

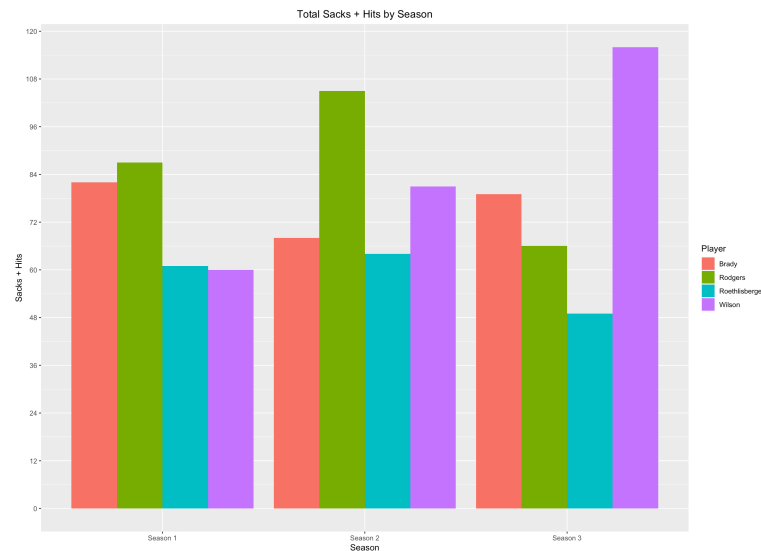
## Introduction

Quarterbacks that are roughed up over the course of their careers are known to have more injuries and productivity issues as they get older. Some coaches avoid certain styles of offense to maximize their quarterback's effectiveness in the passing game over the course of the long season, and typically shy away from having the quarterback hold the ball and/or run often in the game. This analysis considers advanced passing and rushing data for four established quarterbacks, which are available for the 2018, 2019, 2020, and 2021 NFL seasons. The goal is to identify the degree to which outside variables in the game may influence each quarterback, and how they perform considering these variables.

For each player, data is taken from their first 48 regular season games played from 2018 through 2021. 48 games reflects three regular seasons worth of games as of the 2020 season.

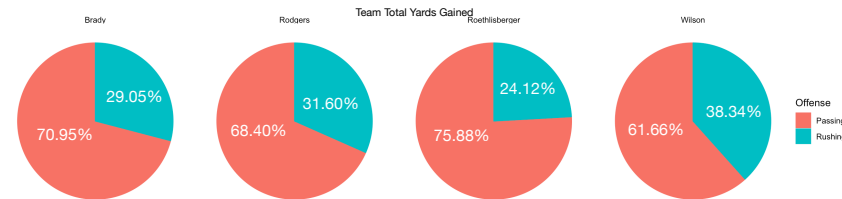
## Hits and Sacks

This metric is useful to show how often these players are taking physical blows. The average total of hits plus sacks for each player across all 48 games was 76.33 for Tom Brady, 86 for Aaron Rodgers, 58 for Ben Roethlisberger (in 45 games played), and 85.66 for Russel Wilson. Wilson and Rodgers are known to have gotten hit often during this 2018-2020 time period, so this is not surprising. Ben's offense is geared around quick passes, so this result is also expected. The most surprising value is for Brady, who is known to always have excellent offensive line protection.



## Offensive Strategy

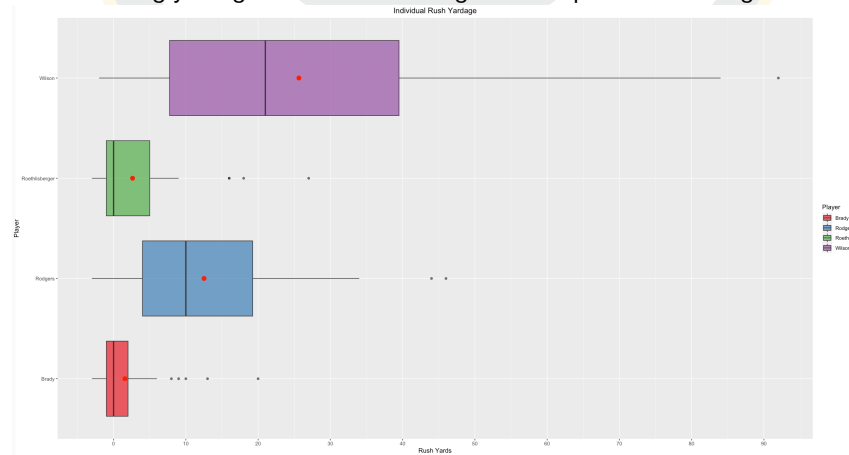
Why could the hits and sacks numbers be the way that they are? There are many factors that go into whether or not a quarterback is hit or sacked. Some variables include the strength of the offensive line, how long the quarterback holds the ball in the pocket, and whether or not the quarterback scrambles outside of the pocket or rushes the ball. One of the most influential in terms of the game approach, however, is the method by which the offense typically gains yardage. The decisions that the head coach and coordinators make before games and on the sidelines lead the offense to taking one strategy over another, with a slant toward either passing or rushing.



The charts above depict the percentage of total yardage gained by each of the four quarterbacks' team offenses (Brady: New England Patriots and Tampa Bay Buccaneers; Rodgers: Green Bay Packers; Roethlisberger: Pittsburgh Steelers; Russel Wilson: Seattle Seahawks). The pass-run splits support the fact that more yards were gained in all cases via the passing game. Russel Wilson's offense during these 48 games showed the greatest fraction of rushing yardage gained over passing yardage. This is interesting to see and is expected, as head coach Pete Carroll is definitely the most unconventional of any of the coaches captured by this analysis. Russel Wilson also has by far the most rushing yards during this stretch of any of these four quarterbacks.

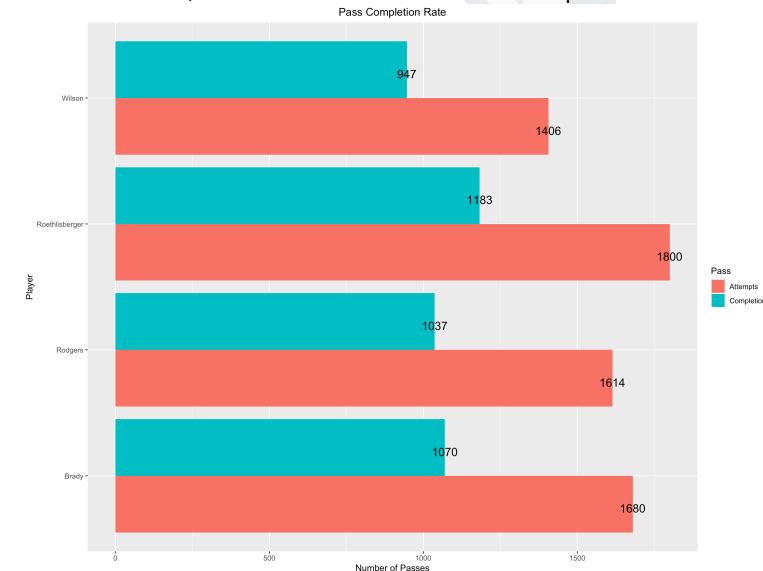
## Quarterback Rushing

Another significant factor that contributes to a quarterback being hit or sacked is the decision he makes on the field to run the ball, how far to run, and whether running is needed due to a broken play. This chart provides some context into how skilled each of these players are in the running game, displaying summary statistics for their individual game performances. The red dots indicate the overall mean rushing yardages. Wilson and Rodgers are expected to have greater numbers.



## Resulting Passing Performance

Considering the differences in sacs/hits totals, offensive passing or rushing strength, and individual quarterback rushing, this chart examines pass attempts versus completions. At first glance, it appears each has a similar approximate 75% completion rate in these 48 sampled games. It is interesting to note Roethlisberger's substantially more pass attempts at 1,800, despite three games worth of additional data for each of the other players. The Steelers rely on high volume of short passes. Rodgers and Brady have very similar numbers, while Wilson has the fewest attempts.



## Conclusion and Additional Factors

These are four very talented players who have played the game in unique ways and with different levels of success over their long careers. The data from these 48 games suggests individual running talent may influence how often the quarterback attempts to run, and how often the offense as a whole runs the ball. The style of offense each player has played in also influences their physical health and the number of passes they attempt.

Additional factors to look into in further analysis are the time in seconds that each quarterback holds the ball each game, and how each quarterback has changed their playing style over the course of their career. It would also be useful to note on a time scale chart when each player was injured compared to when they were physically hit the most. Outside factors like the talent of each team's offensive line by year are also relevant.