

Exploratory Data Analysis (EDA) Summary

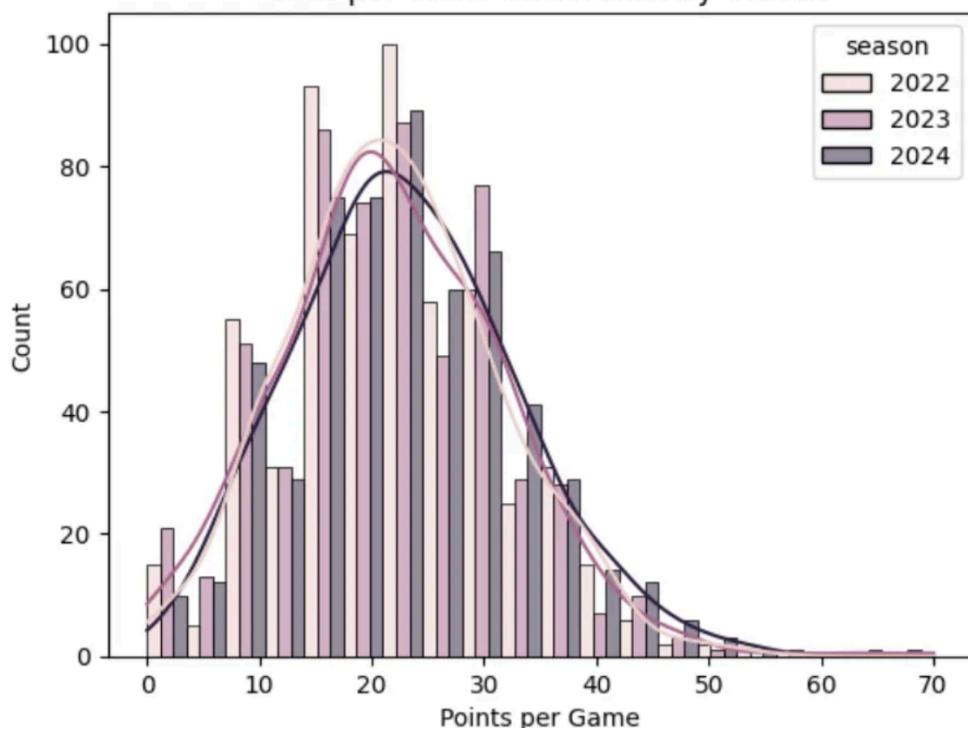
Analysis of team performance statistics, win-loss data, and game-level distributions focusing on variability, correlation with performance, and shifts in league averages across the 2022 to 2024 seasons.

Which Stats Vary Most?

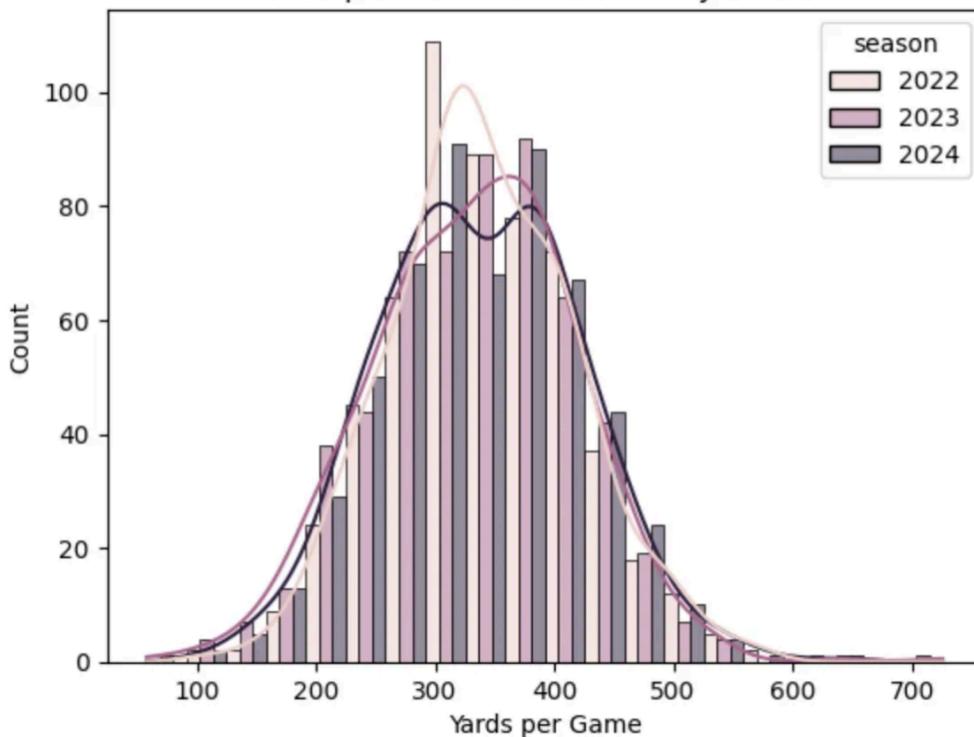
The distributions for **Points per Game** and **Rush Yards per Game** show noticeable variability across the three seasons (2022, 2023, and 2024), indicating shifts in league-wide tendencies.

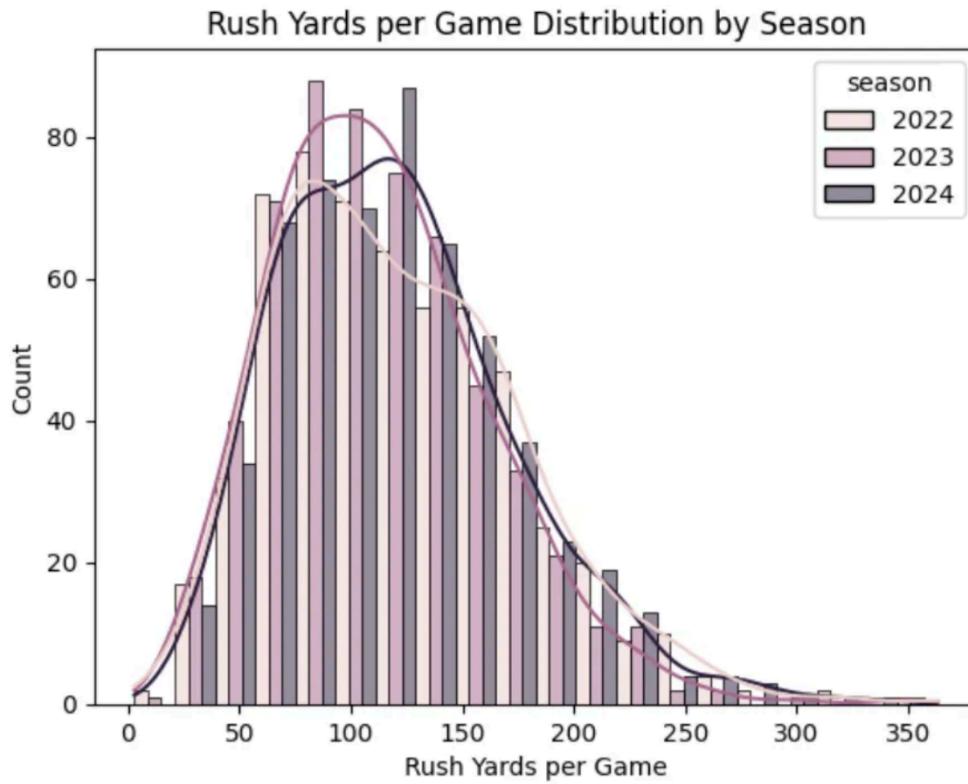
- **Rush Yards per Game:** This statistic shows a substantial rightward shift in its distribution, with the peak moving from around **75 yards** in 2022 to about **125 yards** in 2024. This change suggests the biggest shift in team-level output.
- **Points per Game:** The distribution also shifts slightly, with the most common score per game rising from around **20 points** in 2022 to approximately **22–23 points** by 2024, showing a slight increase in average scoring.
- **Yards per Game (Total Offense):** While the means increase, the distributions for total yards per game appear **relatively stable** across the seasons, with the majority of teams remaining in the **250 to 450-yard range**.
- **Sacks, Turnovers:** The provided data suggests most teams are consistently clustered around low values: **2 sacks per game** and **0–1 turnovers per game (and vice versa)**, implying relatively low inter-team variability for these stats in a given game.

Points per Game Distribution by Season



Yards per Game Distribution by Season





Which Stats Correlate with Performance?

Performance can be assessed by scoring ability (Points) and overall winning (Wins).

Correlation with Scoring (Points For)

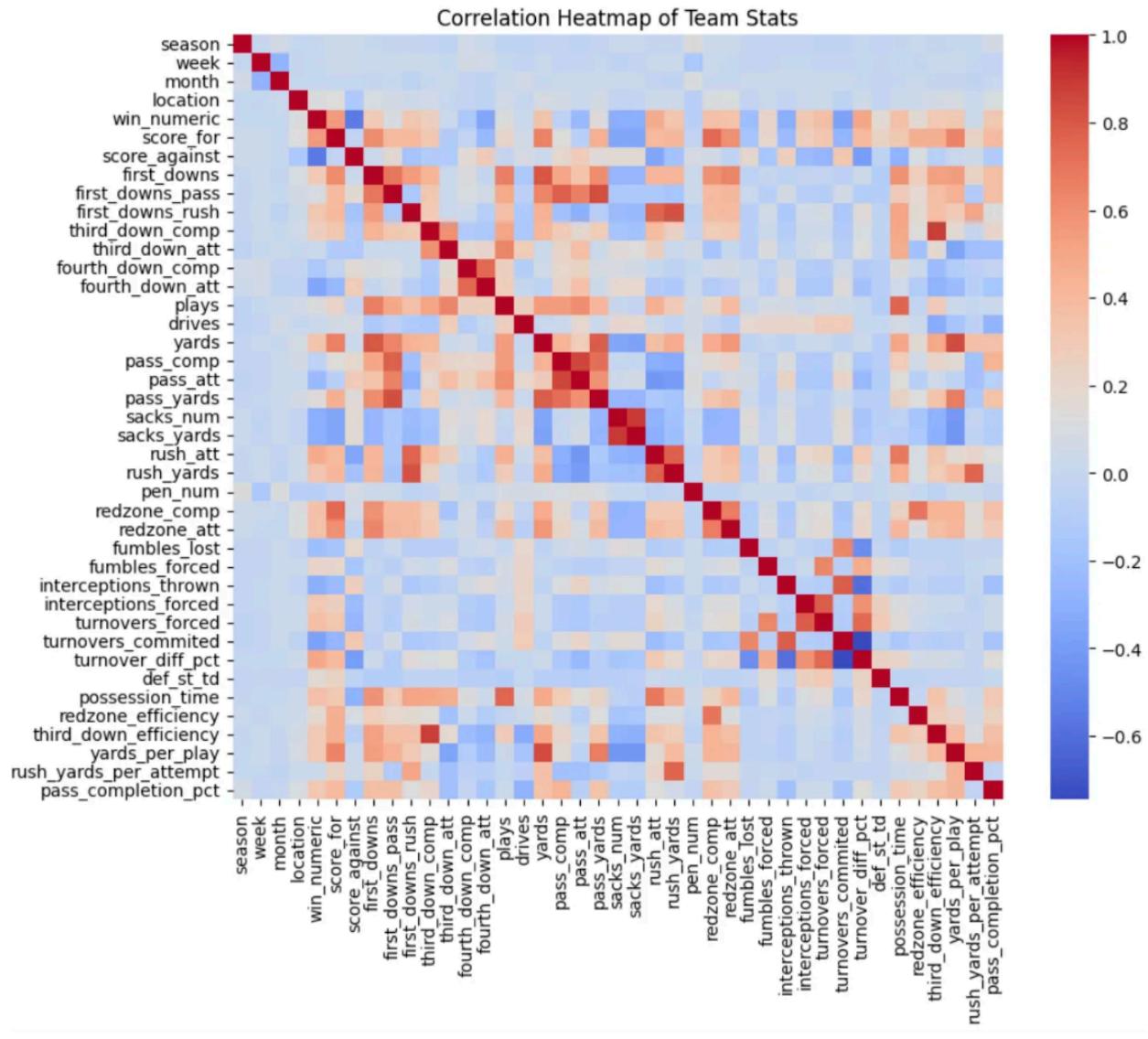
Several statistics show a strong positive correlation with a team's offensive **Score For**, indicating they are key drivers of points:

- **Redzone Efficiency (0.8):** Redzone completions and attempts are the strongest predictors, with completion percentage having a **0.8 correlation**.
- **Yards and Efficiency (0.7):** Total Yards and **Yards Per Play** both show a **0.7 correlation**, highlighting that moving the ball efficiently is essential for scoring.
- **First Downs (0.6):** Achieving **First Downs** has a **0.6 correlation**, showing the importance of sustaining drives.

Correlation with Winning (Wins)

Three key stats are moderately correlated with overall team wins:

- **Turnover Differential (0.6)**: This is one of the strongest predictors of overall winning, showing that winning the turnover battle is crucial.
- **Score For (0.6)**: The amount a team scores is directly tied to winning.
- **Rush Attempts (0.6)**: This suggests that establishing a running game and controlling the clock may be associated with more wins.



How Have League Averages Shifted?

League averages have generally shifted toward a slightly **more productive and rush-heavy offensive environment** from 2022 to 2024.

- **Overall Offensive Production (Yards):** The average offensive production has steadily increased:
 - **2022:** ~Low 300 yards per game.
 - **2023:** ~Mid 300 yards per game.
 - **2024:** ~Mid 300 yards per game.
 - **Rushing vs. Passing:** The increase in total offense is driven entirely by the ground game, while passing yards have remained stable:
 - **Rushing:** Increased significantly from ~75 yards per game (2022) to ~125 yards per game (2024). This is the **most dramatic shift** observed.
 - **Passing:** Remained stable at ~210 yards per game across all three seasons.
 - **Scoring (Points):** There is a clear upward trend in scoring:
 - The league average point total increased by roughly **1 point per game each year** from 2022 to 2023, with most teams now scoring **20–22 points** per game.
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Team Performance Overview (2022–2024)

- **Elite Consistency (Top Tier):** The **Chiefs** are the most dominant team, appearing in the Top 5 by Wins in all three seasons and leading the league with **~49 total wins** (2022-2024). The **Eagles** (45 total wins) and **Bills** also showed consistent elite performance.
- **Bottom Tier Consistency:** The **Cardinals, Panthers, Bears, Patriots, and Titans** consistently feature in the Bottom 5 by Wins across individual or total seasons (2022-2024), with win totals hovering around **14 to 16 wins** for the three-year period.
- **Win Slope Analysis:** The cumulative win charts confirm performance tiering:
 - **High Slope Teams (e.g., Bills, Ravens, Lions, Chiefs):** Exhibit the steepest, most consistent accumulation of wins.
 - **Mid-Slope Teams (e.g., Cowboys, Buccaneers, Packers):** Show good, steady winning but at a lower rate (e.g., Cowboys ~33 wins).
 - **Flat Slope Teams (e.g., Panthers, Cardinals, Titans, Giants):** Exhibit the slowest win accumulation, often leveling off early.

