26 How do winners control their mental states?

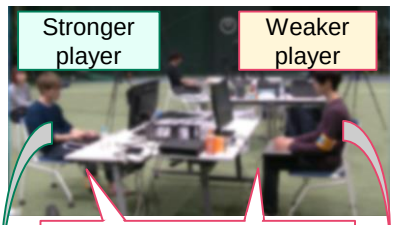
- Physiological states and sports performance in real games -

Abstract

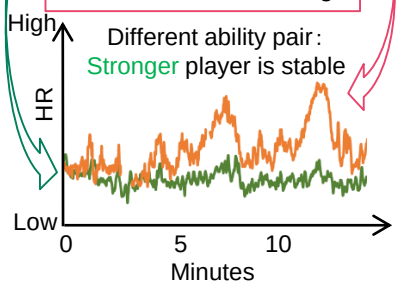
It is said that mental state is an important factor if one is to be a winner in sports. Although mental and physiological states are related, the relationship between physiological state and sporting performance, especially in real games, remains unclear. Here, we investigate this relationship for real competition in esports, baseball, and snowboarding by focusing on the heart rate (HR) as an indicator of mental state. The results show a strong relationship between sporting performance and HR, such as the huge variation in HR that occurs when the opponent is a higher-level player, the stable performance that accompanies a stable heart rate regardless of the situation, and a top player delivering a good performance with a high HR. Further investigation will reveal the component of the mental state related to performance and will enable us to develop ways of improving athletes' performance by adjusting their physiological state.

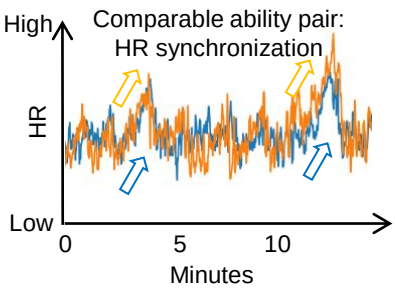
Esports (Fighting game)

Relative abilities of opponents define the HR variation



Simultaneous recording



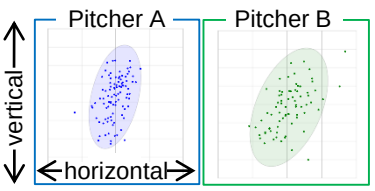


*The heart rate value was normalized.

Baseball (Pitching)

Stable HR leads to stable high-performance pitching

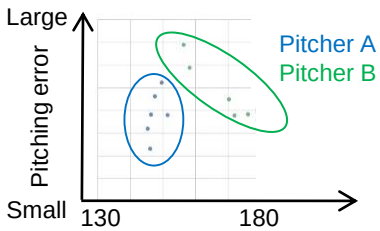
Pitching error



Small error = Good control

Control: Pitcher A > Pitcher B

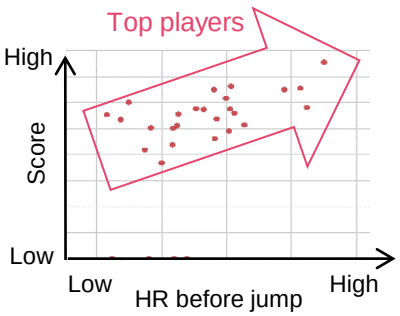
Good control ⇔ Stable HR

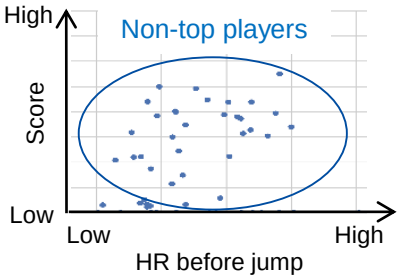


Mean HR in an inning (BPM)

Snowboard (Jumping)

Top players HRs increase to make a high-scoring jump





*The heart rate value was normalized.

References

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