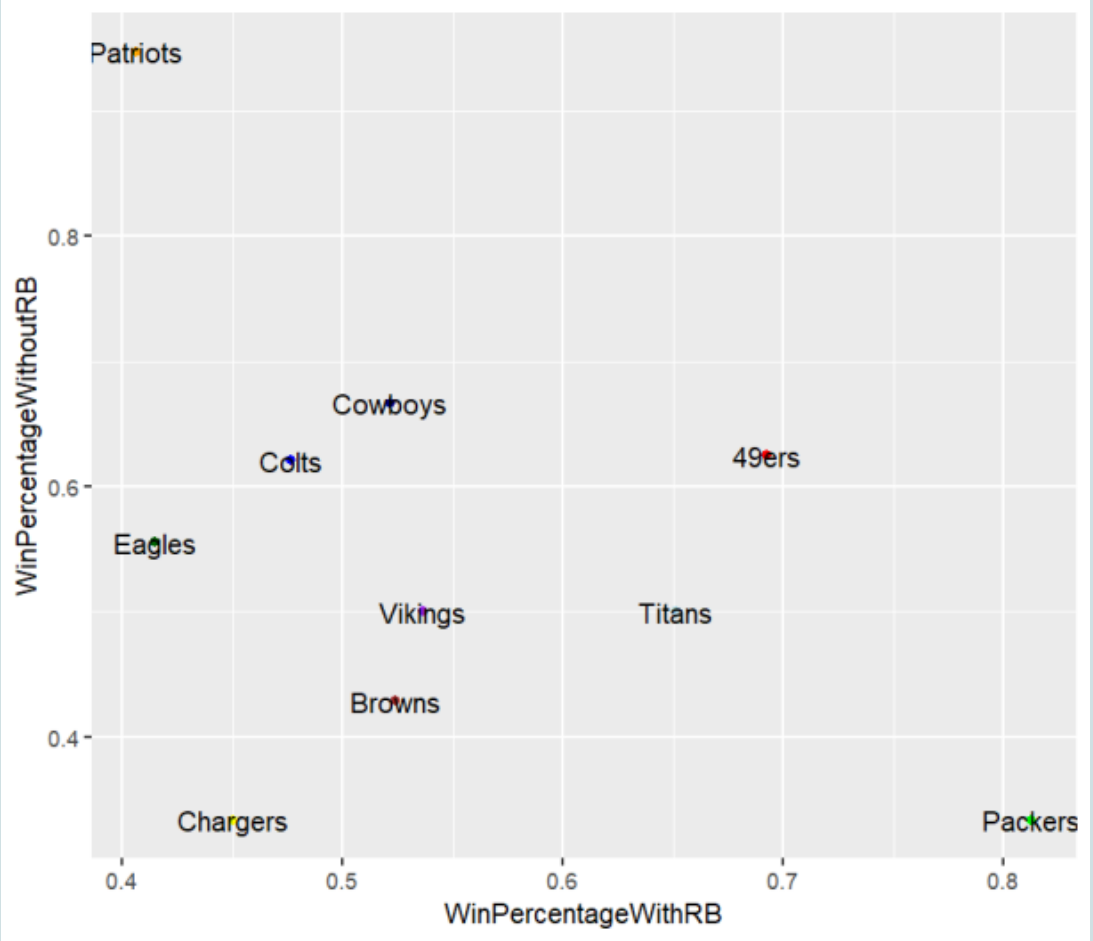
- Contains all games from 2002-2021 (5,357 in total) with 39 variables including home rushing yards, away rushing yards, total away rushing yards, total home rushing yards, etc
- Each row refers to a specific game
- Cleaning the data involved filtering the dataset for years 2019-2021, as well as each specific team
- We first established which teams had the most rushing yards
- We ultimately decided to use the top 10, however, we replaced the Jacksonville Jaguars with the the Dallas Cowboys due to the fact that the Jaguars lacked a notable back who had a few year tenure with them

```
> Team %>% arrange(desc(Team_rushing_yards)) %>% print(n=20)
# A tibble: 32 × 2
   team  Team_rushing_yards
   <chr>              <int>
 1 CLE                 6283
 2 SFO                 6196
 3 MIN                 5978
 4 NWE                 5938
 5 IND                 5933
 6 TEN                 5882
 7 GNB                 5825
 8 LAC                 5657
 9 JAX                 5284
10 PHI                 4912
11 DAL                 4862
12 BAL                 4782
13 MIA                 4748
14 LAR                 4696
15 BUF                 4556
16 CHI                 4549
17 NOR                 4522
18 DEN                 4341
19 PIT                 4333
20 SEA                 4276
```

NFL Team Stats: Filtering for Top Performing Running Backs

- We then proceeded to filter the dataframe for each team, their running backs with the most rushing yards, and the team's winning percentage with and without their star running back
- In this example, the San Francisco 49ers' go-to- guy in the running game was Raheem Mostert While he was very productive, the discrepancy of the winning percentage with and without him was negligible
- Their winning percentage with him was 69%, compared to their winning percentage of 63% without him
- We repeated this for all 10 teams

Plot of Teams With Most Rushing Yards From 2019-2021 and their Respective Winning % With and Without their Star Running Backs



NFL Team Stats: Comprehensive Findings

- After calculating teams' win percentage with and without their star running backs, we averaged out the findings for a more comprehensive statistic
  - Winning percentage with star running back: 56%
  - Winning percentage without star running back: 61%

Additional Sources

“The position's relatively short shelf life in relation to its actual value in a pass-first league lowers its importance. “

-Brent Sobleski, BleacherReport

https://bleacherreport.com/articles/2881966-recent-trends-show-exactly-why-nfl-teams-should-never-overpay-running-backs

- Teams playing Kansas City Chiefs in 202 had the 4th-highest YPC of 4.9
  - Kansas City won the Super Bowl in 2020
- Christian McCaffrey in 2019 became the 3rd player to hold 1000 receiving and 1000 rushing yards
  - Current highest paid running back
  - $16+ million a year from the 49ers
- Running backs should be considered replaceable parts in offenses

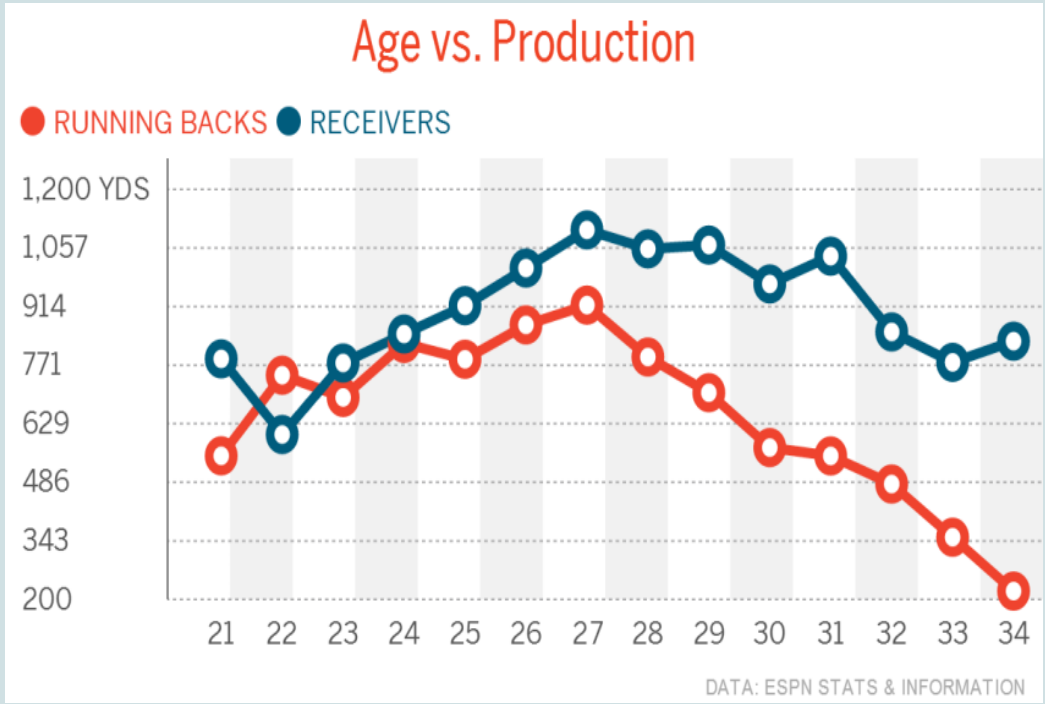
‘Hey, we are valuable. [Frank Gore and I] have 10, 14-year careers as well, so value us as well like you would value a quarterback.’”

-Adrian Peterson to NBC Sports

- Adrian Peterson signed a 7-year, $96 million contract in 20011
  - Since then, the NFL salary cap increased 65%
- Current running back contacts are far less, prioritizing other positions
- Despite AP’s claims, he has never been in a Super Bowl
  - Postseason record of 1-5
  - Hasn’t been in the postseason since 2015

https://profootballtalk.nbcsports.com/2020/06/28/adrian-peterson-its-disrespectful-how-nfl-teams-value-running-backs/

*Receivers with minimum of 50 receptions
*Taken from 2013 season



- Adrian Peterson contributed to the graph at 28 years old.
- His production fell 40% from the previous year
- At 37, AP is a free-agent and still hopes to be signed this year

2021 Rushing

ATT	YDS	AVG
38	**98**	**2.6**
38	98	2.6
3230	14,918	4.6

https://www.espn.com/blog/nflnation/post/_/id/123542/inside-slant-running-back-cliff-after-age-27

Conclusion: Evolve or Lose

Findings

NFL teams looking to make investments in their future should not sign running backs to big deals, long-term. The league is changing and teams need to prioritize playmakers. A running backs ability to catch and run routes like a receiver and block like a lineman adds value, but the span of their career is too limited.


2 Super Bowl Rings
Both from LaSean McCoy as a Backup
https://www.yardbarker.com
/nfl/articles/the_25_best_run