

EPA and WPA in Super Bowl LI

1. The EPA and WPA values have a slight positive correlation, with an r-squared of 0.4595. This means that 45.95% of the variability in WPA can be explained by EPA for Super Bowl LI. This is a decently strong correlation for a univariate regression.
2. The largest discrepancies in Z-scores come from big plays, typically scoring plays. The biggest discrepancy comes from the Atlanta interception return for the touchdown. This makes sense, as the offense (New England) had -10.17 expected points added, but the offense's WPA only decreased by 12%. The points went in the direction of Atlanta, the defense, but New England still had plenty of time to win the game. The game-winning touchdown also had a high discrepancy. This makes sense, as the offense (New England) moved their win probability up to 100%, but the expected points gained was just 1.95. Other large discrepancies happen during the end of the fourth quarter, when the Patriots tied the football game at 28 and when the Falcons received the ball back. This makes sense; the win probabilities became essentially even when the Patriots tied the game. When Atlanta received the ball back and started moving downfield, their chances of winning the game increased but expected points did not significantly change.

Descriptive Statistics in Sports

1. Counting stats like points or points per game tell a completely different story than efficiency statistics like True Shooting Percentage (TS%) and Efficient Field Goal Percentage (eFG%). Points and points per game are extremely dependent on the number of shots and minutes that a player has, while True Shooting Percentage adjusts for these metrics. TS% considers two-pointers, three-pointers, and free throws to create an ultimate efficiency metric for shooting.
2. A player like Keon Ellis of the Sacramento Kings has two different narratives around him because of this gap between counting stats and efficiency stats. According to ESPN's page for Hollinger's stats, Ellis averaged only 8.3 points per game during the 2024-2025 season. This is not considered very good by most basketball fans. On the other hand, Ellis had a TS% of 66.4%, good enough for 14th in the NBA last year.
3. I believe that Keon Ellis' story as a basketball player can be explained better by True Shooting Percentage because it adjusts for the number of shots and minutes he receives. Ellis is near the top of the NBA for TS%, but his points per game suffers because he does not play that many minutes or get that many shots. When he does get shots, he's as efficient as just about any other player in the league. With a bigger role, Ellis could probably thrive and get the counting stats and recognition he deserves.

$$TS\% = \frac{PTS}{2(FGA + 0.44 \times FTA)}$$

Probabilistic Statistics in Sports

1. One example of a probabilistic statistic in sports is expected goals in soccer or hockey. This statistic measures the probability of a goal happening on each shot during a game.
2. Inputs include spot on the field/rink, distance from the goal line, angle to the net, body part used, quality of the original pass, and many more. The output is the likelihood of a shot resulting in a goal. These probabilities can be accumulated for total expected goals for an entire game. I appreciate that this statistic takes so much context of the game into consideration when calculating the probability of a shot being a goal. I'm sure this statistic can be improved, because expected goals are imperfect estimates of the true probability. These models should be continually adjusted over time to become more accurate at estimating these likelihoods.

3. According to FootyStats, Real Salt Lake of Major League Soccer has an expected goals per 90 minutes of 1.59 goals for the 2025 season. Despite this, the team's featured goals per 90 is just 1.07 goals. This is a gap of 0.52 goals per 90 minutes, and it is easily the highest in the MLS. They grade more highly for expected goals per 90 minutes because they are clearly much better at creating strong chances per shot than converting them. My takeaway is that Real Salt Lake may be doing many things right on the attacking third of the field in terms of getting strong shots. Unfortunately, they can't seem to convert on strong chances.