# Preparation of a NBA dataset with SAS

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## Introduction

The data files we used are CSV files from basketball-reference.com, a renowned basketball data website. They are relatively clean, with some missing values and repetitions which gave the opportunity to test data cleaning and organizing skills. There are 30 variables and approximately 3000 observations. Our goal was to combine per-game, per-player statistics from multiple seasons (2012-2016) and upon doing so, utilize the data to identify some interesting trends and notable players throughout the past half-decade. Preparation of these data sets also holds great business value for NBA franchises.

The important variables in this data set include identifying variables (name, position, team) as well as the averages and percentages of offensive metrics (field goals, three pointers, two pointers, free throws, points per game) and various other per-game statistics (rebounds, assists, blocks). We use these to identify notable players, like the point leaders (total and three's only), the defensive rebound leaders, and players who averaged a 20-5-5 combination (points, rebounds, and assists).

Datasets:

https://www.basketball-reference.com/leagues/NBA_2016_per_game.html
https://www.basketball-reference.com/leagues/NBA_2015_per_game.html
https://www.basketball-reference.com/leagues/NBA_2014_per_game.html
https://www.basketball-reference.com/leagues/NBA_2013_per_game.html
https://www.basketball-reference.com/leagues/NBA_2012_per_game.html

Note: Must download as CSV files, and there may or may not be extra information at the end of the files. This must be deleted before running our code if it appears.

## Methods

Each CSV file has 30 columns and between 500 and 600 rows. This adds up to a combined 3,008 observations when concatenated. The files contain per-game data on each NBA player, as well as general information on the player such as name, position, and team. All variables are numeric except those three. The numeric variables read in include: age, games, games started, minutes played, a count, attempts, and percentage variable for each of field goals, three pointers, two pointers, and free throws, effective field goal percentage, rebounds (offensive and defensive), assists, steals, blocks, turnovers, personal fouls, and points per game. Multiple

entries for a single player are possible, due to trades and a player's presence in more than one of the seasons included.

Each file was read in with using several options on the infile statement. While combining the five data files, a "Year" variable was added to specify observational seasons. The extra text following each player's name (e.g. Quincy Acy**acyqu01**) was also deleted using a simple scan function. These additions as well as variables for total points and total three pointers were created with PROC SQL. We combined the five datasets within the same procedure with union operator..The table was modified with appropriate formats and labels.

Some data exploration techniques then revealed several issues to address. A PROC FREQ step with nlevels allowed us to notice any missing values and any incorrect entries. Three problems arose: all percentage variables had missing values, the number of teams was 33 (there are 30 in the league), and some players had more than 82 games played in a season (normal length of regular season).

The first problem arose due to the fact that if a player never attempted a free-throw, 3-point shot, or 2-point shot, their corresponding percentage variable would be missing due to a divide-by-zero error when calculating the percentage. We fixed this by replacing any missing values with 0, and recalculating percentages based on their equations in the data set glossary (https://www.basketball-reference.com/about/glossary.html).

There were 33 levels for team, even though 30 teams exist in the league. This is due to the fact that the New Orleans Hornets were renamed the Pelicans, the Charlotte Bobcats became the Charlotte Hornets, and the TOT level represents total statistics for those players who were traded and played for multiple teams during one season. Consequently, no fixes were needed. A similar situation arose for position; 13 levels were found yet there are only 5 positions. This was due to the fact that the data set included hyphenated combinations of positions.

For the games issue, we found two players (Josh Smith and Ramon Sessions) that had 83 games played in a year. These were rare and caused by complications from trading. Therefore, they did indeed play 83 games.

A data step addressed these issues and included wholesale data fixes, which were needed because of the problems in the calculations of percentages. The new and cleaned data set was named nba_clean. Another PROC FREQ confirmed our fixes.

We used SQL to count all the unique teams a player has been on. The first 10 observations were printed in descending order.

Next we accumulated number of points and points from three-point shots in a data step. The leading scorer on each team was subsequently then also found using PROC MEANS, SORT, and a data step. Finally we displayed with a SQL several tables, including, the top 10 three points leaders, the top 10 points leaders, the top 10 field goal shooting percentages, the top 10 number of defensive rebounds, and the players who averaged the 20-5-5 combination.

Results

After reading in the data, a PROC CONTENTS (seen below) allowed us to view the dimensions of our new table as well as confirm our assignments of labels and formats.

**The CONTENTS Procedure**

| | | | |
|---|---|---|---|
| **Data Set Name** | NBA.NBA | **Observations** | 3008 |
| **Member Type** | DATA | **Variables** | 32 |
| **Engine** | V9 | **Indexes** | 0 |
| **Created** | 12/20/2017 19:18:19 | **Observation Length** | 296 |
| **Last Modified** | 12/20/2017 19:18:19 | **Deleted Observations** | 0 |
| **Protection** | | **Compressed** | NO |
| **Data Set Type** | | **Sorted** | NO |
| **Label** | | | |
| **Data Representation** | SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64 | | |
| **Encoding** | utf-8 Unicode (UTF-8) | | |

**Alphabetic List of Variables and Attributes**

| # | Variable | Type | Len | Format | Label |
|---|---|---|---|---|---|
| 23 | AST | Num | 8 | | Assists per Game |
| 2 | Age | Num | 8 | | |
| 25 | BLK | Num | 8 | | Blocks per Game |
| 21 | DRB | Num | 8 | | Defensive Rebounds per Game |
| 7 | FG | Num | 8 | | Field Goals Made |
| 8 | FGA | Num | 8 | | Field Goal Attempts per Game |
| 9 | FG_Pct | Num | 8 | PERCENT8.3 | Field Goal Percentage |
| 17 | FT | Num | 8 | | Free Throws Made |
| 18 | FTA | Num | 8 | | Free Throw Attempts |
| 19 | FT_Pct | Num | 8 | PERCENT8.3 | Free Throw Percentage |
| 4 | G | Num | 8 | | Games Played |
| 5 | GS | Num | 8 | | Games Started |
| 6 | MP | Num | 8 | | Average Minutes Played per Game |
| 20 | ORB | Num | 8 | | Offensive Rebounds per Game |
| 27 | PF | Num | 8 | | Personal Fouls per Game |
| 30 | Player_Name | Char | 40 | $40. | Player |
| 1 | Position | Char | 8 | | |
| 28 | Pts_G | Num | 8 | | Points per Game |
| 32 | Pts_Tot | Num | 8 | | Total Points |
| 24 | STL | Num | 8 | | Steals per Game |
| 26 | TOV | Num | 8 | | Turnovers per Game |
| 22 | TRB | Num | 8 | | Total Rebounds per Game |
| 3 | Team | Char | 10 | | |
| 10 | ThreePoints | Num | 8 | | 3-Pointers Made |
| 11 | ThreePoints_A | Num | 8 | | 3-Pointers Attempts |
| 12 | ThreePoints_Pct | Num | 8 | PERCENT8.3 | 3-Pointers Percentage |
| 31 | ThreePoints_Tot | Num | 8 | | Total 3-Pointers |
| 13 | TwoPoints | Num | 8 | | 2-Pointers Made |
| 14 | TwoPoints_A | Num | 8 | | 2-Pointers Attempted |
| 15 | TwoPoints_Pct | Num | 8 | PERCENT8.3 | 2-Pointers Percentage |
| 29 | Year | Num | 8 | 8. | |
| 16 | eFG_Pct | Num | 8 | PERCENT8.3 | Effective Field Goal Percentage |

Running a PROC FREQ step with nlevels allowed us to notice any missing values and any incorrect entries, all of which belonged to percent variables. A frequence procedure was used rather than a PROC MEANS since it also revealed an unexpected number of levels for position and team.

**Overall Missing Levels**

**The FREQ Procedure**

| Number of Variable Levels | | | | |
|---|---|---|---|---|
| **Variable** | **Label** | **Levels** | **Missing Levels** | **Nonmissing Levels** |
| **Position** | | 13 | 0 | 13 |
| **Age** | | 22 | 0 | 22 |
| **Team** | | 33 | 0 | 33 |
| **G** | Games Played | 83 | 0 | 83 |
| **GS** | Games Started | 83 | 0 | 83 |
| **MP** | Average Minutes Played per Game | 371 | 0 | 371 |
| **FG** | Field Goals Made | 104 | 0 | 104 |
| **FGA** | Field Goal Attempts per Game | 206 | 0 | 206 |
| **FG_Pct** | Field Goal Percentage | 383 | 1 | 382 |
| **ThreePoints** | 3-Pointers Made | 39 | 0 | 39 |
| **ThreePoints_A** | 3-Pointers Attempts | 88 | 0 | 88 |
| **ThreePoints_Pct** | 3-Pointers Percentage | 314 | 1 | 313 |
| **TwoPoints** | 2-Pointers Made | 92 | 0 | 92 |
| **TwoPoints_A** | 2-Pointers Attempted | 174 | 0 | 174 |
| **TwoPoints_Pct** | 2-Pointers Percentage | 364 | 1 | 363 |
| **eFG_Pct** | Effective Field Goal Percentage | 390 | 1 | 389 |
| **FT** | Free Throws Made | 82 | 0 | 82 |
| **FTA** | Free Throw Attempts | 95 | 0 | 95 |
| **FT_Pct** | Free Throw Percentage | 483 | 1 | 482 |
| **ORB** | Offensive Rebounds per Game | 51 | 0 | 51 |
| **DRB** | Defensive Rebounds per Game | 99 | 0 | 99 |
| **TRB** | Total Rebounds per Game | 134 | 0 | 134 |
| **AST** | Assists per Game | 99 | 0 | 99 |
| **STL** | Steals per Game | 26 | 0 | 26 |
| **BLK** | Blocks per Game | 33 | 0 | 33 |
| **TOV** | Turnovers per Game | 48 | 0 | 48 |
| **PF** | Personal Fouls per Game | 43 | 0 | 43 |
| **Pts_G** | Points per Game | 264 | 0 | 264 |
| **Year** | | 5 | 0 | 5 |
| **Player_Name** | Player | 816 | 0 | 816 |
| **ThreePoints_Tot** | Total 3-Pointers | 208 | 0 | 208 |
| **Pts_Tot** | Total Points | 1065 | 0 | 1065 |

The 3 extra levels in the team variable were identified in the following table as TOT and the two renamed franchises (NOH/NOP and CHA/CHO). These 4 teams were combined into 2 teams respectively.

**Unusual Levels in Teams**

**The FREQ Procedure**

| Team | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| ATL | 89 | 2.96 | 89 | 2.96 |
| BOS | 92 | 3.06 | 181 | 6.02 |
| BRK | 93 | 3.09 | 274 | 9.11 |
| CHA | 37 | 1.23 | 311 | 10.34 |
| CHI | 83 | 2.76 | 394 | 13.10 |
| CHO | 53 | 1.76 | 447 | 14.86 |
| CLE | 99 | 3.29 | 546 | 18.15 |
| DAL | 97 | 3.22 | 643 | 21.38 |
| DEN | 89 | 2.96 | 732 | 24.34 |
| DET | 83 | 2.76 | 815 | 27.09 |
| GSW | 82 | 2.73 | 897 | 29.82 |
| HOU | 94 | 3.13 | 991 | 32.95 |
| IND | 81 | 2.69 | 1072 | 35.64 |
| LAC | 88 | 2.93 | 1160 | 38.56 |
| LAL | 86 | 2.86 | 1246 | 41.42 |
| MEM | 102 | 3.39 | 1348 | 44.81 |
| MIA | 91 | 3.03 | 1439 | 47.84 |
| MIL | 93 | 3.09 | 1532 | 50.93 |
| MIN | 93 | 3.09 | 1625 | 54.02 |
| NOH | 19 | 0.63 | 1644 | 54.65 |
| NOP | 89 | 2.96 | 1733 | 57.61 |
| NYK | 89 | 2.96 | 1822 | 60.57 |
| OKC | 91 | 3.03 | 1913 | 63.60 |
| ORL | 85 | 2.83 | 1998 | 66.42 |
| PHI | 104 | 3.46 | 2102 | 69.88 |
| PHO | 95 | 3.16 | 2197 | 73.04 |
| POR | 79 | 2.63 | 2276 | 75.66 |
| SAC | 93 | 3.09 | 2369 | 78.76 |
| SAS | 85 | 2.83 | 2454 | 81.58 |
| TOR | 86 | 2.86 | 2540 | 84.44 |
| TOT | 292 | 9.71 | 2832 | 94.15 |
| UTA | 85 | 2.83 | 2917 | 96.97 |
| WAS | 91 | 3.03 | 3008 | 100.00 |

Our suspicions on the number of levels for position were relieved once we saw the data included hyphenated combinations of positions (accounting for the 13 possible positions), as seen with the below PROC FREQ output.

**Unusual Levels in Position**

**The FREQ Procedure**

| Position | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| C | 541 | 17.99 | 541 | 17.99 |
| C-PF | 1 | 0.03 | 542 | 18.02 |
| PF | 618 | 20.55 | 1160 | 38.56 |
| PF-C | 3 | 0.10 | 1163 | 38.66 |
| PF-SF | 3 | 0.10 | 1166 | 38.76 |
| PG | 603 | 20.05 | 1769 | 58.81 |
| PG-SG | 5 | 0.17 | 1774 | 58.98 |
| SF | 586 | 19.48 | 2360 | 78.46 |
| SF-PF | 3 | 0.10 | 2363 | 78.56 |
| SF-SG | 1 | 0.03 | 2364 | 78.59 |
| SG | 631 | 20.98 | 2995 | 99.57 |
| SG-PG | 8 | 0.27 | 3003 | 99.83 |
| SG-SF | 5 | 0.17 | 3008 | 100.00 |

The two players with unusual game counts are outputted below, via PROC MEANS.

**Unusual Total Games**

**The MEANS Procedure**

| Analysis Variable : G Games Played | | | | | | |
|---|---|---|---|---|---|---|
| Player | N Obs | N | Mean | Std Dev | Minimum | Maximum |
| Josh Smith | 1 | 1 | 83.0000000 | . | 83.0000000 | 83.0000000 |
| Ramon Sessions | 1 | 1 | 83.0000000 | . | 83.0000000 | 83.0000000 |

The following two tables were used to confirm our fixes.

**Confirms Miscellaneous Fixes**

**The FREQ Procedure**

| Number of Variable Levels | | |
|---|---|---|
| **Variable** | **Label** | **Levels** |
| **Position** | | 13 |
| **Age** | | 22 |
| **Team** | | 31 |
| **G** | Games Played | 83 |
| **GS** | Games Started | 83 |
| **MP** | Average Minutes Played per Game | 371 |
| **FG** | Field Goals Made | 104 |
| **FGA** | Field Goal Attempts per Game | 206 |
| **FG_Pct** | Field Goal Percentage | 915 |
| **ThreePoints** | 3-Pointers Made | 39 |
| **ThreePoints_A** | 3-Pointers Attempts | 88 |
| **ThreePoints_Pct** | 3-Pointers Percentage | 274 |
| **TwoPoints** | 2-Pointers Made | 92 |
| **TwoPoints_A** | 2-Pointers Attempted | 174 |
| **TwoPoints_Pct** | 2-Pointers Percentage | 696 |
| **eFG_Pct** | Effective Field Goal Percentage | 389 |
| **FT** | Free Throws Made | 82 |
| **FTA** | Free Throw Attempts | 95 |
| **FT_Pct** | Free Throw Percentage | 345 |
| **ORB** | Offensive Rebounds per Game | 51 |
| **DRB** | Defensive Rebounds per Game | 99 |
| **TRB** | Total Rebounds per Game | 134 |
| **AST** | Assists per Game | 99 |
| **STL** | Steals per Game | 26 |
| **BLK** | Blocks per Game | 33 |
| **TOV** | Turnovers per Game | 48 |
| **PF** | Personal Fouls per Game | 43 |
| **Pts_G** | Points per Game | 264 |
| **Year** | | 5 |
| **Player_Name** | Player | 816 |
| **ThreePoints_Tot** | Total 3-Pointers | 208 |
| **Pts_Tot** | Total Points | 1065 |

**Confirms Fixes for Renamed Franchises**

**The FREQ Procedure**

| Team | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
|---|---|---|---|---|
| ATL | 89 | 2.96 | 89 | 2.96 |
| BOS | 92 | 3.06 | 181 | 6.02 |
| BRK | 93 | 3.09 | 274 | 9.11 |
| CHI | 83 | 2.76 | 357 | 11.87 |
| CHO/CHA | 90 | 2.99 | 447 | 14.86 |
| CLE | 99 | 3.29 | 546 | 18.15 |
| DAL | 97 | 3.22 | 643 | 21.38 |
| DEN | 89 | 2.96 | 732 | 24.34 |
| DET | 83 | 2.76 | 815 | 27.09 |
| GSW | 82 | 2.73 | 897 | 29.82 |
| HOU | 94 | 3.13 | 991 | 32.95 |
| IND | 81 | 2.69 | 1072 | 35.64 |
| LAC | 88 | 2.93 | 1160 | 38.56 |
| LAL | 86 | 2.86 | 1246 | 41.42 |
| MEM | 102 | 3.39 | 1348 | 44.81 |
| MIA | 91 | 3.03 | 1439 | 47.84 |
| MIL | 93 | 3.09 | 1532 | 50.93 |
| MIN | 93 | 3.09 | 1625 | 54.02 |
| NOH/NOP | 108 | 3.59 | 1733 | 57.61 |
| NYK | 89 | 2.96 | 1822 | 60.57 |
| OKC | 91 | 3.03 | 1913 | 63.60 |
| ORL | 85 | 2.83 | 1998 | 66.42 |
| PHI | 104 | 3.46 | 2102 | 69.88 |
| PHO | 95 | 3.16 | 2197 | 73.04 |
| POR | 79 | 2.63 | 2276 | 75.66 |
| SAC | 93 | 3.09 | 2369 | 78.76 |
| SAS | 85 | 2.83 | 2454 | 81.58 |
| TOR | 86 | 2.86 | 2540 | 84.44 |
| TOT | 292 | 9.71 | 2832 | 94.15 |
| UTA | 85 | 2.83 | 2917 | 96.97 |
| WAS | 91 | 3.03 | 3008 | 100.00 |

We also used SQL to show us how many distinct teams each player has been on. We sorted the table by descending order and only showed the first 10 observations below. These are interesting to know as they can give insight into why a player is traded (demand for talent, bad deals, etc.)

**Unique Teams per Player (Top 10 Obs.)**

| Player | Distinct_Teams |
|---|---|
| D.J. Augustin | 7 |
| Ish Smith | 7 |
| Lance Stephenson | 6 |
| Wayne Ellington | 6 |
| Gary Neal | 6 |
| Ersan Ilyasova | 6 |
| Jose Calderon | 6 |
| Beno Udrih | 6 |
| Jared Cunningham | 6 |
| Toney Douglas | 6 |

Next, we found the points leader per team and printed the resulting data set below.

**NBA Data**
**Points Leader Per Team**

| Team | Player | Number of Years | Total Points |
|---|---|---|---|
| HOU | James Harden | 5 | 10,828 |
| GSW | Stephen Curry | 5 | 9,939 |
| OKC | Russell Westbrook | 5 | 9,228 |
| POR | Damian Lillard | 5 | 8,885 |
| TOR | DeMar DeRozan | 5 | 8,336 |
| NYK | Carmelo Anthony | 5 | 8,229 |
| SAC | DeMarcus Cousins | 5 | 7,595 |
| NOH/NOP | Anthony Davis | 5 | 7,499 |
| CHO/CHA | Kemba Walker | 5 | 7,342 |
| CLE | Kyrie Irving | 5 | 7,286 |
| WAS | John Wall | 5 | 7,214 |
| UTA | Gordon Hayward | 5 | 6,904 |
| LAC | Blake Griffin | 5 | 6,902 |
| IND | Paul George | 5 | 6,813 |
| DAL | Dirk Nowitzki | 5 | 6,125 |
| CHI | Jimmy Butler | 5 | 6,099 |
| BRK | Brook Lopez | 5 | 6,068 |
| SAS | Kawhi Leonard | 5 | 6,004 |
| MEM | Mike Conley | 5 | 5,802 |
| ORL | Nikola Vucevic | 5 | 5,524 |
| MIA | Dwyane Wade | 4 | 5,228 |
| ATL | Paul Millsap | 4 | 5,178 |
| DET | Andre Drummond | 5 | 5,114 |
| MIN | Andrew Wiggins | 3 | 4,998 |
| MIL | Giannis Antetokounmpo | 4 | 4,737 |
| BOS | Avery Bradley | 5 | 4,476 |
| DEN | Kenneth Faried | 5 | 4,385 |
| PHO | Eric Bledsoe | 4 | 4,163 |
| LAL | Kobe Bryant | 4 | 4,155 |
| PHI | Robert Covington | 3 | 2,667 |

Most of these players in the table are all-star players or are renown in the NBA community, but this table can explain a lot about a team's history over the last five years. Teams like the Philadelphia 76ers or the New Orleans Hornets have scoring leaders that have scored very few points (probably wouldn't even be a top 3 scorer on some of the top teams), and this makes sense since these are teams that are currently rebuilding their rosters or are without a superstar player. Top team-leaders for scoring like James Harden (Houston Rockets) and Stephen Curry (Golden State Warriors) are superstars on teams that have been contending for the championship for each of the past five years.

In a following PROC SQL step, tables for top 10 three points leaders, the top 10 points leaders, the top 10 field goal shooting percentages, the top 10 number of defensive rebounds, and the players who averaged the 20-5-5 combination. They are below.

**Top 10 Three Points Leaders**

| Player | Three Point Total |
|---|---|
| Stephen Curry | 1,545 |
| Klay Thompson | 1,224 |
| Kyle Korver | 1,078 |
| James Harden | 1,062 |
| Damian Lillard | 1,058 |
| J.J. Redick | 1,010 |
| J.R. Smith | 959 |
| Isaiah Thomas | 914 |
| Wesley Matthews | 907 |
| Kyle Lowry | 833 |

**Top 10 Points Leaders**

| Player | Total Points |
|---|---|
| James Harden | 10,828 |
| DeMarcus Cousins | 9,954 |
| Stephen Curry | 9,939 |
| LeBron James | 9,747 |
| Russell Westbrook | 9,228 |
| Kevin Durant | 9,140 |
| Damian Lillard | 8,885 |
| Rudy Gay | 8,846 |
| Isaiah Thomas | 8,773 |
| DeMar DeRozan | 8,336 |

These two tables show an interesting difference. Of the top ten 3-point leaders, only Stephen Curry, James Harden, Damian Lillard, and Isaiah Thomas are top ten in overall points scored in the last five years. With a lot of relevant articles and media claiming the NBA has become very focused on 3-point scoring, a many players are still scoring lots of points without relying on the 3-point shot. DeMarcus Cousins, LeBron James, and Russell Westbrook are top five in points scored, but aren't even in the top ten for 3-pointers made. While this shows that 3-point shots aren't everything, the fact that Stephen Curry and Klay Thompson are both on the Golden State Warriors, who have won two championships in the past five years, and are the best three-point scorers in the NBA is a compelling counter-argument.

The following table displays the best FG percentages.

**Top 10 Field Goal Shooting Percentages**

| Player | Position | Year | Effective Field Goal Percentage | Field Goal Attempts per Game |
|---|---|---|---|---|
| Edy Tavares | C | 2016 | 75.00% | 4.0 |
| Brandan Wright | PF | 2014 | 74.80% | 5.0 |
| DeAndre Jordan | C | 2016 | 71.40% | 7.1 |
| DeAndre Jordan | C | 2014 | 71.10% | 6.5 |
| DeAndre Jordan | C | 2015 | 70.30% | 6.6 |
| Axel Toupane | SF | 2016 | 68.80% | 4.0 |
| Brandan Wright | C | 2013 | 67.70% | 5.7 |
| Troy Daniels | SG | 2013 | 67.70% | 6.2 |
| DeAndre Jordan | C | 2013 | 67.60% | 6.3 |
| Brandan Wright | PF | 2015 | 67.30% | 4.3 |

These results show that a majority of the most efficient scorers are centers and power forwards (only one guard makes this list, with the rest being relatively taller and larger players), which would make sense because these big men play close to the basket and often score from close range. DeAndre Jordan seems to be a stand out here as one of the most consistent efficient scorers.

**Top 10 Number of Defensive Rebounds**

| Player | Year | Defensive Rebounds per Game |
|---|---|---|
| Earl Barron | 2012 | 12.0 |
| Kevin Love | 2012 | 10.4 |
| DeAndre Jordan | 2015 | 10.3 |
| Hassan Whiteside | 2016 | 10.3 |
| DeMarcus Cousins | 2016 | 10.2 |
| DeAndre Jordan | 2014 | 10.1 |
| DeAndre Jordan | 2016 | 10.1 |
| Andre Drummond | 2015 | 9.9 |
| Kevin Love | 2013 | 9.6 |
| DeAndre Jordan | 2013 | 9.5 |

In this table, we pulled out the most defensive rebounds (when defense obtains possession of the ball after a missed shot by the offense) per game per player for the top 10

players in our list, for any year including and between 2012-2016. We sorted from greatest to least number of defensive rebounds, demonstrating values ranging between 12.0 and 9.5.

The table for the 20-5-5 combination averages is displayed next.

**Players with 20 Points, 5 Rebounds, and 5 Assists Per Game**

| Player | Position | Year | Total Rebounds per Game | Points per Game | Assists per Game |
|---|---|---|---|---|---|
| Giannis Antetokounmpo | SF | 2016 | 8.8 | 22.9 | 5.4 |
| Kobe Bryant | SG | 2012 | 5.6 | 27.3 | 6.0 |
| Jimmy Butler | SF | 2016 | 6.2 | 23.9 | 5.5 |
| Kobe Bryant | SG | 2014 | 5.7 | 22.3 | 5.6 |
| Stephen Curry | PG | 2015 | 5.4 | 30.1 | 6.7 |
| Kevin Durant | SF | 2013 | 7.4 | 32.0 | 5.5 |
| James Harden | PG | 2016 | 8.1 | 29.1 | 11.2 |
| James Harden | SG | 2015 | 6.1 | 29.0 | 7.5 |
| Blake Griffin | PF | 2014 | 7.6 | 21.9 | 5.3 |
| James Harden | SG | 2014 | 5.7 | 27.4 | 7.0 |
| LeBron James | PF | 2012 | 8.0 | 26.8 | 7.3 |
| LeBron James | SF | 2016 | 8.6 | 26.4 | 8.7 |
| LeBron James | SF | 2015 | 7.4 | 25.3 | 6.8 |
| LeBron James | PF | 2013 | 6.9 | 27.1 | 6.3 |
| LeBron James | SF | 2014 | 6.0 | 25.3 | 7.4 |
| Russell Westbrook | PG | 2012 | 5.2 | 23.2 | 7.4 |
| Russell Westbrook | PG | 2015 | 7.8 | 23.5 | 10.4 |
| Russell Westbrook | PG | 2016 | 10.7 | 31.6 | 10.4 |
| Russell Westbrook | PG | 2013 | 5.7 | 21.8 | 6.9 |
| Russell Westbrook | PG | 2014 | 7.3 | 28.1 | 8.6 |

These players are considered superstar-caliber players who are very versatile. Most of these players listed here are candidates for the Most Valuable Player (MVP) award or are former MVPs, which shows that 20-5-5 can be a good metric for identifying potential MVP candidates. LeBron James and Russell Westbrook are increasingly considered to be among the greatest players to ever play in the NBA, and it shows with their consistent performances throughout the years with both having averaged a 20-5-5 in all of the years the data set covers. Note that Russell Westbrook average over 10 rebounds, 10 assists, and 30 points per game during the 2016-2017 season, which from a pure statistical perspective is one of the most impressive performances for a player in NBA history.