

Abstract

Elite athletes exhibit sophisticated control over whole-body movements under immense competitive pressures. The effects of cognitive pressure on the psychophysiological state and postural control have been recognized. However, little is known about how pre-competitive physiological changes alter whole-body movement control and affect competitive performance in real competitions. Therefore, we measured the pre-competitive physiological states, body movements, and competitive performance of elite athletes in the snowboard Big-Air competition, which is similar to regular competitions, and examined the relationship between them. The results indicate that elite snowboarders develop a pre-competitive sympathetic predominance that increases riding speed, initiates a trick earlier, and increases the rotating speed, leading to a higher score. The present study contributes to the idea that athletes can guide themselves to an optimal state in which they can achieve superior performance in real competitions. Furthermore, it could contribute widely to other fields in which excellent performance is required under pressure.

Relationship between pre-competitive physiological states and competitive performance [1]

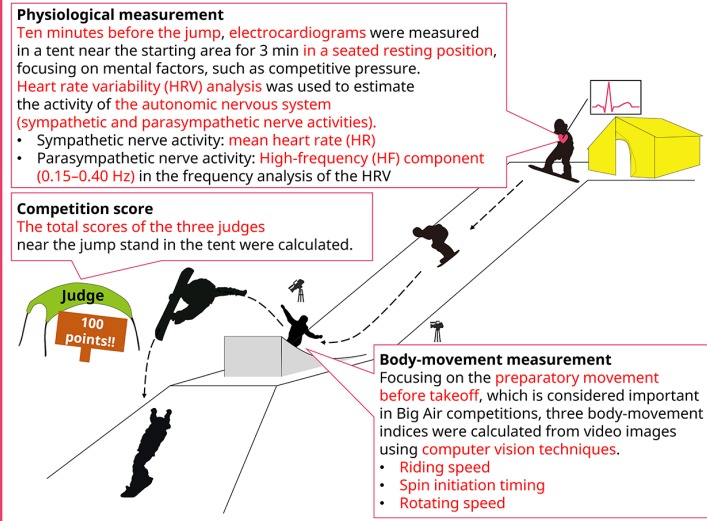
- Elite athletes exhibit sophisticated control over whole-body movements under immense competitive pressures.
 - The effects of cognitive pressure on psychophysiological states and posture control have been recognized.
- However, little is known about how precompetitive physiological changes alter whole-body movement control and affect competitive performance in the real competition.

Measuring elite athletes in real competitions

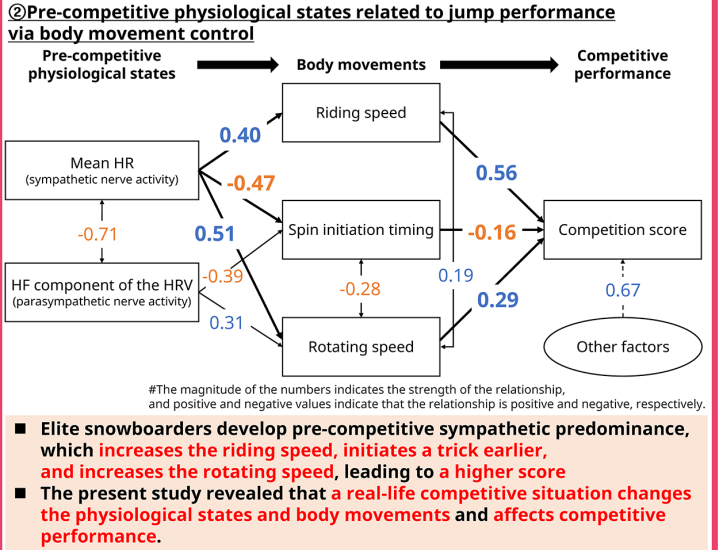
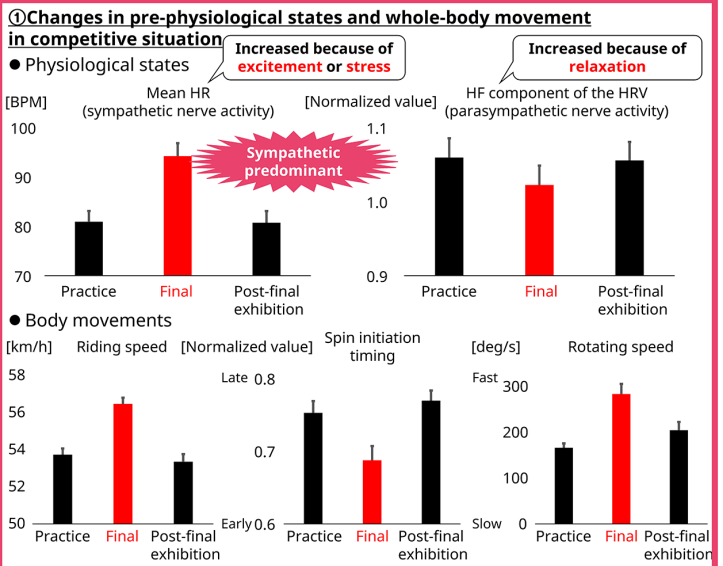
We focused on snowboard Big Air competitions, wherein large changes in physiological conditions are expected.

- [Purpose]**
To assess elite athletes in an environment where they could compete seriously, we examined 20 top-level Japanese male snowboarders who participated in a competition with prizes compliant with international rules.
- [Situations]**
- Competition: Final
 - Non-competition: Practice and post-final exhibition
- [Measurements]**
- Physiological states
 - Body movements
 - Competition score

- [Analysis]**
- ① Comparison of physiological states and body movements between different situations
 - ② Relationship between physiological states, body movements, and competitive performance



The more sympathetic predominant, the better the performance



References

[1] S. Matsumura, K. Watanabe, N. Saijo, Y. Oishi, T. Kimura, M. Kashino, "Positive Relationship Between Precompetitive Sympathetic Predominance and Competitive Performance in Elite Extreme Sports Athletes," *Frontiers in Sports and Active Living*, Vol. 3, 712439, 2021.

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