Difference Makers 🏀

Data science shows which NBA techniques lead to the most winning quarters for every team, against any team.

The DataScience "Difference Makers" project uses predictive modeling on every available game-by-game statistic to precisely identify how one team can out score another most reliably. All teams, even the lowest-ranked ones, have winning quarters against the best teams. Difference Makers looks this quarter-by-quarter data on matchups to see how teams can predictably rack up point differentials against their opponents.

Clippers' Keys to Defeating the Warriors:
Rebounds, Turnovers and Efficiency

What We Found:
The Clippers reliably score more points per quarter than the Warriors when they score from turnovers, grab boards, and are keenly efficient with their shots.

Boards, Turnovers and Efficiency: How the Clippers Beat the Warriors
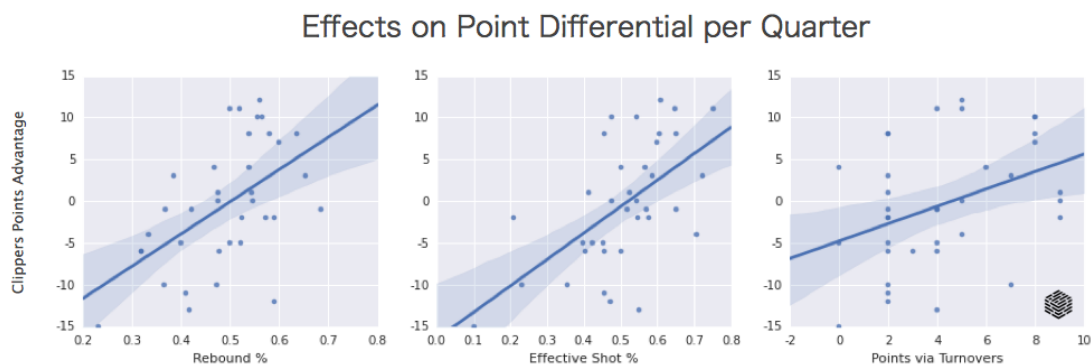
Effects on Point Differential per Quarter

Each dot represents a quarter from nine head-to-head Games May 1, 2013 through November 5, 2015

How We Figured it Out:

We analyzed data from head-to-head games from 2013 through their game on November 4th, 2015. The Difference Makers algorithm analyzed scores of play types from points in the paint to steals to blocks. The algorithm then checked each type of play to determine which had the most reliable impact on the Clippers' ability to score more points than the Warriors.

While many algorithms measure only wins and losses, or individual player performances, Difference Makers measures exactly *how strong* and *how reliable* a particular play type is on the most important metric: scoring differential. For a losing quarter, you want to lose by as little as possible, and for a winning quarter, you want to win by as much as possible.

Each quarter performance is shown as a dot in the graph above, with the resulting effect and confidence interval shown.

While they may have had a losing record (1 to 3) against the Warriors last season, the Clippers had ample moments of domination against their state rivals on a quarter-by-quarter basis. Using Difference Makers, the Clippers can focus on what makes the most difference when it comes to having a winning quarter.

How the Algorithm Works

The Difference Makers algorithm pulls in quarter-by-quarter data for a given matchup across seasons. It looks at data across multiple areas to identify the most predictive ways to win. Areas of data processed include:

- Assists
- Blocks
- Offensive rebounds
- Defensive rebounds
- Three-point shots
- Free throws
- Steals
- Turnovers
- Second chance points
- Points in the paint

By focusing on head-to-head matchups, we can discover how effective the Clippers are *specifically* against the Warriors — or how effective any team is against any other. Looking at the quarter-by-quarter data gives us a granularity deeper than what we would get if we looked at the overall game. Furthermore, we can look at the effects on point differential on a continuous basis. Rather than focusing on who won or lost the quarter (or, worse, who won or lost the game), we can look at *how much* each quarter was won or lost by. The resulting statistical power shows us the most effective play types that have an impact on A) putting points on the board, while B) preventing a team's opponent from scoring.

Exploring the Clippers' Data

Initially, the algorithm looks for significant quarter-by-quarter correlations for point differentials across many variables. Then, significance tests illustrate which variables most influence a particular target. In the example below, the target was a statistic called "plus-minus," which measures the point differential of a team on a play-by-play basis. Each variable with significant effect on quarterly plus-minus is recorded, with the values per quarter shown along with the quarterly plus-minus. Linear regression is then performed on the data set and a "best-fit" line is drawn along with a confidence interval. The resulting matrix, shown below, gives access to an at-a-glance analyses of the impact of multiple play types.

Variable Exploration: Clippers vs. Warriors
Effects on Point Differential per Quarter
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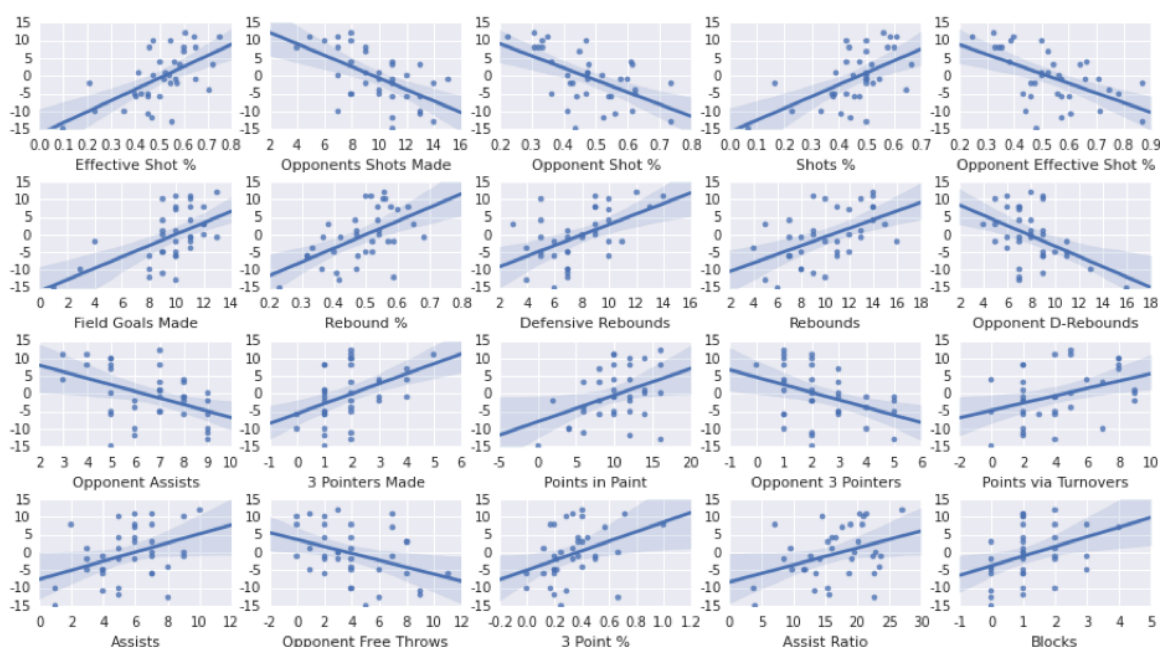
The Future of Difference Makers

The breadth and availability of the NBA's data set makes it an ideal playground for showcasing data science techniques. We've applied additional methods including clustering and data mining to the data and look forward to introducing a few additional analyses soon. We're glad to join the community of data miners that are exploring NBA data and we'd ultimately like to share our API so that users can enter in any two teams and, based on the latest data, identify and visualize the top "difference-making" strategies for their team.