

# PFF's Complete Guide to Recruiting in College Football

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## Abstract

Analytics has infiltrated everything in football from fourth-down decisions to personnel moves, game planning to marketability. Recruiting analytics hasn't been a focus at Pro Football Focus until recently. In this paper, we will offer a thorough and complete analysis of the different recruiting factors that can affect how players perform in college, including their 247 composite score, mesurables, the size of their recruiting classes and more.

- Part II will look at how often players change positions from high school to college and what that means for their level of play.
- Parts III and IV will break down what a player's recruiting rating (based on his 247 composite score) means for performance in college.
- Parts V and VI will show how teams that subscribe to PFF can use recruiting analytics to their advantage and use a website to do their own analysis.



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## I. Introduction

The simplest way to analyze recruiting trends is examining by position how a recruit's rating out of high school translates into college performance. To do this, we can use two proprietary metrics: one by 247Sports and the other in-house at PFF:

1. 247Sports Composite Score is considered the gold standard for analyzing recruits. It comprises 247's in-house ratings, Rivals<sup>2</sup>, Scout<sup>3</sup> and ESPN<sup>4</sup> rankings. The highest a recruit can be rated is 1.0000 if the player is rated No. 1 across the board at each of the four rating services. If a player is ranked No. 2 at 247, No. 3 at Rivals, No. 2 at Scout and No. 4 at ESPN, then his cumulative ranking away from No. 1 is 7 (1+2+1+3), resulting in a 0.9993 rating. The cutoff for each star is listed below:
  - a. 5 Star: .9830 (170 spots from #1 overall)
  - b. 4 Star: .8900
  - c. 3 Star: .7970
  - d. 2 Star: 0.7000
2. Now that we have a basis for evaluating players coming out of high school, we also want to examine the value that each recruit adds to their college football team. To evaluate this, we can use Wins Above Average<sup>5</sup> (WAA). WAA takes into account a player's PFF grade, total snaps, the value of their position and their opponents to generate the amount of wins a player added to a team over what an average player would have generated at that same position. **When recruiting and developing recruits, college programs should be trying to maximize the total WAA of a recruiting class, as that means the players added value to their team throughout their college careers.**

Using both of these metrics will allow us to compare recruits to their peers, as both the 247 composite score and college WAA are standardized. We will also cover how often a

player changes position between high school and college, how measurables impact college performance and team breakdowns in both the recruiting and development spheres.

## II. Position Changes

Because college programs have different schemes than high schools and recruits' height and weight change as they age, many players change positions. In Figure 1, each position played in high school has at least a 50% retention rate to college.

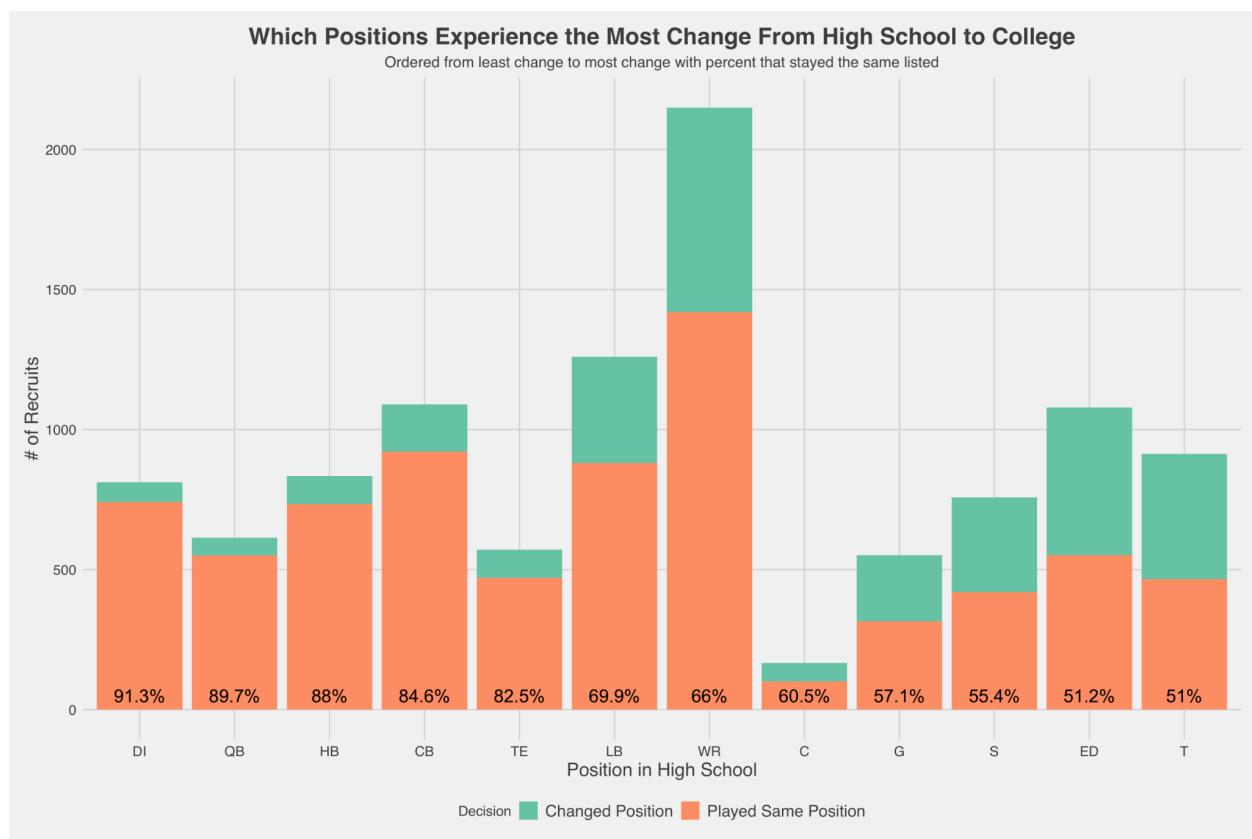


Figure 1 shows the total number of recruits at each position from 2012 to 2020 on the y-axis split by whether they changed position from high school to college (green) or stayed at the same position (orange). The bars are ordered from least change to most change.

As shown, interior defensive linemen see the least amount of position change, which makes intuitive sense as they are often the heaviest on the team. By bulking up in college, they rarely have the opportunity to move down a weight class and into a different position. It's also easier to gain size than it is to acquire the athleticism to play a lighter position.

## A. Offensive Position Changes

The offensive line sees a lot of position changing. In Figure 2, we can take a closer look at the new college positions after switching on the offensive side.

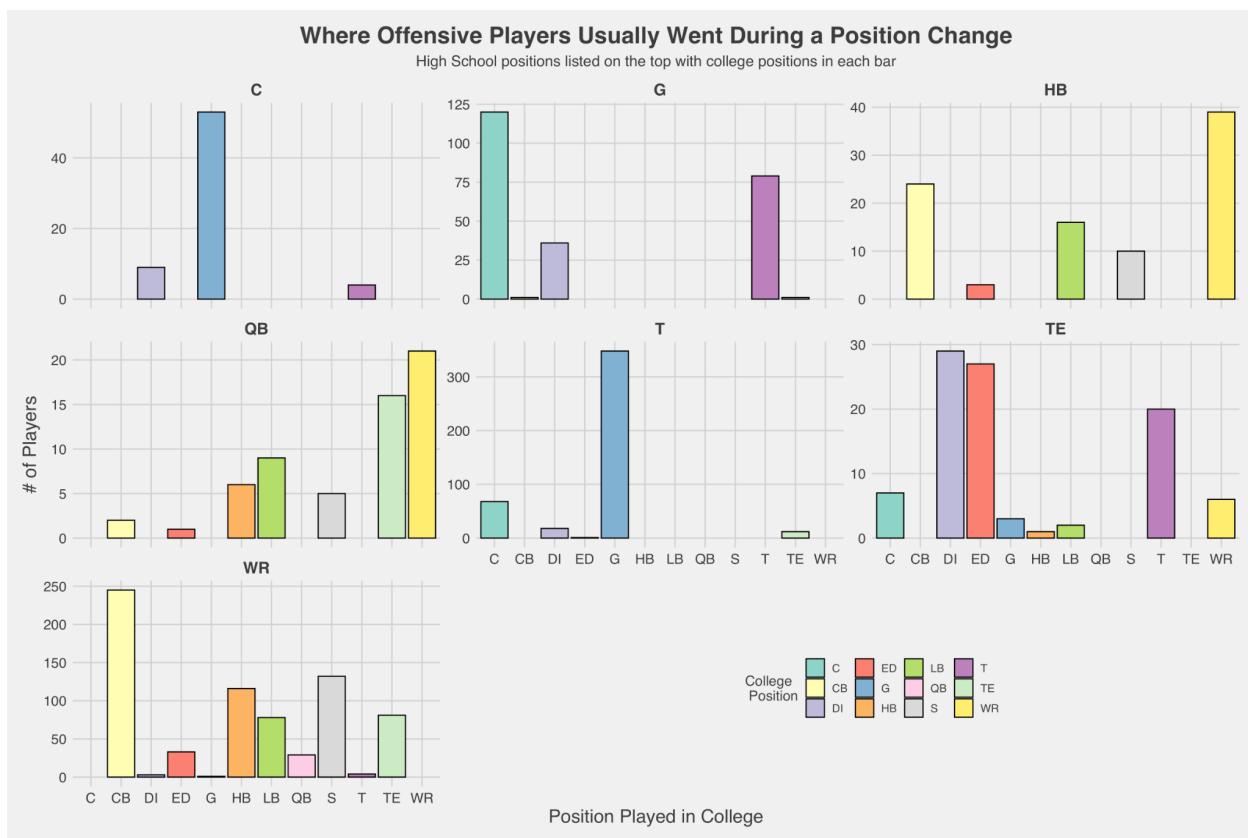


Figure 2 shows what position a player usually ends up playing in college after changing from a high school position. For example, 22 high school quarterbacks have switched to play wide receiver in college.

In Figure 2, we see that the most common position switch is a high school tackle switching to guard in college. Tackle to guard has happened 390 times since 2012, while the vice versa has only happened 122 times. This shows that, similar to the argument for defensive linemen above, players are often gaining weight (and losing athleticism in the process) in college, as guards often weigh more than tackles, and switching to the heavier position. Another very common position change was wide receivers changing to the secondary. With more wide receivers available to recruit than any position, this also makes intuitive sense as college programs' receiver rooms might not have the space to fit every receiver they recruit. They are able to switch them into the secondary and utilize their ball skills.

## B. Defensive Position Changes

As seen earlier in Figure 1, edge rushers are the 2nd most common high school position to change once they're in college. In Figure 3, we can look at what position they end up switching to.

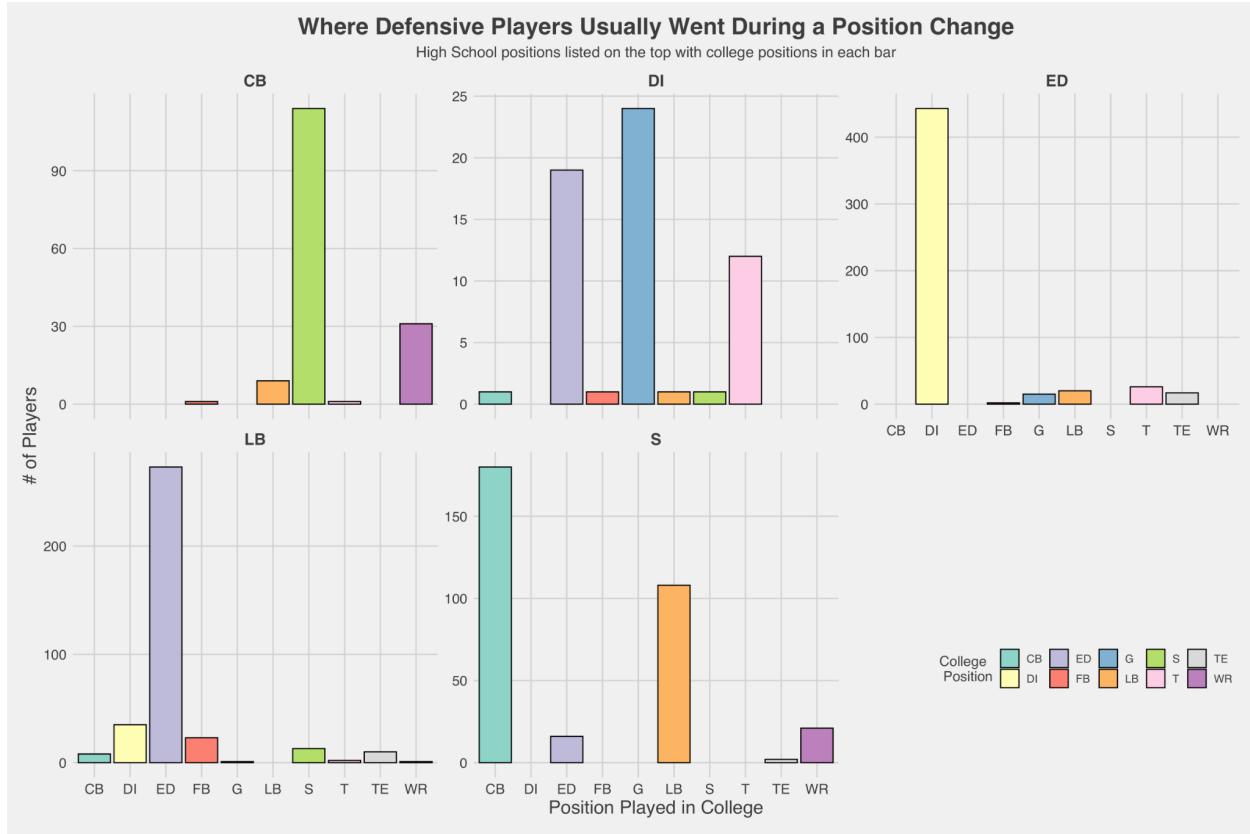


Figure 3 shows the positions that defensive players change to from high school to college when they decide on a position change. The bars represent the count of each college position once a change occurs.

Figure 3 makes it clear that more EDGE's switch to interior defensive line (430 players) than the other way around (18 players). DI's don't change positions often, but when they do they either rush the passer or play guard. High school linebackers also fit into the theory that players are gaining weight in college, as they commonly move to edge rusher, while safeties and corners seem to swap with each other at the same rate — that could just be indicative of scheme.

## C. Overall Position Change Performance

Changing positions from high school to college isn't an easy task. Using the average WAA of players that stayed at the same position from high school to college, we can look at how the players that changed compared to them.

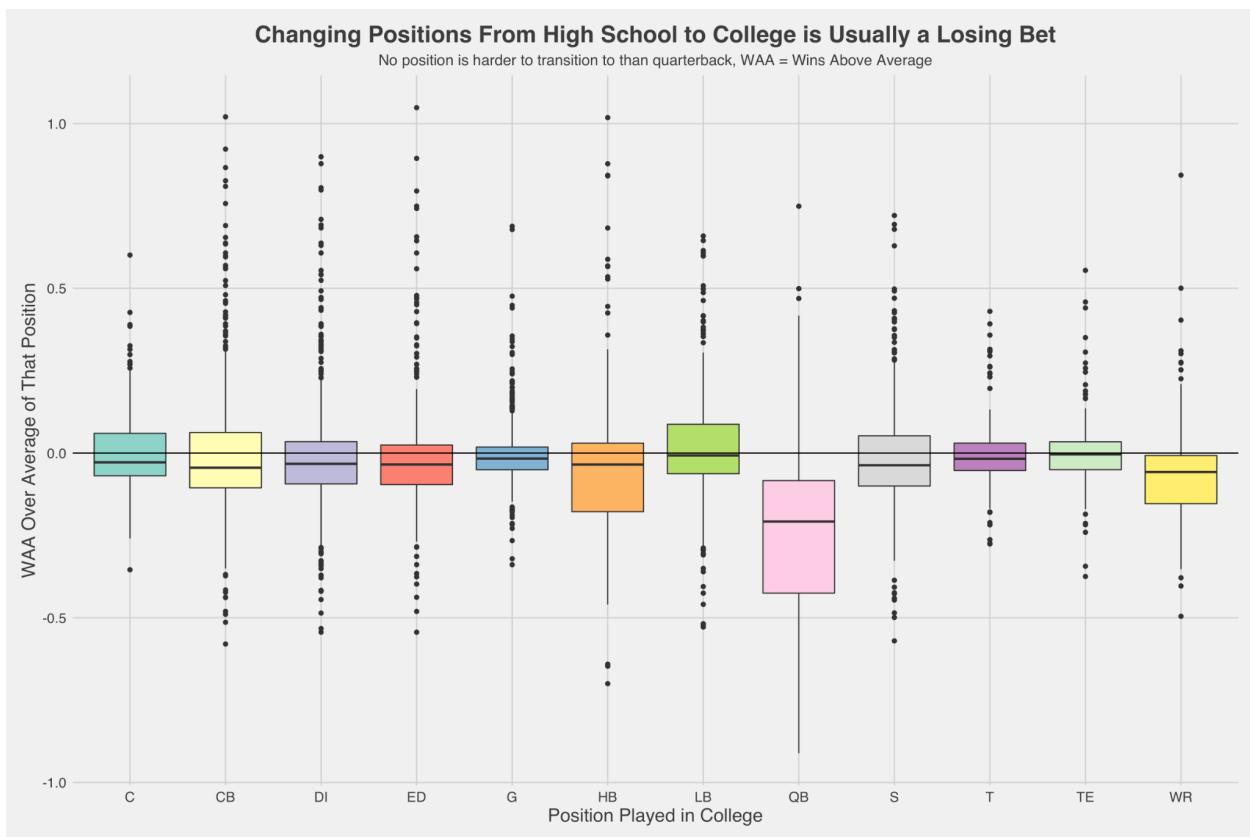


Figure 4 uses boxplots to show the variation of how positions perform in WAA after a position change compared to the average WAA at the position. The bottom of the boxplot is the 25th percentile outcome; the middle line is the 50th percentile; and the top is the 75th percentile outcome, with outliers listed in black dots.

As shown, the 50th percentile outcome for every position that changes is below the average line. One reason for this is that players staying at their position have been able to do so amidst (or after) changes to body composition, and being able to do so might have gained them the necessary ability at the position that a newcomer might lack upon his initial move.

No position is hit harder than quarterback, as it's the only position that gets significantly worse with a wide range of outcomes. Tight end is the position closest to breaking even, which is interesting because there was no single high school position that had a direct pipeline to becoming a college TE; instead, players from various positions moved there. This could mean that good athletes in general transition to tight end in college and they've seen some success there for good reason.

### **III. Offensive Recruiting Breakdown**

Since the College Football Playoff started in 2014, every team that has won a national championship has ranked in the top 10 in offensive efficiency. Recruiting on the offensive side of the ball is more important than ever. However, there are some positions whose recruiting ratings translate to college performance better than others. We take a deeper look at that in Figure 5.

## A. Recruiting Score and Total WAA by Position

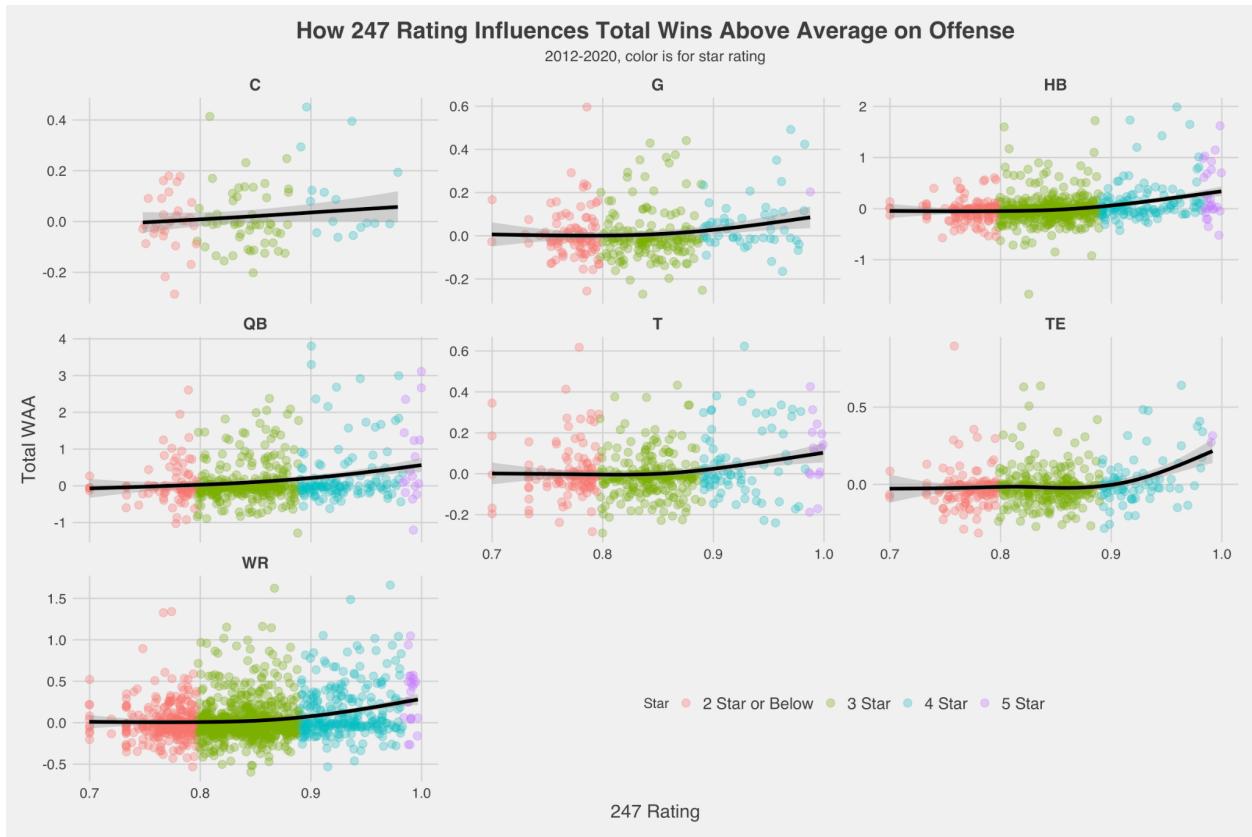


Figure 5 shows the 247 composite on the x-axis and the total WAA a player provides on the y-axis split up by position. There is also a trendline for each position.

In general, 247 rating tends to be a significant factor in how a player will perform in college. This is somewhat obvious, but reassuring, to see that the 247Sports formula holds water. The two main positions in which 247 rating is more predictive of success than anywhere else is quarterback and wide receiver. As shown, 2- and 3-star quarterbacks and wide receivers tend to perform the same, but there is a pretty good uptick when a recruit is in the 4- or 5-star range. Tackles also see a similar effect but to a lesser degree, while their counterparts on the offensive line don't see much of a change. This could mean that interior offensive linemen are more development-based while tackles are more talent-based. Running back behaves in a similar way, as a lot of running back performance is situation-based. Listed below are the tiers of significance for how recruiting rating translates to college performance.

- **Tier 1:** Quarterback, Wide Receiver
- **Tier 2:** Tackle
- **Tier 3:** Guard, Center, Running Back
- **Tier 4:** Tight End

## B. How Weight Affects Performance

College football programs should focus resources on getting 4- or 5-star quarterbacks and/or wide receivers, since those types of players seem to considerably change the program. Interior offensive linemen and running backs seem to be more situation-based and can be developed when starting as a 2- or 3-star. Figure 6 shows us how something like a recruit's weight at the time of recruitment correlates with performance for players who stayed at the same position from high school to college.

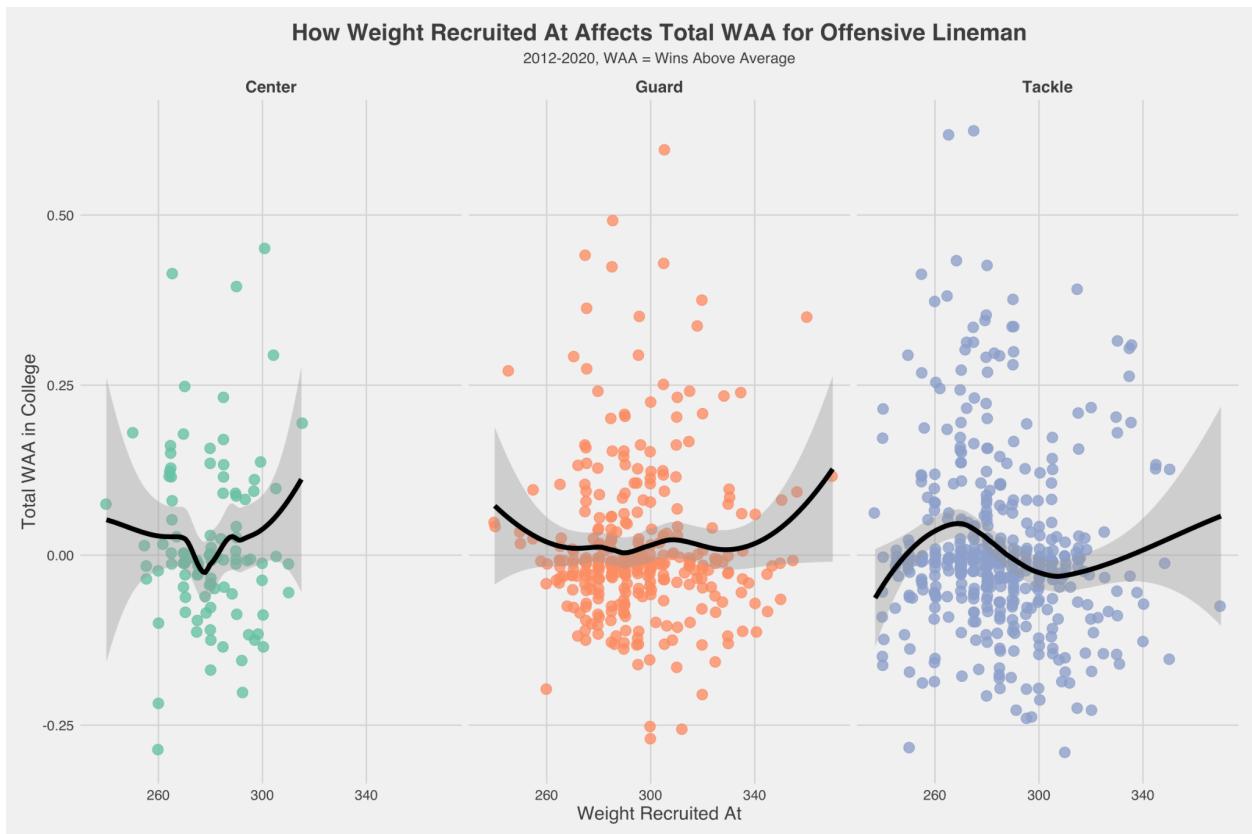


Figure 6 displays the weight at which the recruit was listed in his 247 portal and his total Wins Above Average (WAA) in college. A trendline is drawn for each offensive line position.

As seen in Figure 6, weight doesn't seem to have much of an impact on how players perform in college. There is a slight bump for tackles between 240 and 280 pounds, but it doesn't seem to be significant. The tail-ends of guards appear to have performed well, but that doesn't seem hugely significant.

## C. How Height Affects Performance

Height might matter at the quarterback, wide receiver and tight end positions. Figure 7 takes a closer look.

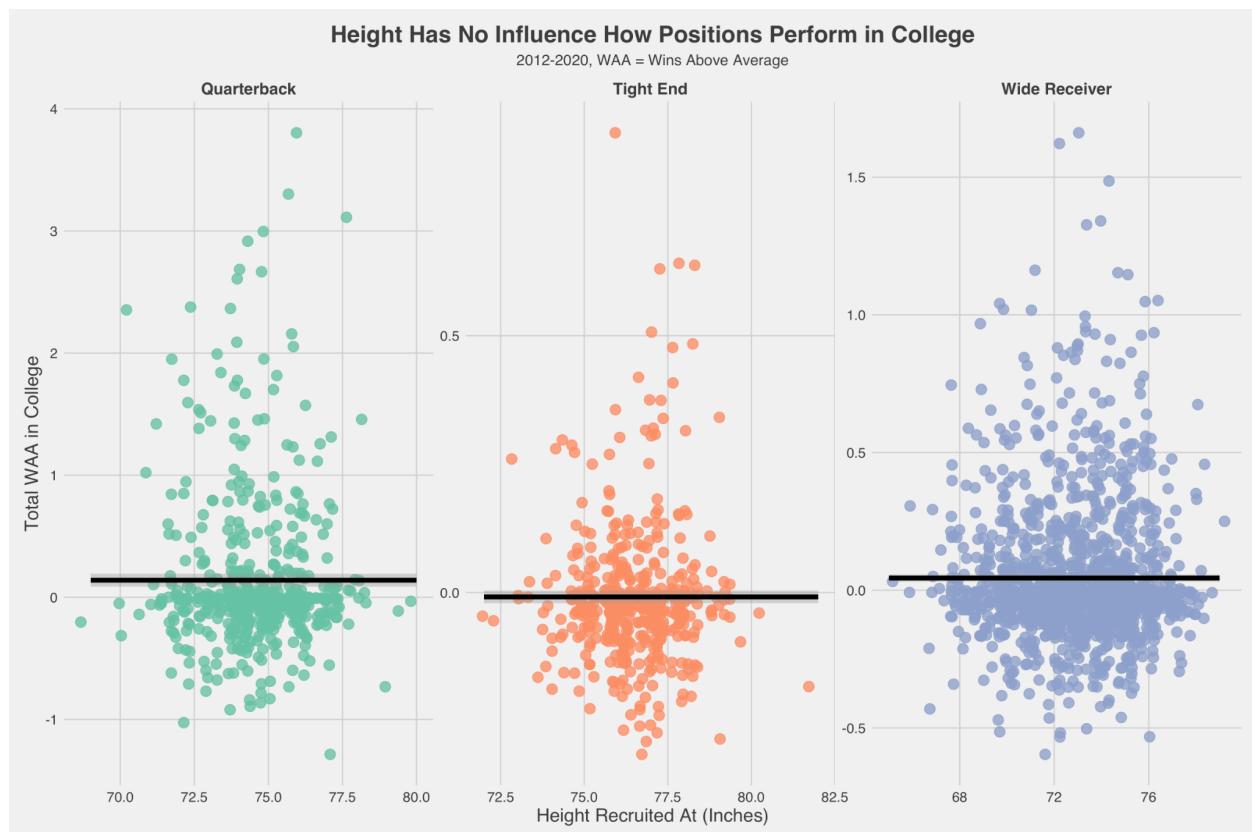


Figure 7 shows the height at which a recruit is listed on the 247 portal and the total Wins Above Average (WAA) they end up generating in college. A trendline is given for each position.

Height is a similar story to weight for offensive linemen. There is no impact between the height of certain positions and performance in college. Being around 6 feet tall has long been seen as a knock for quarterbacks, but we have seen shorter quarterbacks like Kyler Murray (70 inches) and Tua Tagovailoa (72 inches) perform well enough to chase Heismans and compete for national championships.

## **IV. Defensive Recruiting Breakdown**

### **A. Recruiting Score and Total WAA by Position**

Recruiting well on the defensive side of the ball is important, too. Certain college football teams pride themselves on being tough, defensive-minded programs. Figure 8 examines which positions are influenced by their 247 rating.



Figure 8 shows the 247 composite on the x-axis and the total WAA a player provides their team on the y-axis split up by position. There is also a trendline for each position.

Cornerbacks don't see much separation between 2 and 3 stars, but there's a strong uptick when they get into the 4- and 5-star range. Interior defensive linemen see a similar trend but to a lesser degree. CBs and DIs who don't change positions seem to have the most control over how they play at the college level. When it comes to edge rushers, linebackers and safeties, recruiting rating doesn't seem to have much of an impact on their college performance. Listed below are tiers showing how much 247 rating affects college WAA:

- **Tier 1:** Cornerbacks, Interior Defensive Linemen
- **Tier 2:** Edge Rushers, Linebackers, Safeties

## B. How Weight Affects Performance

Weight didn't impact performance much for offensive linemen in Figure 6, and we see a similar pattern for defensive linemen in Figure 9.

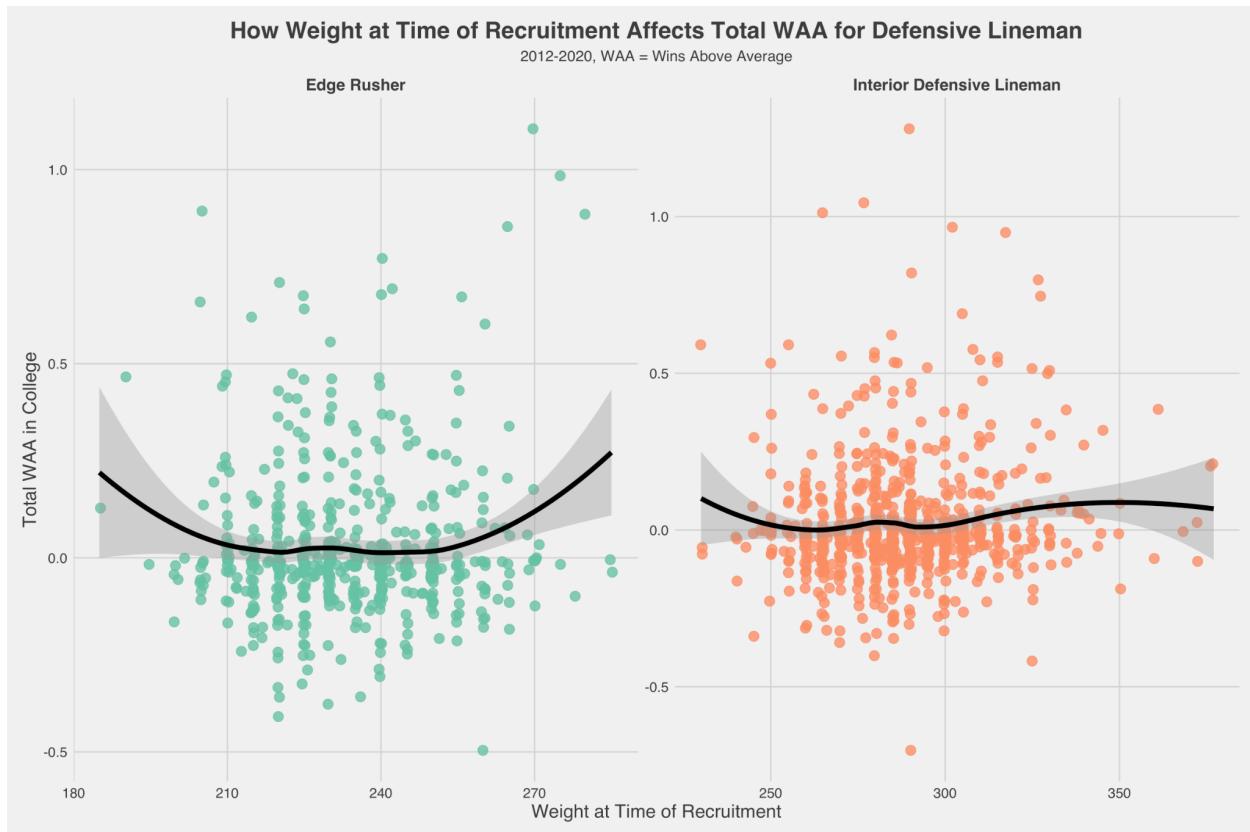


Figure 9 displays the weight at which a recruit was listed in their 247 portal and their total Wins Above Average (WAA) in college. A trendline is drawn for each defensive line position.

Lighter edge rushers and interior defensive linemen have found just as much success as heavier ones. Marcus Davenport came out of high school at 185 pounds and ended up producing a +0.47 WAA throughout his college career at UTSA off the edge. On the flip side, Joey Bosa left high school at 270 pounds and ended up as the edge rusher with the most WAA in the PFF College era. The tails of edge rushers have succeeded, while all types of interior defensive linemen have had their fair share of ups and downs.

## V. Using Recruiting Analytics

Now that we've analyzed how different factors, like recruit rating and position, can affect total WAA in college, we can now build a model to predict it. Projecting college

performance proves to be difficult, as only 4% of the variance explained by 247 rating and position can actually be mapped to total WAA. An expected WAA formula was made using a generalized linear model (GLM) that found ridge regression was the best way to predict college WAA.

For example, Trevor Lawrence — a 0.9999-rated quarterback recruit —was expected to gain the most WAA out of anyone in the recruiting database. By using the amount of WAA he actually gained while in college, we can make a new metric called WAA Over Expected to measure his development.

## A. Power 5 Breakdown

Figure 10 shows how Power 5 schools recruit with expected WAA and develop with actual WAA.

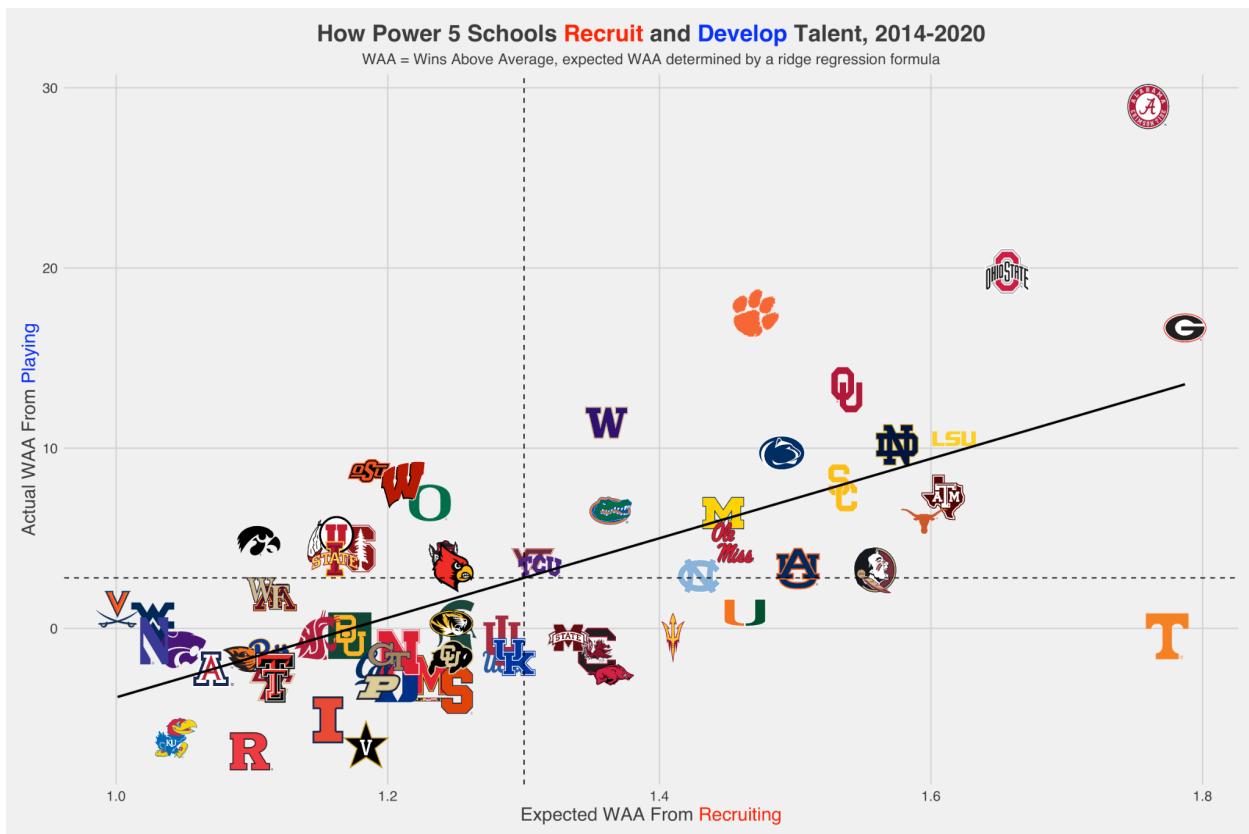


Figure 10 shows the expected Wins Above Average (WAA) from recruiting on the x-axis and the actual WAA generated from playing on the y-axis of Power 5 schools.

Alabama stands out as the program with the highest expected WAA from recruiting *and* the highest actual WAA from playing. By recruiting well at positions that translate well from high school to college, like quarterback, wide receiver and cornerback, Alabama has been able to rack up accomplishments. Listed below are what each quadrant means for a program:

- Top Right: Above-Average Recruiting and Above-Average Developing
- Top Left: Below-Average Recruiting and Above-Average Developing
- Bottom Left: Below-Average Recruiting and Below-Average Developing
- Bottom Right: Above-Average Recruiting and Below-Average Developing

Programs that recruit well also tend to develop their players well. This makes sense, as recruiting budgets generally correlate with development budgets, and playing well means programs often have more money to recruit with. Being above the trendline means a program is overachieving based on what an average program would do with the same recruits. Programs like Wisconsin and Washington show that you don't necessarily have to recruit well to play well, but missing out on blue-chip recruits does limit your ceiling, as neither team has made a serious run for a national championship during the PFF era.

## B. Group of 5 Breakdown

The Group of 5 can also be broken down into Expected WAA and Actual WAA as seen in Figure 11.

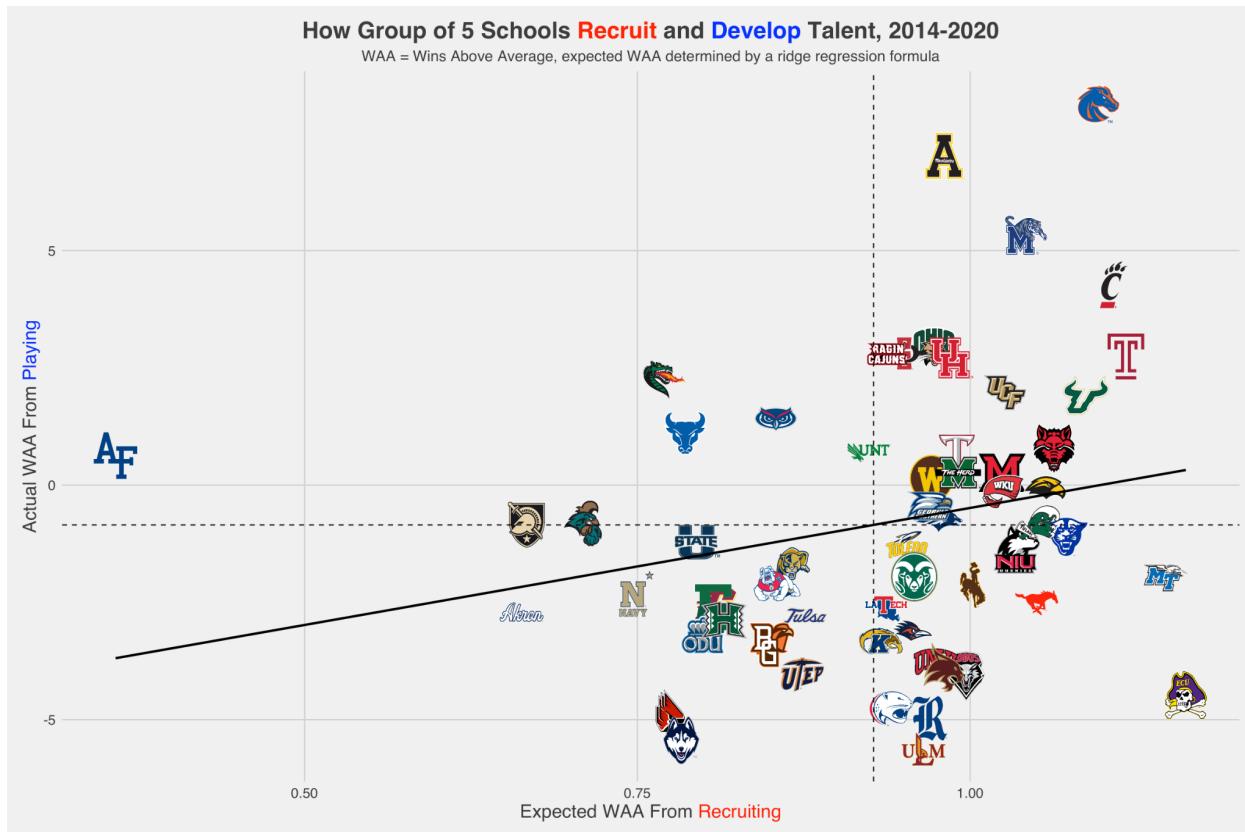


Figure 11 shows the expected Wins Above Average (WAA) from recruiting on the x-axis and the actual WAA generated from playing on the y-axis of Group of 5 schools.

Programs like Boise State, Appalachian State, Memphis and Cincinnati have been the gold standard for Group of 5 schools since 2014, as they've both recruited well and developed well. The trendline between recruiting performance and development performance isn't as strong in the Group of 5 as it is in the Power 5. This could mean that allocated resources between recruiting and developing aren't as strongly related in G5 as they are in P5.

### C. Individual Class Breakdown

Looking more into the relationship between recruiting and developing, Figure 12 shows how individual classes have been recruited and developed.

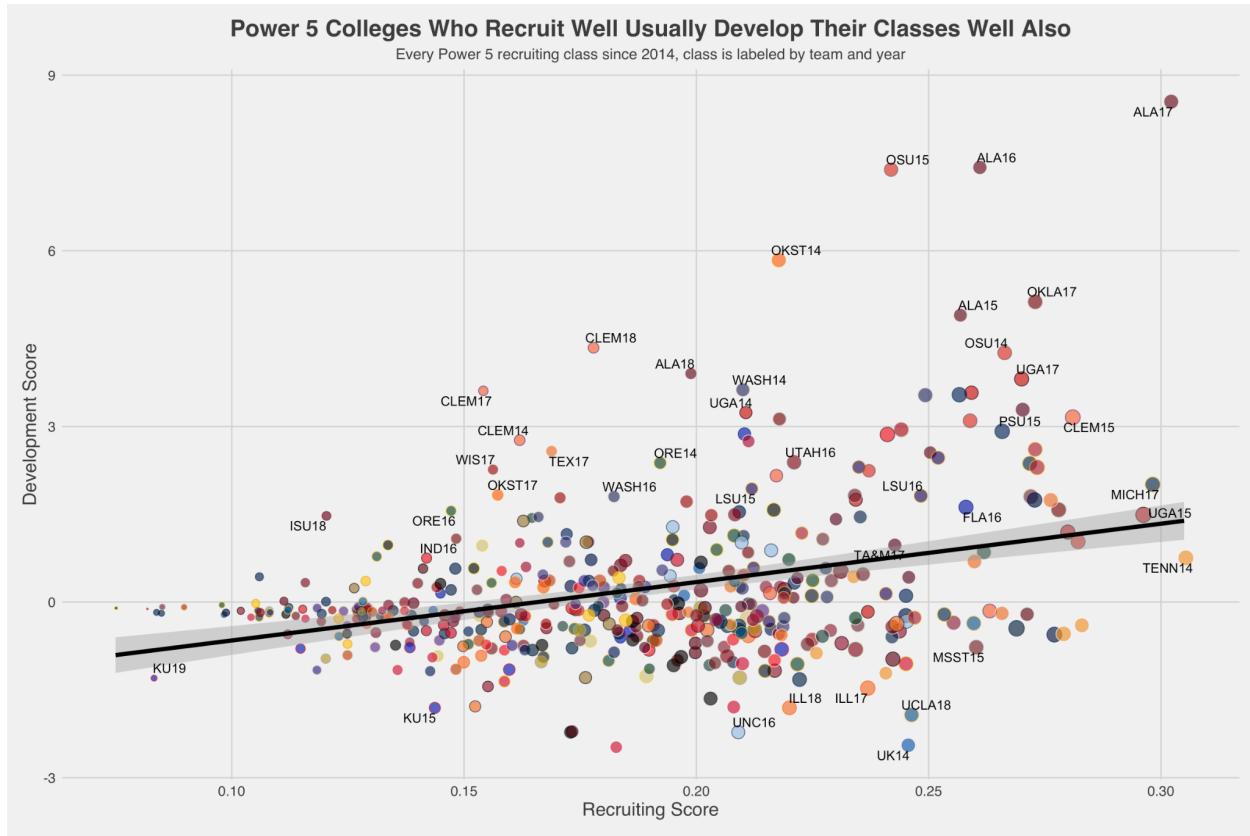


Figure 12 shows each individual class labeled by school and year of the recruiting class. The x-axis shows their expected WAA from recruiting and the y-axis shows the WAA over expected each specific recruiting class generated.

Ole Miss' 2016 recruiting class, featuring highly rated recruits like Shea Patterson, Benito Jones and Greg Little, had the highest expected WAA of all-time but performed exactly as expected with a WAAOE (WAA Over Expected) of +0.2. On the flip side, Alabama's 2017 recruiting class, including Mac Jones, Devonta Smith and Najee Harris, generated the most WAA in the PFF College era. All in all, there is a slight correlation between recruiting score and development score but not enough to make a broad conclusion.

Figure 13 looks at class size and WAA over expected per recruit.

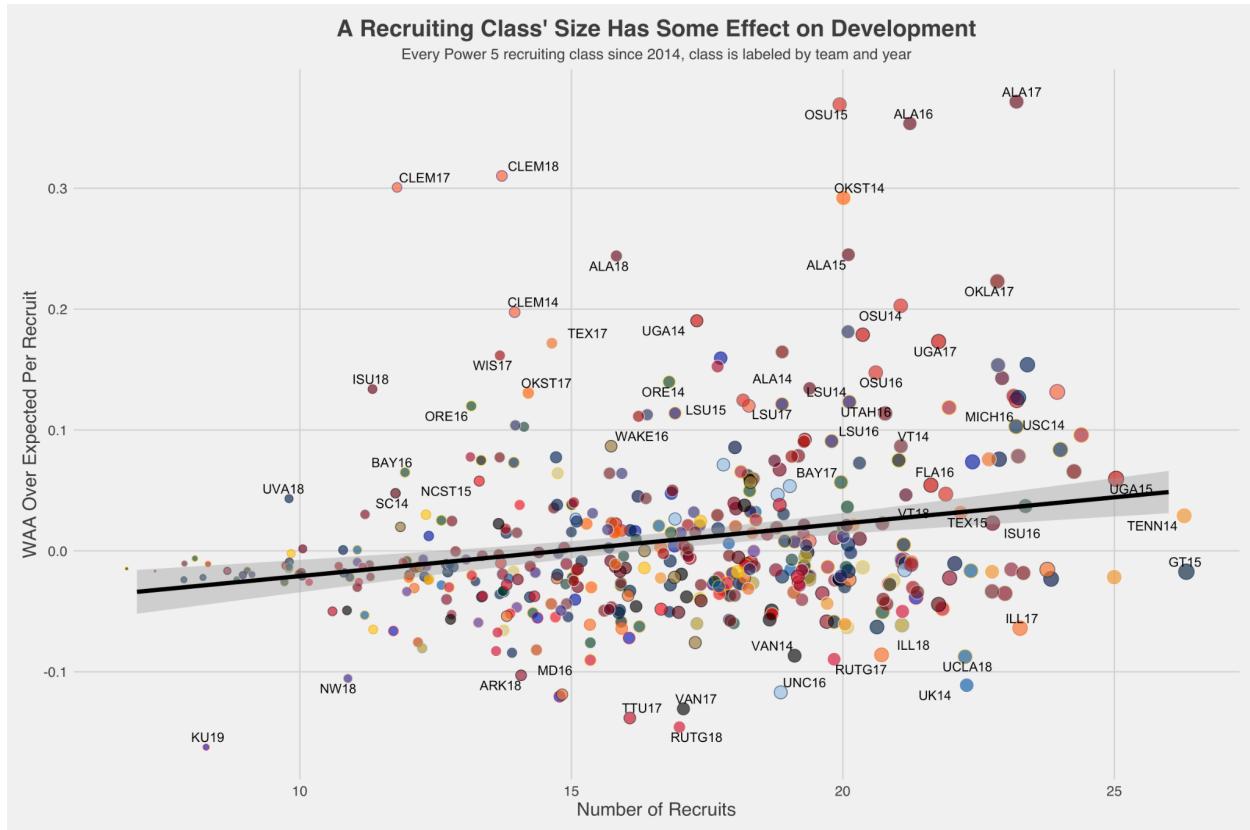


Figure 13 displays the number of recruits in a class on the x-axis and the WAA Over Expected per Recruit they generated on the y-axis. The trendline is in black with confidence intervals in gray.

Figure 13 doesn't show much of a relationship between class size and performance. The interesting finding is that the confidence intervals in gray increase as the class size gets bigger, meaning it's easier to control a small or medium class size and a lot harder to control a bigger one.

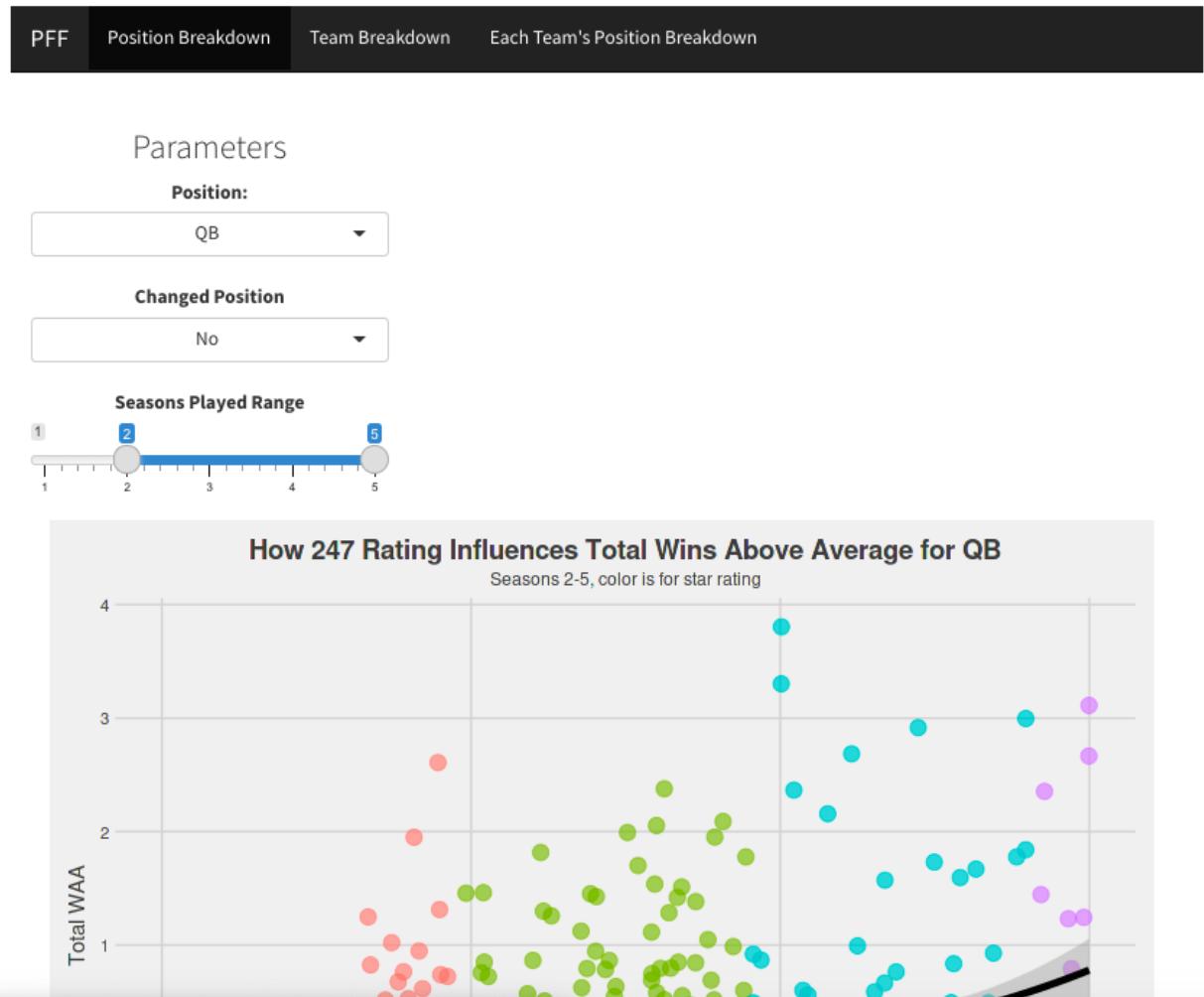
## VI. Website Application

When it comes to coaches applying the principles in this white paper to their programs, they can interact with some of these figures here:

<https://mfbanalytics.shinyapps.io/Recruiting/>.

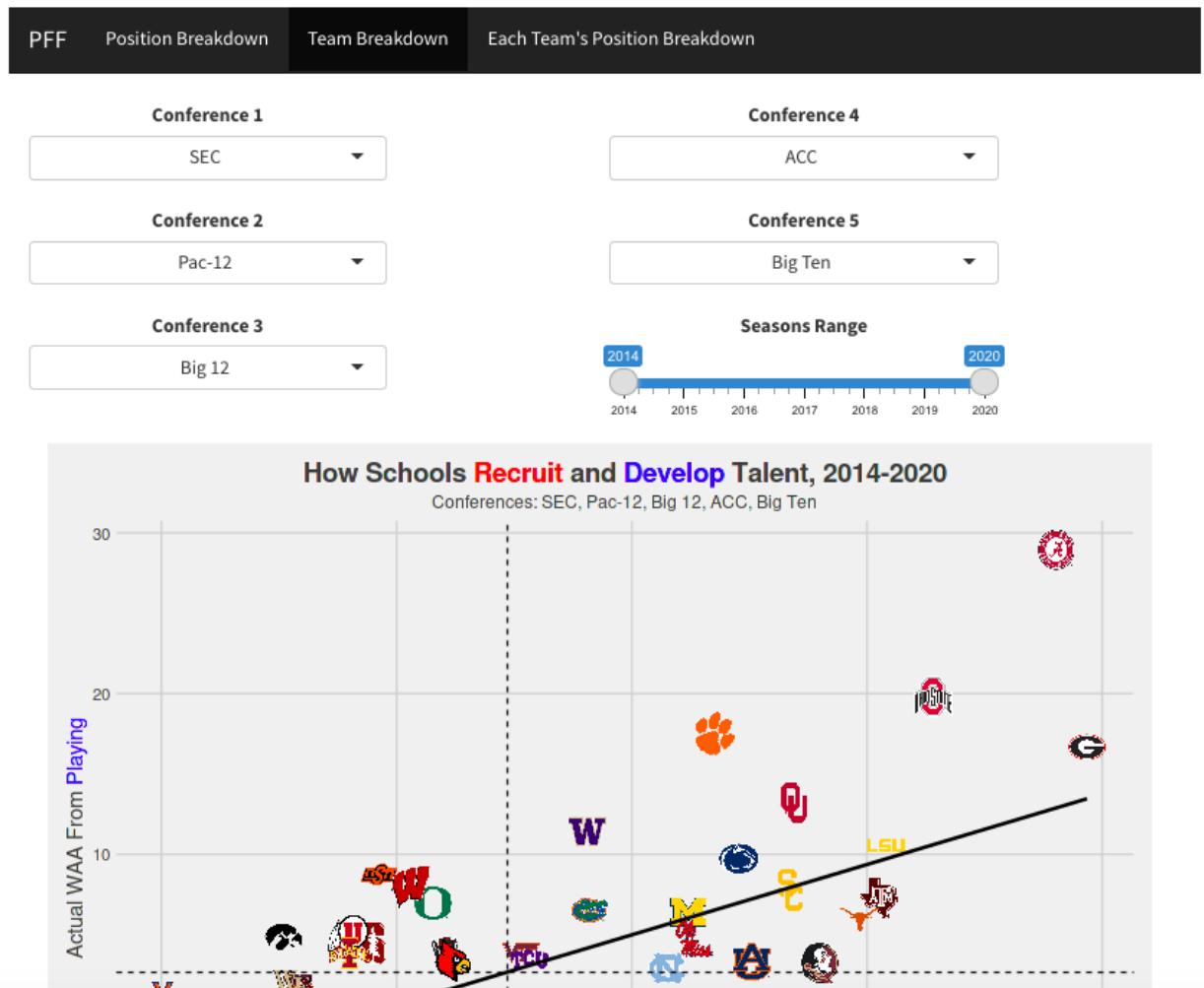
The website can be broken down into three tabs:

## 1. Overall Positional Breakdown



In this section, a user can pick a position, filter by whether the player changed position from high school to college and then look at various ranges of seasons played in college. They can then examine how the 247 rating translates to total WAA for that position and which positions players move to most often.

## 2. Team Breakdown



In the next section, a user can choose five conferences to compare (set as default to the Power 5 schools) and pick a range of recruiting classes to examine for expected WAA and actual WAA. Below that, they can look at specific programs by recruiting class.

## 3. Team Breakdown by Position

The final section of the site does something similar to Section 2, but it looks at specific positions rather than whole classes.

## VII. Conclusion

Using the principles found in this paper, college programs can start recruiting more efficiently, and PFF clients can gain an advantage over non-PFF clients. The main takeaways are:

- When it comes to recruiting certain positions, the possibility of players changing positions from high school to college should be considered by coaches. It's important to note that positions like defensive lineman and quarterback do not change positions often, while edge rushers and tackles do. This is helpful for future roster-building, as a coach can be confident certain positions will remain where they are on the pre-season depth chart, while others are more likely to move.
- Since players who change positions usually don't have as much experience at the new position and might not have been great at their old position (hence the change), changing positions is almost always a losing bet compared to those who stay at their original position. Changing a position player into a quarterback is the hardest thing for a college program to pull off.
- When recruiters are choosing which positions on offense to focus their resources, the main focus should be on getting blue-chip players (4 or 5 stars) at quarterback, wide receiver and tackle. The other positions on offense are more situation-based, while those three are more talent-based.
- On defense, recruiters should go all-out trying to get highly rated cornerbacks and interior defensive linemen. This paper has shown how impactful blue chips at those positions are, as they translate well from high school to college and provide good value.
- It was previously assumed that height and weight could have a big impact on how a player performs — that a player too light or too short wouldn't succeed — but that does not seem to be the case. Because of rigorous weight-lifting programs

and dieting plans, players' weights can fluctuate throughout college. So weight when recruited is not such an important factor.

- Programs can use expected WAA to make sure their recruiting classes meet their standards. They can better understand how recruiting well and developing well go hand-in-hand and use that to their advantage.
- The site can be used as an interactive reference and a comparison tool:  
[https://mfbalytics.shinyapps.io/Recruiting/](https://mfbanalytics.shinyapps.io/Recruiting/).

The data, code and data visualization is provided on github<sup>6</sup>.

## VII. References

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