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The effect of physical and cognitive fatigue on mountain bike balance and agility performance

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Be part of it.

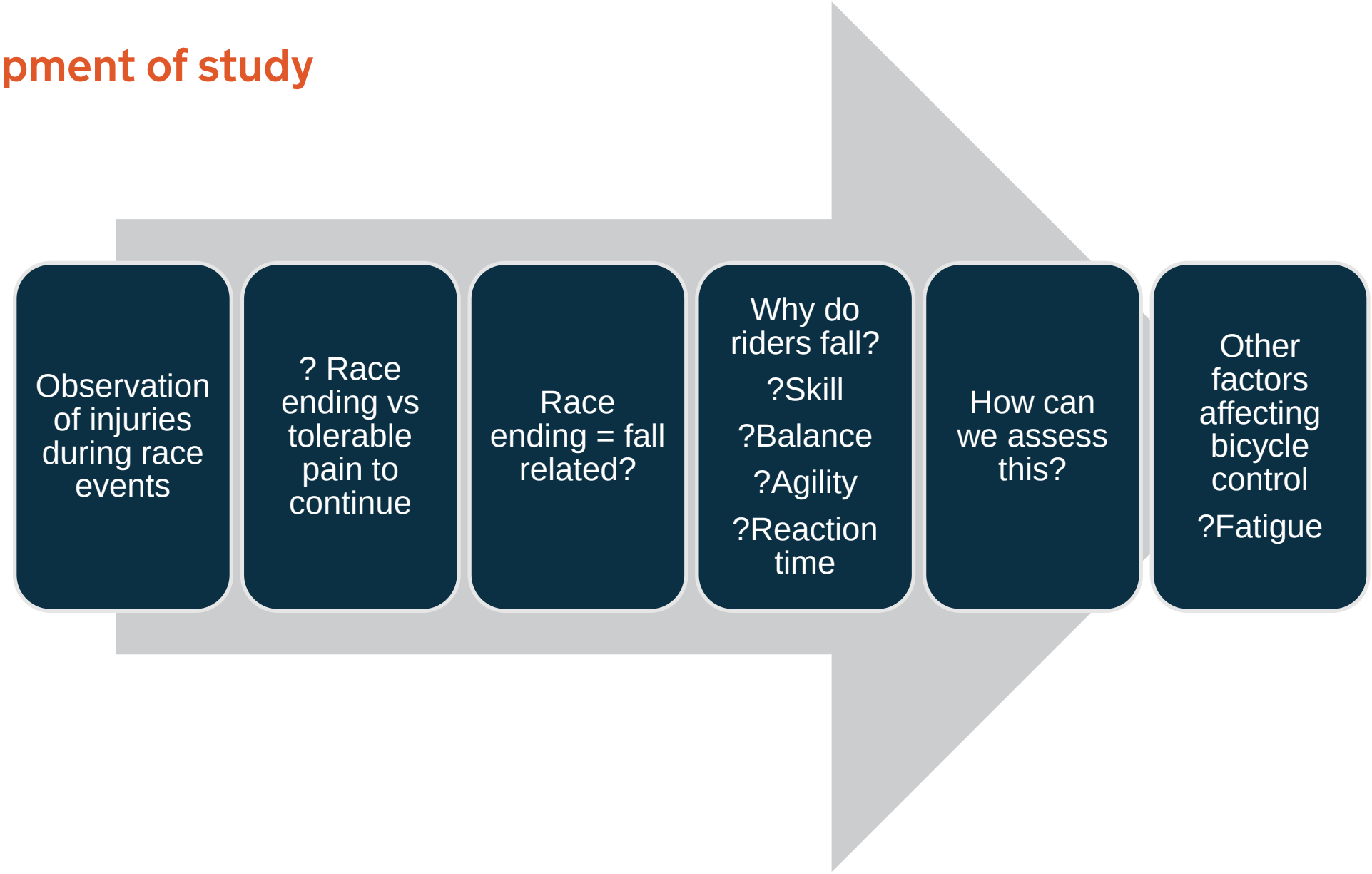
Where did it all start?

absa CAPE EPIC

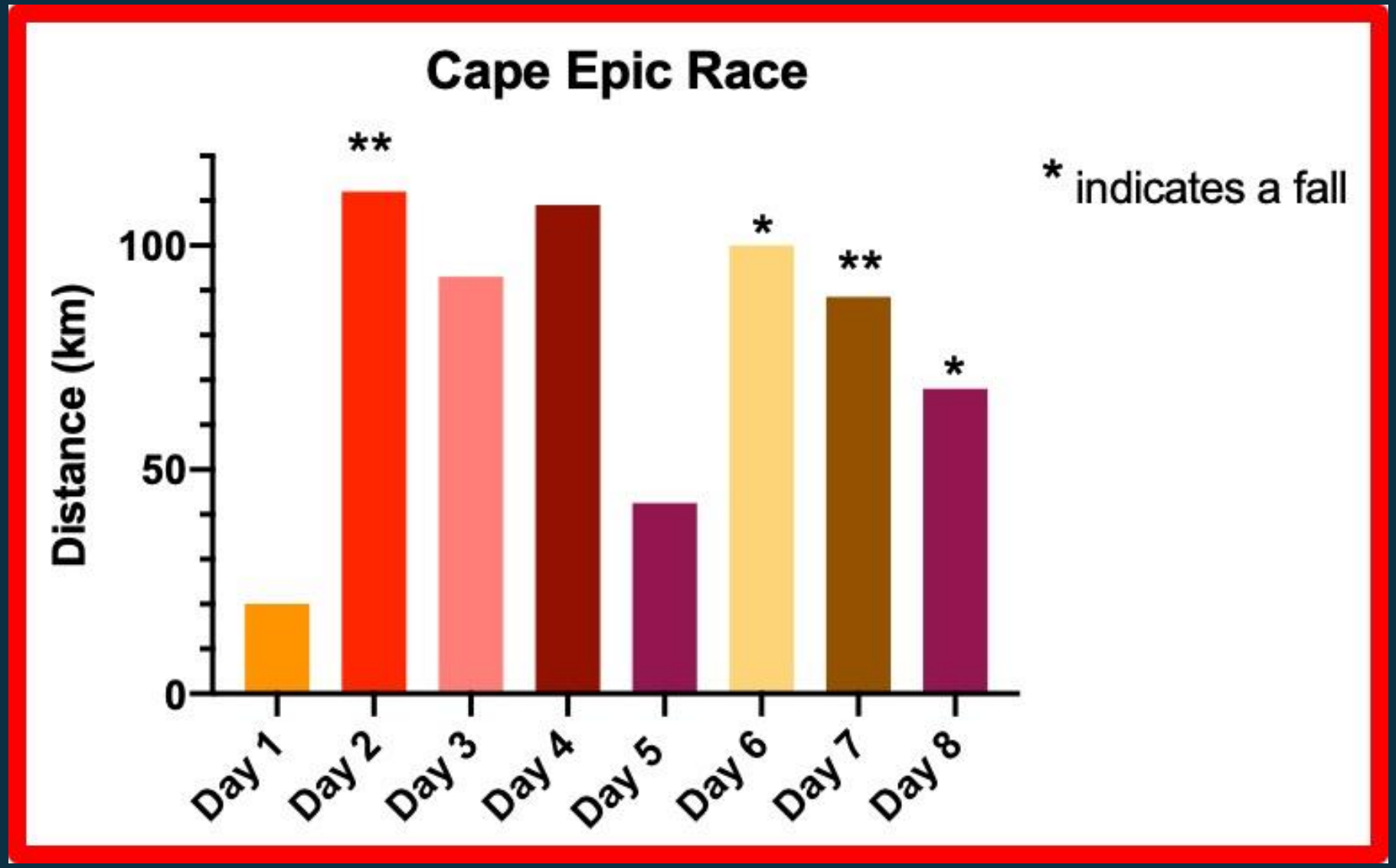
essm
EXERCISE SCIENCE AND SPORTS MEDICINE

FACULTY OF
HEALTH SCIENCES

Development of study

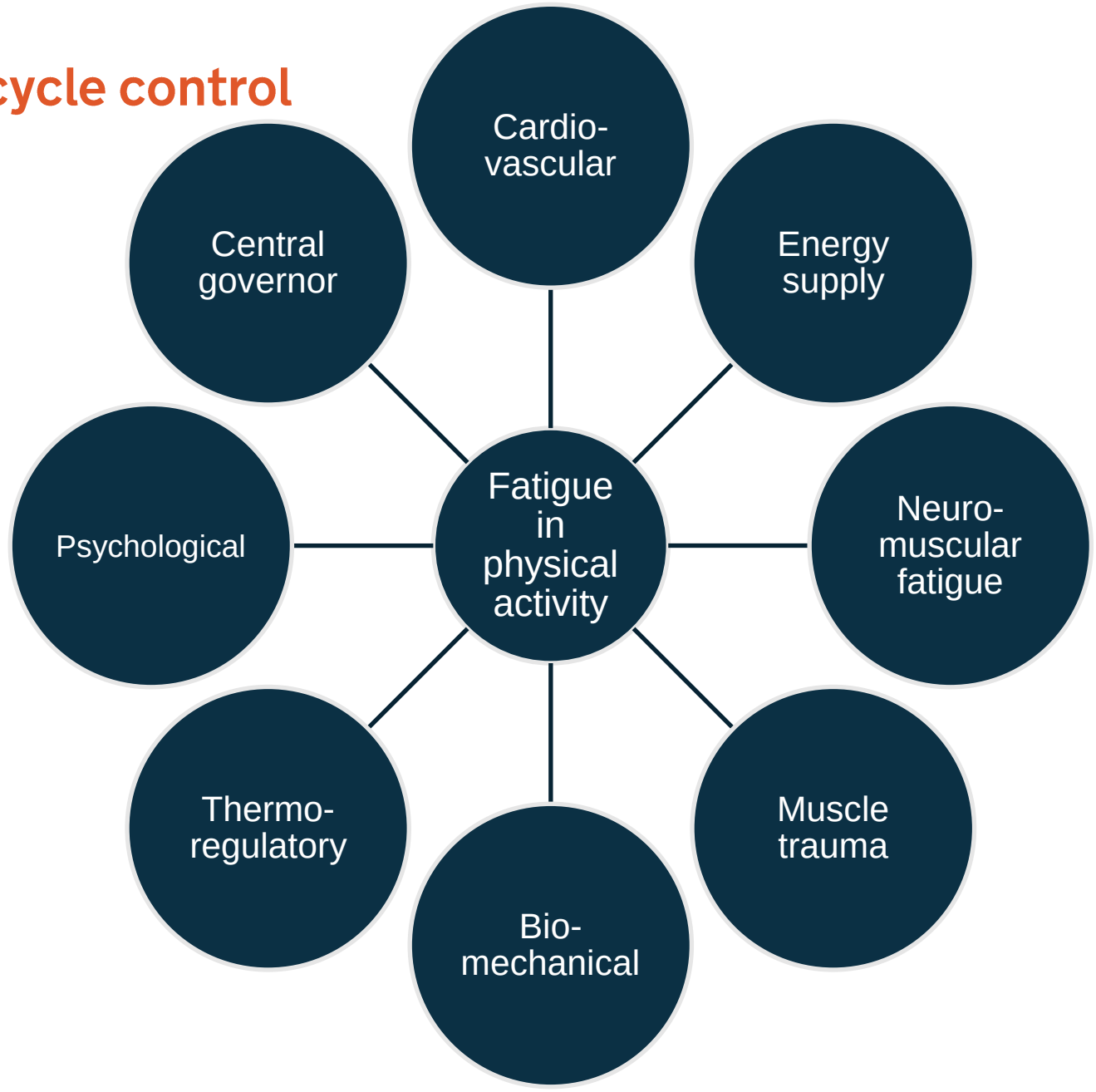


ABSA Cape Epic case series (2019)



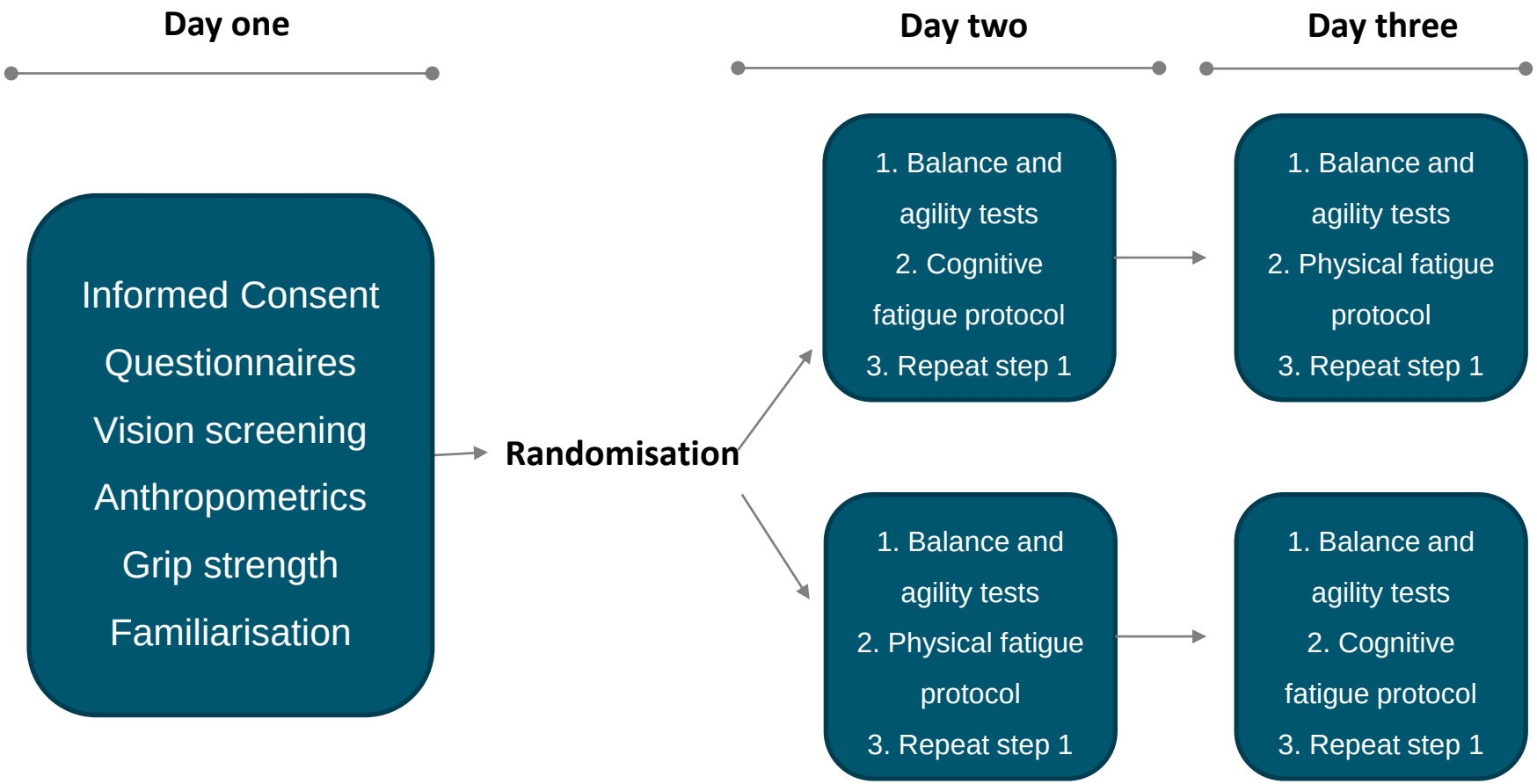
Fatigue as a factor affecting bicycle control

Models and theories



Methods

- Quasi-experimental study with test-retest design



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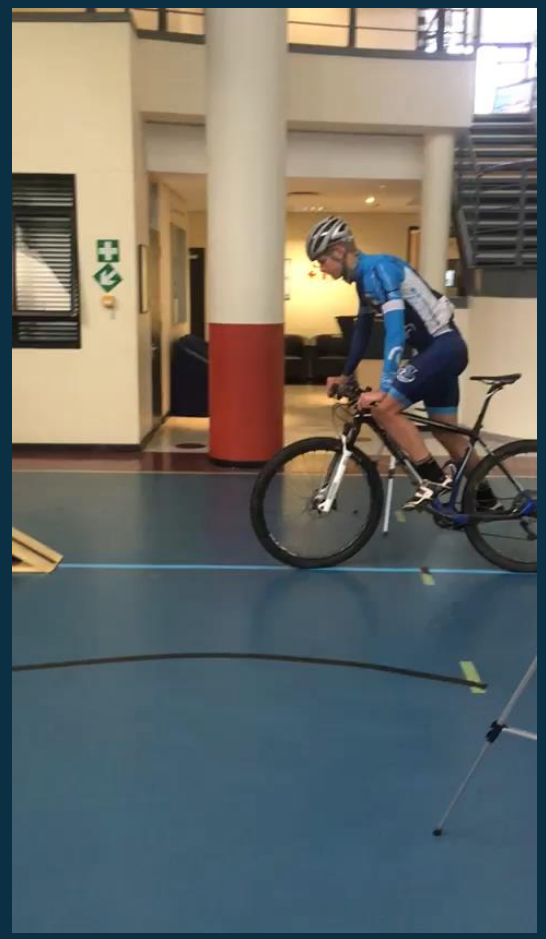
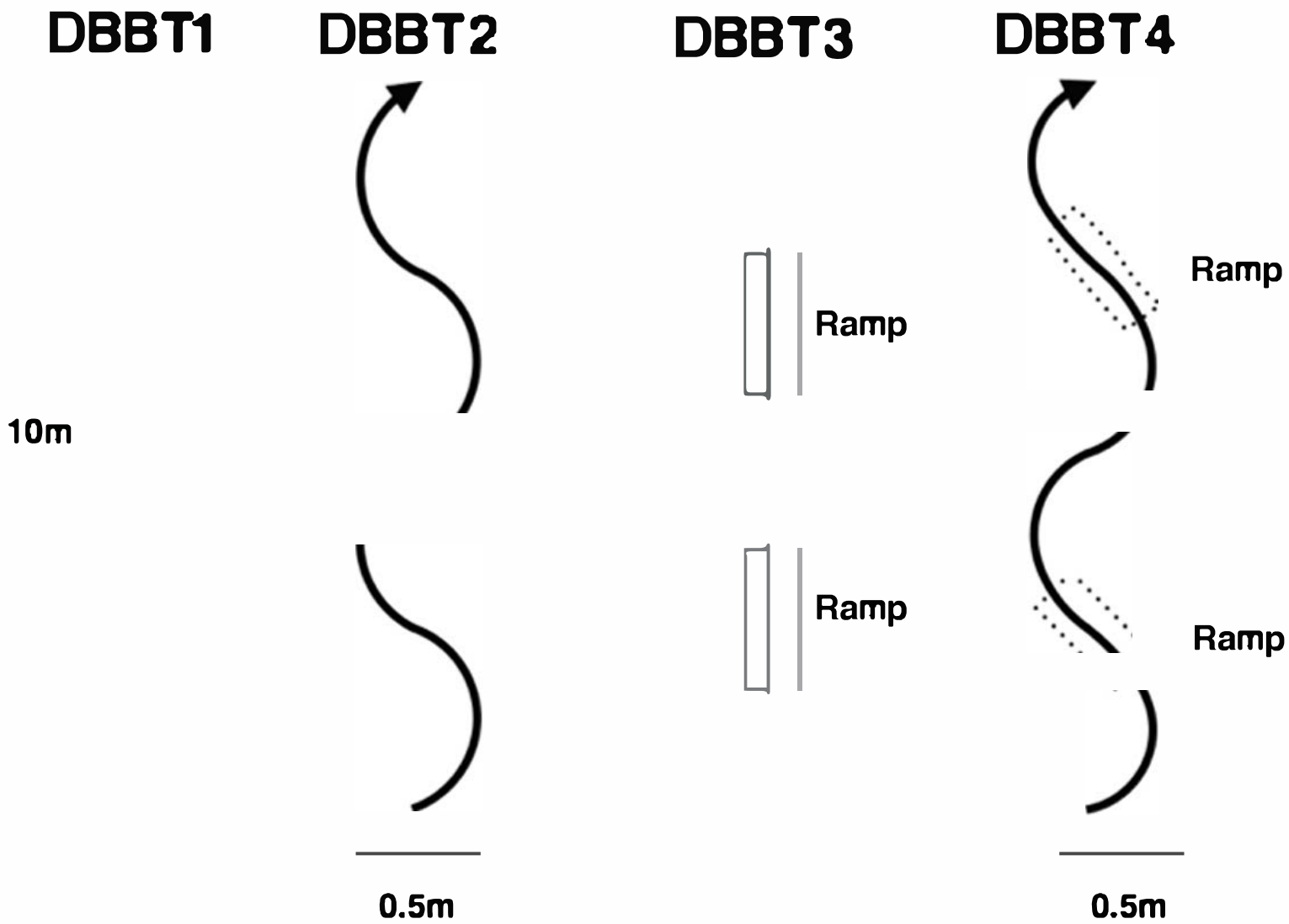
Dynamic bicycle specific balance tests





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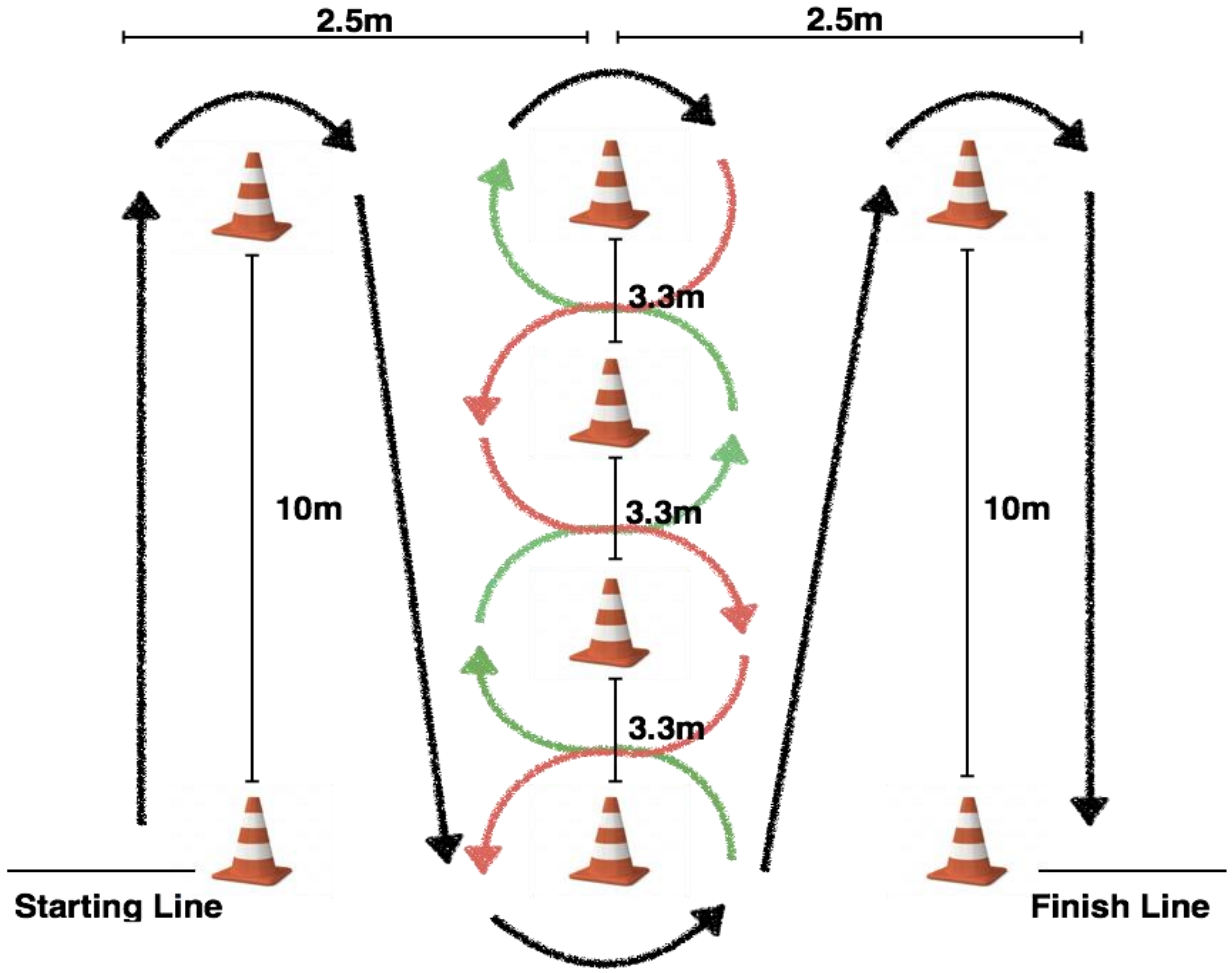
Bicycle specific agility assessment



Fatigue protocols

Physical fatigue protocol

5 x 1 minute sprints, 30 sec rest

Top up between tests: 2 x 1 min sprints

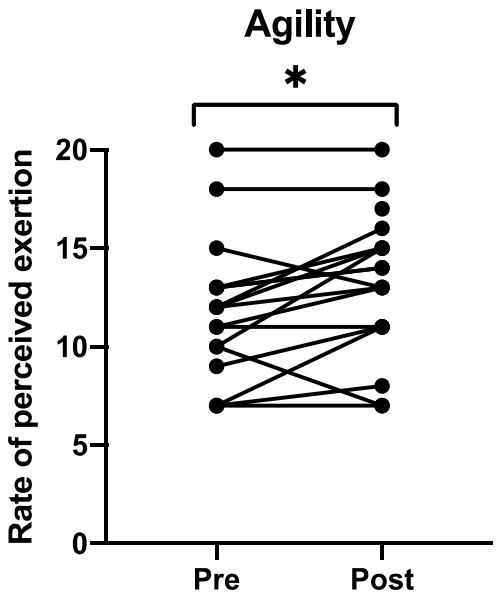
Cognitive fatigue protocol

30 minute incongruent Stroop task

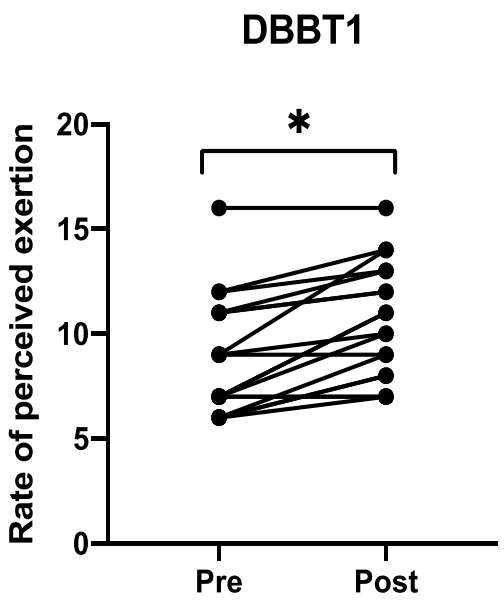
Top up between tests: 2 min Stroop task

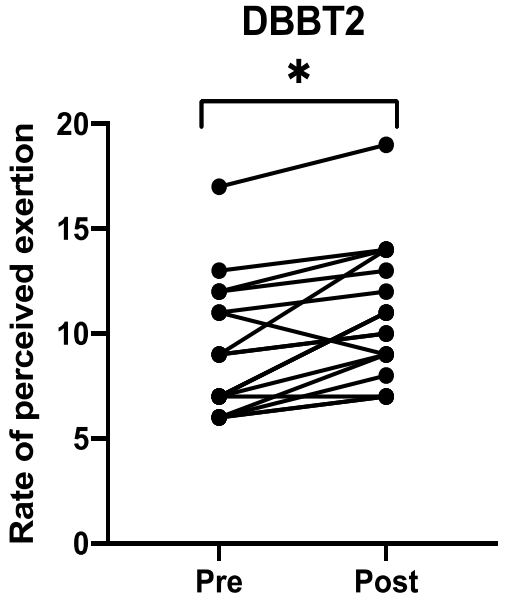
Results: Physical fatigue protocol

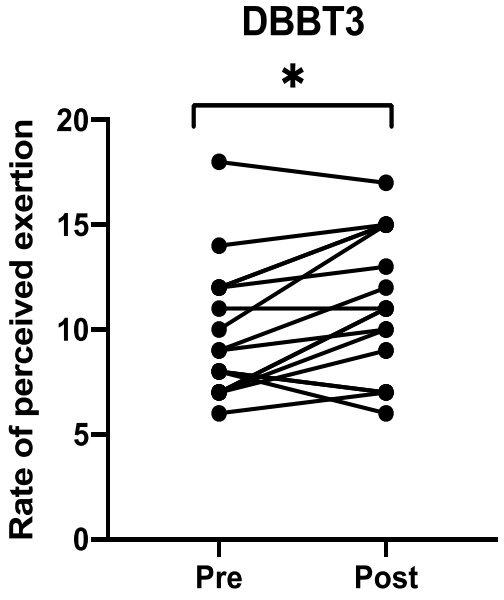
- 19 participants: 9 ♂ 10 ♀
- Able to ride a mountain bike with cleats and clipless pedals
- Mean 9 yr MTB experience, 7.6 yr road experience
- Training 3.5 hr per week, mean distance/yr 5301 km

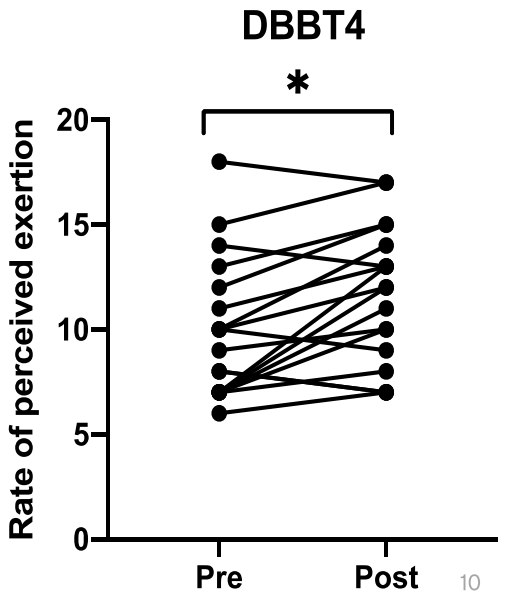


*p<0.05





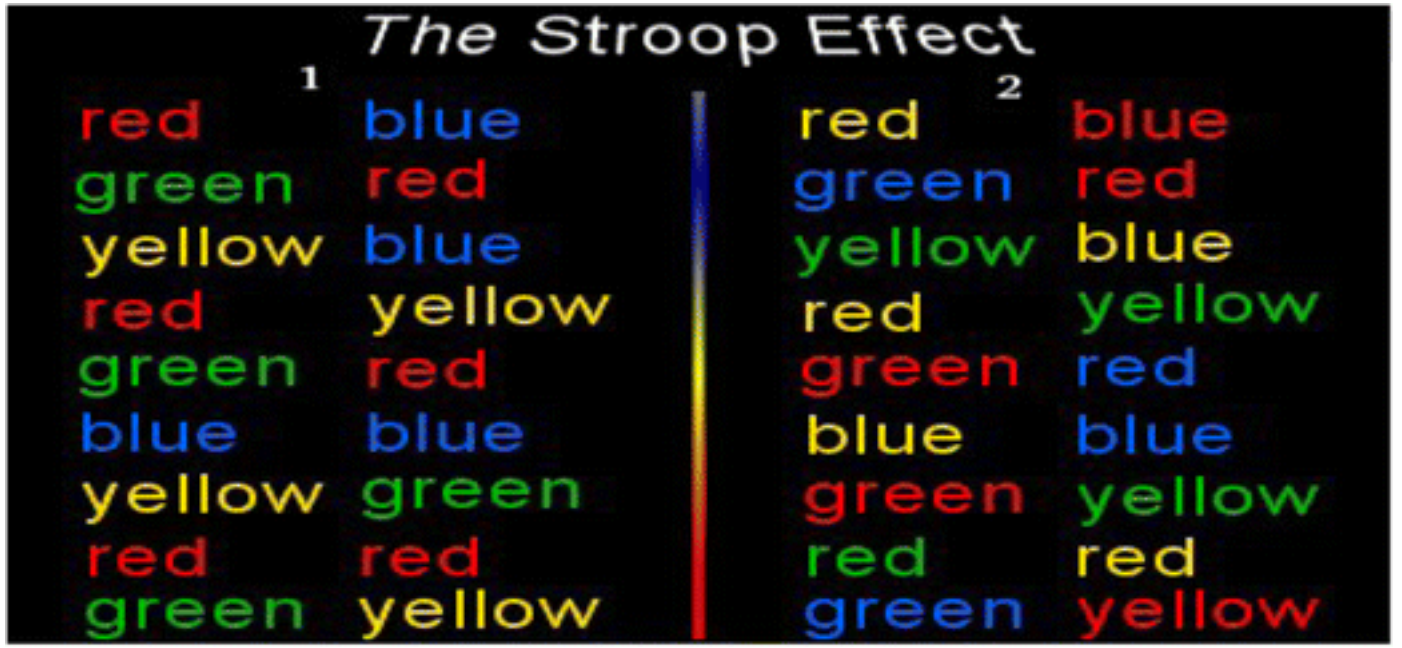




Cliff's *d* effect sizes were small to moderate (0.29-0.4)

Cognitive fatigue protocol

- No significant changes in RPE or performance following cognitive fatigue

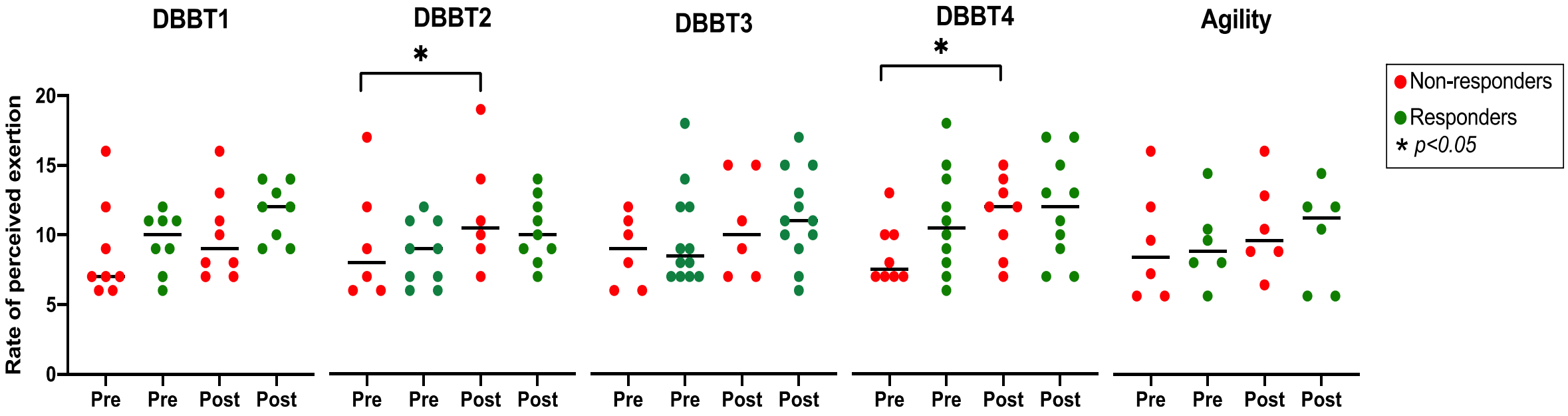


Statistical analyses: Responder analysis

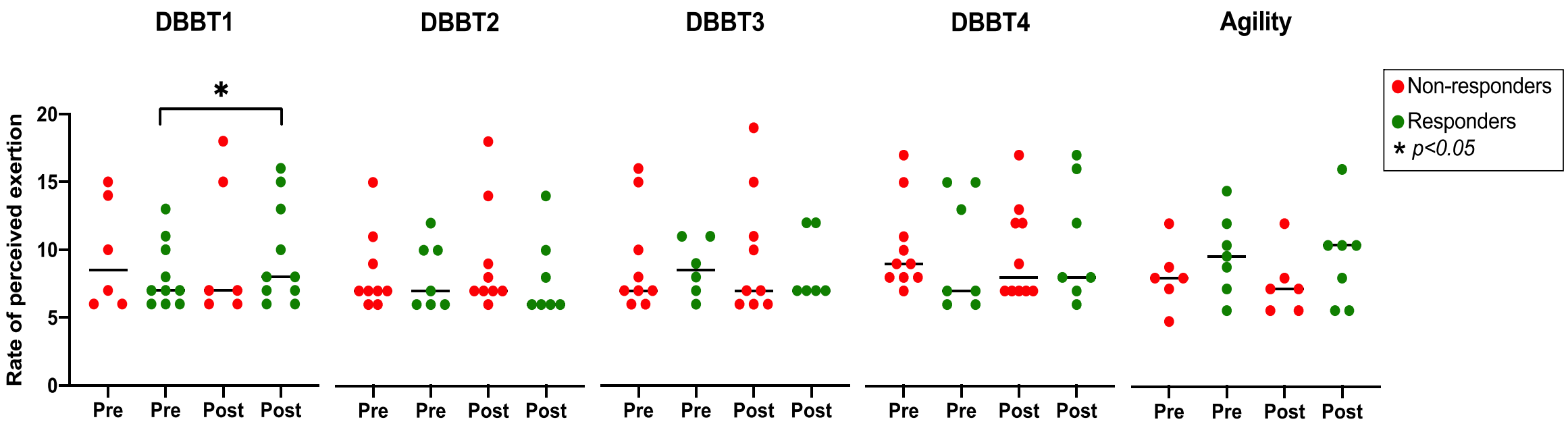
DBBT1-4 and Agility test

- Meaningful difference: $\Delta mean \pm (SD \times 0.2)$
- Responders = $\Delta mean - (SD \times 0.2)$
- Non-responders = $\Delta mean + (SD \times 0.2)$

Physical Fatigue Protocol



Cognitive Fatigue Protocol



Other variables

Pre- and post-fatigue

- Grip strength
- ∆ Rate of perceived exertion
- ∆ Heart rate
- MTB experience (years)
- Annual cycling distance
- Descriptive characteristics

Discussion and Limitations

- Almost no significant differences pre- and post fatigue
- Additional validity of novel tests
- Post STROOP: subjective reporting of ‘relief’, ‘can’t wait to get back on the bike’ etc, but not measured as mental-RPE
- Trained MTB: used to long periods of combined physical and cognitive fatigue – fatigue protocols too short? not compound?
- Recommendation: vibrational fatigue? Prolonged periods of cycling?
- Further research needed!

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Questions?

Thanks to supervisors: A/Prof Theresa Burgess and Prof Mike Lambert
Expert panel input: A/Prof Jeroen Swart and Dr Mike Posthumus
Research Assistants: Charlie Fethney and Lara Paul


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