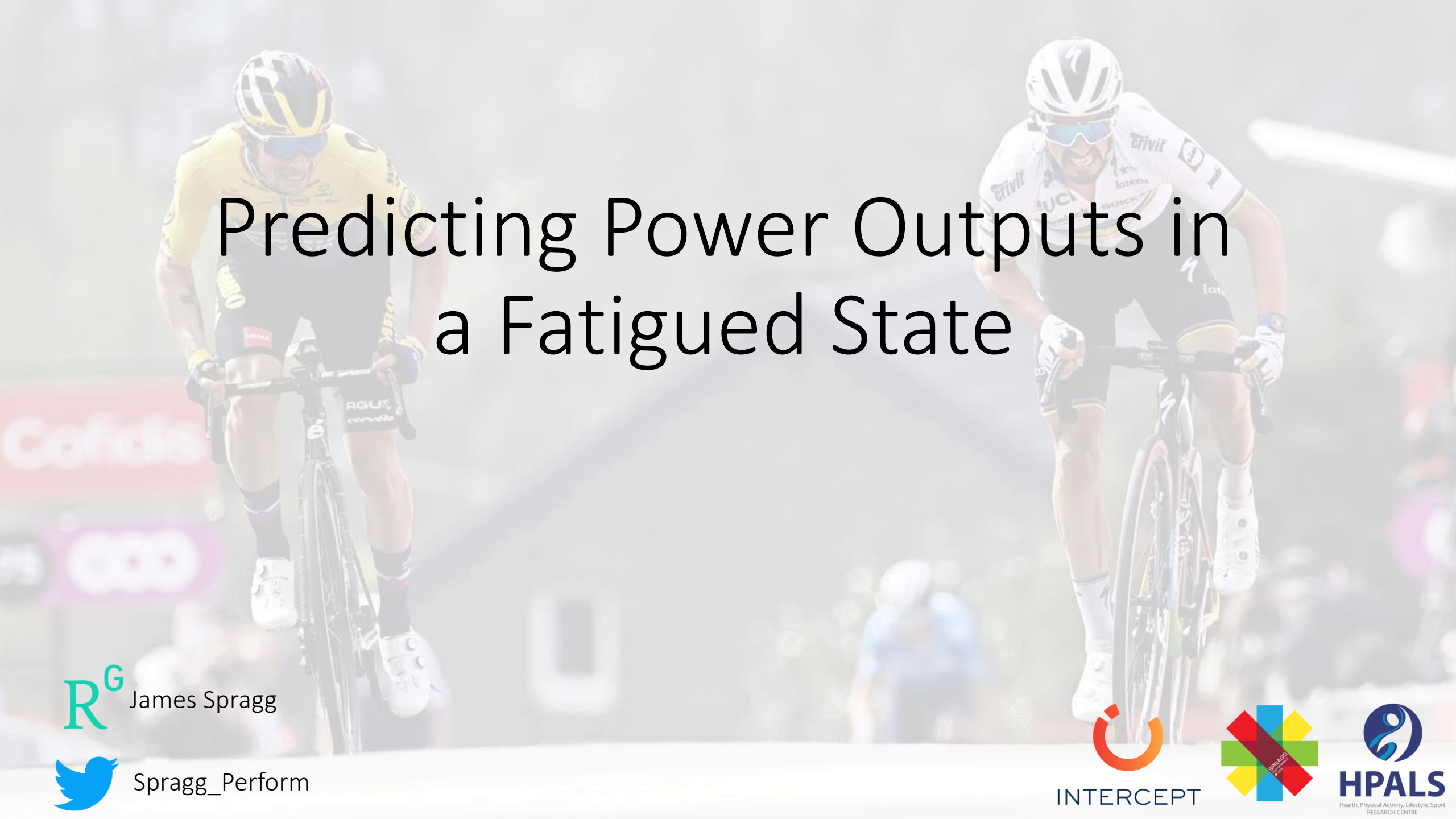


Predicting Power Outputs in a Fatigued State

James Spragg

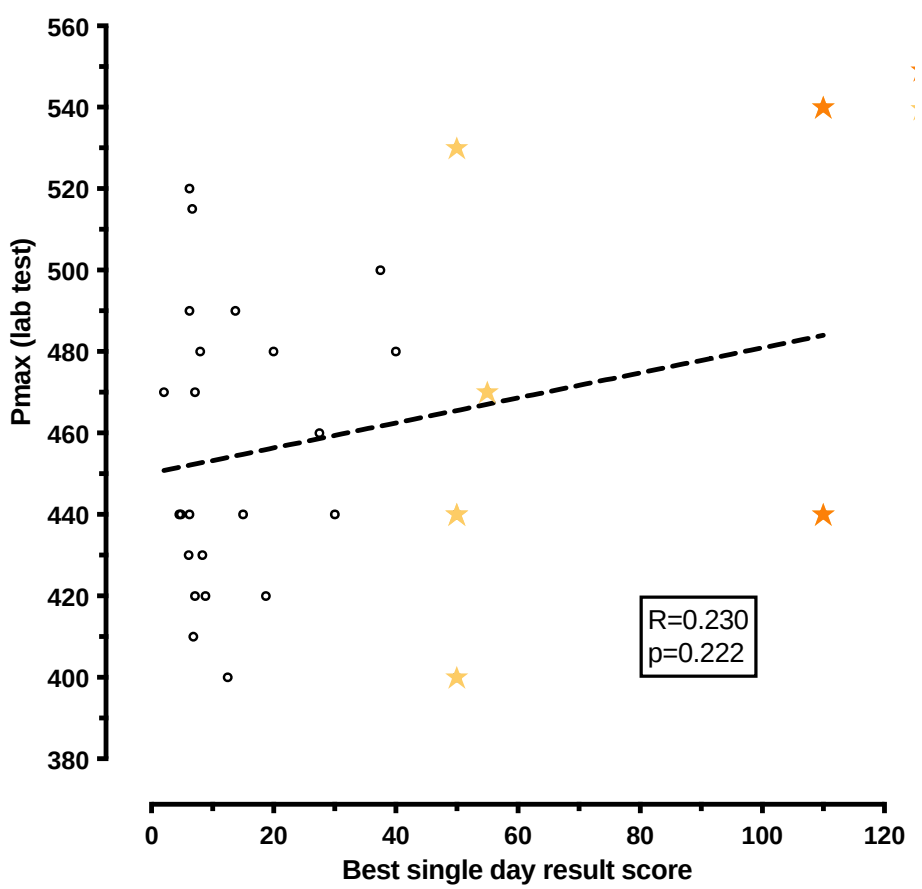
Spragg_Perform

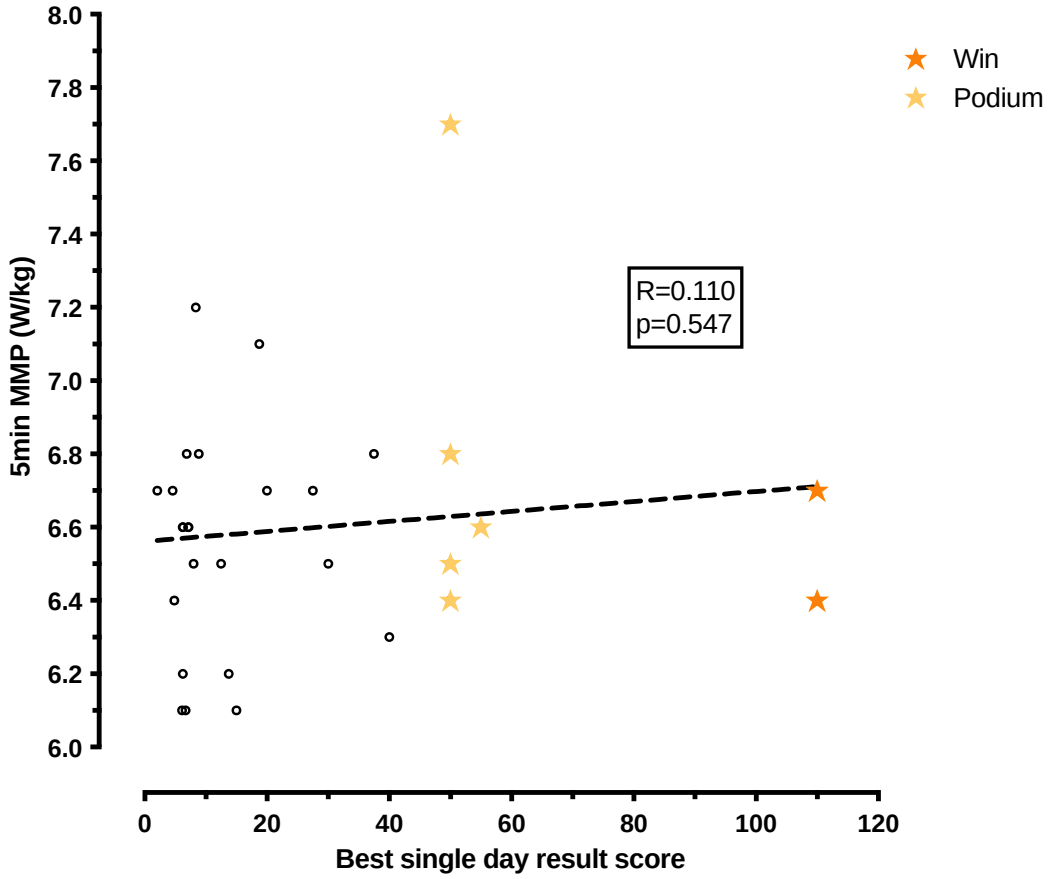
INTERCEPT

HPALS
Health, Physical Activity, Lifestyle, Sport RESEARCH CENTRE

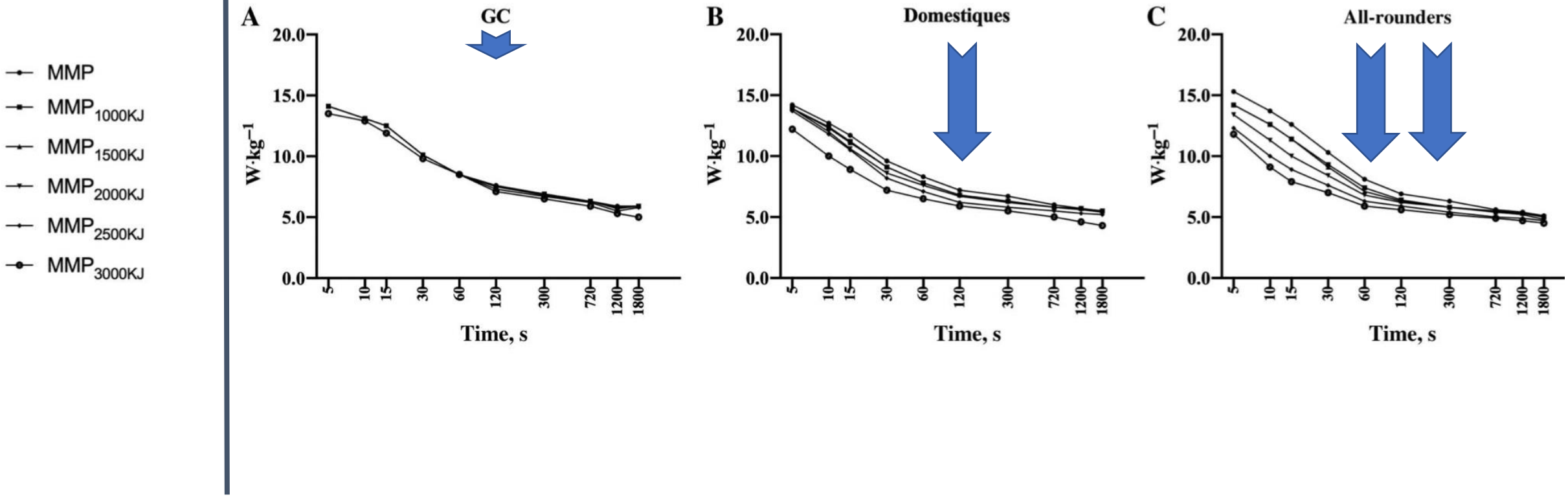
Fresh performances aren’t a very good predictor of race results

‘very small to no correlation between power output values from traditional testing and race performance’



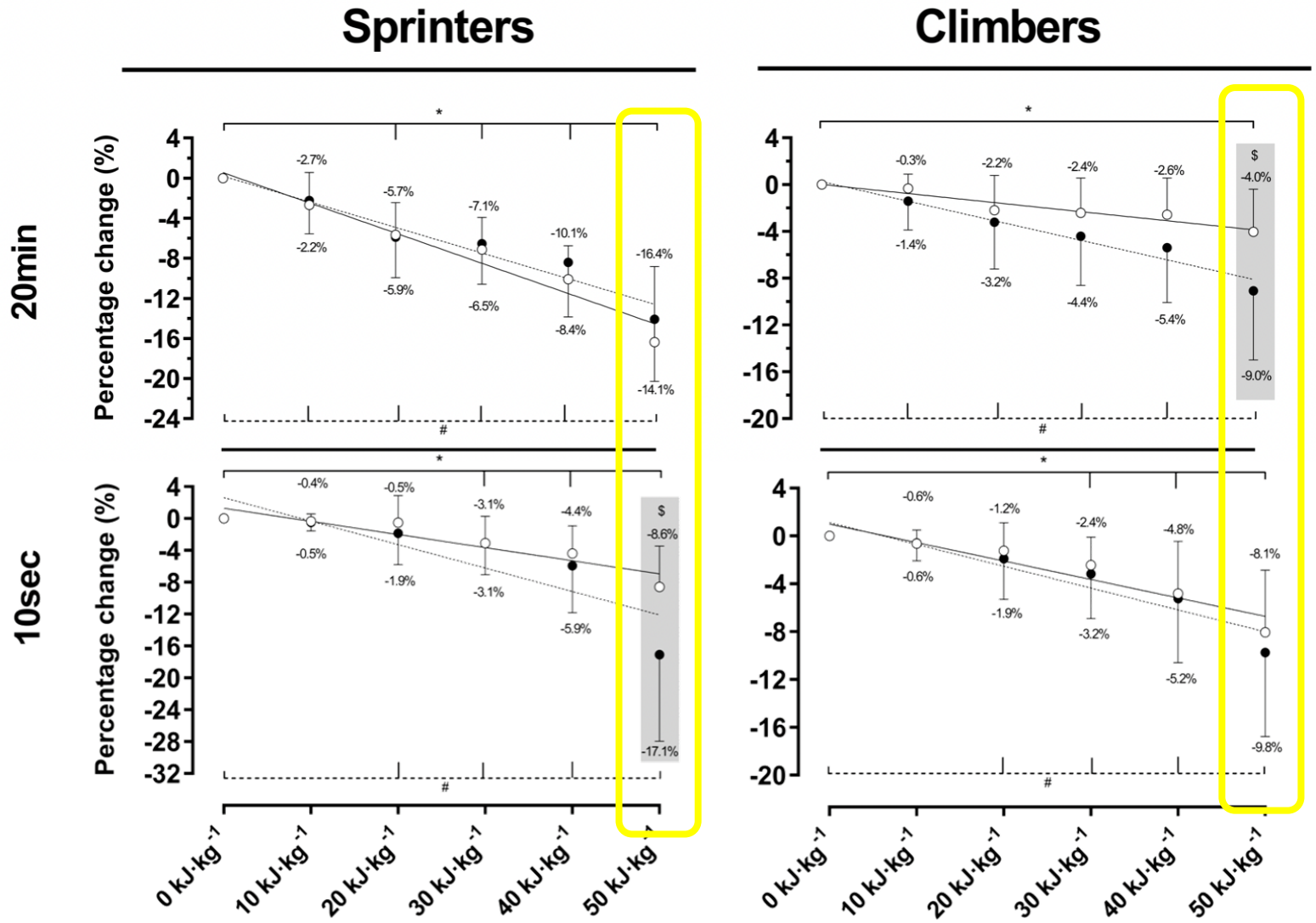


What happens under fatigue – what we know already…



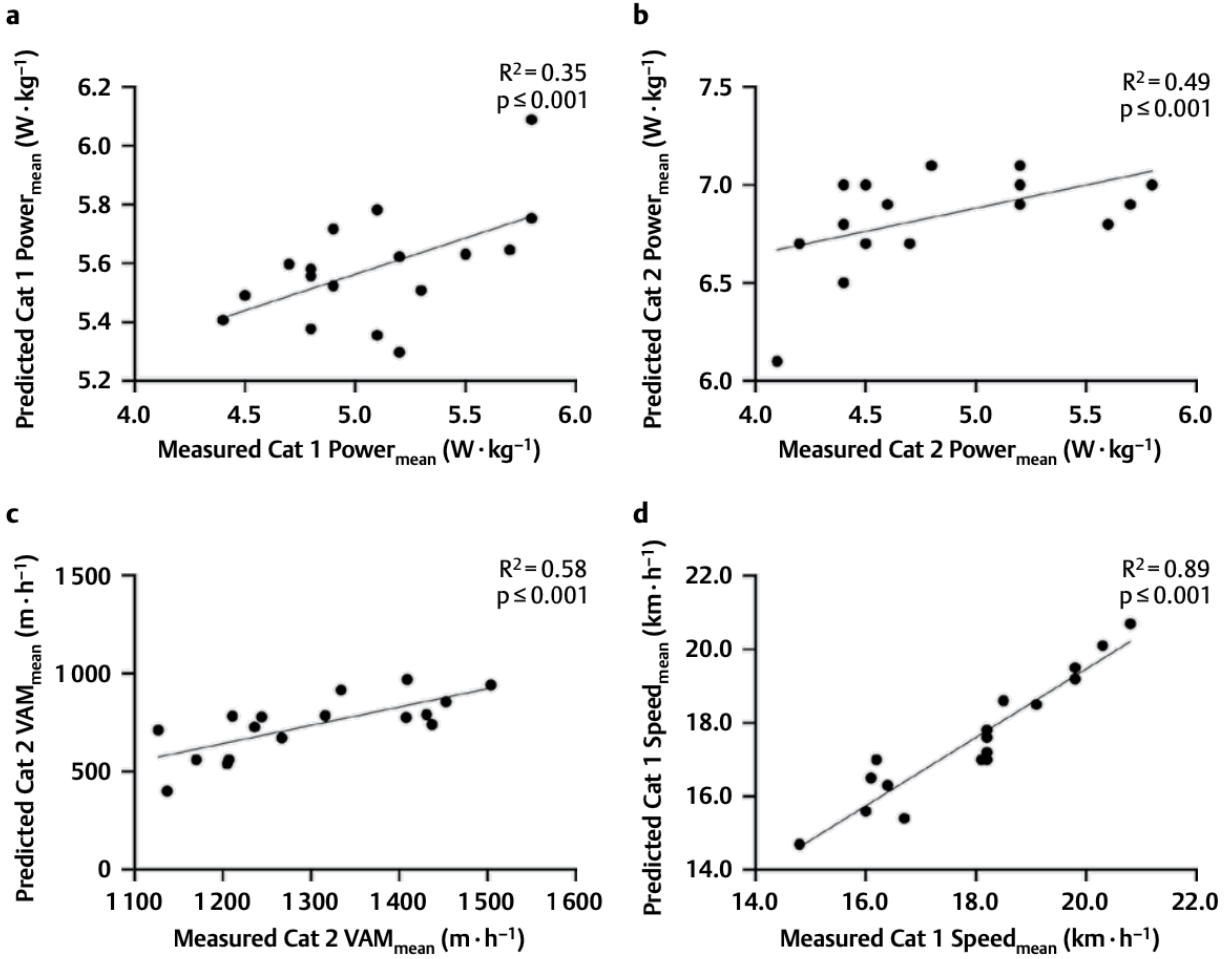
What happens under fatigue – what we know already…

- Highly Successful
- Less Successful



How well can we predict performance in a fatigued state already?

'If we know something about the workload in a given race, we can do a pretty good job'



Load metrics
(internal and external)

eTRIMP
eTRIMP.km^{-1}
Total Work
Total Work.km^{-1}

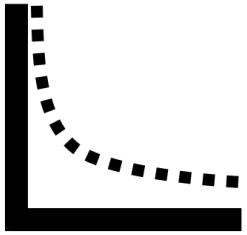
Predicting performance in a fatigued state (at an individual level)

Participants

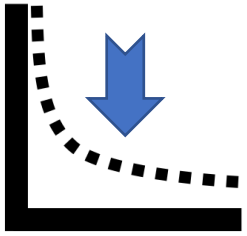
Continental and ProTeam athletes

n=4 included in analysis

(many more have completed steps 1 and 2)



Step 1 – Model the power duration relationship in a fresh state

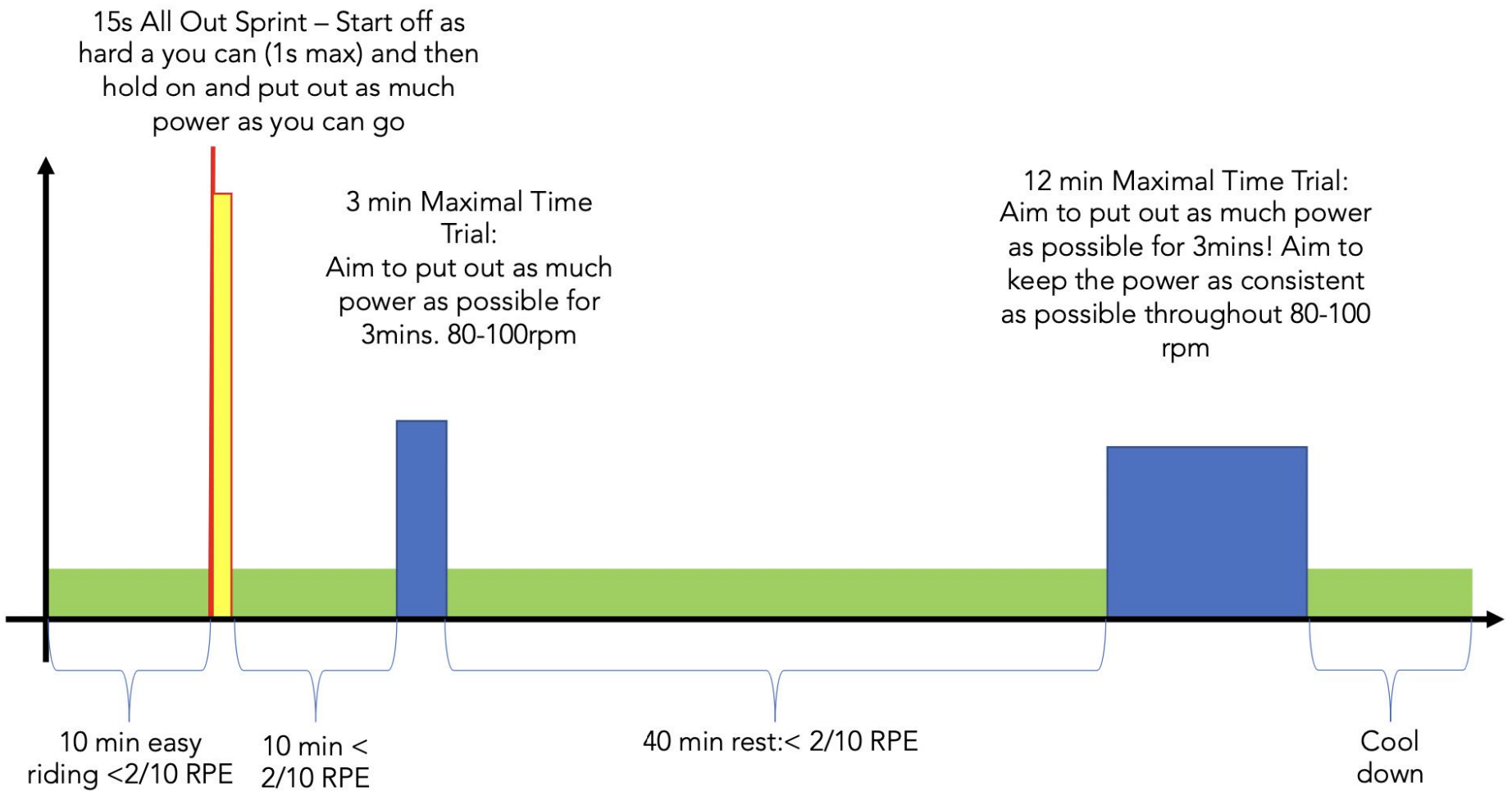


Step 2 – Model the power duration relationship in a fatigued state (post novel fatiguing protocol)

Step 3 – Compare model estimates (time-matched) to MMP values from uphill finishes where riders contested the victory

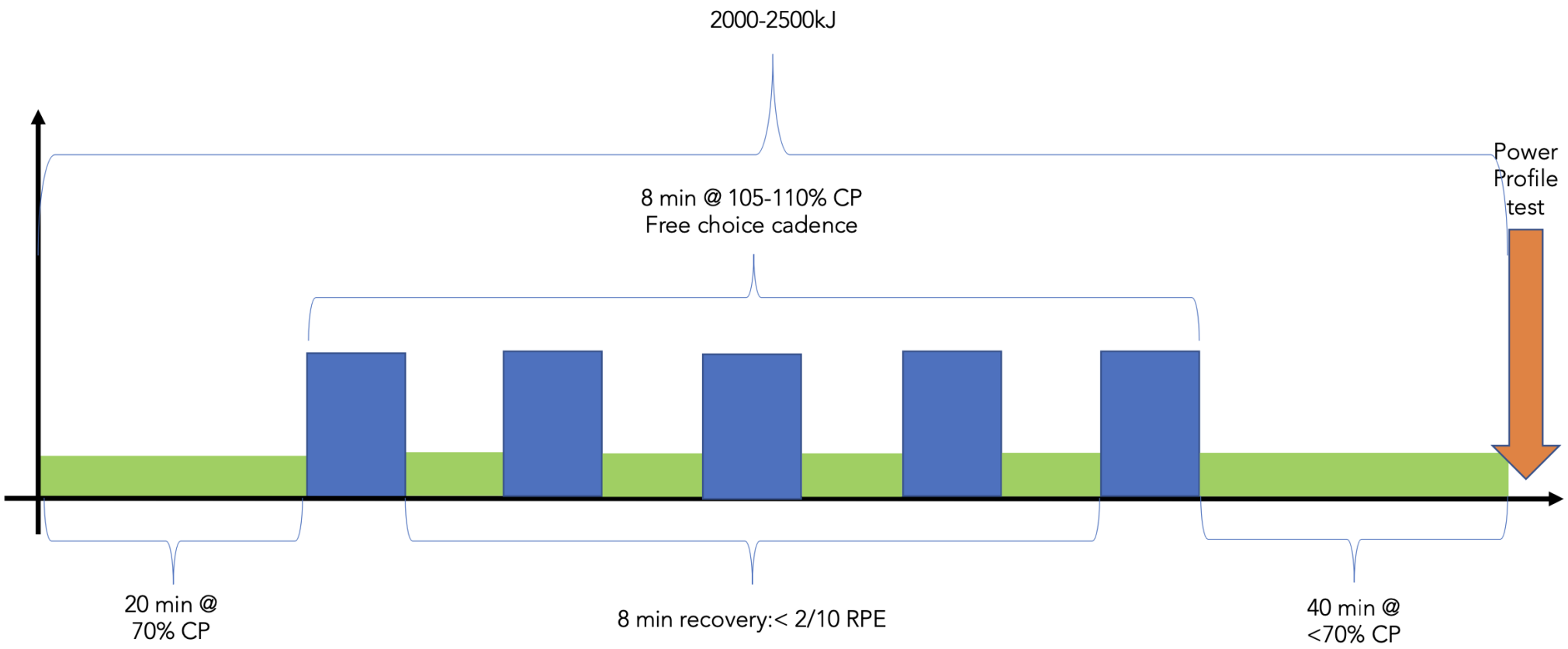
Power Profile Test – To Derive a Fresh P-D

We are looking for maximal 1s 3min and 12 min efforts



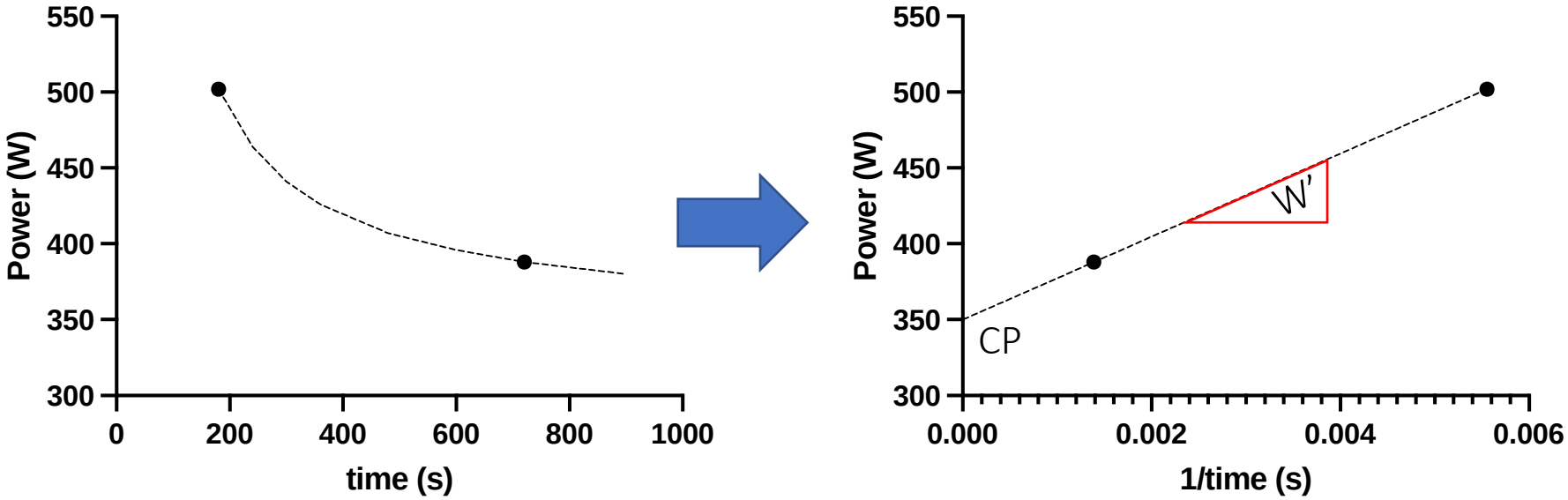
Fatiguing Protocol - To Derive a Fatigued P-D

We are looking for maximal 1s 3min and 12 min efforts in a fatigued state



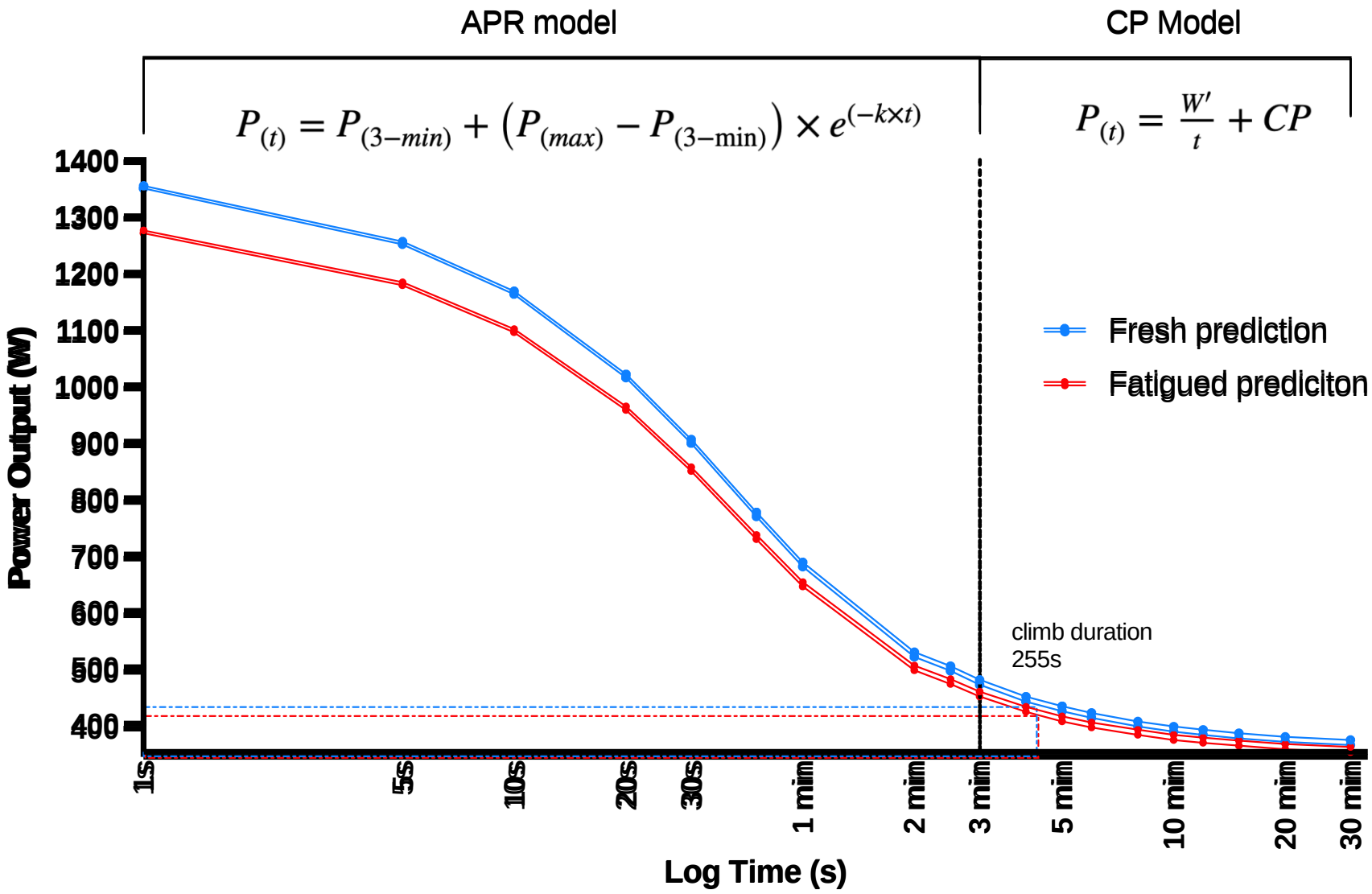
Estimating CP and W’

Linearization of the P-D relationship allows CP and W’ to be easily determined



PD relationship fresh vs fatigued

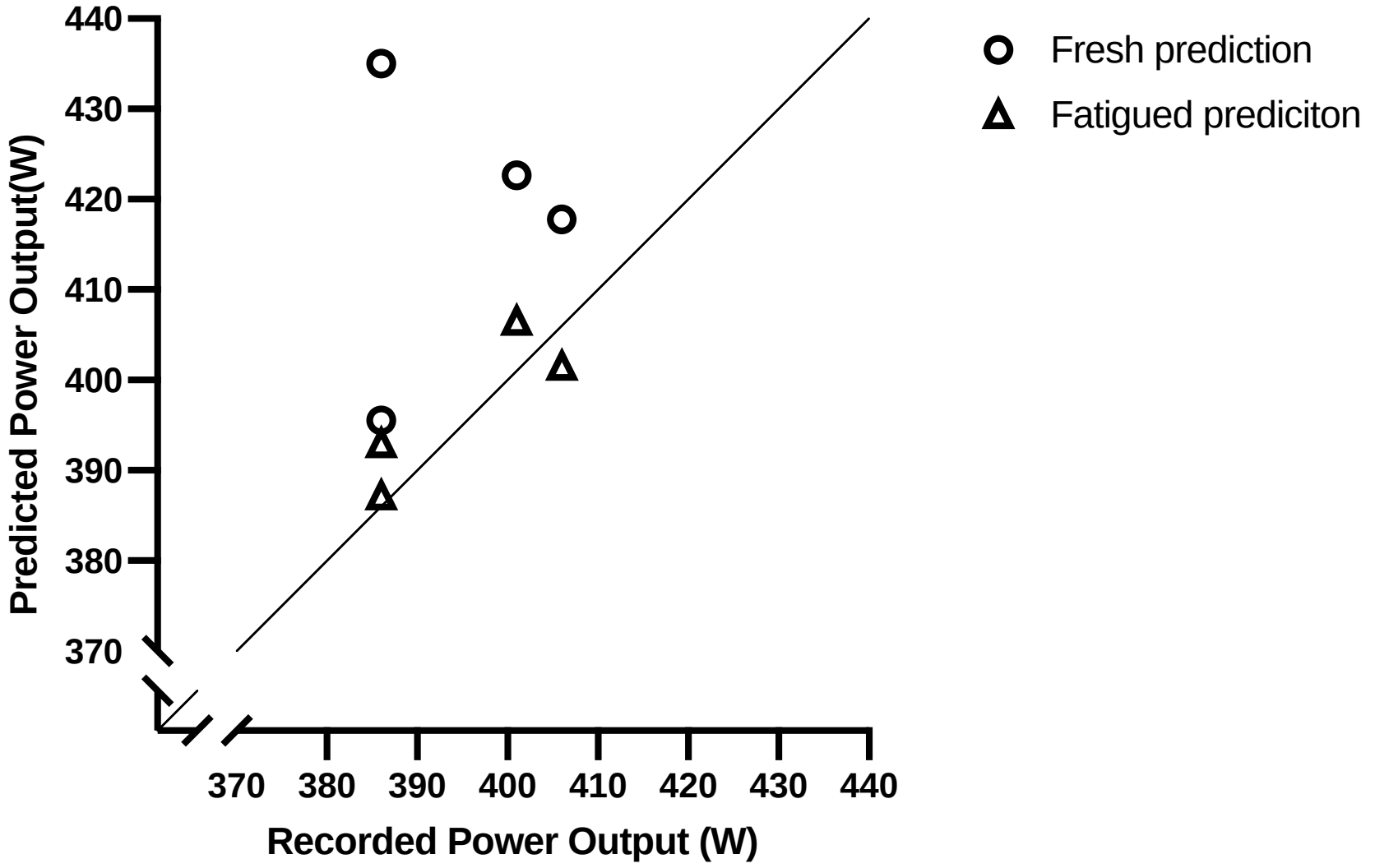
Modelling the P-D relationship allows us to time match the efforts to the time taken to complete the final climb



Results

Fresh values overestimates by 23w ± 18 (5.9%)

Fatigued values overestimates by 2w ± 5 (0.6%)



Conclusions

- Fresh values are a poor predictor of fatigued performance
- Athletes more than capable of testing in a fatigued state
- Novel fatiguing protocol can replicate race demands
- Power profiling in a fatigued state predicts in race performance

Questions?

James Spragg

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INTERCEPT

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