# Heads up Kobe Bryant! Research shows that trying for another 3-pointer is a mistake 



Image: Wikipedia.

Basketball fans everywhere recognize the following scenario: Their favorite player scores a three-point shot. A short time later he regains control of the ball. But does the fact that he scored the last time make him more likely to try another three-pointer? Does it change the probability that he will score again?

New research by Dr. Yonatan Loewenstein and graduate student Tal Neiman at the Hebrew University in Jerusalem shatters the myth that a player who scores one or more three-pointers improves his odds of scoring another. Dr. Loewenstein is at the Edmond and Lily Safra Center
for Brain Sciences and the Department of Neurobiology at the Hebrew University.

Appearing in the latest issue of the journal Nature Communications, the report raises doubts about the ability of athletes in particular, and people in general, to predict future success based on past performance.

Loewenstein and Neiman examined more than 200,000 attempted shots from 291 leading players in the National Basketball Association (NBA) in the 2007-2008 and 2008-2009 regular seasons, and more than 15,000 attempted shots by 41 leading players in the Women's National Basketball Association (WNBA) during the 2008 and 2009 regular seasons.

The researchers studied how scores or misses affected a player's behavior later in the game, and found that after a successful threepointer, players were significantly more likely to attempt another threepointer. In other words, a successful three point shot provided players with positive reinforcement to attempt additional three point shots later in the game.

Surprisingly, the researchers discovered the exact opposite of what players and fans tend to believe: players who scored a three-pointer and then attempted another three-pointer were more likely to miss the followup shot. On the other hand, players who missed a previous three-pointer were more likely to score with their next attempt.

According to Dr. Loewenstein, "The study shows that despite many years of intense training, even the best basketball players over-generalize from their most recent actions and their outcomes. They assume that even one shot is indicative of future performance, while not taking into account that the situation in which they previously scored is likely to be different than the current one." The behavior of basketball players shows
the limitations of learning from reinforcement, especially in a complex environment such as a basketball game.
"Learning from reinforcement may not improve performance, and may even damage it, if it is not based on an accurate model of the world," explains Dr. Loewenstein. "This affects everyone's behavior: brokers make investments according to past market performance and commanders make military moves based on the results of past battles. Awareness of the limitations of this kind of learning can help them improve their decision-making processes - as well as those of basketball players."

## Provided by Hebrew University of Jerusalem

Citation: Heads up Kobe Bryant! Research shows that trying for another 3-pointer is a mistake (2011, December 7) retrieved 10 April 2024 from https://phys.org/news/2011-12-kobe-bryantpointer.html

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