

## ABSTRACT

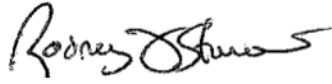
### Is Momentum Real: On the Existence and Influences of Psychological Momentum in Professional Tennis

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The existence and magnitude of momentum in sports has been fiercely debated in the last forty years. Professional tennis's repetitive and hierarchical structure has proved ideal for research, and recent studies have found evidence for momentum in professional tennis in a series of specific circumstances. Utilizing a holistic approach, this paper proposes a comprehensive definition for momentum as the derivative of the players' smoothed point margin curve. Using the backward approximation of the derivative, we find evidence that a player's momentum entering a point has a significant impact on his or her likelihood of winning the next point. Male players are more impacted by this effect than female players. From here, we use the forward approximation of the derivative to evaluate the impact that various characteristics have on momentum. Of note, we find strong evidence that hitting an ace, breaking serve, and winning a set tend to increase a player's future momentum. Conversely, an interruption in play tends to diminish momentum. In general, these associations are stronger for male players than female players. These results confirm and expand upon the conclusions of established peer-reviewed research.

APPROVED BY DIRECTOR OF HONORS THESIS:



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