Redefining Dominance

Nikola Jokic through the Lense of Data

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Just two decades ago, Shaquille O'Neal was named to the All-NBA First Team for the final time, ending a seven-year streak at the pinnacle of the sport. To Shaq's own disappointment, he had only a single MVP award to his name, which to this day he continues to discuss on his Inside the NBA show. Now, global basketball fans are in the midst of a new phenomenon which could make the self-proclaimed "*most dominant player ever"* just a relic of the past.

Nikola Jokic, unlike O'Neal, was no superstar entering the league, and was famously drafted during an advertisement for Taco Bell. Drafted at pick 41, Jokic spend a year in Serbia before making his debut appearance in 2015. Not many people knew what the young talent might become, but given a few years, they might realise what they all missed out on.

Currently, Jokic is on pace for his 4th MVP award, which would certainly raise questions about his place on the all-time lists. Certainly, his dominance will be compared to that of Shaq even though the two player's styles could not be more different – but what characteristics separate him from the dominant centers of years past? Even surface level data can show just how he impacts the game more than any all-time center and highlight the extreme levels to which he has elevated his game. Based on box score data alone, when compared to other all-star players, it is easy to showcase his dominance and versatility whilst on the floor.

The General

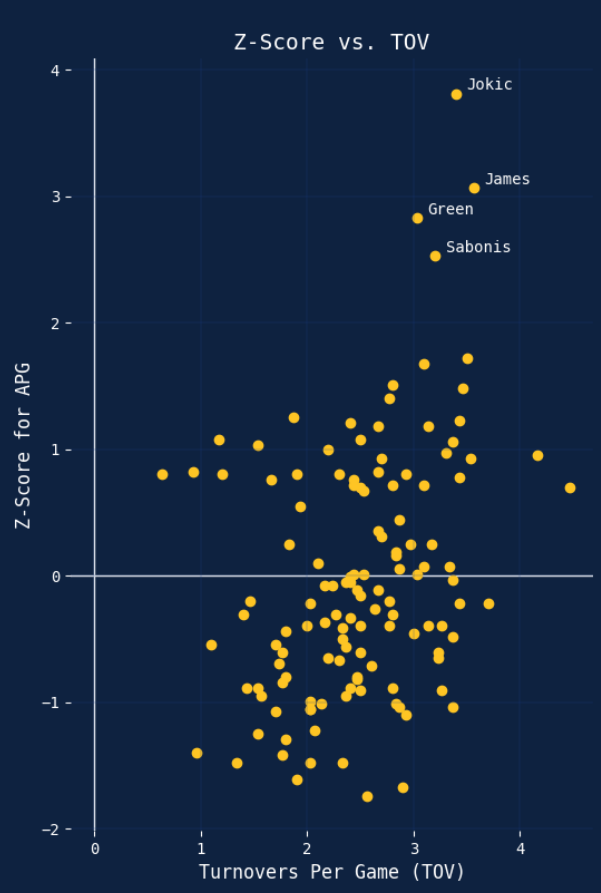
One key aspect, which becomes obvious to all first-time watchers of the Nuggets, is how Jokic can scan the floor, find his teammates, and consistently make the perfect pass. Historically, a pass-first center is extremely rare, and this breed of player only began to appear in the small-ball era of basketball, pioneered by the Golden State Warriors in the 2010s. In that setup, Draymond Green began playmaking so that all four players on the floor could work off ball, which reinforced both the rise of the three pointer and an offence with a higher frequency of cuts to the basket. This method of scoring is now used widespread across the NBA, especially by teams like the Oklahoma City Thunder, who play with small lineups with either Chet Holmgren or Isaiah Hertenstein. These players can anchor the defence and still initiate actions on the other side of the ball. For Hartenstein in particular, who is averaging a career high in assists and points in his seventh year, we can see remnants of a Draymond Green.

Small ball may have birthed the facilitating center, but Jokic simply takes this concept to another level, creating his own offence and creating opportunities by others through his unique passing ability. Nikola averages 7.1 assists for his career, but a deeper look into his career statistics show a vast level of improvement, and just ridiculous numbers. In the 2024-25 season he is averaging 10.1 assists (as of time of writing).

To understand the magnitude of his playmaking performance, I have conducted extreme value analysis with visualisations of all of Jokic's seasons against all seasons played by All-Star power forwards and centers in the NBA, since recording of all current stats began.

The Z-Score can be used to show how unlikely, or in this case hard to achieve, having seasons like Jokic is. X is the mean of Jokic's APG for all his seasons, μ is the mean of all APG recorded by All-Star power forwards and centers, and σ is the standard deviation of all those years. A higher or lower Z-Score from 0 is a sign of a much higher or lower average performance compared to others within the dataset.

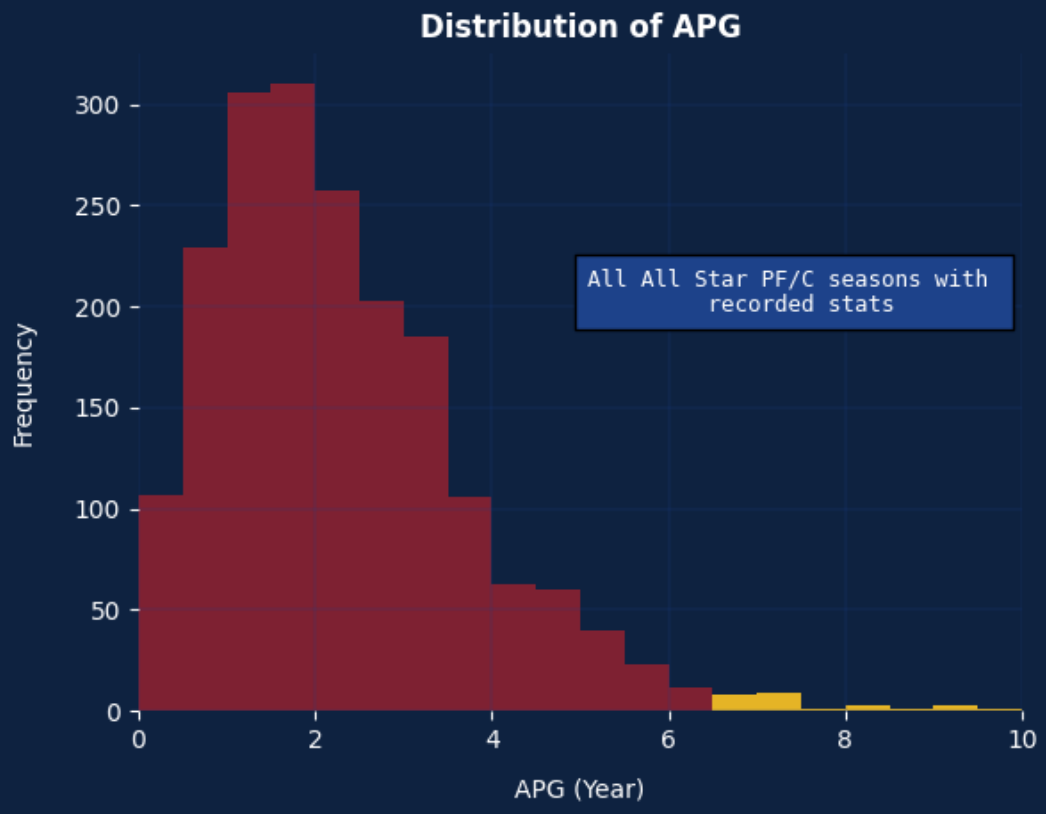
$$Z = \frac{X - \mu}{\sigma}$$



Jokic has a Z-Score of 3.5835 (5 s.f) which in context means that his assist per game statistic would have a 0.1% chance of occurring assuming that he was a regular center entering the league. Obviously, we know that Nikola is a special player, but this does show the extremities of his success. When compared to all All-Star guards, his Z-Score remains a high positive at 0.81045, which would place him still near the top 20% of all guards within the prestigious category. The graph shows the extreme Z-Score for Jokic, when compared to power forwards and centers, and highlights the other main playmaking big-men who have had their own respective impact onto their teams.

The data above also incorporates the turnover per game stat which is a sign of efficient playmaking, as opposed to throwing unnecessary and incorrect passes. It would be sensible to suggest that an increase in number of assists goes hand in hand with number of turnovers, and so although Jokic sits to the right of the graph, this is not a sign of bad performance. A major step off to the right of the graph would be concerning but the effectiveness of Jokic's playmaking is supported by his position. He even sits to the left of Lebron, who although may not be considered a power forward or center, is included in the data, and is well known for his court vision and high IQ among many other strengths.

To visualise the insanity of Nikola's APG numbers, and career so far, I plotted all seasons of all All-Stars on a histogram, to see how the statistic is distributed, and how vastly greater Nikola's skillset is to other big men. The graph displays the rarity of such a high level of playmaking amongst big-men, and the yellow bars consist of seasons only from Lebron James, Draymond Green, Domantas Sabonis and Jokic himself, with the three highest APG seasons ever recorded in this category of player.

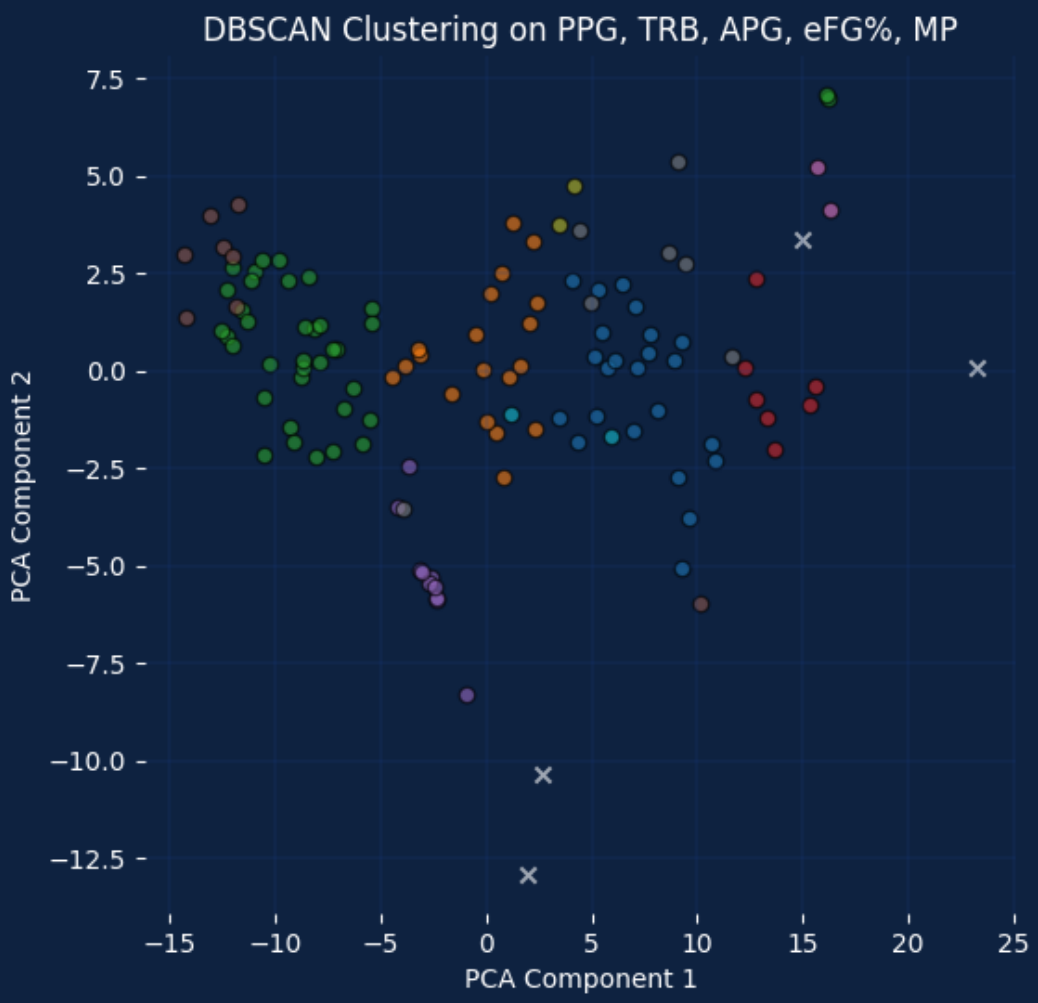


The Unicorn

In order to gain a sense of how irregular and how unique Jokic's style of play is, I wanted to cluster these NBA All-Star centers and power forwards into groups and see if Jokic fits into a certain category of player or if he is truly his own style of player. I have used the DBSCAN clustering algorithm which includes Noise points (points which are too far away from any core-point based on ε - distance). Epsilon has a value of 5, where the distance metric is based on Euclidean distance of PPG, TRB, APG, eFG%, MP:

$$\sqrt{(PPG_1 - PPG_2)^2 + (TRB_1 - TRB_2)^2 + (APG\ \ldots)^2\ \ldots}$$

The minimum number of players required for a cluster is 2. After clustering with these specific parameters and using the averages for each All-Stars best 5 season stetch, it leaves just 4 "Noise" points.



The 4 players are Jokic, Kareem, Rodman, and Unseld. Kareem is mainly set apart by his truly incredible ability to stay on the floor, with his 44.2 minutes played per game average in his 5-year peak. Rodman and Unseld both have very low PPG averages for All-Stars, so they are similarly left out of any clusters; with a larger epsilon they both become their own cluster. So, arguably it is outstanding that Jokic is himself a Noise point where these abnormal All-Stars are included.

The chart above displays the output of the clustering algorithm, with Jokic as the far-right point, Kareem as the top point, and Rodman and Unseld as the two bottom points. The PCA components are a 2D representation of the 5D stats, with the maximal variance to visualise the clusters effectively. The chart shows many large clusters, with most centers being of the same style, some with more defensive tendencies and some with more offensive capability.

With a larger epsilon however, Jokic begins to be clustered with his fellow modern centers, and his closest previous MVP rivals. Joel Embiid and Giannis Antetokounmpo who arguably are freaks of nature in their own rights sit with Jokic and leave only Kareem as the last standing Noise point. All 3 of their PPG, TRB, eFG%, and MP are quite similar, which leads to this change. An even larger epsilon (7.5) then groups Karl Anthony Towns into this cluster. Notable other clusters are both Sabonis and Green, who are border-points, which are points who could not form their own cluster but are within the borders of another cluster. Effectively this means they are unique but still not complete outliers like the “Noise” points.

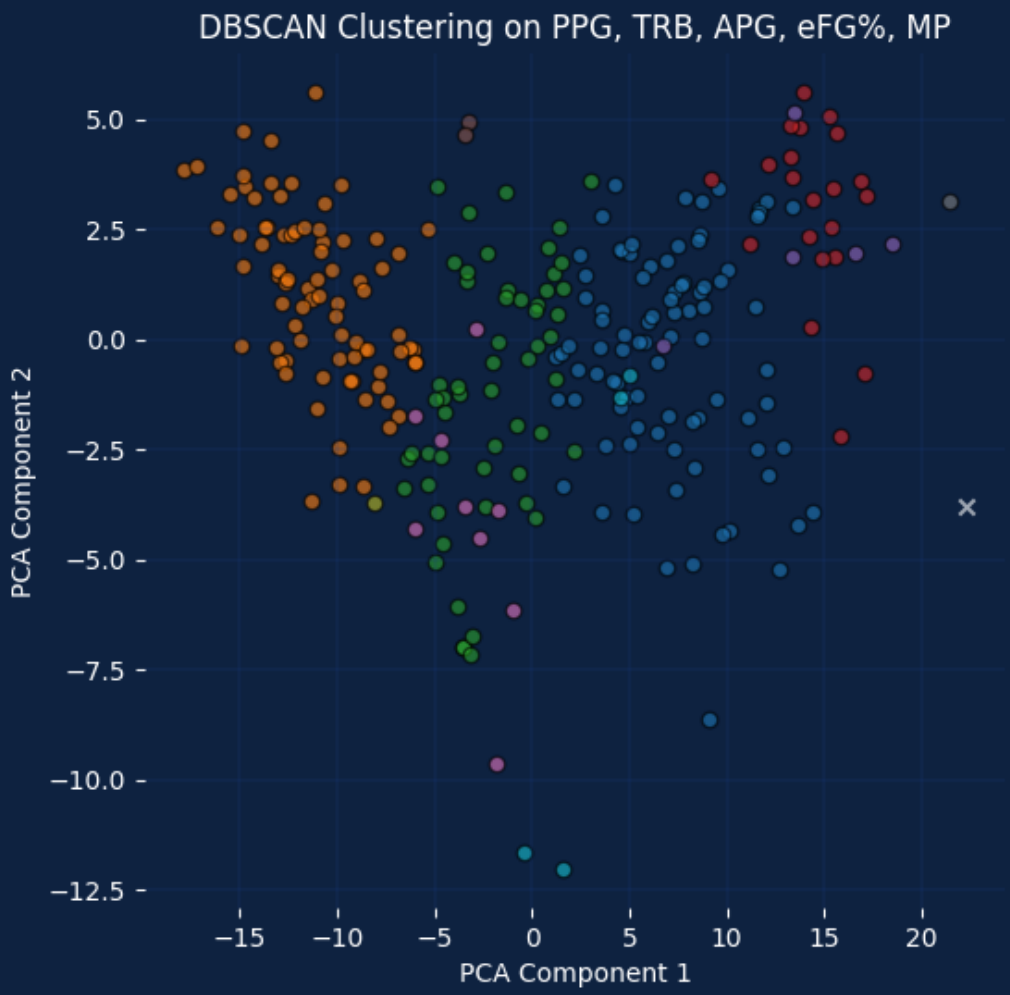
Curiously, when all All-Stars are used (not just centers), then Jokic is grouped with players like Lillard, Curry, Irving and Giannis. The plot begins to reflect the nature of the league's positionless-ness, and players are mostly split into time eras. The only noise point with a large epsilon and large minimum cluster size is Kareem. Significant border-points including Jordan and Iverson. This makes good sense, as these 3 players all have unique ability either scoring or longevity. The main four clusters for this plot appear to be: Old School Centers, Traditional Forwards, Modern Centers, and then a group of both guards, and players like Jokic and Giannis. This is quite intriguing and most likely reflects the guard skills possessed by both Antetokounmpo and Jokic.

I find it interesting how, although BasketballReference.com’s similarity score links Jokic to Shaq, Bill Russel, Moses Malone and more, his playstyle does not share much in common with these players, although his Win Shares (the stat used by Basketball Reference) and his physique may be similar.

Another interesting note is that Lebron James is grouped in this experiment with highly skilled facilitating guards including Trae Young, Tyrese Haliburton, Tiny Archibald, and, perhaps more curiously, Pete Maravich. It is a testament to both Lebron’s IQ and his ability to play point guard at a high level.

For this plot, due to the high number of players, epsilon is set to 8, and the minimum number of players to fill a cluster is 5. Using the PCA components again, this can be

similarly visualised. Due to the less strict constraints, there are much larger clusters, and less variety than within the Power Forward and Center plot seen before. This results in those larger more stereotypical groups as previously explained, with groups mostly representing their time periods.



Having viewed the results of both plots, we can helpfully see which players have played in their own way, whether their style has been successful or not. It begs the question, do players with unique characteristics fair better than others throughout their careers or does this have no impact? Well, it is no coincidence that Kareem has 6 championships, 6 MVPs and 19 All-Star selections, Rodman has 5 championships, 2 DOPYs but admittedly only 2 All-Star picks. Unseld whilst having a lesser PPG average than most All-Stars, was one of the greatest defensive players of all time and won MVP and ROY in the same year, a feat only accomplished also by Wilt Chamberlain. These outrageous achievements are achieved by unique players, and clearly, Jokic may carve his own identity into the NBA and continue to win many awards like these players before him.

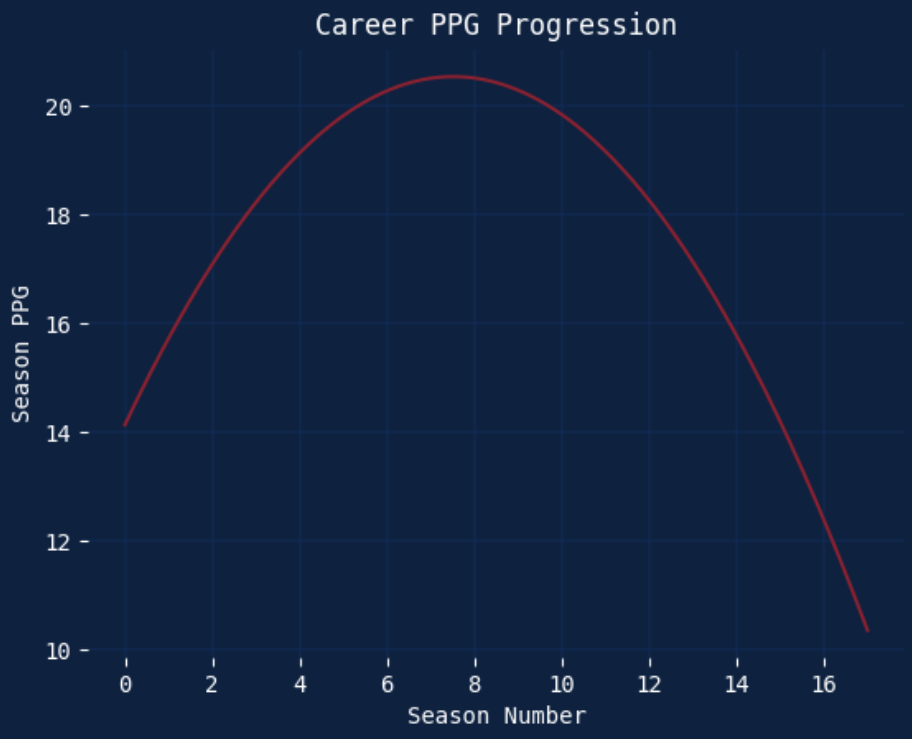
Prospects

Having looked into the style of play, and current dominance of Jokic, in the typical sports analysist style, there is room to imagine and forecast where Nikola's career might go and try to predict whether he may enter the debate for one of the all-time greats. The clustering experiment has already shown how hard it may be to become the greatest center of all time, with Kareem, Wilt, Duncan, Shaq and more having had similarly dominant careers of their own. But amusingly the Serb is only in his tenth season and seems to be entering his prime this year whilst recording a PPG average of over thirty.

His case for the MVP this year is very strong once again, and his only competition Shai Gilgeous-Alexander will certainly make it a close vote.

For my last experiment, I wanted to try and estimate where Jokic might end up on some of the all-time scoring list. These rankings are another key factor brought up in debates and a player could leave a lasting impact on the league by posting high career totals. Notably, the assists record may never be broken, with John Stockton currently 3,000 assists ahead of Chris Paul in second place. Jokic currently sits 68th in this list, but it will be interesting to see where he ends up as his career progresses and his playstyle potentially makes another shift post prime.

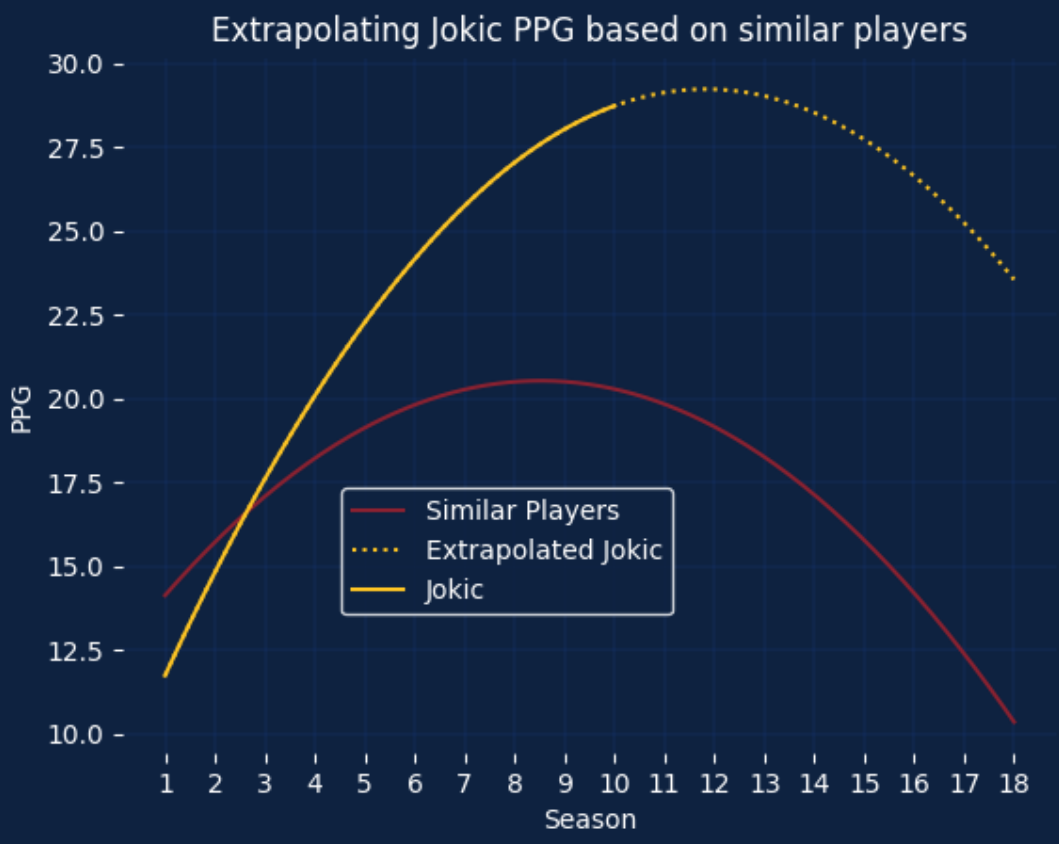
For points per game, I have looked at the PPG progression of players with similar heights and weights to Jokic (also all All-Stars), to visualise their averages season by season.



This graph uses the NumPy function polyfit which takes a list of data points and uses least squares regression to convert this into a smooth polynomial. The line clearly has the characteristics we would expect, including early career progression, a prime, and a slow drop off towards the end of a career before retirement.

Now, I wanted to predict how Jokic's career may pan out, and I have used 18 seasons as the benchmark, although it is entirely possible that he could play many more than this. It was just the case that most of these similar players who were all stars end their careers between 16-20 seasons.

Using the same polyfit function, I plotted Nikola's career so far and extrapolated his data series based on this previous quadratic.



The result shows how Jokic is seriously still improving and may not have even hit his peak performance yet. His early career improvement was staggering and his room for potential may be much higher than an average All Star. This is particularly interesting and a point of discussion regarding Draft prospects: do you want to player with a high physical ceiling, or a player who could have an extremely high skill level?

The limitations of this graph are that we do not know when Jokic's career might end, if he might get injured, or how much his career could taper off in relation to other players.

The graph is useful however to show that, had I conducted my previous experiments in a few years' time, his statistics may have further improved, and the significance of his results may have increased.

Working out what his career total for points may be is tricky, and any method will have a very high variance due to missed games, playoff performance, and more. Quite crudely, I am taking his average games played by season and using his predicted PPG average for that year and multiplying these to find a yearly total.

The quadratic given by his extrapolated line is $PPG = -0.1492x^2 + 3.531 + 8.357$, so I will simply substitute a year x into this equation to give a year's average.

His current points total is 15531, and we are halfway through the 2024/25 season. For his career, he averages 75 games played, so we will assume he still has 28 games left in the tank this season. It is his 10th year in the league so we will assume that his PPG average is 28.73 based on the line (even though currently he is averaging just above or just below 30). This results in roughly 805 points for the rest of the season.

With this process repeated for the next 8 seasons Jokic will have 16400 more points. This gives a total of 32736 points. That would leave him at 5th all-time above Jordan and just below Kobe. However, his 75 games a year average will be more difficult to continue especially as his career progresses, and when we might see a switch to a more assist heavy game. The calculation also assumes that he has around 2.5 years left of his prime, where he will score just below 30 points, which is highly optimistic, but also very possible. Then again, if Jokic played more than 18 seasons he could sit higher, similarly he could sustain an injury, which he has been extremely lucky with so far in his career.

This lack of injuries is a very strong aspect of his game, and for a big man to play so many minutes with such a high impact, he is undoubtedly extremely valuable to the Denver Nuggets and will be this year as they look to win another championship. Staying on the court will be especially important also to win this year's MVP, where his competition may be the toughest of the last 5 years.

Final Remarks

If the reader is to take anything from this article, it should be that Nikola Jokic is his own player and is redefining the way basketball may be played in the future. Even if he does not win this year's MVP, he will be the best player in the world, and it is hard to compare him to anyone else currently in the league. We have Sabonis, Green, Sengun and many other players with a similar style to Jokic, but a look into the stats, shows the gap between these players and Jokic himself. It is hard to find a comparison, and even with Lebron James included in most of the data within this article, Jokic cements himself in and around the greatest player the league has ever seen.

I find it truly incredible and absolutely love watching the Denver Nuggets play – even more so with the addition of Westbrook, adding another dynamic piece to Jokic's own arsenal of cutters and shooters. Other teams witnessing the boost to Nikola's statistics even with this improved team, with more scoring options, must be praying that they can avoid him come playoff time.

The dominance of the Serbian will continue to grow, and if he were to win a championship this year, how will the other great centers like Shaq react, and what will the media have to say about this generations most skilled player?

Written by Thomas Williams, basketball fan and computer scientist.

All data which has been used in this article has been collected from basketball-reference.com, and all stats were collected as of 15 January 2024.