NFL Analysis

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Introduction to Project

The main objective of this project is to see what makes a team win more games. I looked at quaterbacks(passing), wide receivers(receiving), running backs(rushing), and defense, using winning percentages along with player statistics and the current NFL draft. Additionally, I used text and sentiment analysis from current press conferences to see if coaches agreed with the importance of each position and their feelings about the upcoming season.

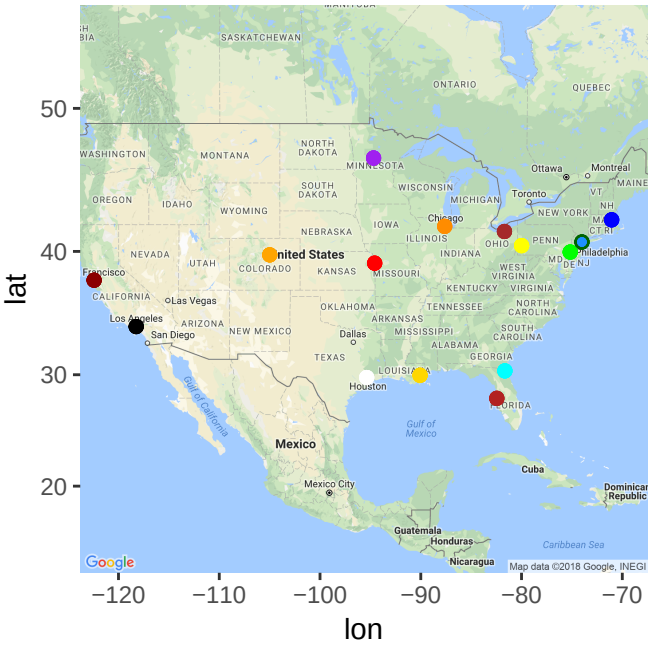
Determing the Winning and Losing Teams

In order to decide which teams to look at, I looked at the overall winning percentages of each team. Then I separated the temas into divisions, showing the division winner and the division loser. This shows the highs and lows of each division, giving a good sample of what the winning teams are like and what the losing teams are like. The T test table below shows that these team do have different winning percentages, so they can be used to compare winning and losing teams.

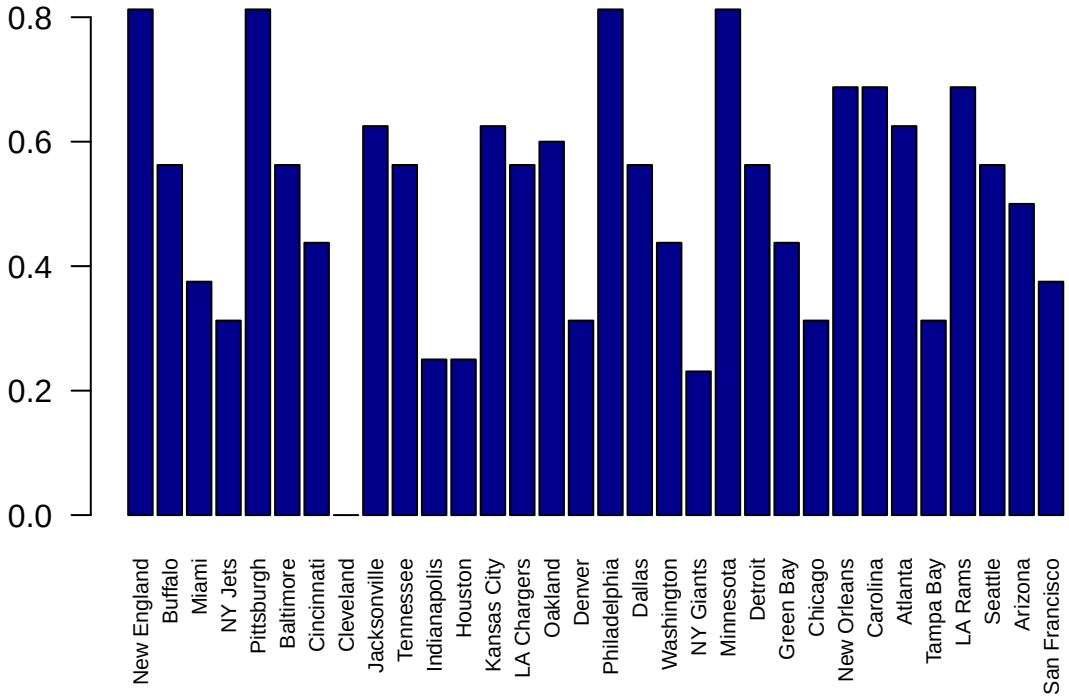
Table 1: T Test comparing Winning and Losing Team Winning Percentages

estimate	statistic	p.value	parameter	conf.low	conf.high	method	alternative
0.4711538	7.898897	9.89e-05	7	0.3301086	0.6121991	Paired t-test	two.sided

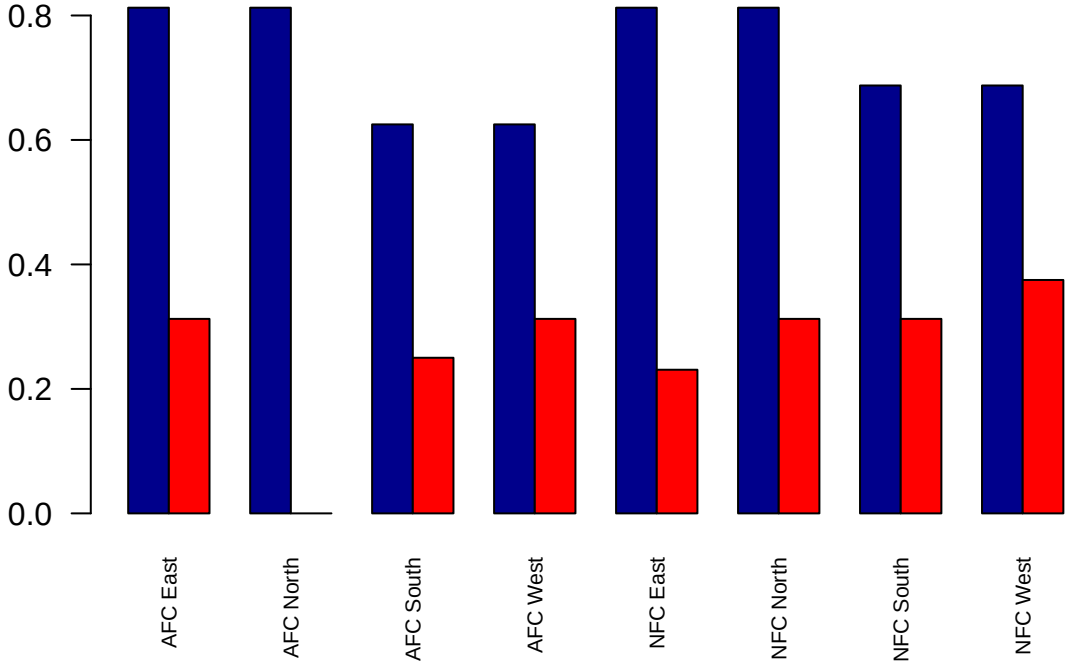
Map of the Top 8 and Bottom 8 Teams in the NFL



2017 Season Winning Percentage



2017 Divisional Winners & Losers



Quarterback Analysis

Table 2: Statistics of the Quarterbacks of the Winning Teams

	Completion %	Passing Yards	Yards Per Attempt	Touchdowns	Interceptions	Sack	Overall Rating
KC	67.5	4042	8.0	26	5	35	104.7
NO	72.0	4334	8.1	23	8	20	103.9
NE	66.3	4577	7.9	32	8	35	102.8
PHI	60.2	3296	7.5	33	7	28	101.9
LA	62.1	3804	8.0	28	7	25	100.5
MIN	67.6	3547	7.4	22	7	22	98.3
PIT	64.2	4251	7.6	28	14	21	93.4
JAX	60.2	3687	7.0	21	13	24	84.7

Table 3: Statistics of the Quaterbacks of the Losing Teams

	Completion %	Passing Yards	Yards Per Attempt	Touchdowns	Interceptions	Sack	Overall Rating
NYJ	67.3	2926	7.4	18	9	39	94.5
SF	54.9	1430	6.4	4	6	19	69.2
CLE	53.6	2894	6.1	11	22	38	60.5
DEN	59.0	2285	6.5	12	14	33	73.3
NYG	61.6	3468	6.1	19	13	31	80.4
CHI	59.4	2193	6.6	7	7	31	77.5
TB	63.8	3504	7.9	19	11	33	92.2
HOU	56.1	1412	6.3	5	6	21	71.4

Table 4: T Test comparing Winning and Losing Team QB Statistics

	estimate	statistic	p.value	parameter	conf.low	conf.high	method	alternative
Compl %	5.550	2.425438	0.0457257	7	0.1391572	10.9608428	Paired t-test	two.sided
Pass Yards	1428.250	4.831353	0.0018965	7	729.2171239	2127.2828761	Paired t-test	two.sided
YPA	1.025	3.876609	0.0060796	7	0.3997783	1.6502217	Paired t-test	two.sided
TD	14.750	7.625951	0.0001236	7	10.1763794	19.3236206	Paired t-test	two.sided
Int	-2.375	-1.003181	0.3491832	7	-7.9731752	3.2231752	Paired t-test	two.sided
Sacks	-4.375	-2.526848	0.0394141	7	-8.4691254	-0.2808746	Paired t-test	two.sided
Rating	21.400	4.499604	0.0027997	7	10.1539093	32.6460907	Paired t-test	two.sided

Interpretation

The T-table shows that there is a difference in the quarterback statistics between the winning teams and the losing teams for all of the presented statistcs categories except interceptions. Quarterbacks contribute to a team winning through passing, helping gain points by throwing touchdown passes and avoiding sacks. More touchdowns and passing yards along with less sacks lead to a higher rating. These factors all indicate that a better quarterback helps the team win more games, making them an important position.

Wide Receiver Analysis

Table 5: Statistics of the Wide Receivers of the Winning Teams

	Receptions	Receiving Yards	Receiving Yards Avg	Yards per Game	TD	First Downs	Yards After Carry
KC	83	1038	12.51	69.2	8	55	406
NO	104	1245	11.97	77.8	5	70	425
NE	69	1084	15.71	77.4	8	57	345
PHI	74	824	11.14	58.9	8	46	243
LA	64	788	12.31	52.5	6	32	749
MIN	91	1276	14.02	79.8	4	59	453
PIT	101	1533	15.18	109.5	9	71	483
JAX	56	702	12.54	50.1	3	40	289

Table 6: Statistics of the Wide Receivers of the Losing Teams

	Receptions	Receiving Yards	Receiving Yards Avg	Yards per Game	TD	First Downs	Yards After Carry
NYJ	65	810	12.46	50.6	5	37	295
SF	59	350	5.93	21.9	0	17	322
CLE	74	693	9.36	43.3	3	31	634
DEN	83	949	11.43	59.3	5	53	299
NYG	64	722	11.28	48.1	6	37	306
CHI	59	614	10.41	38.4	1	33	182
TB	71	1001	14.10	66.7	5	55	134
HOU	96	1378	14.35	91.9	13	69	359

Table 7: T Test comparing Winning and Losing Team WR Statistics

	estimate	statistic	p.value	parameter	conf.low	conf.high	method	alternative
Recep	8.8750	0.9080947	0.3940163	7	-14.2349683	31.984968	Paired t-test	two.sided
Yards	246.6250	1.4082499	0.2018868	7	-167.4886227	660.738623	Paired t-test	two.sided
Avg Yards	2.0075	1.8899051	0.1006894	7	-0.5042574	4.519257	Paired t-test	two.sided
YPG	19.3750	1.7400498	0.1253997	7	-6.9544737	45.704474	Paired t-test	two.sided
TD	1.6250	0.9275579	0.3845039	7	-2.5176141	5.767614	Paired t-test	two.sided
First Downs	12.2500	1.3733520	0.2120130	7	-8.8419314	33.341931	Paired t-test	two.sided
YAC	107.7500	1.2545414	0.2499101	7	-95.3427449	310.842745	Paired t-test	two.sided

Interpretation

The T-table shows that none of the differences between the wide receiver stats of the winning and losing teams were significant. This means that a wide receiver and receving statistics do not significantly vary between winning and losing teams, indicating that wide receivers are not a primary reason for a team winning more games. This could be because while the receivers are able to preform similarly when they have the ball, worse teams might not have as many offensive opportunities. So while the wide receivers are able to perform well, the teams that lose more may not have as many opportunities to take advantage of their skills.

Running Back Analysis

Table 8: Statistics of the Running Backs of the Winning Teams

	Attempted Rushes	Yards Gained	Rushing Average	Yards Per Game	Touchdowns	Rushing First Downs
KC	272	1327	4.88	82.9	8	60
NO	230	1124	4.89	70.2	12	50
NE	180	896	4.98	56.0	6	48
PHI	208	873	4.20	62.4	1	39
LA	279	1305	4.68	87.0	13	66
MIN	216	842	3.90	52.6	8	42
PIT	321	1291	4.02	86.1	9	74
JAX	268	1040	3.88	80.0	9	46

Table 9: Statistics of the Running Backs of the Losing Teams

	Attempted Rushes	Yards Gained	Rushing Average	Yards Per Game	Touchdowns	Rushing First Downs
NYJ	178	772	4.34	51.5	5	30
SF	240	938	3.91	58.6	8	44
CLE	206	853	4.14	53.3	2	38
DEN	245	1007	4.11	62.9	3	47
NYG	171	751	4.39	50.1	5	33
CHI	276	1122	4.07	70.1	9	61
TB	238	888	3.73	55.5	3	43
HOU	108	423	3.92	26.4	3	23

Table 10: T Test comparing Winning and Losing Team RB Statistics

	estimate	statistic	p.value	parameter	conf.low	conf.high	method	alternative
Attempts	39.0000	1.352459	0.2182883	7	-29.1871585	107.1871585	Paired t-test	two.sided
Total Yards	243.0000	2.010040	0.0843608	7	-42.8667681	528.8667681	Paired t-test	two.sided
Avg	0.3525	2.438346	0.0448677	7	0.0106575	0.6943425	Paired t-test	two.sided
YPG	18.6000	2.246877	0.0594714	7	-0.9747271	38.1747271	Paired t-test	two.sided
TD	3.5000	2.857738	0.0244165	7	0.6039386	6.3960614	Paired t-test	two.sided
First Downs	13.2500	1.931427	0.0947231	7	-2.9718222	29.4718222	Paired t-test	two.sided

Interpretation

The T-table shows that there are significant differences between the winning and losing teams for the average rushing yards per carry and the number of touchdown scored statistics for the running backs. This means that the running backs contribute most to a team through yards gained per carry, not just overall, and by scoring touchdowns. Both of these contribute to a win by moving the team down the field and scoring points. Therefore, the more yards a running back can gain in one carry and the more touchdowns they can score, the more likely their team is to win.

Defense Analysis

Table 11: Statistics of the Defense of the Winning Teams

	Interceptions	Return Yards	Return Average	Touchdowns	Solo Tackles	Assisted Tackles	Sack
KC	5	137	27.40	0	42	4	0.0
NO	5	85	17.00	1	43	9	0.0
NE	4	12	3.00	0	16	7	0.0
PHI	4	36	9.00	0	39	8	1.0
LA	5	42	8.40	0	61	17	1.5
MIN	3	2	0.67	0	68	21	0.0
PIT	6	70	11.67	0	53	3	0.0
JAX	3	29	9.67	0	73	13	1.0

Table 12: Statistics of the Defense of the Losing Teams

	Interceptions	Return Yards	Return Average	Touchdowns	Solo Tackles	Assisted Tackles	Sack
NYJ	2	13	6.50	0	10	3	0
SF	2	0	0.00	0	53	14	0
CLE	3	59	19.67	1	54	11	0
DEN	3	33	11.00	0	52	11	0
NYG	3	1	0.33	0	37	13	0
CHI	2	0	0.00	0	61	8	0
TB	3	28	9.33	0	50	16	0
HOU	3	10	3.33	0	47	24	0

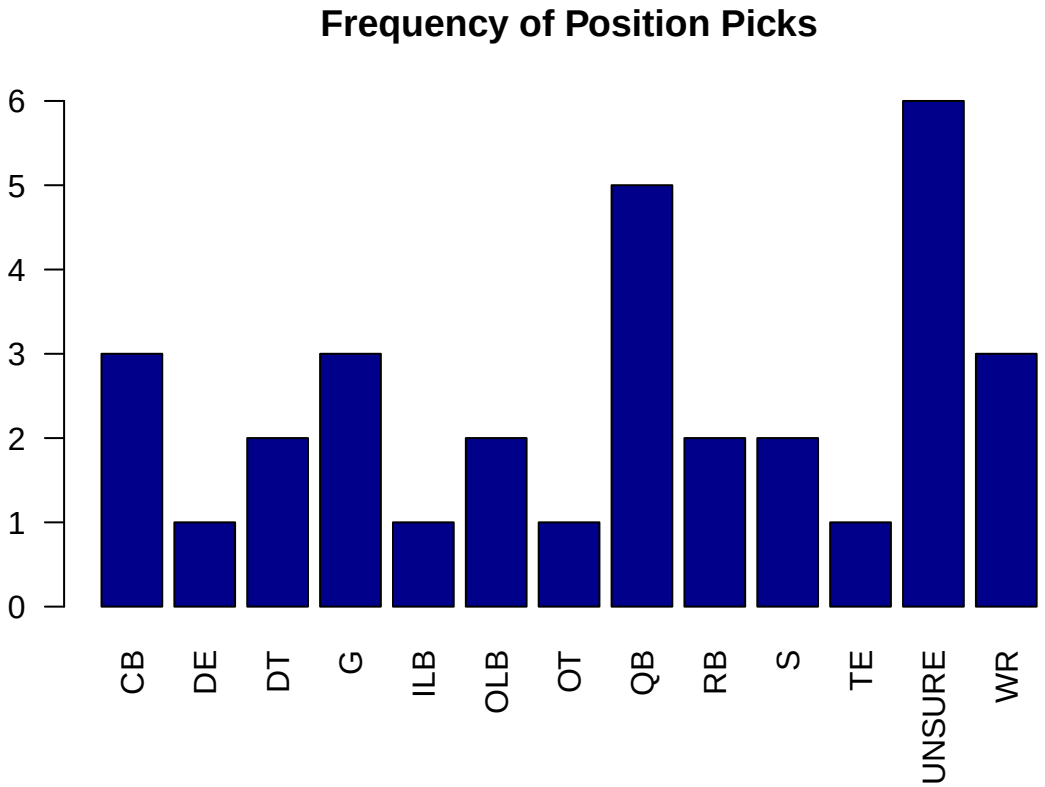
Table 13: T Test comparing Winning and Losing Team Defense Statistics

	estimate	statistic	p.value	parameter	conf.low	conf.high	method	alternative
Int	1.75000	4.2488389	0.0037986	7	0.7760651	2.723935	Paired t-test	two.sided
Return Yards	33.62500	1.7980716	0.1152091	7	-10.5948678	77.844868	Paired t-test	two.sided
Return Avg	4.58125	1.1116763	0.3029947	7	-5.1634341	14.325934	Paired t-test	two.sided
TD	0.00000	0.0000000	1.0000000	7	-0.4468720	0.446872	Paired t-test	two.sided
Solo Tackle	3.87500	0.4627455	0.6575878	7	-15.9262070	23.676207	Paired t-test	two.sided
Asst Tackle	-2.25000	-0.7641558	0.4697439	7	-9.2124605	4.712460	Paired t-test	two.sided
Sack	0.43750	1.9855802	0.0874593	7	-0.0835180	0.958518	Paired t-test	two.sided

Interpretation

The T-table shows that the only difference between the winning teams and losing teams that is significant is the number of interceptions. The winning defenses had more interceptions. The more interceptions a defense can make, the less the other team's offense has the ball, giving them less opporutnites to score. So the winning team has a defense that is able to make more interceptions and limit the other team's chance to score.

Mock Draft Predictions Analysis



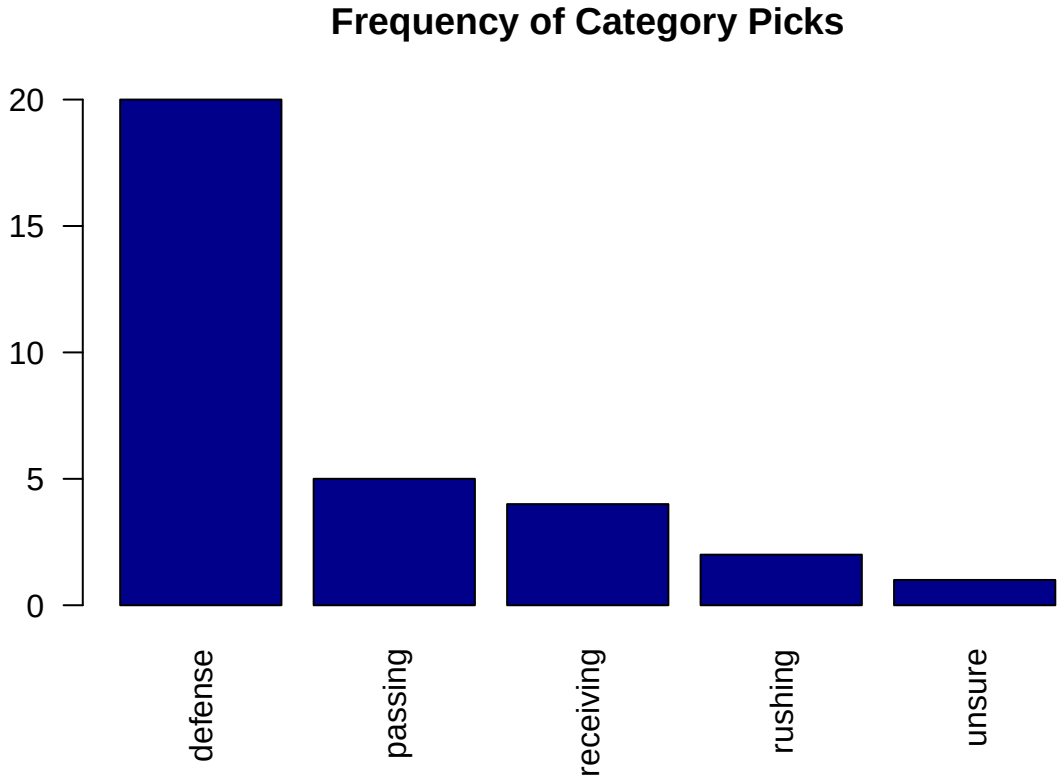


Table 14: Position Category for Picks of Winning Teams

Category	Frequency
defense	4
receiving	2
rushing	1

Table 15: Position Category for Picks of Losing Teams

Category	Frequency
defense	3
passing	3
rushing	1

Table 16: Averege Winning Percentages Based on Pick Position

	Win Percentage
Receiving	0.6562500
Defense	0.5892857
Rushing	0.5216346
Passing	0.2083333

Interpretation

The mock draft picks are the guesses of NFL analysist, making predictions of who each team will pick based on their draft number and the needs of the team. After looking at the best guesses for each of the teams and the position category it fell into, there were several trends.

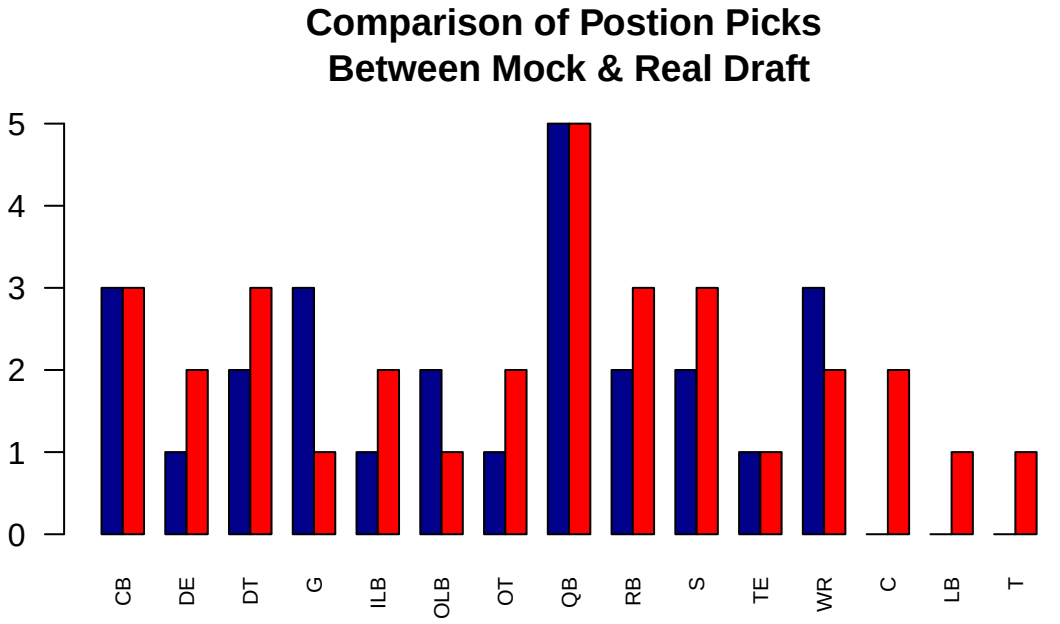
There were a wide range of positions that were selected, but most of the picks fell into the defensive category. This is because the defensive category is the most generic and includes more positions. The other categories only include one positon.

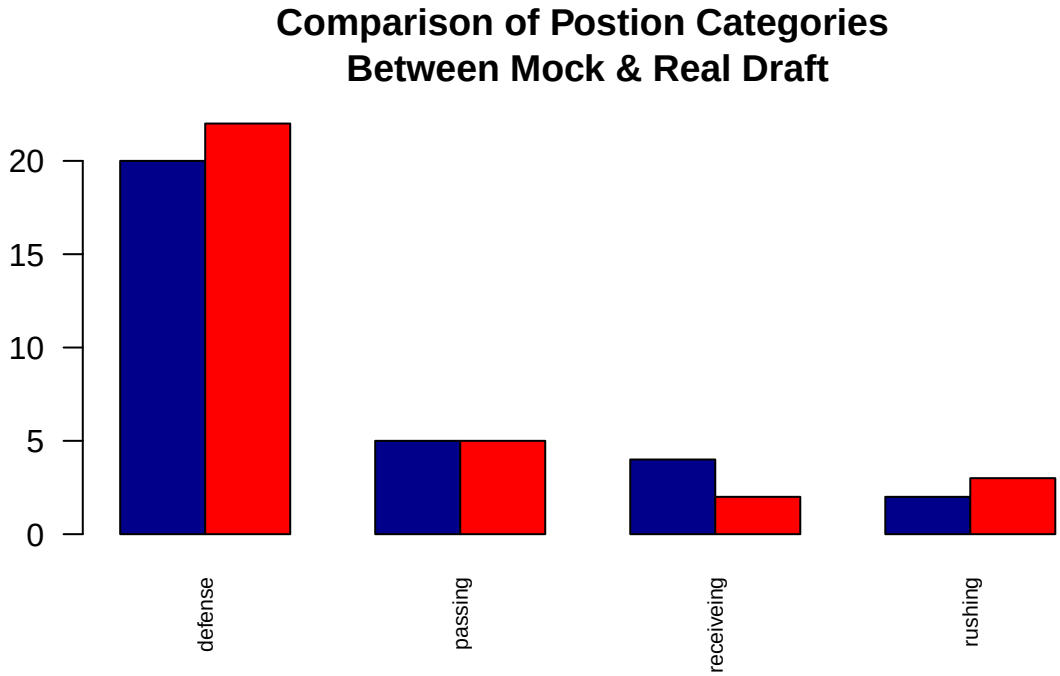
The teams with the lowest winning percentages picked passing/quarterbacks and rushing/running backs. This makes sense because they get the highest draft order and are able to pick from a wider range of positions and player. Because they have a wider selection to pick from, they select players from the category that statistically has the most impact on helping a team win.

The teams with the highest winning percentages picked receiving player/wide receivers and defensive players. This makes sense because they have the lowest impact on success and they have the lowest draft order numbers, so the other teams did not select them and the teams have less options to choose from.

The After the Draft Analysis

Using real time data, I compared the Mock Draft Predictions to the actual Draft Picks. The table below shows the best guess prediction for the first round of picks compared to the actual picks made by each team.



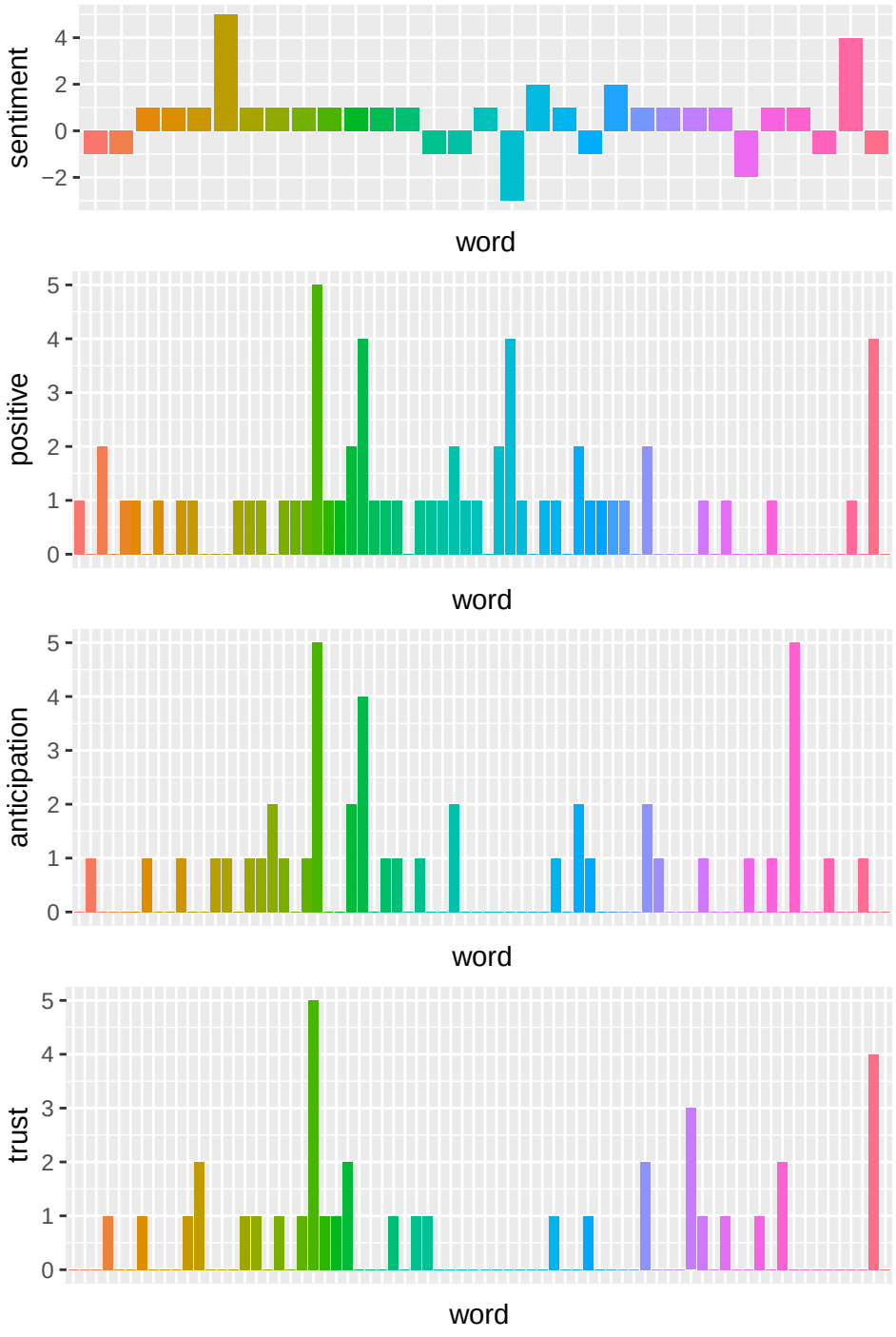


Looking at this chart we can see that the mock draft was relatively close to what happened in the actual draft. The picks and the categories they fall into are similar to what the mock draft and data analysis predicted, showing that the position analysis was correct.

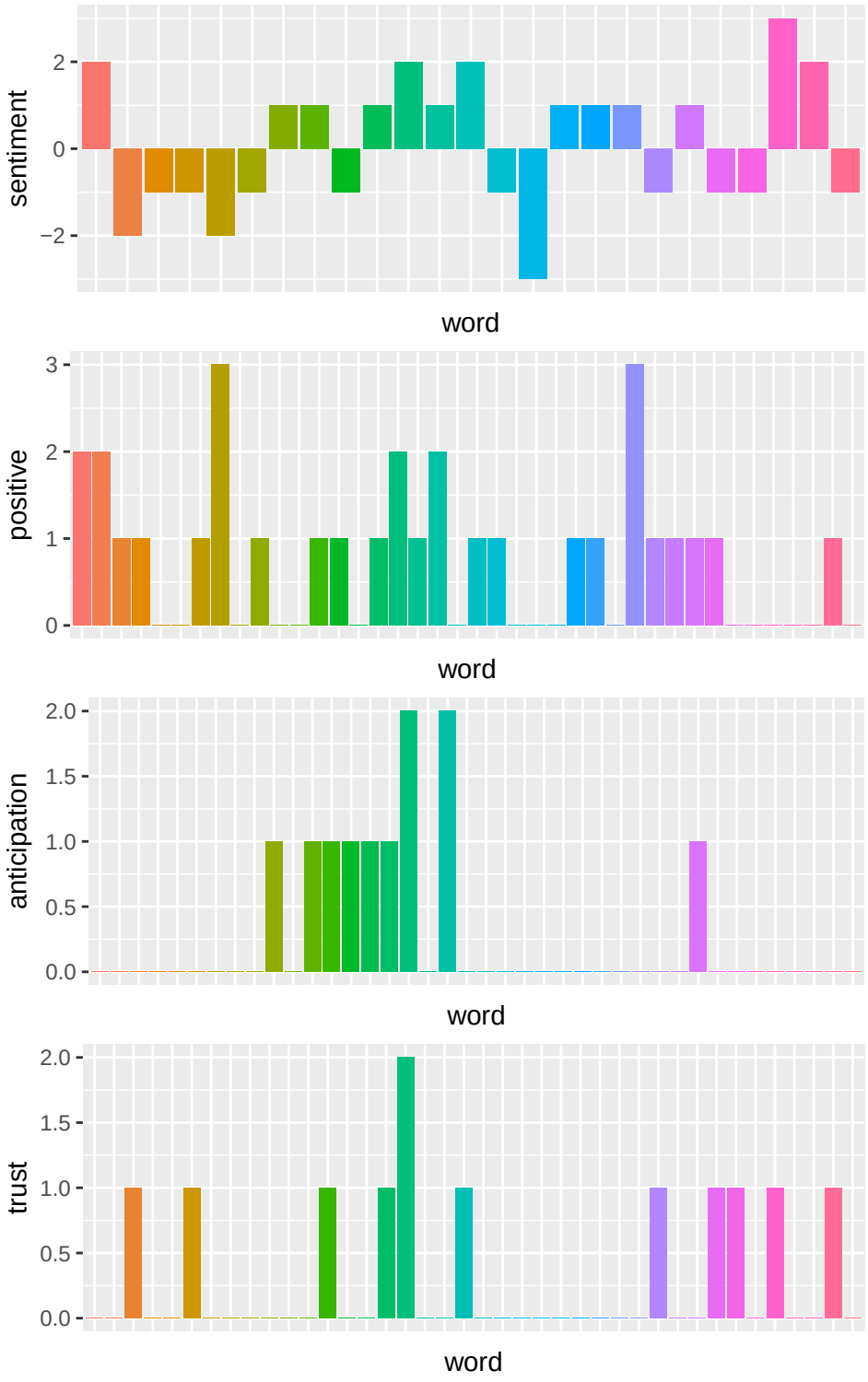
Sentiment Analysis

Using the real time press releases of the top two teams, the Patriots and the Eagles, and the bottom two teams, the Browns and the Giants, I was able to analyze how the teams felt about the picks and how they are going to impact the upcoming season.

The Patriots



The Eagles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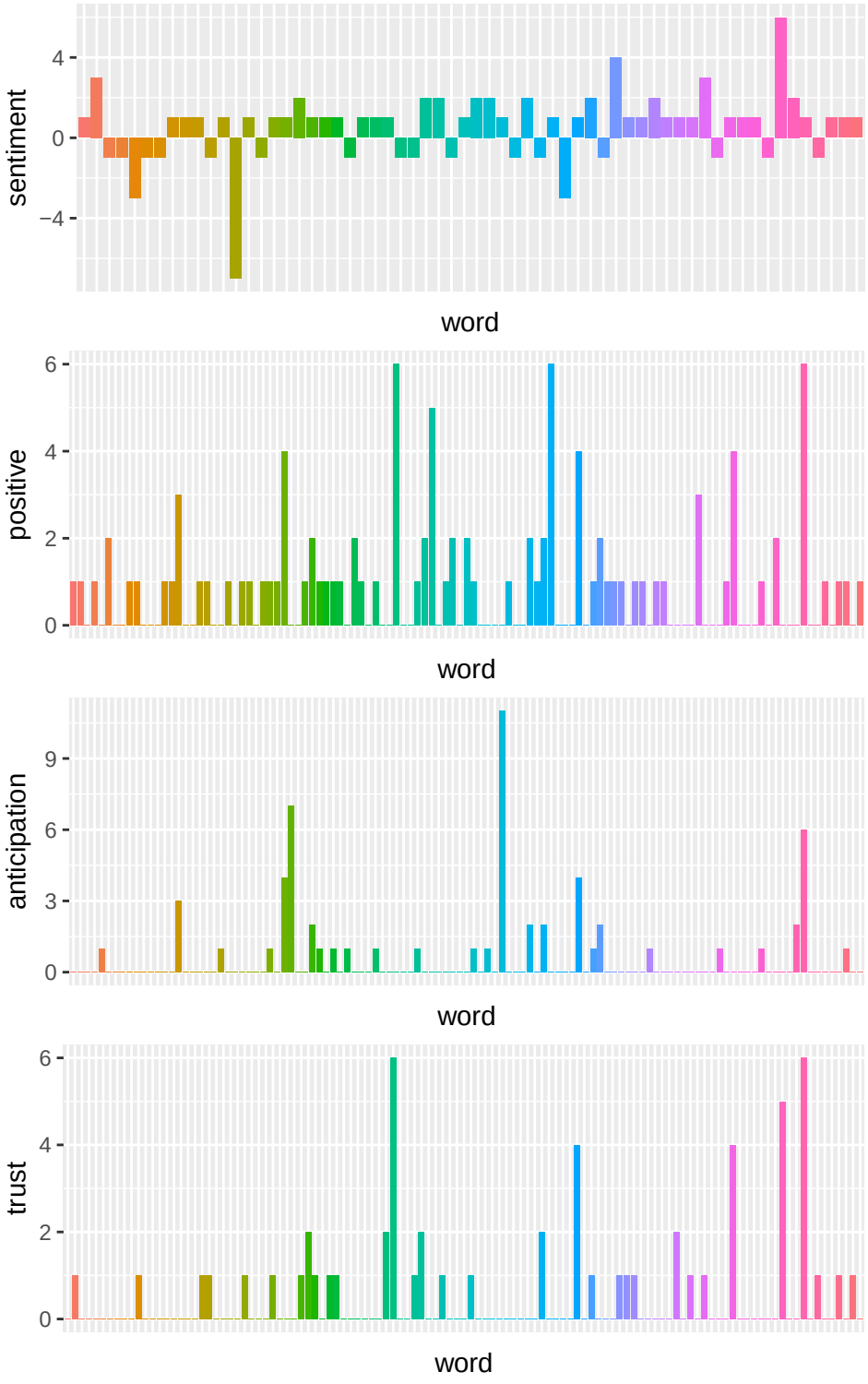
The Giants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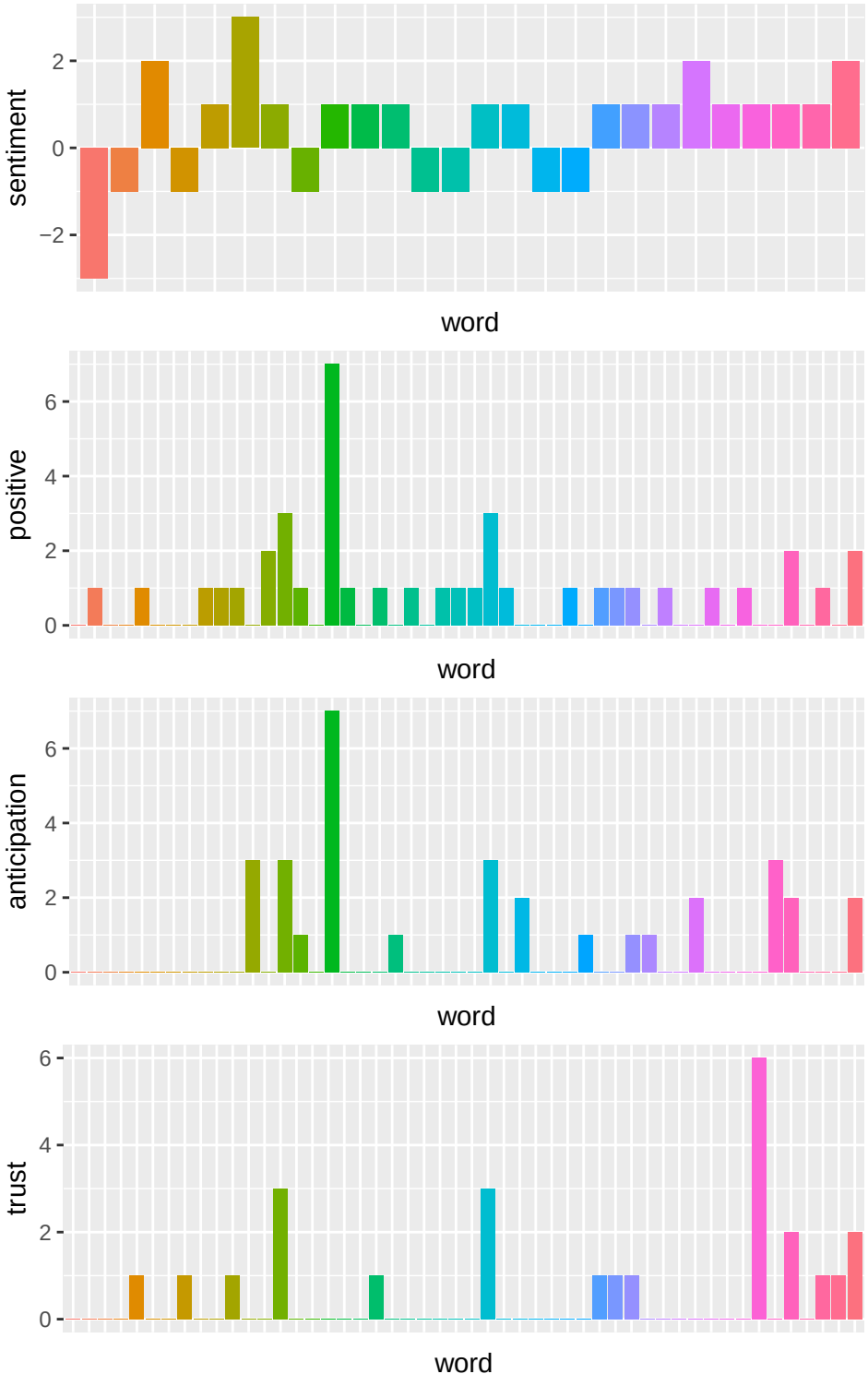
The Browns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Sentiment Analysis Interpretation

The main emotions that stuck out from the sentiment analysis were positive and negative, anticipation and trust.

All four teams had about an even spread of positive and negative sentiments, but the New England Patriots and the Cleveland Browns had slightly more postive sentiments. Reasons for this may be that they are overall most optimistic and positve about their picks and upcoming season, or that the other teams used football words like "offensive" which were taken as negative sentiments.

The Patriots has the most constistency in their press release with postive, anticipation and trust sentiments strongly present throughout. They had a good season and are consistently known as one of the best teams in the NFL, so it makes sense that they have the high levels of postive and trust sentiments. Additionally, they were able to get several promising players from the draft, including two players in the first round. This correlates to the high levels of anticipation.

The Eagles had high levels of positive sentiments throughout, with a concentration of anticipation in the middle and trust at the beginning and end. The Eagles also had a good season and were the Super Bowl Champions. This accounts for the high levels of postivity. However, they have not done as well consitently as the Patriots, which could be why they do not have high levels trust throughout the statement. When they were speaking about their new draft picks in the middle, they did show high levels of anticipation, which shows they are probably looking forward to the next season and are happy with their new players.

The Giants' strongest and most present sentiments were positivity and anticipation. They did not have a great season, but need to make sure that they are communicating the idea that they have been making positive changes and are excited about next season. They also had a fair amount of trust statements, which could be because they are trying to show that they have faith in the players and the team to have a better season next season.

The Browns had the least amount of positive sentiments. This make sense because they lost every game this season. The highest level of positive sentiments happens around the same time as their highest level of anticipation. This is probably when they were talking about their new picks, showing that they are very excited about them and think they will help the team. They ended with high levels of trust, showing that like the Giants, they trust their players and their team to win games.

Overall Analysis and Interpretiation

Overall, the data analysis on the different postitions showed that there was a difference between players on the winning and losing teams in most positions. Quarterback made the most difference, followed by running backs, then defense and wide receivers mattered the least.

The mock draft predicted that the positions analysis was very closely related to what the teams would pick. The real time drafts then solidified this. The teams with the lowest records picked quarterbacks and the teams with the higher records picked defensive players and wide receivers.

Finally, the press releases correlated to the overall winning and losing records and showed that all of the teams were excited and hopeful about their new picks and ready for next season.

Shiny Website: https://jbriglio.shinyapps.io/nfl_analysis_shiny/