**NFL DRAFT DATA ANALYZATION(2023)**

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# **Abstract:**

Not longer than 200 words. Describes findings and overall summary of paper

# **Highlights:**

Key Highlights found in research

# **1 Introduction:**

On February 8, 1936, at Philadelphia’s Ritz-Carlton Hotel the first ever NFL Draft was held. There were no formal scouting departments, no agents and no 24-hour sports media coverage. The list of eligible players was compiled from newspaper reports, visits to local colleges by team executives, and recommendations to front-office personnel. From this draft only 24 of the 81 players selected ended up playing in the NFL as most tended to opt out and pursue different careers such as the first overall pick, Jay Berwanger, who was the Heisman winner out of the college of Chicago. He ended up pursuing a career as a foam rubber salesman (operations.nfl.com. (n.d.)). Since then, the NFL Draft has had a great amount of change in how teams draft, how the draft is presented and how players are scouted. Today teams have very large scouting departments and managerial teams all designed to assemble the best roster in the NFL.

Data Analysis Introduction

Growing up, I always was so intrigued with the NFL draft that I would constantly be doing mock drafts, scouting college players, and creating my own franchises in Madden. This passion led to me deciding to attend the University of Wisconsin-River Falls to major in Data Science.

# **2 Introduction to Data**

2.1 NFL Draft Data: The dataset for this research was supplied by Pro Football Reference. The dataset includes the following:

* **Rnd** -- **Round selected in draft  
  Supplemental draft round indicated with 'S'**
* **Pick** -- **Overall Selection in Draft**
* **Tm – Team that drafted player**
* **Player – Players name**
* **Pos** -- Position
* **Age** -- Age as of September 1 of the draft year
* **To** -- Last Year
* **AP1** -- **First-team all-pro selections**
* **PB** -- **Pro Bowl Selections**
* **St** -- Number of years as primary starter for his team at his position
* **wAV** -- **Weighted Career Approximate Value**.  
  See the glossary for details on how we compute Approximate Value.  
  The career AV is computed by summing  
  100 percent of the AV of his best season,  
  95 percent of the AV of his next-best season,  
  90 percent of the AV of his third-best season,  
  and so on
* **DrAV** -- AV accumulated for team that drafted this player
* **G** -- Games played
* **Cmp** -- Passes completed
* **PassAtt** -- Passes attempted
* **PassYds** -- Yards Gained by Passing  
  For teams, sack yardage is deducted from this total
* **PassTD** -- Passing Touchdowns
* **Int(O)** -- Interceptions thrown
* **RushAtt** -- Rushing Attempts (sacks not included in NFL)
* **RushYds** -- Rushing Yards Gained (sack yardage is not included by NFL)
* **RushTD** -- Rushing Touchdowns
* **Rec** -- Receptions
* **RecYds** -- Receiving Yards
* **RecTD** -- Receiving Touchdowns
* **Solo** -- Tackles  
  Before 1994: unofficial and inconsistently recorded from team to team. For amusement only.  
  1994-now: unofficial but consistently recorded.
* **Int(D)** -- Passes intercepted on defense
* **Sk** -- Sacks (official since 1982,  
  based on play-by-play, game film  
  and other research since 1960)
* **College/University** – College or University Player attended prior to being drafted to NFL

One key aspect from this dataset that is used in a majority of the research is the wAV short for weighted career approximate value. This feature generated by Pro Football reference is an attempt at putting an accurate depiction of how successful a career a player has and the total complete value a player was throughout their whole entire career. Basically, it is a measure of production throughout a player’s career. How wAV is measured is 100% of the player’s best season, 95% of the player’s next best season, 90% of the player’s next best season and so on going down by 5% for each season. The reason for having this system is because there has to be a way of balancing peak production against raw career totals. For example, take player A that has player 4 years total in the NFL and was very great during those 4 years and ends with a total of 60 AV for those 4 years. Then you have player B who played 20 years in the NFL and was not great during those 20 years, but in the end his total career AV is 62. Does this make Player B better than Player A? The obvious answer is no because excellent short production is better than bad long production. This is why this weighted system is used. To measure the production of each individual season for a player Pro Football Reference has an AV, short for Approximate Value, which is an attempt to put a single number on the seasonal value of a player at any position from any year. The founder of Pro Football Reference and also the creator of Approximate Value described AV as: "AV is not meant to be a be-all end-all metric. Football stat lines just do not come close to capturing all the contributions of a player the way they do in baseball and basketball. If one player is a 16 and another is a 14, we can't be very confident that the 16AV player actually had a better season than the 14AV player. But I am pretty confident that the collection of all players with 16AV played better, as an entire group, than the collection of all players with 14AV."

"Essentially, AV is a substitute for --- and a significant improvement upon, in my opinion --- metrics like 'number of seasons as a starter' or 'number of times making the pro bowl' or the like. You should think of it as being essentially like those two metrics, but with interpolation in between. That is, 'number of seasons as a starter' is a reasonable starting point if you're trying to measure, say, how good a particular draft class is, or what kind of player you can expect to get with the #13 pick in the draft. But obviously some starters are better than others. Starters on good teams are, as a group, better than starters on bad teams. Starting WRs who had lots of receiving yards are, as a group, better than starting WRs who did not have many receiving yards. Starters who made the pro bowl are, as a group, better than starters who didn't, and so on. And non-starters aren't worthless, so they get some points too."

The full methodology behind Approximate Value is as follows:

# Offense

Every team gets this many points to divvy up among its offensive players:

**team\_offense\_points** = 100 \* (team offensive points per drive) / (league average offensive points per drive),

where

offensive points per drive = (7\*(rushTD+passTD) + 3\*FG) / (rushTD + passTD + turnovers + punts + FGA)

## Offensive line

As a unit, the offensive line for a given team will share this many points:

**team\_points\_for\_o\_line** = 5 / 11 \* team\_offense\_points

For each offensive lineman (and fullback and tight end), we define:

individual\_points = [(games played) + 5\*(games started)\*(pos\_multiplier)] \* (all\_pro\_multiplier),

where pos\_multiplier = 1.2 for tackles, 1.0 for guards and centers, 0.3 for fullbacks, and 0.2 for tight ends,

and all\_pro\_multiplier = 1.9 for first-team AP all-pro, 1.6 for second-team AP all-pro, and 1.3 for a pro bowler who was not first- or second-team all-pro. [NOTE: all\_pro\_multiplier is for tackles, guards, and centers only, not fullbacks or tight ends.]

Finally, each individual player receives this many points:

**approx\_value** = (individual\_points) / (sum of individual\_points for all players on team) \* (team\_points\_for\_o\_line)

## Skill-position players

Since we know the entire offensive unit will get team\_offense\_points, and we gave team\_points\_for\_o\_line of those to the line, we have:

**team\_points\_for\_skill\_positions** = team\_offense\_points - team\_points\_for\_o\_line

Now we split that up into two pieces:

**team\_points\_for\_rushers** = team\_points\_for\_skill\_positions \* (.22) \* [(team\_rsh\_yards / team\_total\_yards ) / .37 ]

Now every individual player gets the following share:

**approx\_value** = (rushing yards) / (team rushing yards) \* team\_points\_for\_rushers

Finally, we give a small bonus (or impose a small penalty) to running backs who had 200 or more carries and whose yards per carry average was much higher or lower than the league average:

bonus = .75 \* [(yards per rush) - (league yards per rush by RBs)], if the player's yards per rush is better than league average.

penalty = 2 \* [(yards per rush) - (league yards per rush by RBs)], if the player's yards per rush is worse than league average.

Note that quarterbacks, wide receivers, and anyone else who compiles rushing yards is eligible to get approximate value points at this stage.

Now onto the passers and receivers....

**team\_points\_for\_passers** = (team\_points\_for\_skill\_positions - team\_points\_for\_rushers) \* .26

So that leaves:

**team\_points\_for\_receivers** = (team\_points\_for\_skill\_positions - team\_points\_for\_rushers) \* .74

Anyone who had a receiving yard gets this many AV points:

**approx\_value** = (receiving yards) / (team receiving yards) \* team\_points\_for\_receivers

And similarly for passers.

**approx\_value** = (passing yards) / (team passing yards) \* team\_points\_for\_passers

And, as with rushers, we add an efficiency adjustment here:

bonus = .5 \* [([Adjusted yards per attempt](http://www.pro-football-reference.com/about/glossary.htm#ay/a)) - (League average adjusted yards per attempt)], if the player's AYPA was better than league average.

penalty = 2 \* [(Adjusted yards per attempt) - (League average adjusted yards per attempt)], if the player's AYPA was worse than league average.

# Defense

**team\_defense\_points** = 100 \* [ (1 + 2\*M - M2) / (2\*M) ],

where M = (team defensive points allowed per drive) / (league average defensive points allowed per drive)

**team\_points\_for\_front\_7** = (2/3) \* team\_defense\_points

**team\_points\_for\_secondary** = (1/3) \* team\_defense\_points

Now, for all defensive players, we compute:

**individual\_points** = [(games played) + 5\*(games started) + sacks + 4\*(fumble recoveries) + 4\*(interceptions) + 5\*(defensive TDs) + (tkl\_constant)\*(tackles)] + (all\_pro\_bonus),

where

tkl\_constant = 0 if the year is before 1994, and otherwise, tkl\_constant = .6 if the player is a defensive lineman, .3 if the player is a linebacker, and 0 of the player is a defensive back.

all\_pro\_bonus = (all\_pro\_level)\*(year\_multiplier),

where

all\_pro\_level = 1.5 for first-team all-pro, 1.0 for second-team all-pro, and 0.5 for pro bowler

year\_multiplier = (year\_constant) \* (number\_of\_games\_multiplier),

where year\_constant = 40 for the pre-official sack years (1960--1981) and 80 for the post-sack years (1982-present), and  
number\_of\_games\_multiplier = (number of games played by each team in that season) / 16

Now, each front-seven player gets:

**approx\_value** = [ (individual\_points) / (sum of individual\_points for all front-seven players on the team) ] \* team\_points\_for\_front\_7

and each defensive back gets:

**approx\_value** = [ (individual\_points) / (sum of individual\_points for all defensive backs on the team) ] \* team\_points\_for\_secondary

# Special Teams

## Returns

Every player gets one point of approx\_value for each kick or punt return TD.

## Kickers

At the moment, Kicking AV is based solely on field goal & extra point performance. The core stat that determines a kicker's performance is Kicking Points Above Average (PAA), which is derived by comparing a player's XP% and his FG% at various distances (0-19 yds, 20-29 yds, 30-39 yds, 40-49 yds, 50+ yds) to the league average in the same category, to determine the number of points he added above what a league-average kicker would produce in the same number of chances.

**PAA\_total** = PAA\_xp + PAA\_fg1 + PAA\_fg2 + PAA\_fg3 + PAA\_fg4 + PAA\_fg5 + PAA\_fg\_u

where

PAA\_xp = xpm - xpa \* lg\_xp\_pct

PAA\_fg1 = 3 \* (fgm1 - fga1 \* lg\_fg1\_pct)

PAA\_fg2 = 3 \* (fgm2 - fga2 \* lg\_fg2\_pct)

PAA\_fg3 = 3 \* (fgm3 - fga3 \* lg\_fg3\_pct)

PAA\_fg4 = 3 \* (fgm4 - fga4 \* lg\_fg4\_pct)

PAA\_fg5 = 3 \* (fgm5 - fga5 \* lg\_fg5\_pct)

PAA\_fg\_u = 3 \* (fgm\_u - fga\_u \* lg\_fg\_pct)

where fgm\_u and fga\_u are field goals made and attempted that are unaccounted for by the distance categories. We have complete distance data going back to 1969; from 1960-1968 we have partial distances for some players. In the case of PAA from unaccounted field goals, kickers are compared to the overall league-average FG%.

From this, we can convert PAA into Approximate Value. First, determine what share of the team's "kicking playing time" the player has received:

**k\_playing\_time** = xpa + 3 \* fga

**pct\_team\_playing\_time** = k\_playing\_time / team k\_playing\_time

Determine the amount of AV the kicker would get in his playing time if he had an average PAA (prorating a league-average 3.125 figure downwards for seasons of fewer than 16 games):

**avg\_AV** = (3.125 / 16) \* team\_games \* pct\_team\_playing\_time

Then adjust up or down based on his PAA\_total (dividing by 5 arbitrarily calibrates the results to match the AV scale of kickers):

**raw\_AV** = avg\_AV + (PAA\_total / 5)

The final step is to prorate this back up to 16 team games for seasons with unusual schedules:

**approx\_value** = 16 \* (raw\_AV / team\_games)

## Punters

Right now, punting AV is determined using gross punting average and the ability to avoid blocked punts.

Just like with kickers, the first step is determining productivity above/below average. We're using Adjusted Punt Yards, which are gross punt yards with a 13-yard penalty for blocks (the rationale being that the punter is 13 yards behind the LOS when a block occurs, but we don't assess the full 50-yard fumble/turnover penalty -- as described in [The Hidden Game of Football](http://www.amazon.com/exec/obidos/ASIN/0446514144/footbaperspe-20) -- because the team was punting/turning the ball over anyway).

**adj\_punt\_ypa** = (punt\_yds - 13 \* punt\_blocked) / (punt + punt\_blocked)

Then, for each league-season, compute the league's average adj\_punt\_ypa using individual punters' (punt + punt\_blocked) totals as the weights. Then figure out how many adjusted punt yards the player added above/below the league average:

**adj\_punt\_yds\_above\_avg** = (punt + punt\_blocked) \* (adj\_punt\_ypa - lg\_adj\_punt\_ypa)

We then begin to convert adj\_punt\_yds\_above\_avg into Approximate Value. Like with kickers, we determine what share of the team's "punting playing time" the player has received:

**pct\_team\_playing\_time** = (punt + punt\_blocked) / (team\_punt + team\_punt\_blocked)]

Then calculate the amount of AV the punter would get in his playing time if he had an average adj\_punt\_yds\_above\_avg ( prorating a league-average 2.1875 figure downwards for seasons of fewer than 16 games):

**avg\_AV** = (2.1875 / 16) \* team\_games \* pct\_team\_playing\_time

Then adjust this up or down based on his adj\_punt\_yds\_above\_avg (dividing by 200 arbitrarily calibrates the results to match the AV scale of punters):

**raw\_AV** = avg\_AV + (adj\_punt\_yds\_above\_avg / 200)

The final step is to prorate this back up to 16 team games for seasons with unusual schedules:

**approx\_value** = 16 \* (raw\_AV / team\_games)

(Pro-Football-Reference.com. (2018).)

For better reference on how certain players are scored check out pro-football-reference.com where they have stats, wAV, and AV calculated for every player after 1960 as well as many other cool features.

To put better meaning the wAV and AV calculation here are examples of players around each range, so throughout the paper there is something to reference when wAV or AV is mentioned. Please note that this data is from 1993 to 2022, so newer players may not be ranked as high and players drafted before 1993 will not be included. The leading all time wAV is Tom Brady with a wAV of 184, second is Peyton Manning with a wAV of 176, and third is Drew Brees with a wAV of 167. The average wAV of a Hall of Famer for each position is as follows:

* QB: 118
* RB: 95
* WR: 95
* TE: 66
* G: 99
* C: 100
* T: 91
* DT: 104
* DE: 104
* ILB: 105
* OLB: 105
* DB: 100
* K: 53
* P: 32

A wAV score of around 100 is about what needs to be achieved in order to be considered to be a Hall of Famer. Below is a deep breakdown of the average stats for certain wAV levels by each position:

QB:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Pass Yd | Pass TD |
| > 160 (First Ballot HOF) Ex: Drew Brees, Aaron Rodgers | 3.75 | 13 | 17.25 | 75,142 | 559 |
| 140 – 159 (Potential HOF) Ex: Matt Ryan, Phillip Rivers | 0.5 | 6 | 14.5 | 63,116 | 401 |
| 120 – 139 (Possible HOF) Ex: Eli Manning, Russell Wilson | 0.25 | 6.33 | 13.66 | 53,898 | 364 |
| 100 – 119 (MVP) Ex: Cam Newton, Donovan McNabb | 0.2 | 3.4 | 11.2 | 42,520 | 262 |
| 80 – 99 (Above Average) Ex: Kirk Cousins, Joe Flacco | 0.1 | 2.66 | 9.06 | 33,143 | 200 |
| 60 – 79 (Average) Ex: Ryan Fitzpatrick,  Andrew Luck | 0.09 | 1.72 | 5.91 | 22,344 | 140 |
| 40 – 59 (Below Average)  Ex: Matt Cassel, Blake Bortles | 0 | 0.69 | 4.46 | 16,747 | 97 |
| 20 – 39 (Bad) Ex: Mark Sanchez, Christian Ponder | 0 | .33 | 2.89 | 10,264 | 56 |
| < 20 (Busts) Ex: JaMarcus Russell, Colt McCoy | 0 | 0 | 0.27 | 1,313 | 6 |

RB:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Rush Yd | Rush TD |
| > 120 (First Ballot HOF) Ex: LaDainian Tomlinson, Marshall Faulk | 3 | 6 | 10.5 | 12,982 | 123 |
| 100 – 119 (HOF) Ex: Edgerrin James, Adrian Peterson | 1.75 | 4.75 | 9.75 | 12,929 | 86 |
| 80 – 99 (Potential HOF) Ex: Jerome Bettis, Frank Gore | 0.57 | 3.86 | 10 | 11,775 | 68 |
| 60 – 79 (Possible HOF) Ex: Marshawn Lynch,  Jamaal Charles | 0.65 | 2.62 | 6.27 | 8,226 | 57 |
| 40 – 59 (Above Average)  Ex: Devonta Freeman, Jonathan Stewart | 0.3 | 1.36 | 4.28 | 5,657 | 44 |
| 20 – 39 (Average) Ex: Chris Carson, C.J. Spiller | 0.05 | .24 | 2.2 | 3,279 | 22 |
| 10 – 19 (Below Average) Ex: Trent Richardson, Jay Ajaji | 0.02 | 0.14 | 0.98 | 1,488 | 10 |
| < 10 (Busts) Ex: Derrius Guice, Kalen Ballage | 0 | 0.01 | 0.15 | 255 | 2 |

WR:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Rec Yd | Rec TD |
| > 120 (First Ballot HOF) Ex: Randy Moss, Marvin Harrison | 4 | 6.67 | 12.33 | 15,269 | 146 |
| 100 – 119 (HOF) Ex: Isaac Bruce, Reggie Wayne | 1.25 | 5.5 | 12.25 | 14,478 | 79 |
| 80 – 99 (Potential HOF) Ex: Antonio Brown, Chad Johnson | 1.27 | 5.36 | 11 | 12,817 | 78 |
| 60 – 79 (Possible HOF) Ex: Calvin Johnson,  Julien Edelman | 0.47 | 2.44 | 8.59 | 9,262 | 60 |
| 40 – 59 (Above Average)  Ex: Alshon Jeffery, Michael Crabtree | 0.15 | 0.69 | 5.96 | 6,189 | 38 |
| 20 – 39 (Average) Ex: Jacoby Jones, Tavon Austin | 0.05 | .26 | 3.21 | 3,394 | 20 |
| 10 – 19 (Below Average) Ex: Jerome Simpson, Jakeem Grant | 0.02 | 0.05 | 1.17 | 1,644 | 10 |
| < 10 (Busts) Ex: Corey Coleman, Olabisi Johnson | 0.01 | 0.03 | 0.12 | 248 | 1 |

TE:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Rec Yd | Rec TD |
| > 70 (HOF) Ex: Tony Gonzalez, Rob Gronkowski | 4 | 9.5 | 12.75 | 11,951 | 87 |
| 50 – 69 (Potential HOF) Ex: Jimmy Graham,  Dallas Clark | 0.5 | 2.75 | 10.25 | 7,604 | 65 |
| 30 – 49 (Above Average)  Ex: Martellus Bennett, Ben Watson | 0.16 | 1.95 | 8.16 | 5,381 | 36 |
| 20 – 29 (Average) Ex: Aaron Hernandez, Eric Ebron | 0 | .47 | 5 | 3,069 | 23 |
| 10 – 19 (Below Average) Ex: Tyler Eifert, Jim Kleinsasser | 0 | 0.1 | 3.61 | 1,768 | 13 |
| < 10 (Busts) Ex: Dan Gronkowski, Jake Butt | 0 | 0.01 | 0.74 | 288 | 2 |

OL:

|  |  |  |  |
| --- | --- | --- | --- |
| wAV | AP1 | PB | St |
| > 100 (HOF) Ex: Jahri Evans, Alan Feneca | 3.25 | 8.5 | 12.5 |
| 80 – 99 (Potential HOF) Ex: Joe Thomas, Tyron Smith | 2.5 | 8 | 10 |
| 60 – 79 (Pro Bowler) Ex: TJ Lang, David Decastro | 0.47 | 2.84 | 9.42 |
| 40 – 59 (Above Average) Ex: Ali Marpet,  Kyle Long | 0.06 | 0.53 | 7.36 |
| 20 – 39 (Average)  Ex: Joe Berger, Matt Kalil | 0 | 0.02 | 3.92 |
| 10 – 19 (Below Average) Ex: Jonathan Scott, Ernest Dye | 0 | 0.03 | 1.29 |
| < 10 (Busts) Ex: Jamain Stephens, Joshua Garnett | 0 | 0 | 0.12 |

DT:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Solo | Sk |
| > 100 (HOF) Ex: Kevin Williams, Aaron Donald | 4.2 | 6.4 | 11.4 | 369 | 73 |
| 80 – 99 (Possible HOF) Ex: Bryant Young, Geno Atkins | 1.2 | 5.5 | 10.67 | 370 | 70 |
| 60 – 79 (Pro Bowler) Ex: Kyle Williams, Gerald McCoy | 0.25 | 2.65 | 9.7 | 293 | 37 |
| 40 – 59 (Above Average) Ex: Derek Wolfe,  Kawann Short | 0.08 | 0.56 | 7.23 | 226 | 24 |
| 20 – 39 (Average)  Ex: B.J. Raji, Kedric Golston | 0.01 | 0.07 | 3.68 | 139 | 14 |
| 10 – 19 (Below Average) Ex: Johnathan Sullivan, Sharrif Floyd | 0 | 0 | 1.32 | 71 | 6 |
| < 10 (Busts) Ex: Reggie McGrew, Ryan Glasgow | 0 | 0 | 0.11 | 15 | 1.22 |

DE:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Solo | Sk |
| > 100 (HOF) Ex: Jared Allen, J.J. Watt | 3 | 6.14 | 12.86 | 463 | 125 |
| 80 – 99 (Potential HOF) Ex: Dwight Freeney, John Abraham | 2 | 5.14 | 11.14 | 393 | 105 |
| 60 – 79 (Pro Bowler) Ex: Everson Griffin, Ryan Kerrigan | 0.59 | 2.48 | 8.59 | 360 | 83 |
| 40 – 59 (Above Average) Ex: Brian Robinson,  Bruce Irvin | 0.04 | 0.86 | 6.64 | 255 | 49 |
| 20 – 39 (Average)  Ex: Ezekiel Ansah, Aldon Smith | 0.01 | 0.11 | 3.6 | 152 | 26 |
| 10 – 19 (Below Average) Ex: Derrick Harvey, Cassius Marsh | 0 | 0.02 | 1.35 | 77 | 12 |
| < 10 (Busts) Ex: Erik Flowers, Jonathan Woodard | 0 | 0 | 0.08 | 15 | 2 |

LB:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Solo | Sk | Int |
| > 100 (HOF) Ex: DeMarcus Ware, Ray Lewis | 4.38 | 8.75 | 12.13 | 936 | 68 | 15 |
| 80 – 99 (Potential HOF) Ex: Luke Kuechly, Takeo Spikes | 1.5 | 3.69 | 10.56 | 758 | 39 | 13 |
| 60 – 79 (Pro Bowler) Ex: Clay Matthews, Chad Greenway | 0.61 | 2 | 8.89 | 582 | 36 | 8 |
| 40 – 59 (Above Average) Ex: DeMeco Ryans,  Brian Orakpo | 0.18 | 0.77 | 6.77 | 450 | 19 | 6 |
| 20 – 39 (Average)  Ex: Manti Te'o, Ryan Shazier | 0.02 | 0.14 | 3.93 | 266 | 11 | 3 |
| 10 – 19 (Below Average) Ex: Stephen Weatherly, Ben Gedeon | 0 | 0.01 | 1.3 | 132 | 5 | 1 |
| < 10 (Busts) Ex: Reuben Foster, Shaquem Griffin | 0 | 0.01 | 0.09 | 24 | 1 | 0 |

DB:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| wAV | AP1 | PB | St | Solo | Sk | Int |
| > 100 (HOF) Ex: Ed Reed, Patrick Peterson | 3.5 | 8.67 | 13.67 | 809 | 15 | 50 |
| 80 – 99 (Potential HOF) Ex: Troy Polamalu, Richard Sherman | 2.67 | 6.22 | 10.67 | 512 | 6 | 37 |
| 60 – 79 (Pro Bowler) Ex: Antonio Cromartie, Charles Tillman | 0.76 | 2.9 | 10.28 | 591 | 6 | 33 |
| 40 – 59 (Above Average) Ex: Kam Chancellor,  Jason McCourty | 0.35 | 1.31 | 7.21 | 426 | 5 | 20 |
| 20 – 39 (Average)  Ex: Patrick Chung, Sean Taylor | 0.03 | 0.19 | 4.46 | 306 | 3 | 12 |
| 10 – 19 (Below Average) Ex: Mackensie Alexander, Trae Waynes | 0.02 | 0.04 | 1.56 | 158 | 2 | 5 |
| < 10 (Busts) Ex: Damon Arnette, Gareon Conley | 0 | 0.01 | 0.11 | 34 | 0 | 1 |

# **3 Question: How valuable is each pick in the NFL draft?**

3.1 Method: To complete this study the wAV from the Pro Football reference dataset was used as a measure of production, so this study was very dependent on the calculation of wAV as how most of the study’s are in this research. To answer this question a model was needed to show the results of the past drafts and how successful each pick ended up being in the NFL. The question was just what type of model to be used. So to start, the data was first plotted to see how it looked and maybe considered which type of regression line may best represent the model. It came clear after looking at the data that it had a large amount of overplotting, so to cut down on that the data for this model is only from 1993 to 2010. 2010 was chosen because a very large majority of the players drafted in the 2010 draft are now retired, so that means most of their careers are over or close to ending meaning their wAV is capped or close to being capped. Where as players from more recent drafts still have multiple years ahead of them in their football careers and more years to increase their wAV. While also looking at the data it became clear that the regression line was either going to be linear or logarithmic. This led to the next step in the process which was deciding which type of model to use, linear or logarithmic. The models were then compared in R using the export\_summs() function comparing the R squared, AIC, and BIC. The models’ residuals versus fitted were also compared as well and in all cases the logarithmic model was better and made more sense for the data (In Figure 1, the model can be seen plotted against the data and in Table 2 the results of the regression function are shown). Chart, scatter chart

Description automatically generated

Figure Value of Each NFL Pick Chart

|  |  |
| --- | --- |
| "Pick" | "wAV" |
| 1 | 79.710258829259 |
| 2 | 70.2706486154282 |
| 3 | 64.7488306189113 |
| 4 | 60.8310384015976 |
| 5 | 57.7921626689812 |
| 6 | 55.3092204050847 |
| 7 | 53.2099226331595 |
| 8 | 51.391428187771 |
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| 252 | 4.40784578482715 |
| 253 | 4.35391114465431 |
| 254 | 4.30018926495616 |
| 255 | 4.24667847373819 |

Table Value of Each Draft Pick Table

3.2 Analysis: According to the regression function from the model there is a sharp change in value from the first pick to about the tenth pick were there is about an around an overall 40 wAV change from just of a span of 10 picks after that it seems to level off and slowing decline all the way down to 4 wAV. The first overall pick according to the model is around 80 wAV which for most positions is equal to almost a borderline Hall of Fame player.

# **4 Question: What team has had the best drafts historically and which team has had the worst drafts historically?**

4.1 Method: For this study the data required a bit of conversion before processing because since 1993 many franchises have relocated and changed abbreviations. For example, the Los Angeles Rams (LAR) are the same franchise as the St. Louis Rams (STL) and the Los Angeles Rams (RAM) they just relocated from Los Angeles to St. Louis in 1995 and then back to Los Angeles in 2016. Other teams that have relocated and changed abbreviations since 1993 were the Phoenix Cardinals (PHO) to the Arizona Cardinals (ARI) in 1994, the Los Angeles Raiders (RAI) to the Oakland Raiders (OAK) in 1995 and then to the Las Vegas Raiders (LVR) in 2020, and the San Diego Chargers (SDG) to the Los Angeles Chargers (LAC) in 2017. After cleaning the data to have every franchise represented once, the average weighted value for the average player (averagewAV) each NFL franchise has drafted was calculated and the NFL franchises were compared.

4.2 Analysis: The top 3 franchises with the highest averagewAV were the Steelers, Packers, and Ravens. The Steelers had the highest with an averagewAV of 17.95. The bottom 3 were the Browns, Commanders, and Raiders. The Browns having by far the worst with an averagewAV of 13.00.

Table Historical Franchise Draft Success Table

|  |  |
| --- | --- |
| Fran | averagewAV |
| PIT | 17.9561752988048 |
| GNB | 17.7977941176471 |
| BAL | 17.528384279476 |
| NOR | 17.4642857142857 |
| SEA | 17.2105263157895 |
| CAR | 16.9716981132075 |
| IND | 16.8786610878661 |
| NWE | 16.6125461254613 |
| HOU | 16.1809045226131 |
| NYG | 16.1644444444444 |
| DAL | 16.1411290322581 |
| PHI | 16.068 |
| ARI | 16.0127659574468 |
| CIN | 15.9372549019608 |
| LAC | 15.8982300884956 |
| ATL | 15.7946428571429 |
| BUF | 15.6285714285714 |
| KAN | 15.625550660793 |
| SFO | 15.476 |
| CHI | 15.4510638297872 |
| NYJ | 15.4330357142857 |
| MIA | 15.4159663865546 |
| TAM | 15.2094017094017 |
| DEN | 15.0983606557377 |
| JAX | 15.0431034482759 |
| LAR | 14.992337164751 |
| MIN | 14.8682170542636 |
| TEN | 14.7227272727273 |
| DET | 14.3039647577093 |
| LVR | 13.7391304347826 |
| WAS | 13.5198237885463 |
| CLE | 13.0044843049327 |

The data makes sense for all of these cases as the top teams have won multiple super bowls in the past 30 years while the bottom teams haven’t won much in the past 30 years. The Browns also having a very long stint in the past 30 years where they were by far the worst team in the league and they were only winning a few games for multiple years in a row.

Chart, scatter chart

Description automatically generatedFigure 2 Average Drafted Player Value Chart

# **5 Question: Which colleges produce the best NFL athletes?**

5.1 Method: For this study all the players from the dataset where at first grouped by the College/University they attended prior to being drafted into the NFL. The college that players were grouped to was their last college played for prior to entering the NFL draft. So for example, players like Jalen Hurts, a standout quarterback for Alabama and Oklahoma, were grouped with only Oklahoma because that was the last college he player for prior to entering the draft. After the players were grouped by their colleges the sum of all the players wAV (weighted average value) was calculated and then compared.

The study also compared the average for each player drafted from each college for colleges with at least 20 players drafted from 1993 to 2010. The reasoning for these specific parameters is because currently in the NFL 1,301 of the 1,884 players in the NFL are from Power Five colleges. There are 65 Power Five colleges, so that would equate to about 20 players from each Power Five college (Reubenking, D. (2021)). Then the specific time from 1993 to 2010 is because players drafted after 2010 are still finishing or even starting their career in the NFL, so they won’t have as high of a wAV as those drafted prior to 2010.

5.2 Analysis: The college with by far the most for sumwAV was the University of Miami Florida with a sum of 3435 wAV. The next four were Ohio St. with 3386, Florida St. with 3211, Alabama with 3085, and LSU with 3081. In the past 30 years this makes sense as these have been some of the best college football schools during that time with Alabama, LSU, and Ohio St. having more current success compared to Florida St. and Miami (FL). Although in the past Florida St. and Miami (FL) were powerhouses, so them being in the top five perfectly makes sense. I would not be surprised if I did this same study in the next 10 years if Alabama, LSU, and Ohio St. climb higher on these rankings because currently these are some of the best teams in college football today.

For the averagewAV of each college athlete drafted to the NFL from each college the top 3 colleges were Boston Col. with 30.26, Miami (FL) 27.69, and Michigan with 26.92. The bottom 3 colleges were BYU with 8.97, Minnesota with 11.04, and Northwestern with 11.14. The top team was kind of surprising at first, but after looking into the data it makes sense why Boston Col. has the top spot for players with successful NFL careers. The reason why they seem to not be as great is recently Boston Col. has not been a very successful college football program, but looking at the data Boston Col. had a lot of great players during the late 1990s and early 2000s. Most of these players also being linemen which tend to usually fly under the radar to the casual eye. Boston Col. has also produced some very well known players that have had very successful NFL careers, such as Matt Ryan, B.J. Raji, and Matt Hasselbeck. The main reason though why Boston Col. is so high though is because they don’t have a lot of players with very low wAV that busted in the NFL. They only have 14 of their 38 players drafted from 1993 to 2010 with a wAV below 10. The next best college was Miami (FL) which is very impressive considering they also had the highest sumwAV out of all colleges, meaning not only do they produce a lot of NFL talent, but a lot of successful NFL talent. When you also look at the players that Miami produced from 1993 to 2010 it is no surprise either why they stand out so much in the data. Ray Lewis, Warren Sapp, and Edgerrin James, who are all Hall of Famers, are just a couple of the elite players Miami produced during this time. Seeing these big name players leads to the question of why they were not above Boston Col. in the rankings and that is because 49 of the 100 players drafted from Miami (FL) from 1993 to 2010 had below a 10 wAV which is nearly 50 percent of the players drafted.

Could potentially add tables here

# **6 Question: Which was the best draft class?**

Method: The methodology used to solve this question was first just a simple grouping of the data by Draft and then creating a sum of all of the players wAV from that draft. The Draft with the highest sumwAV had the best draft class. During this study it is also important to once again keep in mind that players from more recent drafts (past 2010) are most likely still playing and therefore have lower wAV then the older draft classes.

Analysis: The top three draft classes were 2006 with 5035 wAV, 1993 with 4987 wAV, and 1996 with 4899 wAV. Some of the top players from the 2006 draft class include, Jahri Evans (G) 114 wAV, Haloti Ngata (DT) 100 wAV, and Andrew Whitworth (T) 100 wAV. These are some incredible NFL players with some great careers, but 2006 draft class was very deep and that is what contributed to such its high wAV. The far worst NFL draft class prior to 2010 would be the 2009 draft class with a wAV of 3978. This draft class includes players such as Alex Mack (C) 86 wAV, LeSean McCoy (RB) 83 wAV, and Clay Matthews (LB) 77 wAV. The difference between the 2006 and 2009 draft classes is whopping a 1057. This also means players drafted in the 2006 draft on average were around 4 wAV better than players drafted in the 2009 draft. To better put this into perspective 4 wAV difference for a WR would equate to around 500 – 800 receiving yards. With this information it is then also crucial to consider the strength of draft classes when potentially trading future draft picks because if a future draft classes may hold more value. Some of the more recent draft classes that had scores that stood out are the 2012 draft with a wAV of 4652, the 2014 draft with a wAV of 4166, and the 2016 draft with a wAV of 3997.

# **7 Question: When do positions tend to get drafted?**

Method: To answer this question a look was needed into past drafts to see on average where each position was drafted. So, this is what was first done to see what positions had the highest average draft pick. This was executed by grouping the data by Pos and taking the average for each position. The highest three positions were T with an average pick of 115, then DE with an average pick 119, and then QB with an average pick of 119. Although this doesn’t really show that much because more backups are needed for certain positions thus more players need to be drafted which could then skew the data. For example, on a NFL roster there are usually only two sometimes 3 Quarterbacks on the team while for Cornerbacks there are usually around 7. Therefore, more Cornerbacks are usually drafted then Quarterbacks meaning Cornerbacks can be skewed lower then Cornerbacks because a 6th string corner is going to be drafted far later then your backup quarterback. To solve this problem, it would be best to just take the average of the first drafted player from each position in each draft and then take the find the total average pick. This will then show a better representation of when positions tend to get drafted.

Analysis: The positions that had the highest average draft pick were QB at 5, DE at 7, and T at 7. The following can be seen in the table below: (insert table)

# **8 Question: When is the optimal place to draft a certain position?**

Analysis:

# **9 Conclusion:**

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