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Predicting Performance in Sub-10s f200 m Male Track Sprint Cyclists

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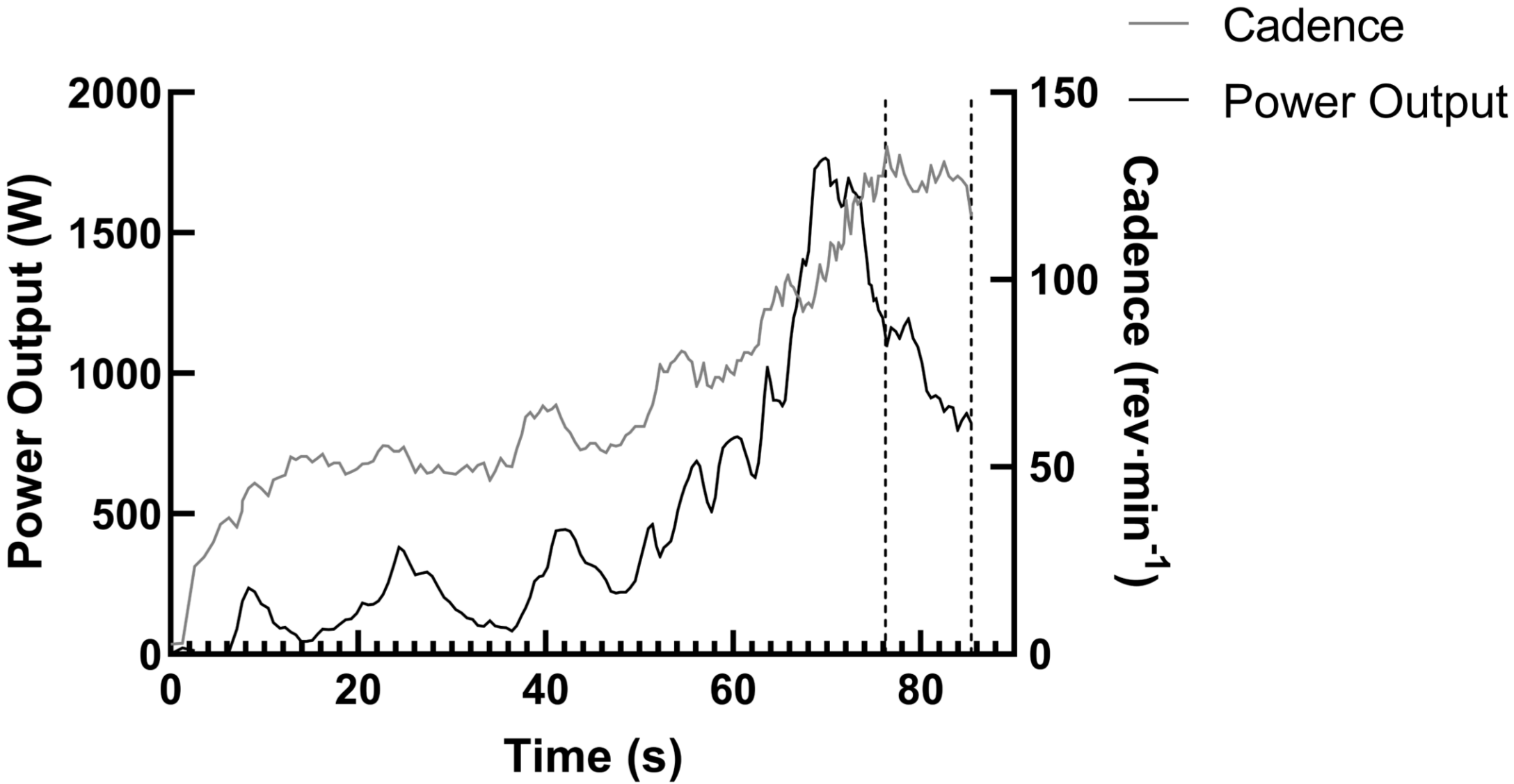
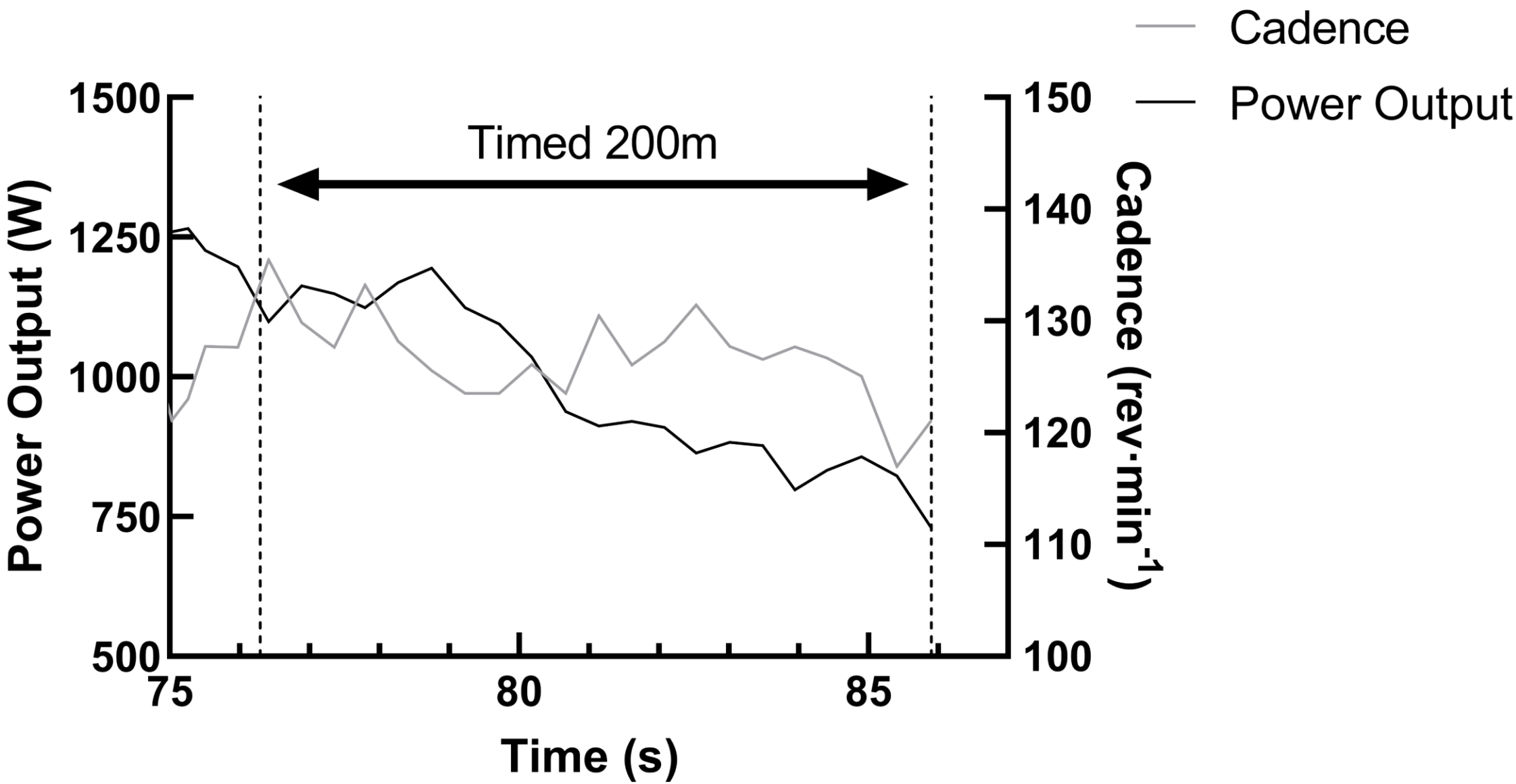
F200m Track Sprint Event

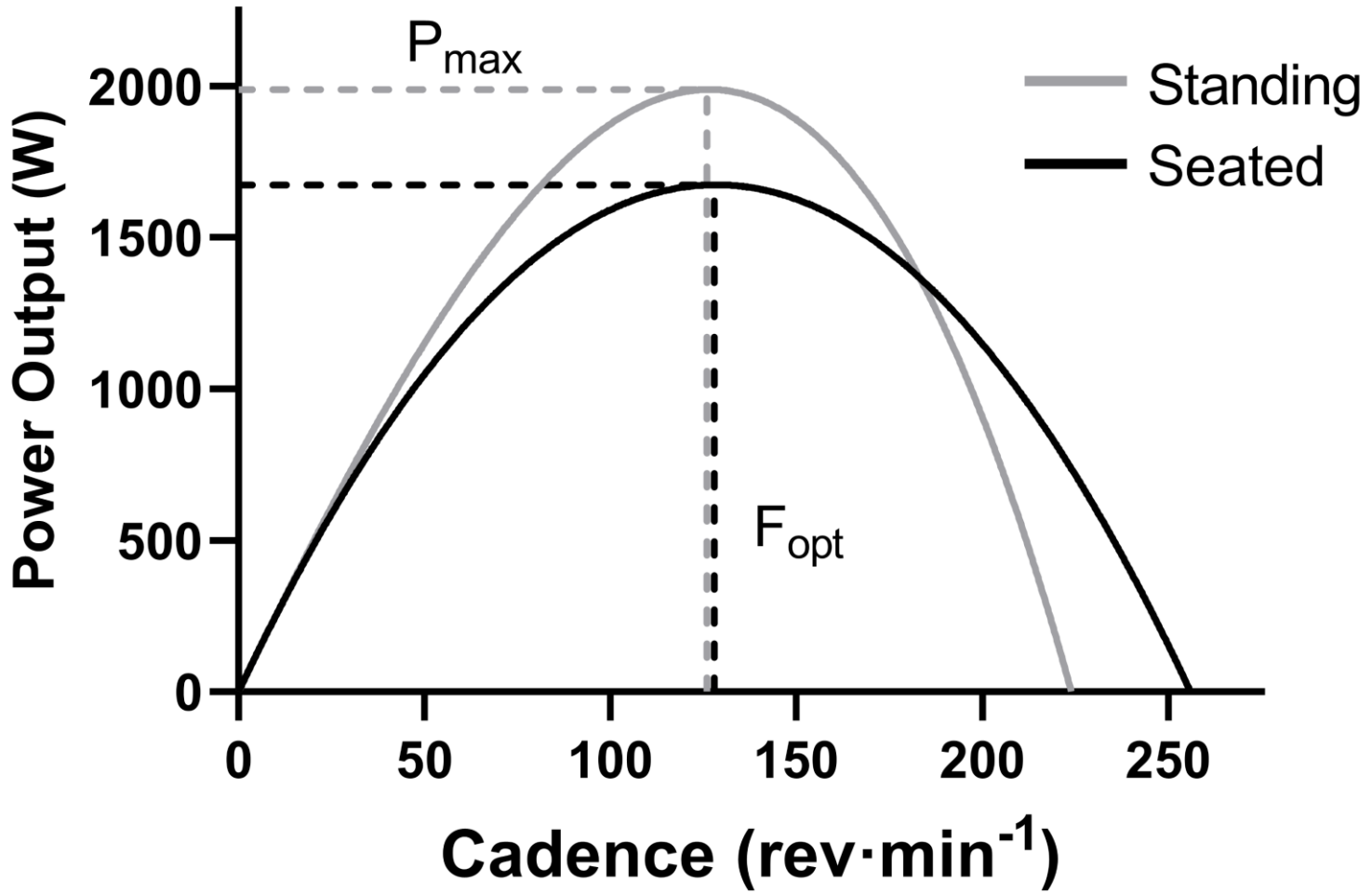


F200m Track Sprint Event



Field Derived P-C Profiles

Standing P_{max}	1989 W
Seated P_{max}	1674 W
Seated F_{opt}	128 rev·min^{-1}
Standing F_{opt}	126 rev·min^{-1}



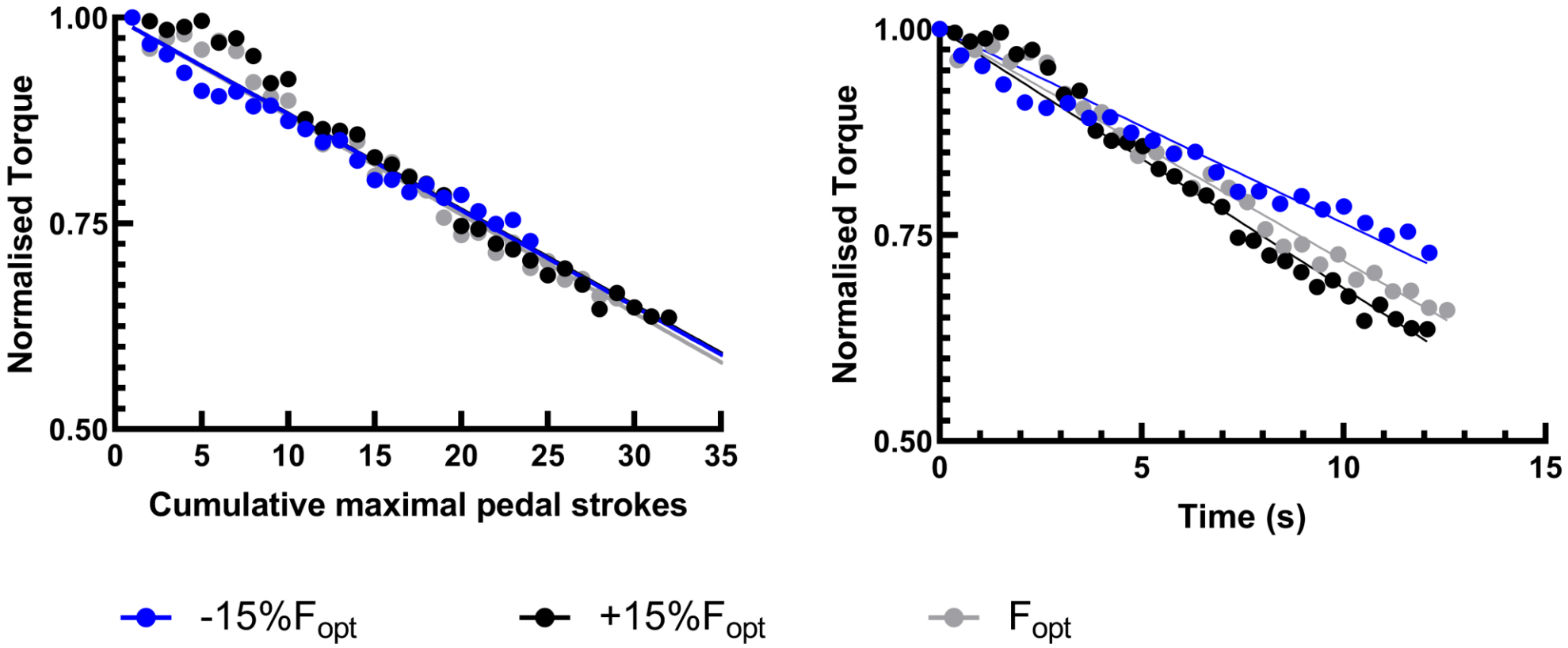
Fatigue Profiles

Function of Stroke

- Equal rate of decrement per stroke

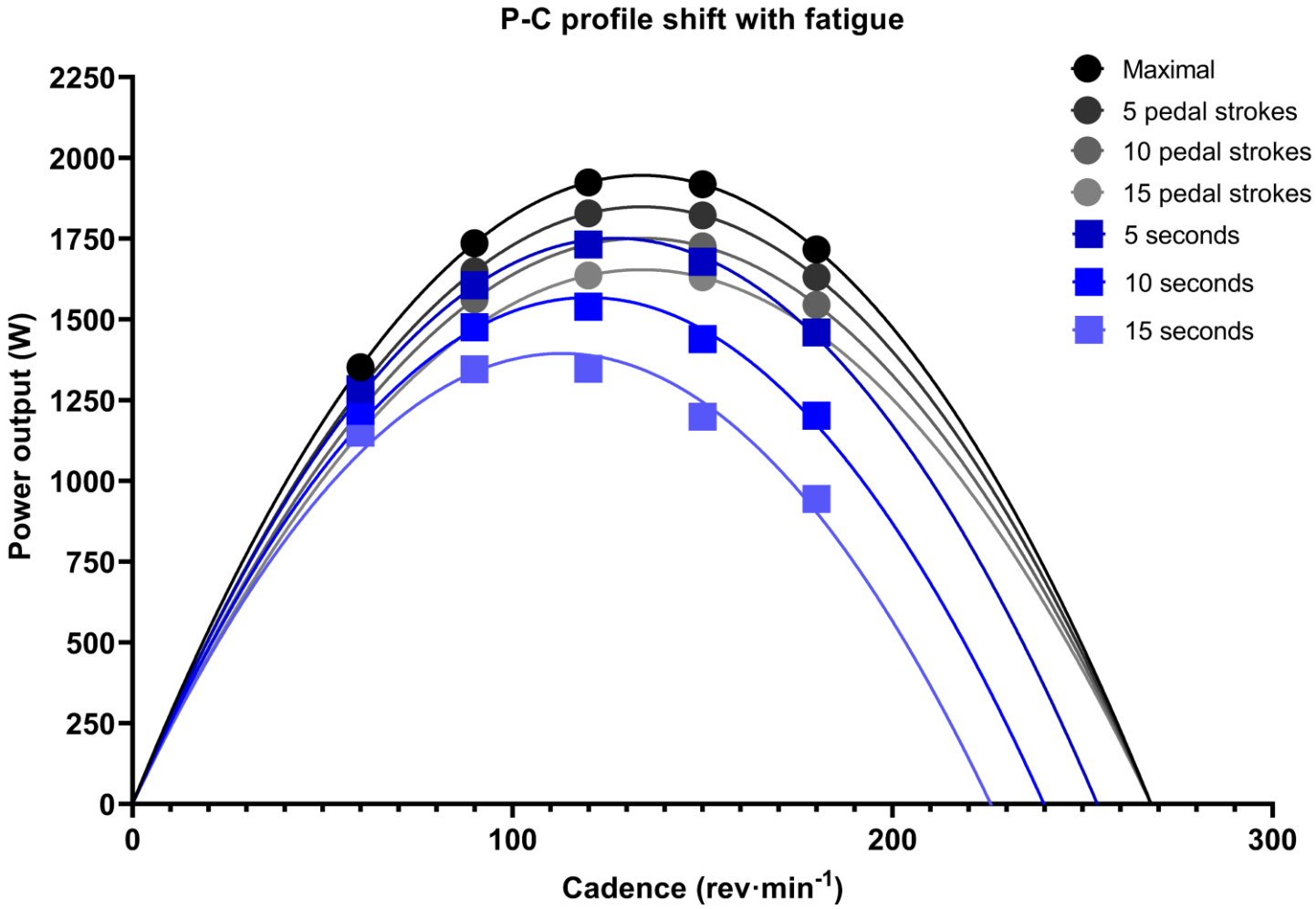
Function of Time

- Unequal rate of decrement per second



Calculating Power Output

Compress field derived P-C profiles by the individualised fatigue rate per pedal stroke. This process resulted in 0.6% error.



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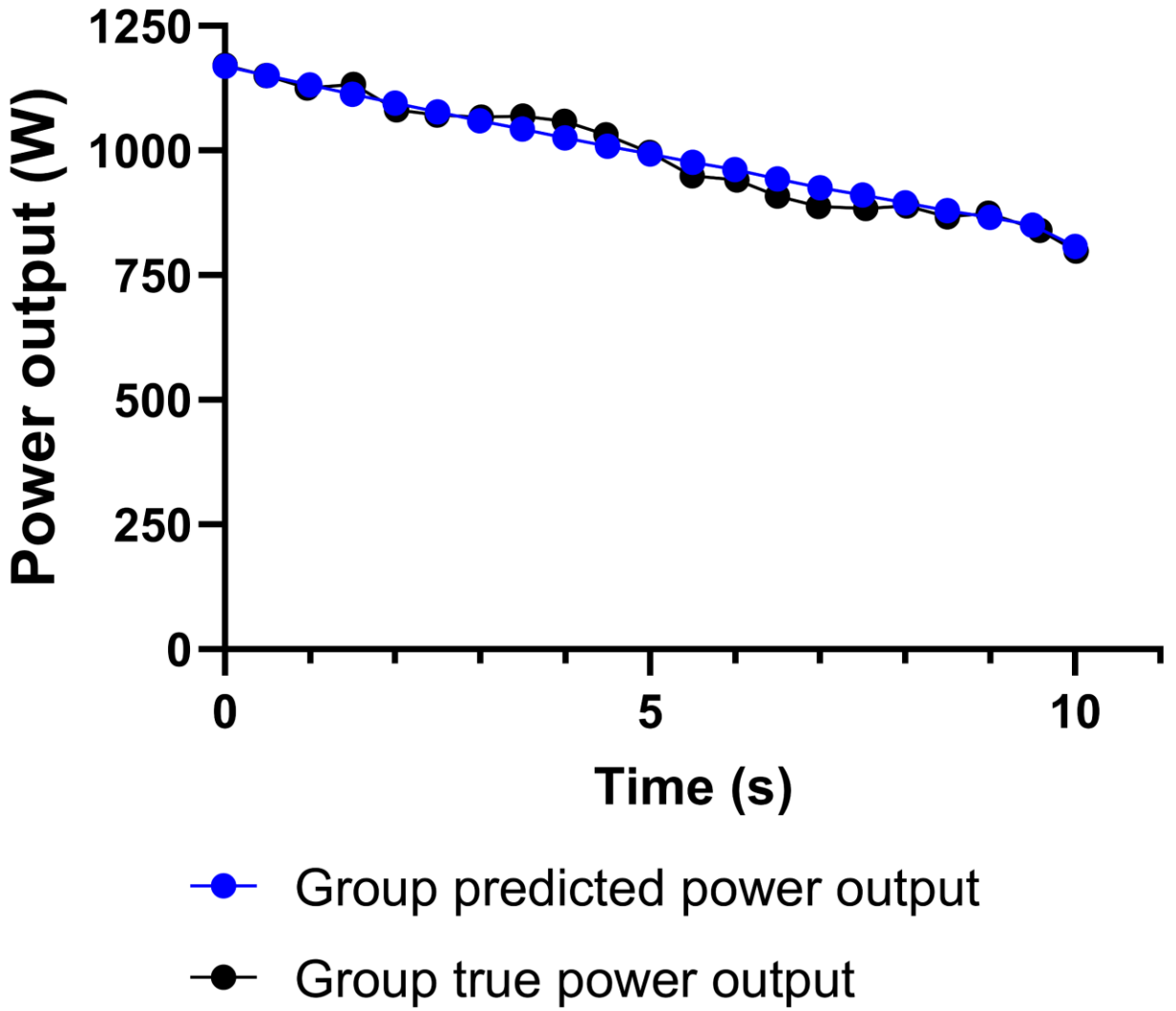
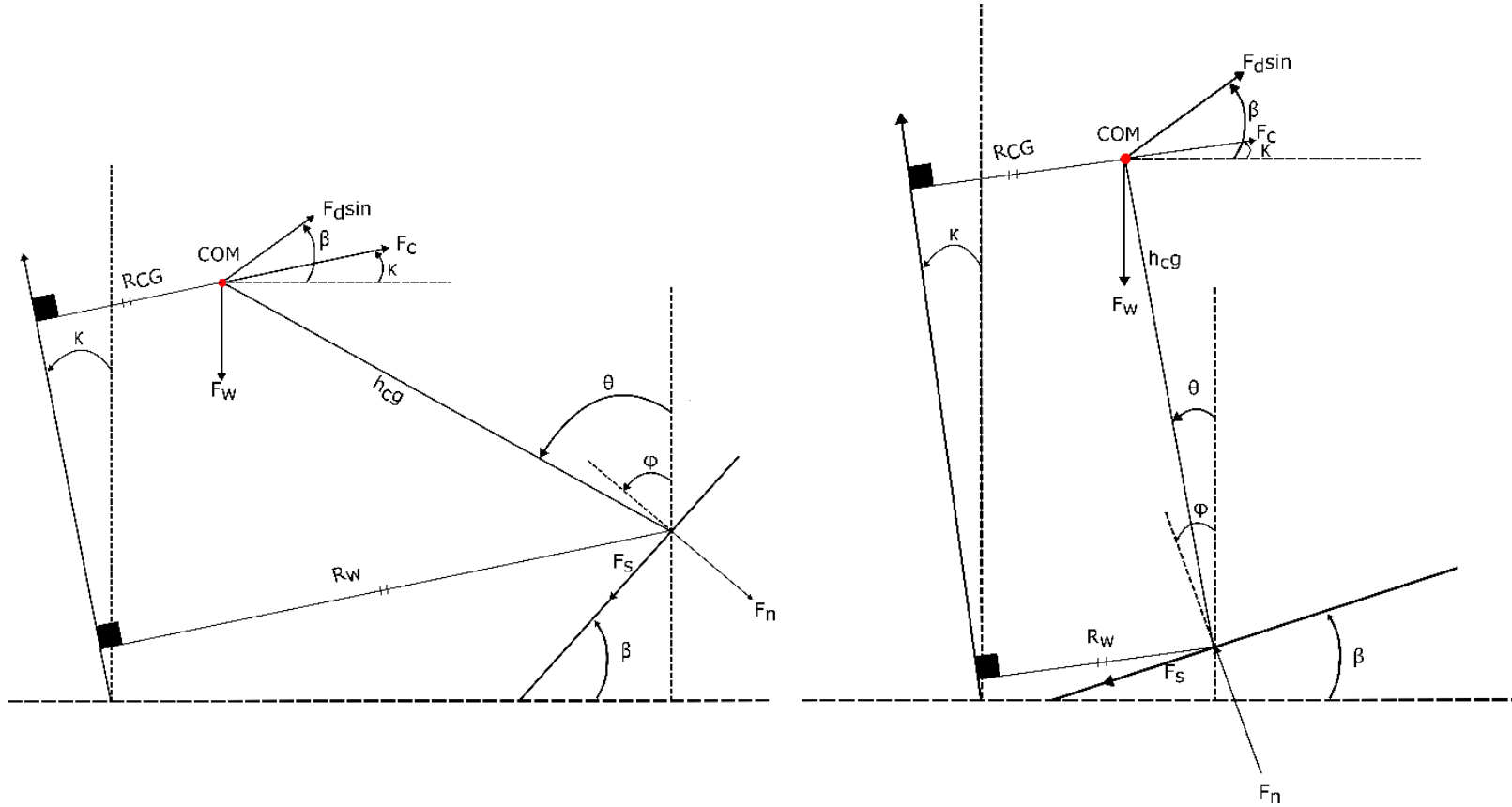
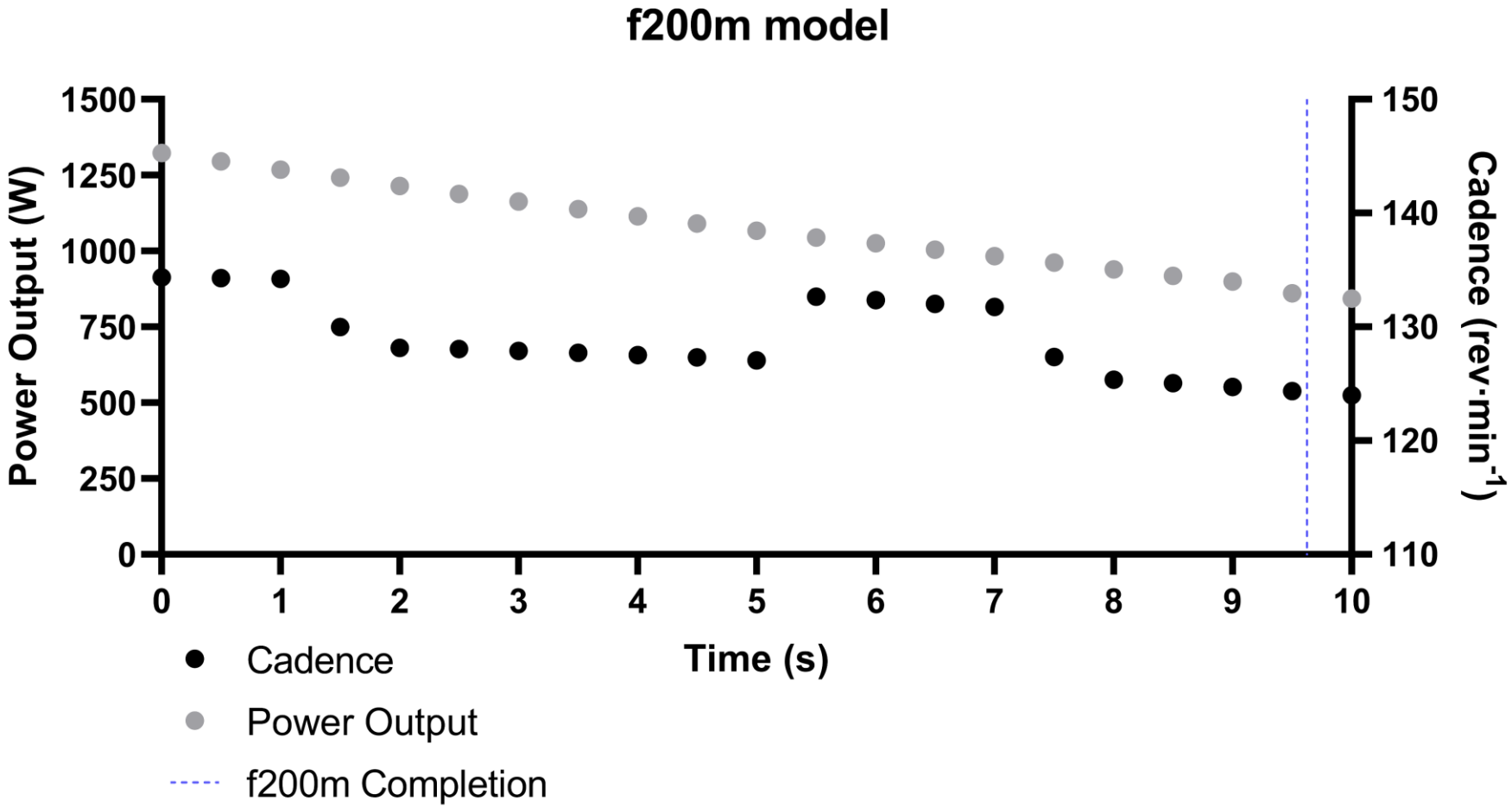


Physics-based Model of Cycling

- Currently accounting for:
  - Aerodynamic drag
  - Rolling resistance
  - Δ Kinetic energy
  - Δ Gravitation potential energy
  - Drive train efficiency
  - Track geometry
  - Centripetal force

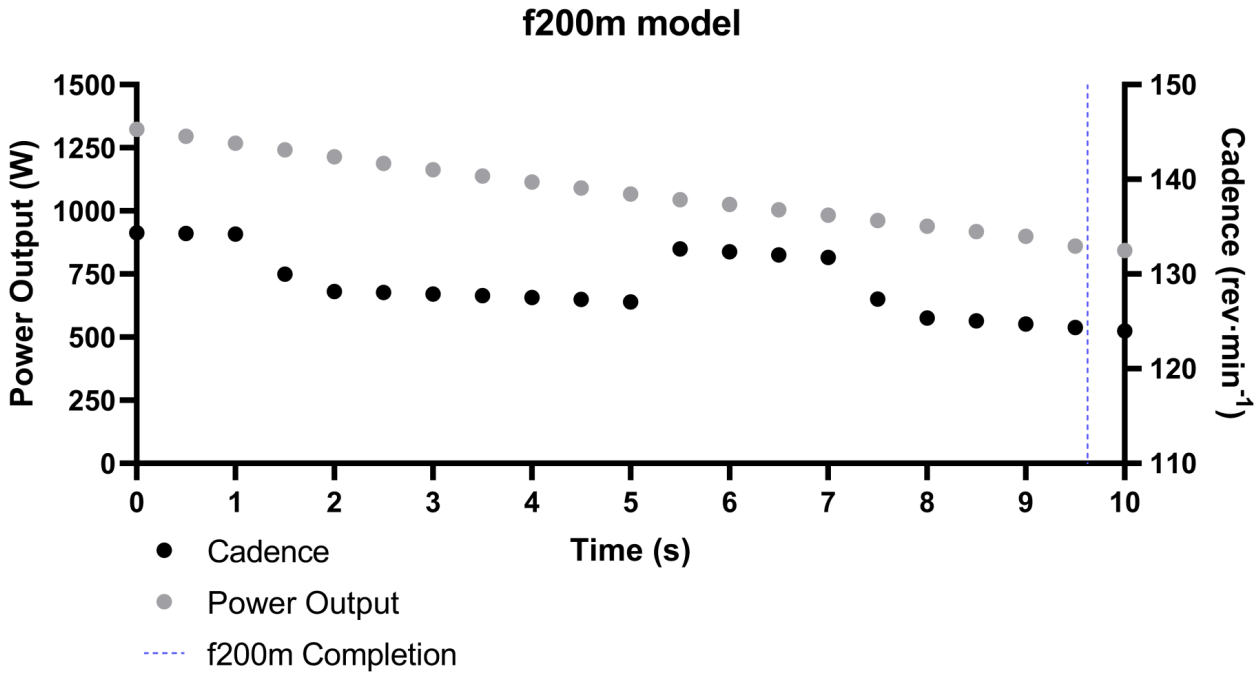


0.04% error in modelling performance times for the f200m.



Application of a Physics-based Model of Cycling

- Theoretically optimise gear selection
- Quantify Δ environmental conditions
- Investment tool to prioritise variables that allow for greatest improvement with least cost



Acknowledgments

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