NBA Basketball Shot Analysis

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Motivation and Objective

- The NBA is a multi-billion dollar sports market that draws millions of fans each year
- While we all watch the occasional basketball game, there are countless metrics and statistics that underlie the game. In this data set, we analyzed the most relevant metric — shot analysis
- Specifically, we wanted to see how basketball has changed over time, through where players take shots, where shots are most successful, and, and if players are getting "better"
- Demonstrate the trends behind the "3-point revolution"

Data Set and Methodology

- The data set we utilized came directly from the NBA website, where we utilized an API that calls from the NBA website.
- The data set starts from 1996 and has data for each player per season
- Based on the data, we either went year by year on analysis or shot by shot on analysis.

Player Data CSV Excerpt
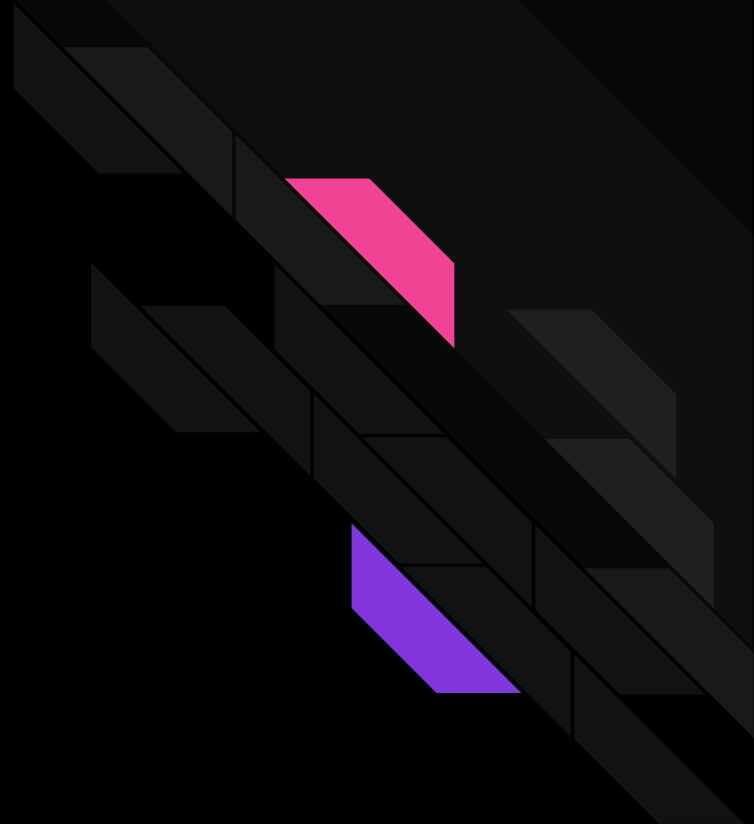
| EVENT_TYPE	ACTION_TYPE	SHOT_TYPE	SHOT_ZONE_BASIC	SHOT_ZONE_AREA	SHOT_ZONE_RANGE	SHOT_DISTANCE	LOC_X	LOC_Y
Missed Shot	Driving Finger Roll Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	1	3	12
Missed Shot	Step Back Jump shot	3PT Field Goal	Above the Break 3	Center(C)	24+ ft.	27	-61	264
Missed Shot	Step Back Jump shot	3PT Field Goal	Above the Break 3	Center(C)	24+ ft.	25	-1	259
Made Shot	Step Back Jump shot	3PT Field Goal	Above the Break 3	Left Side Center(LC)	24+ ft.	26	-120	232
Made Shot	Driving Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	2	3	20
Missed Shot	Driving Finger Roll Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	1	2	13
Made Shot	Driving Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	1	0	17
Missed Shot	Driving Floating Jump Shot	2PT Field Goal	In The Paint (Non-RA)	Center(C)	Less Than 8 ft.	7	26	65
Missed Shot	Jump Shot	3PT Field Goal	Above the Break 3	Left Side Center(LC)	24+ ft.	24	-160	180
Made Shot	Running Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	0	2	9
Missed Shot	Jump Shot	3PT Field Goal	Above the Break 3	Right Side Center(RC)	24+ ft.	24	115	218
Made Shot	Pullup Jump shot	3PT Field Goal	Above the Break 3	Right Side Center(RC)	24+ ft.	24	78	235
Missed Shot	Step Back Jump shot	3PT Field Goal	Above the Break 3	Right Side Center(RC)	24+ ft.	24	145	199
Missed Shot	Driving Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	3	-9	31
Made Shot	Step Back Jump shot	3PT Field Goal	Above the Break 3	Right Side Center(RC)	24+ ft.	25	103	231
Made Shot	Driving Finger Roll Layup Shot	2PT Field Goal	Restricted Area	Center(C)	Less Than 8 ft.	1	-3	16

1. Players are becoming more efficient over time
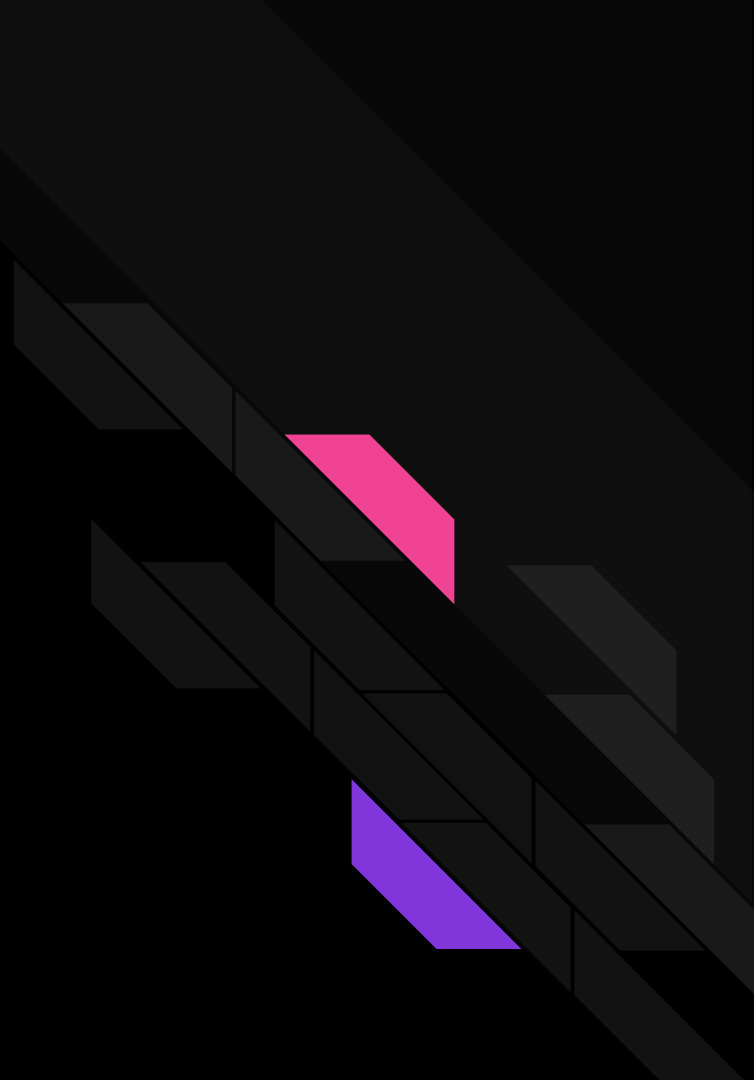
Accuracy of two point attempts

- Seems to be about a 5 point increase in accuracy from 1996 to Today

- We could speculate that players of today are simply better overall
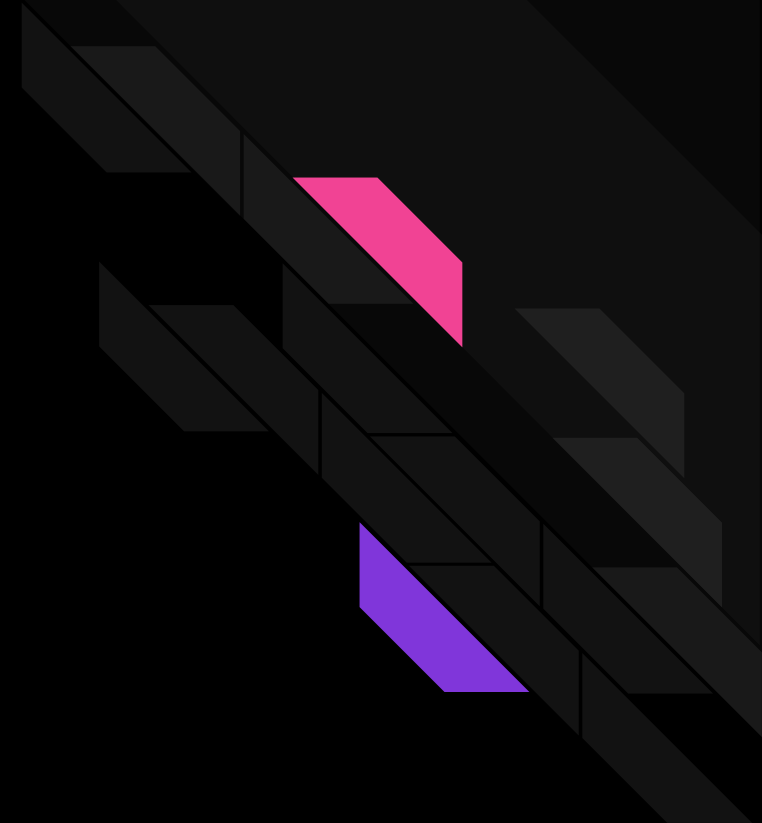
Accuracy of three point attempts
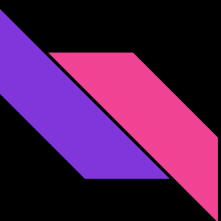
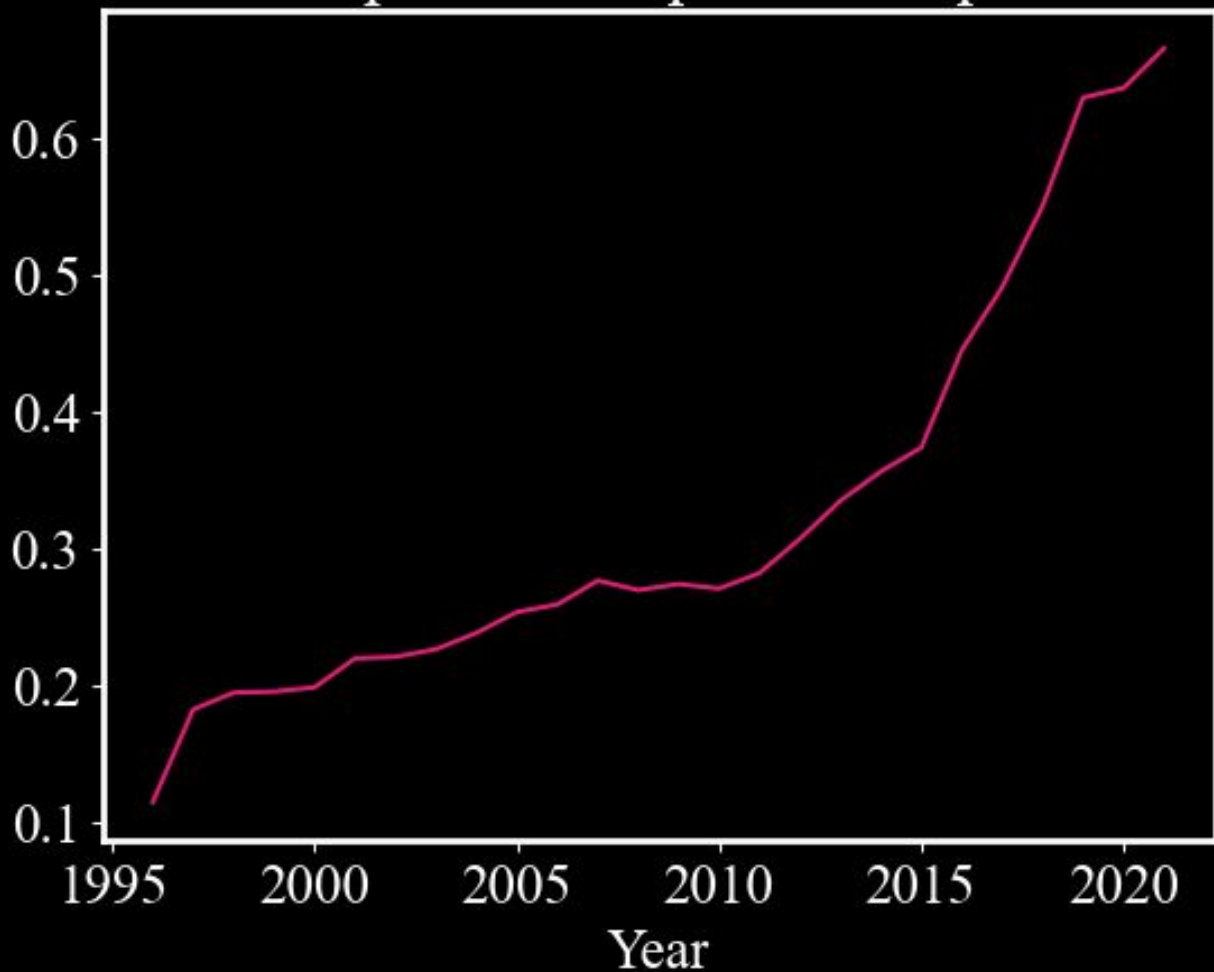- Appearance of a general upward trend

- Much higher variance for the distribution
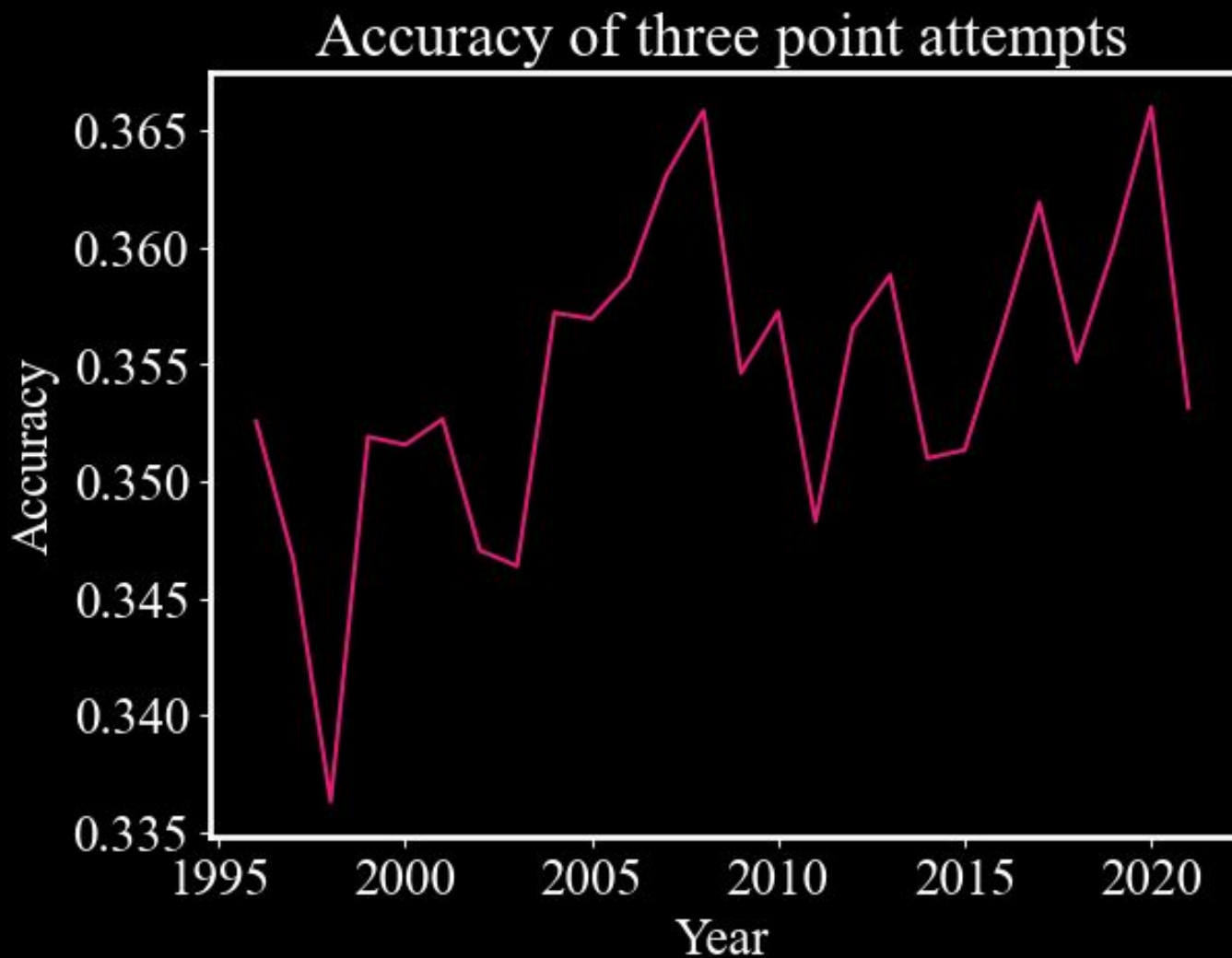
2. Popularity of 3-Pointers versus 2-Pointers

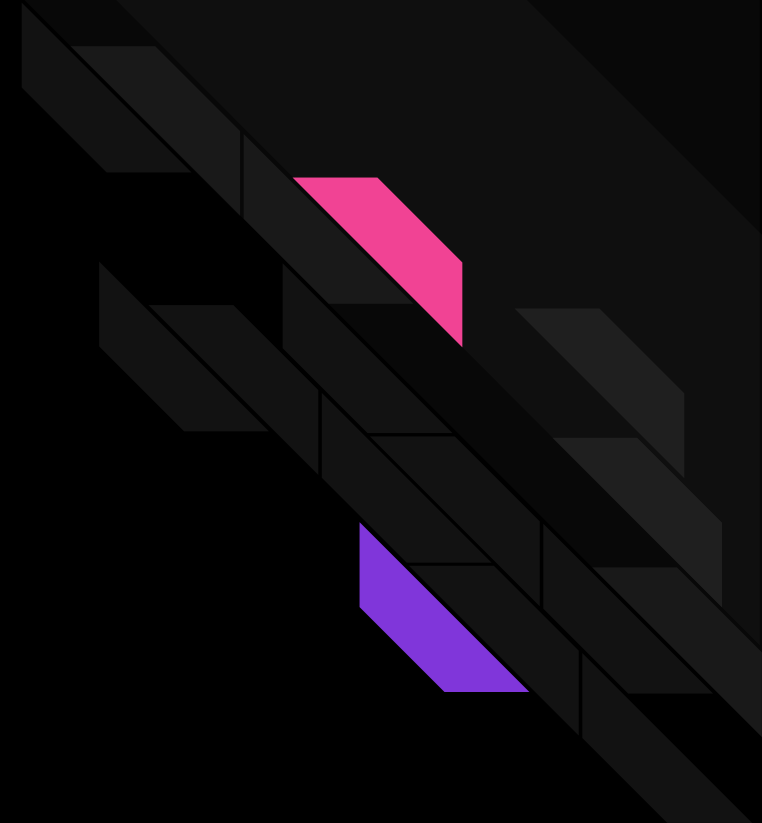# Ratio of three point attempts vs two point attempts

- Significant increase in 3PT:2PT ratio

- Seems to be a much higher slope after 2015. The 2014-2015 season is Steph Curry's first MVP and 2015-2016 was his second MVP

3. Efficiency of Specific Shots

Step Back Jump shot (44.49% success)

- Heat Map of all Step Back Jump Shots

- Not a super successful shot, looking at the heat map it happens relatively far from the basket as well
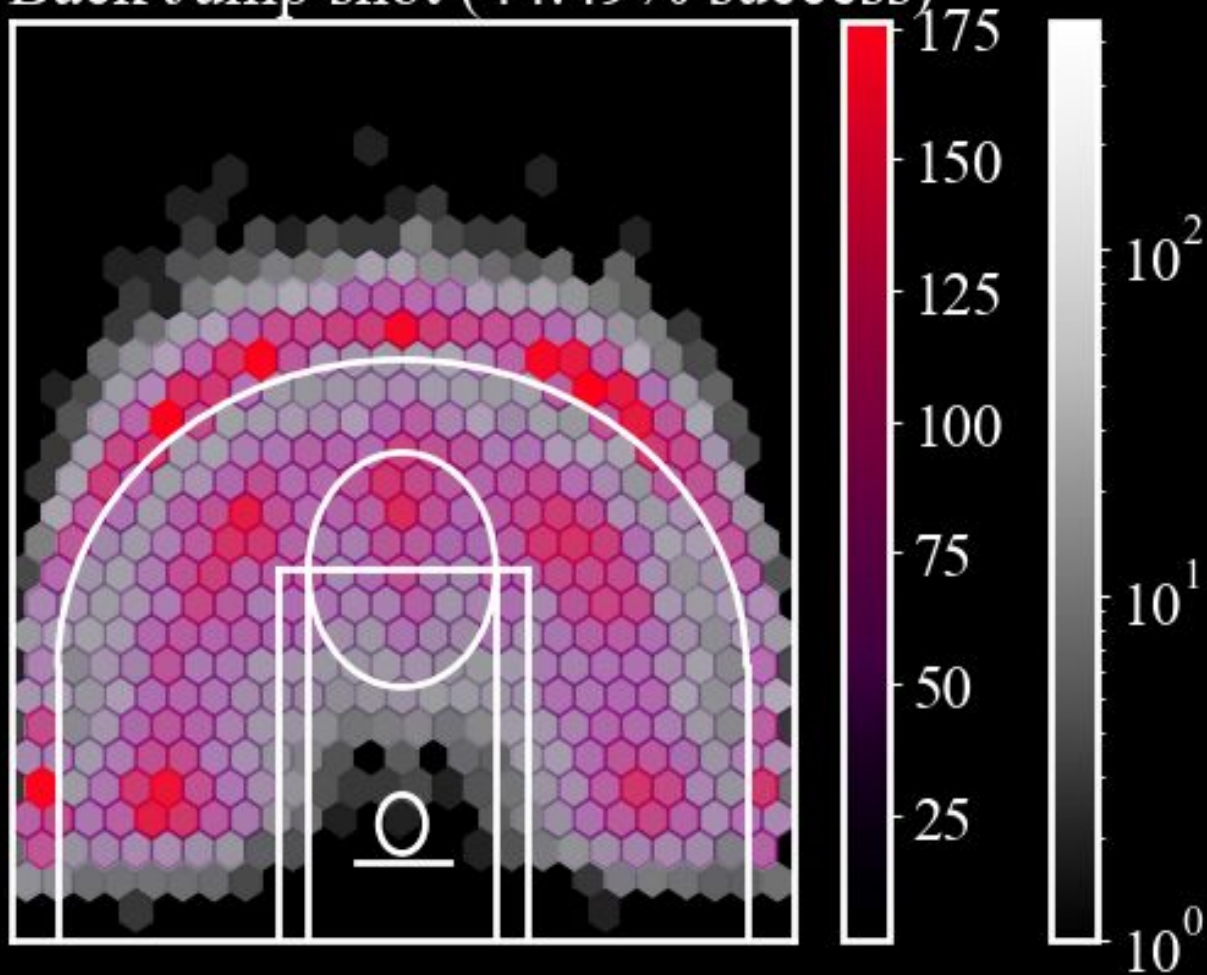
- Another relatively unsuccessful shot

- This shot is also a very common one, and if more people are likely to take the shot, that contributes to a lower success
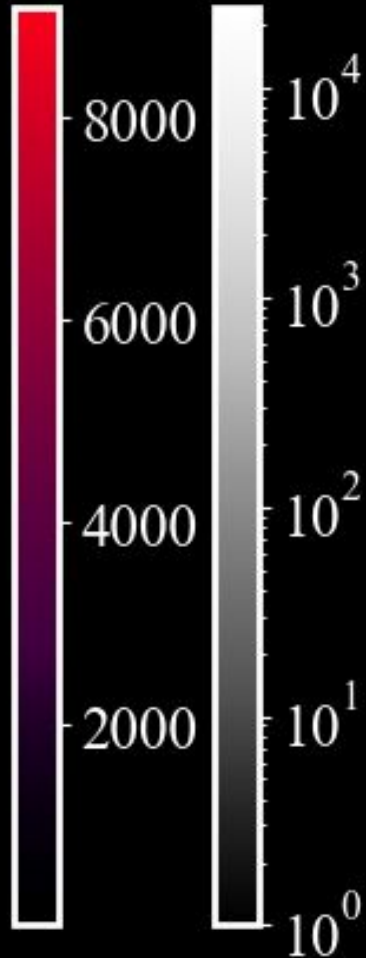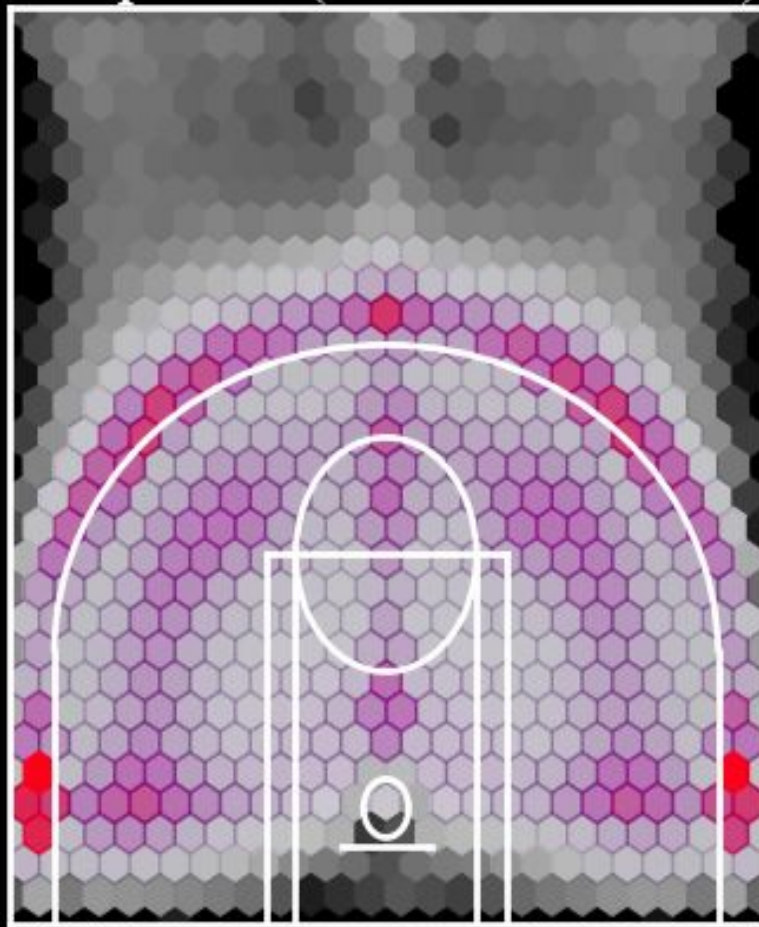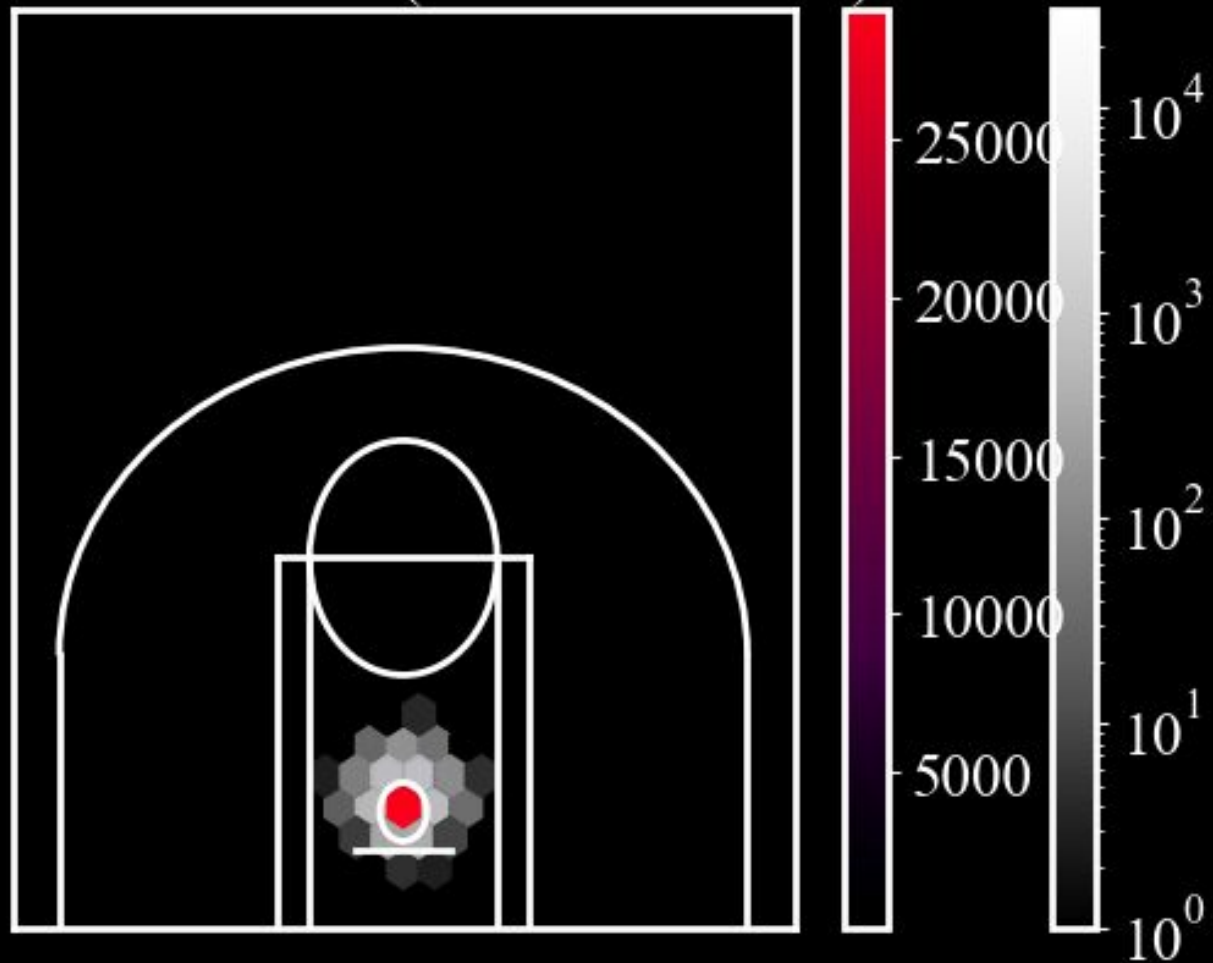
- Compared to the previous shots, the layup here is much more successful

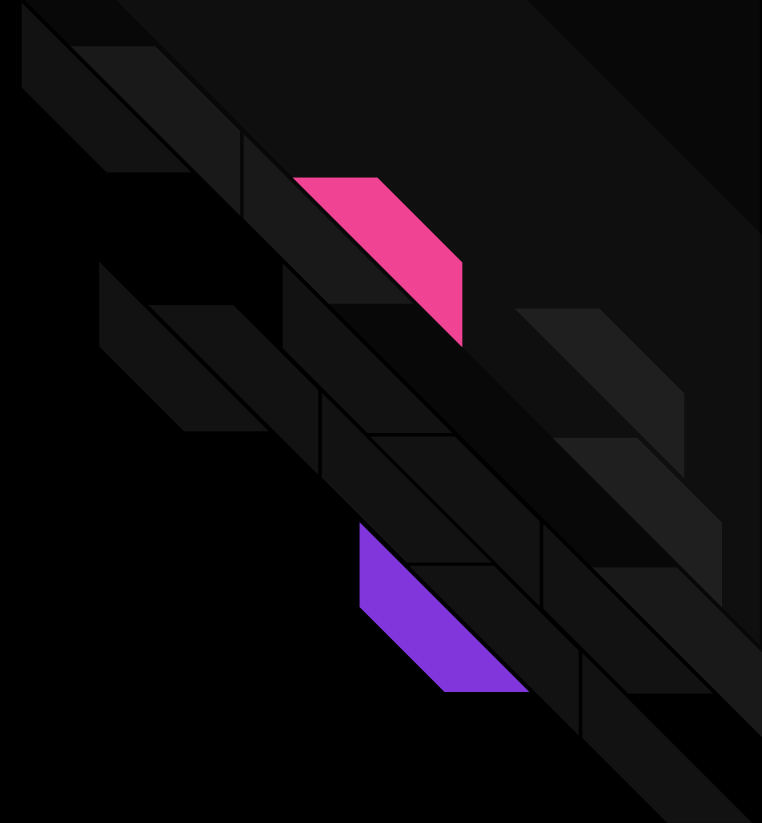- Factoring in the amount of successes as well, clearly this is a favorite shot of basketball players
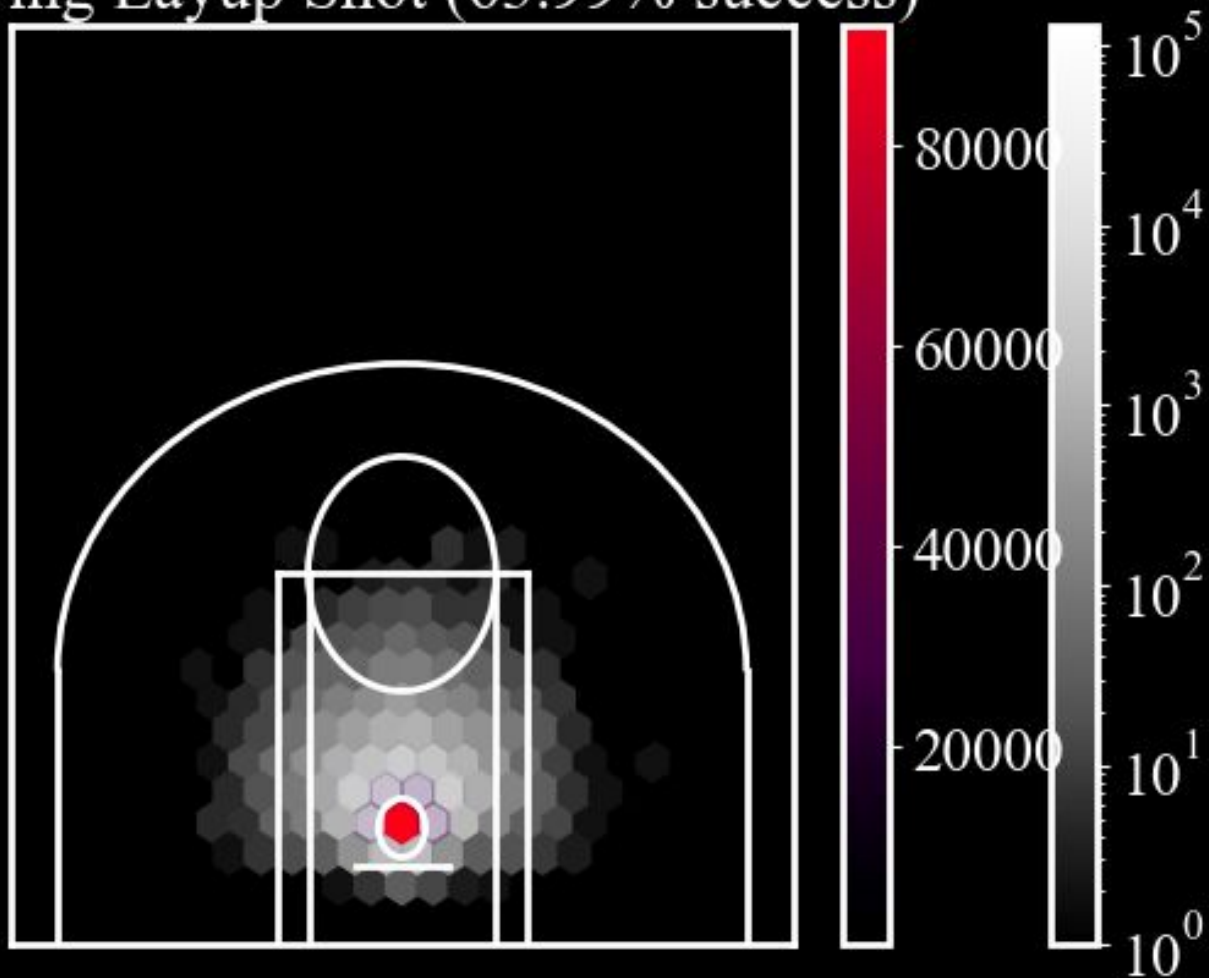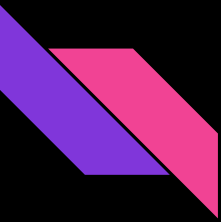
Slam Dunk Shot (97.53% success)

- Extremely efficient shot, with numerous successes

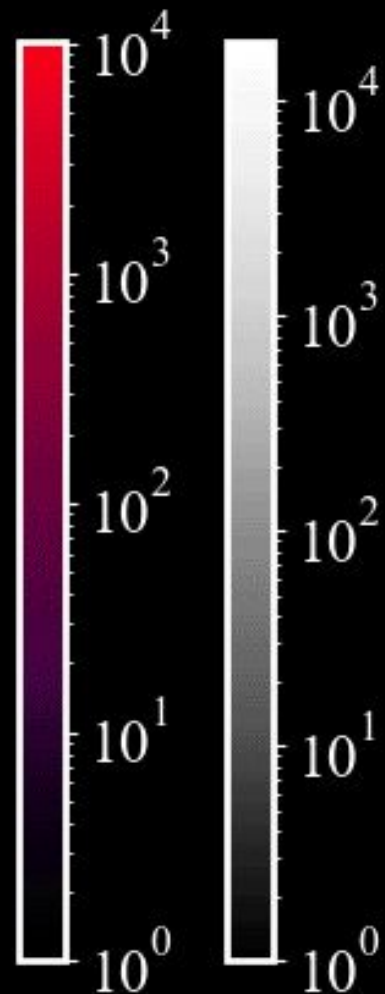- Why is this not the favorite shot of all players if it is so effective?

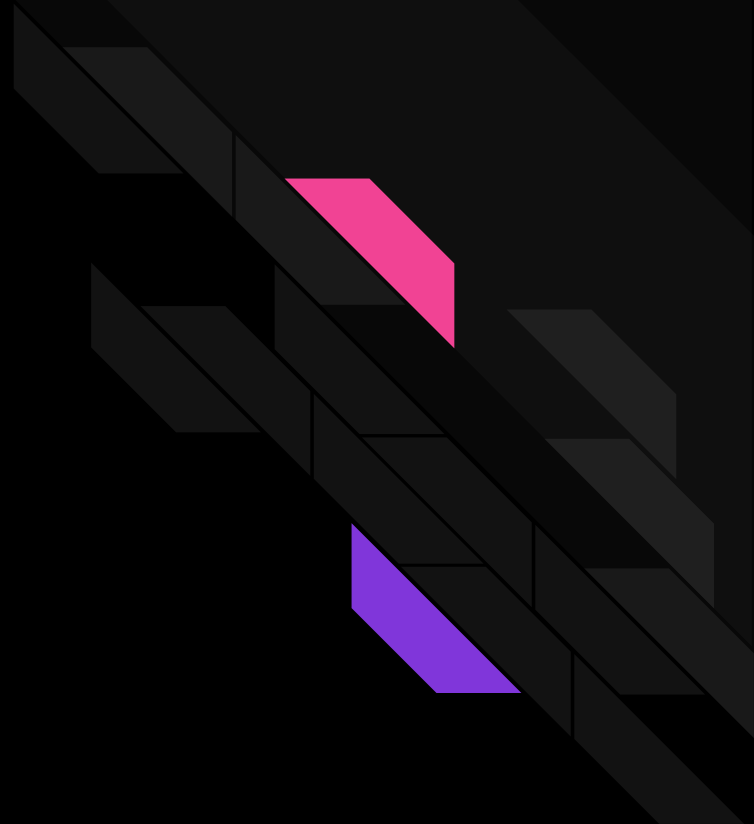4. Shooting location changed from 1996-2022

- Looking at the transition over time, the success of shots and shot attempts seem to be happening from farther and farther back

- Players are starting to favor longer shots
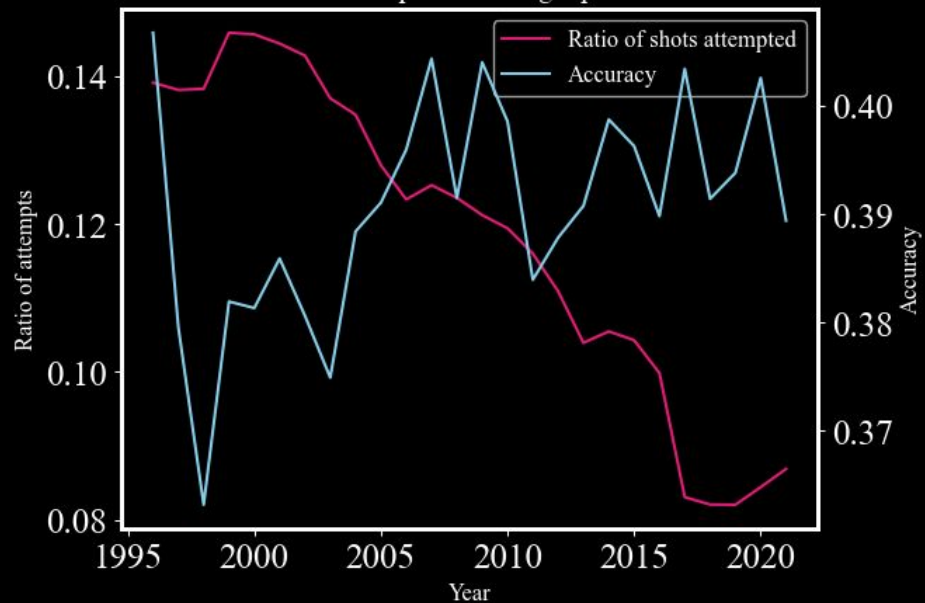
1996 (45.12% success)

5. Trending to Center

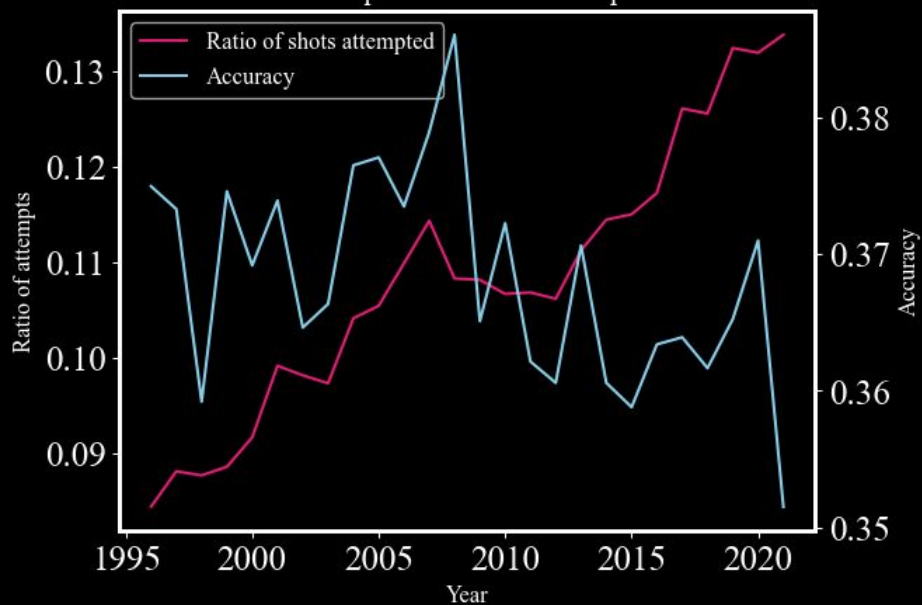Shots attempted from Left position

Shots attempted from Right position

Shots attempted from Left Center position

Shots attempted from Right Center position

Thank You!