Major League Sports

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Division of Labor

1. Syndariah Johnson - NFL Statistics
2. Romello Turner - NBA Statistics
3. Diamond Watson - MLB Statistics

Phase 1

Figure 1.1: NFL Team Divisions

This is a text table visual. This visualization shows the NFL divisions and each NFL team within each division. There are 8 divisions and 4 teams per division making it 32 NFL teams.

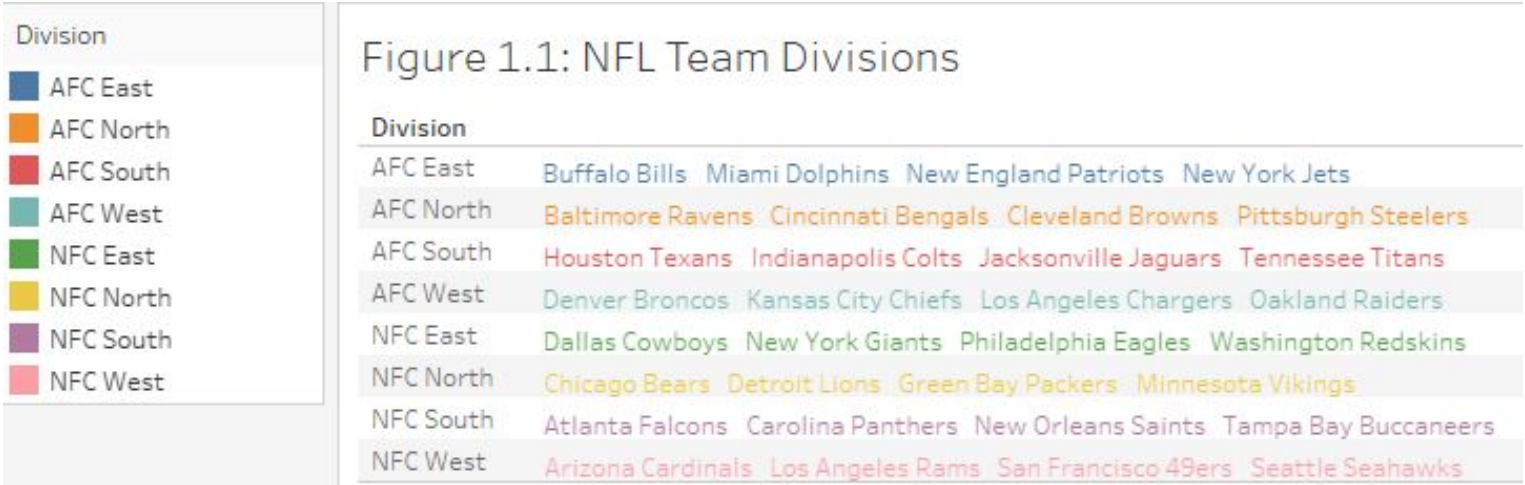


Figure 1.2: 2016 NFL Season Total Team Wins

This is a vertical bar chart visualization showing how many wins each NFL team had for the 2016 NFL season. The New England Patriots led that season with the most wins of 14. The Cleveland Browns had a terrible season with only 1 win.

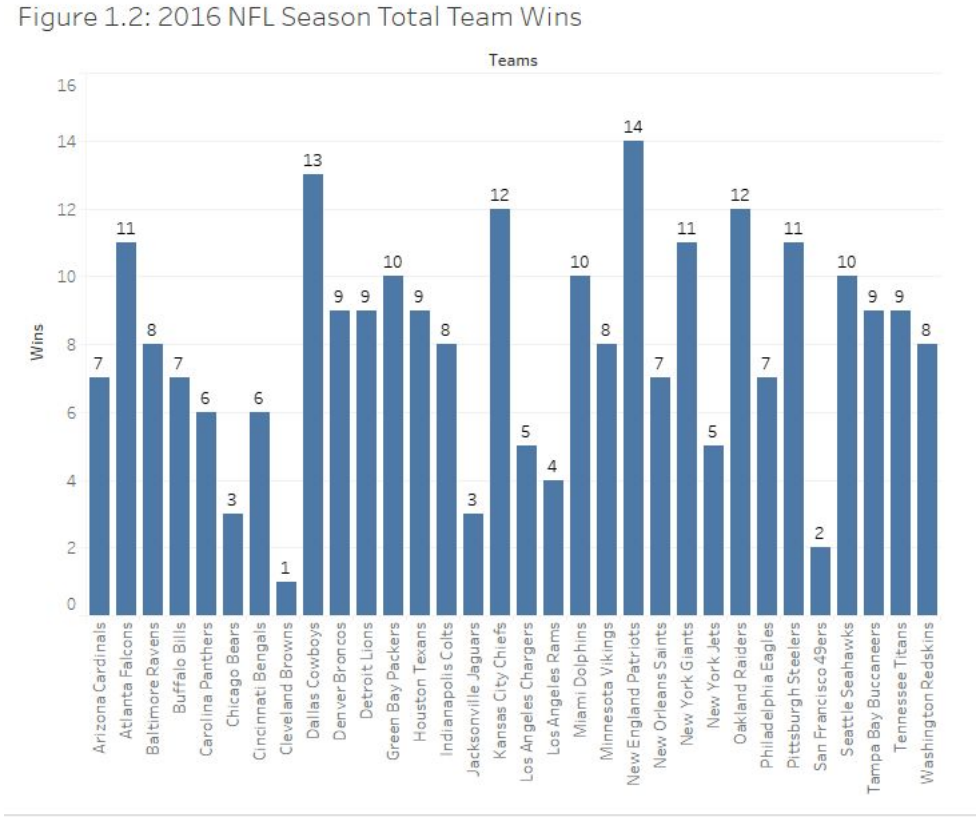


Figure 1.4: 2016 NFL Team Interceptions

This is a packed bubble visualization showing the number of interceptions each NFL team had during the 2016 NFL season. The circles are color coded by team.

- The largest circle is for 25 interceptions - New York Jets.
- The smallest circle is for 2 interceptions - New England Patriots.

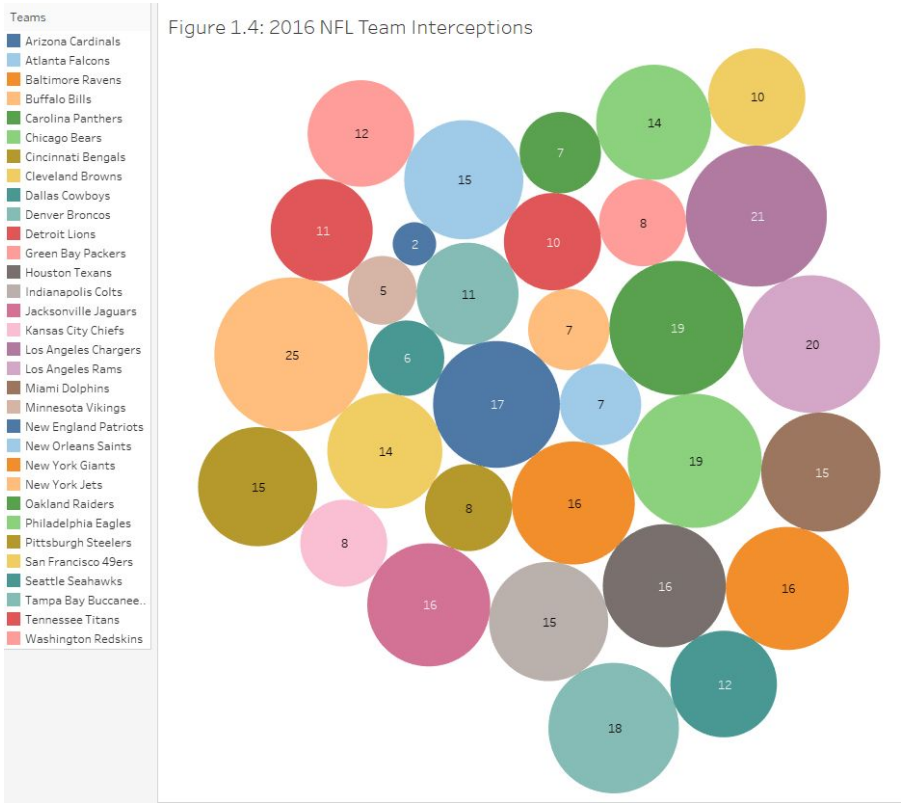


Figure 1.6: 2016 NFL Season Team Quarterback Ratings

This is a circle view visualization that shows the ranking of team quarterbacks for the 2016 NFL season.

- Highest quarterback ranking: Atlanta Falcons - 114.94
- Lowest quarterback ranking: New York Jets - 66.22

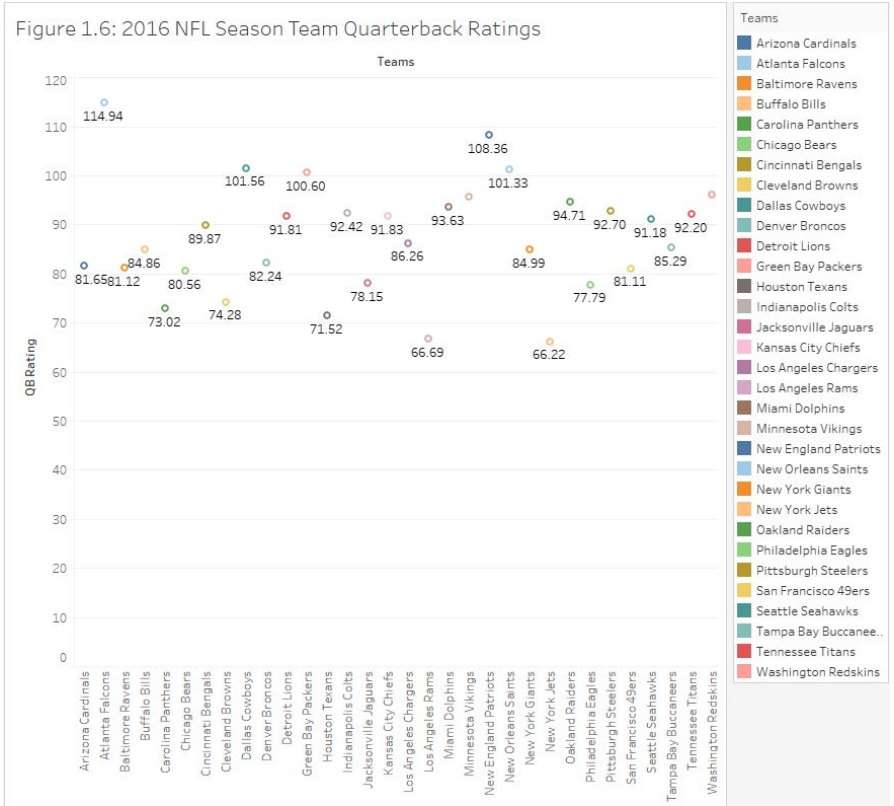


Figure 2.1: NBA Teams with most wins since 1946

This Tree Map represents the teams from the seasons of 1946 – 2016 that have received the most wins. The higher values are sorted as the top left section being the highest.

- Most wins: Boston Celtics - 2,677 wins.
- The next team is the Los Angeles Lakers at 2,576 wins.

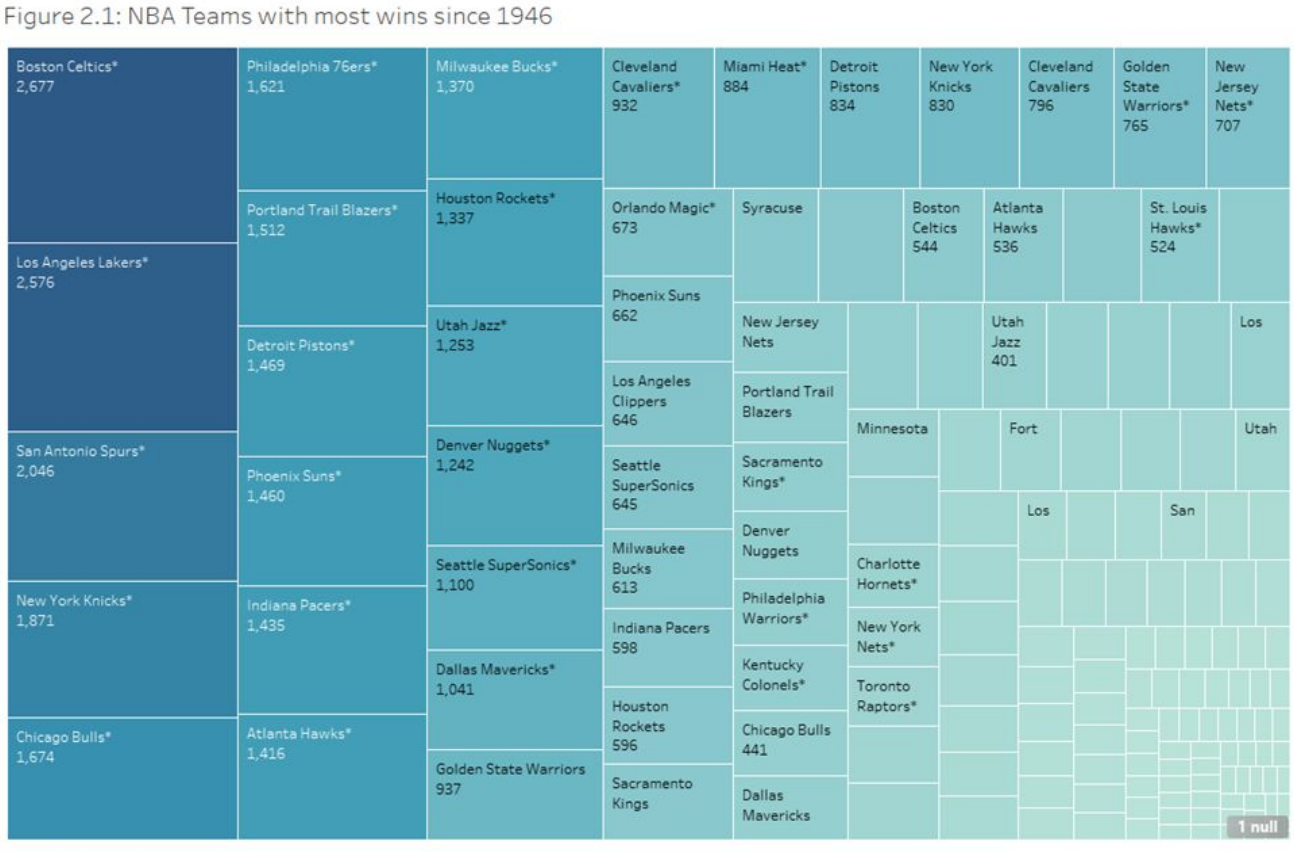


Figure 2.2: Win Losing percentage per Team

This bar chart represents the sum of the winning and losing percentages of the NBA teams from 1946 - 2016. The number for every win represents one loss. Color shows details about the playoffs which create outliers in the stats. Teams on the high end,Boston State Warriors, New York Knicks, and Detroit Pistons do well with having more successful games.

- The lowest W/N% Chicago packers - 0.23

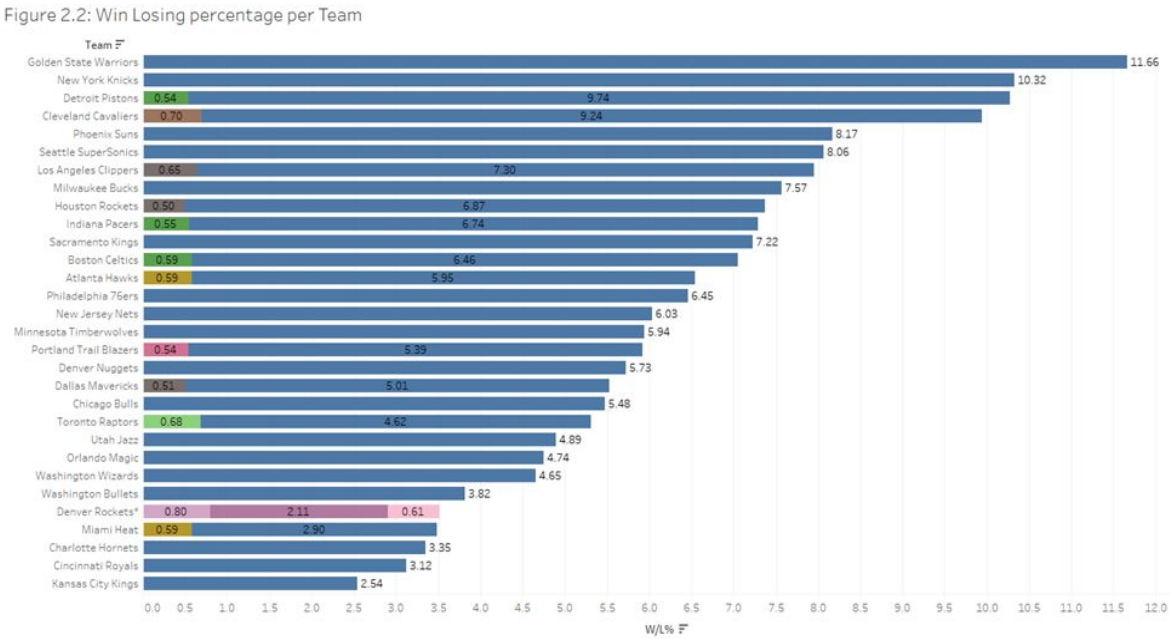


Figure 2.3: Teams with Most Losses since 1946

This figure represents all the NBA teams' losses from 1946 - 2016 in a bubble circle graph. The enlarged bubbles show the teams who have taken the most losses. The largest values are on the inside and the smaller values decreases towards the outside.

- Most losses: New York Knicks - 1,426 losses.

Figure 2.3: Teams with Most Losses since 1946

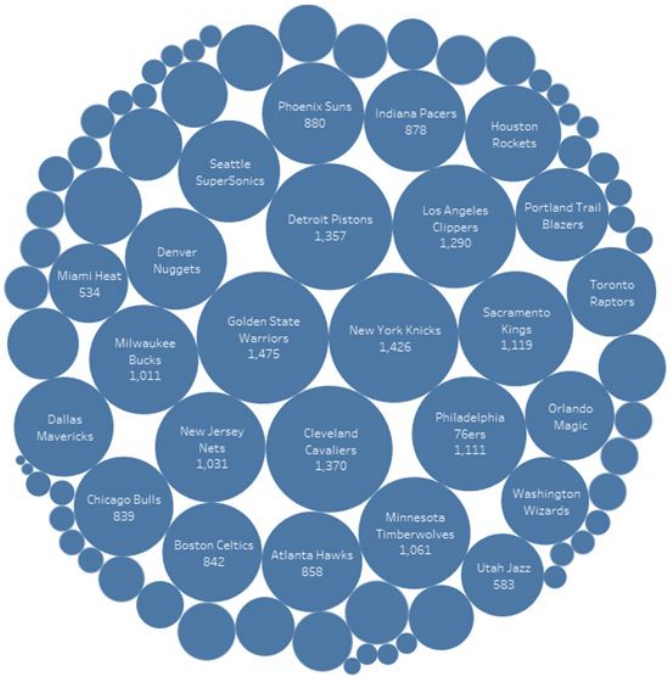


Figure 2.4: Seasons since 1946 - Sum of NBA Team Salaries

The bubble graph represents the data from all the NBA players salary from the seasons. This graph shows the data by having the largest values on the outer circle, while the smaller values are in the inner circle.

- Highest sum of salary: 2015-16 - $2,058,152,325

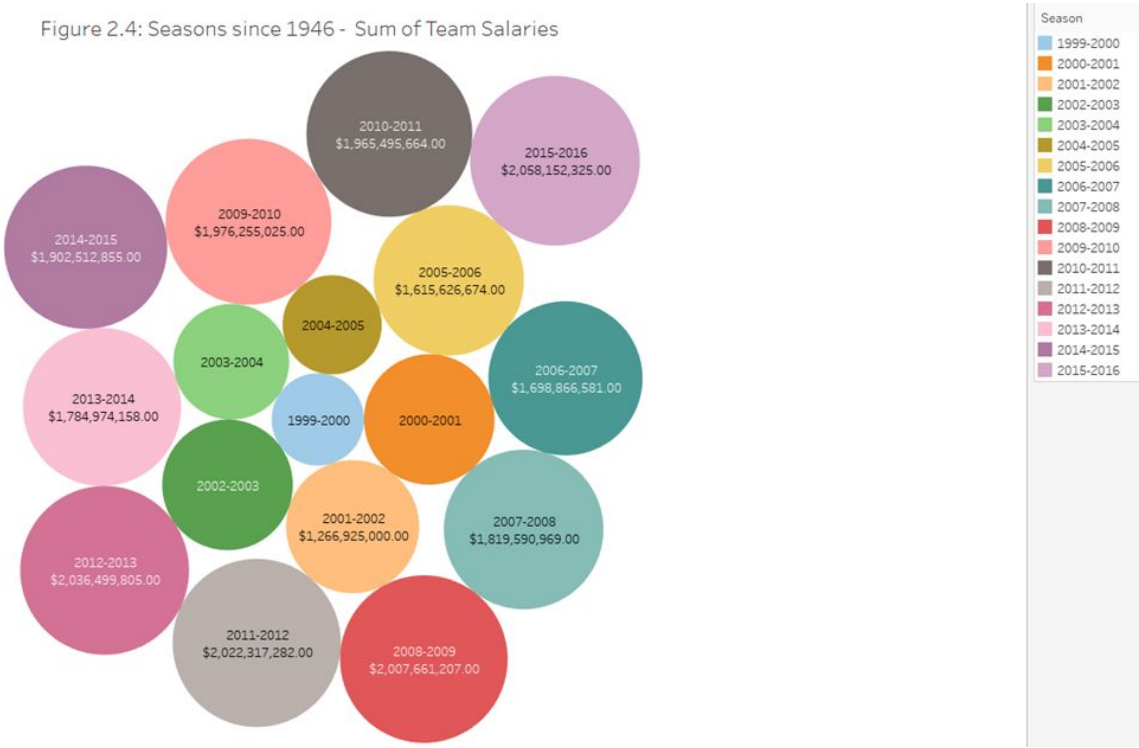


Figure 3.1: Player's Name, Team, & Salary

This figure displays the name of great Major League Baseball Players. Above, it also states the teams they played for at a particular time. It even compares each other's salaries. For example, the first name on the figure is Jason Castro, and he played for the San Diego Padres. That year he made $1,098,114. The name right under is Jason Heyward, and he played for the Chicago Cubs and made $53,777,778.

Figure 3.2: Teams in 2019 with the total number of innings played

This figure displays the location of Major League Baseball Teams. In 2019 it also showed the total number of innings had at these locations and the number of games played there. For instance, Det (Detroit Tigers) played almost 80 games and played 30,177 innings in the 2019 season.

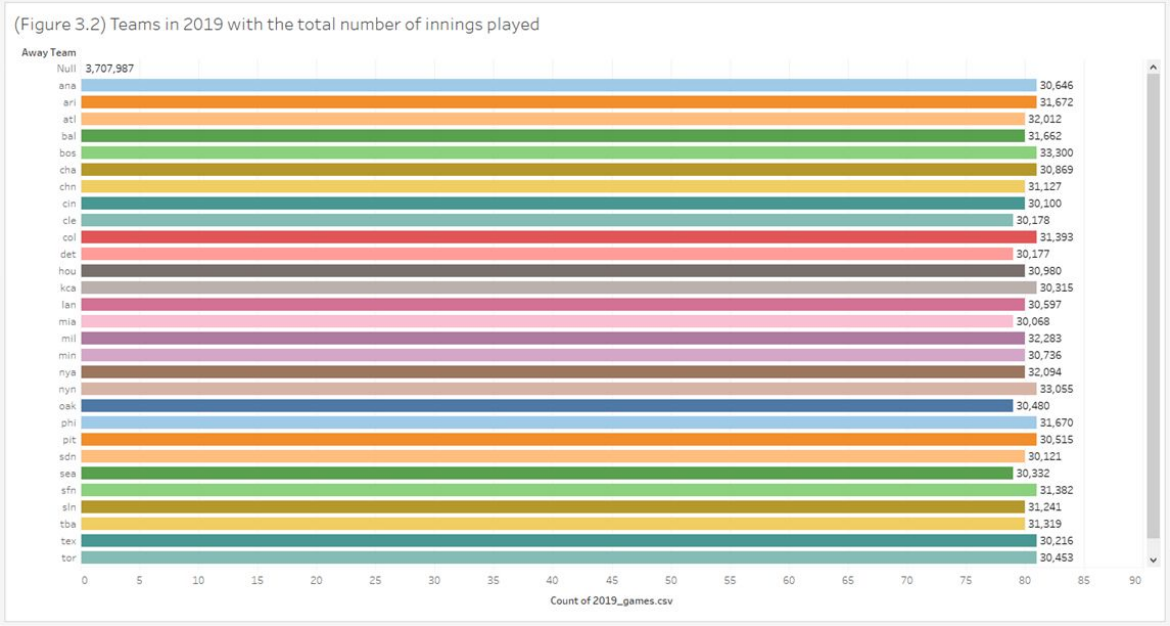


Figure 3.4:Teams Left On Base Average in 2012

This figure displays Major League Baseball Teams in 2012 left on base average. For example, the MLB Team in Texas ended the 2012 season with a 1,113 left-on-base average. That means at the end of each inning for the 2012 season, numerous players were still on bases by the time the inning ended, and that number added up.

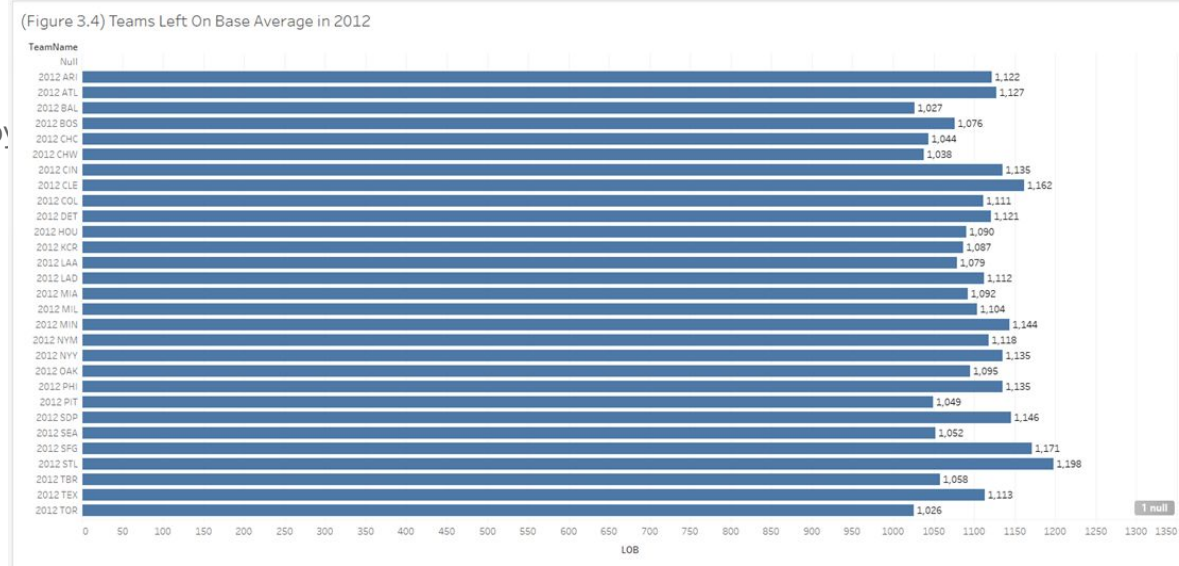
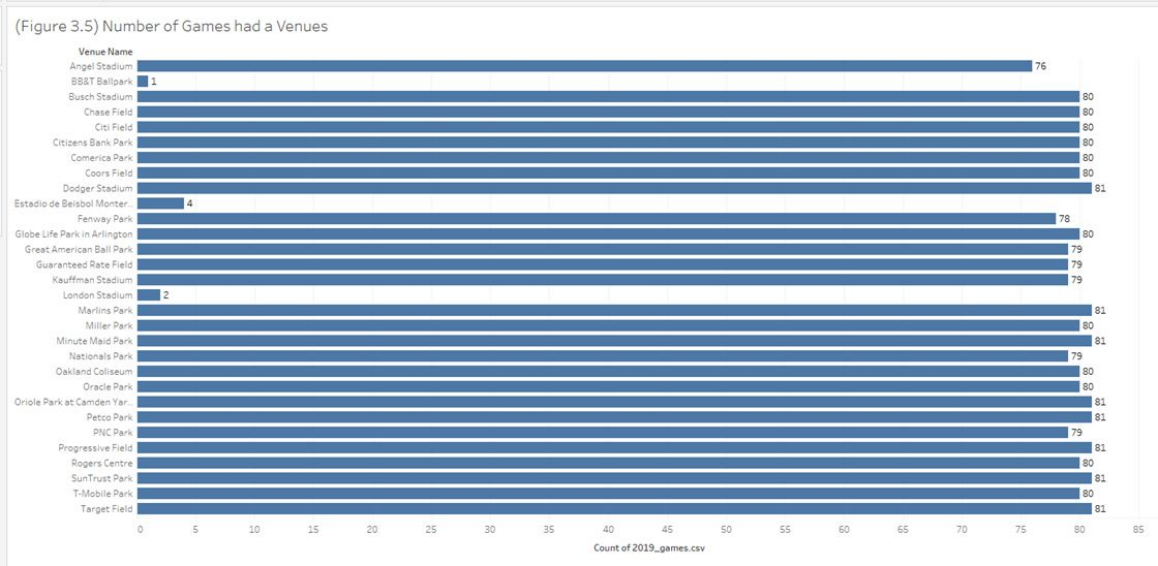


Figure 3.5: Number of Games had a Venues

This figure displays the number of games played at the venue for the MLB games in 2019. For example, in 2019, the London Stadium had only 2 games played there for that season. At the same time, Target Field had 81 games played there in 2019.



Phase 1 Conclusions

NFL -

- There are 8 different NFL divisions
  - 4 teams per division
- The Cleveland Browns had a horrible 2016 season with only 1 win
- Quarterbacks can be ranked high and be good but the team still has to be good altogether. Some of the quarterbacks are ranked higher than others but the whole team has a bad record
  - San Francisco 49ers quarterback ranked at 81.11(higher than 8 other team quarterbacks)
  - still had the second lowest win-loss record of 2 -14

NBA -

- The more wins a team holds the more revenue they can retain.
- Players have different amount of time active in NBA
- The only seasons of the NBA I obtained were 1946 - 2016.

MLB -

- Each team has played over 1,000 innings in a season and has played over 75 games within a season
- The average stadium gets played in was at least 76 times
- If teams feel like a field isn't a good field to play in, it won't be played in as often

Phase 2

Figure 1.7: Completed Passes & Attempted Passes for 2022 NFL Season & Figure 1.8: Completed Passes & Attempted Passes for 2016 NFL Season - stacked bar chart

Figure 1.7: Completed Passes & Attempted passes for 2022 NFL Season

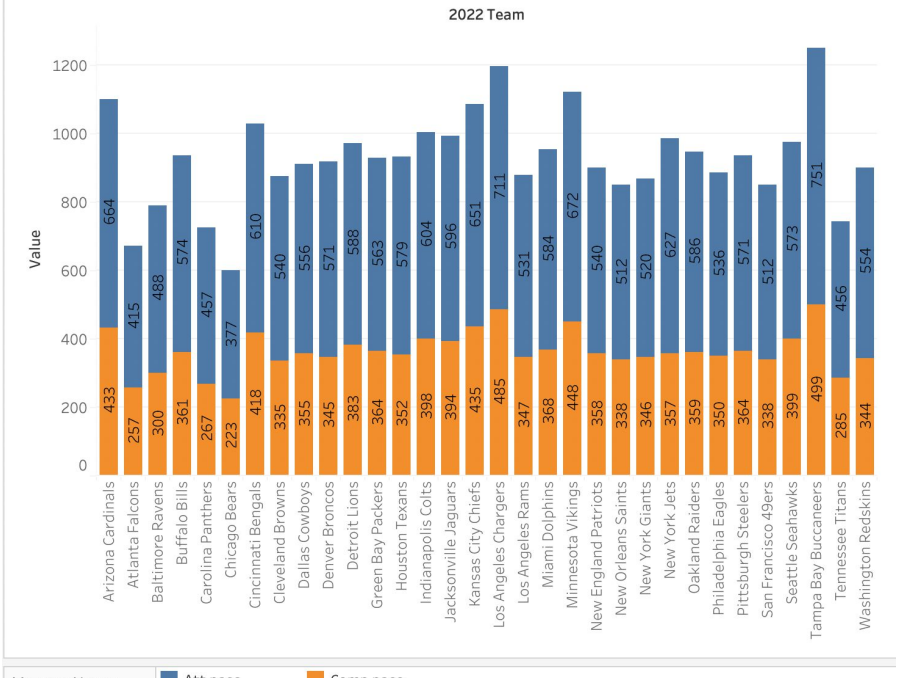


Figure 1.8: Completed Passes & Attempted Passes for 2016 NFL Season

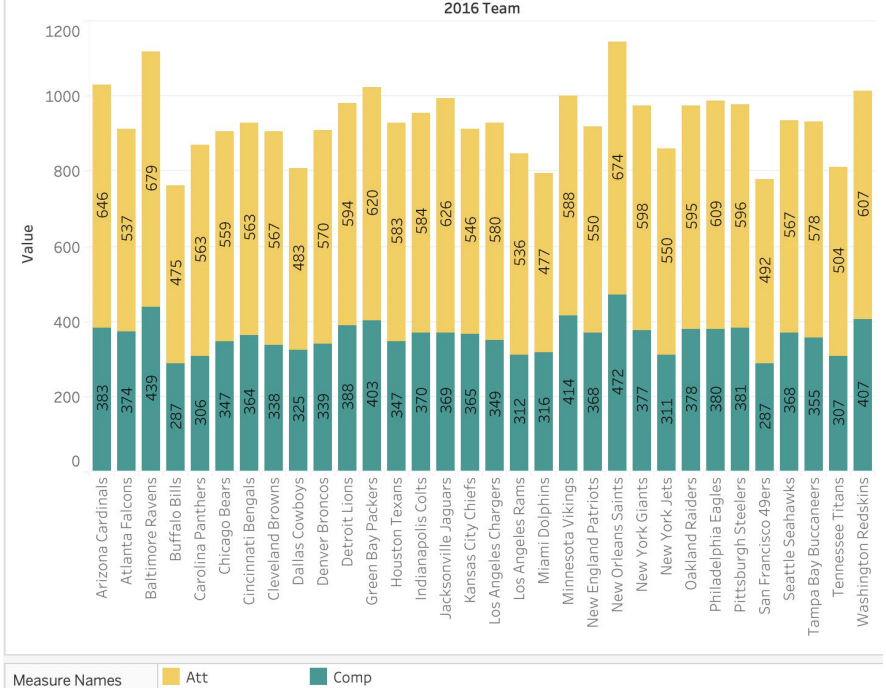


Figure 1.11: 2022 NFL Season Team Penalties & Penalty Yards & Figure 1.12: 2016 NFL Season Team Penalties & Penalty Yards - dual combination

Figure 1.11: 2022 NFL Penalties & Penalty Yards per Team

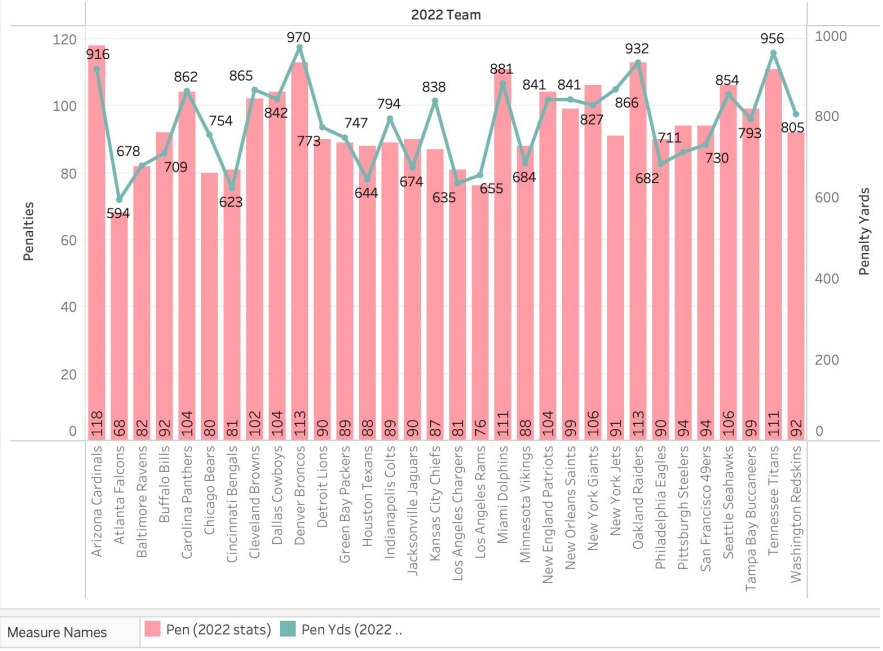


Figure 1.12: 2016 NFL Penalties & Penalty Yards per Team

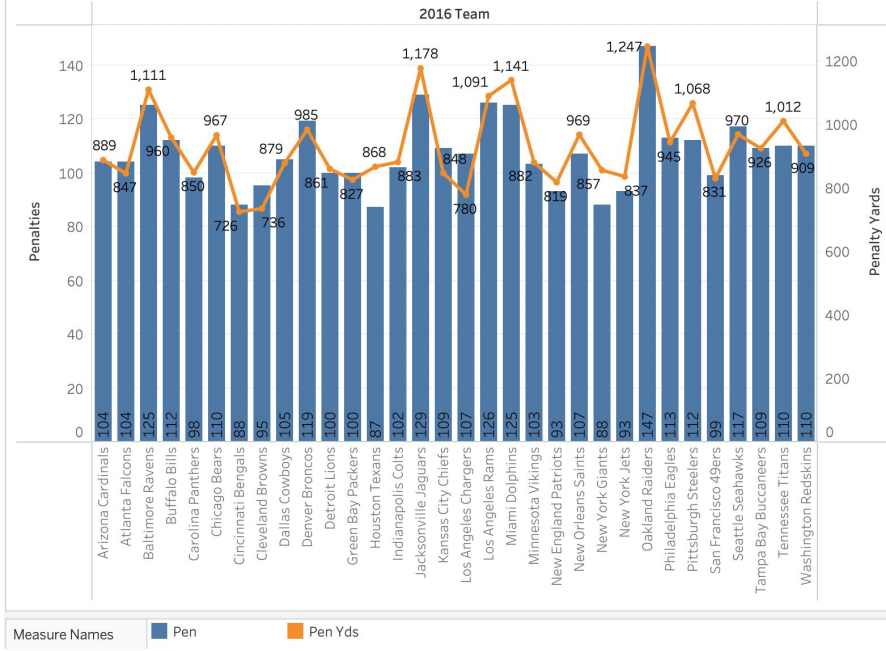


Figure 1.13: Level of Detail - 2022 NFL Season

This is a level of detail chart. This chart shows the wins ('W'), losses ('L'), and win/loss percentage (W/L %) for the 2022 NFL season, broken down by division and team.

Figure 1.13: Level of Detail - 2022 NFL Season

Division	2022 Team	W (2022 stats)	L (2022 stats)	W/L % 2022
AFC East	Buffalo Bills	13	3	0.81%
	Miami Dolphins	9	8	0.53%
	New England Patriots	8	9	0.47%
	New York Jets	7	10	0.41%
AFC North	Baltimore Ravens	10	7	0.59%
	Cincinnati Bengals	12	4	0.75%
	Cleveland Browns	7	10	0.41%
	Pittsburgh Steelers	9	8	0.53%
AFC South	Houston Texans	3	13	0.19%
	Indianapolis Colts	4	12	0.25%
	Jacksonville Jaguars	9	8	0.53%
	Tennessee Titans	7	10	0.41%
AFC West	Denver Broncos	5	12	0.29%
	Kansas City Chiefs	14	3	0.82%
	Los Angeles Chargers	10	7	0.59%
	Oakland Raiders	6	11	0.35%
NFC East	Dallas Cowboys	12	5	0.71%
	New York Giants	9	7	0.56%
	Philadelphia Eagles	14	3	0.82%
	Washington Redskins	8	8	0.50%
NFC North	Chicago Bears	3	14	0.18%
	Detroit Lions	9	8	0.53%
	Green Bay Packers	8	9	0.47%
	Minnesota Vikings	13	4	0.76%
NFC South	Atlanta Falcons	7	10	0.41%
	Carolina Panthers	7	10	0.41%
	New Orleans Saints	7	10	0.41%
	Tampa Bay Buccaneers	8	9	0.47%
NFC West	Arizona Cardinals	4	13	0.24%
	Los Angeles Rams	5	12	0.29%
	San Francisco 49ers	13	4	0.76%
	Seattle Seahawks	9	8	0.53%

Figure 2.7: Overall Highest Assist Percentage (Ast%) for NBA Players of 1946-2016

This Tree maps figure shows the NBA Players for highest assist percentage from 1946 to 2016, which is filtered to keep the top 100 of 4,328 members, and sum of Assist percentage.

- Ast% (Assist Percentage) - percentage of assists a player records in the relation to their team's overall total while in the game.
- Highest Ast%: John Stockton

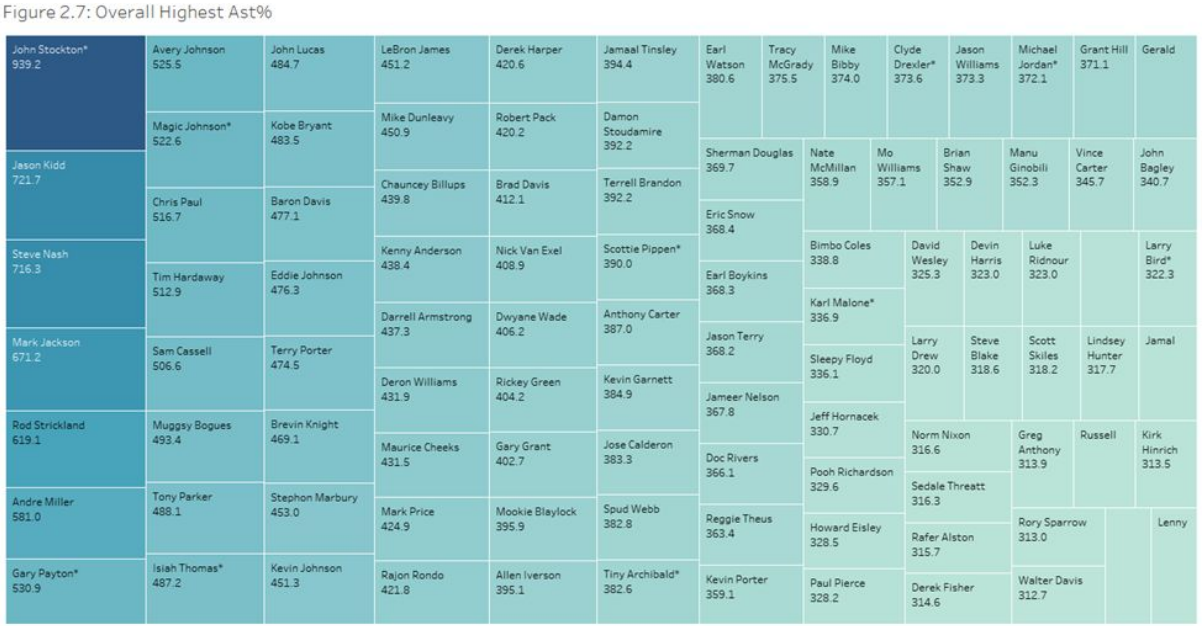


Figure 2.8 Top 20 players who played the most NBA games from 2012-2016

The horizontal bar graph represents the top 20 of 4,328 members with the highest sum of games played (G). Sum of Games played for each Player broken down by most recent Seasons acquired from 2012 to 2016 yearly. Color shows details about Player.

- Outlier in season 2013-14 from player Kobe Bryant.
    - Lakers Nation stated, "On April 12, 2013, Los Angeles Lakers legend Kobe Bryant made two clutch free throws after a torn Achilles injury against the Golden State Warriors," (Lakers Nation, 2022). He gradually began to play more games as the seasons passed.

Figure 2.8: Top 20 players who played the most NBA games from 2012 - 2016

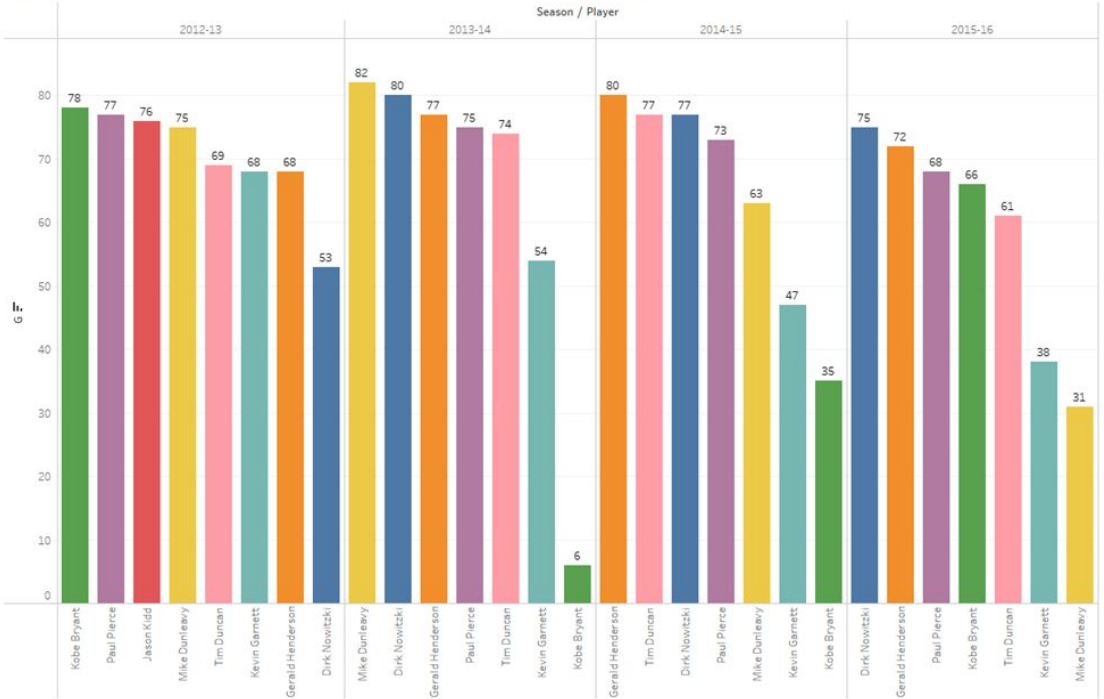


Figure 2.10 Boston Celtics Assist percentage (Ast%) & Block Percentage (Blk%) for 1973-2016 Comparison

This area map is shown from the team with the most wins in the NBA mentioned in Phase 1, the Boston Celtics, Ast% and Blk% for each Season.

Assist Percentage (Ast%) - The percentage of a team's assists that a player has while on the court

Block Percentage (Blk%) - Percentage of the 2-point field goal attempts blocked by the player while on the court

- Stats affect one another
- The team does a better job in Ast% than Blk%.

Figure 2.10: Boston Celtics Ast% & Blk% Comparision

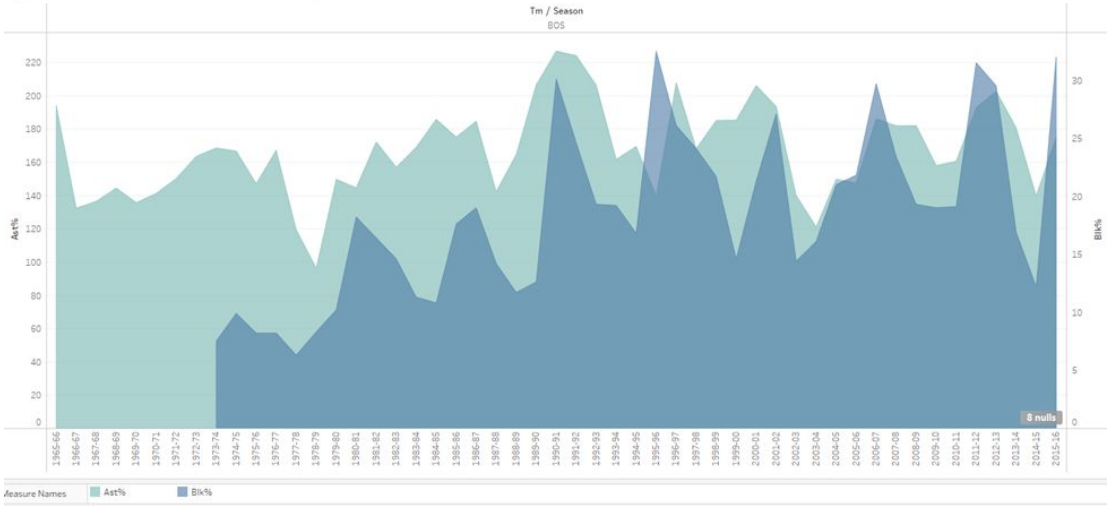


Figure 2.11 NBA Top BPM (Box Plus Minus) Comparison to WS (Win Share) Percentage for 1946-2016

This scatter plot shows two details on a dual axis being BPM (Box Plus Minus) and WS (Win Share) for each Player.

- BPM - evaluating the players' quality and contribution to the team from all their games played.
- WS - measures players based on their playing time during offense and defense. Worth one third of a team win.
- Top BPM & WS: Lebron James

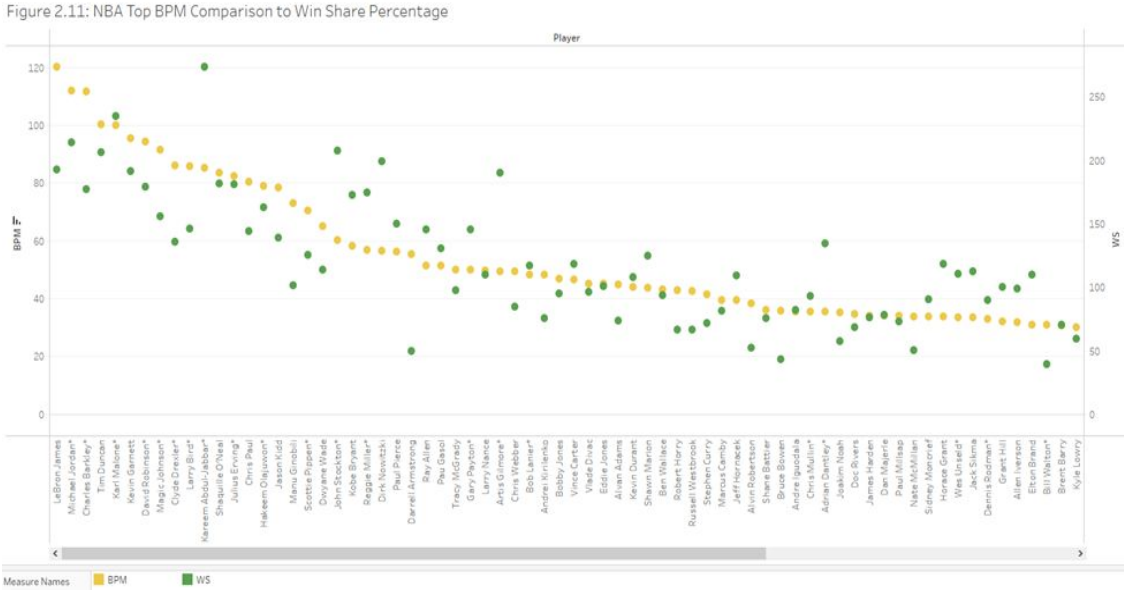


Figure 3.7: Pitcher ELO Rating

The figure above shows each player's Elo rating. Their Elo rating is represented by a number that depends on the outcome of rated games played. So, after every game, the winning player takes points from the losing one. Then the difference in the ratings of the winner and loser determines the total number of points gained or lost after a game. As shown above, Jordan Montgomery has the highest Elo rating above. This is 100 of 320 pitchers for pitchers from the year 1871 – 2023.

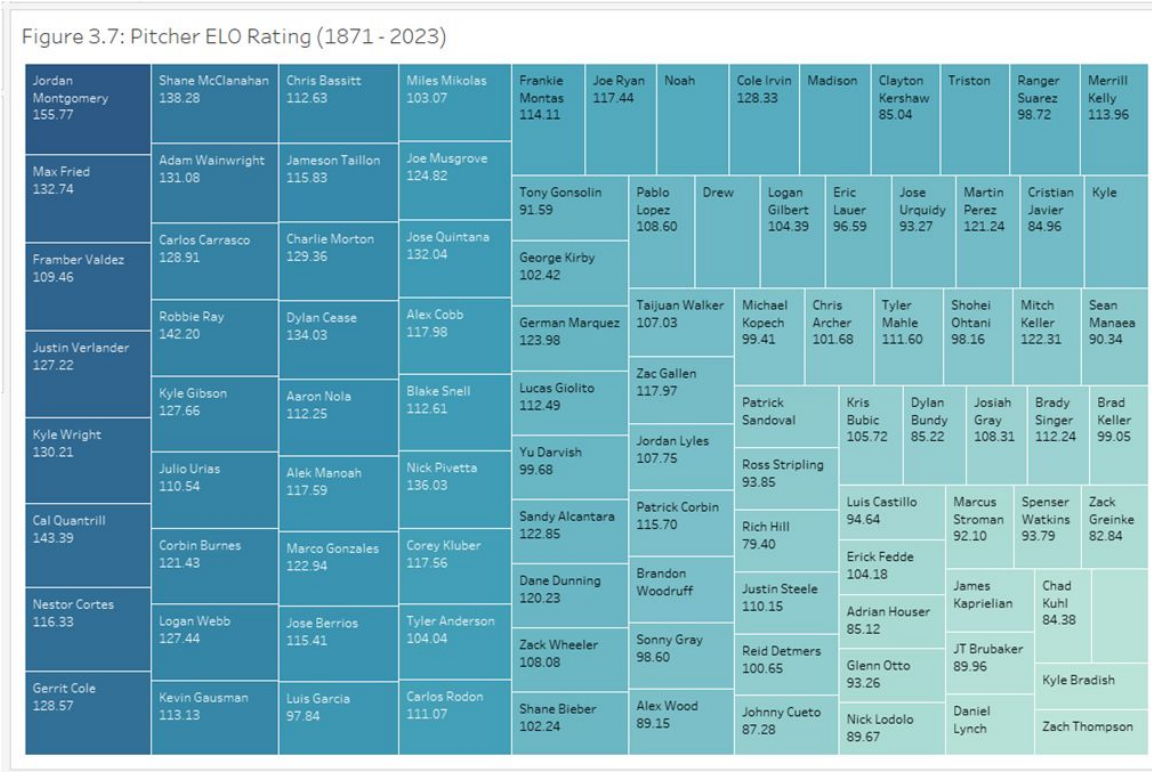


Figure 3.8: Pitcher Ratings (1871 - 2023)

Shown above are pitcher ratings. The pitcher with the highest rating is Framber Valdez, with a rating of 26,473. ERA (Earned Run Average) is the tool that is used for evaluating pitchers. The formula for finding the ERA is 9 times earned runs divided by innings pitched. So, if a pitcher leaves a game with runners on base, any received runs scored by those runners will count against them. ERA is an ideal evaluation of pitchers. This is from 1871 – 2023.

Figure 3.8: Pitcher Ratings (1871 - 2023)

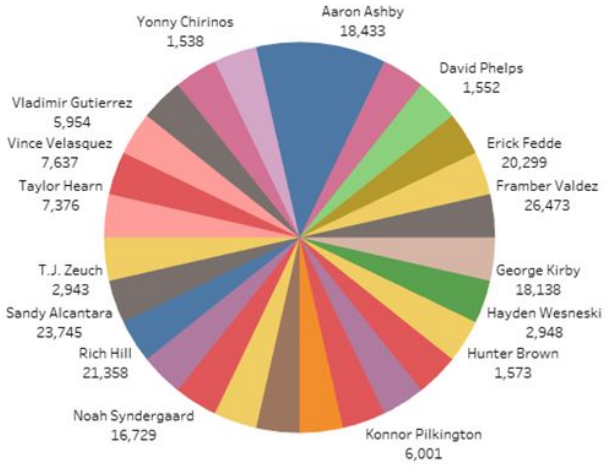


Figure 3.10: Team Hits vs Wind Speed (2016)

The trend bottom line shows the wind speed while the top shows team hits. The wind is a big factor in MLB games because it can enhance a game. The wing can cause a baseball to change course. Home Runs are easier to hit with the wind blowing is blowing out but not when it is blowing in. Also, if the wind is blowing, it may be harder to catch a ball depending on which direction the wind is blowing. When the Boston Red Sox played, the wind speed was 1,005. That day it worked in their favor because they were able to have 853 hits. This data is from 2016.

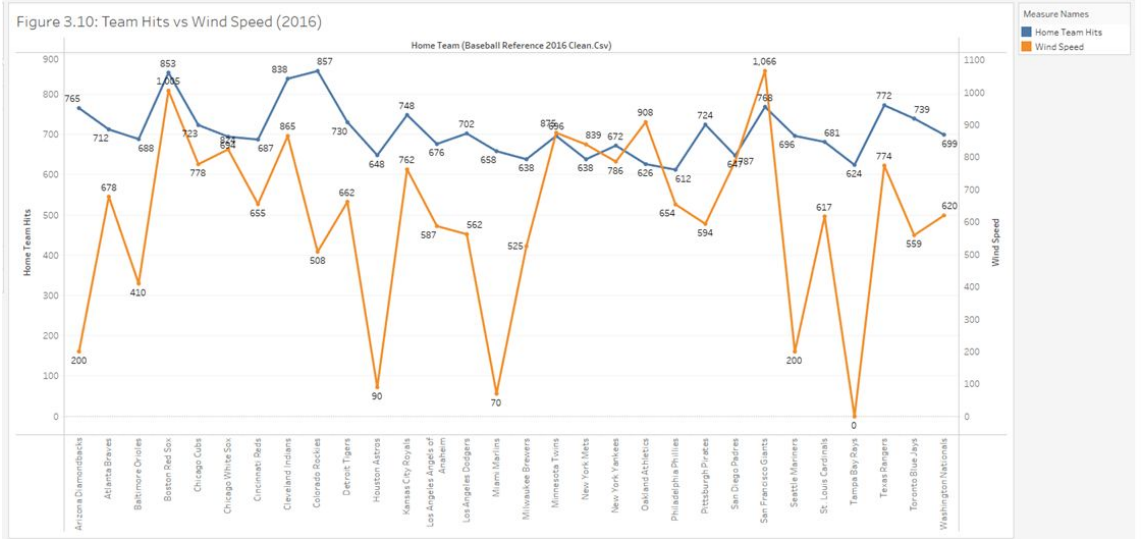
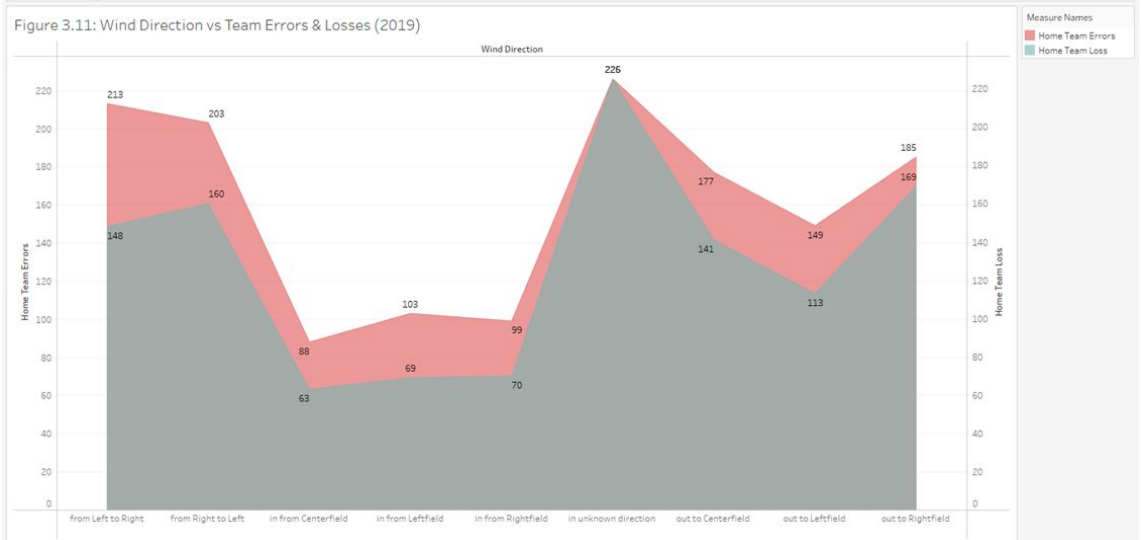


Figure 3.11: Home Team Errors and Home Team Loss for each Wind Direction (2019)

Like I said above the wind plays a drastic role in MLB games. Above shows the errors and losses that happened whenever the wind was blowing in a certain direction of the field. Less losses and errors happened when the wind was blowing in from the Center field, Left field, and Right field because, as you can see, it stays constant. Yet when the winding was blowing from left to right the errors were high at 213. The weather measures above are from games in 2019.



Phase 2 Conclusions

NFL -

- The consistency of attempted/completed passes for both seasons are inconsistent
- Oakland Raiders had an issue with penalties
  - During the 2016 & 2022 NFL season the Oakland Raiders led penalties
  - 2022: 113 penalties
  - 2016: 147 penalties

NBA -

- The factors considered
  - Assist Percentage, Block Percentage, Win Share, and Box Plus Minus.
- These stats explain how well a player contributes to the team during a game
- players playing for more than one team in their career. The time of each player's career is still in effect with the figures.

MLB -

- ELO and pitcher ratings are major evaluating tools for the MLB
- With there being pitcher-friendly and hitter-friendly fields, you can predict the outcome of games
- The wind can either be an enhancer or an enabler

Phase 3

Figure 1.17: NFL Super Bowl State Locations

This is a map figure. This figure highlights all the states that NFL Super Bowls were in. Out of all 50 States, Super Bowls were only hosted in ten. These ten States include California, Arizona, Texas, Florida, Louisiana, Georgia, Indiana, New Jersey, Michigan, & Minnesota.

Figure 1.17: NFL Super Bowl Locations

Figure 1.21: Number of NFL Super Bowl Games in each State

This is a treemap. This treemap is representing the number of Super Bowl games held in each participating State.

- 17 – Florida
- 13 – California
- 10 – Louisiana
- 4 – Texas
- 4 – Arizona
- 3 – Atlanta
- 2 – Michigan
- 2 – Minnesota
- 1 – Indiana
- 1 – New Jersey

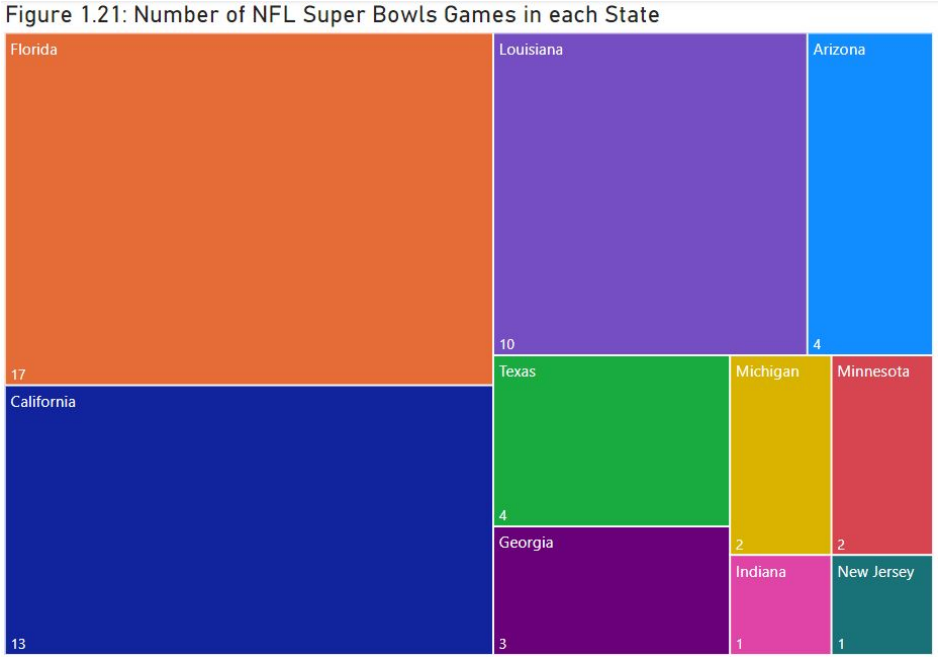


Figure 1.23: NFL Super Bowl Winner and Loser Points Each Year

This is a step line chart. It shows all Super Bowl games' winner and loser points. The top layer in the winning team points and the bottom layer is the losing team points.

- Highest ever scored points for a Super Bowl Game: 55
- Lowest ever scored points in Super Bowl games: 3
  - 1972 and 2019

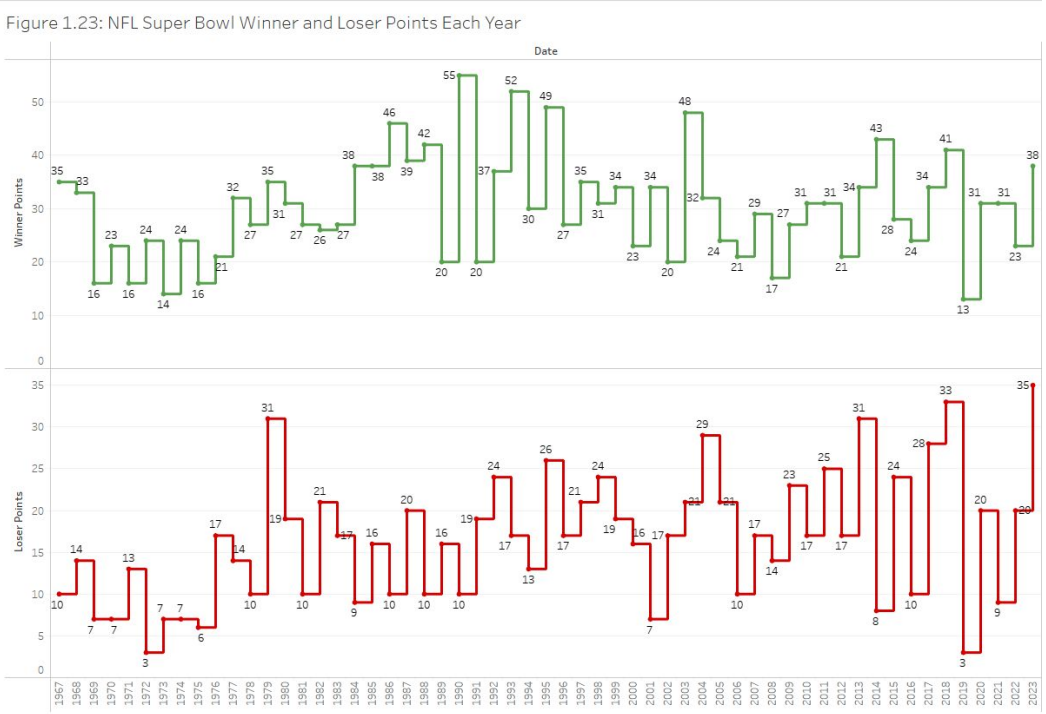


Figure 1.24: NFL Super Bowl MVP Count

This is a symbol chart. This figure shows all Super Bowl MVPs and how many times they have won the Super Bowl MVP title. The number of Super Bowl MVP titles are represented by the male gender symbol.

- Most have only one Super Bowl MVP title
- Tom Brady has won five Super Bowl MVP titles

Figure 2.15: Count of NBA Players by Place of Birth

This figure represents a count of NBA players by place of birth on a donut chart. Specifically, the state in North America and then outside the country. Many players' place of birth in North America is California.

- NBA started out in New York

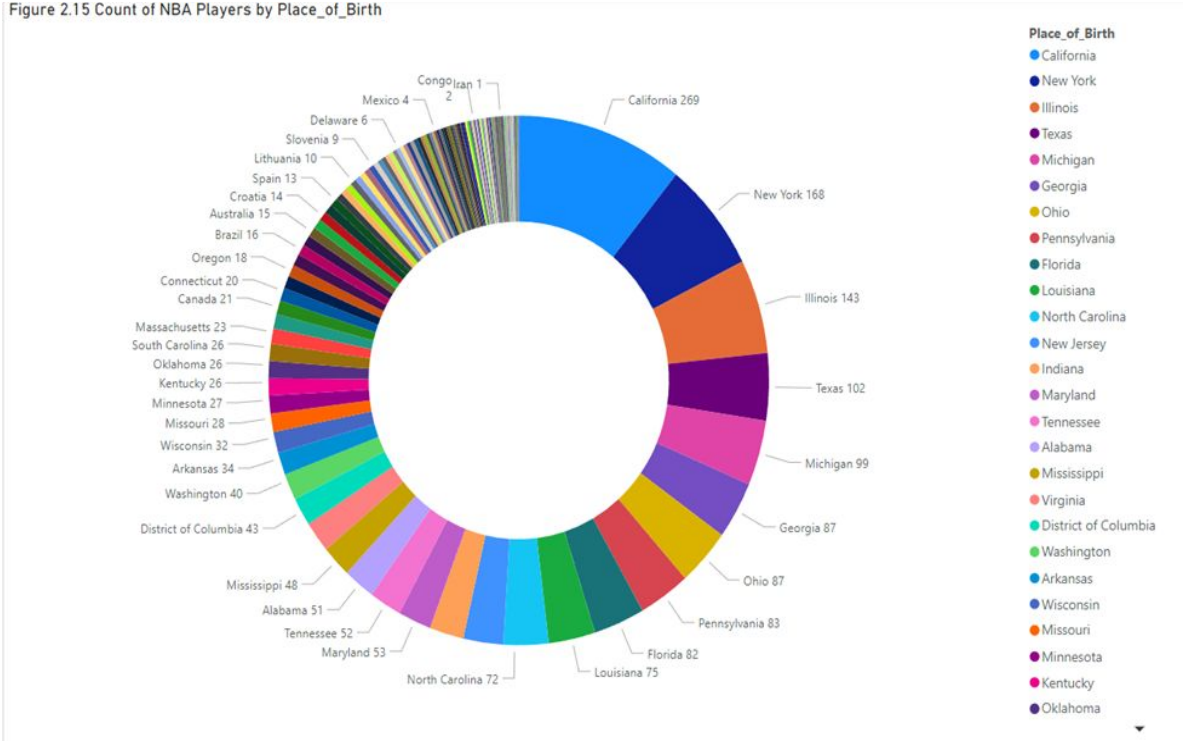


Figure 2.13: Count of NBA Players from 1946 - 2016 by Ethnicity

This figure is a count of the NBA Players from 1946 to 2016 by their Ethnicity on a waterfall chart. The data set grouped the majority of classes being black, white, black and white (mixed), and other. Others represent different races such as Hispanic, Asian, and more.

- The majority of people in the NBA are black, precisely 73% of all players.

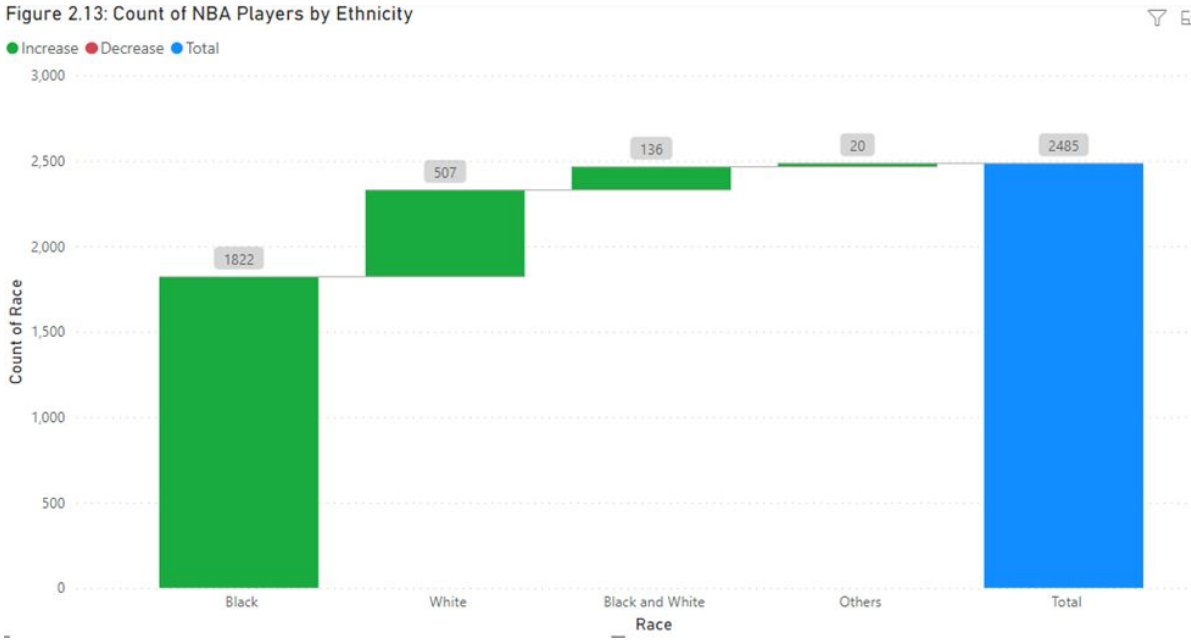


Figure 2.16: Count of NBA Players by College

This figure represents the count of NBA players by college. The amount that did not attend college are 249 players. 2236 players attended college.

Highest attendance: University of California, Los Angeles - 61 players

Most NBA players are scouted out by agents who normally seek players at college level.

Figure 2.18: NBA Players Average Age Groups

This Histogram represents the amount of age groups that are accounted for in the NBA from 1946 – 2016. The age is counted per player per season they are active.

- The highest age group to be in the NBA:25-27.5 years old - 6,094 players.

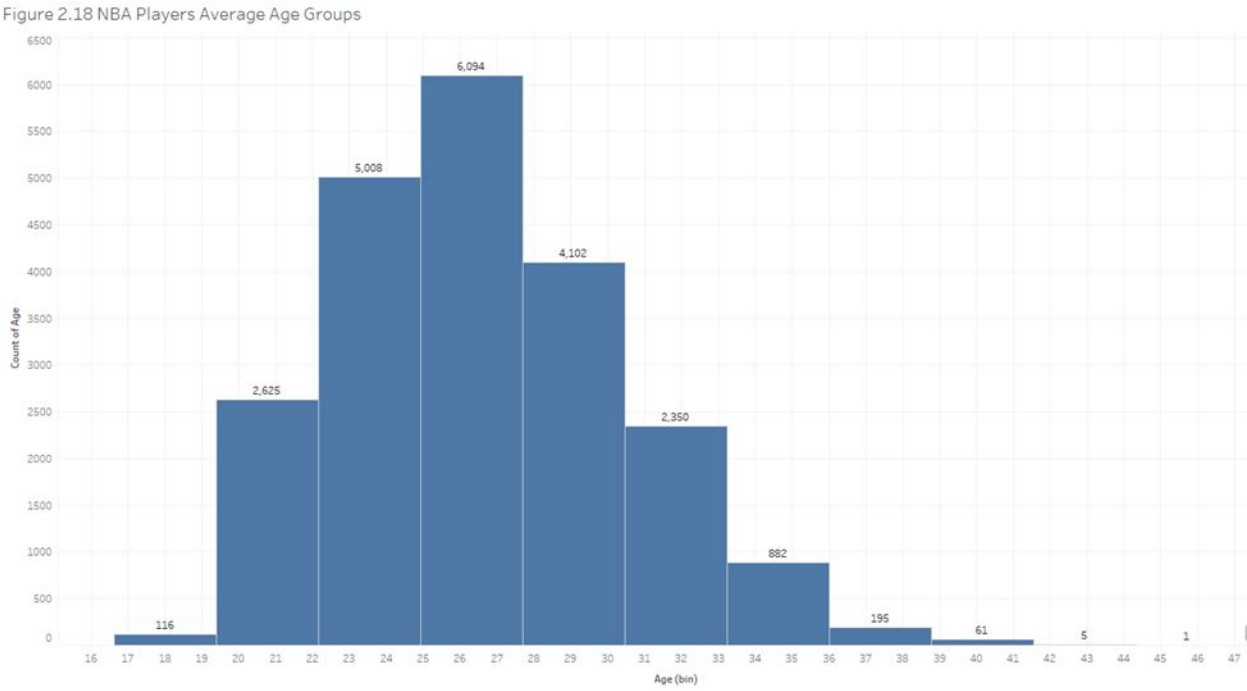


Figure 3.14: BOP, bWE, and RBI

The figure above displays the Base-Out Percentage (BOP), which is 60.72%. BOP was first introduced by Barry Codell in 1979. It determines how many bases a batter earns for each out he records. Runs Batted In (RBI) are also displayed above is 28.04%. It is the overall number of runs scored as a direct result of a player hitting the ball or being walked when at bat. bWE is also displayed above, which I think may be an error. I could not find anywhere what it means in baseball terms. This data is from 2001 – 2019.

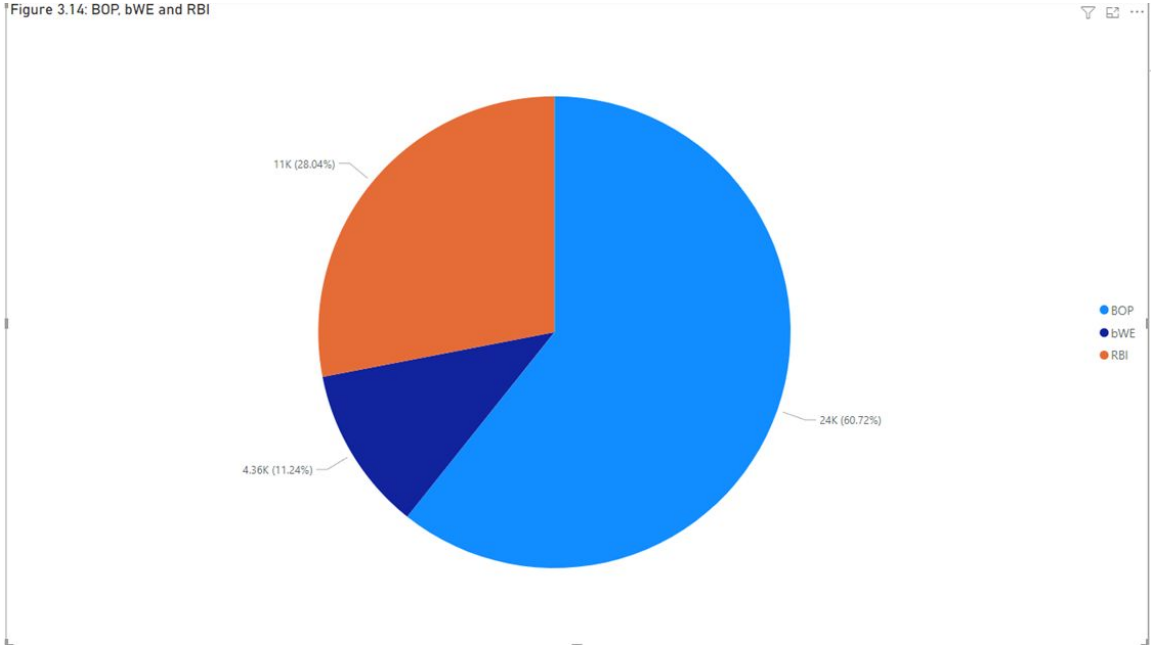


Figure 3.18: Top Players for each Year

The data above is from 1870 – 2020, as it is shown above. In 1904 C. Patten was the top player in the MLB. In 2016 C. Martinez was the top MLB player for that season. These rankings are based on Wins Above Replacement (WAR). It is combined with the seven seasons' WAR score, prime performances, best three seasons, and Championship games. Miss seasons and injuries are taken into consideration along with postseason performances and if the player has taken enhancing substances.

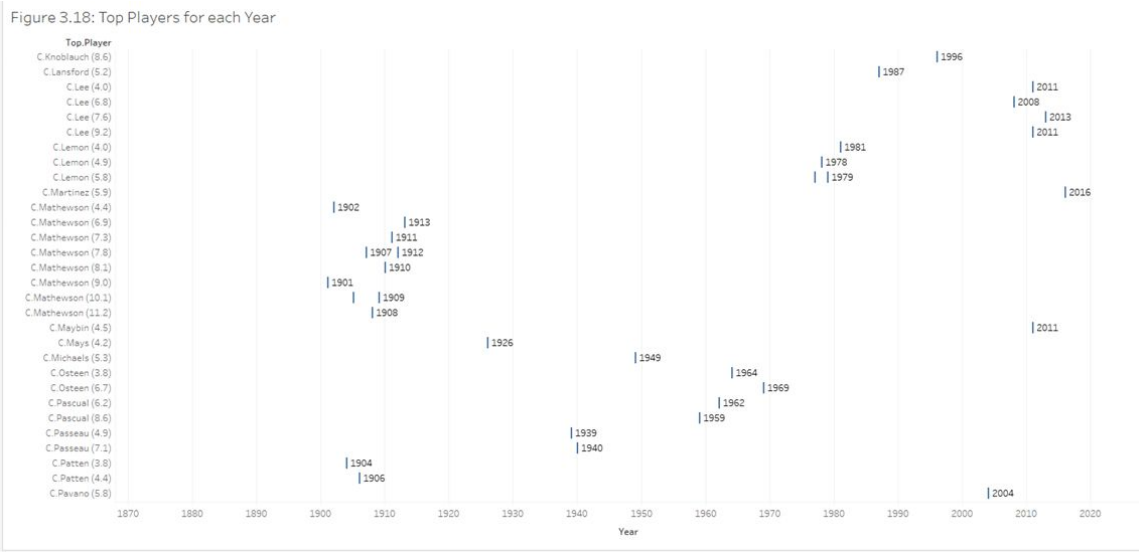


Figure 3.19: Pitcher Elevation Angle vs Horizontal Angle

Pitcher angles are very big across the country in Baseball. Vertical angles tell us how steep or flat the pitch was when it crossed home plate. Horizontal angles tell us how the ball came into the zone horizontally. All of this is taken into consideration because it is tracked during and also after every game for each pitcher. It also determines what kind of pitch the pitcher throws at the hitter. This data is from 2001 – 2019.

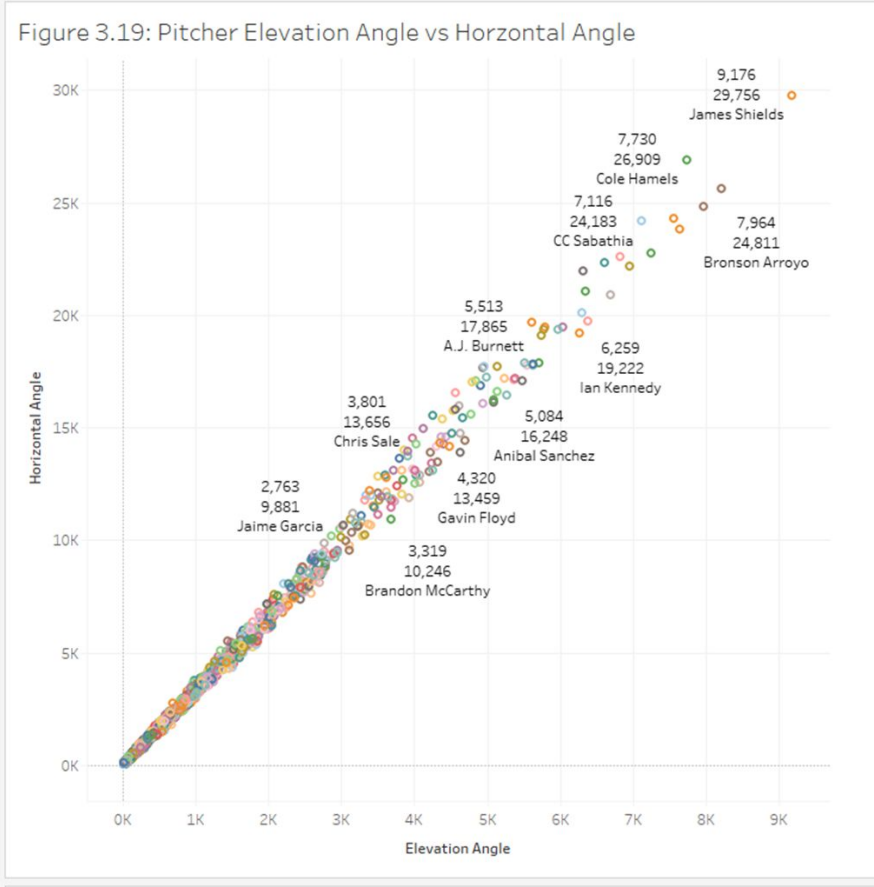
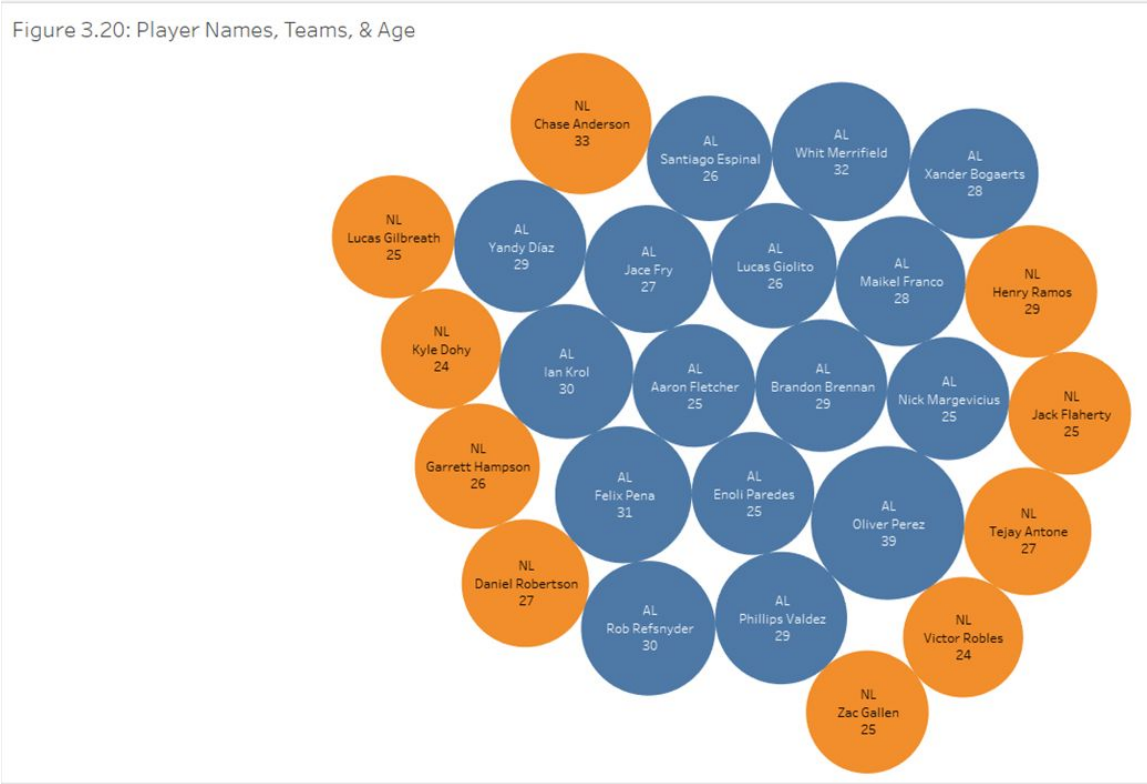


Figure 3.20: Player Names, Team & Age

The figure data above is from 2019. It states Player Names. What league they were playing for at the time, and their age at the time. Henry Romos was 29, and he was playing in the National League for the Boston Red Sox. Jace Fry was 27 in 2019, playing in the American League for the Detroit Tigers.



Phase 3 Conclusions

NFL -

- Super Bowls are only held in 10 of the 50 States
    - Mainly in Florida, California, and Louisiana
- The highest ever scored points during a Super Bowl game is 55
- Not many Super Bowl MVPs have over 1 Super Bowl MVP title

NBA -

An analysis of the NBA demographics, what exactly makes up the average NBA players as who they are, where they're from, and their age groups. Also taking in consideration where they are scouted and if going to college makes a difference.

- Average NBA player based on the demographics is a black male in the age group 25 – 28 that is from the United States.

MLB -

- Base-Out Percentages are how many bases a batter earns per out they get
- Runs batted In is the overall number of runs scored by directly hitting the ball or being walked when they are up to bat.

Overall Conclusions

NFL -

- Phase 1: There are 8 NFL divisions, with 4 teams in each division. The Cleveland Browns had the worst record (1-15) for the 2016 NFL Season. Just because a team record is bad, the QB ranking can still be high. The correlation is seen between Figures 1.2, 1.3, & 1.6.
- Phase 2: Shows a comparison on two NFL Seasons. Here we can conclude how each team can play differently each season, doing very well one season and falling off the next season.
- Phase 3: This phase was focused on NFL Super Bowls.I can conclude that NFL Super Bowl games are held mainly in 3 States (Florida, Louisiana, California). Lastly, most Superbowl NFL title holders only have 1 Super Bowl MVP title. Tom Brady is the only NFL Player with 5 NFL Super Bowl MVP titles.

NBA -

- Phase 1 from the NBA teams, it's clear the more wins a team holds the more revenue they can retain. The figures show relationships of high salaried players being in top winning teams.
- Phase 2 is a deeper analysis of Phase 1. The factors that were in consideration were the players' percentages while playing such as Assist Percentage, Block Percentage, Win Share, and Box Plus Minus. These stats explain how well a player contributes to the team.
- Phase 3 NBA players come from all over the world, but mainly from the United States who are often scouted from college basketball.

These stats examined show that there is true value in the NBA players while the well known names in the industry are able to prove themselves.

MLB -

- In Phase 1 I discovered that each team's batting average does vary greatly.
- In Phase 2 I discovered The wind can either be an enhancer or an enabler. It all just depends on the direction of the wind and where it is blowing to and from. It also is a game-altering factor because it can cause many errors or help score home runs.
- In Phase 3 I learned that every little thing is tracked in Baseball. The game is played from the pitch speed, type, and angle to the weather, wind, and field.