R_Final_Proj

Ryan Wallman

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INTRO: We pulled this data from a GitHub repository designed to promote American football analytics. The data contains a plethora of information for every game dating back to the 2000 National Football League season. For this project, we analyze total number of points scored, yards gained, and turnovers committed for certain NFL seasons across all 32 NFL teams, and compare them using a bar graph. Because the dataset only denotes the team what won the game, we only calculate our statistics across games won by these teams. This this provides a strong analysis, as teams must play up to their potential in order to win the Super Bowl, and thus we calculate metrics for teams' performances during games they played well in. Following each graph, we provide an analysis and demonstrate its correlation.

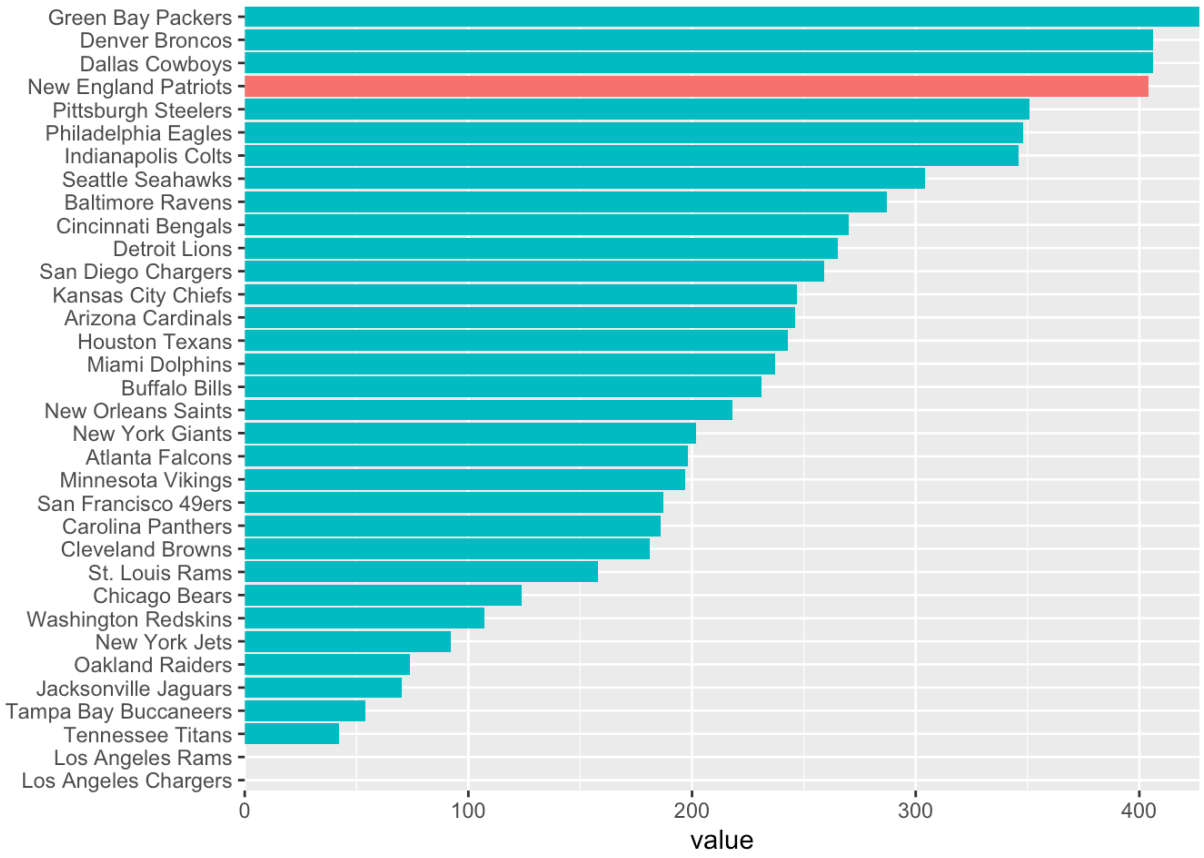
```
games <- read.csv(file = "https://
raw.githubusercontent.com/rfordatascience/tidytuesday/
master/data/2020/2020-02-04/games.csv")
games$winner[games$tie != is.na(games$tie)] <- "Tie"
games <- games[-c(6)]


for (i in 1:2){
  row <- games[i,]
}
initialize_yards <- function(team_name, year_param, games){
  total_stat =0
  for (i in 1:nrow(games)){
    row <- games [i,]
       if (team_name == row$winner & year_param == row$year
& row$week != "SuperBowl" & row$week != "WildCard" &
row$week != "Division" & row$week != "ConfChamp" ){
      total_stat = row$"yds_win" + total_stat

      }
```

```
  }

  return (total_stat)

}
initialize_pts <- function(team_name, year_param, games){
  total_stat =0
  total_count = 0
  for (i in 1:nrow(games)){
    row <- games [i,]
        if (team_name == row$winner & year_param ==
row$year & row$week != "SuperBowl" & row$week != "WildCard"
& row$week != "Division" & row$week != "ConfChamp" ){
      total_stat = row$"pts_win" + total_stat

      }
  }

  return (total_stat)

}
initialize_turnovers <- function(team_name, year_param,
games){
  total_stat =0
  for (i in 1:nrow(games)){
    row <- games [i,]
        if (team_name == row$winner & year_param ==
row$year & row$week != "SuperBowl" & row$week != "WildCard"
& row$week != "Division" & row$week != "ConfChamp" ){
      total_stat = row$"turnovers_win" + total_stat

      }
  }

  return (total_stat)

}
# Load ggplot2
library(ggplot2)
sb_win <- function(year_param){
  for (i in 1:nrow(games)){
```

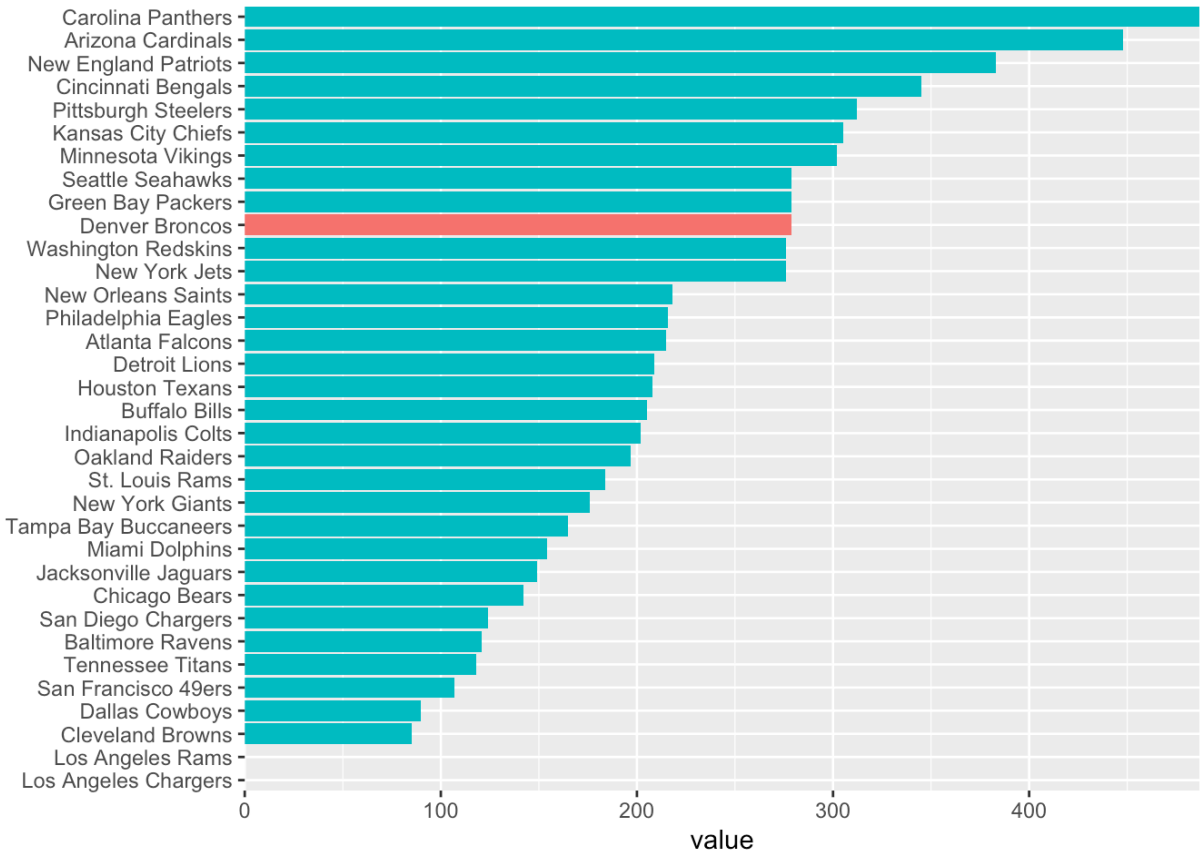
```
    row <- games [i,]
       if (year_param == row$year & "SuperBowl" ==
row$week){
         return (row$winner)
       }
  }
}

plot_func <- function(value, year){
  # Create data
  winner <- sb_win(year)
data <- data.frame(
  name=c("Arizona Cardinals", "Baltimore Ravens", "Atlanta
Falcons","Buffalo Bills", "Carolina Panthers","Cincinnati
Bengals", "Chicago Bears", "Cleveland Browns","Dallas
Cowboys","Denver Broncos", "Detroit Lions", "Houston
Texans", "Green Bay Packers", "Indianapolis Colts", "St.
Louis Rams","Los Angeles Rams", "Jacksonville Jaguars",
"Minnesota Vikings", "Kansas City Chiefs", "New Orleans
Saints", "Oakland Raiders", "New York Giants", "San Diego
Chargers", "Los Angeles Chargers", "Philadelphia Eagles",
"Miami Dolphins", "San Francisco 49ers","New England
Patriots", "Seattle Seahawks", "New York Jets" , "Tampa Bay
Buccaneers", "Pittsburgh Steelers", "Washington Redskins",
"Tennessee Titans"),

  value =value
  )

# Barplot

ggplot(data,
       aes(x = reorder(name, value),
           y = value,
           fill = ifelse(name == winner, "Highlighted",
"Normal") )) +
  geom_bar(stat = "identity") +
  ## drop legend and Y-axis title
  theme(legend.position = "none", axis.title.y =
element_blank()) +
  coord_flip(expand = FALSE)
```

```
}
team_pts <- function(year){
cardinals <- initialize_pts("Arizona Cardinals", year,
games)
ravens <- initialize_pts("Baltimore Ravens", year, games)
falcons  <- initialize_pts("Atlanta Falcons", year, games)
bills  <- initialize_pts("Buffalo Bills", year, games)
panthers  <- initialize_pts("Carolina Panthers", year,
games)
bengals <- initialize_pts("Cincinnati Bengals", year,
games)
bears <- initialize_pts("Chicago Bears", year, games)
browns  <- initialize_pts("Cleveland Browns", year, games)
cowboys  <- initialize_pts("Dallas Cowboys", year, games)
broncos  <- initialize_pts("Denver Broncos", year, games)
lions <- initialize_pts("Detroit Lions", year, games)
texans  <- initialize_pts("Houston Texans", year, games)
packers  <- initialize_pts("Green Bay Packers", year,
games)
colts  <- initialize_pts("Indianapolis Colts", year, games)
st_rams  <- initialize_pts("St. Louis Rams", year, games)
la_rams <- initialize_pts("Los Angeles Rams", year, games)
jags  <- initialize_pts("Jacksonville Jaguars", year,
games)
vikings  <- initialize_pts("Minnesota Vikings", year,
games)
chiefs  <- initialize_pts("Kansas City Chiefs", year,
games)
saints  <- initialize_pts("New Orleans Saints", year,
games)
raiders  <- initialize_pts("Oakland Raiders", year, games)
giants  <- initialize_pts("New York Giants", year, games)
sd_chargers  <- initialize_pts("San Diego Chargers", year,
games)
la_chargers <- initialize_pts("Los Angeles Chargers", year,
games)
eagles  <- initialize_pts("Philadelphia Eagles", year,
games)
dolphins  <- initialize_pts("Miami Dolphins", year, games)
niners  <- initialize_pts("San Francisco 49ers", year,
games)
```

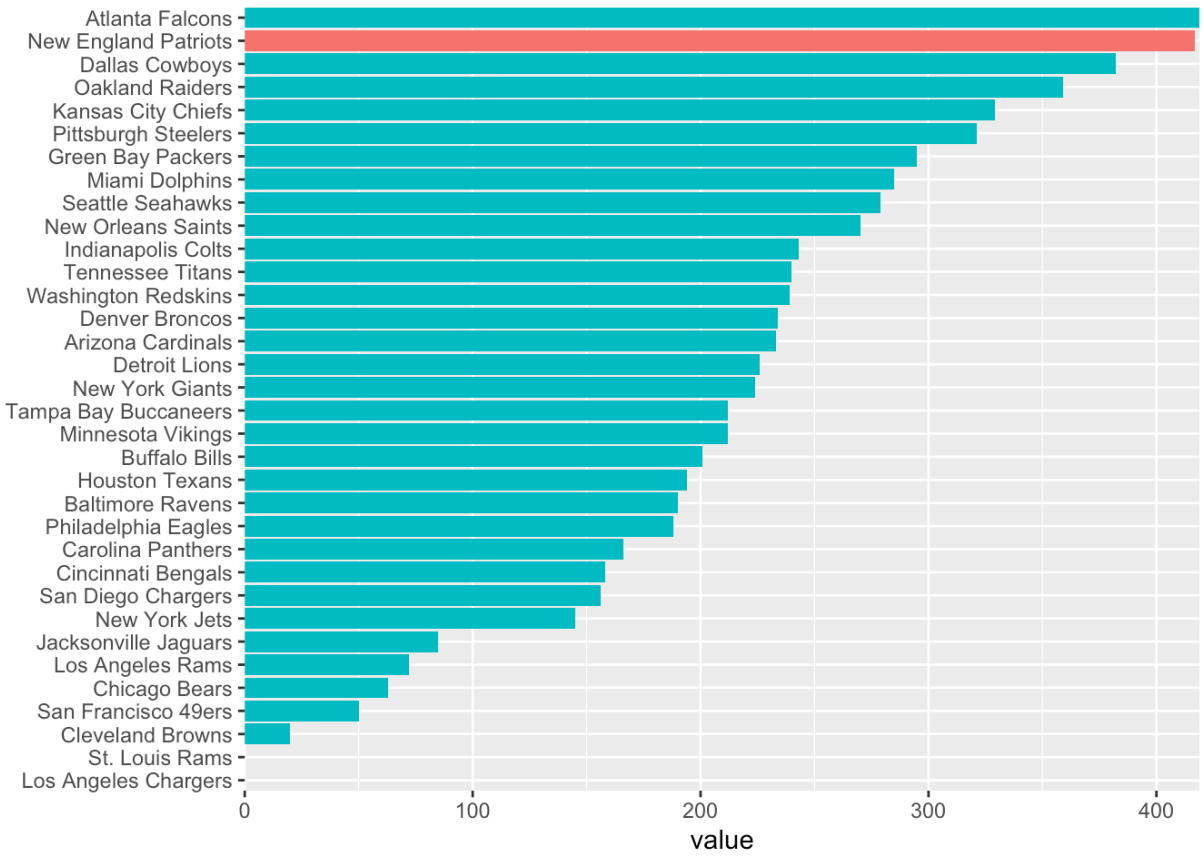
```
patriots  <- initialize_pts("New England Patriots", year,
games)
seahwaks  <- initialize_pts("Seattle Seahawks", year,
games)
jets  <- initialize_pts("New York Jets", year, games)
bucs  <- initialize_pts("Tampa Bay Buccaneers", year,
games)
steelers  <- initialize_pts("Pittsburgh Steelers", year,
games)
commanders  <- initialize_pts("Washington Redskins", year,
games)
titans  <- initialize_pts("Tennessee Titans", year, games)
value = c(cardinals, ravens, falcons, bills,panthers,
bengals, bears ,browns, cowboys, broncos, lions, texans,
packers, colts, st_rams, la_rams, jags,vikings, chiefs,
saints, raiders, giants,sd_chargers, la_chargers, eagles,
dolphins, niners, patriots, seahwaks, jets, bucs,
steelers, commanders,  titans)
return(value)
}
par(mfrow=c(1,2))

values <- team_pts(2014)
plot_func(values, 2014)
```



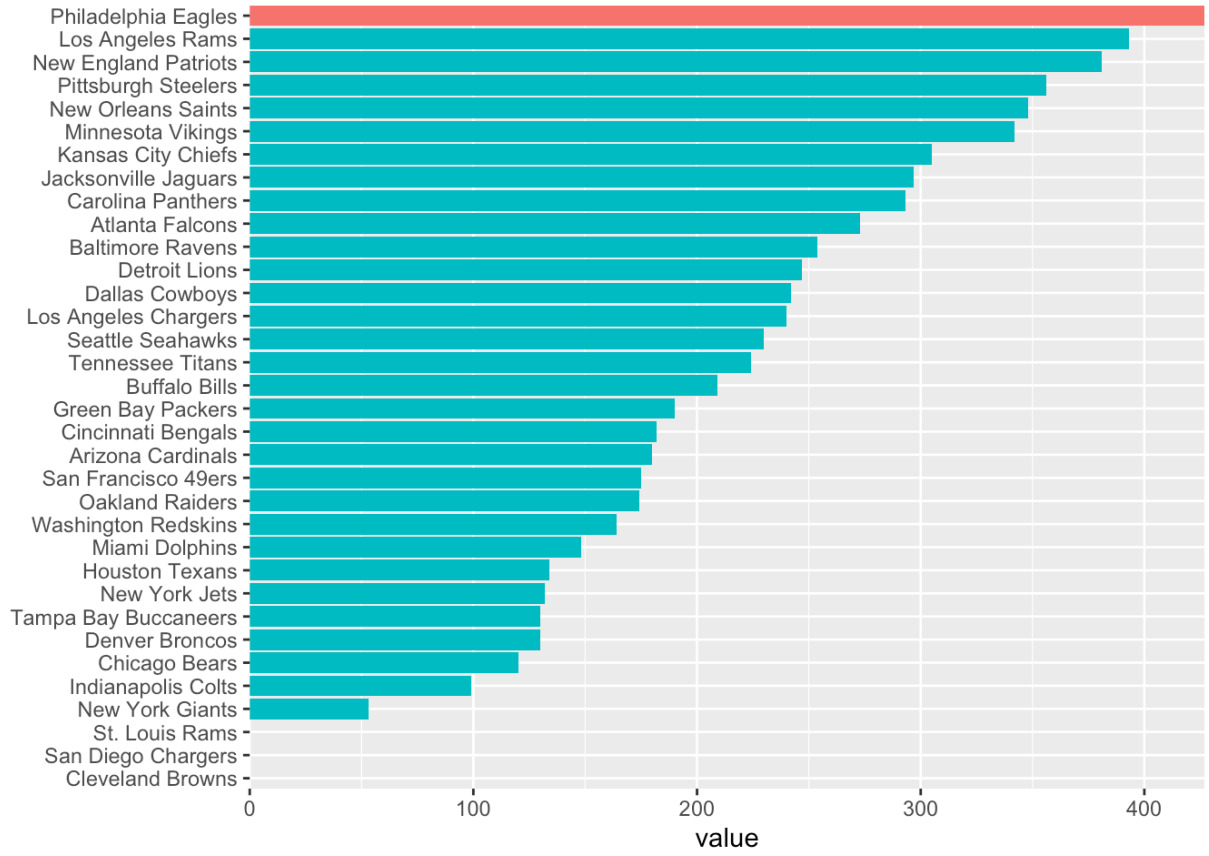

```
values <- team_pts(2015)
plot_func(values, 2015)
```



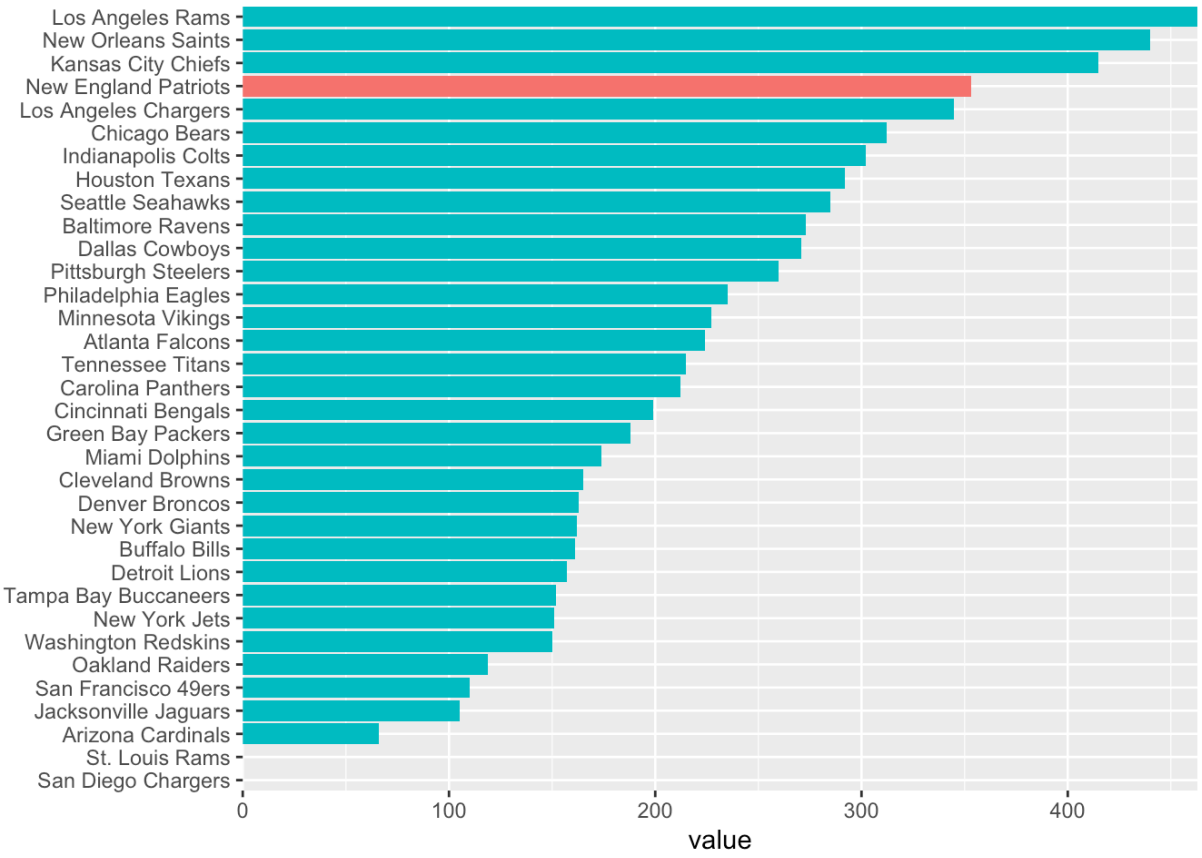

```
values <- team_pts(2016)
plot_func(values, 2016)
```



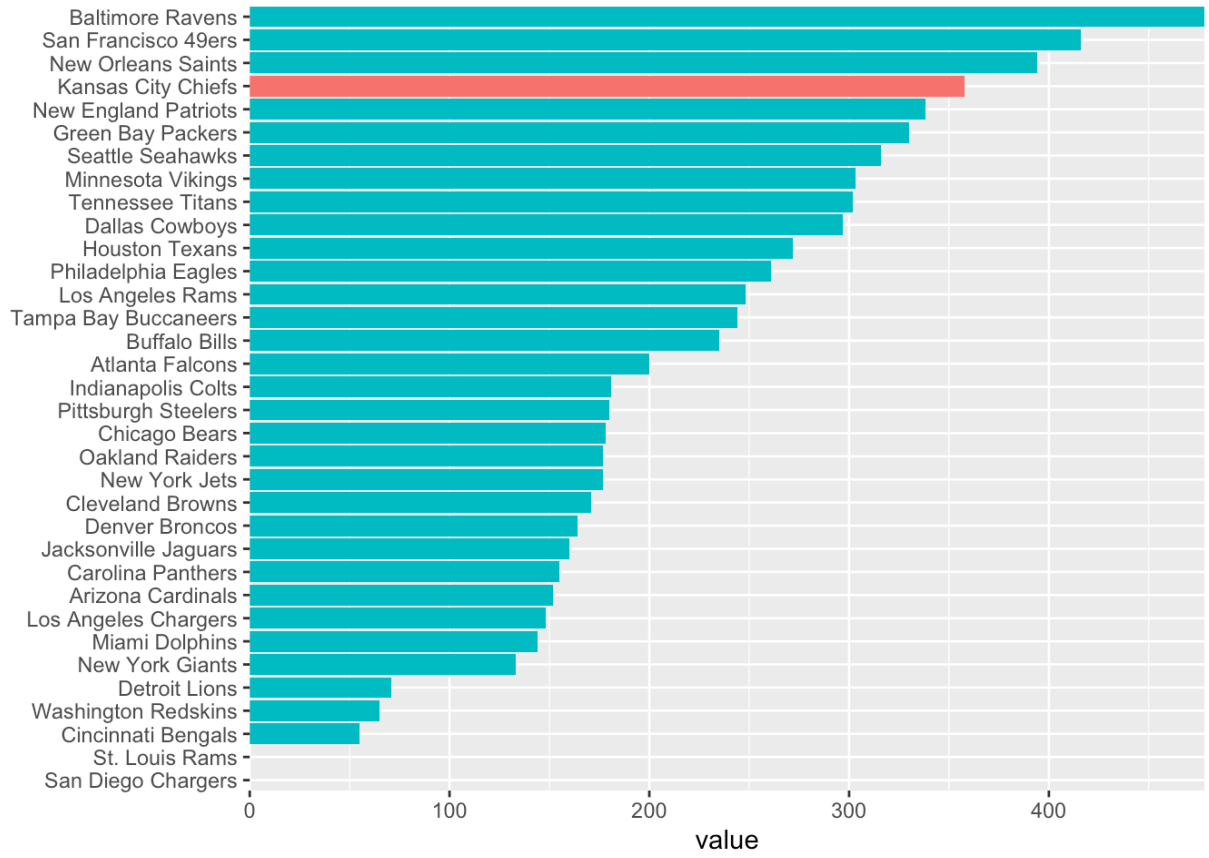

```
values <- team_pts(2017)
plot_func(values, 2017)
```




```
values <- team_pts(2018)
plot_func(values, 2018)
```




```
values <- team_pts(2019)
plot_func(values, 2019)
```

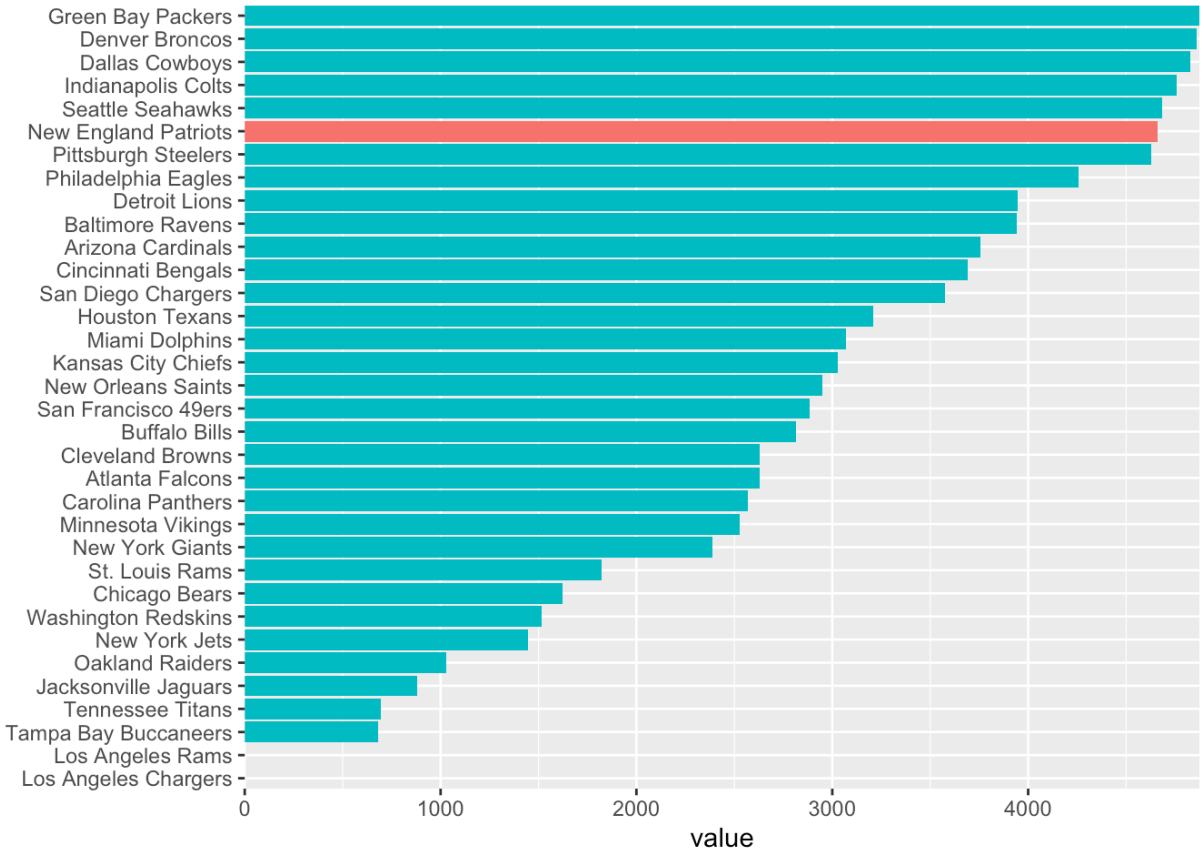


These plots represent a bar graph of all 32 teams in the National Football League from 2014, 2015, 2016, 2017, 2018, and 2019. The red bar indicates the winner of the Super Bowl, and the blue lines indicate the other teams in the NFL at the time. The value the bar graph is comparing is the total number of points a team scores in wins throughout the season. The reason that the St. Louis Rams, and San Diego Chargers both have 0 points is because they recently moved locations, both to Los Angeles. These two teams are included in the chart because this project has the potential to analyze data from the early 2000s, when they were teams.The statistic the bar graph is showing are the total number of points scored by each team. Every year, the Super Bowl winner consistently ranked in the top 5 of total points scored, with the exception the the Denver Broncos who ranked 10th in the year they won the Super Bowl. Thus, we can say there is a strong positive correlation between the number of yards a team has in its wins and their potential to win the Super Bowl.

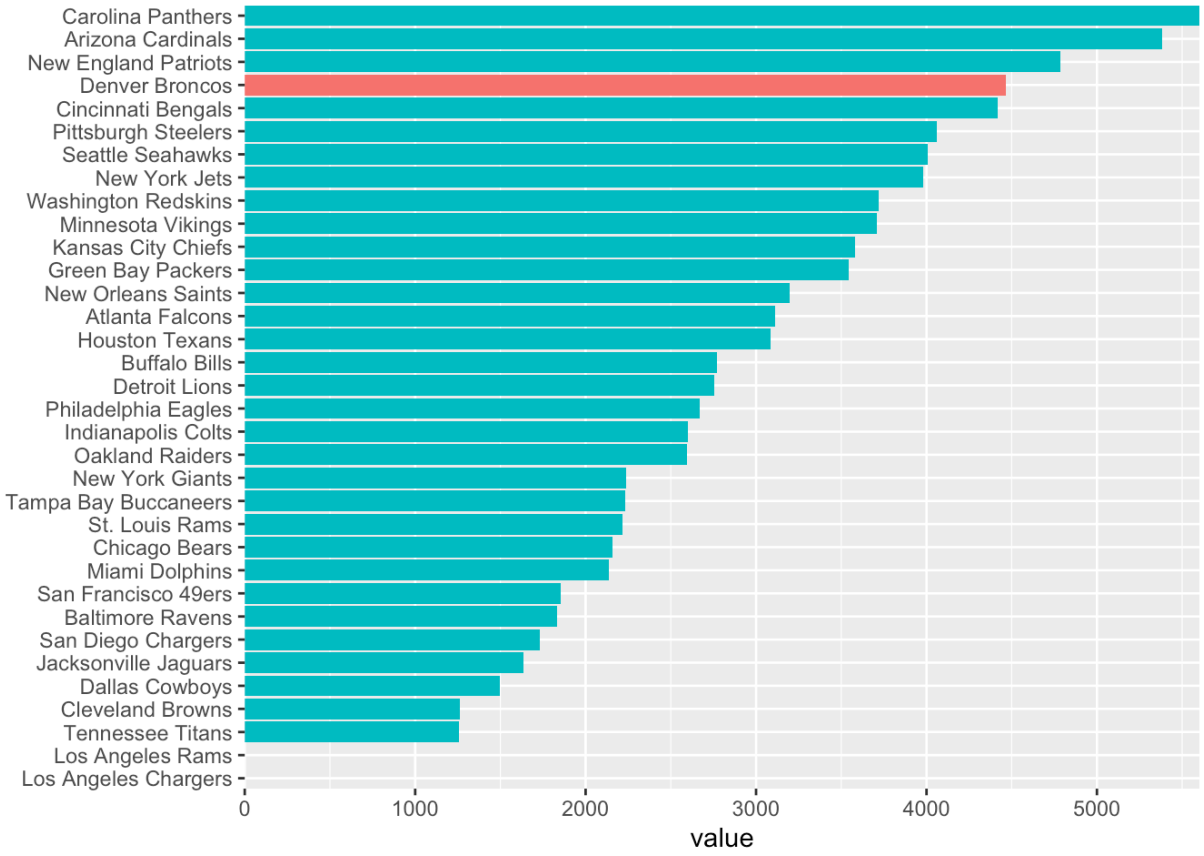
```
team_yards <- function(year){
cardinals <- initialize_yards("Arizona Cardinals", year,
games)
ravens <- initialize_yards("Baltimore Ravens", year, games)
```

```
falcons  <- initialize_yards("Atlanta Falcons", year,
games)
bills  <- initialize_yards("Buffalo Bills", year, games)
panthers  <- initialize_yards("Carolina Panthers", year,
games)
bengals <- initialize_yards("Cincinnati Bengals", year,
games)
bears <- initialize_yards("Chicago Bears", year, games)
browns  <- initialize_yards("Cleveland Browns", year,
games)
cowboys  <- initialize_yards("Dallas Cowboys", year, games)
broncos  <- initialize_yards("Denver Broncos", year, games)
lions <- initialize_yards("Detroit Lions", year, games)
texans  <- initialize_yards("Houston Texans", year, games)
packers  <- initialize_yards("Green Bay Packers", year,
games)
colts  <- initialize_yards("Indianapolis Colts", year,
games)
st_rams  <- initialize_yards("St. Louis Rams", year, games)
la_rams <- initialize_yards("Los Angeles Rams", year,
games)
jags  <- initialize_yards("Jacksonville Jaguars", year,
games)
vikings  <- initialize_yards("Minnesota Vikings", year,
games)
chiefs  <- initialize_yards("Kansas City Chiefs", year,
games)
saints  <- initialize_yards("New Orleans Saints", year,
games)
raiders  <- initialize_yards("Oakland Raiders", year,
games)
giants  <- initialize_yards("New York Giants", year, games)
sd_chargers  <- initialize_yards("San Diego Chargers",
year, games)
la_chargers <- initialize_yards("Los Angeles Chargers",
year, games)
eagles  <- initialize_yards("Philadelphia Eagles", year,
games)
dolphins  <- initialize_yards("Miami Dolphins", year,
games)
niners  <- initialize_yards("San Francisco 49ers", year,
```

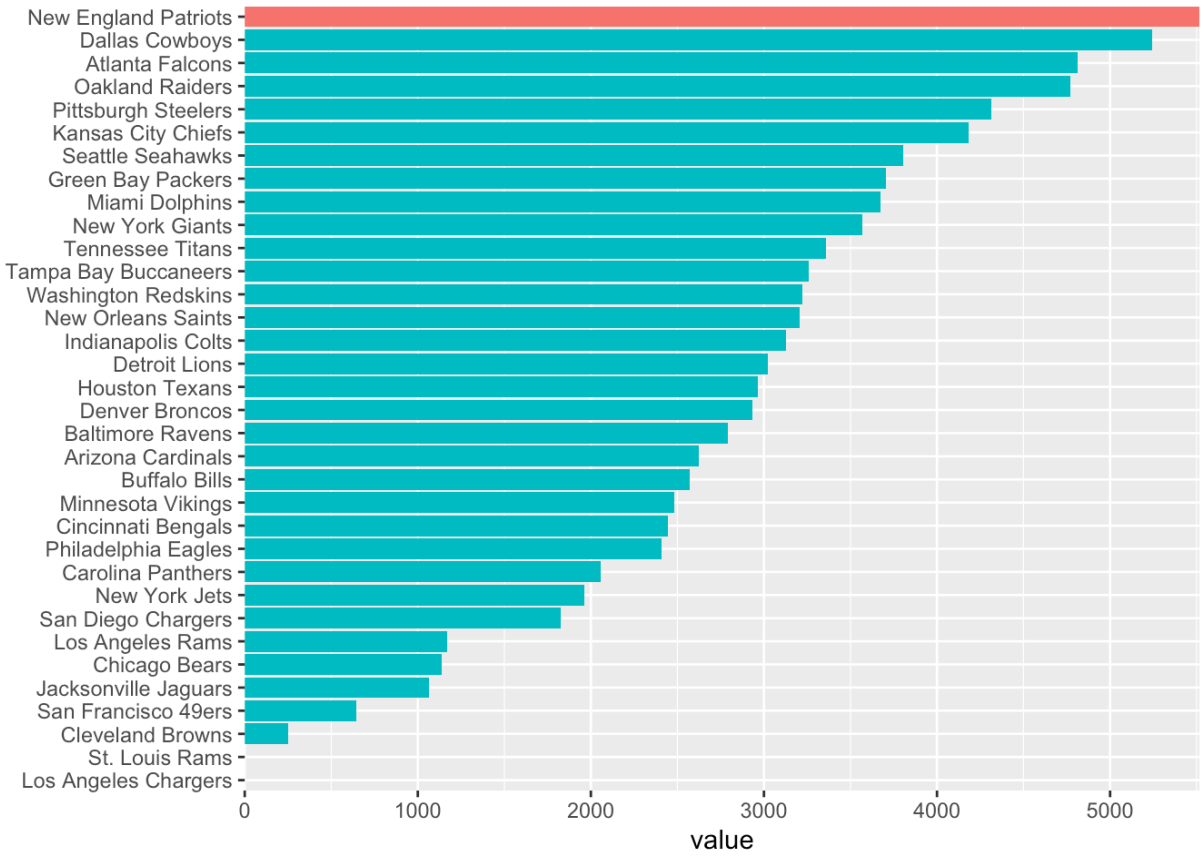
```
games)
patriots  <- initialize_yards("New England Patriots", year,
games)
seahwaks  <- initialize_yards("Seattle Seahawks", year,
games)
jets  <- initialize_yards("New York Jets", year, games)
bucs  <- initialize_yards("Tampa Bay Buccaneers", year,
games)
steelers  <- initialize_yards("Pittsburgh Steelers", year,
games)
commanders  <- initialize_yards("Washington Redskins",
year, games)
titans  <- initialize_yards("Tennessee Titans", year,
games)
value = c(cardinals, ravens, falcons, bills,panthers,
bengals, bears ,browns, cowboys, broncos, lions, texans,
packers, colts, st_rams, la_rams, jags,vikings, chiefs,
saints, raiders, giants,sd_chargers, la_chargers, eagles,
dolphins, niners, patriots, seahwaks, jets, bucs,
steelers, commanders,  titans)
return(value)
}
par(mfrow=c(1,2))

values <- team_yards(2014)
plot_func(values, 2014)
```



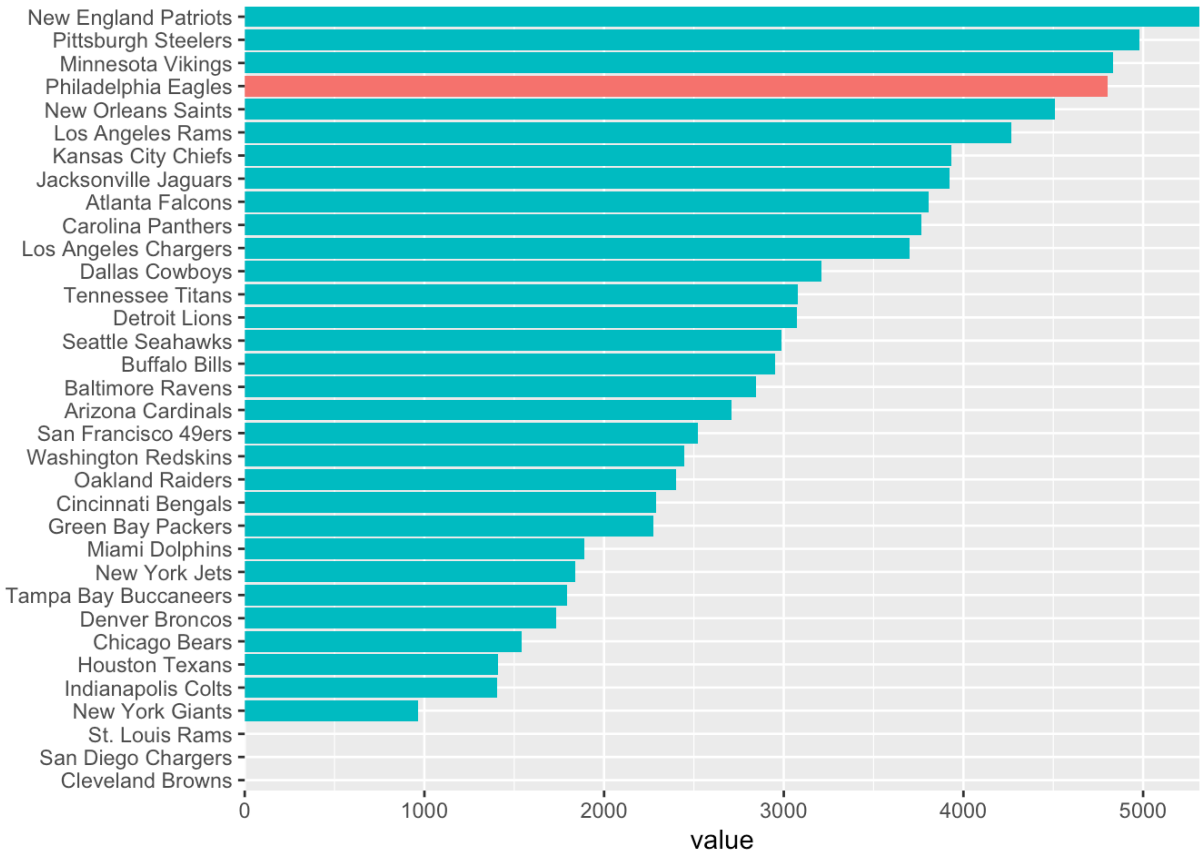

```
values <- team_yards(2015)
plot_func(values, 2015)
```



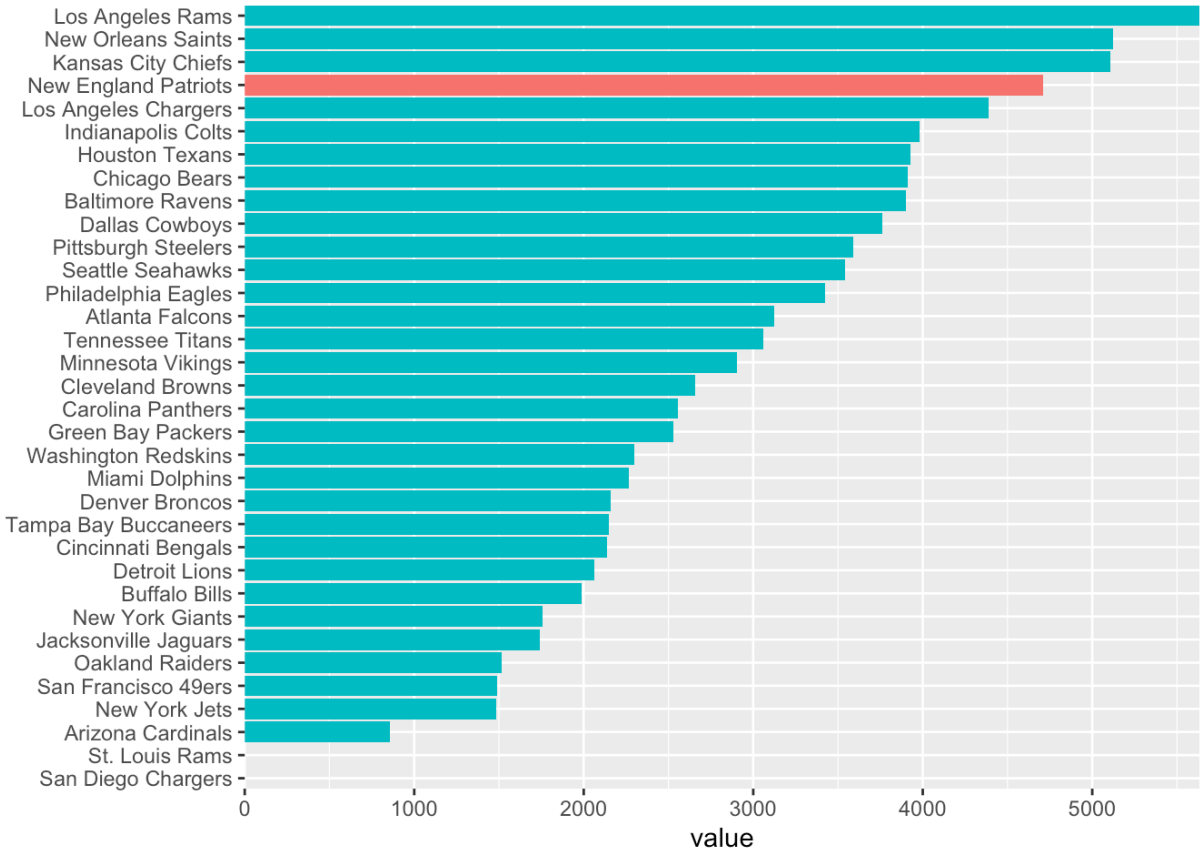

```
values <- team_yards(2016)
plot_func(values, 2016)
```



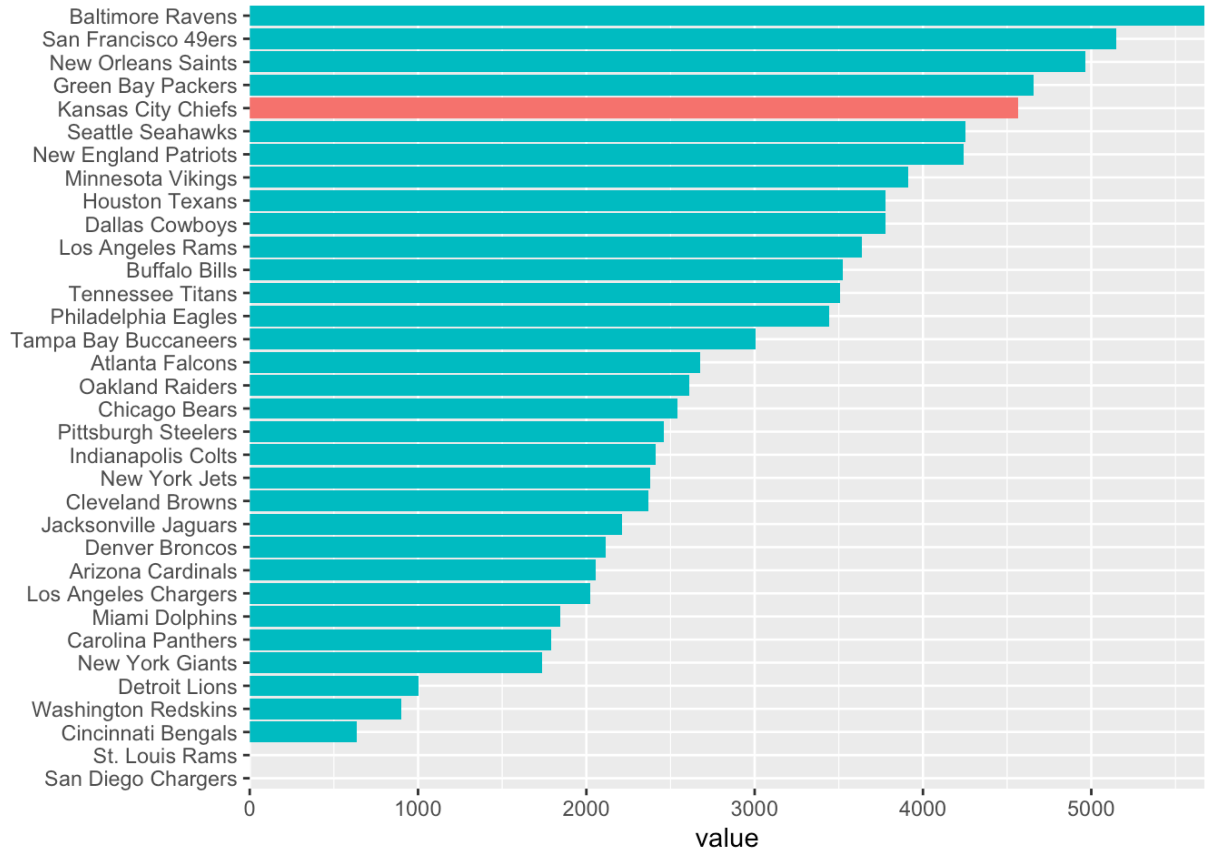

```
values <- team_yards(2017)
plot_func(values, 2017)
```




```
values <- team_yards(2018)
plot_func(values, 2018)
```




```
values <- team_yards(2019)
plot_func(values, 2019)
```

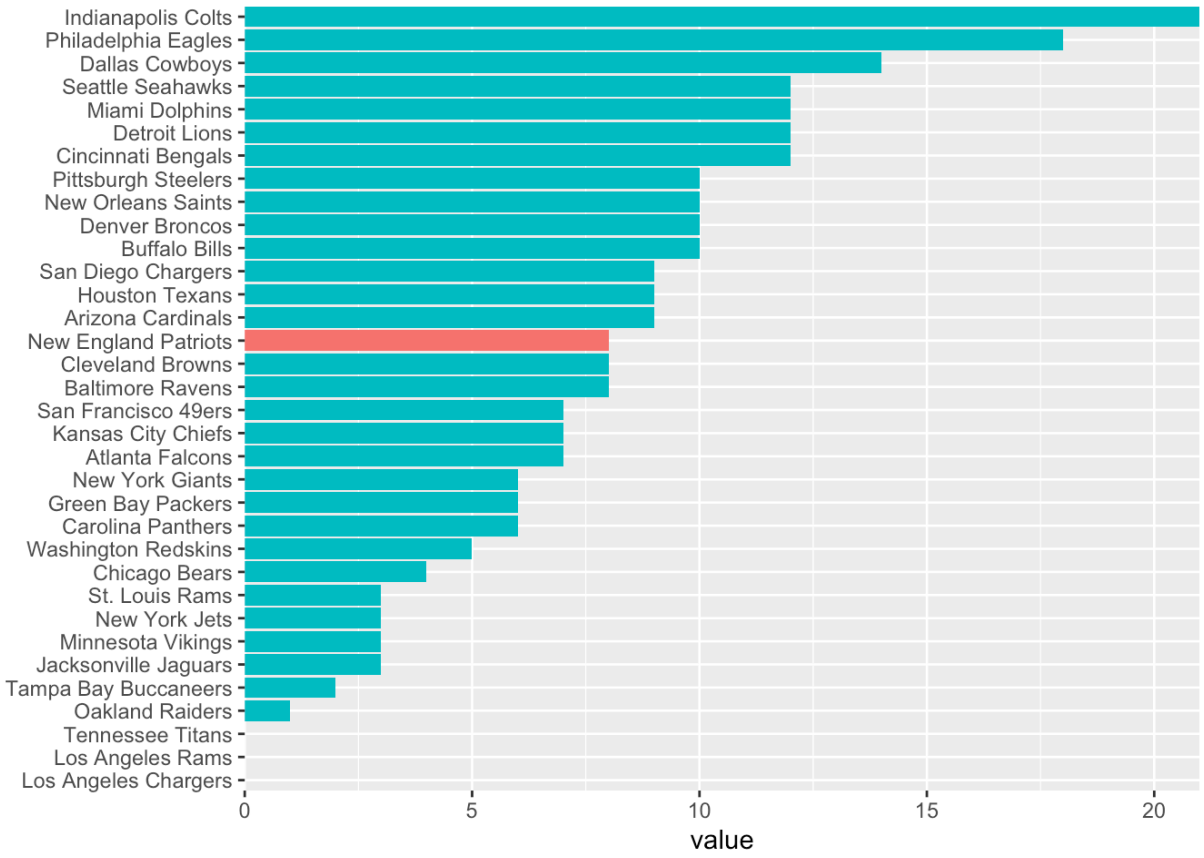


These plots represents a bar graph of all 32 teams in the National Football League from 2014, 2015, 2016, 2017, 2018, and 2019. The red bar indicates the winner of the Super Bowl, and the blue lines indicate the other teams in the NFL at the time. The statistic the bar graph is showing are the total number of yards in wins by each team across a season. Similar to that of total points scored each year, we can clearly see the correlation between a successful football team, and its total number of yards. Each of the Super Bowl winners from 2014 to 2019 ranks in the top 6 of the league in total yards in wins. Because of this, we can clearly state that there is a positive correlation between total yards in winning games and a Super Bowl Winning game.

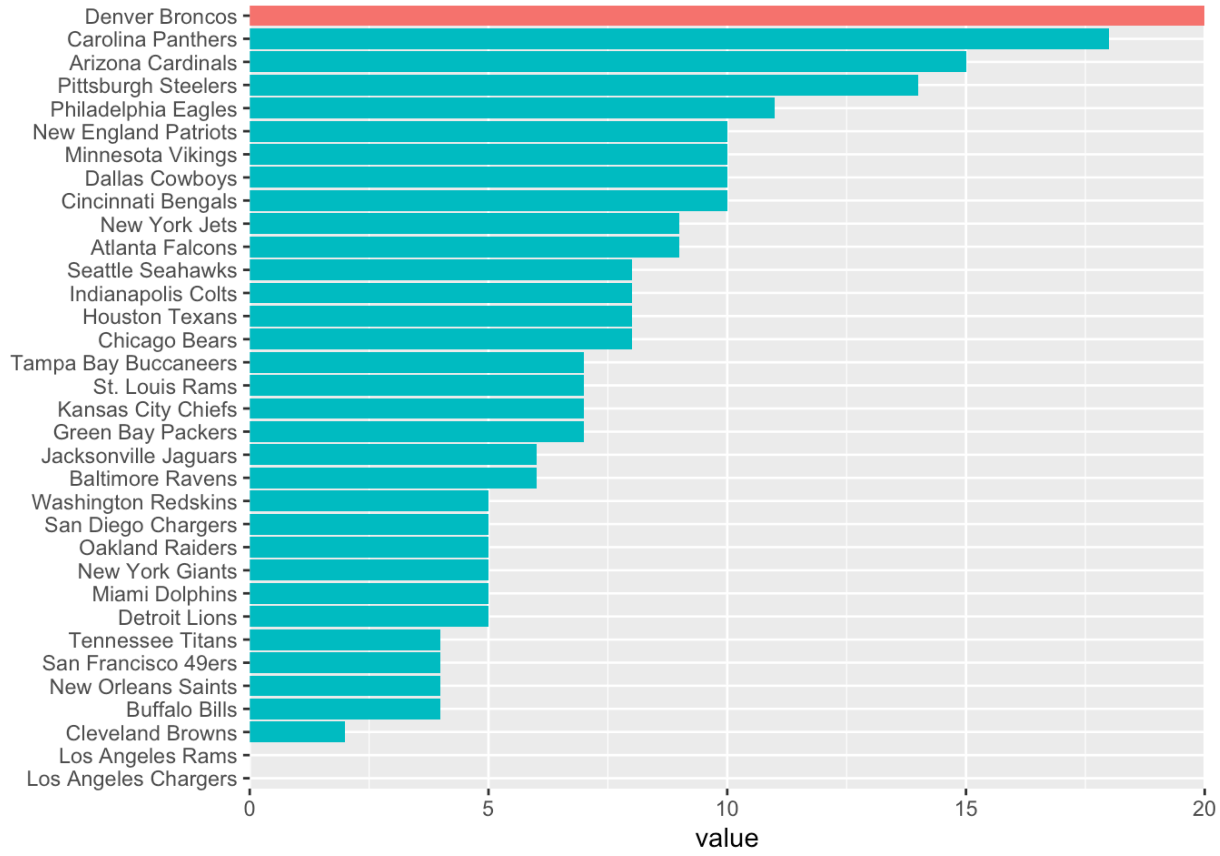
```
team_turnovers <- function(year){
cardinals <- initialize_turnovers("Arizona Cardinals",
year, games)
ravens <- initialize_turnovers("Baltimore Ravens", year,
games)
falcons  <- initialize_turnovers("Atlanta Falcons", year,
games)
```

```
bills  <- initialize_turnovers("Buffalo Bills", year,
games)
panthers  <- initialize_turnovers("Carolina Panthers",
year, games)
bengals <- initialize_turnovers("Cincinnati Bengals", year,
games)
bears <- initialize_turnovers("Chicago Bears", year, games)
browns  <- initialize_turnovers("Cleveland Browns", year,
games)
cowboys  <- initialize_turnovers("Dallas Cowboys", year,
games)
broncos  <- initialize_turnovers("Denver Broncos", year,
games)
lions <- initialize_turnovers("Detroit Lions", year, games)
texans  <- initialize_turnovers("Houston Texans", year,
games)
packers  <- initialize_turnovers("Green Bay Packers", year,
games)
colts  <- initialize_turnovers("Indianapolis Colts", year,
games)
st_rams  <- initialize_turnovers("St. Louis Rams", year,
games)
la_rams <- initialize_turnovers("Los Angeles Rams", year,
games)
jags  <- initialize_turnovers("Jacksonville Jaguars", year,
games)
vikings  <- initialize_turnovers("Minnesota Vikings", year,
games)
chiefs  <- initialize_turnovers("Kansas City Chiefs", year,
games)
saints  <- initialize_turnovers("New Orleans Saints", year,
games)
raiders  <- initialize_turnovers("Oakland Raiders", year,
games)
giants  <- initialize_turnovers("New York Giants", year,
games)
sd_chargers  <- initialize_turnovers("San Diego Chargers",
year, games)
la_chargers <- initialize_turnovers("Los Angeles Chargers",
year, games)
eagles  <- initialize_turnovers("Philadelphia Eagles",
```

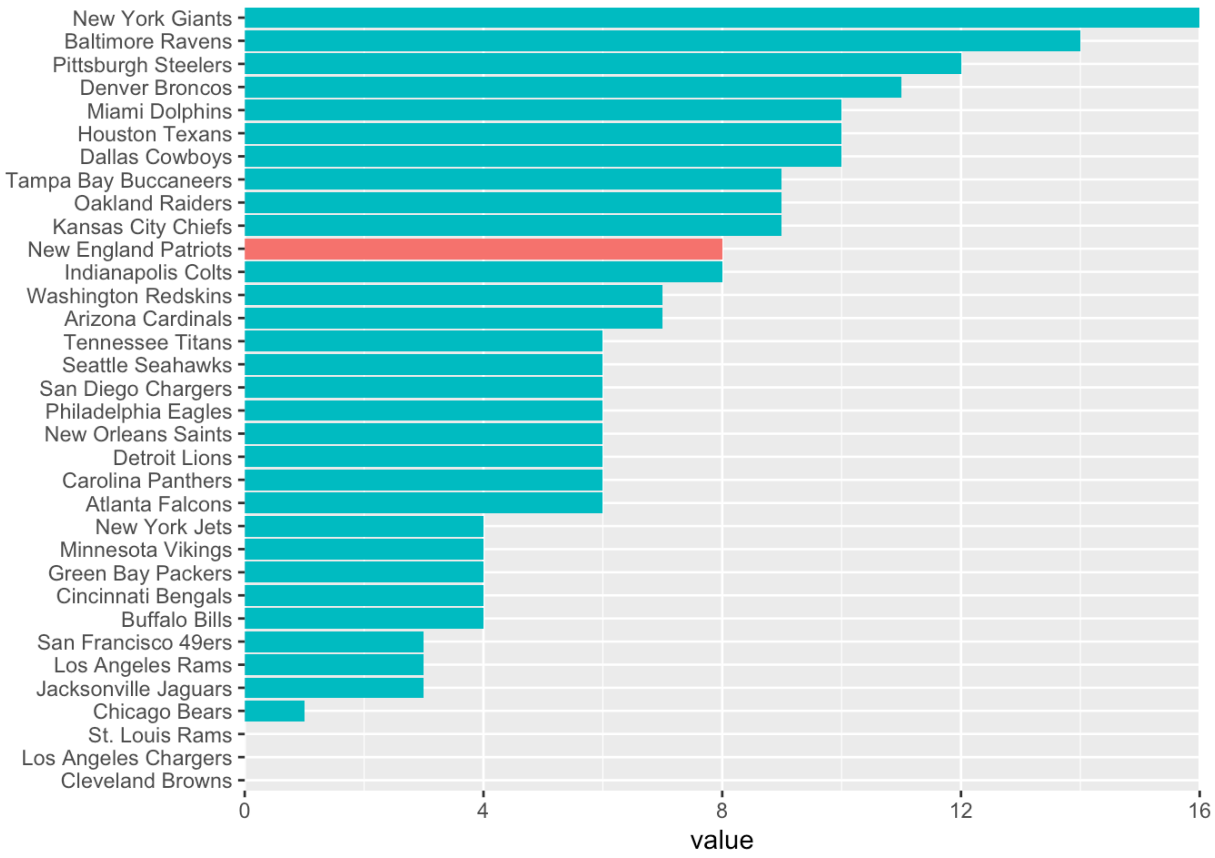
```
year, games)
dolphins  <- initialize_turnovers("Miami Dolphins", year,
games)
niners  <- initialize_turnovers("San Francisco 49ers",
year, games)
patriots  <- initialize_turnovers("New England Patriots",
year, games)
seahwaks  <- initialize_turnovers("Seattle Seahawks", year,
games)
jets  <- initialize_turnovers("New York Jets", year, games)
bucs  <- initialize_turnovers("Tampa Bay Buccaneers", year,
games)
steelers  <- initialize_turnovers("Pittsburgh Steelers",
year, games)
commanders  <- initialize_turnovers("Washington Redskins",
year, games)
titans  <- initialize_turnovers("Tennessee Titans", year,
games)
value = c(cardinals, ravens, falcons, bills,panthers,
bengals, bears ,browns, cowboys, broncos, lions, texans,
packers, colts, st_rams, la_rams, jags,vikings, chiefs,
saints, raiders, giants,sd_chargers, la_chargers, eagles,
dolphins, niners, patriots, seahwaks, jets, bucs,
steelers, commanders,  titans)
return(value)
}
par(mfrow=c(1,2))

values <- team_turnovers(2014)
plot_func(values, 2014)
```



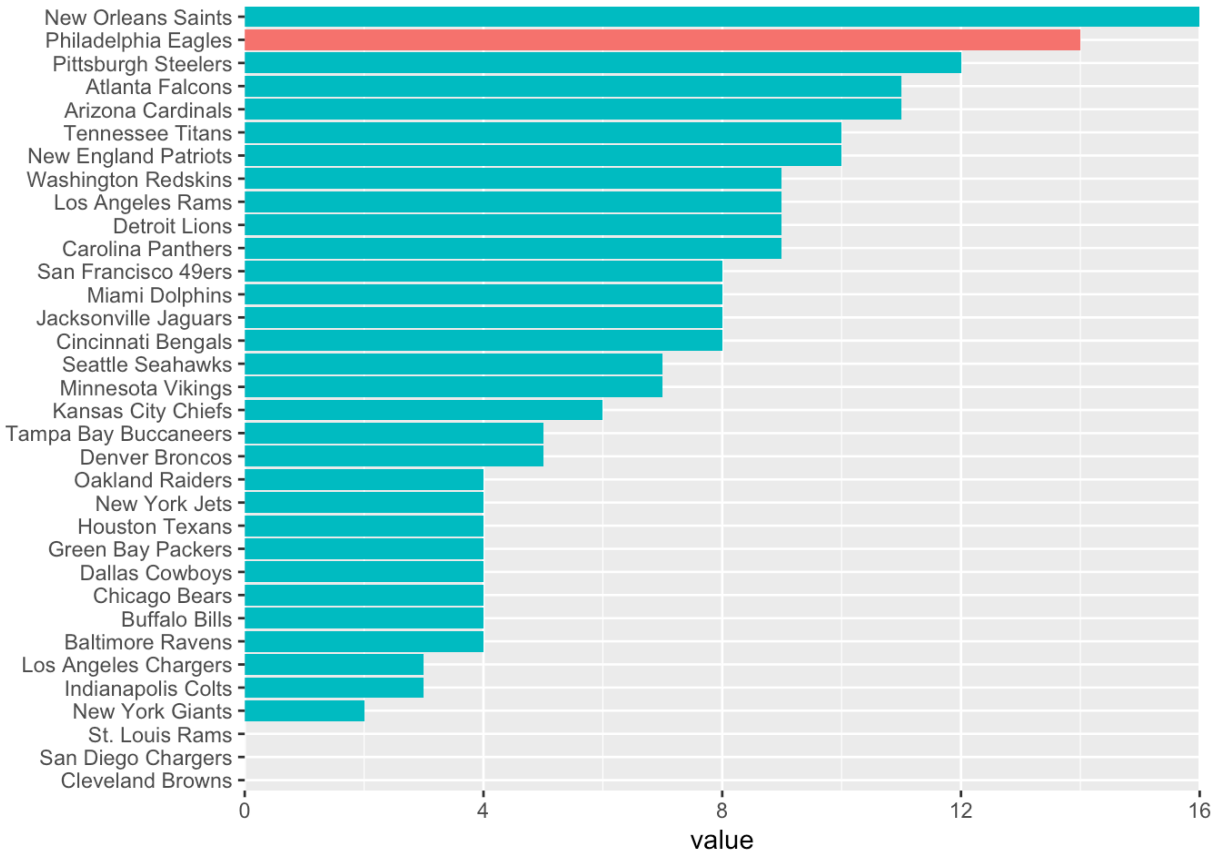

```
values <- team_turnovers(2015)
plot_func(values, 2015)
```



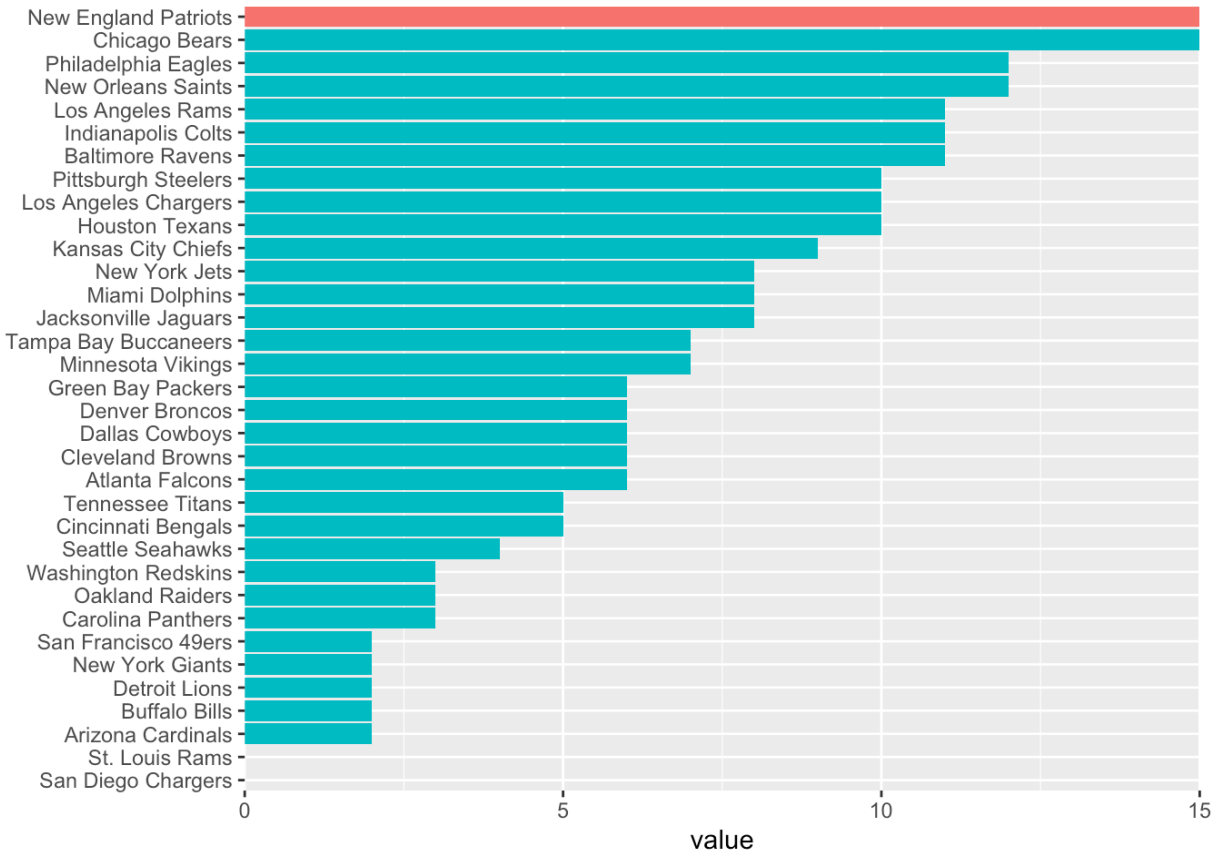

```
values <- team_turnovers(2016)
plot_func(values, 2016)
```



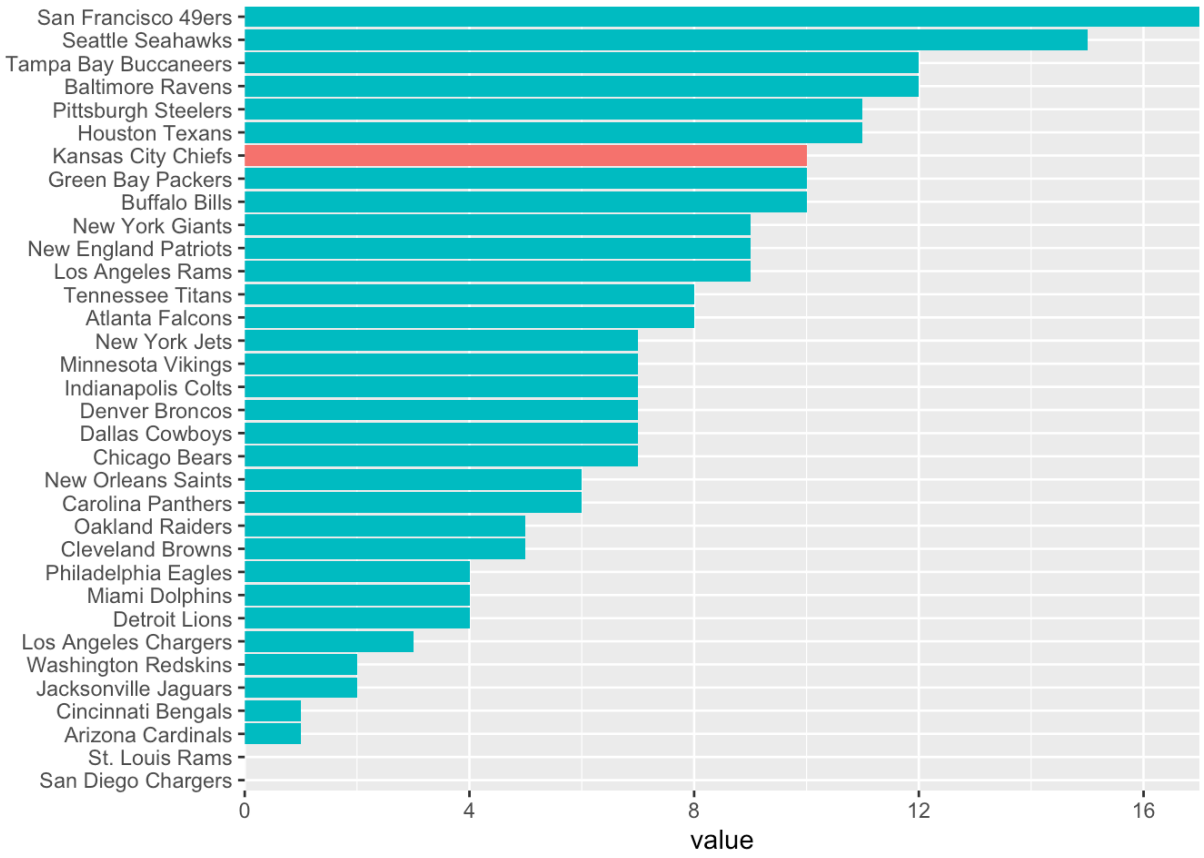

```
values <- team_turnovers(2017)
plot_func(values, 2017)
```




```
values <- team_turnovers(2018)
plot_func(values, 2018)
```




```
values <- team_turnovers(2019)
plot_func(values, 2019)
```



These plots represents a bar graph of all 32 teams in the National Football League from 2014, 2015, 2016, 2017, 2018, and 2019. The red bar indicates the winner of the Super Bowl, and the blue lines indicate the other teams in the NFL at the time. The statistic the bar graph is showing are the total number of turnovers in wins by each team across a season. While for the total points and total yards statistics the Super Bowl winner was in the top 10 each time, that is not the case for the total amount of turnovers< ADD TEAMS> One reason why teams that win the Super Bowl actually have a larger amount of turnovers is because they play more aggressive on the offensive end. Due to their tendency to go to big plays and score more points, turnovers will inevitable come. While there is certainly a positive correlation between the winner of the Super Bowl and the amount of turnovers that team has in wins, there are still outlier teams.