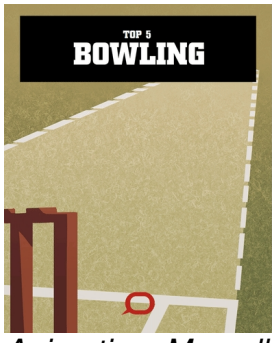
In this series we're looking at how the economics of sports is doing away with hunches and intuition. Using data and research to evaluate players, strategies and even leagues.

Fans will often rank and compare cricket players by high scores, wickets taken, or batting and bowling averages (number of runs scored or conceded per wicket). But these measures don't really capture how much players have contributed to winning a match.

The Sydney Sixers' Sean Abbott took the most wickets in the last season of the Big Bash League, but according to my official ranking he was only the 44th best bowler.

Mitchell Johnson of the Perth Scorchers is my pick for number one. He didn't take quite as many wickets as Abbott, but he was a lot better at preventing scoring. A lot of Sean Abbott's wickets were taken late in the innings, when they aren't as vital to winning the match.

My rankings are based on "resources". The more efficiently players and teams use the resources available (120 deliveries and 10 wickets per team in a Twenty20 match), the more they advance their chance of victory.



Animation: Marcella Cheng

The batting team's task is to maximise scoring by trading-off these two resources as effectively as possible. Trying to score rapidly is risky, so teams may lose wickets quickly and leave deliveries unused (if they all get out). Scoring slowly ensures that all deliveries are faced, but risks wasting wickets and a low final score.

Importantly, the value of resources changes as the game progresses. For batting teams, wickets become less valuable as the innings progresses. This is because a batting team can play more and more aggressively as losing wickets becomes less and less likely to mean they won't face all deliveries.

For the bowling team, as the game progresses taking wickets becomes no more important than simply preventing any runs scored on a delivery. Given this, the best bowlers prevent the batting team from scoring efficiently.

The problem with averages

Consider the final delivery of the first innings in a cricket match. If this delivery does not result in a four, a six, or the batsman getting out (all of which would result in the play being dead and the end of the innings); the best thing for the batsman to do would be to keep running between the wickets until they are run-out by the fielding side.

Even if there is only a minimal chance of additional runs from this strategy, there is no cost to the batting team. A wicket lost on the final delivery will not decrease the score and there is no benefit to the batting team for ending the innings with wickets still available.

But a look at scorecards through the years shows this is not what the batsmen do.

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The reasons for this may be varied. But they are no doubt related to the fact that, while the team is not harmed by losing a wicket on the last delivery, it reduces the batsman's average. If teams use batting averages in the selection process, a batter throwing away their wicket on the final delivery may hurt their career prospects.

While this is an extreme example, it is not the only perverse incentive that arises from judging player performance using averages. For instance, bowlers may be incentivised to "buy wickets" - to bowl in ways that maximise their chance of taking wickets (such as by encouraging big hits), but in so doing making it easier for batters to score.

As the goal of a cricket team is scoring more runs than their opponent, it is better to look at player contributions to team performance than their averages.

Animation: Marcella Cheng

More than averages

To appreciate the impact of a player we need a metric based not on how many runs are scored or wickets taken, but when and under what circumstances. Fortunately, this is precisely the basis of the Duckworth-Lewis-Stern method. You may have heard of Duckworth-Lewis-Stern if you've watched a cricket match that has been affected by weather.

In such cases, the method determines the scoring resources actually available to each team and adjusts the target score accordingly. For instance, if the team batting second lost 30% of

their resources due to rain, then the target will be set to 70% of what the team batting first scored.

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Using this same methodology we can calculate the difference between the actual runs scored or conceded by a player and the number of runs that should have been scored or conceded.

For example, if the deliveries a batsman faced represented 15% of their team's scoring resources, then we would expect their individual score to be 15% of the team total. Similarly, if a bowlers overs represent 15% of the batting team's resources, they would be expected to have conceded 15% of the opponent's total.

The difference between these expectation and the actual runs scored (for a batsman) or conceded (for a bowler) is what I call the player's "net runs attributable".

As this measurement is calculated in the same units for both batsmen and bowlers, it provides a means to compare performances across the two disciplines, as well as assess the performance of all-rounders (players who can competently bat and bowl).

I have used a modified version of this measurement to rate batsmen and bowlers for the last two seasons of the Big Bash League. It has led to interesting discussions about the nature of player contributions and team selection.

For instance, the Brisbane Heat's Chris Lynn topped the batting ratings last season. This was no surprise given his prowess at hitting sixes. That leading wicket-taker Sean Abbott was not among the top ten bowlers is a stark indication that aggregate performances are not always indicators of team benefit.