

# Athletes find strategies to 'psych out' opponents, study says

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If a soccer player was lining up for a penalty kick during a tight game, a

strategic move would be to launch an unpredictable kick at the goalie to surprise them and score.

New research from UO psychologists reveals more information about when people act in unpredictable ways, behavior that can offer a strategic advantage during competitive events, like soccer games and tennis matches, as opponents attempt to predict one another's moves.

"Competitions that require fast-based [decision making](#) are often won by the player who can choose their moves in the least predictable manner," said UO psychology professor Ulrich Mayr, who published the paper in the journal eLife along with psychology doctoral student Atsushi Kikumoto. "But how people can consistently achieve the competitive edge of surprise has not been well understood."

The new study shows that people will oscillate between two different decision-making strategies when they're competing, one that's more calculated and another that involves more randomized choices. And how they play the game depends on whether they win or lose.

"Through this experiment, we found that following a win, people tended to choose their next move based on their knowledge of the opponent. However, following losses, choices were more random," Kikumoto said.

Take that same soccer player and goalie as an example. They are both likely to use their knowledge of the other's tendencies when deciding how to kick the ball or defend the goal. If the kicker knows the goalie is weak at blocking the lower left corner, the kick will probably be aimed there.

Mayr and Kikumoto discovered that when players make a successful move, they'll repeat their strategy and continue leveraging recent history and information about their opponent in their decision-making. So if the

kicker sunk the ball into the lower left corner, that positive feedback will provide motivation to keep turning to that knowledge of the goalie's tendencies as decisions are made.

But if they were to lose a round or fail to score, they will switch tactics and their next move will be much more randomized. If the goalie blocked the shot, the next kick could fly toward just about any inch of the net.

The researchers reached their results by conducting five different experiments where they had people play a rock-paper-scissor-like game against a computerized opponent. They found that if players won, they would draw from their knowledge about their opponent's tendencies to decide their next move, which is known as a model-based selection. But if a player lost, they would act in more random and unexpected ways, or what researchers refer to as memory-free.

The researchers were able to see the differences in these two decision-making models in the participants' brainwaves, with mid-frontal activity reflecting information about the opponent's strategy following wins. But after losses, that activity was missing, which shows that people suppress that information in the wake of a failure.

These findings could explain why athletes choke under pressure, Mayr said, as well as provide some insights into certain symptoms of depression. When individuals experience repeated failure, their behavioral responses often become increasingly random, making it even less likely that they will achieve the success they're seeking. This can give rise to "learned helplessness," a sense of loss of control over the environment that is often seen as a hallmark of depression.

The researchers' findings also address a longstanding conundrum in the field of psychology: How is it possible that brains can produce random

behavior when they're wired to do the opposite?

"In fact, in most cases people are bad at randomness," Mayr said. "After all, our memory system's purpose is designed to exploit regularities—the opposite of randomness."

Mayr and Kikumoto's research shows that in certain situations the memory system can simply shut off, allowing randomness to emerge. It also presents questions for a future study about how people might be able to consciously balance the two models of decision-making under competitive pressure.

Provided by University of Oregon

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