Comparing the Pittsburgh Steelers under Bill Cowher vs. Mike Tomlin

STAT184 Final Project

JJ Steinbugl and Sammit Bal

12/18/2024

Introduction

The Pittsburgh Steelers are one of the most famous franchises in NFL history, known for their iconic players, championship success, and leadership. Over the past three decades, the team has been shaped by two head coaches: Bill Cowher and Mike Tomlin.

Bill Cowher, who coached the team from 1992 to 2006, is known for his strong defensive-minded strategies, and running focused offense. Under his leadership, the Steelers reached the Super Bowl twice, winning in 2005. Following Cowher's tenure, Mike Tomlin took the reins in 2007, becoming the youngest head coach to win a Super Bowl in 2008.

In this report we will compare the Steelers' performance under Cowher and Tomlin, exploring their impact on the franchise through various metrics, including win-loss records, playoff consistency, and average offensive and defensive rankings. Additionally, we will consider how changes in the NFL's playstyle may have influenced their respective coaching tenures.

This analysis aims to answer a few critical questions about who has been the better coach, who demonstrated greater consistency, and who achieved more success during their time at the helm of the Pittsburgh Steelers?

Methodology

This analysis compares the performance of the Pittsburgh Steelers under Bill Cowher (1992–2006) and Mike Tomlin (2007–present). The following outlines the approach taken to gather, analyze, and interpret data, as well as the methods used to account for changes in NFL playstyles over time.

Data was gathered from Pro Football Reference, and Statista, this data includes win-loss records, divisional rankings, offensive and defensive rankings, and points scored and allowed. After the data was gathered we cleaned and merged the data sources in order to consolidate our data and make it easier to work with in the future. The data also meets the FAIR principles as it can be easily found, it is accessible and free to download, it can be easily interpreted in CSV format, and it can easily be reused.

We recognize that football is an ever evolving sport and understand how NFL rule changes can affect a teams playstyle. Over the years we have noticed the shift toward pass-heavy offenses and rule changes favoring offensive play and player safety. To address these changes, the analysis will consider and address these recent trends/changes before any type of conclusion is made.

Research Questions:

- Who is the better coach for the Pittsburgh Steelers?
- Who is more consistent in their rankings during their tenure?
- Who was more successful during their tenure?
- How does the evolving NFL playstyle affect the statistics?

Analysis

Who is the better coach for the Pittsburgh Steelers?

This is the obvious question to ask in this analysis, and is indeed the overarching question. We will first analyze wins and losses, as it is the broadest metric for success in the NFL. A win lose record is also what most people look at when comparing teams or in this case coaches.

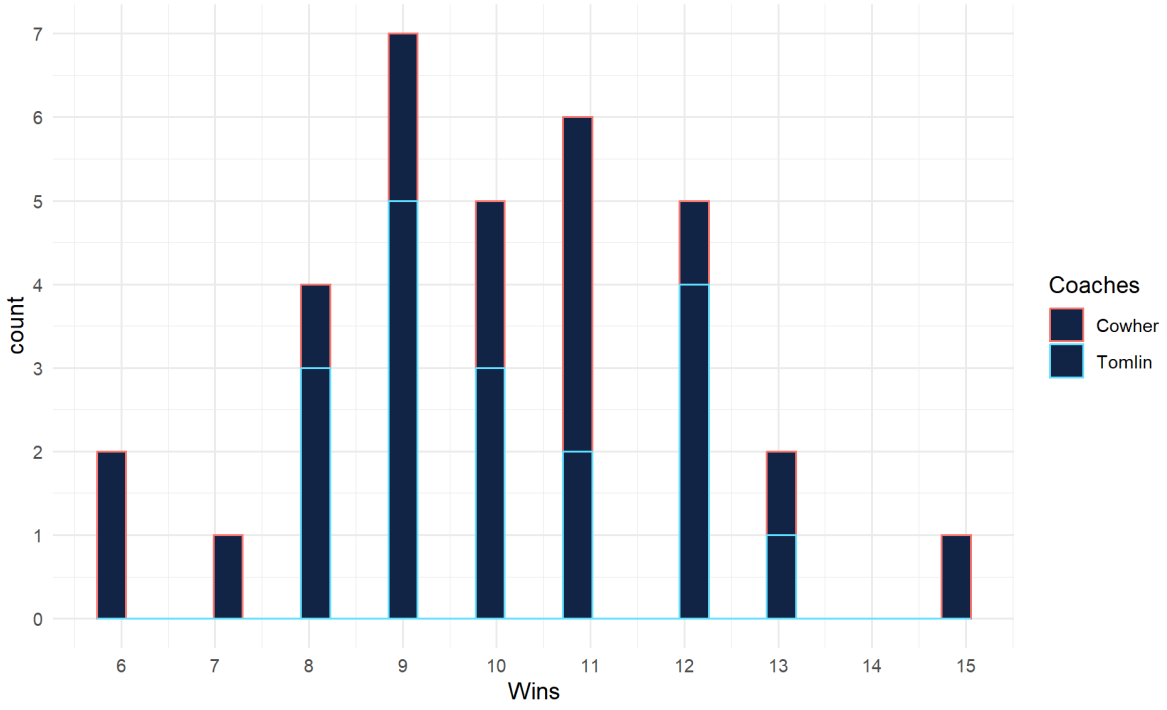

Figure (1)

This is a graph that visualizes a teams wins, essentially shows how many times Coaches Cowher and Tomlin got a certain amount of wins. These counts range from 6 to 15, with Cowher taking the lowest and highest. We also see that Mike Tomlin has been very consistent from the 8 to 13 win range, but Bill Cowher has had more variety in his win columns. An important note to consider here is that When Cowher coached, there were only 16 games in the season, as opposed to Tomlin who has 17 games in each season. We interpret that Tomlin has been much more consistent with winning, but we are aware of the uneven game amounts.

The next category we analyzed was each coaches total points scored in terms of both their wins and their points scored. The graph comparing points scored to wins is on the top (Figure 2), and the one comparing points scored to the year is under (Figure 3).

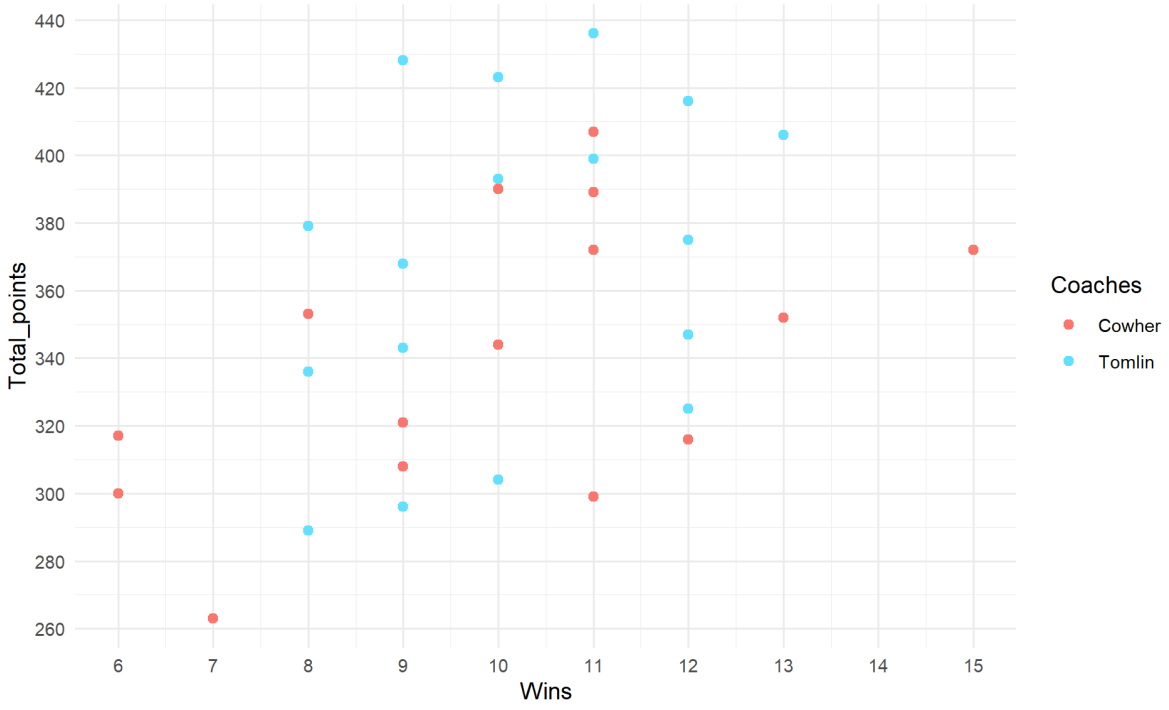
Total_points
440
420
400
380
360
340
320
300
280
260
6
7
8
9
10
11
12
13
14
15
Wins
Coaches
Cowher
Tomlin

Figure (2)

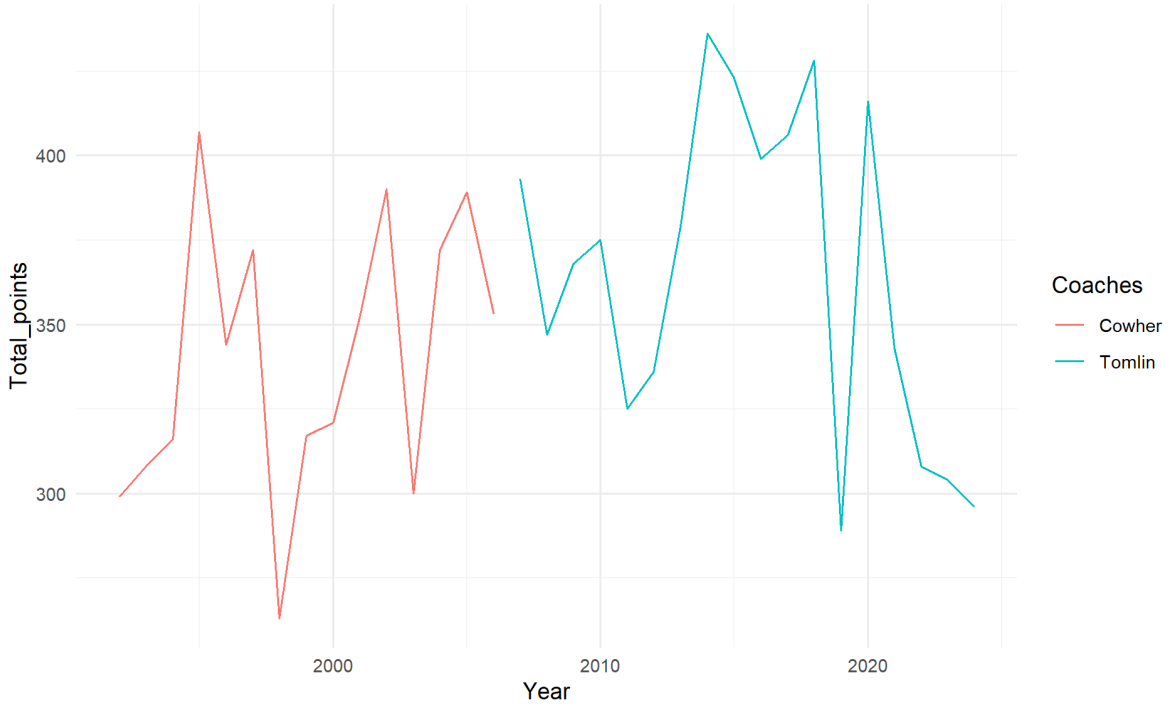

Figure (3)

As you can see, the graph comparing points scored and year (Figure 3) favors Tomlin, as he is consistently scoring more points, which by correlation is going to contribute to winning more games, as we saw in the graph above (Figure 2). But, a trend that has appeared more recently in the NFL is that NFL football is a much higher scoring game than in years past. This is easily seen in the graph comparing points and wins (Figure 2), as Tomlin is easily scoring more points than Cowher, even in his seasons with less wins.

Who is more consistent in their rankings during their tenure?

The next thing we can look at is how these two coaches compared to their colleagues throughout their time coaching. We will analyze graphs comparing their ranks in all categories, offensive and defensive.

The first visualization we made was comparing the offensive points scored ranking of the coaches each year they coached (Figure 4). In terms of ranking, number 1 is the best, so the lower the line is, the better the coach was ranked in that year.

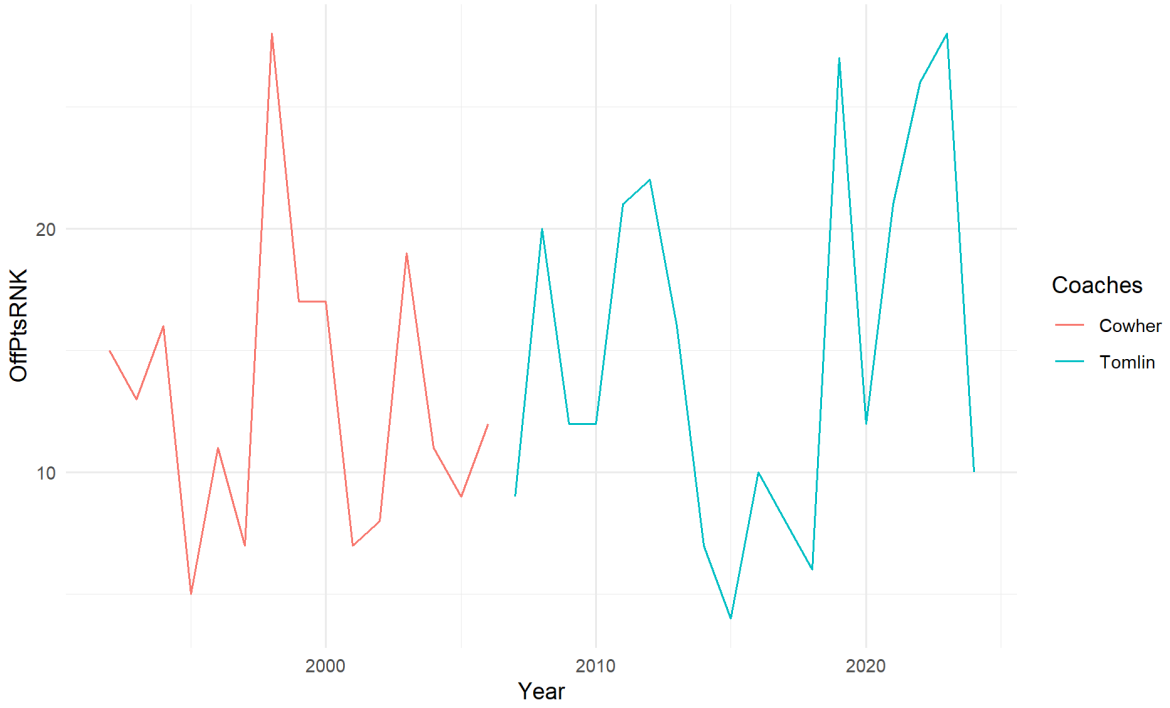

Figure (4)

In Figure 4 we can see that Mike Tomlin is pretty inconsistent, as he has had many low ranking seasons followed by a few high ranking seasons. Coach Cowher is more consistent, only having one big spike up in the high 20's, but ignoring that season he's had a consistent rank of around 8th. In this aspect Coach Cowher comes out on top as the more consistent and on average higher ranked team.

We then created another vizualization for defensive points scored rank (Figure 5). Again same rules apply, the lower the line the better the ranking is.

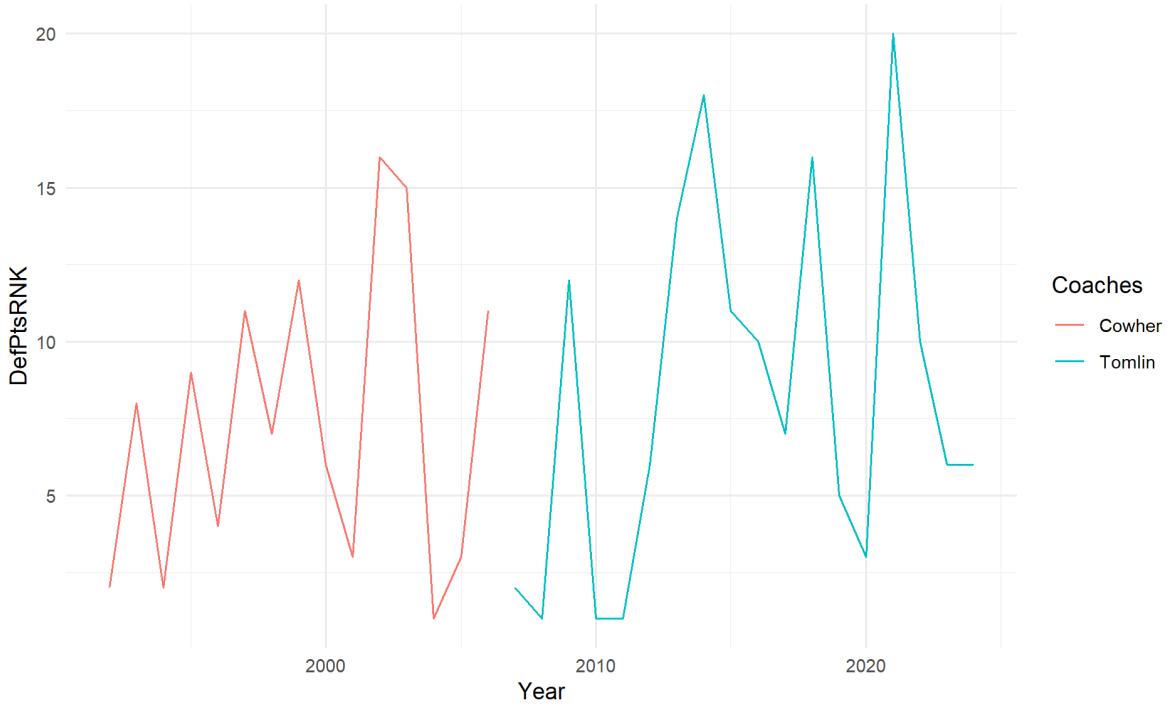

Figure (5)

From this graph we can see that Mike Tomlin's defense has been very sporadic in its rankings, early on there were some great defensive seasons but as we progress the amplitude of the rankings began to get very unpredictable. On the other hand Bill Cowher was much more consistent, he did have one sudden drop but overall he was more consistent during his time at the Steelers.

The next graph shows the coaches rank in terms of offensive and defensive yards (Figure 6). In this particular graph, the further to the bottom left the coach is, the better their ranks were.

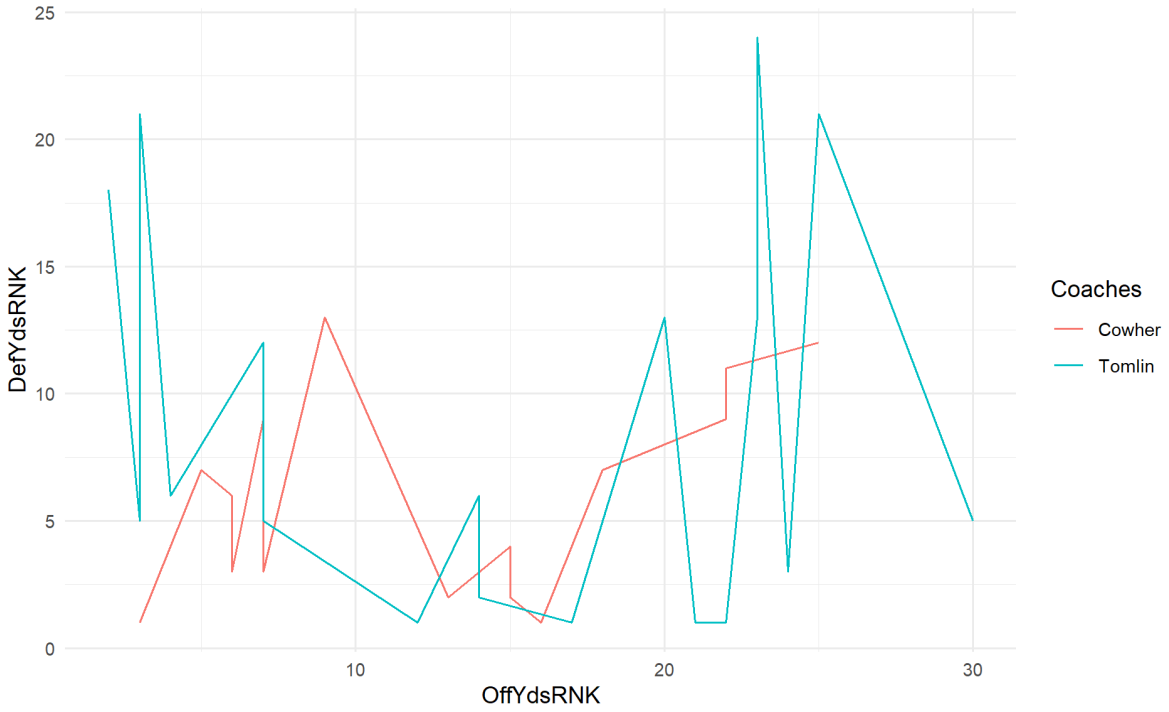

Figure (6)

Looking at Figure 6 we can see that Coach Cowher was able to stay in the bottom left of the graph more often than Mike Tomlin, this position means that his teams acquired much lower ranks in both offensive and defensive yards. We can also see that his defenses were generally better rated than his offenses. This trend is not true for Tomlin however as he dealt with a few seasons that saw both his offense and defense ranked in the 20's. Overall, Cowher came out on top in this category, mostly due to his emphasis on defense and generally just having less off seasons.

Who was more successful during their tenure?

When measuring success, one of the most common statistics to view success is by end of the season ranks, as well as playoff runs. We will compare both of these to see the success level of each coach.

Our first graph is compares the divisional finishes of both coaches (Figure 7). One thing we have to be aware of is that in Cowher's time, there were 5 or 6 teams in the playoffs, compared to the modern day 4 teams. This could skew the results in Tomlin's favor however we understand this change and know that it will not affect our analysis or discussion greatly.

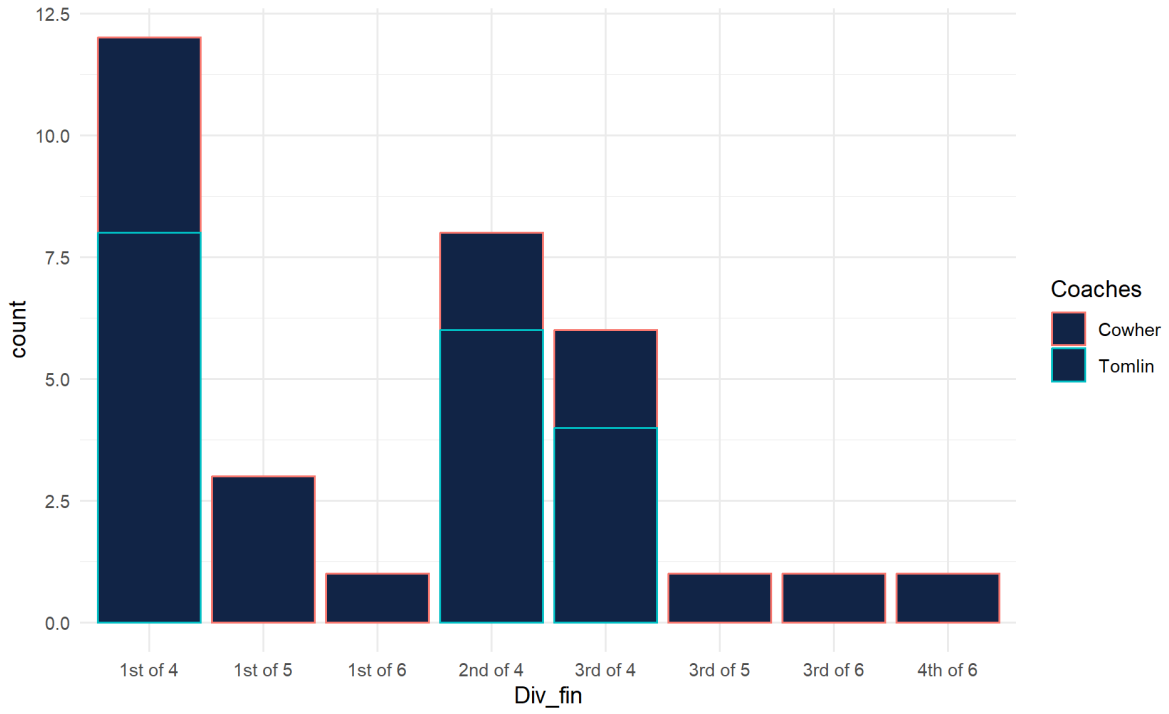

Figure (7)

Looking at Figure 7 and accounting for the fact that there are a different number of teams between the two time frames, the coaches results are pretty even. Each coach has finished first about 7 times, and they have each finished second and third the same amount of times. This tells us they were both very successful, but nothing too prominent to distinguish them from one another. In the last section we saw that Cowher's teams were usually ranked better than Tomlin's but we now see that overall both coaches achieved similar results. Could this mean that although Tomlin's teams were generally ranked lower, they out preformed better ranked teams in the playoffs?

To understand this question we can compare their playoff appearances, and to what level they got to (Figure 8). The order in terms of most important to least important is as follows: Won SB (Superbowl), Lost SB, Lost Conf, Lost Div, Lost WC, and No Appearance.

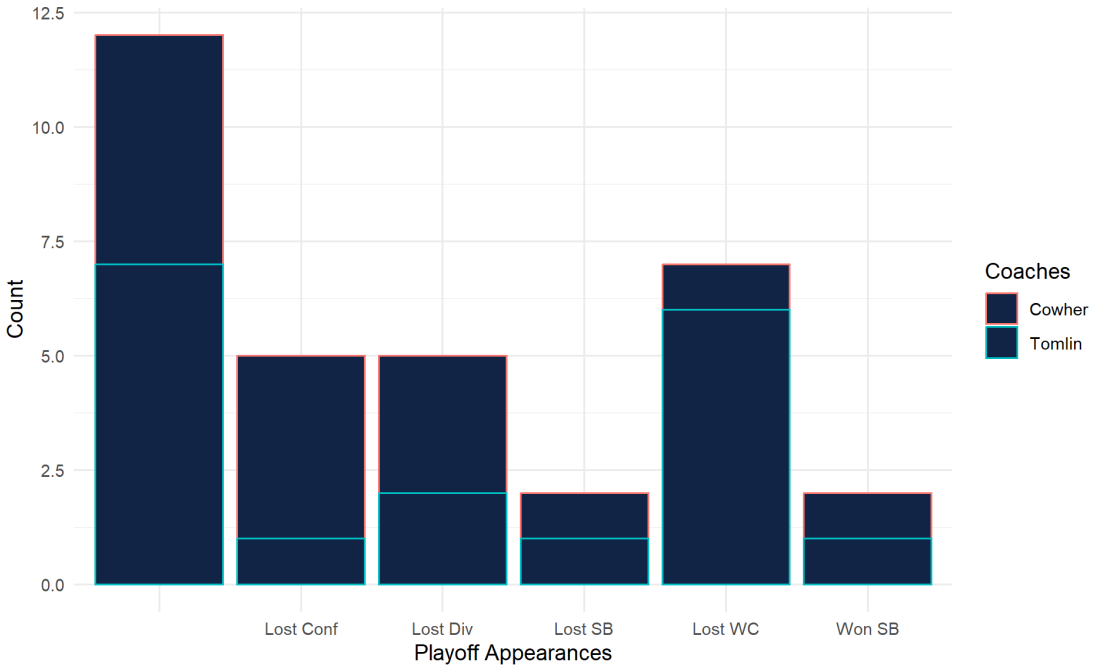

Figure (8)

Looking at figure 8 we observe that in terms of the most important appearance, the Superbowl, both coaches have won one and lost one, so there is no significant difference there. But, we do see that coach Cowher is leading in both the Lost Conf and Lost Div columns, meaning that he was able to get further in the playoffs a lot more often than coach Tomlin. To answer the question above, no, the data from figure 8 shows us that that Tomlin's teams did not out preform better ranked teams in the playoffs. Overall, we determined that Bill Cowher was more successful in the playoffs.

How does the evolving NFL playstyle affect the statistics?

Earlier we discussed how the NFL gameplay has changed in terms of being higher scoring, as well as changing the number of teams in each division, and how that might have some effect on how a coach's success is viewed. An underlying bias we found was in a metric some people might forget when talking about football: money. Some people may determine a coaches success based on how much revenue they can bring in. To show this metric we visualized a graph which plotted the Steelers revenue in millions over the course of Cowher's and Tomlin's time at the Steelers (Figure 9).

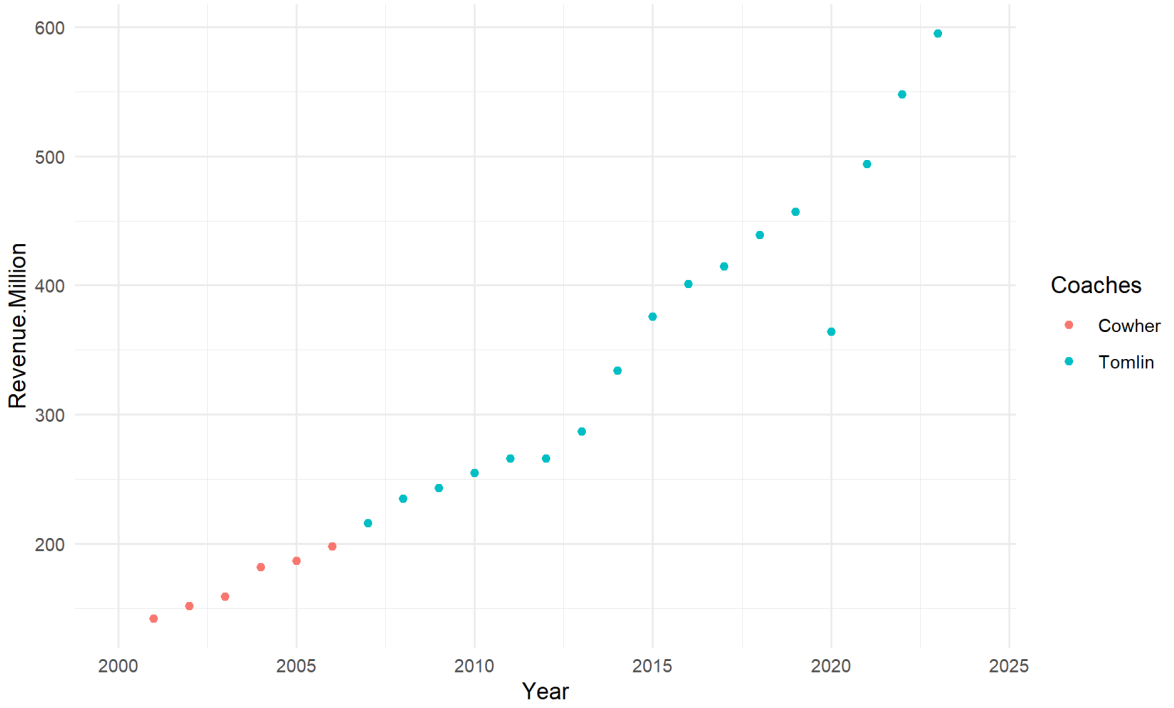

Figure (9)

When looking at figure 9, we can see that Tomlin has blown Cowher out of the water in terms of revenue. In the eyes of many people out there they would consider this a massive win for Tomlin as his numbers are amazing but we don't think these numbers tell the whole story. These numbers definitely don't reflect better performance, but they instead reflect the evolving NFL landscape and the Steelers' consistent competitiveness during both tenures. Overall, the growth of the NFL over the past 20-30 years has brought with it huge amounts of money, it also comes with in our analysis the notion that more money does not equal more better.

Conclusion

When taking into account all of the graphs, analysis, and discussions, we discover a couple things: In terms of winning and points scored, we see that Mike Tomlin edges out Bill Cowher, even when accounting for a higher scoring NFL and a different type of game than past years. However, in terms of consistency, especially in rankings, Bill Cowher is miles ahead in almost every metric. In terms of success, both coaches have done very well in their tenures, but Bill Cowher was able to finish just a little higher than Mike Tomlin in both division finishes and playoff runs.

We understand that deciding who is the better coach is an objective question, and at the end of the day an opinion, so the interpretations of our graphs have been layed out for the reader to make their own judgments alongside us. Nevertheless, through our analysis, we conclude that Bill Cowher was overall a better coach for the Pittsburgh Steelers.

References

NFL scoring and changes reference:

Graban, Mark. "NFL Scoring Is Up, an All-Time High, but Is It a 'Signal' Worth Explaining?" *Lean Blog*, 13 Oct. 2020, www.leanblog.org/2020/10/nfl-scoring-is-up-an-all-time-high-but-is-it-a-signal-worth-explaining/.

Data References:

"Pittsburgh Steelers Revenue 2021." *Statista*, www.statista.com/statistics/195289/revenue-of-the-pittsburgh-steelers-since-2006/.

"Pittsburgh Steelers Team Records, Leaders, and League Ranks." *Pro-Football-Reference.com*, www.pro-football-reference.com/teams/pit/.

Code Appendix

```
#load packages
library(tidyverse)
library(tidyr)
library(dplyr)
library(esquisse)


#dataset contains all basic team information as well as points and yard ranks
#tidy dataset

#get rid of top row
tidy_data <- sportsref_download.xls[-c(1),] %>%
  #delete unnecessary columns
  subset(select = -c(X.1, X.2, Top.Players, X.11, X.12, X.13, X.18, Simple.Rating.System, X.1
  #renames columns
  rename(
    Year = X,
    Wins = X.3,
```

```
  Loses = X.4,
  Ties = X.5,
  Div_fin = X.6,
  Playoffs = X.7,
  Total_points = Points,
  Points_allowed = X.8,
  Point_diff = X.9,
  Coaches = X.10,
  OffPtsRNK = Off.Rank,
  OffYdsRNK = X.14,
  DefPtsRNK = Def.Rank,
  DefYdsRNK = X.15,
  TurnRNK = Overall.Rank,
  PtsDiffRNK = X.16,
  YdsDiffRNK = X.17) %>%
#mutates or changes the data type of the column
#this helps with graphing and making sure the data is being represented correctly
mutate(Year = as.integer(Year)) %>%
mutate(Wins = as.integer(Wins)) %>%
mutate(Loses = as.integer(Loses)) %>%
mutate(Ties = as.integer(Ties)) %>%
mutate(Total_points = as.integer(Total_points)) %>%
mutate(Points_allowed = as.integer(Points_allowed)) %>%
mutate(Point_diff = as.integer(Point_diff)) %>%
mutate(OffPtsRNK = as.integer(OffPtsRNK)) %>%
mutate(OffYdsRNK = as.integer(OffYdsRNK)) %>%
mutate(DefPtsRNK = as.integer(DefPtsRNK)) %>%
mutate(DefYdsRNK = as.integer(DefYdsRNK)) %>%
mutate(TurnRNK = as.integer(TurnRNK)) %>%
mutate(PtsDiffRNK = as.integer(PtsDiffRNK)) %>%
mutate(Year = as.integer(Year)) %>%
mutate(Wins = as.integer(Wins)) %>%
mutate(Loses = as.integer(Loses)) %>%
mutate(Ties = as.integer(Ties)) %>%
mutate(Total_points = as.integer(Total_points)) %>%
mutate(Points_allowed = as.integer(Points_allowed)) %>%
mutate(Point_diff = as.integer(Point_diff)) %>%
mutate(OffPtsRNK = as.integer(OffPtsRNK)) %>%
mutate(OffYdsRNK = as.integer(OffYdsRNK)) %>%
mutate(DefPtsRNK = as.integer(DefPtsRNK)) %>%
mutate(DefYdsRNK = as.integer(DefYdsRNK)) %>%
mutate(TurnRNK = as.integer(TurnRNK)) %>%
```

```r
  mutate(YdsDiffRNK = as.integer(YdsDiffRNK))

#keeps data from years 1992 to 2024 only
tidy_data <- tidy_data[-(34:91),]

View(tidy_data)



#creating graphs to compare tomlin and cowher
esquisser(data = tidy_data, viewer = "browser")



##data set contains steelers revenue_data
revenue_data <- steelersrevenue[-c(1,2,3),] %>%
  #renaming columns
  rename(Year = V1,
         Revenue.Million = V2) %>%
  #changing data type
  mutate(Year = as.integer(Year))

#adding revenue data to original dataset
merged_tidy_data <- tidy_data %>%
  left_join(revenue_data, by = "Year")


View(merged_tidy_data)


#graph compares wins between coaches

ggplot(tidy_data) +
  aes(x = Wins, colour = Coaches) +
  geom_histogram(bins = 30L, fill = "#112446") +
  scale_color_manual(
    values = c(Cowher = "#F8766D",
               Tomlin = "#61E0FF")
  ) +
  theme_minimal() +
  scale_x_continuous(breaks = scales::pretty_breaks(n = 10)) +
  scale_y_continuous(breaks = scales::pretty_breaks(n = 10))
```

```r
#graphs compares total points scored and wins

ggplot(tidy_data) +
  aes(x = Wins, y = Total_points, colour = Coaches) +
  geom_point(size = 3L, shape = "bullet") +
  scale_color_manual(
    values = c(Cowher = "#F8766D",
               Tomlin = "#61E0FF")
  ) +
  theme_minimal() +
  scale_x_continuous(breaks = scales::pretty_breaks(n = 10)) +
  scale_y_continuous(breaks = scales::pretty_breaks(n = 10))

#graph compares total points and years

ggplot(tidy_data) +
  aes(x = Year, y = Total_points, colour = Coaches) +
  geom_line() +
  scale_color_hue(direction = 1) +
  theme_minimal()


# off pts rank

ggplot(tidy_data) +
  aes(x = Year, y = OffPtsRNK, colour = Coaches) +
  geom_line() +
  scale_color_hue(direction = 1) +
  theme_minimal()

#def pts rnk

ggplot(tidy_data) +
  aes(x = Year, y = DefPtsRNK, colour = Coaches) +
  geom_line() +
  scale_color_hue(direction = 1) +
  theme_minimal()

#points allowed

ggplot(tidy_data) +
  aes(x = Year, y = Points_allowed, colour = Coaches) +
```

```r
  geom_line() +
  scale_color_hue(direction = 1) +
  theme_minimal()

# off yds rank and def yds rank

ggplot(tidy_data) +
  aes(x = OffYdsRNK, y = DefYdsRNK, colour = Coaches) +
  geom_line() +
  scale_color_hue(direction = 1) +
  theme_minimal()

#added div finish

ggplot(tidy_data) +
  aes(x = Div_fin, colour = Coaches) +
  geom_bar(fill = "#112446") +
  scale_color_hue(direction = 1) +
  theme_minimal()


#added playoff runs
ggplot(merged_tidy_data) +
  aes(x = Playoffs, colour = Coaches) +
  geom_bar(fill = "#112446") +
  scale_color_hue(direction = 1) +
  labs(x = "Playoff Appearances", y = "Count") +
  theme_minimal()

#added revenue graph
merged_tidy_data %>%
  filter(Year >= 2000L & Year <= 2024L) %>%
  ggplot() +
  aes(x = Year, y = Revenue.Million, colour = Coaches) +
  geom_point() +
  scale_color_hue(direction = 1) +
  theme_minimal()
```