

# Jordan V. Lebron

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```
# Import libraries and data here
library(dplyr)
library(readr)
library(tidyverse)
library(rvest)
library(ggplot2)
library(tidyr)
library(esquisse)

# Downloaded Lebron Data from BasketBall Reference
# Link: https://www.basketball-reference.com/players/j/jamesle01.html#per_game
LebronPerGame <- read_csv('./LebronNew/LebronPerGameNew.csv')
LebronTotals <- read_csv('./LebronNew/LebronTotalStatsNew.csv')
LebronAdvanced <- read_csv('./LebronNew/LebronAdvancedNew.csv')
LebronPer100Poss <- read_csv('./LebronNew/LebronPer100Poss.csv')
LebronAllStarGames <- read_csv('./LebronNew/LebronAllStarGame.csv')

# Downloaded Jordan Data from BasketBall Reference
# Link: https://www.basketball-reference.com/players/j/jordami01.html
JordanPerGame <- read_csv('./JordanNew/JordanPerGameNew.csv')
JordanTotals <- read_csv('./JordanNew/JordanTotalStatsNew.csv')
JordanAdvanced <- read_csv('./JordanNew/JordanAdvancedNew.csv')
JordanPer100Poss <- read_csv('./JordanNew/JordanPer100Poss.csv')
JordanAllStarGames <- read_csv('./JordanNew/JordanAllStarGame.csv')

# Downloaded from StatHeadBasketBall
# # Link: https://stathead.com/basketball/us/lebron-james-vs-michael-jordan#coverage_note
LebronVJordanPlayoffTotals <- read_csv('./LebronVJordanPlayoffTotals.csv')
```

## Guiding Question:

- Who is the Greatest Basketball Player of All Time in NBA History, Lebron or Jordan?

## Become acquainted with your data sources:

### Where did you find them?

- Data retrieved from BasketBall Reference.

### Who collected/maintains them?

- Sean Lahman donated much of the initial data.
- Chip Hart and Kevin Cohen provided input on the site's design and data collection, respectively.

- Tom Timmerman, Dick Pfander, Todd Spehr, Matt Shuh, Justin Kubatko, Sean Burrill, Tariq Jabbar, Mike Lynch, Michael Hamel, Mark Montieth, and Robert Bradley have all contributed significantly to the collection of NBA and ABA data.
- Matthew Maurer, an NBA Draft historian, has supplied information on the NBA Draft.

## When & Why were they originally collected?

Basketball Reference was launched in April of 2004 by Justin Kubatko. The primary goal was to create a comprehensive database that tracks basketball information. This encompasses player statistics, team performances, game results, and much more, making it an invaluable resource for fans, analysts, and researchers interested in the sport's history and current events.

## What does a case represent in each data source, and how many total cases are available?

- For player statistics, each row or case represents a season's worth of performance data for that player.
- Game logs would treat each game as a case.
- Draft data entries represent individual players selected in the NBA draft.
- There are thousands of cases covering decades of basketball history across the NBA and ABA.

## What are some of the variables that you plan to use?

- Points per game (PointsPerGame)
- Assists per game (AssistsPerGame)
- Rebounds per game (ReboundsPerGame)
- Total Points (TotalPoints)
- Total Assists (TotalAssists)
- Total Rebounds (TotalRebounds)
- Player efficiency rating (PlayerEfficiencyRating)
- Career achievements (CareerAchievements)
- All-star game appearances (AllStarGameAppearances)
- Game scores (GameScores)

## Explore intuition related to the research question

### 1. Comparing Lebron and Jordans total and per-game stats

Bargraph showcasing a comparison of per game-stats

```
LebronStatsPerGame <- LebronTotals %>%
  summarise(Player = "Lebron James", AssistsPerGame = sum(AST, na.rm = TRUE) / sum(G, na.rm = TRUE), ReboundsPerGame = sum(RB, na.rm = TRUE) / sum(G, na.rm = TRUE))

JordanStatsPerGame <- JordanTotals %>%
  summarise(Player = "Michael Jordan", AssistsPerGame = sum(AST, na.rm = TRUE) / sum(G, na.rm = TRUE), ReboundsPerGame = sum(RB, na.rm = TRUE) / sum(G, na.rm = TRUE))

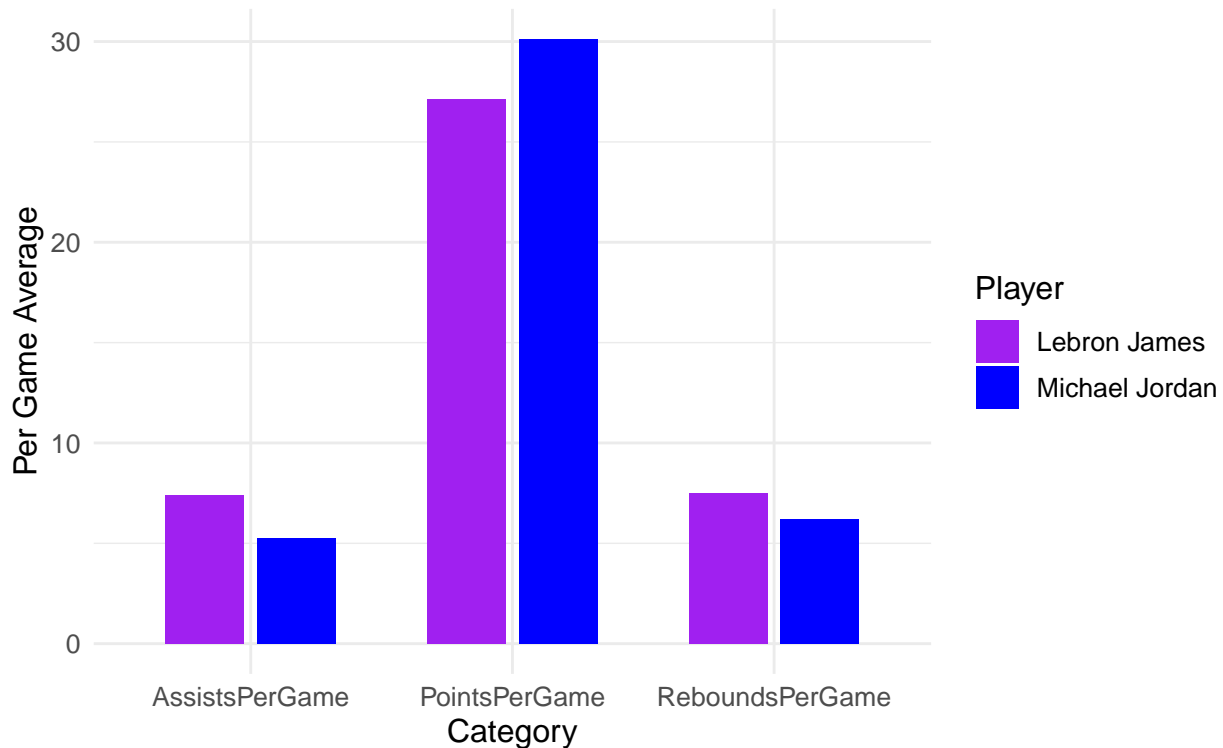
StatsComparison <- bind_rows(LebronStatsPerGame, JordanStatsPerGame)

StatsComparisonLong <- StatsComparison %>%
  pivot_longer(cols = c(AssistsPerGame, ReboundsPerGame, PointsPerGame), names_to = "Statistic", values_to = "Value")

ggplot(StatsComparisonLong, aes(x = Statistic, y = Value, fill = Player)) +
  geom_bar(stat = "identity", position = position_dodge(width = 0.7), width = 0.6) +
  theme_minimal() +
  labs(title = "Comparison of Per Game Statistics", subtitle = "Lebron James vs. Michael Jordan", x = "Category", y = "Value") +
  scale_fill_manual(values = c("Lebron James" = "purple", "Michael Jordan" = "blue")) +
  theme(text = element_text(size = 12))
```

## Comparison of Per Game Statistics

Lebron James vs. Michael Jordan



```
print(StatsComparison)
```

```
## # A tibble: 2 x 4
##   Player      AssistsPerGame ReboundsPerGame PointsPerGame
##   <chr>          <dbl>          <dbl>          <dbl>
## 1 Lebron James      7.38            7.50           27.1
## 2 Michael Jordan    5.25            6.22           30.1
```

LeBron has averaged 27.1 points, 7.4 assists, and 7.5 rebounds per game over the course of his 21 year career. Jordan has averaged 30.1 points, 5.3 assists, and 6.2 rebounds over the course of his 15 year career. Even though Jordan has averaged a higher amount of points, LeBron was never seen as a scorer. LeBron was known for his playmaking and getting his team involved (We can see that with the 7.4 assists), while Jordan was predominantly known as a prolific scorer.

## Bargraph showcasing a comparison of total stats

```
LebronTotalsStats <- LebronTotals %>%
  summarise(Player = "Lebron James", TotalRebounds = sum(TRB, na.rm = TRUE), TotalAssists = sum(AST, na.rm = TRUE), TotalPoints = sum(P, na.rm = TRUE))

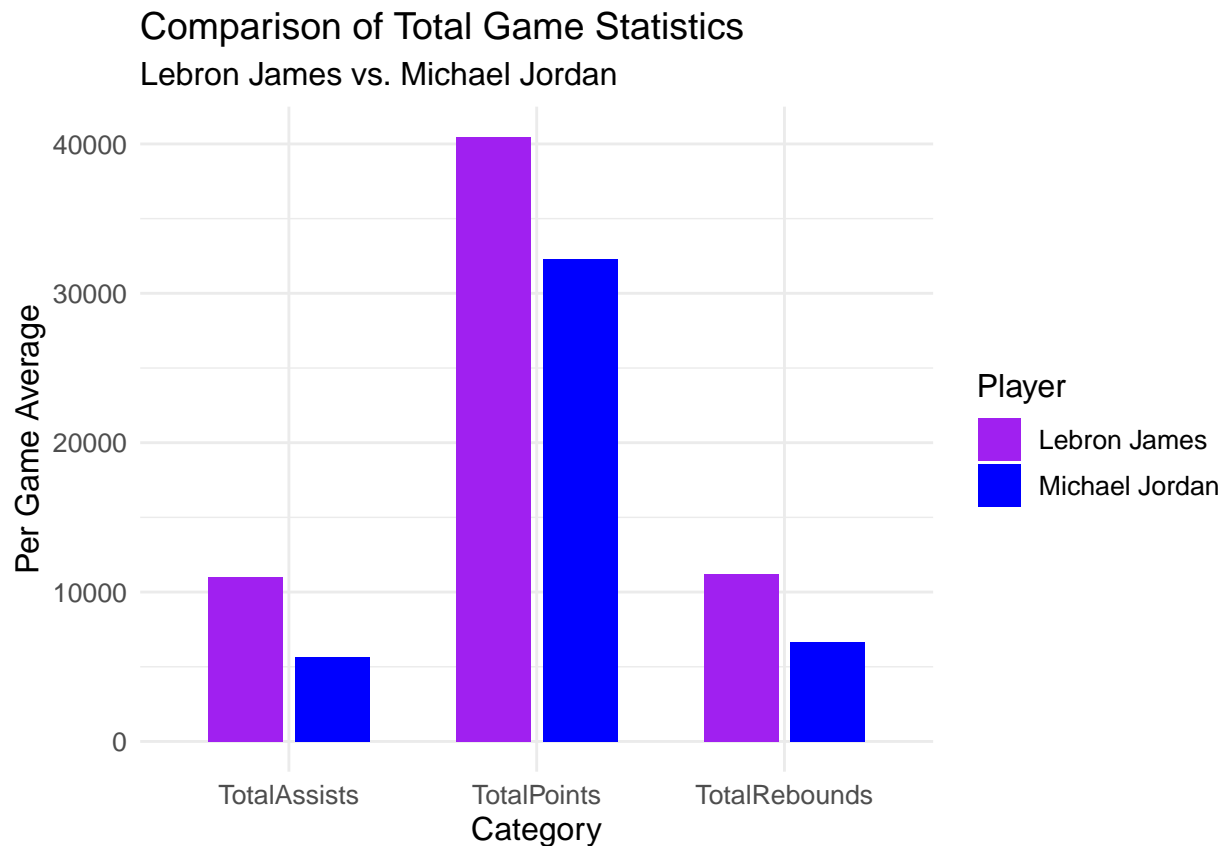
JordanTotalsStats <- JordanTotals %>%
  summarise(Player = "Michael Jordan", TotalRebounds = sum(TRB, na.rm = TRUE), TotalAssists = sum(AST, na.rm = TRUE), TotalPoints = sum(P, na.rm = TRUE))

StatsComparison <- bind_rows(LebronTotalsStats, JordanTotalsStats)

StatsComparisonLong <- StatsComparison %>%
  pivot_longer(cols = c(TotalRebounds, TotalAssists, TotalPoints), names_to = "Statistic", values_to = "Value")

ggplot(StatsComparisonLong, aes(x = Statistic, y = Value, fill = Player)) +
  geom_bar(stat = "identity", position = position_dodge(width = 0.7), width = 0.6) +
  theme_minimal()
```

```
labs(title = "Comparison of Total Game Statistics", subtitle = "Lebron James vs. Michael Jordan", x = "Category",
scale_fill_manual(values = c("Lebron James" = "purple", "Michael Jordan" = "blue"))) +
theme(text = element_text(size = 12))
```



```
print(StatsComparison)
```

```
## # A tibble: 2 x 4
##   Player      TotalRebounds TotalAssists TotalPoints
##   <chr>          <dbl>         <dbl>         <dbl>
## 1 Lebron James    11185         11009         40474
## 2 Michael Jordan   6672          5633         32292
```

LeBron over the course of his 21 years has accumulated 40,474 points, 11,009 assists, and 11,185 total rebounds. Jordan in his 15 years in the league has totaled 32,292 points, 5,633 assists, and 6,672 total rebounds. LeBron has just overtaken Kareem as the all time leading scorer and sits in 4th place for total all time assists while Jordan barely breaks the top five for points and has nowhere near the rebounds and assists to be a leader in the stat. Even though LeBron has played 6 more seasons than Jordan, he is currently putting up 27 points per game for his entire career including this current year at 39 years old. Jordan had to retire at 39 because he was such a liability as a player.

## Histogram showcasing LeBron and Jordan Playoff Totals

```
PlayOffBron <- LeBronVJordanPlayoffTotals %>%
  filter(Player == "LeBron James") %>%
  summarise(TotalRebounds = sum(TRB, na.rm = TRUE),
            TotalAssists = sum(AST, na.rm = TRUE),
            TotalPoints = sum(PTS, na.rm = TRUE),
            Player = "LeBron James")
```

```

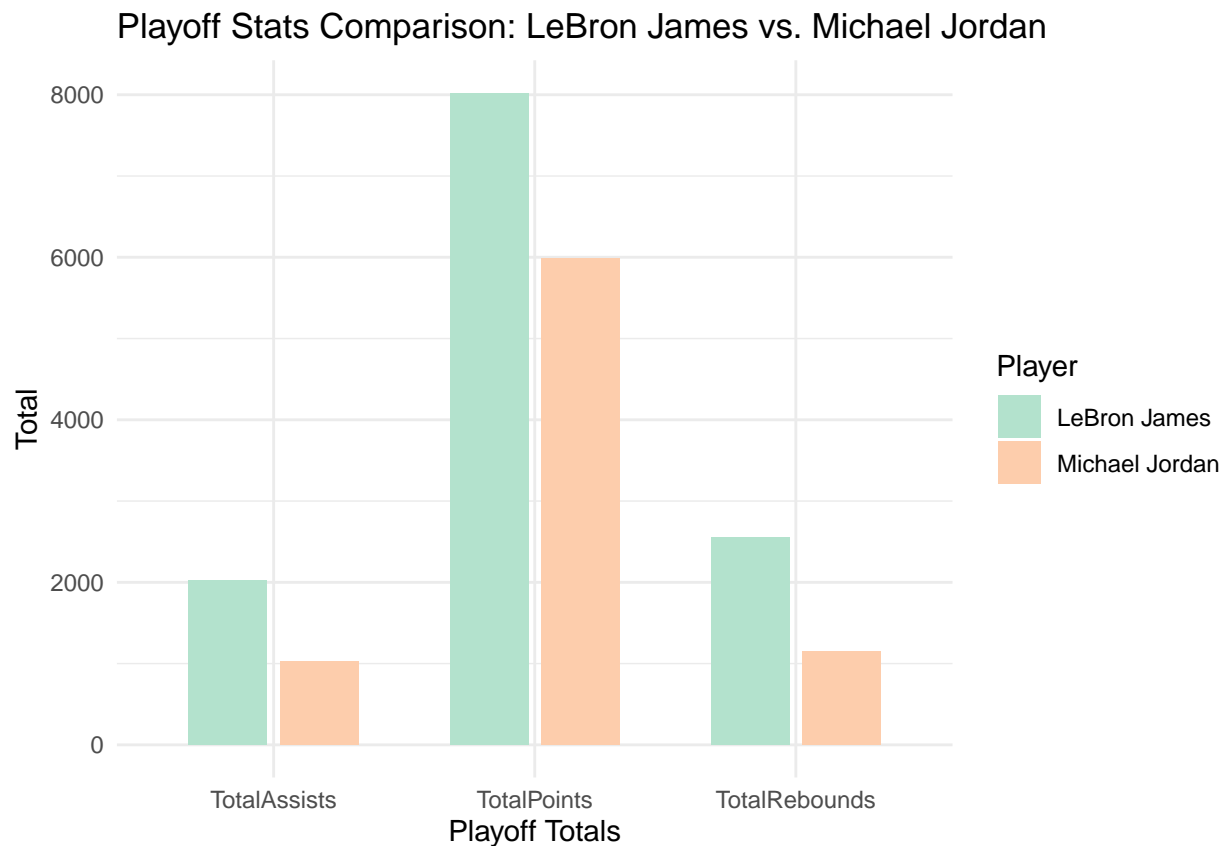
PlayOffJordan <- LeBronVJordanPlayoffTotals %>%
  filter(Player == "Michael Jordan") %>%
  summarise(TotalRebounds = sum(TRB, na.rm = TRUE),
            TotalAssists = sum(AST, na.rm = TRUE),
            TotalPoints = sum(PTS, na.rm = TRUE),
            Player = "Michael Jordan")

StatsComparison <- bind_rows(PlayOffBron, PlayOffJordan)

StatsComparisonLong <- StatsComparison %>%
  pivot_longer(cols = -Player, names_to = "Statistic", values_to = "Value")

ggplot(StatsComparisonLong, aes(x = Statistic, y = Value, fill = Player)) +
  geom_bar(stat = "identity", position = position_dodge(width = 0.7), width = 0.6) +
  labs(title = "Playoff Stats Comparison: LeBron James vs. Michael Jordan",
       x = "Playoff Totals",
       y = "Total",
       fill = "Player") +
  theme_minimal() +
  scale_fill_brewer(palette = "Pastel2")

```



Throughout LeBrons 21 year career he has made the playoffs 16 times while Jordan during his 15 year career managed to make the playoffs only 13 times. LeBron clearly dominates in the stats we are observing, points, assists, and total rebounds. Even though LeBron has played 3 more years in the playoffs, he has double the amount of assists and rebounds while also having 2,000 more points than Jordan. LeBron in his 16 playoff years has been to the finals 10 times compared to only 6 from Jordan. LeBron had more room to increase his stats because he was able to make it past all the tough teams in his division to reach the finals, while Jordan has been seen as a first round exit in the years he didn't make the finals.

## 2. Using Advanced and Per100Poss stats for comparison

Dotplot showcasing VORP (Value over replacement player)

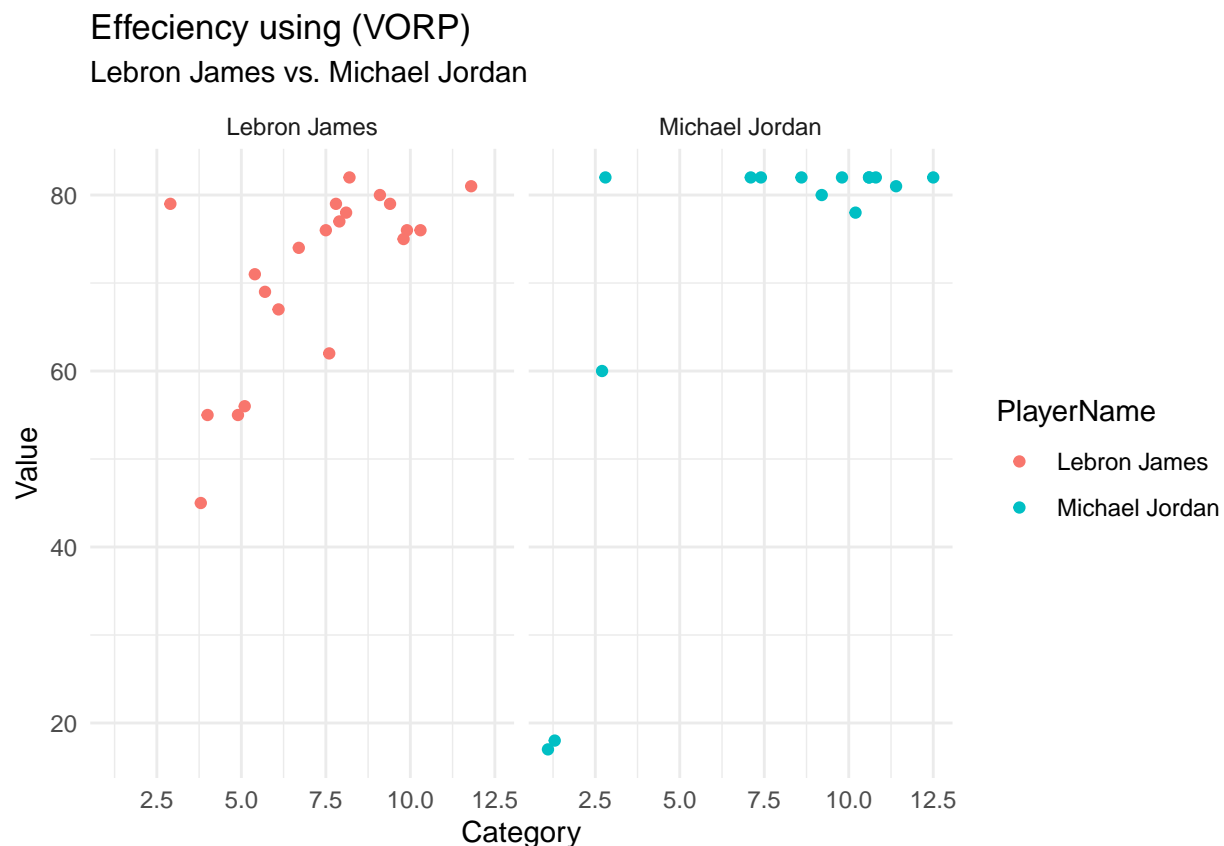
```
LebronLongevity <- LebronAdvanced %>%
  mutate(PlayerName = "Lebron James", Games = G, TrueShootingPercentage = as.numeric("TS%"), WinShare = WS, ValueOverReplacementPlayer = VORP)
  select(PlayerName, Season, Games, TrueShootingPercentage, WinShare, ValueOverReplacementPlayer)

JordanLongevity <- JordanAdvanced %>%
  mutate(PlayerName = "Michael Jordan", Games = G, TrueShootingPercentage = as.numeric("TS%"), WinShare = WS, ValueOverReplacementPlayer = VORP)
  select(PlayerName, Season, Games, TrueShootingPercentage, WinShare, ValueOverReplacementPlayer)

CombinedData <- bind_rows(LebronLongevity, JordanLongevity)

CombinedDataLonger <- CombinedData %>%
  pivot_longer(cols = c(Games), names_to = "Statistic", values_to = "Value")

CombinedDataLonger %>%
  ggplot(aes(x = ValueOverReplacementPlayer, y = Value, color = PlayerName)) +
  geom_point(shape = "circle", size = 1.5) +
  scale_color_hue(direction = 1) +
  theme_minimal() +
  facet_wrap(vars(PlayerName)) +
  labs(title = "Effeciency using (VORP)", subtitle = "Lebron James vs. Michael Jordan", x = "Category", y = "Value")
```



```
print(CombinedDataLonger)
```

```
## # A tibble: 45 x 7
```

```
##   PlayerName Season TrueShootingPercentage WinShare ValueOverReplacementPl~1
```

```
##      <chr>      <chr>      <dbl>      <dbl>      <dbl>
## 1 LeBron James 2003-04      NA      5.1      2.9
## 2 LeBron James 2004-05      NA     14.3      9.1
## 3 LeBron James 2005-06      NA     16.3      9.4
## 4 LeBron James 2006-07      NA     13.7      8.1
## 5 LeBron James 2007-08      NA     15.2      9.8
## 6 LeBron James 2008-09      NA     20.3     11.8
## 7 LeBron James 2009-10      NA     18.5     10.3
## 8 LeBron James 2010-11      NA     15.6      7.8
## 9 LeBron James 2011-12      NA     14.5      7.6
## 10 LeBron James 2012-13      NA     19.3      9.9
## # i 35 more rows
## # i abbreviated name: 1: ValueOverReplacementPlayer
## # i 2 more variables: Statistic <chr>, Value <dbl>
```

This bar plot shows an advanced stat, Value over replacement player. This is showing us per 100 possessions each players had accounted for that benefited their team. We can see that Jordans ceiling is higher and has had more instances in his career where his VORP is higher than LeBrons. We can also see that LeBron is way more consistent with his lowest points on the bar plot accounting for his rookie seasons in the NBA when he was 18 coming out of high school. This plot leans both ways with what bias you hold towards either player, but overall we think this shows how valuable LeBron really is to his team.

## Bargraph showcasing Player Efficiency Ratings (PER)

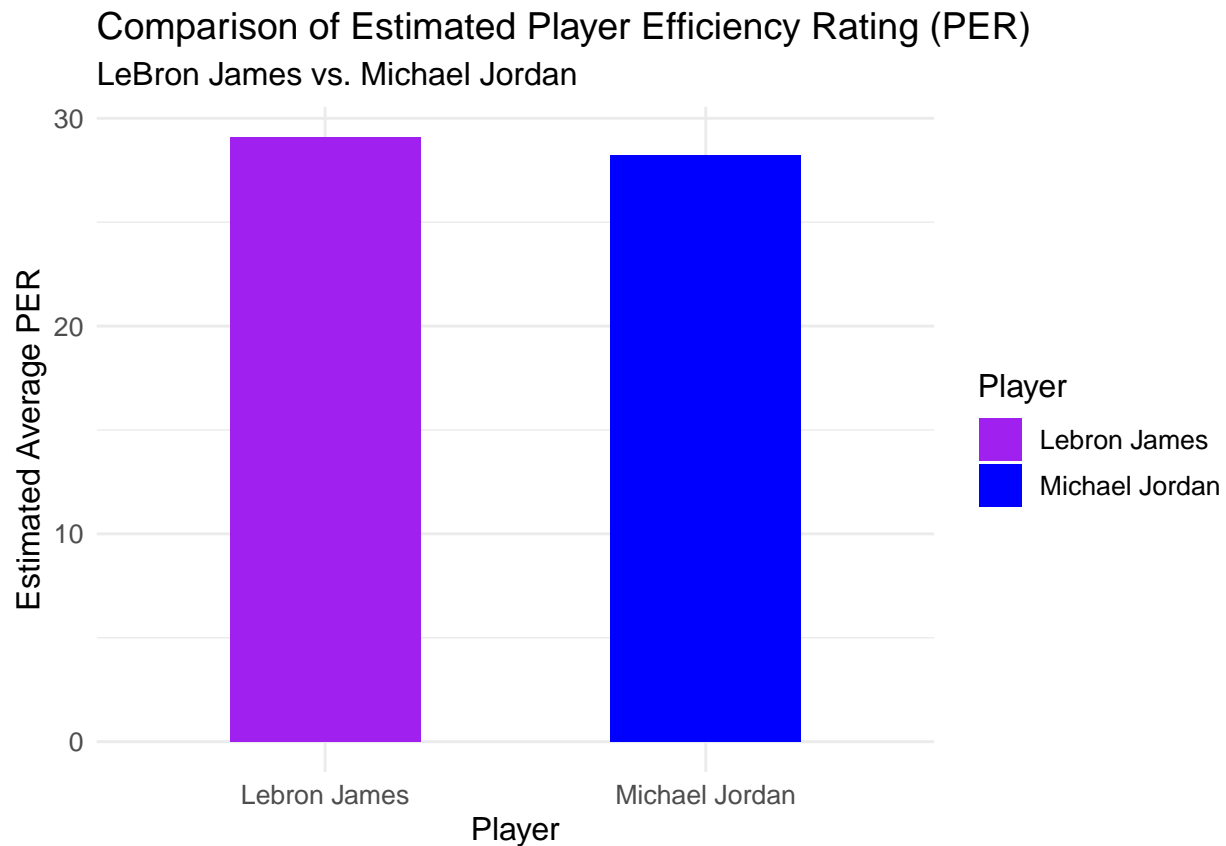
```
PER <- function(x){
  x %>%
    mutate(uPER = (PTS + TRB + AST + STL + BLK - ((FGA - FG) + (FTA - FT) + TOV)) / G) %>%
    summarise(AveragePER = mean(uPER, na.rm = TRUE))
}

LebronPER <- PER(LebronTotals) %>%
  mutate(Player = "Lebron James")

JordanPER <- PER(JordanTotals) %>%
  mutate(Player = "Michael Jordan")

PERComparison <- bind_rows(LebronPER, JordanPER) %>%
  select(Player, everything())

ggplot(PERComparison, aes(x = Player, y = AveragePER, fill = Player)) +
  geom_bar(stat = "identity", position = position_dodge(), width = 0.5) +
  theme_minimal() +
  labs(title = "Comparison of Estimated Player Efficiency Rating (PER)", subtitle = "LeBron James vs. Michael")
  scale_fill_manual(values = c("Lebron James" = "purple", "Michael Jordan" = "blue")) +
  theme(text = element_text(size = 12))
```



```
print(PERComparison)
```

```
## # A tibble: 2 x 2
##   Player      AveragePER
##   <chr>         <dbl>
## 1 Lebron James    29.1
## 2 Michael Jordan  28.2
```

This graph compares LeBron and Jordans efficiency ratings over the course of their careers when comparing their turnover percentages to their scoring ability. The graph shows that LeBrons per 100 possessions stats makes LeBron a more efficient player.

### 3. Showcasing and comparing LeBron and Jordans Legacys

Barpgraph that shows LeBron and Jordans Efficiency ratings above age 30

```
OldBron <- LebronPer100Poss %>%
  filter(Season > "2014-15") %>%
  mutate(PER = (PTS + TRB + AST + STL + BLK - ((FGA - FG) + (FTA - FT) + TOV)) / G, Player = "Lebron James")

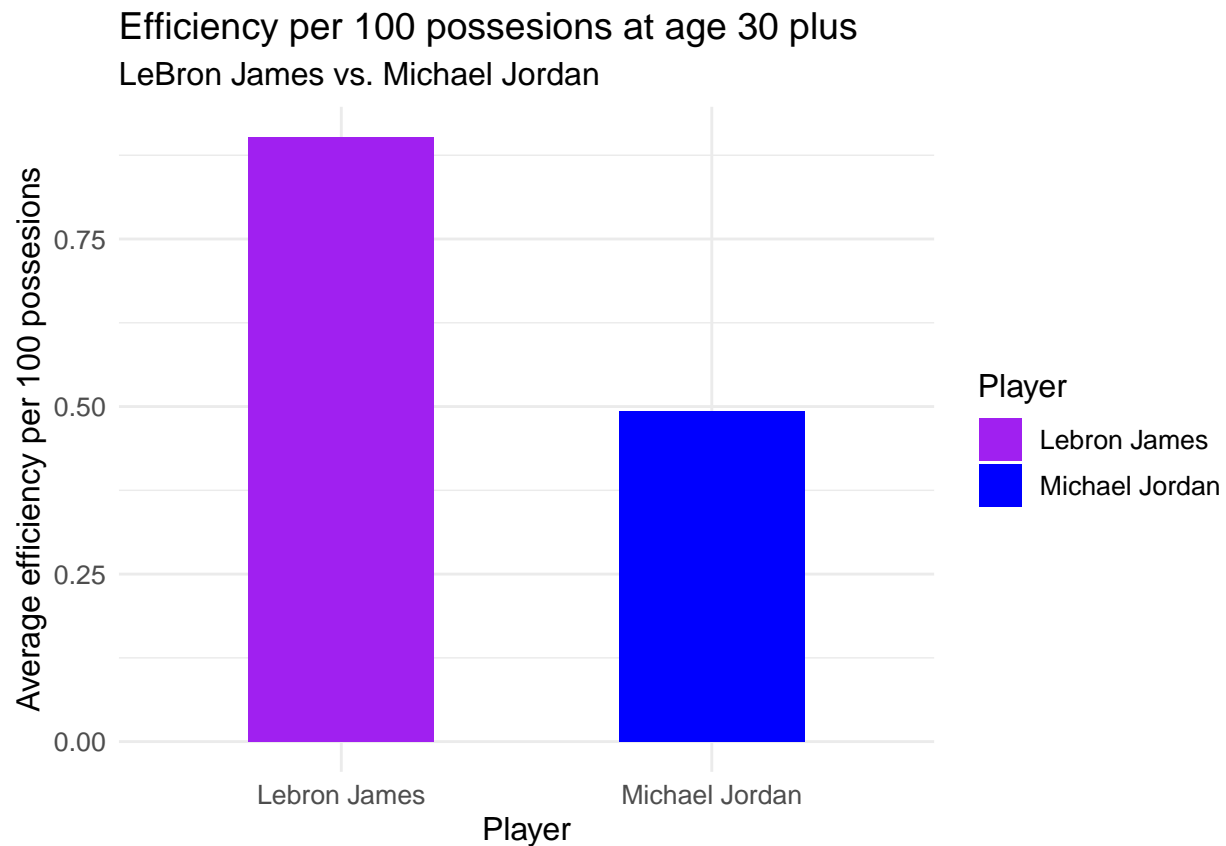
OldJordan <- JordanPer100Poss %>%
  filter(Season > "1994-95") %>%
  mutate(PER = (PTS + TRB + AST + STL + BLK - ((FGA - FG) + (FTA - FT) + TOV)) / G, Player = "Michael Jordan")

OldComp <- bind_rows(OldBron, OldJordan) %>%
  select(Player, everything())

ggplot(OldComp, aes(x = Player, y = PER, fill = Player)) +
```



```
geom_bar(stat = "identity", position = position_dodge(), width = 0.5) +
theme_minimal() +
labs(title = "Efficiency per 100 possessions at age 30 plus", subtitle = "LeBron James vs. Michael Jordan", y
scale_fill_manual(values = c("Lebron James" = "purple", "Michael Jordan" = "blue"))) +
theme(text = element_text(size = 12))
```



```
print(OldComp)
```

```
## # A tibble: 14 x 34
##   Player      Season  Age Tm   Lg   Pos      G    GS    MP    FG    FGA 'FG%'
##   <chr>      <chr> <dbl> <chr> <chr> <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 Lebron Ja~ 2015~ 31 CLE  NBA   SF      76    76  2709   14    26.9 0.52
## 2 Lebron Ja~ 2016~ 32 CLE  NBA   SF      74    74  2794  13.1   24    0.548
## 3 Lebron Ja~ 2017~ 33 CLE  NBA   PF      82    82  3026  13.9   25.6 0.542
## 4 Lebron Ja~ 2018~ 34 LAL  NBA   SF      55    55  1937  13.4   26.3 0.51
## 5 Lebron Ja~ 2019~ 35 LAL  NBA   PG      67    67  2316  13.2   26.8 0.493
## 6 Lebron Ja~ 2020~ 36 LAL  NBA   PG      45    45  1504  13.7   26.6 0.513
## 7 Lebron Ja~ 2021~ 37 LAL  NBA   C       56    56  2084  14.7   28.1 0.524
## 8 Lebron Ja~ 2022~ 38 LAL  NBA   PF      55    54  1954  14.8   29.6 0.5
## 9 Lebron Ja~ 2023~ 39 LAL  NBA   PF      71    71  2504   13    24.1 0.54
## 10 Michael J~ 1995~ 32 CHI  NBA   SG      82    82  3090  15.6   31.5 0.495
## 11 Michael J~ 1996~ 33 CHI  NBA   SG      82    82  3106  15.8   32.5 0.486
## 12 Michael J~ 1997~ 34 CHI  NBA   SG      82    82  3181  14.9   32.1 0.465
## 13 Michael J~ 2001~ 38 WAS  NBA   SF      60    53  2093  14.3   34.4 0.416
## 14 Michael J~ 2002~ 39 WAS  NBA   SF      82    67  3031  12.2   27.4 0.445
## # i 22 more variables: '3P' <dbl>, '3PA' <dbl>, '3P%' <dbl>, '2P' <dbl>,
## #   '2PA' <dbl>, '2P%' <dbl>, FT <dbl>, FTA <dbl>, 'FT%' <dbl>, ORB <dbl>,
## #   DRB <dbl>, TRB <dbl>, AST <dbl>, STL <dbl>, BLK <dbl>, TOV <dbl>, PF <dbl>,
## #   PTS <dbl>, ...30 <lgl>, ORtg <dbl>, DRtg <dbl>, PER <dbl>
```

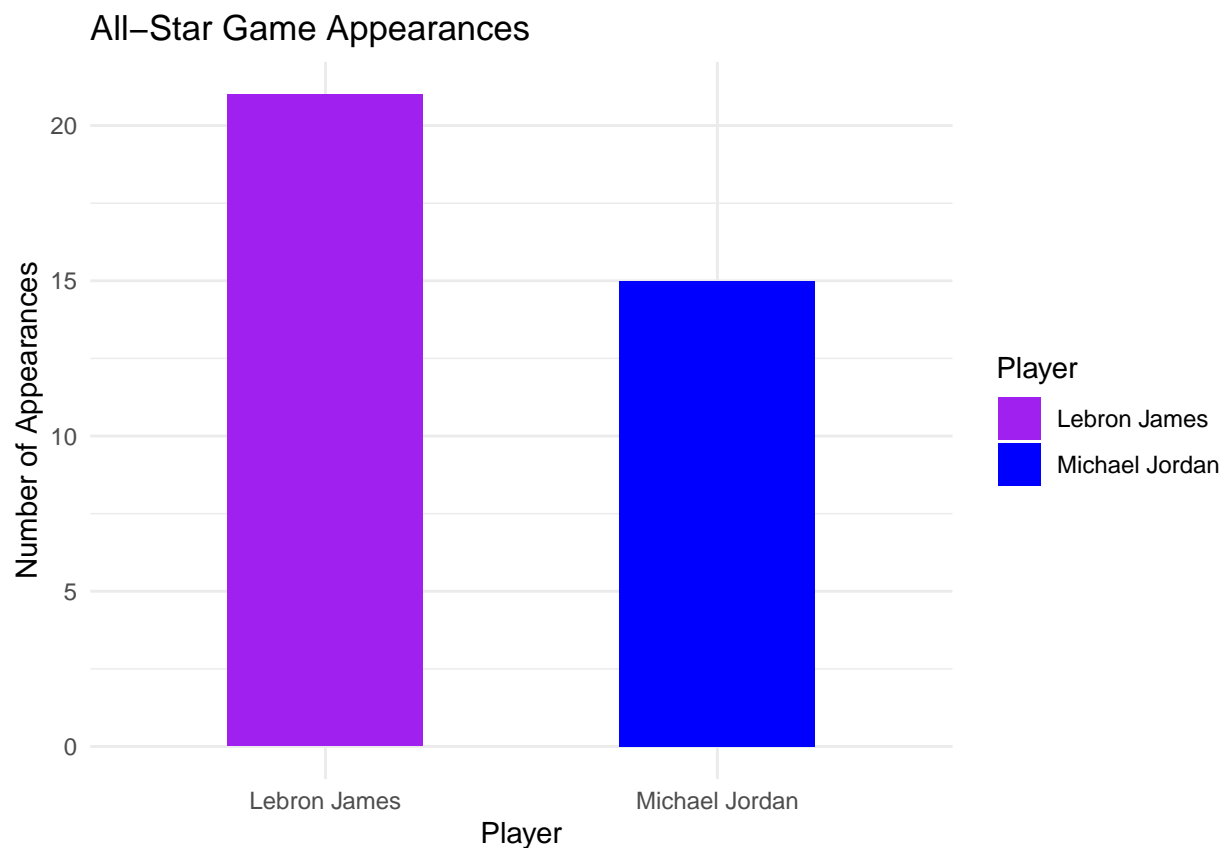
This bar graph compares Michael Jordan and LeBrons efficiency's per 100 possessions at age 30 plus. We can clearly see the longevity LeBron holds. When comparing points, assists, rebounds, field goal percentages, and turnover rate, we see that LeBron dominates. At age 39 LeBron is still considered a top player in the NBA while Jordan was a dwindling old man expiring in his puny body.

## Comparing total all star appearances

```
LebronAllStarAppearances <- nrow(LebronAllStarGames)
JordanAllStarAppearances <- nrow(JordanAllStarGames)

AllStarData <- data.frame(Player = c("Lebron James", "Michael Jordan"), Appearances = c(LebronAllStarAppearances, JordanAllStarAppearances))

ggplot(AllStarData, aes(x = Player, y = Appearances, fill = Player)) +
  geom_bar(stat = "identity", position = position_dodge(), width = 0.5) +
  theme_minimal() +
  labs(title = "All-Star Game Appearances", y = "Number of Appearances", fill = "Player") +
  scale_fill_manual(values = c("Lebron James" = "purple", "Michael Jordan" = "blue"))
```



```
print(AllStarData)
```

```
##           Player Appearances
## 1  Lebron James          21
## 2 Michael Jordan          15
```

When it comes to All-Star game appearances LeBron has been selected to one every season he has played in the NBA and sits at the most all-star selections ever. Jordans 15, although impressive, are expected when you are considered one of the greatest of all time. Lebrons Longevity to be able to make it to an all star game 21 years, even at his current age of 39 is unheard of.

## Conclusion

Key insight/takeaway about research question - Summarize the key insight, takeaway, conclusion to the research question that motivated your analysis

While studying our data comparing LeBron and Jordan we found that the GOAT debate is closer than we originally thought it was when viewed from a statistical perspective. We couldn't really conclude who was the greatest player ever with some of the most insightful basketball stats, there were strong cases for both. But because basketball is just more than statistics, a visual eye test might also help you sway a certain direction with who you think is the greatest basketball player of all time. We will still go with LeBron as our GOAT.

Challenge Encountered - Describe the biggest challenge that you encountered and how you overcame it in the project.

The biggest challenge we faced was finding relevant data sources. All the data sources off of Kaggle were old when it comes to finding LeBron's stats. LeBron is still currently playing so we needed up to date statistics while everything on Kaggle was over 5 years behind. We came across the websites basketball reference and Stat head to head which aided us heavily for finding out the statistics we needed and wanted to use.

```
LebronVJordanPlayoffTotals <- data.frame(  
  Player = c(rep("LeBron James", 10), rep("Michael Jordan", 10)),  
  TRB = round(runif(20, 5, 15)), # Total Rebounds  
  AST = round(runif(20, 5, 15)), # Assists  
  PTS = round(runif(20, 20, 40)) # Points  
)  
  
PlayOffBron <- LebronVJordanPlayoffTotals %>%  
  filter(Player == "LeBron James") %>%  
  summarise(TotalRebounds = sum(TRB, na.rm = TRUE),  
            TotalAssists = sum(AST, na.rm = TRUE),  
            TotalPoints = sum(PTS, na.rm = TRUE),  
            Player = "LeBron James")  
  
PlayOffJordan <- LebronVJordanPlayoffTotals %>%  
  filter(Player == "Michael Jordan") %>%  
  summarise(TotalRebounds = sum(TRB, na.rm = TRUE),  
            TotalAssists = sum(AST, na.rm = TRUE),  
            TotalPoints = sum(PTS, na.rm = TRUE),  
            Player = "Michael Jordan")  
  
StatsComparison <- bind_rows(PlayOffBron, PlayOffJordan)  
  
StatsComparisonLong <- StatsComparison %>%  
  pivot_longer(cols = -Player, names_to = "Statistic", values_to = "Value")  
  
ggplot(StatsComparisonLong, aes(x = Value, fill = Player)) +  
  geom_density(alpha = 0.5) +  
  labs(title = "Playoff Stats Density Comparison: LeBron James vs. Michael Jordan",  
       x = "Value",  
       y = "Density",  
       fill = "Player") +  
  theme_minimal() +  
  scale_fill_brewer(palette = "Pastel7")
```

Playoff Stats Density Comparison: LeBron James vs. Michael Jordan

