Fantasy Football Player Rankings

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Project 2 Report

Executive Summary

Having success at fantasy football takes more than just luck or drafting the right players. Sure, those things help, but nearly every weekend, matchups are won or lost based upon individual performances that are either way above projections, or far below. What if I told you that you that those crazy highs and lows might actually be predictable?

Wanting to take the luck and randomness out of how my fantasy teams would perform each week, I had the idea to take a more analytical approach by creating a player ranking system for each position on the roster. This ranking would update each week, based upon a number of variables including offensive and defensive rankings, individual performance rankings and accuracy, and even weather data. My first stab at building an algorithm to spit out a player ranking system started with the kickers, and preliminary research has shown that a model to help predict who will score big — and who might tank — might actually give you a huge leg up to winning your league.

Abstract

The simplistic beauty of fantasy football is that it is a wonderful and true microcosm of the real game — well, at least the non-physical parts. Luckily, you don't have to go through training camp or be in elite physical shape to play the game. Instead, you fulfill nearly every other non-athletic role that real NFL teams have: owner, general manager, scout, statistics department, head trainer, team doctor, and of course, the head coach. During the duration of the fantasy football season, those of us who play in a league — or multiple leagues — are faced with a multitude of decisions. After you draft your team, each week you are tasked with choosing the best players at each position you feel will win you your matchup against your opponent. This sounds simple, right? The choice of who to start vs. who to leave sitting on your bench may

seem like something that is just left up to luck or chance, or done by random choice. You drafted two great quarterbacks, you can just flip a coin as to who to start that weekend, right? Wrong.

Introduction and Background

It goes without saying that there are a lot of random things that happen during the course of an NFL football game that contribute to the game's final outcome and individual player performance and statistics. But there are a multitude of variables that come into play even before opening kickoff that can provide you with information to help you make your decisions.

Problem Statement

The problem that I will be addressing aims to take the randomness and guesswork out of weekly fantasy football matchups by creating a player ranking system. The rankings are driven by a unique algorithm for each of the following positions that comprise a typical fantasy football roster:

- Quarterback (QB)
- Running Back (RB)
- Wide Receiver (WR)
- Tight End (TE)
- Kicker (K)
- Defense and Special Teams (DST)
- Defensive Player (D)

Note: for purposes of this project, I am only going to summarize one position on the fantasy football roster, that being the kicker. While each of the other positions will have their own separate ranking system, the algorithm for each position will share some common elements. However, due to the interest of time and scope, I will only discuss the kicker position and lay out the model used for this particular position.

Detailed Background

The life of the special teams group in the game of American football is — to me — one of the most underrated parts of the game. For here we have the hidden yards including both kickoff and punt return yardage. These return yards aren't shown in statistics for offense, but a great

return game is just as important as any weapon on the offensive side of the ball. For example, a great punt and/or kick returner can set your offense up for a short touchdown drive, or in some cases of the outliers — the great return men of the game — swing momentum singlehandedly by scoring touchdowns. These hidden yards score points for a fantasy football owner under the DST position (Defense and Special Teams). But that is not the focus of this particular project.

The other primary pieces of special teams units are the guys with the golden legs: the kickers and punters. Actually, there are a few other huge components of this group, those being the holder and the long snapper, but they aren't accounted for in fantasy football even though their jobs are a monumental part of special teams. I digress... To try to keep this brief, the punter kicks the ball away to the other team if the offensive unit stalls and is not within field goal range, and is also not accounted for in fantasy football — another travesty if you ask me. That leaves us with the kicker. Ahh yes, the kicker.

The kicker is the player that attempts to score his team points via field goals and PATs (points after touchdown). Most simply, they are most often either one of two things: a hero or a villain; the determination of which is usually upon the outcome of a single, last second, potentially game-winning kick, or a culmination of that game's kicks. Make a game-winning kick as time expires? Hero! Miss 3 out of 5 and cost your team that day's victory? Ugh, pack your bags you might not be long for this team. And trust me, I would know. As a Chicago Bears fan, I watched the team's kicker double-doink us out of advancing in the Playoffs during the 2018 season. Double-doink? Oh, that's a new phrase invented specifically for kicker Cody Parkey and it can be defined as such:

> *"A game-winning field goal attempt in which the football hits one of the uprights — producing a loud DOINK sound — that then falls down onto the crossbar (making another loud DOINK sound) and finally, takes an un-fortuitous bounce off of said crossbar backwards into the end zone resulting in a miss and therefore no points."*

I will not delve more into that particular situation and its outcome; however, I will state that Mr. Parkey was released quickly after that miss concluded the Bears' 2018 NFL season. But don't think that his dismissal was an over-reaction to that one failed kick. Unfortunately (for me as a fan), the Bears didn't release him because he missed just that one (hugely important!) kick at the most important point of their spectacularly winning season. Oh no. Parkey had plenty of other misses in 2018: out of 30 attempts that season, he made only 23 of them for an abysmal

(by kicking standards) 76.7% accuracy rate. When you make your living making kicks in the NFL, that simply doesn't cut it. As a human being, I feel for the guy. It's hard to be perfect. But as a football fan of the Chicago Bears, I say good riddance.

I use that heart-wrenching narrative as a setup to this: the kicking position is extremely important. For real NFL teams, a good, reliable kicker with a solid, accurate leg is the thing that can give your team that ticker tape parade in February that all fans dream of.

Greg "The Leg" Zeurlein kicked his Los Angeles Rams (a team the Bears soundly defeated in 2018) into the Super Bowl. Yes, sure, a little non-called pass interference might have had something to do with it, but the important thing is that the guy nailed some huge kicks (on the road in New Orleans) to get the NFC Championship game into overtime and eventually to win it.

The same goes for your fantasy team. You have to get this position right. All things being equal across the other positions, I feel having the top kicker — or kickers if you play in a league where you have two — each week on your roster is a very easy way to help you beat your opponent using almost the same "hidden yards" concept of the return game. Getting high scores from your kicker(s) on your fantasy team is like getting "hidden points". Oh, and if your kicker outscores one of your opponents' skill position players, that is just outright comical, and you sir or madam should be given bonus points.

Methods and Technical Approach

Based upon research and EDA from asking the question "what are the biggest contributions to kicking attempts in a game?" I am hypothesizing that the best kickers to start on a given week — the ones who will score the most fantasy points — will most likely come from a combination of the following variables:

- A kicker with a high rate of accuracy
- A kicker's offense with a high ranking in offensive efficiency
- A kicker's offense with a low ranking in red zone efficiency
- A kicker facing a defense that has a high ranking in red zone efficiency
- A kicker's team is a heavy favorite
- A kicker's team is not a heavy underdog
- A kicker competing in a game that is expected to be close
- The weather will not have a detrimental impact on the kicking game

Data Sources

My data sources consist of a mixture of the following:

- NFL statistics and/or data sets from Pro Football Focus
- Fantasy football statistics, content, and data sets from FantasyPros
- Forecasted weather data for NFL stadiums from various sites; in particular hyper-local weather data such as available via Dark Sky.

Analysis

My model will rank kickers before the week's games on a week-by-week basis, and can be adjusted as needed. For example, the weight that one of the variables has in determining the final ranking might show over time that it is either too high or too low. How much impact does bad weather have? Is kicking in rain harder than kicking in wind? What about snow? Does it matter if its a dry powdery snow or a wet, heavy snow? Analysis will help drive the answers to these questions and the kicker ranking algorithm.

Variables

To try to accurately predict how kickers in the NFL will perform during a week's games, I will attempt to create a model that uses the variables talked about previously in the Technical Approach section. Let's dig into these variables briefly.

It's important to understand why these eight items stand out, as they are the variables that will make up the kicker ranking algorithm. I will do this as succinctly as possible: You want to start a kicker with a high rate of accuracy, plays for a team with a highly efficient offense, and one that is less prone to score touchdowns once they get into their opponent's red zone. Additionally, the algorithm will call for the kicker's opposing defense to be really good at preventing touchdowns in the red zone, the kicker's team to not be a heavy underdog, and the kicker's team expecting to either win big or be in a close game. Finally, the weather needs to not be a reason why the kicking game would be impacted in a detrimental reason.

My research has shown that the kicker position in fantasy football is rather unique in that starting the same kicker throughout the course of the season (as is pretty typical with a fantasy team) might not ultimately be the best strategy — nor is it always the best strategy to start a kicker that plays for a team with only a highly potent offense.

The best kickers to start each week can be determined from the output of a certain set of criteria; as a season progresses, the outputs from these criteria can and will change — for example, think of a kicker's accuracy as a season progresses, some kickers get better over time, others might trend downhill. It's common in the NFL for a kicker to start a season off strong, but start to lose confidence with a few misses. Last season, one of the NFL's best kickers of all time, Adam Vinatieri, almost quit the Colts one day after a handful of missed kicks early on in the season.

Looking into the Data

To take a swing at my kicker ranking concept, I took a random week from the latter portion of the 2018 NFL season to work with, primarily because I wanted to have a culmination of previous game weeks' data to work with. First, let's load in our NFL Week 12 kicker ranking dataset and get a quick summary and look at the data:

```
2018_w_12_k_data
```

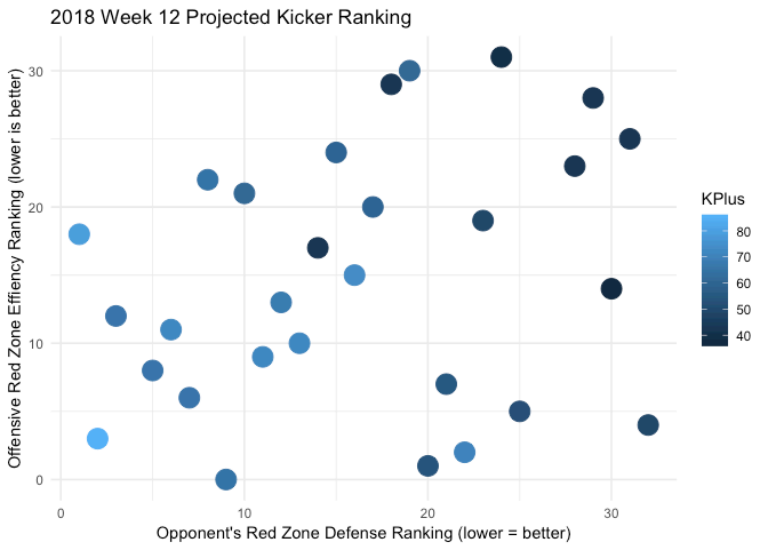
```
##                  Name Accuracy Team Opponent Spread OU OppRZD OffRZEff OffRank       Weather KPlus
## 1       Michael Badgley    100.0  LAC  vs. ARI  -13.0 44     12       13     7     73F, Light Wind    68
## 2      Ka'imi Fairbairn     81.5  HOU  vs. TEN   -6.5 41      2        3    13          Dome    67
## 3         Aldrick Rosas     95.2  NYG   at PHI    7.0 46      7        6    23     55F, 7 MPH Wind    61
## 4         Jason Sanders     93.8  MIA   at IND   10.0 51      9        0    28          Dome    59
## 5          Cairo Santos     83.3   TB   vs. SF   -3.0 54     16       15     1     80F, 7 MPH Wind    57
## 6         Mason Crosby     76.9   GB   at MIN    4.0 48      1       18     8          Dome    56
## 7       Brandon McManus     82.4  DEN  vs. PIT    3.0 48     13       10    11     45F, 8 MPH Wind    54
## 8           Dan Bailey     82.4  MIN   vs. GB   -4.0 48     11        9    14          Dome    54
## 9    Stephen Gostkowski     86.4   NE   at NYJ   -9.0 47      8       22    10     55F, 7 MPH Wind    52
## 10        Justin Tucker     90.5  BAL  vs. OAK  -12.0 43     10       21    12     55F, Light Wind    52
## 11       Dustin Hopkins     85.0  WAS   at DAL    9.0 41      3       12    25          Dome    51
## 12         Brett Maher     84.0  DAL  vs. WAS   -9.0 41      5        8    27          Dome    50
## 13         Jake Elliott     77.8  PHI  vs. NYG   -7.0 46      6       11    19     55F, 7 MPH Wind    50
## 14           Josh Lambo     94.4  JAC   at BUF   -3.0 38     25        5    21     41F, Light Wind    46
## 15         Jason Myers      91.3  NYJ   vs. NE    9.0 47     20        1    29     55F, 7 MPH Wind    46
## 16         Robbie Gould     95.5   SF    at TB    3.0 54     32        4    17     80F, 7 MPH Wind    45
## 17       Adam Vinatieri     83.3  IND  vs. MIA  -10.0 51     15       24     9          Dome    43
## 18         Matt Bryant     100.0  ATL    at NO   14.0 60     28       23     6          Dome    43
## 19         Matt Prater     86.4   DET  vs. CHI    3.0 45     21        7    24          Dome    41
## 20            Wil Lutz     95.5   NO   vs. ATL  -14.0 60     29       28     4          Dome    37
## 21         Cody Parkey     76.2   CHI   at DET   -3.0 45     17       20    16          Dome    36
## 22      Steven Hauschka     93.8  BUF  vs. JAC    3.0 38     14       17    31     41F, Light Wind    36
## 23         Graham Gano     91.7  CAR  vs. SEA   -3.0 47     18       29    15     53F, Light Wind    35
## 24       Daniel Carlson     63.6  OAK   at BAL   12.0 43     22        2    22     55F, Light Wind    34
## 25         Greg Joseph     84.6  CLE   at CIN    3.0 48     23       19    18     53F, 6 MPH Wind    34
## 26        Chris Boswell     72.7  PIT   at DEN   -3.5 48     19       30     5     45F, 8 MPH Wind    33
## 27          Ryan Succop     85.7  TEN   at HOU    6.5 41     30       14    30          Dome    22
## 28 Sebastian Janikowski     75.0  SEA   at CAR    3.0 47     31       25    20     53F, Light Wind    18
## 29        Randy Bullock     75.0  CIN  vs. CLE   -3.0 48     24       31    26     53F, 6 MPH Wind    14
```

Here's the summary of the variables in that data:

- `Name`: The kicker.
- `Accuracy`: The kicker's rate of accuracy on the season so far.
- `Team`: The kicker's team.
- `Opponent`: The team the kicker is facing this week.
- `Spread`: The expected/predicted point spread of the game as determined by oddsmakers. A negative number means the kicker's team is favored. For example a -7 means the kicker's team is predicted to win by 7 points.
- `OU`: The predicted over/under of this game as determined by oddsmakers. This is the expected total combined score of the two teams. A game with a high OU is expected to be a high scoring game, a low OU means lower scoring.
- `OppRZD`: The ranking of the kicker's opponent's red zone defense. A low number here means that the defense is good at preventing touchdowns when their opponent reaches the red zone (20 yards from the goal line).
- `OffRZEff`: The kicker's team's red zone efficiency. A low number here mans that the kicker's team has a hard time scoring touchdown when they get into the red zone and are more likely to have to kick field goals.
- `OffRank`: The kicker's team's offensive efficiency. A low number here means that the kicker's offense is good at moving the ball down the field. This is good because a team that moves the ball is more likely to score points.
- `Weather`: This is the predicted weather data for the game. If it's raining heavily or snowing or windy, this will impact the kicking game.
- `KPlus`: This is the output of my algorithm that takes into account the other variables in the data set. The higher the number here, the better — this drives the ranking order.

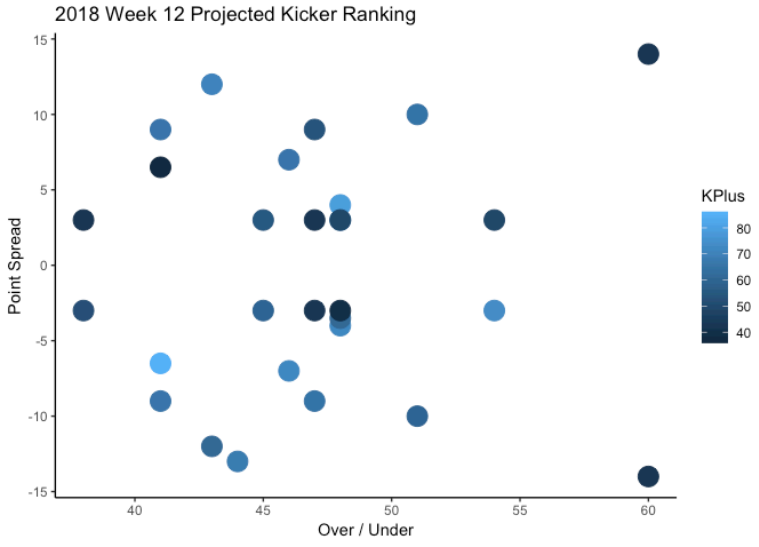
Charts and Plots

Let's look at two scatter plots from the data set. The first one shows our projected kicker rankings plotted out on a grid with the variables for offensive red zone efficiency and the opponent's red zone defense:



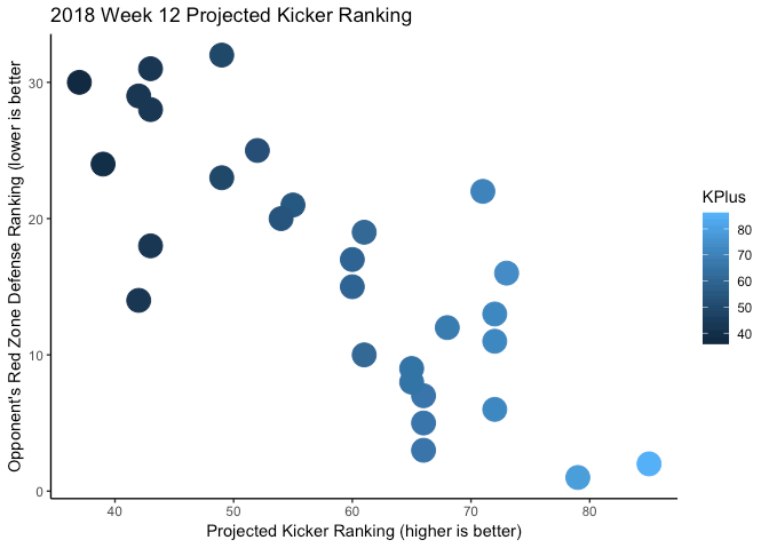
Looking at this scatter plot, it's easy to see that when a kicker's team has a low offensive red zone efficiency and their opponent has a strong red zone defense (lower ranking), that's a good combination for the potential for the kicker to rank highly in the projections (the KPlus score).

Now I would like to present another example, this one showing the projected kicker rankings with the variables for the game's projected point spread and over / under:

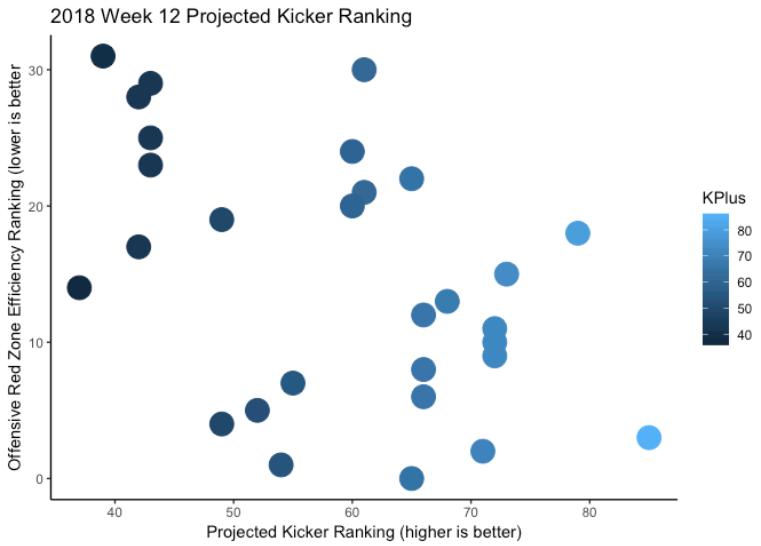


Looking at the second scatter plot, it's not as easy to discern how the over / under and point spread play into the projections for the kicker, but a few things stand out. Kickers playing in games that are expected to be close have a better chance to do better than those that are expected to be in a blowout loss. Also, kickers playing for teams that are projected to win by a large margin should fare well.

Next, I'd like to take a look at the data doing some regression testing. Here's the first chart:



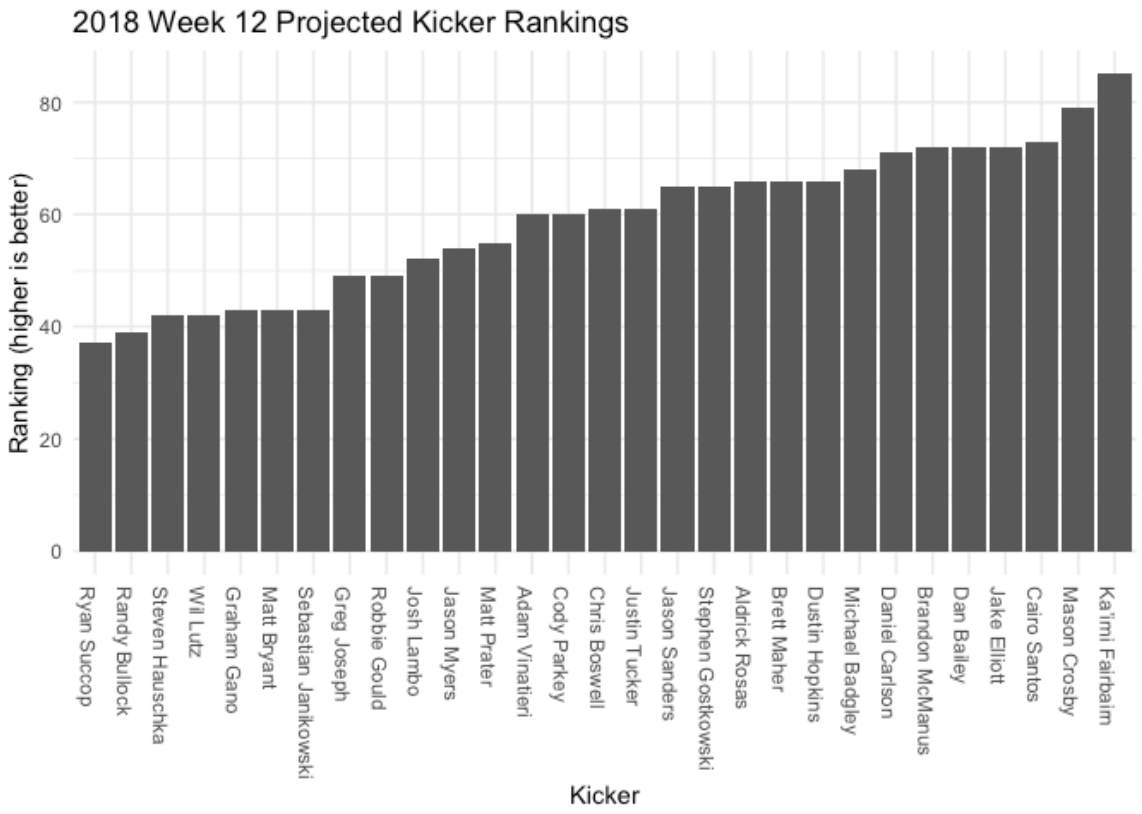
From that chart, we can see that the lower the ranking of a kicker's opponent's red zone defense is, the better chances there are for a kicker to score points via field goals. This next chart shows a regression analysis using the `KPlus` variable as the dependent variable, and the `OffRZEff` variable as the independent(explanatory) one:



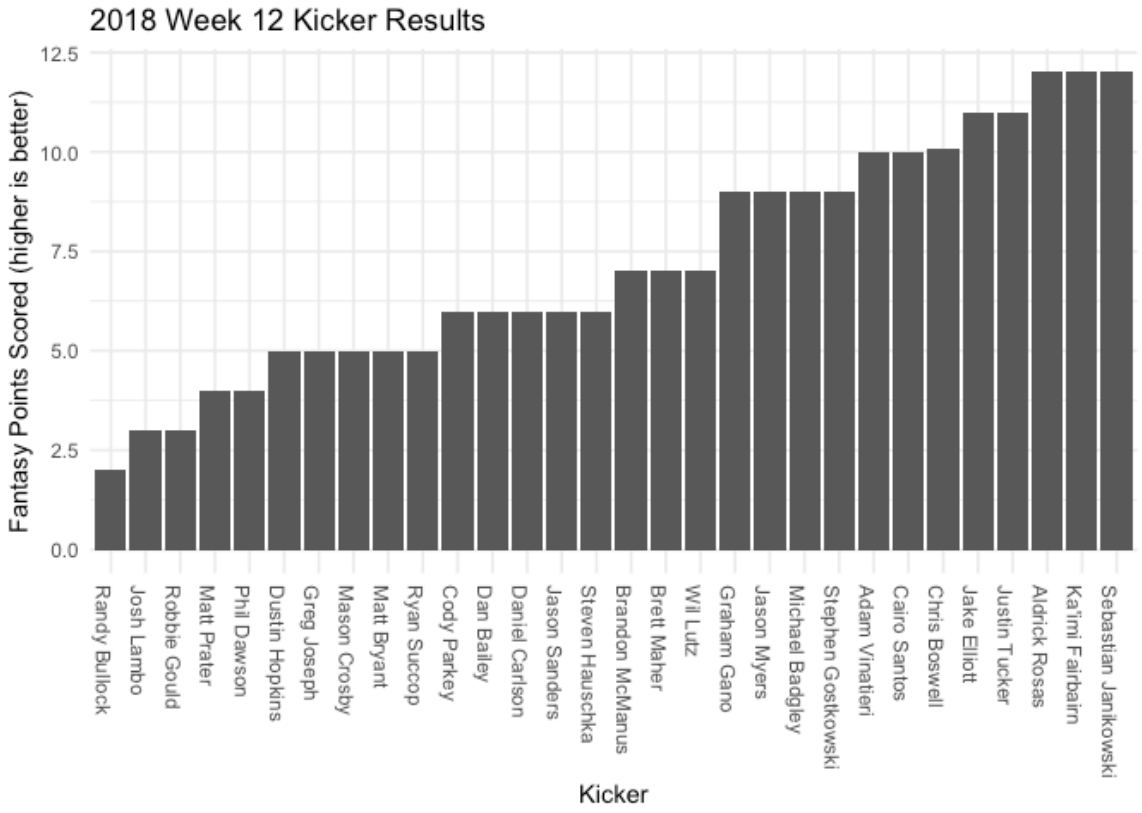
That chart is more visual information that we are on to something here. It looks like kickers on teams that have a low offensive red zone efficiency — they are not good at scoring touchdowns — is a great thing for a kicker, thus likely to have a higher ranking in the algorithm.

Testing the Hypothesis

Okay, now it's time to really put all of this together. Using the information from our variables, it is now time to mash them up into an algorithm to drive the model that will power our kicker ranking system. The data in this dataset that the KPlus scores is built from comes from a multitude of sources, including weekly NFL offensive and defensive rankings, kicker accuracy, and weather information from the sites listed in the Data Sources section. As you will see, the primary determinant of the kicker ranking system is the KPlus column, which is a column that I created; the values here come from a unique algorithm using the variables from the data that I described above. The higher the KPlus number, the better. Here is the projected rankings:



Now let's look at how the kickers actually performed in Week 12 of the 2018 season and see how our prediction rankings fared using similar charts as the ones used to present the projected rankings:



It looks like we have a big outlier here as far as Janikowski; he wasn't projected to do that well but he ended up tied for the league in points at the kicking position. On the other hand, the three top projected kickers did well, as two out of the three tied for the lead in points this week, while Badgley wasn't too far behind them.

Conclusion

The frustrations at the kicker position on my fantasy football roster over various years of playing is the primary reason I chose to key in on it for this project; as such, I set about finding a good way to help predict success at this position by creating an algorithm that could rank each week's kickers based upon numerous variables pulled from numerous sets of data.

While much of what happens in football can seem random, I believe that by using as much information as possible, we do have a chance at making fantasy football performance forecasting models based upon numerous variables and research.

Acknowledgements

I owe credit to numerous people in the “regular” football analysis and fantasy sports world, including the writers at fantasypros.com, and in particular Mike Tagliere. His writing and podcasts have really helped me to understand some of the more important “game behind the game” types of things. Additionally, Andrew Swanson who writes at FantasyPros and individually was a primary influence with his “K Score” metric. I took what Andrew and “Tags” talk about and tried to build upon that. Last, I want to thank my family for putting up with me during fantasy football season. I know there are days I am not easy to deal with when my mind is wrapped in data and numbers!

References and Annotations:

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