**Optimal performance for elite athletes: How can sport science assist in making adequate choices in regulating exercise intensity & tactics?**

**SUPERVISORS**
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Throughout the last century, a lot of research has been performed in the field of sports science. Sports performance has been researched in theoretical as well as in applied context, and from different angles; psychology, biomechanics and physiology. To further optimize sports performance at this point, it is important to understand interactions between these different components. This has been demonstrated in speed skating and cycling; We included multiple performance determining factors (mostly based on biomechanics and physiology) in a model of a ‘virtual athlete’ (1,2) that can be used to advise coaches on making their choices related to performance & tactics. It also helped to further understand theoretical concepts of pacing and performance. However, one component was not included: The ‘virtual athlete’ model could not predict performance in other than time trial performances: it did not respond to opponents. For sports such as short track speed skating or Tour de France cycling, it is of great importance to present a theoretical framework in which there is room to include an opponent.

We recently proposed a new theoretical framework (3), based on the importance of the coupling between perception and action. In this framework, the environment (in particular the opponents) invites the athlete to respond. However, the decision regarding how to expend energy over the race is also based on the physiological/biomechanical capacity of the athlete, eg: is he/she able to accelerate fast enough to make a jump to overtake the competitor, or not? How does fatigue impact on the decision to accelerate of overtake? Are there sport specific aspects that make a difference? This theoretical framework thus provides the ideal framework for integrating interactions between biomechanics/physiology and psychology, including how to respond on opponents.

The present project will be about further developing this research, and to explore how sport science can assist in making adequate choices in regulating exercise intensity & tactics. A start has been made by designing the theoretical framework in which opponents can be included (3). This was further explored in experimental studies on tactics in shorttrack skating (4) and to a lesser extent in Paralympic sports and classification (5), and can be continued in both directions.

**REFERENCES**
(2011) 30-35.


5. Timans W, Altmann VC, Hettinga FJ. Paralympic ice-skating; What are the steps for a classification system? A review. 5th State of the Art Congress ´Rehabilitation: Mobility, Exercise and Sports 2014´, Groningen (2014).

**Entry requirements and application procedures**

Applications should be submitted electronically by 30th April 2014, see here for details. This scholarship will be to the value of £12,500 per annum plus UK tuition fees.

For general information about the School of Biological Sciences at the University please see here.