The hot hand pushing you to experiment a little

Our understanding of how people react under different conditions can change as data and research methods develop, and previous studies are re-examined. The story of whether a “hot hand” exists in sport provides an example of the dynamic nature of knowledge when it comes to how people behave. This may justify experimenting a little with how you live

What are the chances?

Have you ever felt you were on a winning streak? The "hot hand" refers to the idea that once you've started to score, you'll keep hitting those shots, winning big, over and over. It's common in sport. Fans talk of it. Commentators speak of it. Players claim they feel it. But does the hot hand really exist or is it merely a feeling?

Those who maintain the hot hand is a fallacy typically refer to a 1985 study on NBA basketball, conducted by Thomas Gilovich, Robert Vallone and Amos Tversky. The authors examined data on shots during games both as field goals and free throws, and ran a controlled experiment with men and women varsity players to determine whether the effect could be confirmed by statistical analysis.

"Basketball players and fans alike tend to believe that a player's chance of hitting a shot is greater following a hit than following a miss on the previous shot," they wrote. In other words, after a player has a string of successful shots it encourages both players and fans to expect continued success by the shooter. They're on a roll. They're running "hot". But the statistics did not support the belief. Other research seemed in line with these conclusions.

Basketball players who believed they'd experienced "hot hand" dismissed these results. Their experience led them not only to doubt but to refute the research, even though other studies covering different sports came to the same conclusion. In academic circles, the "hot hand fallacy" became a staple example of how perceptions did not necessarily reflect reality. Data rules. Emotions lose.

Looking more closely

Players and fans continued to doubt the research even when it was supported by other studies covering different sports. This irritated academics. The persistence of this doubt may be one of the reasons that – in 2014, 29 years after the initial research - Andrew Bocskocsky, John Ezekowitz, and Carolyn Stein published a new study on the topic.

The researchers concentrated on a key assumption in the original research that each shot was of similar difficulty. The authors called this an assumption of "key shot selection independence". They were able to concentrate on this because a novel database that included optical tracking data of both the players and the ball became available. The tracking data allowed information about how basketball players actually reacted to their own perceived "hotness" and how other players also reacted.

Analysis of 83,000 shots from the 2012-2013 NBA season showed "that players who have exceeded their expectations over recent shots shoot from significantly further away, face tighter defence, are more likely to take their team's subsequent shot, and take more difficult shots".

They showed that players who were "outperforming" continued to do so. The effect was small (1.2 to 2.4%) but significant, given the difficulty of the shot. Arguably a warm rather than a hot hand.

The researchers noted an important caveat in their findings. They noted that their "conception of the Hot Hand as exceeding expectations is different from the popular conception of absolute performance."

Checking the numbers

A further study released in 2018 took a detailed look at the probability of consecutive performances within the context of multiple coin tosses. This paper took a different approach to interpreting statistics.

If a person tossed a coin three times and got heads on each occasion, what is the probability of flipping a fourth head? Researchers Joshua Miller and Adam Sanjurgo showed that the chance of a continued streak is 42%, which is lower than 50% used in previous studies. The difference comes down to the way chances are calculated in sequences of events, such as tossing a coin. The maths behind this is tricky, even for readers of a journal such as Econometrica, which published the paper. "...the bias is subtle and (initially) surprising, even for people well-versed in probability and statistics", wrote the authors.

The argument was there was a statistical bias in previous studies. When the lower requirement was applied to a range of data used in previous research it supported the idea of hot hand. The extent varied by a range of variables, including skill levels, when applied to a game such as basketball.

Toting up

The debate is not finished. This 2020 paper finds evidence of a hot hand for free throws in basketball but not for field goals. Maybe half a fallacy? While the initial research seems to be largely correct because people tend to overestimate its effect and see patterns where they probably don't exist, its conclusions are not as uncontroversial as was believed for decades.

The hot hand story illustrates a wider issue. It can be difficult to change your mind, even when the evidence suggests your belief may not be entirely correct. Curiously, this was one of the observations of the original paper. However, as this 2016 article shows, citing people involved in various stages of hot hand research, this difficulty extends to specialists.

There may be two lessons from this story. First, when a behaviour you have been following, even when based on the best information you have available, is not working as well as you hoped, consider modifying it. For example, you may not be hitting your savings goals despite having a good plan. Alternatively, you may be hitting a financial goal but feel miserable. Experiment a little. The information you based the original behaviour on may be less reliable or less relevant to you than first thought.

Second, pass the ball to your hot team mate. Everyone else – except the odd behavioural scientist in the crowd - will think you did the right thing. If your hot team mate scores, you get reflected glory. If she fluffs it, it's not your fault.