This report will address the methods and key findings of the exploration of the dataset, as well as how those relate to the overall scope and direction of the project. The dataset that we explored was a CSV file containing records of every shot taken by one player from each team during the 2014-2015 NBA season. We first decided to summarize the data, and found that the mean number of shots per game for each player was about 8.9 shots/game (see Figure 1). We decided to visualize this finding further, as seen in Figure 1, which helped us decide to only include players who average more than four shots a game in our data exploration. This will help us eliminate players who we don't shoot enough to show meaningful results regarding hot streaks and the hot hand.

After cleaning the data, we decided to calculate and plot the average field goal percentage by player (see Figure 2). This plot shows that there is a moderate amount of variation in the data, with some players dipping as low as 30-35% and some players as high as 70%. We found that the maximum values on that plot represent the players Ed Davis, Mason Plumlee, James Johnson, Tyson Chandler, and Deandre Jordan. Since these players all had the highest field goal percentage in our dataset, we decided to focus the remainder of our exploration on their statistics. While these players may not give us an idea of the average player in the league, we believed their high field-goal percentage would give us more streaks to examine, since they're making shots with more consistency than others.

By plotting out each player's field goal percentage by game (see Figures 3 – 7), we hoped to search for evidence of hot-hand on a macroscopic scale. James Johnson's (Figure 5) and Mason Plumlee's (Figure 4) plots display some of this evidence, as we can see some points in the season where the players are consistently shooting at high field-goal percentages. We hope to

examine the concept of hot-hand on a macroscopic scale as we continue to work through this project.

In order to look closely at the number of hot streaks our players went on during the season, we created a new column in the data that kept track of the current streak a player was on. We then counted instances of these players hitting a streak of four or more, and considered those hot streaks. We also counted instances of players missing four or more in a row, and considered these cold streaks. Figure 8 shows the number of hot and cold streaks for each of our five players. By applying this method of classification to more than just these five players, we could potentially find which players may be more susceptible to going on streaks, and then examine those players further.

We also decided to explore the effect of shot distance and nearest defender distance on whether a player will make or miss a shot. The plots in Figures 9-13 show us that as these players took shots further from the basket, they were more likely to miss. There also seems to be a clear correlation between defender distance and shot outcome that can be seen most prominently in Deandre Jordan's plot (see Figure 13). This finding will be relevant as we eventually examine how a player's hot streak affects shot-selection and defender distance.

Overall, our data exploration gave us a good idea of how to examine our data and how streaky some of the better shooters in the league are. We hope to continue to use these exploration methods as we continue to test the hot-hand on a game-to-game basis and a season-wide basis.

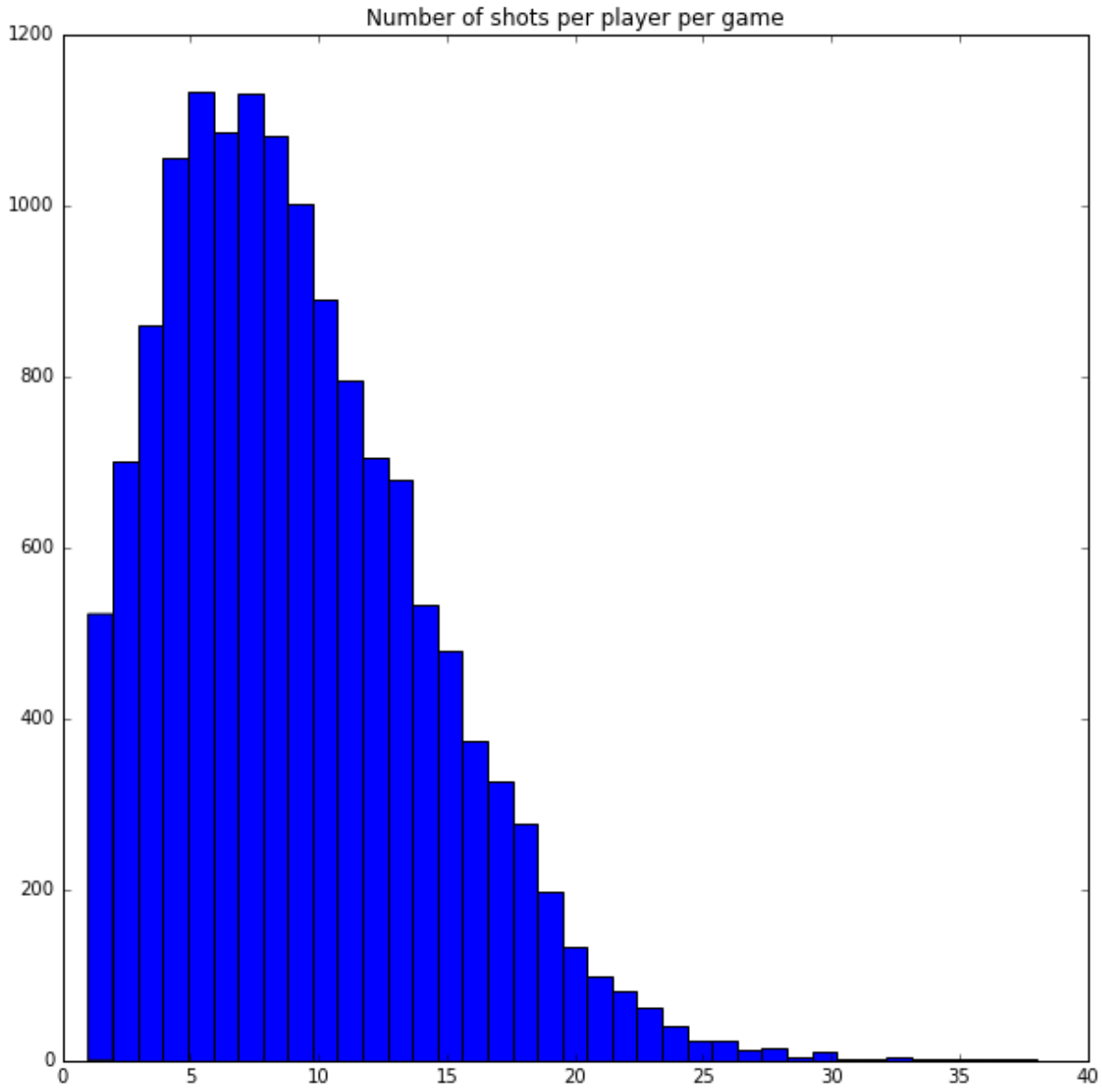
Number of shots per player per game
1200
1000
800
600
400
200
0
0
5
10
15
20
25
30
35
40

Figure 1

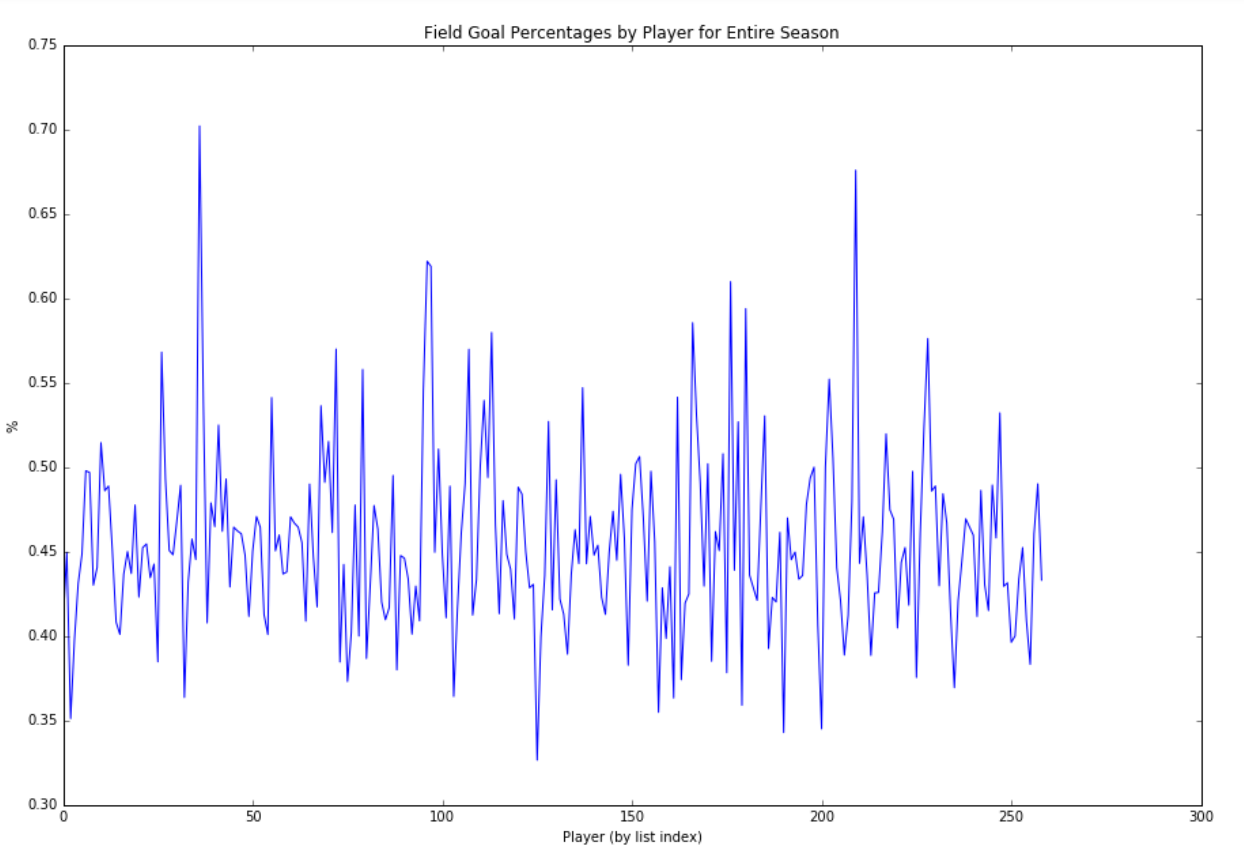

Figure 2

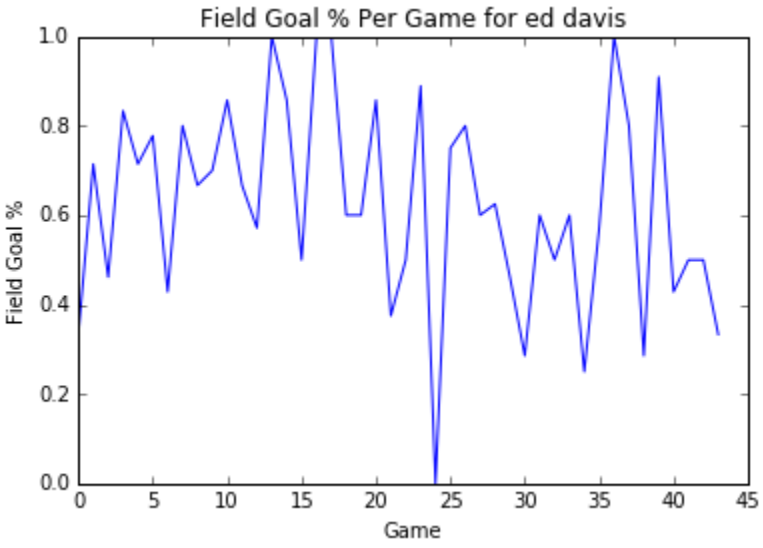

Figure 3

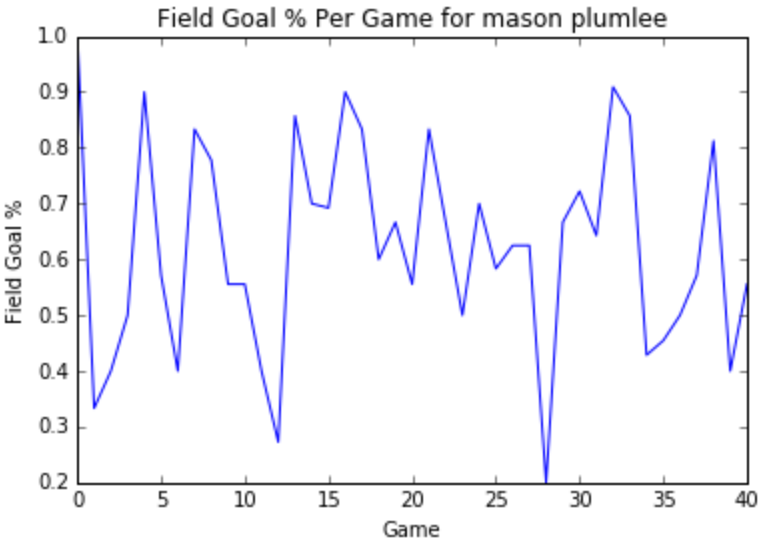

Figure 4

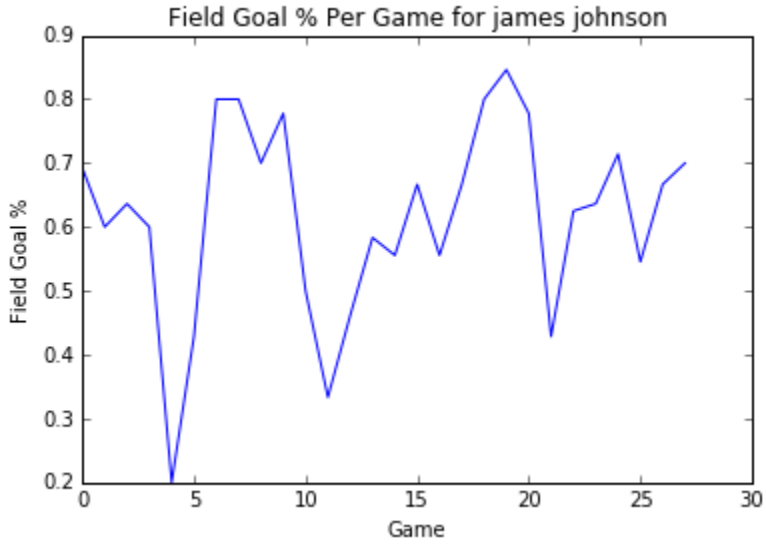

Figure 5

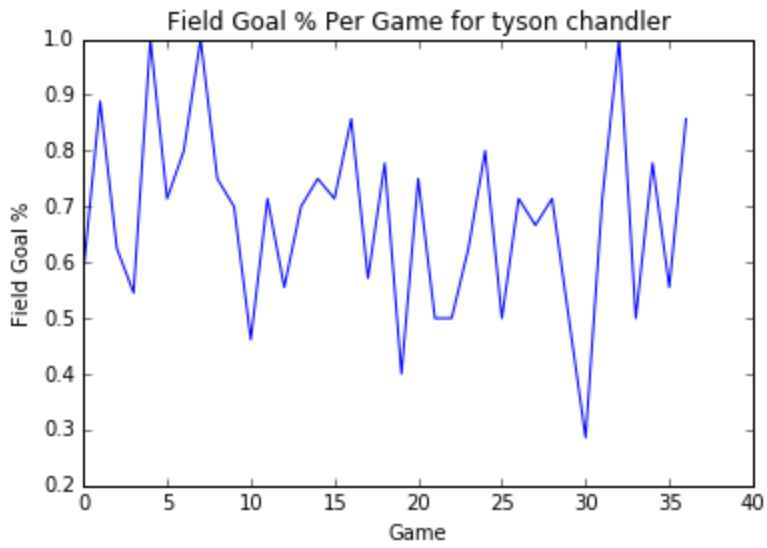

Figure 6

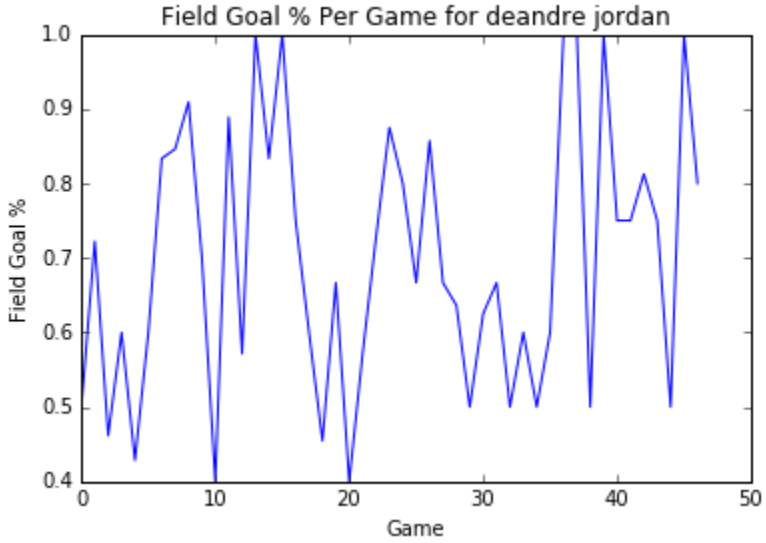

Figure 7

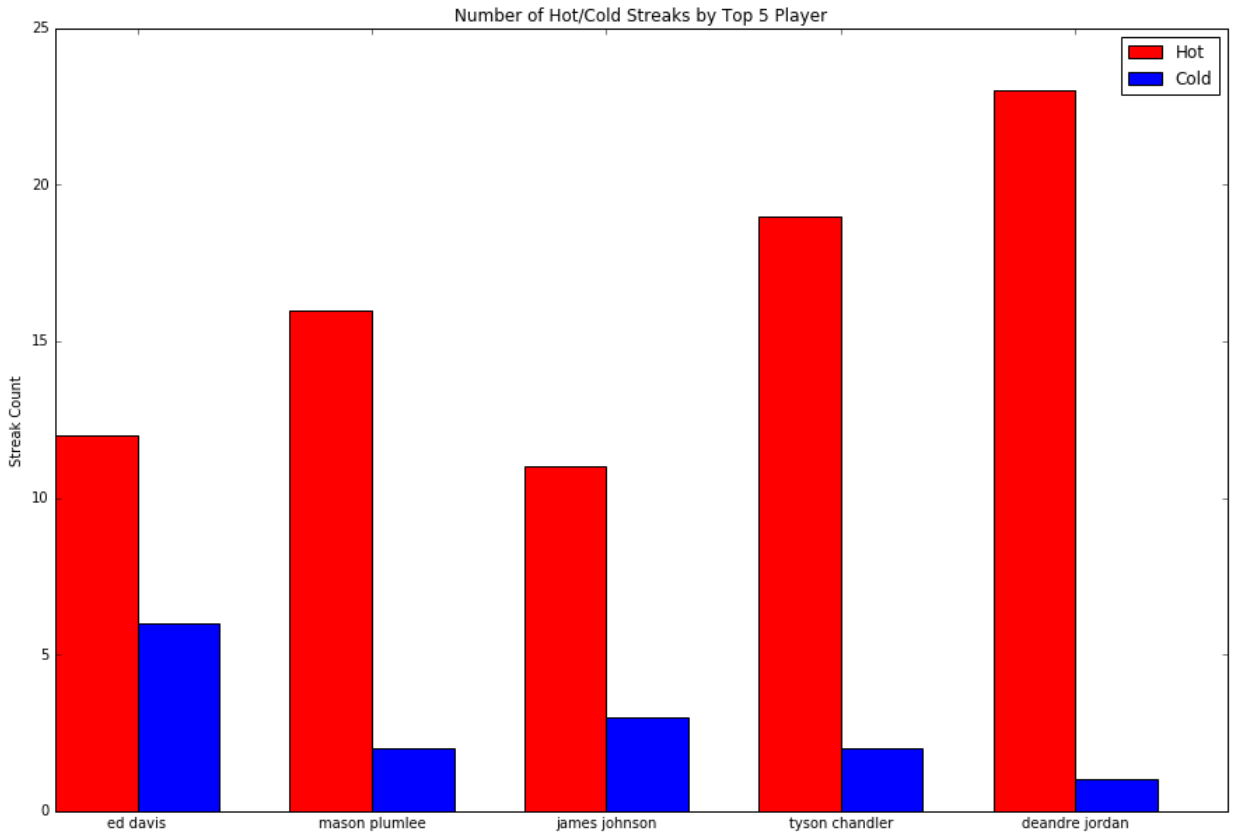
Number of Hot/Cold Streaks by Top 5 Player
Hot
Cold
Streak Count
25
20
15
10
5
0
ed davis
mason plumlee
james johnson
tyson chandler
deandre jordan

Figure 8

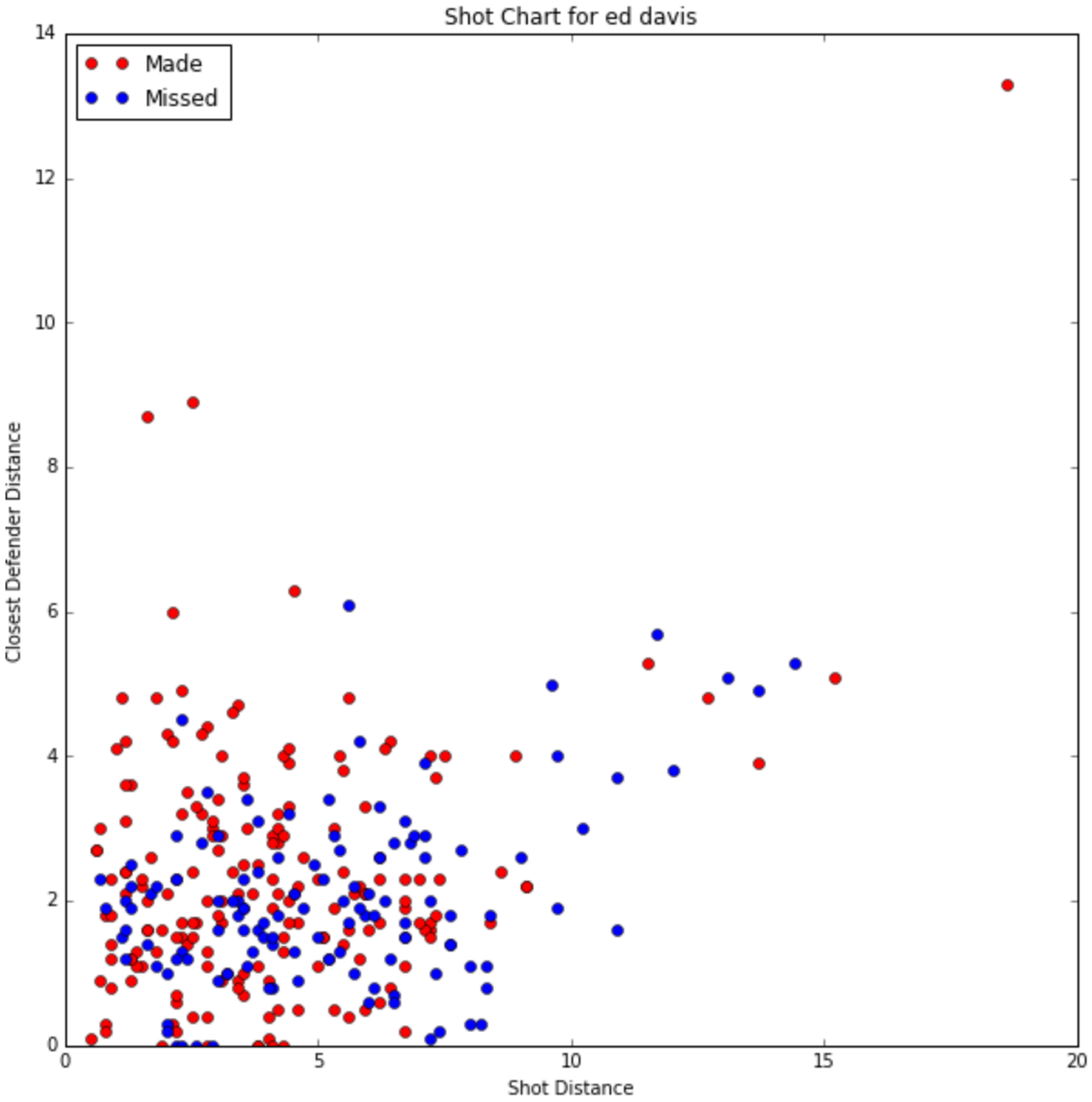
Shot Chart for ed davis
Made
Missed
Closest Defender Distance
Shot Distance
0
2
4
6
8
10
12
14
0
5
10
15
20

Figure 9

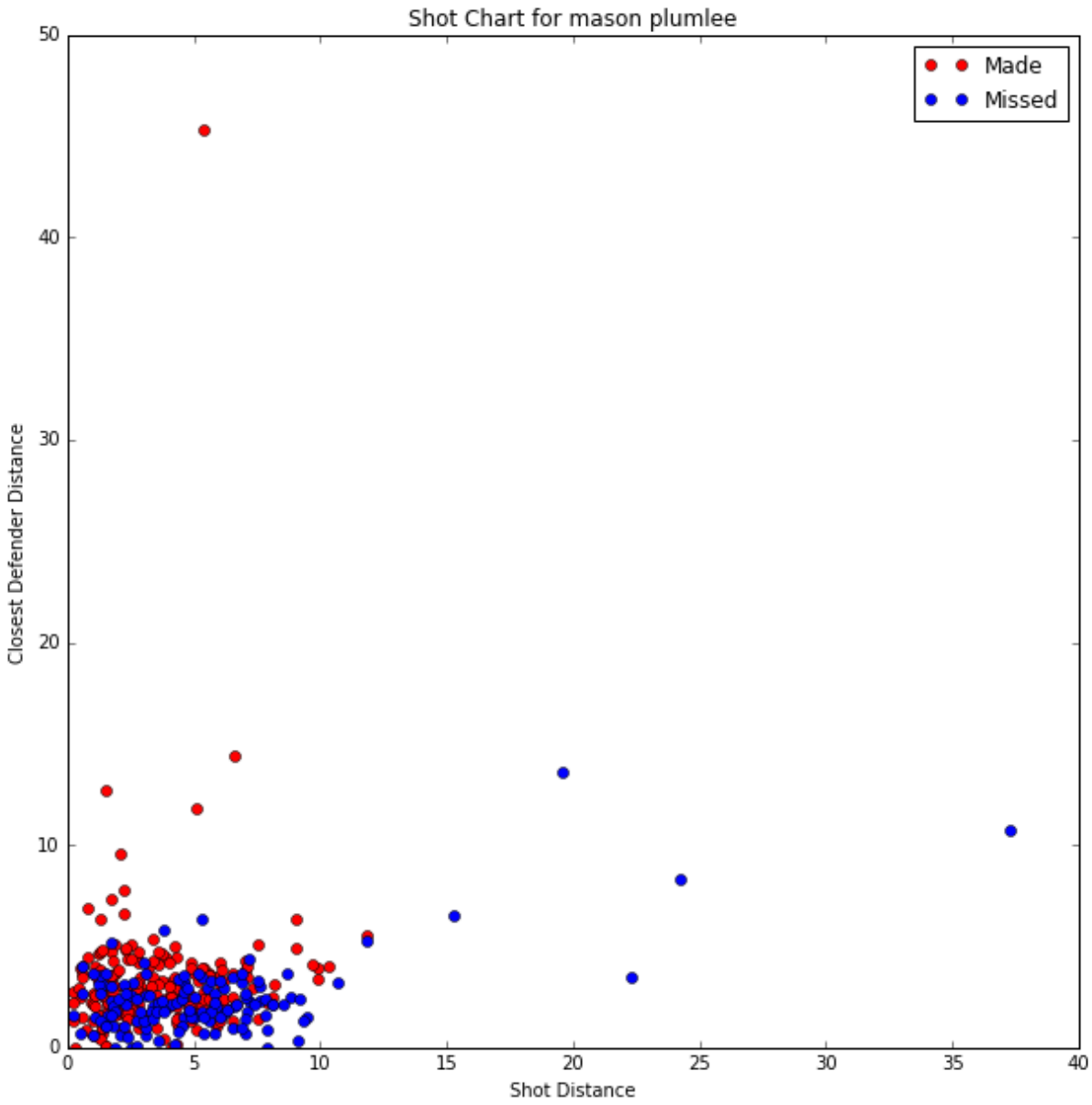
Shot Chart for mason plumlee
Made
Missed
Closest Defender Distance
Shot Distance
0
10
20
30
40
50
0
5
10
15
20
25
30
35
40

Figure 10

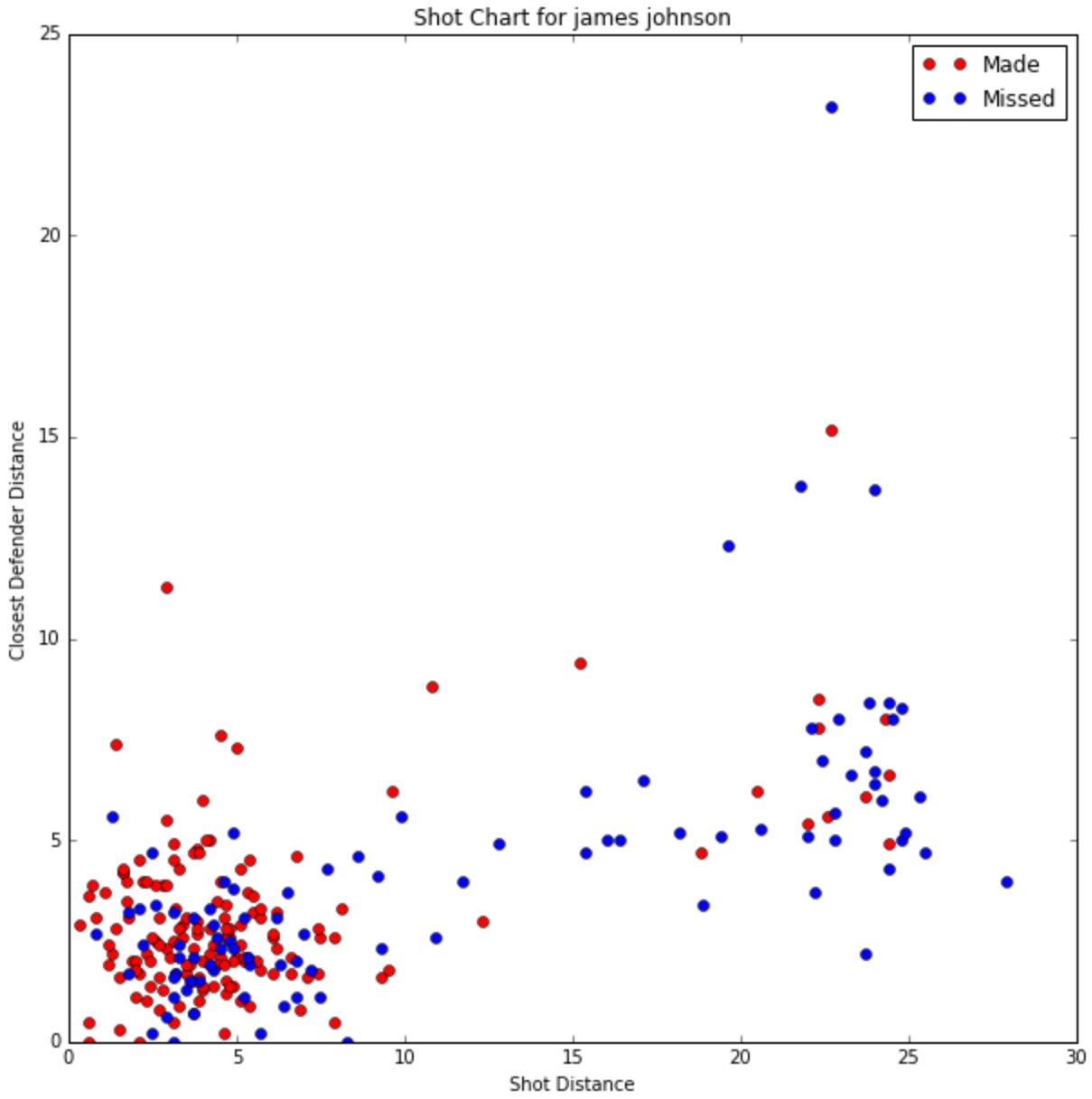
Shot Chart for james johnson
Made
Missed
Closest Defender Distance
Shot Distance
0
5
10
15
20
25
30

Figure 11

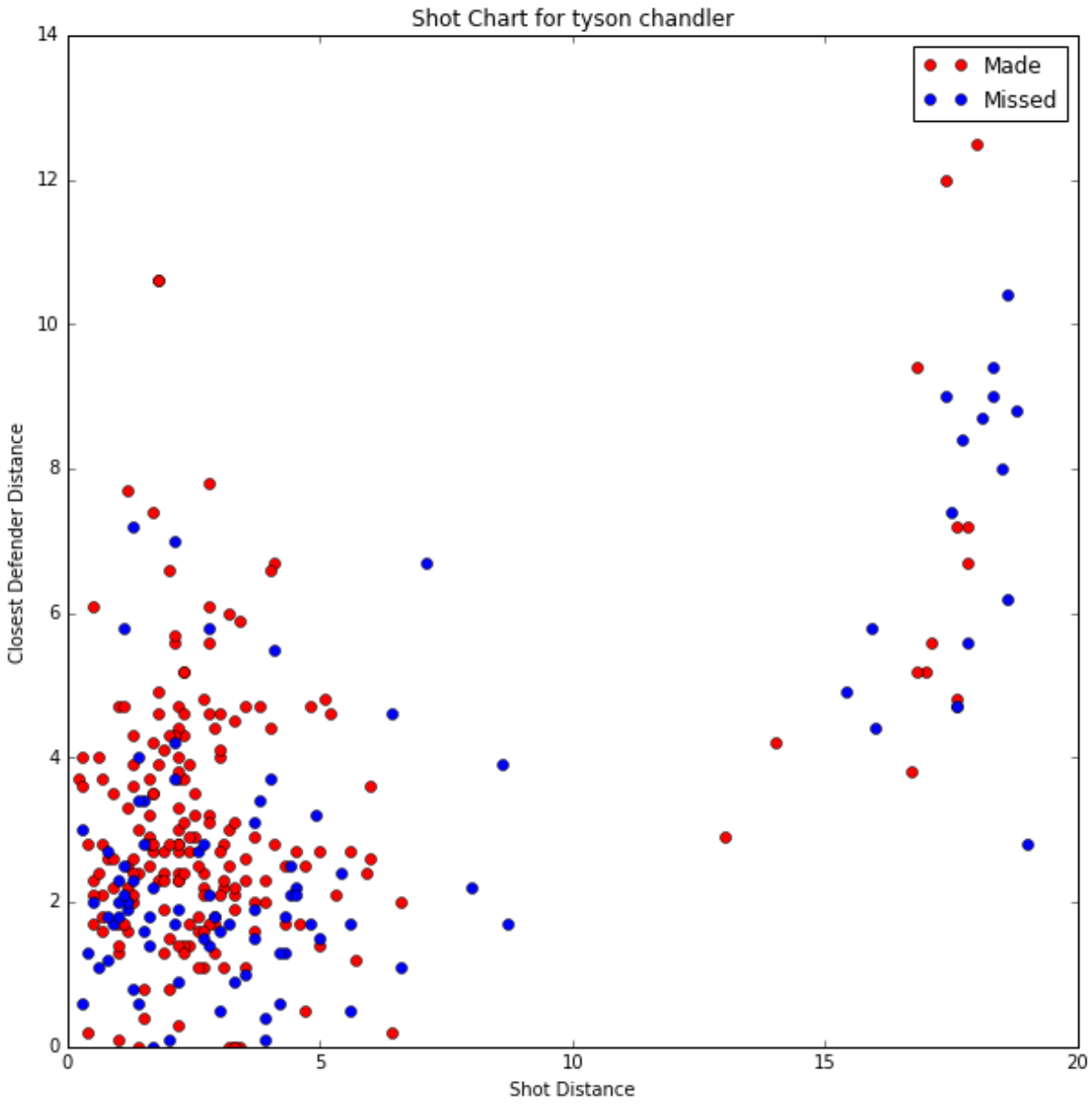
Shot Chart for tyson chandler
Made
Missed
Closest Defender Distance
Shot Distance
0
2
4
6
8
10
12
14
0
5
10
15
20

Figure 12

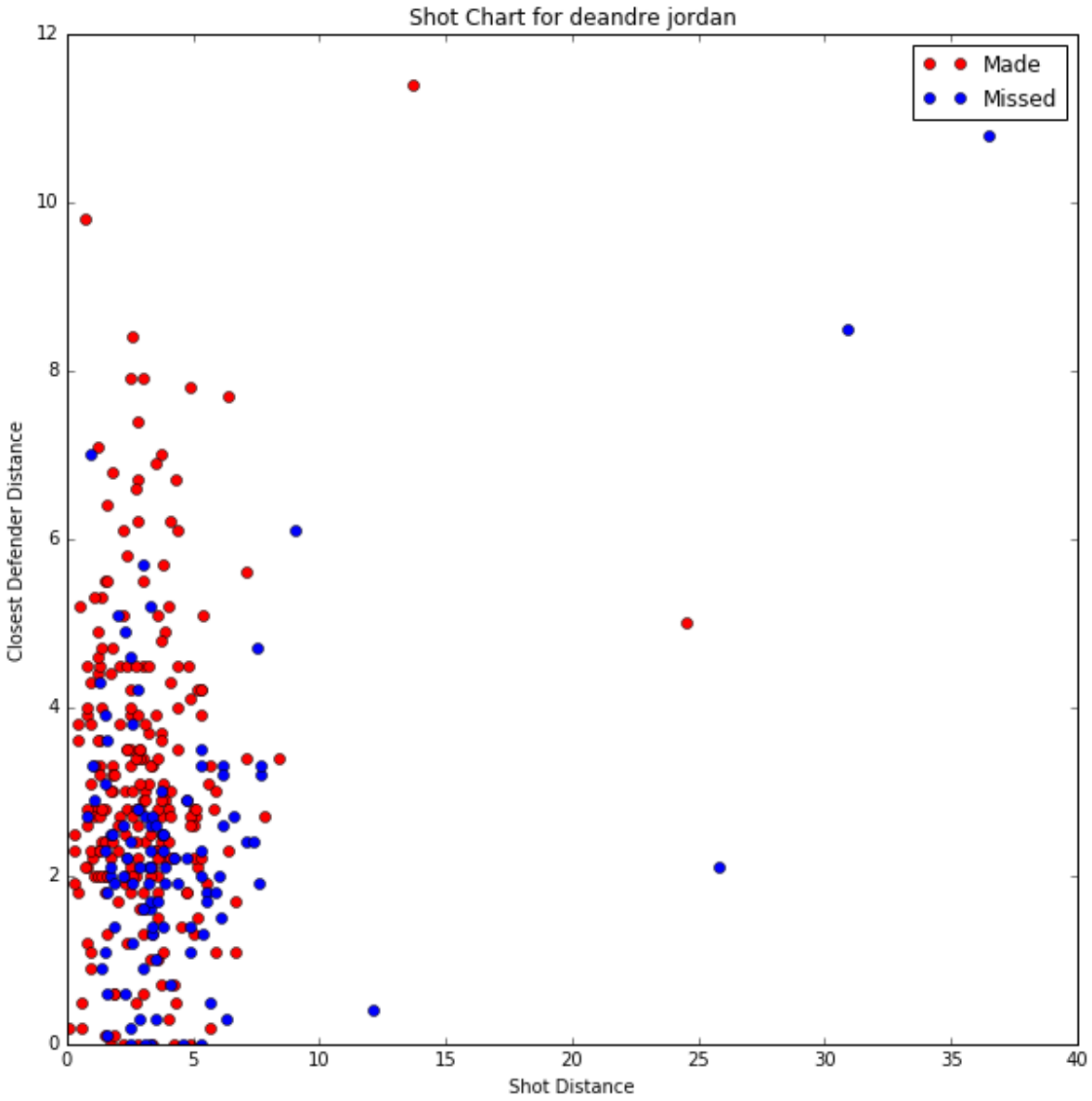
Shot Chart for deandre jordan
Made
Missed
Closest Defender Distance
Shot Distance
0
2
4
6
8
10
12
0
5
10
15
20
25
30
35
40

Figure 13