

Introduction: In basketball, a common question compares efficiency to shot volume, especially how high-volume scorers compare to their lower-volume counterparts. The goal of this project is to answer this question as logically as possible using data from the 2024-2025 Division 1 NCAA college basketball season with players from only the Power 5 Conferences.

The measures of efficiency and volume in this project will be True Shooting Percentage (utilizes data from 2-point shots, 3-point shots, and free throws, resulting in an accurate measurement) and Field Goal Attempts per 40 minutes. The dataset used in this project includes over 700 players with a minimum of 200 minutes played from the ACC, Big 10, Big 12, SEC, and Big East conferences from the 2024-2025 season.

Hypothesis: As volume increases, efficiency will slightly decrease because of various factors such as increased defensive attention and difficulty of shot selection.

Data & Methodology: All data was compiled from [Sports-Reference.com](https://www.sports-reference.com) using Power 5 player statistics with a minimum of 200 minutes played from the 2024-2025 NCAA season.

True Shooting Percentage (0.475 represents the average number of free throws per shot possession):

$$TS\% = \text{Points} / (2 * (\text{FGA} + 0.475 * \text{FTA}))$$

Field Goal Attempts per 40 minutes played:

$$\text{FGA}/40 = (\text{FGA} / \text{MP}) * 40$$

Analyses Performed (all analyses were performed in Python using pandas, matplotlib, and NumPy):

- A scatterplot of FGA/40 compared to TS% with all 700+ players along with a regression line
- Calculation of the correlation coefficient between FGA/40 and TS%
- Potential outliers + separated into three categories (high-volume + high efficiency, high-volume + low efficiency, low-volume + high efficiency)
- Histogram of TS% of all 700+ players
- Compared average TS% of high-volume scorers and low-volume scorers

Results: The scatterplot generated shows a rather large spread, where players with similar shot volumes often vary in efficiency. The regression line shows a weak negative slope, demonstrating that efficiency tends to slightly decrease with an increase in shot volume.

The small correlation coefficient calculated of $r = -0.0816$ supports the hypothesis above of a weak negative correlation.

The averages of the high and low volume players of 55.3% and 56.0% respectively and the difference of a meager 0.7% shows that shot volume does not strongly determine efficiency.

The histogram of true shooting percentage across all players indicates a roughly normal distribution, with most players falling into the range of around 52% and 60%. There is a minimal

amount of ultra high or low efficiency players. Most players are clustered close together, supporting the weak correlation result. Overall, most players fall within a predictable range regardless of shot volume.

Conclusion: To summarize, the analysis found minimal evidence regarding how shot volume affects shooting efficiency in Division 1 college basketball across Power 5 Conferences. High-volume scorers still show a slight decrease in True Shooting Percentage, though it is not as high as predicted. Although there is a slight correlation between volume and efficiency, a number of high-volume players still retain a high efficiency. These analyses suggest that shot volume is not the main indicator of efficiency; rather, position, offensive role, and other factors may affect efficiency more than volume.