

Power Forward Percentiles

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Statistical Conditions

Using statistics from Basketball Reference. Player has played over 20 games and over 6 minutes per game.

Loading Packages

```
lapply(
  c('heatmaply', # devtools::install_github('talgalili/heatmaply')
    'mclust', #install.packages('mclust')
    'dplyr', # devtools::install_github('hadley/dplyr')
    'plotly', # devtools::install_github('ropensci/plotly')
    'nbastatR', # devtools::install_github('abresler/nbastatR')
    'purrr', # devtools::install_github('hadley/purrr')
    'tidyr' # devtools::install_github('hadley/tidyr')
  ),
  library,
  character.only = T
)

options(digits = 4)
```

Using Statistics from Basketball Reference

Start by creating per minute stats. Then, use rank function to create rank vector for each stat. Use rank values to find percentile.

```
stat_2019 <- bref_players_stats(season = "2019", tables = c("advanced", "totals", "per game", "per 36"))
  filter(countGames > 20) %>%
  filter(minutesPerGame > 6) %>%
  filter(slugPosition == 'PF') %>%
  mutate(df_size = length(ptsPerGame) - 1) %>%
  mutate(ptsPerMinute = ptsPerGame / minutesPerGame, fgaPerMinute = fgaPerGame / minutesPerGame) %>%
  mutate(astPerMinute = astPerGame / minutesPerGame, tovPerMinute = tovPerGame / minutesPerGame) %>%
  mutate(trbPerMinute = trbPerGame / minutesPerGame, orbPerMinute = orbPerGame / minutesPerGame, drbPerMinute = drbPerGame / minutesPerGame) %>%
  mutate(blkPerMinute = blkPerGame / minutesPerGame, stlPerMinute = stlPerGame / minutesPerGame, pfPerMinute = pfPerGame / minutesPerGame) %>%
  mutate(pts_pg_rank = rank(ptsPerGame), pts_pm_rank = rank(ptsPerMinute), fga_pg_rank = rank(fgaPerGame), fga_pm_rank = rank(fgaPerMinute)) %>%
  mutate(ast_pg_rank = rank(astPerGame), ast_pm_rank = rank(astPerMinute), tov_pg_rank = rank(tovPerGame), tov_pm_rank = rank(tovPerMinute)) %>%
  mutate(trb_pg_rank = rank(trbPerGame), trb_pm_rank = rank(trbPerMinute), orb_pg_rank = rank(orbPerGame), orb_pm_rank = rank(orbPerMinute)) %>%
  mutate(drb_pg_rank = rank(drbPerGame), drb_pm_rank = rank(drbPerMinute), blk_pg_rank = rank(blkPerGame), blk_pm_rank = rank(blkPerMinute)) %>%
  mutate(stl_pg_rank = rank(stlPerGame), stl_pm_rank = rank(stlPerMinute), pf_pg_rank = rank(pfPerGame), pf_pm_rank = rank(pfPerMinute)) %>%
  mutate(pctFG_rank = rank(pctFG), pctFG3_rank = rank(pctFG3), pctFG2_rank = rank(pctFG2), pctFT_rank = rank(pctFT)) %>%
  mutate(pctEFG_rank = rank(pctEFG), pctTS_rank = rank(pctTrueShooting)) %>%
  mutate(ratioOWS_rank = rank(ratioOWS), ratioOBPM_rank = rank(ratioOBPM), ratioDWS_rank = rank(ratioDWS)) %>%
  mutate(ratioWS_rank = rank(ratioWS), ratioWSPer48_rank = rank(ratioWSPer48), ratioBPM_rank = rank(ratioBPM)) %>%
  mutate(ratioOWS_percentile = (100 * (ratioOWS_rank - 0.5) / df_size), ratioDWS_percentile = (100 * (ratioDWS_rank - 0.5) / df_size)) %>%
  mutate(ratioWS_percentile = (100 * (ratioWS_rank - 0.5) / df_size), ratioWSPer48_percentile = (100 * (ratioWSPer48_rank - 0.5) / df_size)) %>%
  mutate(ratioOBPM_percentile = (100 * (ratioOBPM_rank - 0.5) / df_size), ratioDBPM_percentile = (100 * (ratioDBPM_rank - 0.5) / df_size)) %>%
```

```

mutate(ratioBPM_percentile = (100 * (ratioBPM_rank - 0.5) / df_size), ratioVORP_percentile = (100 *
mutate(ratioPER_percentile = (100 * (ratioPER_rank - 0.5) / df_size)) %>%
mutate(pts_pg_percentile = (100 * (pts_pg_rank - 0.5) / df_size), pts_pm_percentile = (100 * (pts_pm_rank - 0.5) / df_size),
mutate(fga_pg_percentile = (100 * (fga_pg_rank - 0.5) / df_size), fga_pm_percentile = (100 * (fga_pm_rank - 0.5) / df_size),
mutate(ast_pg_percentile = (100 * (ast_pg_rank - 0.5) / df_size), ast_pm_percentile = (100 * (ast_pm_rank - 0.5) / df_size),
mutate(tov_pg_percentile = (100 * (tov_pg_rank - 0.5) / df_size), tov_pm_percentile = (100 * (tov_pm_rank - 0.5) / df_size),
mutate(tov_ast_rank = rank(astPerMinute/tovPerMinute), tov_ast_percentile = (100 * (tov_ast_rank) - 0.5) / df_size),
mutate(trb_pg_percentile = (100 * (trb_pg_rank - 0.5) / df_size), trb_pm_percentile = (100 * (trb_pm_rank - 0.5) / df_size),
mutate(orb_pg_percentile = (100 * (orb_pg_rank - 0.5) / df_size), orb_pm_percentile = (100 * (orb_pm_rank - 0.5) / df_size),
mutate(drb_pg_percentile = (100 * (drb_pg_rank - 0.5) / df_size), drb_pm_percentile = (100 * (drb_pm_rank - 0.5) / df_size),
mutate(blk_pg_percentile = (100 * (blk_pg_rank - 0.5) / df_size), blk_pm_percentile = (100 * (blk_pm_rank - 0.5) / df_size),
mutate(stl_pg_percentile = (100 * (stl_pg_rank - 0.5) / df_size), stl_pm_percentile = (100 * (stl_pm_rank - 0.5) / df_size),
mutate(pf_pg_percentile = (100 * (pf_pg_rank - 0.5) / df_size), pf_pm_percentile = (100 * (pf_pm_rank - 0.5) / df_size),
mutate(pctFG_percentile = (100 * (pctFG_rank - 0.5) / df_size), pctFG3_percentile = (100 * (pctFG3_rank - 0.5) / df_size),
mutate(pctFG2_percentile = (100 * (pctFG2_rank - 0.5) / df_size), pctFT_percentile = (100 * (pctFT_rank - 0.5) / df_size),
mutate(pctEFG_percentile = (100 * (pctEFG_rank - 0.5) / df_size), pctTS_percentile = (100 * (pctTS_rank - 0.5) / df_size),
mutate(pts_percentile = pts_pg_percentile + pts_pm_percentile / 200, ast_percentile = ast_pg_percentile + ast_pm_percentile / 200,
mutate(fga_percentile = fga_pg_percentile + fga_pm_percentile / 200, tov_percentile = tov_pg_percentile + tov_pm_percentile / 200,
mutate(trb_percentile = trb_pg_percentile + trb_pm_percentile / 200, orb_percentile = orb_pg_percentile + orb_pm_percentile / 200,
mutate(drb_percentile = drb_pg_percentile + drb_pm_percentile / 200, blk_percentile = blk_pg_percentile + blk_pm_percentile / 200,
mutate(stl_percentile = stl_pg_percentile + stl_pm_percentile / 200, pf_percentile = pf_pg_percentile + pf_pm_percentile / 200,
mutate(rebound_percentile = (trb_percentile + orb_percentile + drb_percentile) / 3) %>%
mutate(total_percentile = (pts_percentile + ast_percentile + fga_percentile - tov_percentile + rebound_percentile) / 5) %>%

```

```

## parsed http://www.basketball-reference.com/leagues/NBA_2019_advanced.html
## parsed http://www.basketball-reference.com/leagues/NBA_2019_totals.html
## parsed http://www.basketball-reference.com/leagues/NBA_2019_per_game.html
## Advanced
## Assigning NBA player dictionary to df_dict_nba_players to your environment
## Totals
## PerGame

```

```
size = length(stat_2019$ptsPerGame) - 1
```

Overview

Throughout this section players will be evaluated based on two simple factors: per game production, and per minute production. This takes into account the total volume of their “raw” offensive stats, as well as the volume compared to their time on the court. In doing this, we are looking at players who produce at a high level while on the court, as well as players who can produce at a high volume of minutes.

The criteria do not necessarily speak to the efficiency of the player. The top 20% will be evaluated in the following criteria.

Raw Offensive Stats

Top 20% in points per game and points per minute, combined:

```

stats_2019 <- stat_2019[order(-stat_2019$pts_percentile),] %>%
  filter(pts_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$pts_percentile))

```

```

## [1] "Giannis Antetokounmpo" "Blake Griffin"
## [3] "Julius Randle"         "Tobias Harris"

```

```
## [5] "John Collins"      "Lauri Markkanen"
## [7] "Kyle Kuzma"        "Kevin Love"
## [9] "Pascal Siakam"     "Aaron Gordon"
## [11] "Marvin Bagley"     "Jabari Parker"
## [13] "Bobby Portis"      "Marcus Morris"
## [15] "Jaren Jackson"     "Rudy Gay"
## [17] "101.197916666667"  "99.8020833333333"
## [19] "98.40625"          "96.9618055555555"
## [21] "95.6076388888889"  "93.4965277777778"
## [23] "93.4826388888889"  "91.4270833333333"
## [25] "89.9895833333333"  "88.5590277777778"
## [27] "87.2534722222222"  "85.8298611111111"
## [29] "84.4479166666667"  "83.0243055555556"
## [31] "81.6493055555556"  "80.2534722222222"
```

Top 20% in assists per game and assists per minute, combined:

```
stats_2019 <- stat_2019[order(-stat_2019$ast_percentile),] %>%
  filter(ast_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ast_percentile))
```

```
## [1] "Draymond Green"      "Giannis Antetokounmpo"
## [3] "Joe Ingles"          "Blake Griffin"
## [5] "Aaron Gordon"        "Gordon Hayward"
## [7] "Julius Randle"       "Pascal Siakam"
## [9] "Tobias Harris"      "Rudy Gay"
## [11] "James Johnson"      "Thaddeus Young"
## [13] "Kyle Kuzma"         "Jabari Parker"
## [15] "Kevin Love"          "101.197916666667"
## [17] "99.7951388888889"    "98.4131944444444"
## [19] "97.0104166666667"    "95.6006944444444"
## [21] "94.2256944444444"    "92.1145833333333"
## [23] "92.1006944444444"    "89.9756944444444"
## [25] "88.6354166666667"    "85.8854166666667"
## [27] "85.8229166666667"    "85.78125"
## [29] "83.0590277777778"    "81.6493055555556"
```

Top 20% in rebounds per game and rebounds per minute, combined (including offensive and defensive):

```
stats_2019 <- stat_2019[order(-stat_2019$trb_percentile),] %>%
  filter(trb_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$trb_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Kevin Love"
## [3] "John Collins"         "Lauri Markkanen"
## [5] "Julius Randle"        "Bobby Portis"
## [7] "Tobias Harris"        "Noah Vonleh"
## [9] "Marvin Bagley"        "Al-Farouq Aminu"
## [11] "Blake Griffin"        "Aaron Gordon"
## [13] "Draymond Green"       "Paul Millsap"
## [15] "Pascal Siakam"        "Rudy Gay"
## [17] "101.1909722222222"     "99.8090277777778"
## [19] "98.3854166666667"     "96.9340277777778"
## [21] "95.5520833333333"     "94.2048611111111"
```

```
## [23] "92.65625" "91.4201388888889"
## [25] "90.0243055555556" "87.8784722222222"
## [27] "87.7256944444444" "85.6979166666667"
## [29] "84.3298611111111" "83.0243055555556"
## [31] "81.4965277777778" "80.2256944444444"
```

```
stats_2019 <- stat_2019[order(-stat_2019$orb_percentile),] %>%
  filter(orb_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$orb_percentile))
```

```
## [1] "John Collins" "Marvin Bagley"
## [3] "Taj Gibson" "Thaddeus Young"
## [5] "Bobby Portis" "Paul Millsap"
## [7] "Julius Randle" "Giannis Antetokounmpo"
## [9] "Noah Vonleh" "Aaron Gordon"
## [11] "Omari Spellman" "JaMychal Green"
## [13] "Nemanja Bjelica" "Pascal Siakam"
## [15] "Kevin Love" "PJ Tucker"
## [17] "101.197916666667" "99.7881944444444"
## [19] "98.40625" "96.9409722222222"
## [21] "93.4826388888889" "93.4756944444444"
## [23] "93.4201388888889" "93.3923611111111"
## [25] "89.2326388888889" "89.1631944444444"
## [27] "85.1631944444445" "85.09375"
## [29] "85.0729166666667" "84.9826388888889"
## [31] "80.8506944444444" "80.7604166666667"
```

```
stats_2019 <- stat_2019[order(-stat_2019$drb_percentile),] %>%
  filter(drb_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$drb_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Kevin Love"
## [3] "Lauri Markkanen" "Tobias Harris"
## [5] "Julius Randle" "Draymond Green"
## [7] "John Collins" "Blake Griffin"
## [9] "Noah Vonleh" "Al-Farouq Aminu"
## [11] "Bobby Portis" "Rudy Gay"
## [13] "Aaron Gordon" "Jabari Parker"
## [15] "Pascal Siakam" "Marcus Morris"
## [17] "101.190972222222" "99.8090277777778"
## [19] "98.3784722222222" "96.9201388888889"
## [21] "95.5659722222222" "94.1493055555556"
## [23] "92.0729166666667" "91.9618055555556"
## [25] "89.3576388888889" "89.3229166666667"
## [27] "86.5659722222222" "86.5520833333333"
## [29] "84.2951388888889" "82.3159722222222"
## [31] "82.1979166666667" "80.1770833333333"
```

Bottom 20% in turnovers per minute and top 20% in ast/tov per minute percentile ratio:

```
stats_2019 <- stat_2019[order(-stat_2019$to_v_pm_percentile),] %>%
  filter(to_v_pm_percentile < 20)
```

```
print(c(stats_2019$namePlayer, stats_2019$to_v_pm_percentile))
```

```
## [1] "Jared Dudley"      "Al-Farouq Aminu"  "Sam Dekker"
## [4] "Lance Thomas"      "Luke Kornet"      "Semi Ojeleye"
## [7] "Dirk Nowitzki"     "Jerami Grant"     "PJ Tucker"
## [10] "TJ Leaf"           "Patrick Patterson" "Marvin Williams"
## [13] "Dante Cunningham"  "Gary Clark"        "18.75"
## [16] "17.3611111111111"  "15.9722222222222"  "13.8888888888889"
## [19] "13.8888888888889"  "11.8055555555556"  "10.4166666666667"
## [22] "9.0277777777778"   "7.6388888888889"   "6.25"
## [25] "4.8611111111111"   "3.4722222222222"   "2.0833333333333"
## [28] "0.694444444444444"
```

```
stats_2019 <- stat_2019[order(-stat_2019$to_vast_percentile),] %>%
  filter(to_vast_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$to_vast_percentile))
```

```
## [1] "Gary Clark"      "Dante Cunningham" "Draymond Green"
## [4] "Luke Kornet"     "Joe Ingles"        "Gordon Hayward"
## [7] "Jonas Jerebko"   "Jared Dudley"      "Marvin Williams"
## [10] "Sam Dekker"      "TJ Leaf"           "James Johnson"
## [13] "Vince Carter"    "Aaron Gordon"      "Dirk Nowitzki"
## [16] "Nemanja Bjelica" "101.381944444444"  "99.9930555555556"
## [19] "98.6041666666667" "97.2152777777778" "95.8263888888889"
## [22] "94.4375"         "93.0486111111111" "89.5763888888889"
## [25] "89.5763888888889" "89.5763888888889" "89.5763888888889"
## [28] "86.1041666666667" "84.7152777777778" "83.3263888888889"
## [31] "81.9375"         "80.5486111111111"
```

Offensive Efficiency & Advanced Stats

Top 20% in field goal percent, 2-point percentage, 3-point percentage, and free throw percentage:

```
stats_2019 <- stat_2019[order(-stat_2019$pctFG_percentile),] %>%
  filter(pctFG_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctFG_percentile))
```

```
## [1] "Cheick Diallo"      "Jon Leuer"
## [3] "Giannis Antetokounmpo" "Taj Gibson"
## [5] "John Collins"       "Pascal Siakam"
## [7] "Ivan Rabb"          "TJ Leaf"
## [9] "Johnathan Motley"   "Thaddeus Young"
## [11] "Julius Randle"      "Christian Wood"
## [13] "Jaren Jackson"      "Marvin Bagley"
## [15] "Rudy Gay"           "100.694444444444"
## [17] "99.3055555555556"   "97.9166666666667"
## [19] "96.5277777777778"   "95.1388888888889"
## [21] "93.75"              "92.3611111111111"
## [23] "90.9722222222222"   "89.5833333333333"
## [25] "88.1944444444444"   "86.8055555555556"
## [27] "85.4166666666667"   "84.0277777777778"
## [29] "81.9444444444444"   "81.9444444444444"
```

```
stats_2019 <- stat_2019[order(-stat_2019$pctFG2_percentile),] %>%
  filter(pctFG2_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctFG2_percentile))
```

```
## [1] "Jonah Bolden"      "Gary Clark"
## [3] "Dragan Bender"     "Giannis Antetokounmpo"
## [5] "Jon Leuer"         "Cheick Diallo"
## [7] "John Collins"      "Kelly Olynyk"
## [9] "Pascal Siakam"     "TJ Leaf"
## [11] "Jeff Green"        "Maxi Kleber"
## [13] "Taj Gibson"        "Ivan Rabb"
## [15] "Christian Wood"    "100.694444444444"
## [17] "99.3055555555556"  "97.9166666666667"
## [19] "96.5277777777778"  "95.1388888888889"
## [21] "93.75"             "92.3611111111111"
## [23] "90.9722222222222"  "89.5833333333333"
## [25] "88.1944444444444"  "86.8055555555556"
## [27] "84.7222222222222"  "84.7222222222222"
## [29] "82.6388888888889"  "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$pctFG3_percentile),] %>%
  filter(pctFG3_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctFG3_percentile))
```

```
## [1] "Dante Cunningham" "Georges Niang"   "JaMychal Green"
## [4] "Rudy Gay"         "Mike Scott"      "Nemanja Bjelica"
## [7] "Tobias Harris"    "Bobby Portis"    "Jerami Grant"
## [10] "Alex Poythress"   "Joe Ingles"      "Vince Carter"
## [13] "Anthony Tolliver" "PJ Tucker"       "Marcus Morris"
## [16] "100.694444444444" "99.3055555555556" "97.9166666666667"
## [19] "96.5277777777778" "94.4444444444444" "94.4444444444444"
## [22] "92.3611111111111" "90.9722222222222" "89.5833333333333"
## [25] "87.5"             "87.5"            "85.4166666666667"
## [28] "83.3333333333333" "83.3333333333333" "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$pctFT_percentile),] %>%
  filter(pctFT_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctFT_percentile))
```

```
## [1] "Kevin Love"      "Jeff Green"      "Lauri Markkanen"
## [4] "Al-Farouq Aminu" "Tobias Harris"   "Marcus Morris"
## [7] "Gordon Hayward"  "Georges Niang"   "Luke Kornet"
## [10] "Mike Muscala"    "Kelly Olynyk"    "Jarell Martin"
## [13] "Rudy Gay"        "Jonathan Isaac"  "Jonas Jerebko"
## [16] "100.694444444444" "99.3055555555556" "97.9166666666667"
## [19] "96.5277777777778" "95.1388888888889" "93.75"
## [22] "92.3611111111111" "90.9722222222222" "89.5833333333333"
## [25] "88.1944444444444" "86.8055555555556" "85.4166666666667"
## [28] "84.0277777777778" "82.6388888888889" "81.25"
```

Top 20% in effective field goal percentage and true shooting percentage:

```
stats_2019 <- stat_2019[order(-stat_2019$pctEFG_percentile),] %>%
  filter(pctEFG_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctEFG_percentile))
```

```
## [1] "Cheick Diallo"      "Giannis Antetokounmpo"
## [3] "Jonah Bolden"       "Georges Niang"
## [5] "John Collins"       "Pascal Siakam"
## [7] "Jon Leuer"          "Taj Gibson"
## [9] "Dante Cunningham"  "Jerami Grant"
## [11] "Nemanja Bjelica"    "Joe Ingles"
## [13] "Kelly Olynyk"       "TJ Leaf"
## [15] "Christian Wood"     "100.69444444444444"
## [17] "98.61111111111111"  "98.61111111111111"
## [19] "96.52777777777778"  "95.13888888888889"
## [21] "93.75"              "92.36111111111111"
## [23] "90.97222222222222"  "89.58333333333333"
## [25] "88.19444444444444"  "86.80555555555556"
## [27] "85.41666666666667"  "83.33333333333333"
## [29] "83.33333333333333"  "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$pctTS_percentile),] %>%
  filter(pctTS_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$pctTS_percentile))
```

```
## [1] "Cheick Diallo"      "Giannis Antetokounmpo"
## [3] "Pascal Siakam"      "John Collins"
## [5] "Jon Leuer"          "Georges Niang"
## [7] "Taj Gibson"         "Kelly Olynyk"
## [9] "Jeff Green"         "Christian Wood"
## [11] "Julius Randle"      "Jonah Bolden"
## [13] "Jerami Grant"       "Tobias Harris"
## [15] "Jaren Jackson"      "100"
## [17] "100"                "97.91666666666667"
## [19] "96.52777777777778"  "95.13888888888889"
## [21] "93.75"              "92.36111111111111"
## [23] "90.97222222222222"  "89.58333333333333"
## [25] "88.19444444444444"  "86.80555555555556"
## [27] "85.41666666666667"  "83.33333333333333"
## [29] "83.33333333333333"  "81.25"
```

Top 20% in offensive box plus-minus and offensive win shares:

```
stats_2019 <- stat_2019[order(-stat_2019$ratioOBPM_percentile),] %>%
  filter(ratioOBPM_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$ratioOBPM_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Blake Griffin"
## [3] "John Collins"         "Pascal Siakam"
## [5] "Julius Randle"        "Tobias Harris"
## [7] "Joe Ingles"           "Kevin Love"
## [9] "Nemanja Bjelica"      "Taj Gibson"
## [11] "Thaddeus Young"       "Jonas Jerebko"
## [13] "Paul Millsap"         "Kelly Olynyk"
## [15] "Jeff Green"           "Rudy Gay"
## [17] "100.69444444444444"    "99.30555555555556"
## [19] "97.91666666666667"    "96.52777777777778"
## [21] "95.13888888888889"    "93.75"
## [23] "92.36111111111111"    "88.88888888888889"
```



```
## [25] "88.8888888888889"      "88.8888888888889"
## [27] "88.8888888888889"      "85.4166666666667"
## [29] "84.0277777777778"      "82.6388888888889"
## [31] "80.5555555555556"      "80.5555555555556"

stats_2019 <- stat_2019[order(-stat_2019$ratioOWS_percentile),] %>%
  filter(ratioOWS_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ratioOWS_percentile))

## [1] "Giannis Antetokounmpo" "Pascal Siakam"
## [3] "Blake Griffin"        "John Collins"
## [5] "Tobias Harris"        "Julius Randle"
## [7] "Jerami Grant"         "Taj Gibson"
## [9] "Paul Millsap"         "Al-Farouq Aminu"
## [11] "Thaddeus Young"       "Jeff Green"
## [13] "Nemanja Bjelica"      "Gordon Hayward"
## [15] "Joe Ingles"           "100.6944444444444"
## [17] "99.3055555555556"     "97.9166666666667"
## [19] "96.5277777777778"     "95.1388888888889"
## [21] "93.75"                "92.3611111111111"
## [23] "90.9722222222222"     "89.5833333333333"
## [25] "87.5"                 "87.5"
## [27] "85.4166666666667"     "84.0277777777778"
## [29] "82.6388888888889"     "81.25"
```

Raw Defensive Stats

Due to the low number of “per-game” stats in these sections, the percentiles range will be widened.

Top 24% in blocks per game and blocks per minute, combined:

```
stats_2019 <- stat_2019[order(-stat_2019$blk_percentile),] %>%
  filter(blk_percentile > 76)

print(c(stats_2019$namePlayer, stats_2019$blk_percentile))

## [1] "Giannis Antetokounmpo" "Jaren Jackson"
## [3] "Jerami Grant"         "Jonathan Isaac"
## [5] "Maxi Kleber"          "Draymond Green"
## [7] "Marvin Bagley"        "Luke Kornet"
## [9] "Jonah Bolden"         "Paul Millsap"
## [11] "Marvin Williams"      "Noah Vonleh"
## [13] "Pascal Siakam"        "Aaron Gordon"
## [15] "Nemanja Bjelica"      "Julius Randle"
## [17] "John Collins"         "Lauri Markkanen"
## [19] "Taj Gibson"           "Michael Kidd-Gilchrist"
## [21] "Mike Muscala"         "101.1979166666667"
## [23] "99.7048611111111"     "97.4826388888889"
## [25] "97.3923611111111"     "94.5451388888889"
## [27] "94.4826388888889"     "92.8090277777778"
## [29] "90.5243055555555"     "90.3854166666667"
## [31] "87.15625"             "86.96875"
## [33] "86.9270833333333"     "83.0451388888889"
## [35] "83.0034722222222"     "82.8923611111111"
## [37] "76.8784722222222"     "76.8576388888889"
```



```
## [39] "76.8298611111111"      "76.71875"
## [41] "76.5798611111111"      "76.53125"
```

Top 20% in steals per game and steals per minute, combined:

```
stats_2019 <- stat_2019[order(-stat_2019$stl_percentile),] %>%
  filter(stl_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$stl_percentile))
```

```
## [1] "PJ Tucker"      "Thaddeus Young"
## [3] "Draymond Green"  "Giannis Antetokounmpo"
## [5] "Paul Millsap"    "Joe Ingles"
## [7] "Gordon Hayward"  "Jaren Jackson"
## [9] "Marvin Williams" "Pascal Siakam"
## [11] "Sam Dekker"      "Taj Gibson"
## [13] "Jonathan Isaac"  "Rudy Gay"
## [15] "Al-Farouq Aminu" "Jerami Grant"
## [17] "101.184027777778" "99.8090277777778"
## [19] "98.3993055555556" "96.9965277777778"
## [21] "94.9201388888889" "94.90625"
## [23] "90.6979166666667" "90.6875"
## [25] "90.6354166666667" "90.5659722222222"
## [27] "83.8298611111111" "83.71875"
## [29] "83.6631944444444" "83.65625"
## [31] "83.6284722222222" "83.5451388888889"
```

Bottom 20% in fouls per minute, and fouls per game and fouls per minute, combined:

```
stats_2019 <- stat_2019[order(-stat_2019$pf_pm_percentile),] %>%
  filter(pf_pm_percentile < 20)

print(c(stats_2019$namePlayer, stats_2019$pf_pm_percentile))
```

```
## [1] "Gary Clark"      "Jonathan Isaac"    "Lauri Markkanen"
## [4] "Joe Ingles"      "DeMarre Carroll"  "Christian Wood"
## [7] "TJ Leaf"         "Aaron Gordon"     "Al-Farouq Aminu"
## [10] "Tobias Harris"   "Sam Dekker"        "Gordon Hayward"
## [13] "Luke Kornet"     "Patrick Patterson" "18.75"
## [16] "17.3611111111111" "15.9722222222222" "14.5833333333333"
## [19] "13.1944444444444" "11.1111111111111" "11.1111111111111"
## [22] "9.02777777777778" "7.63888888888889" "6.25"
## [25] "4.86111111111111" "3.47222222222222" "2.08333333333333"
## [28] "0.694444444444444"
```

```
stats_2019 <- stat_2019[order(-stat_2019$pf_percentile),] %>%
  filter(pf_percentile < 20)

print(c(stats_2019$namePlayer, stats_2019$pf_percentile))
```

```
## [1] "Caleb Swanigan"    "Johnathan Motley"  "Jarell Martin"
## [4] "Dante Cunningham" "Georges Niang"     "Ryan Anderson"
## [7] "Sam Dekker"        "Gary Clark"        "Luke Kornet"
## [10] "Guerschon Yabusele" "Semi Ojeleye"      "Christian Wood"
## [13] "Patrick Patterson" "TJ Leaf"           "19.2048611111111"
## [16] "17.15625"          "17.1354166666667"  "14.7118055555556"
## [19] "12.1909722222222"  "11.9548611111111"  "11.8298611111111"
```

```
## [22] "8.42708333333333" "8.34375" "5.27430555555556"
## [25] "4.98263888888889" "4.91666666666667" "2.08680555555556"
## [28] "0.75"
```

Defensive Advance Stats

Top 20% in defensive box plus-minus and defensive win shares:

```
stats_2019 <- stat_2019[order(-stat_2019$ratioDBPM_percentile),] %>%
  filter(ratioDBPM_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ratioDBPM_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Draymond Green"
## [3] "Isaiah Hartenstein"   "Maxi Kleber"
## [5] "Thaddeus Young"       "Jonah Bolden"
## [7] "Jonathan Isaac"       "Paul Millsap"
## [9] "PJ Tucker"           "Noah Vonleh"
## [11] "Jaren Jackson"        "Pascal Siakam"
## [13] "Aaron Gordon"         "Nemanja Bjelica"
## [15] "Jared Dudley"         "100.694444444444"
## [17] "99.3055555555556"     "97.9166666666667"
## [19] "96.5277777777778"     "95.1388888888889"
## [21] "93.0555555555556"     "93.0555555555556"
## [23] "90.9722222222222"     "89.5833333333333"
## [25] "88.1944444444444"     "86.1111111111111"
## [27] "86.1111111111111"     "83.3333333333333"
## [29] "83.3333333333333"     "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$ratioDWS_percentile),] %>%
  filter(ratioDWS_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ratioDWS_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Thaddeus Young"
## [3] "Joe Ingles"            "Pascal Siakam"
## [5] "Aaron Gordon"         "Jerami Grant"
## [7] "Draymond Green"       "Jonathan Isaac"
## [9] "PJ Tucker"            "Blake Griffin"
## [11] "Paul Millsap"         "Al-Farouq Aminu"
## [13] "Tobias Harris"        "Kelly Olynyk"
## [15] "Marcus Morris"        "100.694444444444"
## [17] "99.3055555555556"     "97.2222222222222"
## [19] "97.2222222222222"     "94.4444444444444"
## [21] "94.4444444444444"     "92.3611111111111"
## [23] "90.9722222222222"     "89.5833333333333"
## [25] "87.5"                 "87.5"
## [27] "85.4166666666667"     "84.0277777777778"
## [29] "81.9444444444444"     "81.9444444444444"
```

Total Advance Stats

Top 20% in box plus-minus, win shares, and win shares per 48 minutes:

```
stats_2019 <- stat_2019[order(-stat_2019$ratioBPM_percentile),] %>%
  filter(ratioBPM_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$ratioBPM_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Blake Griffin"
## [3] "Pascal Siakam"         "Thaddeus Young"
## [5] "Paul Millsap"          "Draymond Green"
## [7] "Nemanja Bjelica"       "Joe Ingles"
## [9] "Maxi Kleber"           "John Collins"
## [11] "Julius Randle"         "PJ Tucker"
## [13] "Jonah Bolden"          "Kelly Olynyk"
## [15] "100.694444444444"      "99.3055555555556"
## [17] "97.9166666666667"     "96.5277777777778"
## [19] "95.1388888888889"     "93.0555555555556"
## [21] "93.0555555555556"     "90.9722222222222"
## [23] "89.5833333333333"     "87.5"
## [25] "87.5"                  "85.4166666666667"
## [27] "84.0277777777778"     "82.6388888888889"
```

```
stats_2019 <- stat_2019[order(-stat_2019$ratioWS_percentile),] %>%
  filter(ratioWS_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$ratioWS_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Pascal Siakam"
## [3] "Blake Griffin"         "Jerami Grant"
## [5] "Tobias Harris"         "Thaddeus Young"
## [7] "Julius Randle"         "Paul Millsap"
## [9] "Joe Ingles"            "John Collins"
## [11] "Al-Farouq Aminu"       "Aaron Gordon"
## [13] "Taj Gibson"            "PJ Tucker"
## [15] "Gordon Hayward"        "100.694444444444"
## [17] "99.3055555555556"      "97.9166666666667"
## [19] "96.5277777777778"     "95.1388888888889"
## [21] "93.75"                  "91.6666666666667"
## [23] "91.6666666666667"     "88.8888888888889"
## [25] "88.8888888888889"     "86.8055555555556"
## [27] "84.7222222222222"     "84.7222222222222"
## [29] "82.6388888888889"     "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$ratioWSPer48_percentile),] %>%
  filter(ratioWSPer48_percentile > 80)
```

```
print(c(stats_2019$namePlayer, stats_2019$ratioWSPer48_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Pascal Siakam"
## [3] "John Collins"          "Paul Millsap"
## [5] "Christian Wood"        "TJ Leaf"
## [7] "Blake Griffin"         "Taj Gibson"
## [9] "Cheick Diallo"         "Ivan Rabb"
## [11] "Jerami Grant"          "Thaddeus Young"
## [13] "Julius Randle"         "Jonas Jerebko"
## [15] "Gordon Hayward"        "Kelly Olynyk"
## [17] "100.694444444444"      "99.3055555555556"
## [19] "97.9166666666667"     "96.5277777777778"
## [21] "95.1388888888889"     "93.75"
## [23] "92.3611111111111"     "90.9722222222222"
```

```
## [25] "89.5833333333333"      "88.1944444444444"
## [27] "86.8055555555556"      "85.4166666666667"
## [29] "84.0277777777778"      "82.6388888888889"
## [31] "80.5555555555556"      "80.5555555555556"
```

Top 20% in value over replacement player, and player efficiency rating:

```
stats_2019 <- stat_2019[order(-stat_2019$ratioVORP_percentile),] %>%
  filter(ratioVORP_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ratioVORP_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Blake Griffin"
## [3] "Pascal Siakam"         "Thaddeus Young"
## [5] "Joe Ingles"            "PJ Tucker"
## [7] "Draymond Green"        "Paul Millsap"
## [9] "Aaron Gordon"          "Julius Randle"
## [11] "Nemanja Bjelica"       "Tobias Harris"
## [13] "Al-Farouq Aminu"       "John Collins"
## [15] "Jerami Grant"          "100.6944444444444"
## [17] "99.3055555555556"      "97.9166666666667"
## [19] "96.5277777777778"      "95.1388888888889"
## [21] "93.75"                 "91.6666666666667"
## [23] "91.6666666666667"      "89.5833333333333"
## [25] "88.1944444444444"      "86.1111111111111"
## [27] "86.1111111111111"      "84.0277777777778"
## [29] "82.6388888888889"      "81.25"
```

```
stats_2019 <- stat_2019[order(-stat_2019$ratioPER_percentile),] %>%
  filter(ratioPER_percentile > 80)

print(c(stats_2019$namePlayer, stats_2019$ratioPER_percentile))
```

```
## [1] "Giannis Antetokounmpo" "Christian Wood"
## [3] "John Collins"          "Blake Griffin"
## [5] "Julius Randle"         "Kevin Love"
## [7] "Johnathan Motley"      "Marvin Bagley"
## [9] "Pascal Siakam"         "Paul Millsap"
## [11] "Taj Gibson"            "Cheick Diallo"
## [13] "Rudy Gay"              "Tobias Harris"
## [15] "Lauri Markkanen"       "100.6944444444444"
## [17] "99.3055555555556"      "97.9166666666667"
## [19] "95.8333333333333"      "95.8333333333333"
## [21] "93.75"                 "91.6666666666667"
## [23] "91.6666666666667"      "89.5833333333333"
## [25] "88.1944444444444"      "86.8055555555556"
## [27] "84.7222222222222"      "84.7222222222222"
## [29] "82.6388888888889"      "81.25"
```