

# Small Forward Percentiles

*Braeden Kuether*

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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 == 'SF') %>%
  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),
  ast_pg_rank = rank(astPerGame), ast_pm_rank = rank(astPerMinute), tov_pg_rank = rank(tovPerGame), tov_pm_rank = rank(tovPerMinute),
  trb_pg_rank = rank(trbPerGame), trb_pm_rank = rank(trbPerMinute), orb_pg_rank = rank(orbPerGame), orb_pm_rank = rank(orbPerMinute),
  drb_pg_rank = rank(drbPerGame), drb_pm_rank = rank(drbPerMinute), blk_pg_rank = rank(blkPerGame), blk_pm_rank = rank(blkPerMinute),
  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),
  pctEFG_rank = rank(pctEFG), pctTS_rank = rank(pctTrueShooting)) %>%
  mutate(ratioOWS_rank = rank(ratioOWS), ratioOBPM_rank = rank(ratioOBPM), ratioDWS_rank = rank(ratioDWS), ratioWS_rank = rank(ratioWS),
  ratioWSPer48_rank = rank(ratioWSPer48), ratioBPM_rank = rank(ratioBPM), ratioDBPM_rank = rank(ratioDBPM)) %>%
  mutate(ratioOWS_percentile = (100 * (ratioOWS_rank - 0.5) / df_size), ratioDWS_percentile = (100 * (ratioDWS_rank - 0.5) / df_size),
  ratioWS_percentile = (100 * (ratioWS_rank - 0.5) / df_size), ratioWSPer48_percentile = (100 * (ratioWSPer48_rank - 0.5) / df_size),
  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] "Paul George"      "LeBron James"      "Kawhi Leonard"
## [4] "Kevin Durant"     "Danilo Gallinari"  "Khris Middleton"

```

```
## [7] "Brandon Ingram"      "Andrew Wiggins"      "T.J. Warren"
## [10] "Jayson Tatum"        "Kelly Oubre Jr."     "Otto Porter Jr."
## [13] "Caris LeVert"        "101.30737704918"     "99.6762295081967"
## [16] "98.0450819672131"    "96.3811475409836"    "94.733606557377"
## [19] "92.2663934426229"    "92.2418032786885"    "89.7745901639344"
## [22] "88.1598360655738"    "86.4795081967213"    "84.8729508196721"
## [25] "83.1844262295082"    "81.5696721311475"
```

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] "LeBron James"      "Kevin Durant"      "Justise Winslow"
## [4] "Khrist Middleton"  "Paul George"       "Caris LeVert"
## [7] "Trevor Ariza"      "Nicolas Batum"     "Kawhi Leonard"
## [10] "Andre Iguodala"    "Kyle Anderson"     "Brandon Ingram"
## [13] "Danilo Gallinari"  "Cedi Osman"        "101.323770491803"
## [16] "99.6762295081967"  "97.2008196721311"  "97.1926229508197"
## [19] "94.7172131147541"  "93.1106557377049"  "91.4303278688525"
## [22] "88.9549180327869"  "88.9385245901639"  "86.5286885245902"
## [25] "84.0286885245902"  "84.0122950819672"  "80.7172131147541"
## [28] "80.6844262295082"
```

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] "LeBron James"      "Paul George"
## [3] "Kawhi Leonard"     "Kevin Durant"
## [5] "Danilo Gallinari"  "Jayson Tatum"
## [7] "Khrist Middleton"  "Kyle Anderson"
## [9] "Otto Porter Jr."   "Robert Covington"
## [11] "Justise Winslow"   "Trevor Ariza"
## [13] "Rondae Hollis-Jefferson" "101.30737704918"
## [15] "99.6516393442623"  "97.9959016393443"
## [17] "96.1926229508197"  "94.6762295081967"
## [19] "92.1639344262295"  "92.1639344262295"
## [21] "89.7172131147541"  "88.0122950819672"
## [23] "86.266393442623"  "83.8893442622951"
## [25] "83.7909836065574"  "81.6516393442623"
```

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

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

```
## [1] "Dorian Finney-Smith" "Derrick Jones Jr."
## [3] "Rondae Hollis-Jefferson" "Paul George"
## [5] "Maurice Harkless"     "Kawhi Leonard"
## [7] "Torrey Craig"         "Bruno Caboclo"
## [9] "Kenrich Williams"     "Alfonzo McKinnie"
```

```
## [11] "Kyle Anderson"      "Andrew Wiggins"
## [13] "101.30737704918"    "99.6844262295082"
## [15] "97.2008196721311"   "97.0614754098361"
## [17] "93.8975409836065"   "93.7909836065574"
## [19] "89.8073770491803"   "89.7786885245902"
## [21] "89.7786885245902"   "84.922131147541"
## [23] "84.75"              "84.6926229508197"
```

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

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

```
## [1] "LeBron James"      "Paul George"      "Kawhi Leonard"
## [4] "Kevin Durant"      "Danilo Gallinari" "Khris Middleton"
## [7] "Jayson Tatum"      "Kyle Anderson"    "Trevor Ariza"
## [10] "Robert Covington" "Otto Porter Jr."  "Justise Winslow"
## [13] "Nicolas Batum"     "Brandon Ingram"   "101.323770491803"
## [16] "99.6598360655738"  "98.0040983606557" "96.3319672131148"
## [19] "93.8975409836065"  "93.8647540983606" "91.3975409836065"
## [22] "88.094262295082"   "87.9877049180328" "87.9713114754098"
## [25] "84.7827868852459"  "83.1024590163935" "80.6024590163934"
## [28] "80.5204918032787"
```

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

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

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

```
## [1] "Mikal Bridges"      "Torrey Craig"      "Keita Bates-Diop"
## [4] "Chandler Hutchison" "Alfonzo McKinnie"  "Doug McDermott"
## [7] "James Ennis III"    "Miles Bridges"     "Troy Williams"
## [10] "Jaron Blossomgame"  "Justin Jackson"    "Tony Snell"
## [13] "18.8524590163934"   "17.2131147540984"   "15.5737704918033"
## [16] "13.9344262295082"   "12.2950819672131"   "10.655737704918"
## [19] "8.19672131147541"   "8.19672131147541"   "5.73770491803279"
## [22] "4.0983606557377"    "2.45901639344262"   "0.819672131147541"
```

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

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

```
## [1] "Andre Iguodala"      "Tony Snell"      "Justin Jackson"
## [4] "Troy Brown"          "Trevor Ariza"    "Darius Miller"
## [7] "Mikal Bridges"      "Kyle Anderson"   "LeBron James"
## [10] "Caris LeVert"        "Kenrich Williams" "Corey Brewer"
## [13] "Nicolas Batum"       "Kevin Durant"    "101.631147540984"
## [16] "99.9918032786885"    "98.3524590163934" "96.7131147540984"
## [19] "95.0737704918033"    "92.6147540983606" "92.6147540983606"
## [22] "90.155737704918"     "88.516393442623"  "86.8770491803279"
## [25] "85.2377049180328"    "83.5983606557377" "81.9590163934426"
## [28] "80.3196721311475"
```

## 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] "Kyle Anderson"      "Omri Casspi"        "Kevin Durant"  
## [4] "LeBron James"       "Jake Layman"        "Andre Iguodala"  
## [7] "Luol Deng"          "Brandon Ingram"     "Kawhi Leonard"  
## [10] "Derrick Jones Jr."  "Doug McDermott"     "Alfonzo McKinnie"  
## [13] "Maurice Harkless"   "100.819672131148"   "99.1803278688525"  
## [16] "97.5409836065574"   "95.9016393442623"   "94.2622950819672"  
## [19] "91.8032786885246"   "91.8032786885246"   "89.344262295082"  
## [22] "87.7049180327869"   "86.0655737704918"   "84.4262295081967"  
## [25] "81.9672131147541"   "81.9672131147541"
```

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

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

```
## [1] "Andre Iguodala"     "Jake Layman"        "Luol Deng"  
## [4] "Omri Casspi"       "James Ennis III"    "Danuel House"  
## [7] "Kevin Durant"      "Alfonzo McKinnie"   "Kyle Anderson"  
## [10] "LeBron James"      "Maurice Harkless"   "OG Anunoby"  
## [13] "100.819672131148"   "99.1803278688525"   "97.5409836065574"  
## [16] "95.9016393442623"   "94.2622950819672"   "92.6229508196721"  
## [19] "90.983606557377"   "89.344262295082"   "87.7049180327869"  
## [22] "85.2459016393443"   "85.2459016393443"   "82.7868852459016"
```

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

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

```
## [1] "Thabo Sefolosha"   "Danilo Gallinari"   "T.J. Warren"  
## [4] "Danuel House"      "Doug McDermott"     "Otto Porter Jr."  
## [7] "Tony Snell"        "Taurean Prince"     "Nicolas Batum"  
## [10] "Paul George"       "Royce O'Neale"      "Khriston Middleton"  
## [13] "Robert Covington"  "100.819672131148"   "99.1803278688525"  
## [16] "97.5409836065574"   "95.9016393442623"   "94.2622950819672"  
## [19] "92.6229508196721"   "90.983606557377"   "89.344262295082"  
## [22] "87.7049180327869"   "85.2459016393443"   "85.2459016393443"  
## [25] "81.9672131147541"   "81.9672131147541"
```

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

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

```
## [1] "Danilo Gallinari"   "Kevin Durant"       "Tony Snell"  
## [4] "Chandler Parsons"  "Nicolas Batum"      "Jayson Tatum"  
## [7] "Kawhi Leonard"     "Bruno Caboclo"      "Paul George"  
## [10] "Khriston Middleton" "Doug McDermott"     "CJ Miles"
```

```
## [13] "Taurean Prince"      "100.819672131148" "99.1803278688525"
## [16] "97.5409836065574"   "95.9016393442623" "94.2622950819672"
## [19] "92.6229508196721"   "90.983606557377"  "89.344262295082"
## [22] "87.7049180327869"   "86.0655737704918" "84.4262295081967"
## [25] "82.7868852459016"   "81.1475409836066"
```

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] "Danuel House"      "Thabo Sefolosha"  "Doug McDermott"
## [4] "Omri Casspi"      "Andre Iguodala"   "Jake Layman"
## [7] "Royce O'Neale"     "Kevin Durant"     "Alfonzo McKinnie"
## [10] "Tony Snell"        "James Ennis III"  "Kyle Anderson"
## [13] "LeBron James"      "100.819672131148" "99.1803278688525"
## [16] "97.5409836065574" "95.9016393442623" "93.4426229508197"
## [19] "93.4426229508197" "90.983606557377"  "89.344262295082"
## [22] "86.8852459016394" "86.8852459016394" "84.4262295081967"
## [25] "81.9672131147541" "81.9672131147541"
```

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

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

```
## [1] "Danuel House"      "Danilo Gallinari" "Kevin Durant"
## [4] "Doug McDermott"    "Kawhi Leonard"    "Omri Casspi"
## [7] "Thabo Sefolosha"   "Jake Layman"       "James Ennis III"
## [10] "Royce O'Neale"     "LeBron James"      "Luol Deng"
## [13] "Andre Iguodala"    "100.819672131148" "99.1803278688525"
## [16] "97.5409836065574" "95.9016393442623" "93.4426229508197"
## [19] "93.4426229508197" "90.983606557377"  "89.344262295082"
## [22] "87.7049180327869" "86.0655737704918" "83.6065573770492"
## [25] "83.6065573770492" "81.1475409836066"
```

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] "LeBron James"      "Paul George"      "Kawhi Leonard"
## [4] "Danilo Gallinari"  "Kevin Durant"     "Khriston Middleton"
## [7] "Danuel House"      "Jake Layman"       "Otto Porter Jr."
## [10] "Robert Covington" "Andre Iguodala"    "T.J. Warren"
## [13] "Doug McDermott"    "Jae Crowder"       "100.819672131148"
## [16] "99.1803278688525" "97.5409836065574" "95.0819672131148"
## [19] "95.0819672131148" "92.6229508196721" "88.5245901639344"
## [22] "88.5245901639344" "88.5245901639344" "88.5245901639344"
## [25] "84.4262295081967" "82.7868852459016" "80.327868852459"
## [28] "80.327868852459"
```

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



```

filter(ratioOWS_percentile > 80)

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

## [1] "Kevin Durant"      "Paul George"      "Danilo Gallinari"
## [4] "Kawhi Leonard"     "LeBron James"     "Khris Middleton"
## [7] "Andre Iguodala"    "Justin Jackson"   "Nicolas Batum"
## [10] "Jake Layman"       "Doug McDermott"   "Otto Porter Jr."
## [13] "Mikal Bridges"     "100.819672131148" "99.1803278688525"
## [16] "97.5409836065574" "95.9016393442623" "94.2622950819672"
## [19] "92.6229508196721" "90.983606557377"  "88.5245901639344"
## [22] "88.5245901639344" "86.0655737704918" "83.6065573770492"
## [25] "83.6065573770492" "81.1475409836066"

```

## 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] "Robert Covington" "Kevin Durant"      "Bruno Caboclo"
## [4] "Kelly Oubre Jr."  "Maurice Harkless"  "Kyle Anderson"
## [7] "Andre Iguodala"   "T.J. Warren"       "Andrew Wiggins"
## [10] "Jayson Tatum"     "Derrick Jones Jr." "LeBron James"
## [13] "Brandon Ingram"   "Otto Porter Jr."   "Miles Bridges"
## [16] "Nicolas Batum"    "Torrey Craig"       "101.118852459016"
## [19] "99.6598360655738" "97.7581967213115" "94.7090163934426"
## [22] "94.4303278688525" "94.3237704918033" "91.0040983606557"
## [25] "87.3401639344262" "87.3155737704918" "87.2991803278689"
## [28] "87.1352459016394" "79.1844262295082" "79.1270491803279"
## [31] "79.0860655737705" "78.9139344262295" "78.7827868852459"
## [34] "78.7745901639344"

```

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] "Paul George"      "Robert Covington" "Kawhi Leonard"
## [4] "Mikal Bridges"    "Otto Porter Jr."  "Kyle Anderson"
## [7] "Trevor Ariza"     "LeBron James"     "Kelly Oubre Jr."
## [10] "T.J. Warren"      "Maurice Harkless" "Caris LeVert"
## [13] "Justise Winslow"  "Jayson Tatum"     "101.299180327869"
## [16] "99.6680327868852" "98.0040983606557" "96.3729508196721"
## [19] "94.7090163934426" "91.3975409836065" "91.3237704918033"
## [22] "91.2991803278689" "87.2909836065574" "87.2172131147541"
## [25] "82.3893442622951" "82.3401639344262" "82.2909836065574"
## [28] "82.25"

```

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] "Luol Deng"          "Nicolas Batum"
## [3] "Andrew Wiggins"    "Andre Iguodala"
## [5] "Justin Jackson"    "Keita Bates-Diop"
## [7] "Kevin Durant"      "Sviatoslav Mykhailiuk"
## [9] "Trevor Ariza"      "LeBron James"
## [11] "Kawhi Leonard"     "Jaron Blossomgame"
## [13] "18.8524590163934"  "17.2131147540984"
## [15] "15.5737704918033"  "13.9344262295082"
## [17] "12.2950819672131"  "10.655737704918"
## [19] "9.01639344262295"  "7.37704918032787"
## [21] "5.73770491803279"  "4.0983606557377"
## [23] "2.45901639344262"  "0.819672131147541"
```

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

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

```
## [1] "Tony Snell"          "Justin Jackson"
## [3] "Abdel Nader"         "Troy Brown"
## [5] "Luol Deng"           "Justin Anderson"
## [7] "Glenn Robinson III"  "Omri Casspi"
## [9] "Keita Bates-Diop"    "Thabo Sefolosha"
## [11] "Jaron Blossomgame"   "Sviatoslav Mykhailiuk"
## [13] "18.1844262295082"    "18.094262295082"
## [15] "14.3155737704918"    "14.1434426229508"
## [17] "14.0286885245902"    "8.61885245901639"
## [19] "8.38934426229508"    "8.35655737704918"
## [21] "8.25"                "4.22540983606557"
## [23] "2.46311475409836"    "0.85655737704918"
```

## 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] "Kyle Anderson"       "Thabo Sefolosha"
## [3] "Maurice Harkless"    "Royce O'Neale"
## [5] "LeBron James"        "Robert Covington"
## [7] "Andre Iguodala"      "Derrick Jones Jr."
## [9] "Bruno Caboclo"       "Rondae Hollis-Jefferson"
## [11] "Dorian Finney-Smith" "Corey Brewer"
## [13] "Justise Winslow"     "100.819672131148"
## [15] "99.1803278688525"    "97.5409836065574"
## [17] "95.9016393442623"    "93.4426229508197"
## [19] "93.4426229508197"    "90.983606557377"
```



```
## [21] "89.344262295082"      "86.8852459016394"
## [23] "86.8852459016394"      "84.4262295081967"
## [25] "81.9672131147541"      "81.9672131147541"
```

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

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

```
## [1] "Paul George"      "Khris Middleton"    "Jayson Tatum"
## [4] "Kawhi Leonard"    "Jae Crowder"        "Kevin Durant"
## [7] "Justise Winslow"  "LeBron James"       "Royce O'Neale"
## [10] "Dorian Finney-Smith" "Maurice Harkless"   "Andre Iguodala"
## [13] "Danilo Gallinari" "Kyle Anderson"      "100.819672131148"
## [16] "99.1803278688525" "96.7213114754098"   "96.7213114754098"
## [19] "94.2622950819672" "92.6229508196721"   "90.1639344262295"
## [22] "90.1639344262295" "87.7049180327869"   "86.0655737704918"
## [25] "84.4262295081967" "81.1475409836066"   "81.1475409836066"
## [28] "81.1475409836066"
```

## 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] "LeBron James"      "Paul George"        "Kawhi Leonard"
## [4] "Kevin Durant"     "Danilo Gallinari"   "Robert Covington"
## [7] "Maurice Harkless" "Andre Iguodala"     "Kyle Anderson"
## [10] "Khris Middleton"  "Nicolas Batum"      "Thabo Sefolosha"
## [13] "Otto Porter Jr."  "100.819672131148"   "99.1803278688525"
## [16] "97.5409836065574" "95.9016393442623"   "94.2622950819672"
## [19] "92.6229508196721" "90.983606557377"    "89.344262295082"
## [22] "87.7049180327869" "85.2459016393443"   "85.2459016393443"
## [25] "82.7868852459016" "81.1475409836066"
```

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

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

```
## [1] "Paul George"      "Kevin Durant"        "Kawhi Leonard"
## [4] "Danilo Gallinari" "LeBron James"        "Khris Middleton"
## [7] "Jayson Tatum"     "Jae Crowder"         "Andre Iguodala"
## [10] "Nicolas Batum"    "Maurice Harkless"    "Dorian Finney-Smith"
## [13] "Royce O'Neale"    "100.819672131148"     "99.1803278688525"
## [16] "97.5409836065574" "95.9016393442623"     "94.2622950819672"
## [19] "92.6229508196721" "90.983606557377"     "89.344262295082"
## [22] "87.7049180327869" "86.0655737704918"     "84.4262295081967"
## [25] "81.9672131147541" "81.9672131147541"
```

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

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

```
## [1] "Kawhi Leonard"      "Kevin Durant"      "Paul George"
## [4] "Danilo Gallinari"   "LeBron James"      "Andre Iguodala"
## [7] "Khris Middleton"    "Derrick Jones Jr." "Omri Casspi"
## [10] "Tony Snell"         "Thabo Sefolosha"   "Maurice Harkless"
## [13] "Danuel House"       "100.819672131148"  "99.1803278688525"
## [16] "97.5409836065574"  "95.9016393442623"  "94.2622950819672"
## [19] "92.6229508196721"  "90.983606557377"   "89.344262295082"
## [22] "87.7049180327869"  "86.0655737704918"  "84.4262295081967"
## [25] "82.7868852459016"  "81.1475409836066"
```

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] "Paul George"      "LeBron James"      "Kevin Durant"
## [4] "Kawhi Leonard"    "Danilo Gallinari"   "Khris Middleton"
## [7] "Nicolas Batum"     "Andre Iguodala"     "Maurice Harkless"
## [10] "Jae Crowder"       "Robert Covington"   "Dorian Finney-Smith"
## [13] "Mikal Bridges"     "100.819672131148"  "99.1803278688525"
## [16] "97.5409836065574"  "95.9016393442623"  "94.2622950819672"
## [19] "91.8032786885246"  "91.8032786885246"  "89.344262295082"
## [22] "87.7049180327869"  "85.2459016393443"  "85.2459016393443"
## [25] "81.9672131147541"  "81.9672131147541"
```

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

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

```
## [1] "Kawhi Leonard"      "LeBron James"      "Kevin Durant"
## [4] "Paul George"        "Danilo Gallinari"   "Khris Middleton"
## [7] "T.J. Warren"        "Otto Porter Jr."    "Omri Casspi"
## [10] "Kelly Oubre Jr."    "Jayson Tatum"       "Caris LeVert"
## [13] "Luol Deng"          "100.819672131148"  "99.1803278688525"
## [16] "97.5409836065574"  "95.9016393442623"  "94.2622950819672"
## [19] "92.6229508196721"  "90.983606557377"   "89.344262295082"
## [22] "87.7049180327869"  "86.0655737704918"  "84.4262295081967"
## [25] "82.7868852459016"  "81.1475409836066"
```