

# How has the Three Point Shot Changed the Way Basketball is Played in the NBA?

CMSE 402, Section 1

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## Introduction

The NBA is quite arguably the most competitive and skilled professional basketball league in the world. To the basketball community, it serves not only as a source of entertainment, but as a guiding force that continuously sets precedents for how the game should be played. The most significant change in recent years has been the massive popularity for the 3 point shot, to which many believe was primarily influenced by Stephen Curry, who has shattered many 3 point records in the last decade. I intend to examine the trend and increasing popularity of the 3 point shot through this project in an effort to demonstrate that the NBA continues to set precedents for how the game of basketball is played.

## Methodology

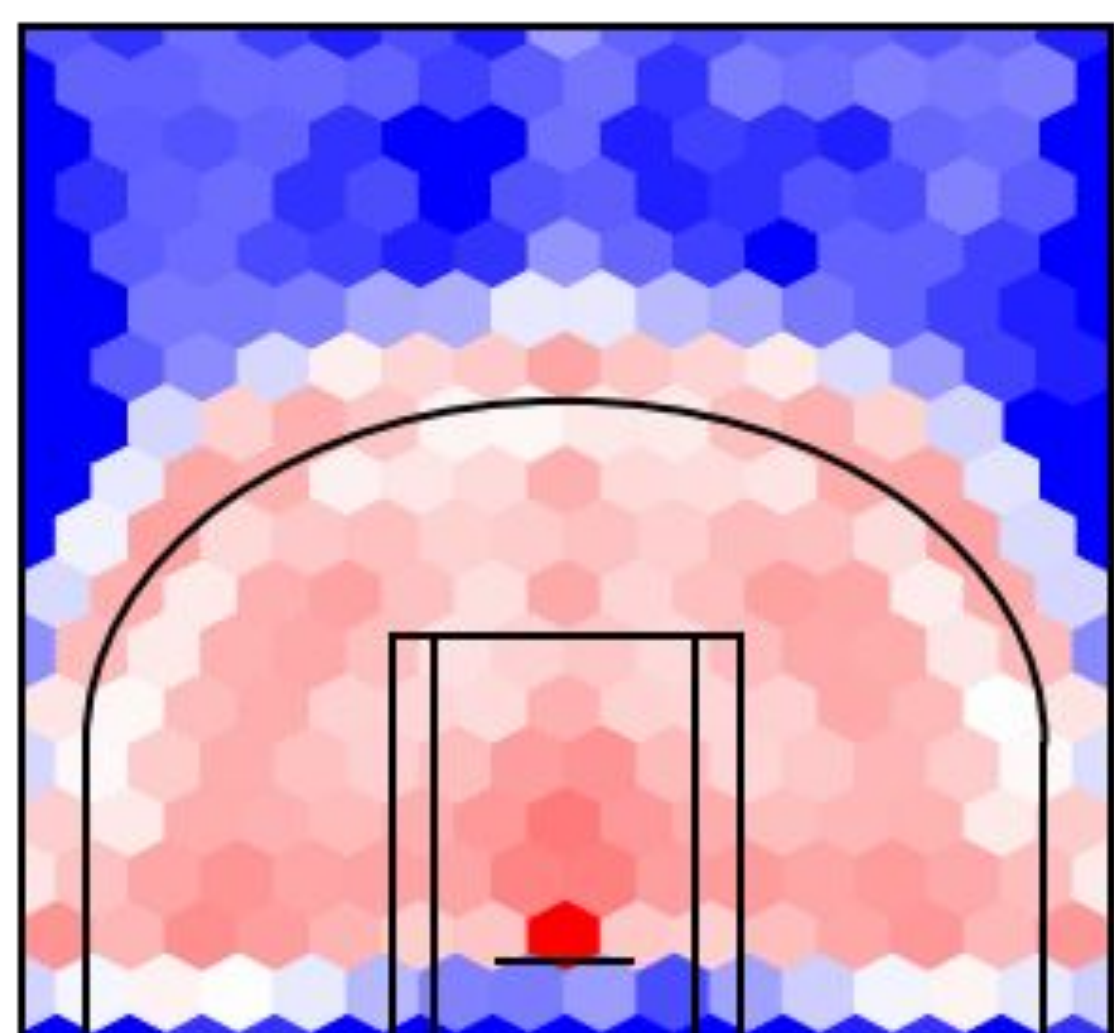
The data for this project is sourced from publicly available statistics on the official website of the NBA. Information is collected using `nba_api`, a Python package designed to pull customized information from the NBA website's massive archive of statistics. Python packages Matplotlib and Seaborn were used as tools to plot the data collected.

## Attempted Field Goals

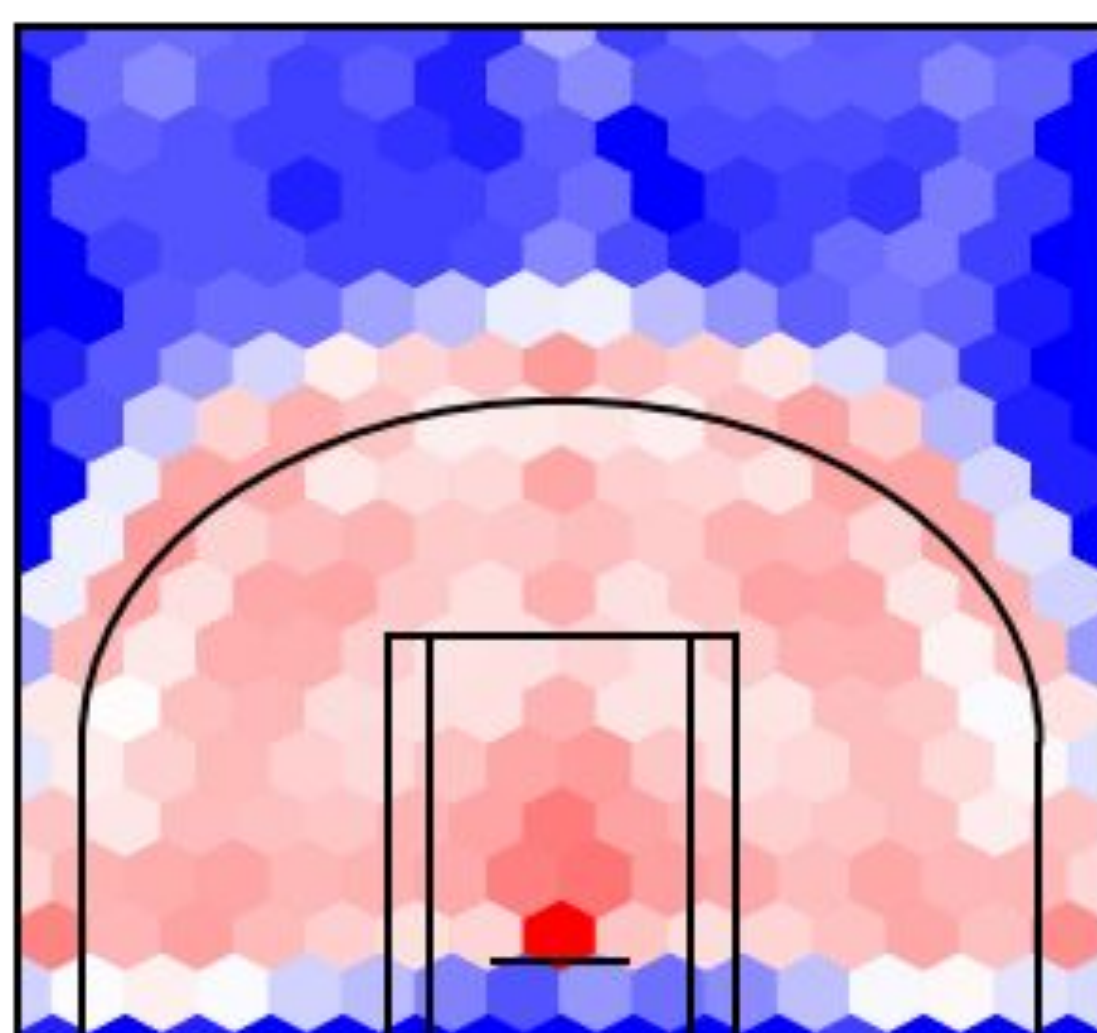
I compared location and volume of all attempted shots between seasons. By looking at the number of field goals attempted by zone over the last 20 years, 2 things can be inferred: 1) The 3 point shot has spread out both in range and volume significantly in the last 10 years. 2) The deep mid-range field goal is one of the least attempted field goal zones, suggesting that the 3 pointer has replaced its importance.

### Hexbin Heatmap of NBA Field Goals Attempted

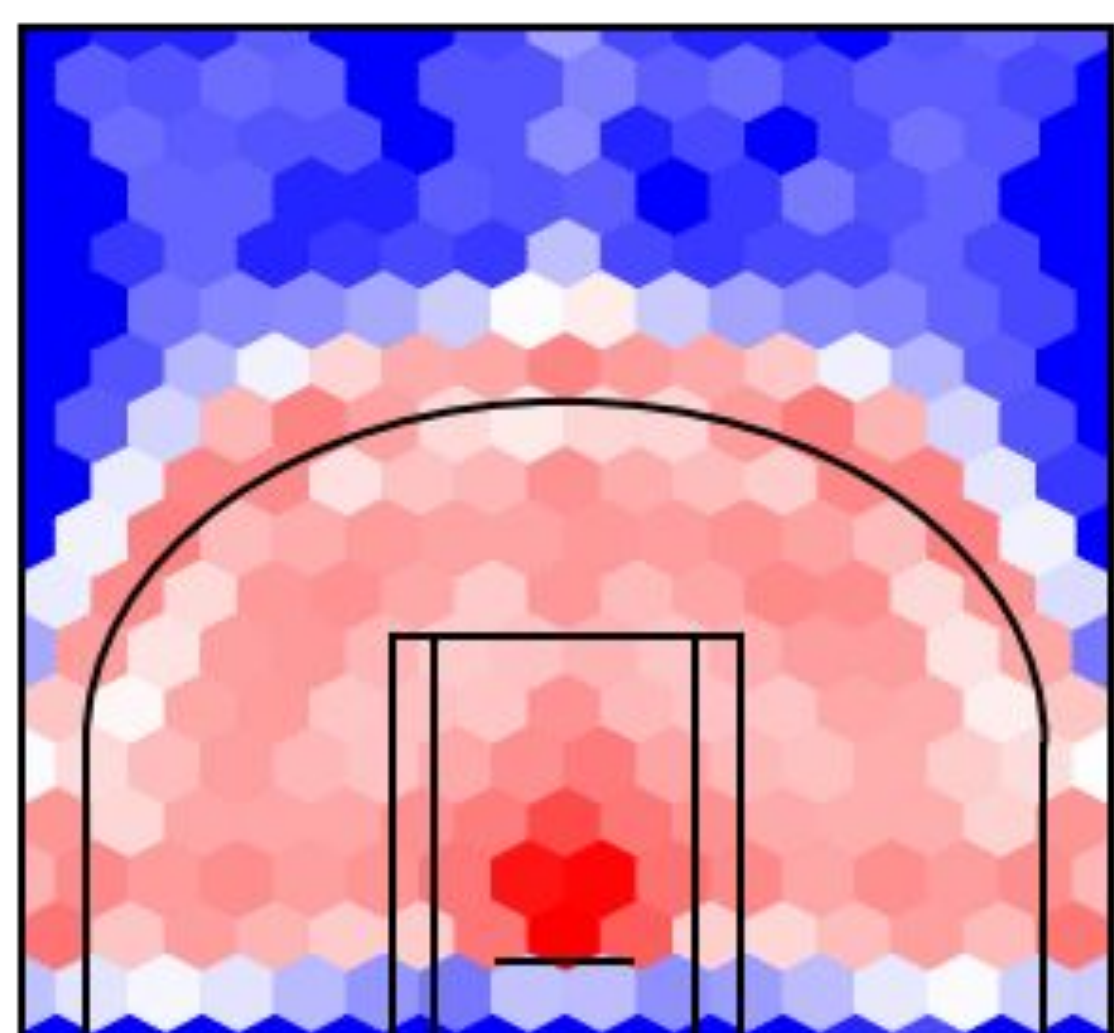
2001-02 Regular Season



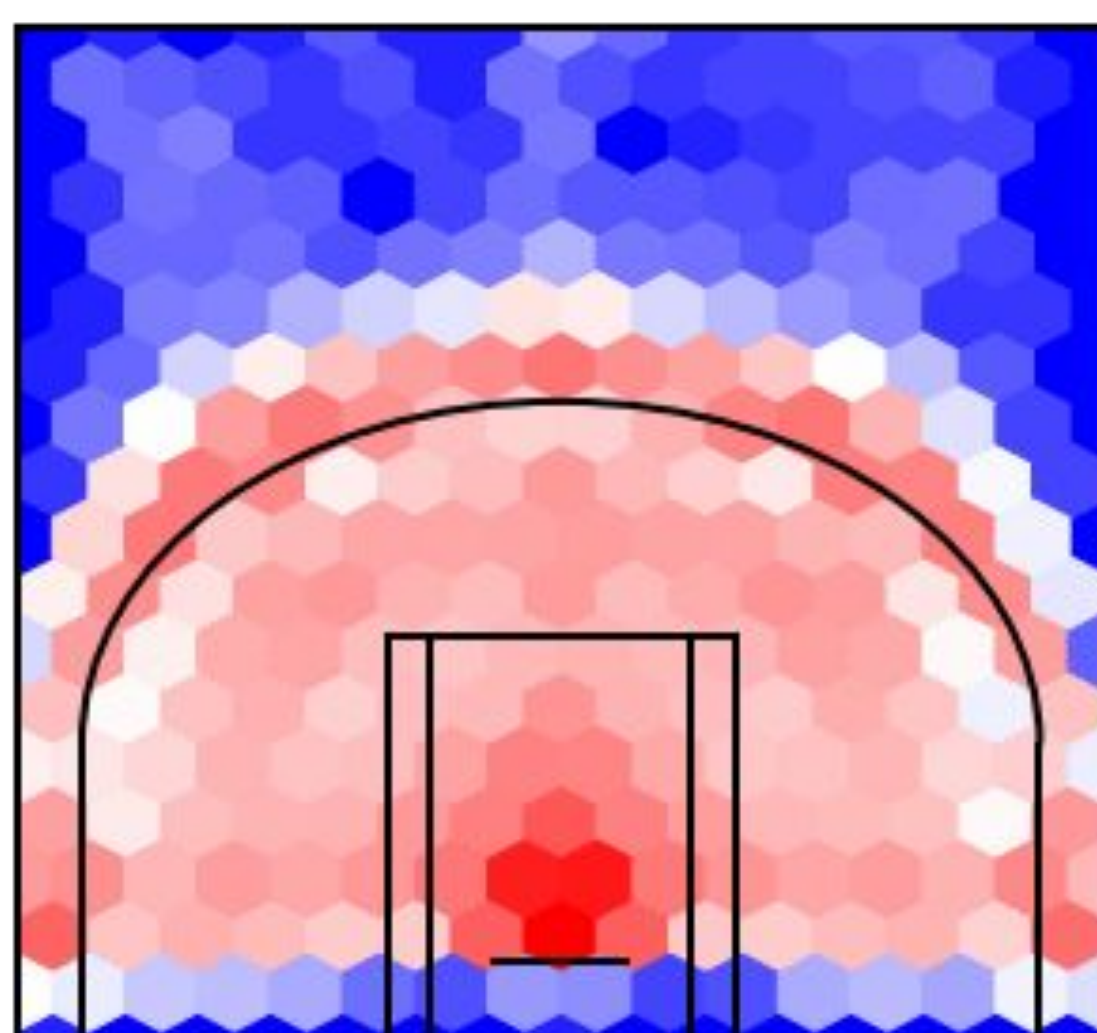
2006-07 Regular Season



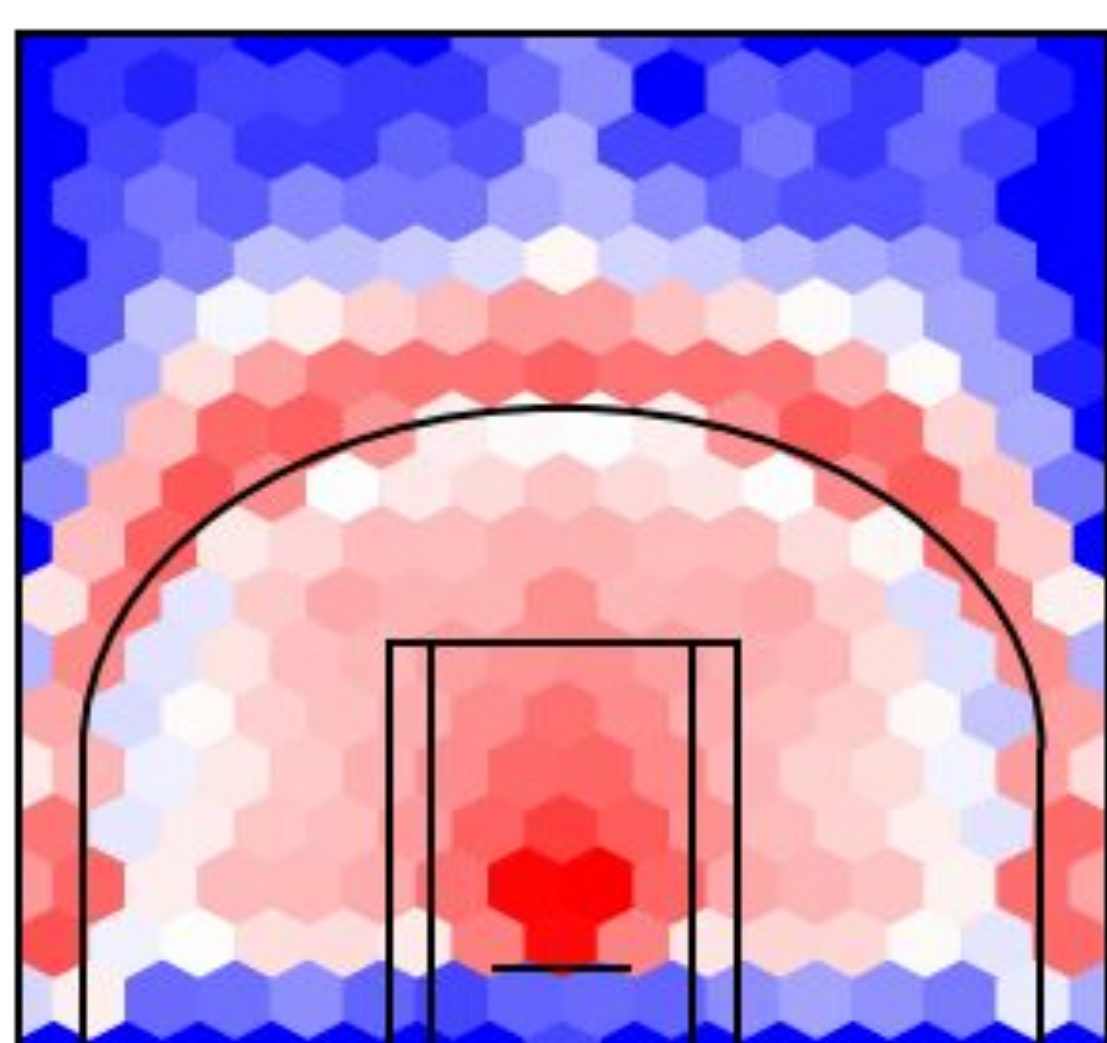
2011-12 Regular Season



2015-16 Regular Season

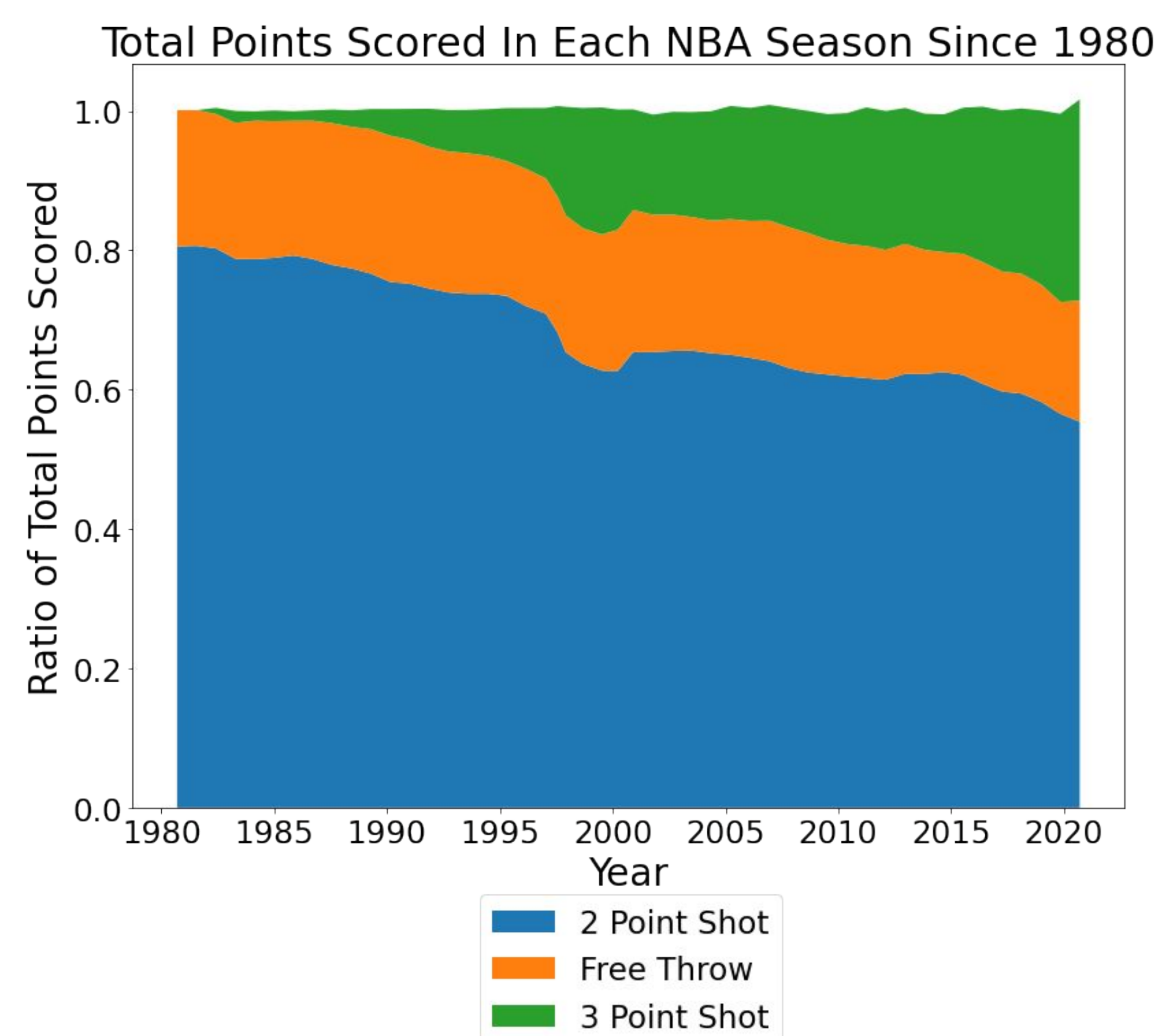


2021-22 Regular Season



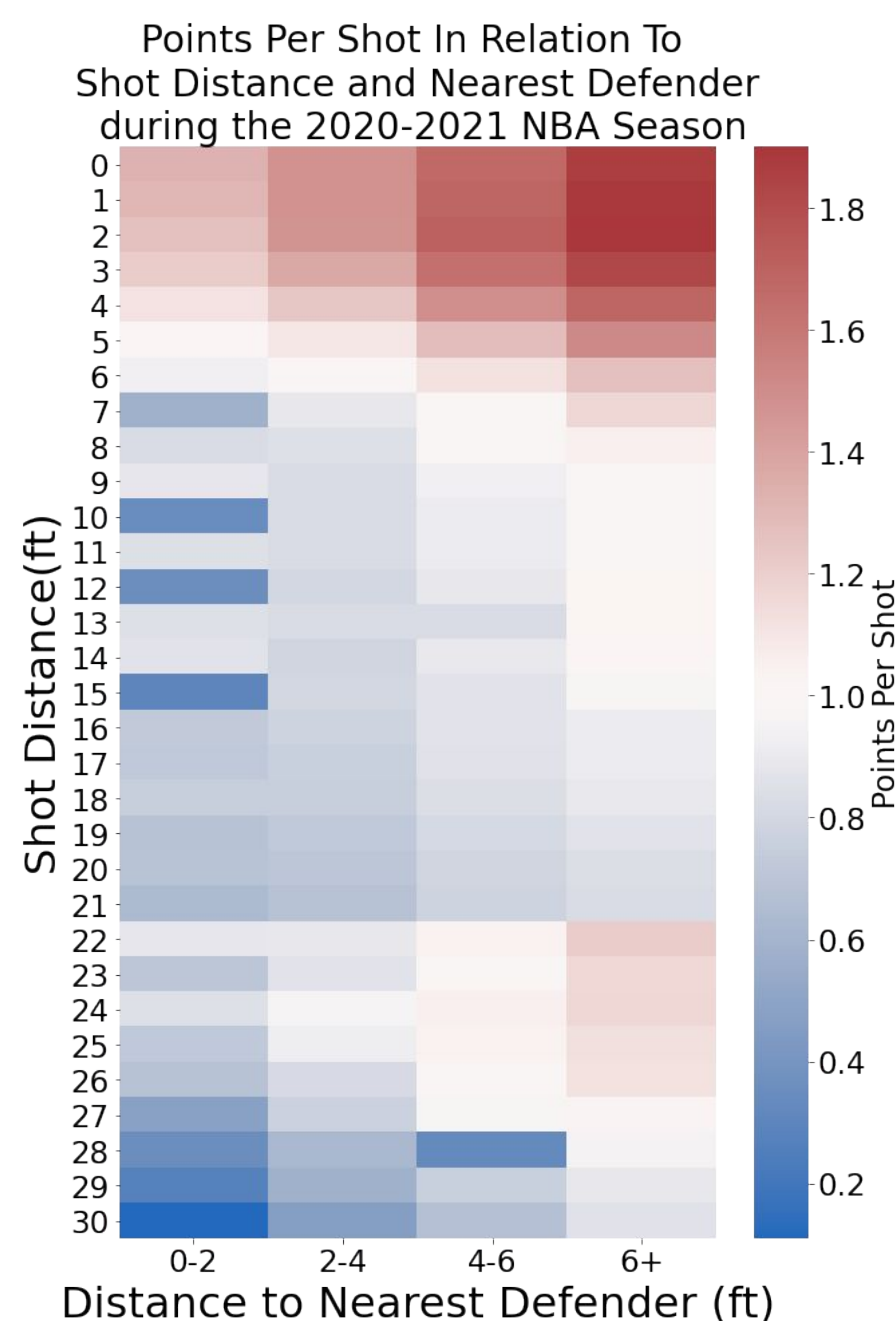
## Source of Points

It is important to consider where teams' points come from over time to truly understand how the 3 point shot is impacting the game. While it has already surpassed the free throw, the 3 point shot is on a trend to become the leading source of points scored in the NBA. It is interesting to note that the year that 3 pointers passed free throws (2009) is the same time that Stephen Curry was drafted, a player which many consider the founder of the 3 point revolution.



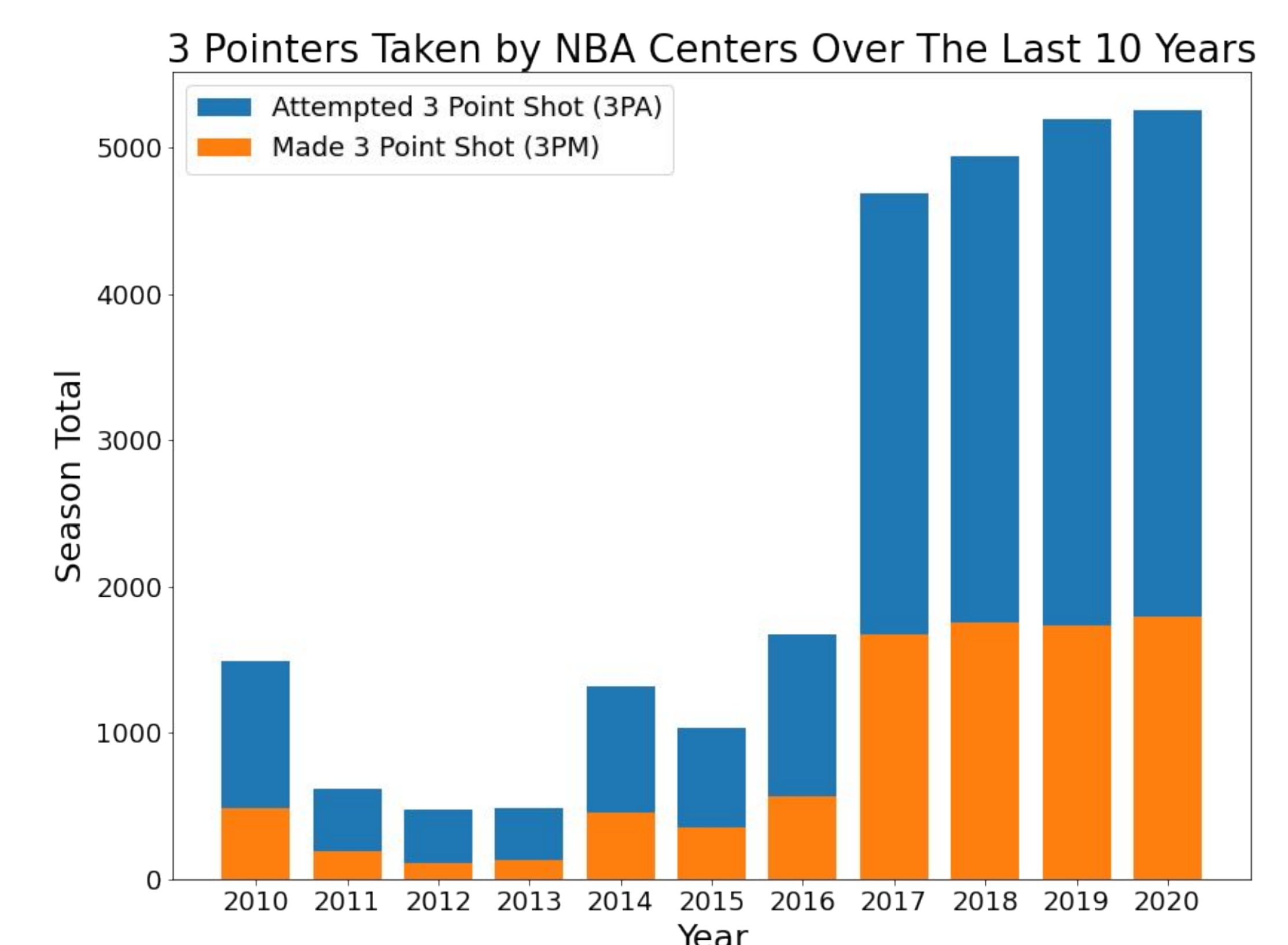
## Point Per Shot

While these figures clearly tell a story, I wanted to look deeper into why the 3 pointer is more popular. I did this by examining last season's points per shot based on the shot distance and the distance of the nearest defender, generating the heatmap shown below. It is clear that while the closest shots are generating the most points per shot, the 3 point shots that are wide open (4-6 and 6+ ft away from nearest defender) are more valuable than many closer shots, both contested and uncontested. Therefore, it implies that for a team to have the best chance of scoring more points than their opponent, they should emphasize taking 3 point shots in their game plan.



## Impact on the Center Position

The last thing I investigated was how the 3 point shot impacts the way positions are played in the NBA. The position of center is quite literal in basketball. Players of this position are typically the tallest player on the team and use that to their advantage to center themselves close to the basket in order to get rebounds and close shots. That is, until recently. In the stacked bar chart below, it can be seen that centers are taking dramatically more 3 pointers (and making them!), which lead me to infer that the NBA is setting a new precedent by changing the way the center position is played through the proliferation of the 3 point shot.



## Conclusion

Overall, I've examined different ways in which the 3 point shot has impacted the way professional basketball and the positions within it are played. My research suggests that the shot has become more valuable to teams than many closer shots that are closer to the basket, as well as seeming to be on track to become the primary source of points scored for teams. This project demonstrates that the NBA sets precedents for how the game and the positions within it are played, with the precedent in question being the 3 point shot. In turn, these precedents guide future young stars who will continue to develop the game in unimaginable ways.

## References

[https://github.com/swar/nba\\_api](https://github.com/swar/nba_api)  
<https://matplotlib.org/stable/index.html#>  
<https://seaborn.pydata.org/index.html>  
<https://www.nba.com/>  
<https://towardsdatascience.com/make-a-simple-nba-shot-chart-with-python-e5d70db45d0d>

