



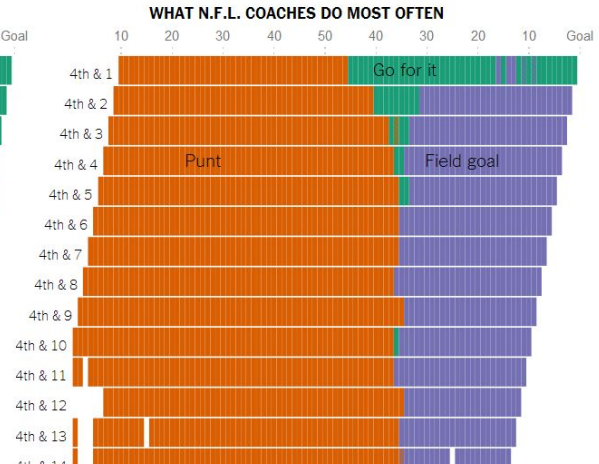
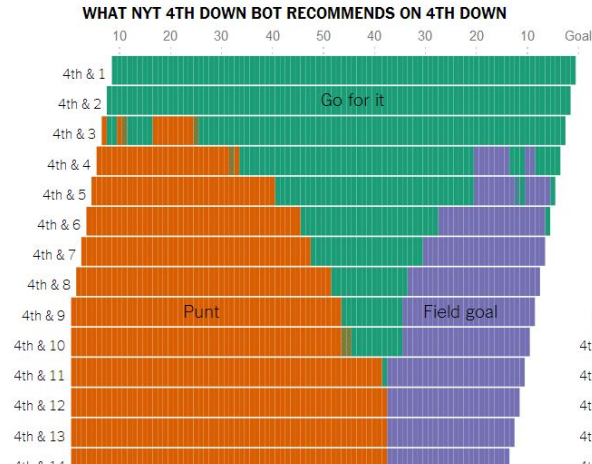
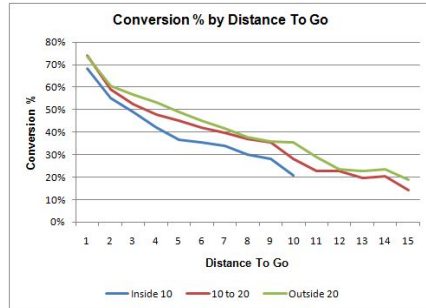
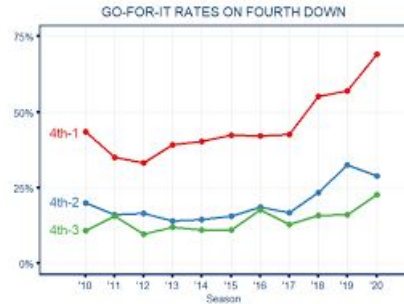
# Evaluating the Performance of NFL Contracts

Ian Gatlin

Data science in the NFL is super popular and gaining more attention every year



# Primary use: analytics for in-game decision making



**Secondary use: talent scouting**

**Is data science used for the draft?**



# UPenn Regression Tree Models

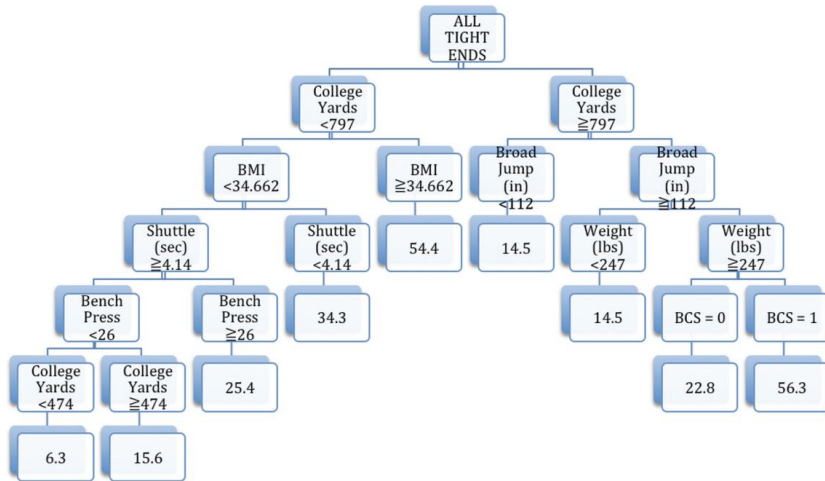


Figure 3 Decision tree model of NFL games started.

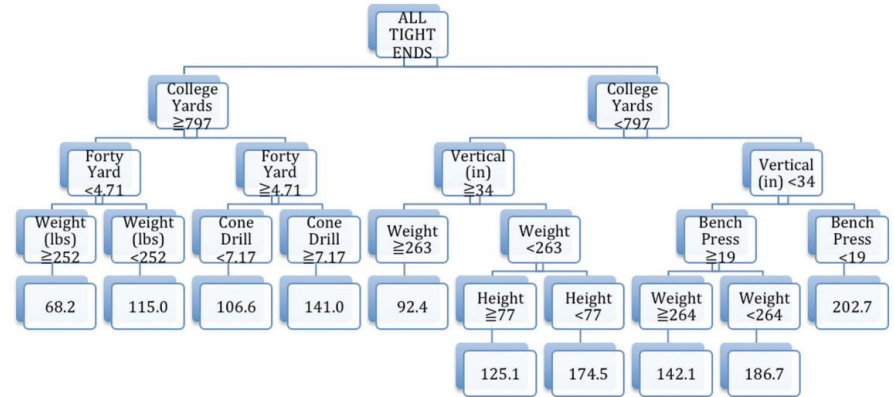


Figure 2 Decision tree model of NFL draft order.

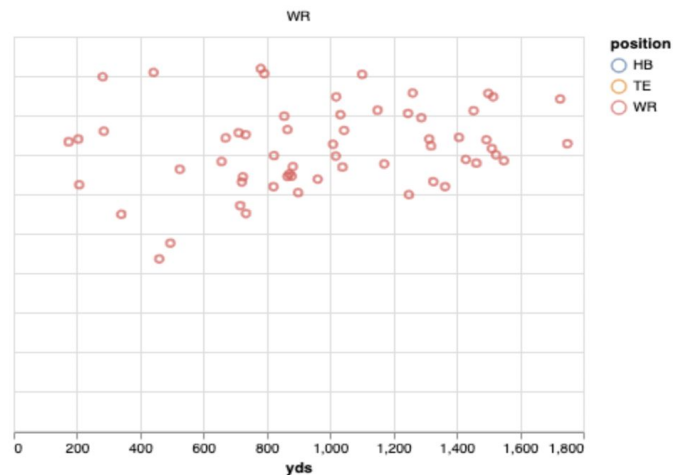
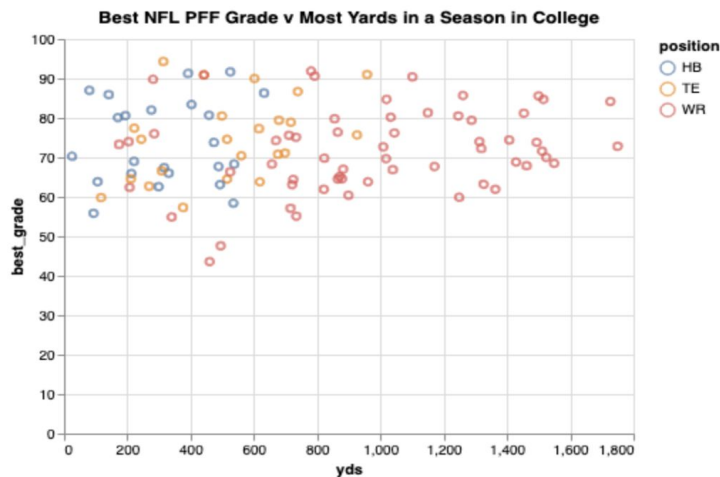
**Sadly it isn't very effective. So don't fret your poor combine performance.**

(^When it comes to your career, it may cost you some money if you fall in the draft)



# My Process at first:

First I was fumbling around with some college data for WRs and was unsuccessful in trying to determine success

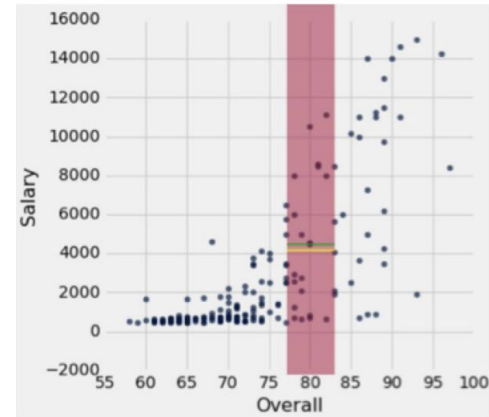


## An interesting use: Free Agency Analytics (FAR)

Last Name	First Name	Position	Overall	Salary	Team
Parker	DeVante	WR	77	2719.14	MIA
Amendola	Danny	WR	83	4050	NE
Wallace	Mike	WR	77	5750	BAL
Aiken	Kamar	WR	78	2553	BAL
LaFell	Brandon	WR	77	2500	CIN
Coleman	Corey	WR	78	2913.75	CLE
Bryant	Martavis	WR	82	664.805	PIT
Moncrief	Donte	WR	78	702.13	IND
Matthews	Rishard	WR	79	5000	TEN
Wright	Kendall	WR	79	2054.61	TEN

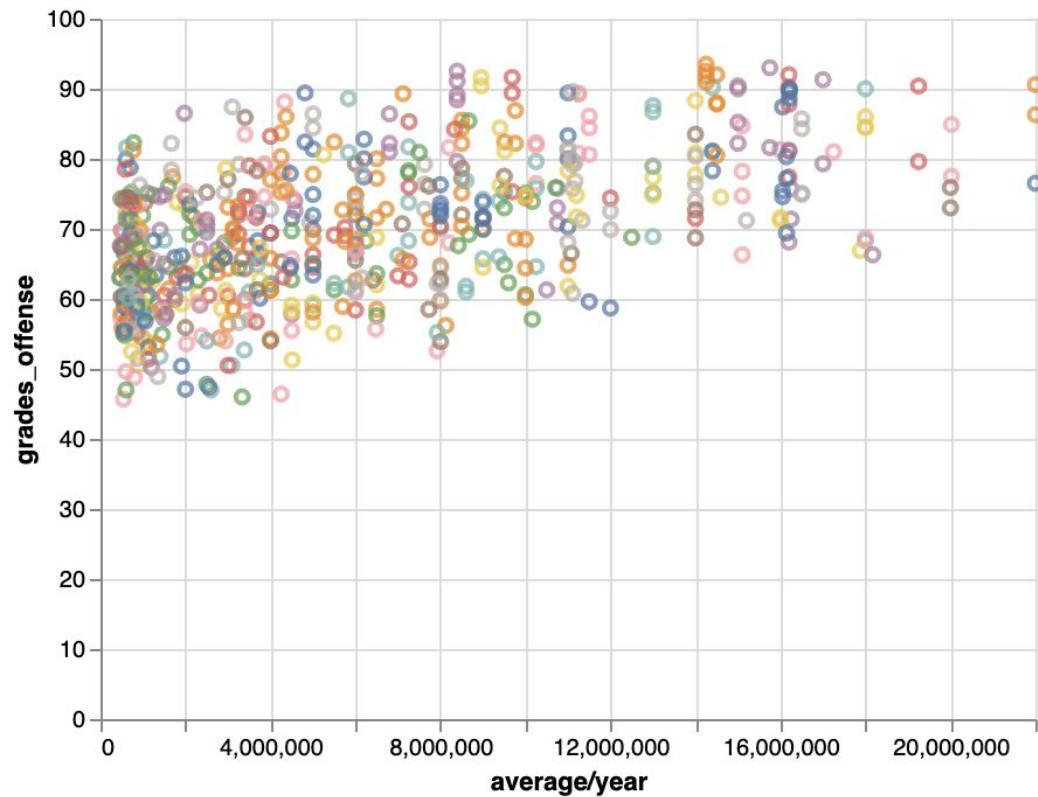
Last Name	First Name	Position	Overall	Salary	Team
Kearse	Jermaine	WR	80	4500	SEA

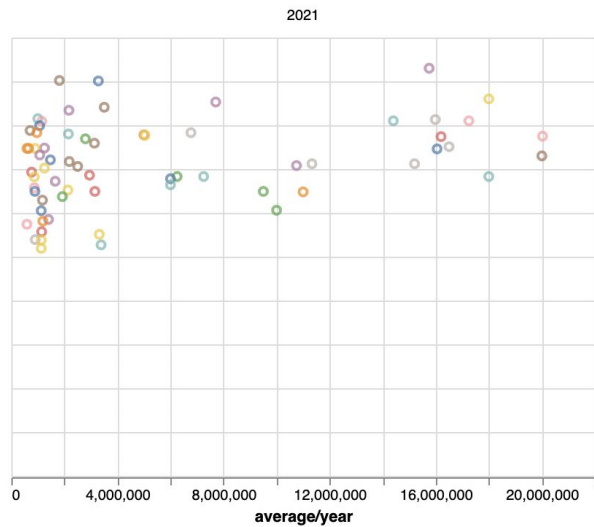
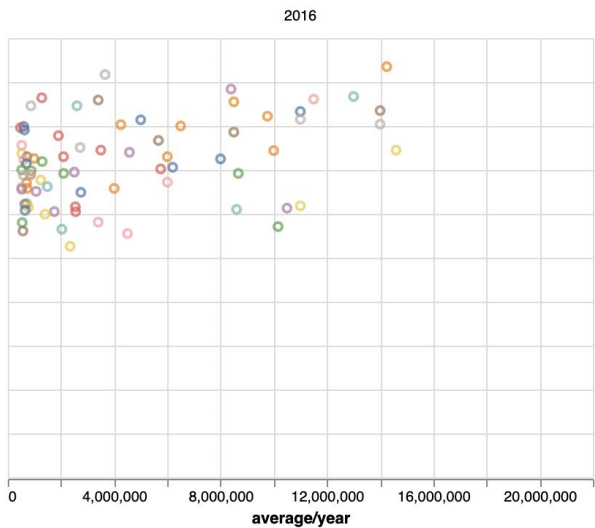
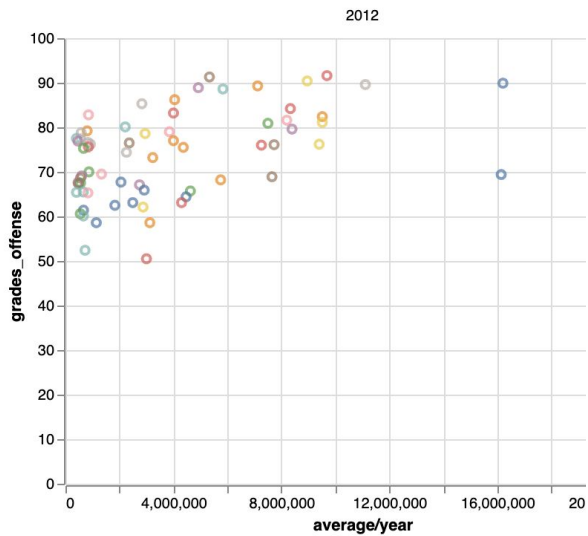
**Table 1** - Ratings and salary data for Jermaine Kearse in 2016.  
His salary is marked by the green band in Figure 3 below.



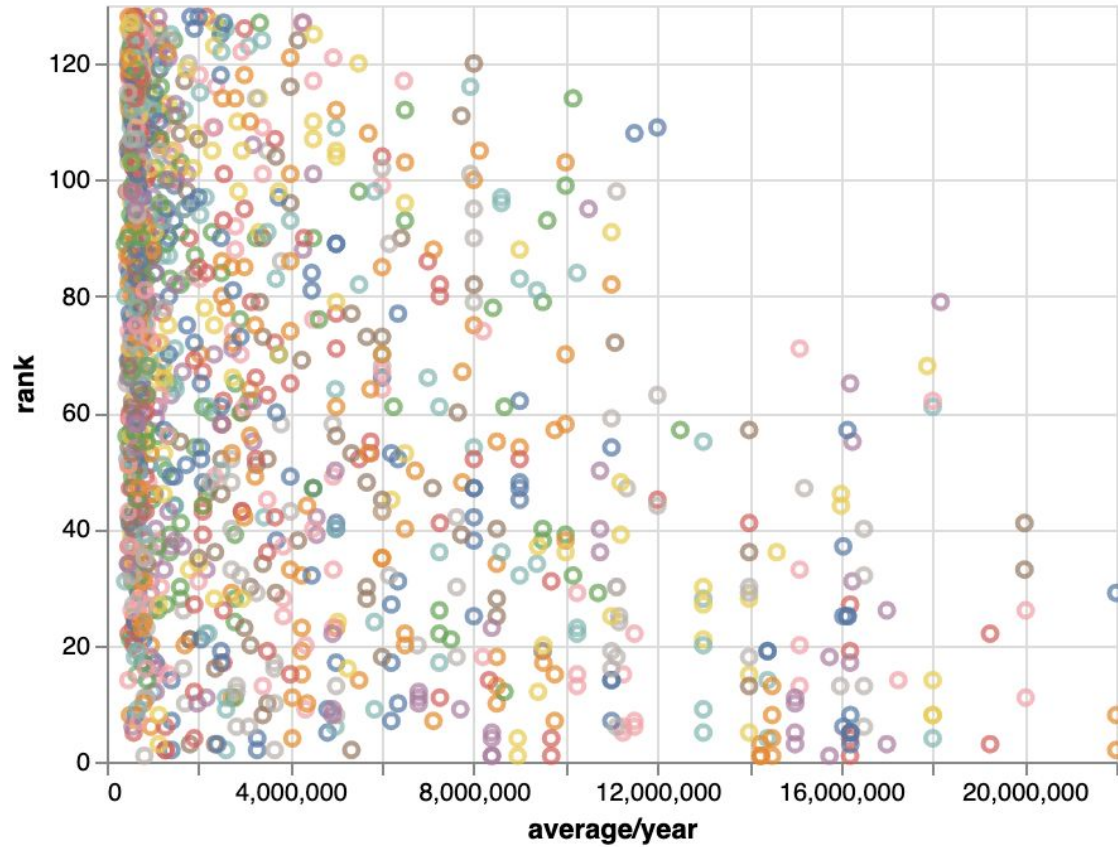


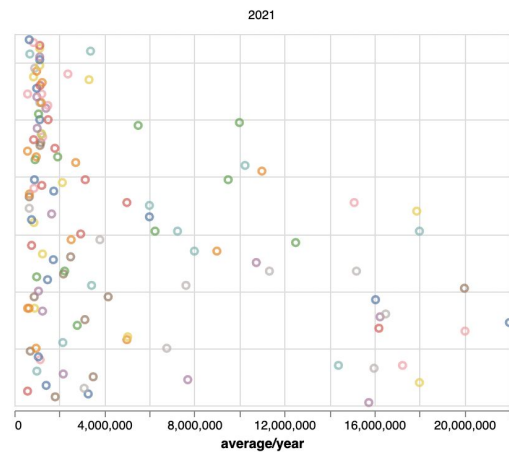
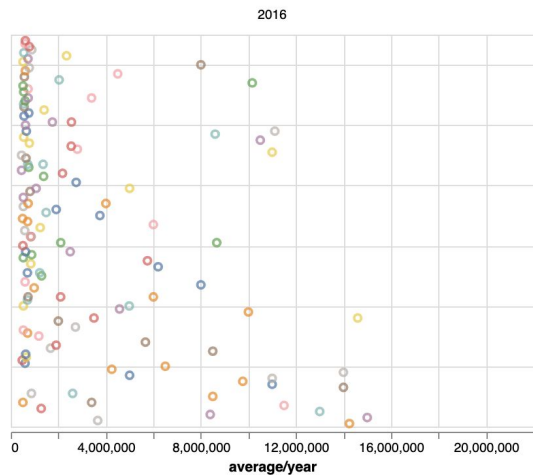
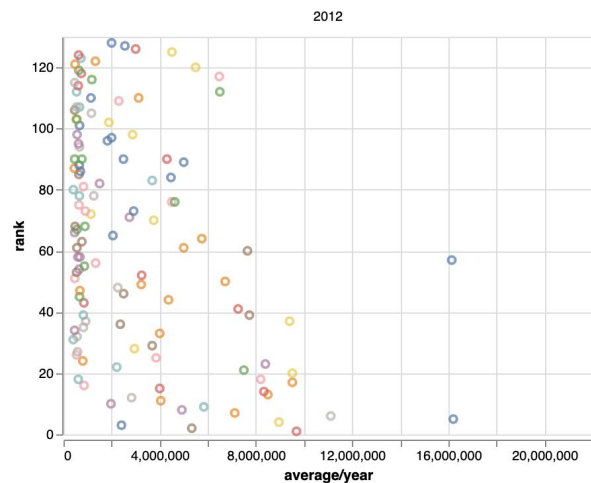
NFL PFF Grade v Salary



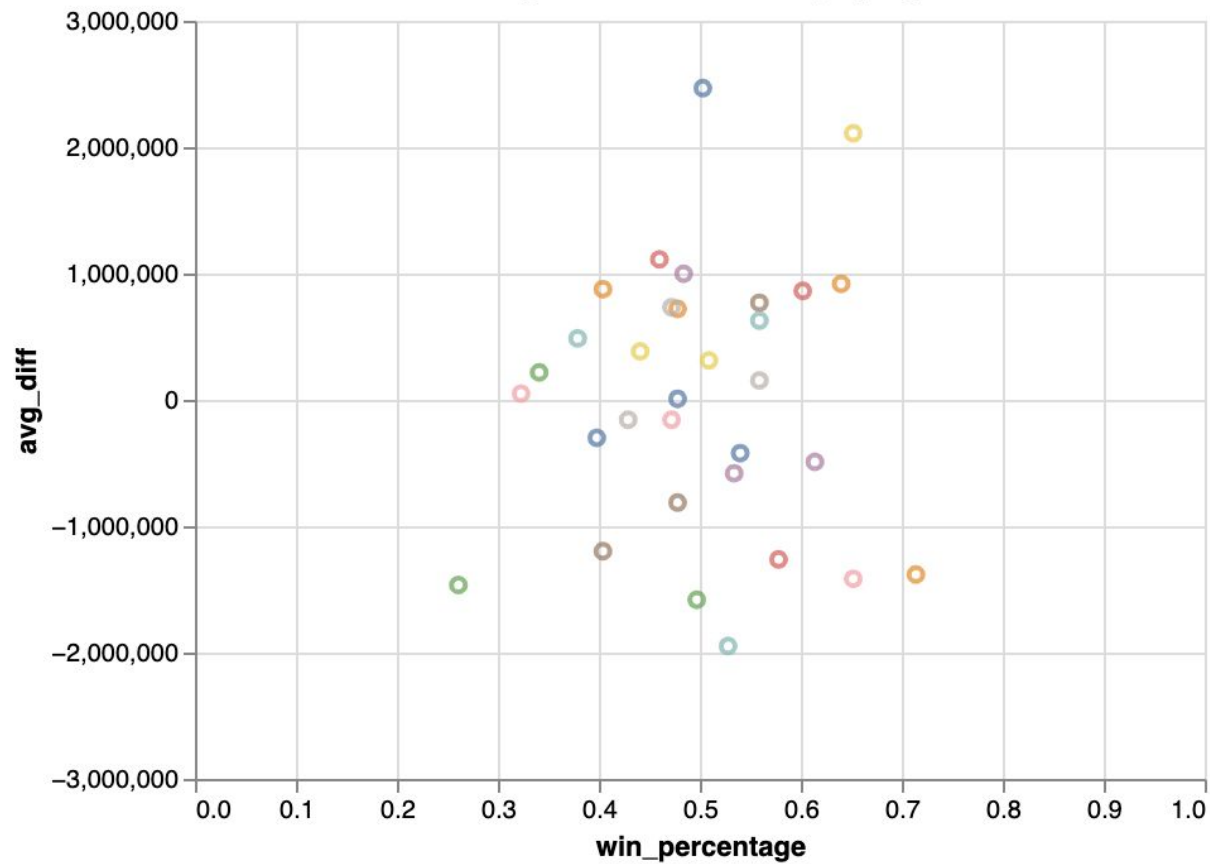


NFL PFF Grade v Salary





Win Percentage v Over or Underpaying Receivers





## Decided to deep dive into salary v PFF grade

- Concatenate all PFF grades for each position individually for 10 years for 7 different positions.
  - Dropped duplicate names
  - Sorted by team and snap counts and kept the players that played the most
  - Gave them a PFF rank which yielded some interesting visualizations
  - Normalized team names (eg: OAK -> LV)



## Making the Tables

- Concatenate all contracts signed from 2007 to 2021.
  - Made new table that expanded the contracts to be an average amount of money paid per year the contract was valid
  - Checked for early extensions
  - Dropped duplicate names
- Only want rookie contracts, not an easy way to do this with the data so I took contracts of players over 23
  - Did more regex to clean names with suffixes like II or Jr. and cleaned up numerical entries in the table

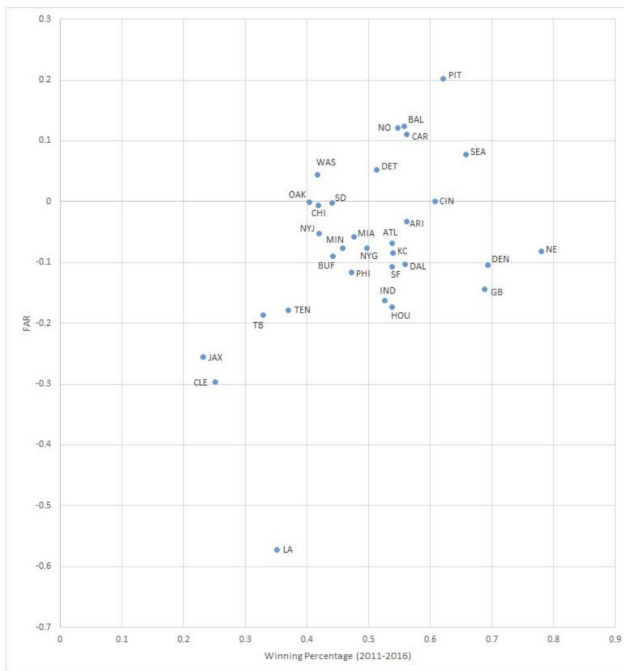
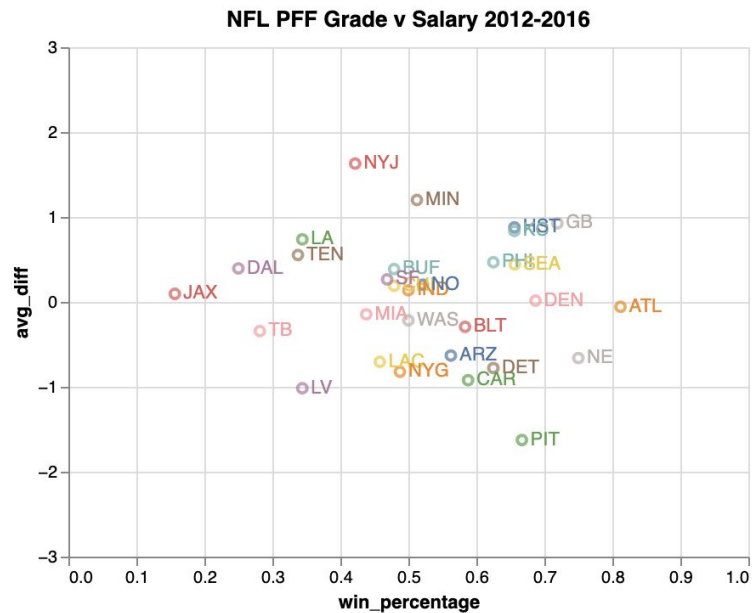


## Merge the Tables and Aggregate the Data

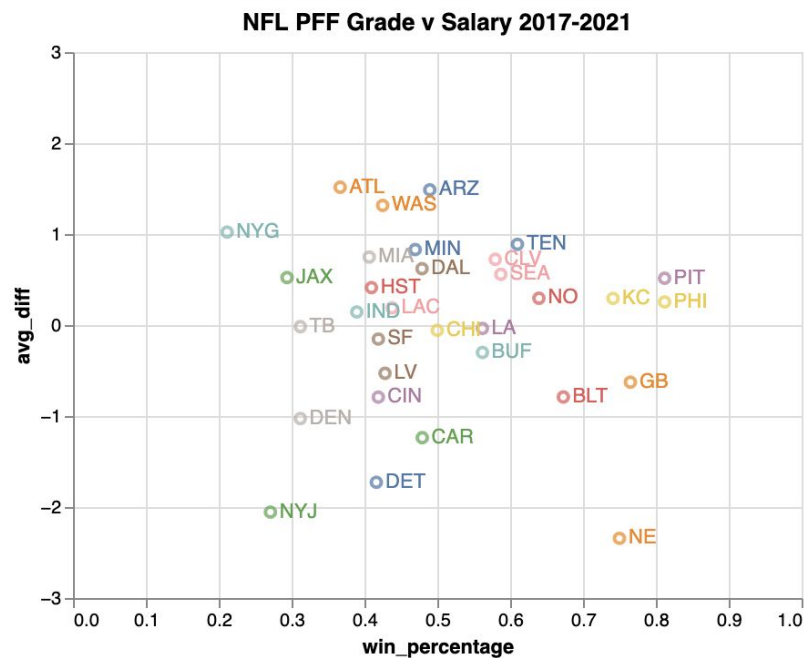
- I took the average salary of players in a certain width rank wise and saved it to a new column
- Now I could make my version of the FAR metric. I found the difference between the a value/year of the players current contract and the average of player's neighbors' contracts
  - salary/year - similar, Therefore, negative values are better, positive scores are worse
  - Aggregated by team name and year and avergered the avg\_diff for each team for each year
- Normalized all of the differences to account for differences in contract value/year since it varies by position
- Weighted each position group to find final averaged avg\_diff for the entire team
- From here I was able to aggregate it in different year intervals to get the relationships I wanted



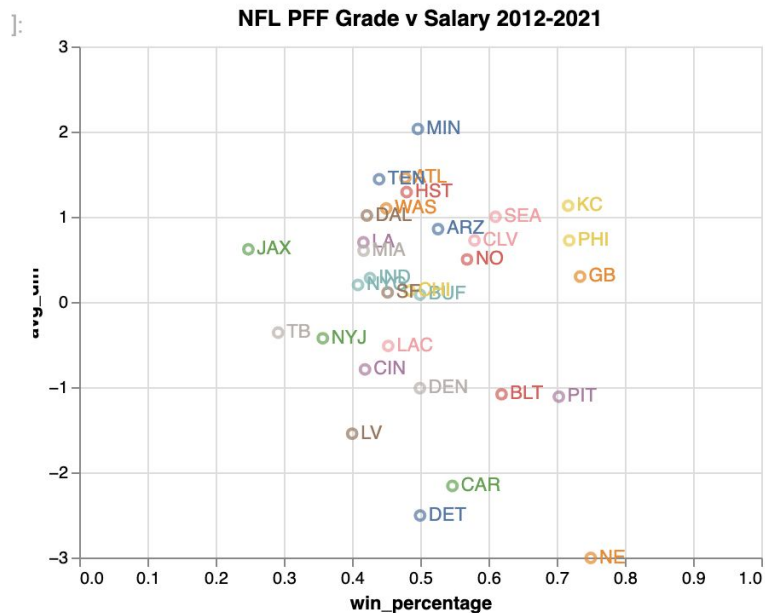
# Avg\_diff (2012-2016) v FAR (2011-2016)



## Avg\_diff (2017-2021)



## Avg\_diff(2012-2021)





## Takeaway & Future Lines of Work

- Teams with a winning culture pay less for players in free agency
- Teams can evaluate if they over or underpay for certain position groups and from this knowledge they can reevaluate and improve their scouting techniques.



# Acknowledgments

Dudde, Konnur, Macdonald, Wu, 'Developing a Metric to Evaluate the Performance of NFL Franchises in Free Agency', University of California, Berkeley.

Jensen, Mulholland, 'Predicting the Draft and Career Success of Tight Ends in the National Football League', University of Pennsylvania.

Meil, Andrew J 2018, 'Predicting Success Using the NFL Scouting Combine', Thesis for Master of Science in Clinical Psychology, California State University, Fullerton.