Reliability of cycling performance during field-based uphill time-trials

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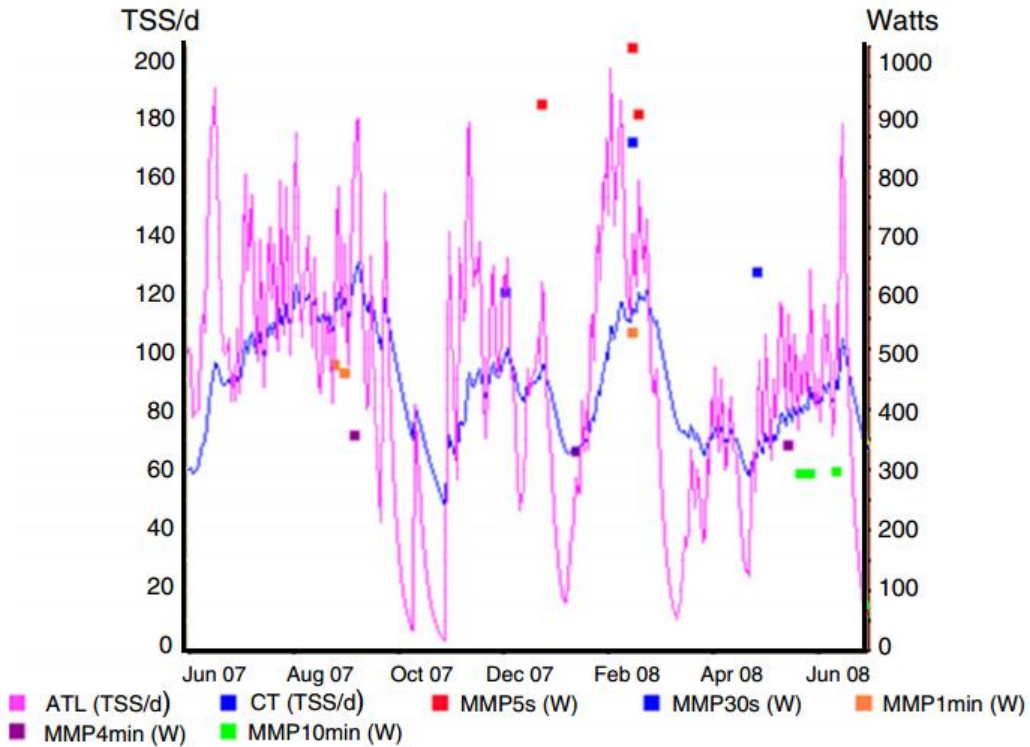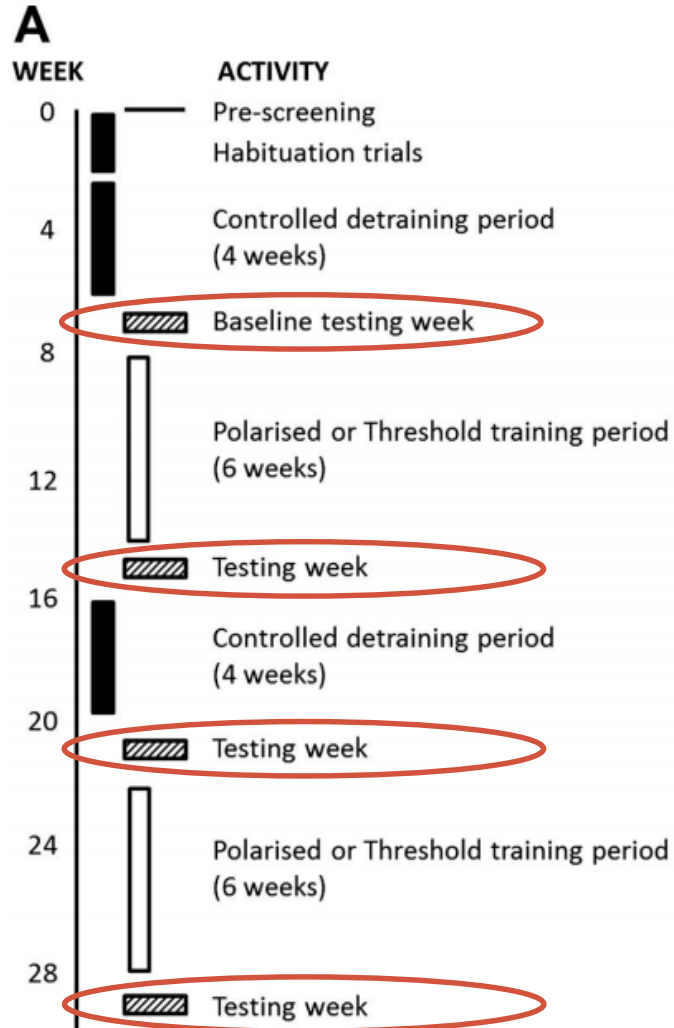
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Background

Halson (2014)

Neal et al. (2013)

Reliability of mean power recorded during indoor and outdoor self-paced 40 km cycling time-trials.

Smith MF[1], Davison RC, Balmer J, Bird SR.

40-km flat

Reproducibility of outdoor flat and uphill cycling time trials and their performance correlates with peak power output in moderately trained cyclists.
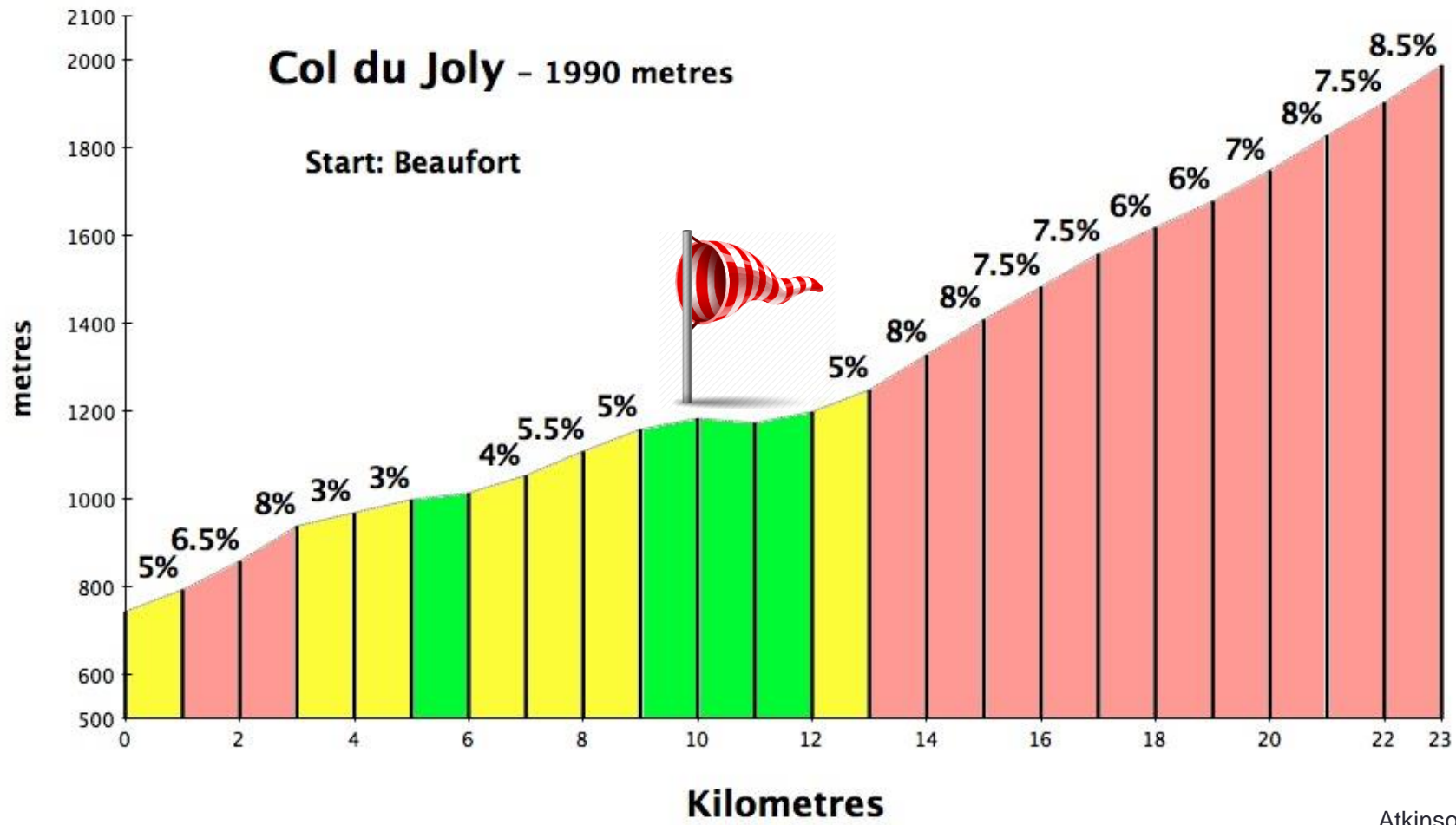
Tan FH[1], Aziz AR[1].

36-km flat
1.4-km uphill

Evaluation of a field test to assess performance in elite cyclists.

Nimmerichter A[1], Williams C, Bachl N, Eston R.

4- and 20-min flat

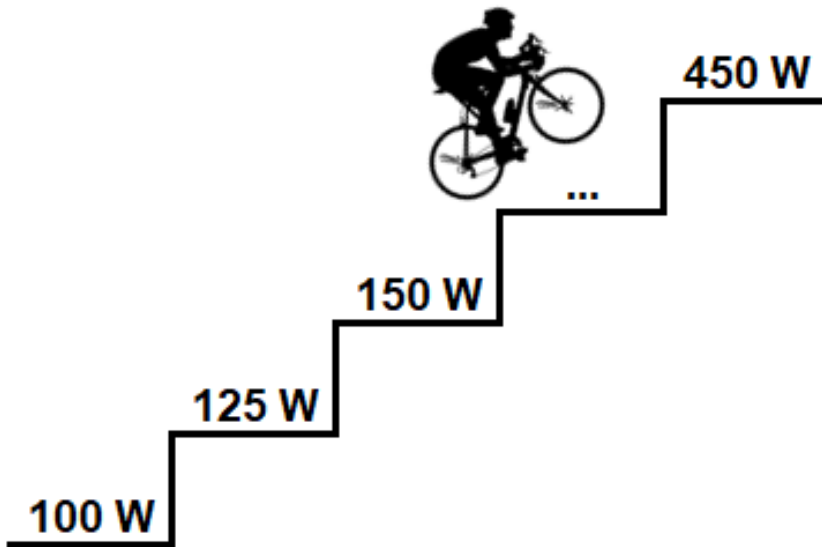Col du Joly – 1990 metres

Start: Beaufort

Study Purpose

- To assess the reliability of mean power output and pacing strategy during field-based uphill TTs and the influence of different courses and performance levels on the reliability measures.
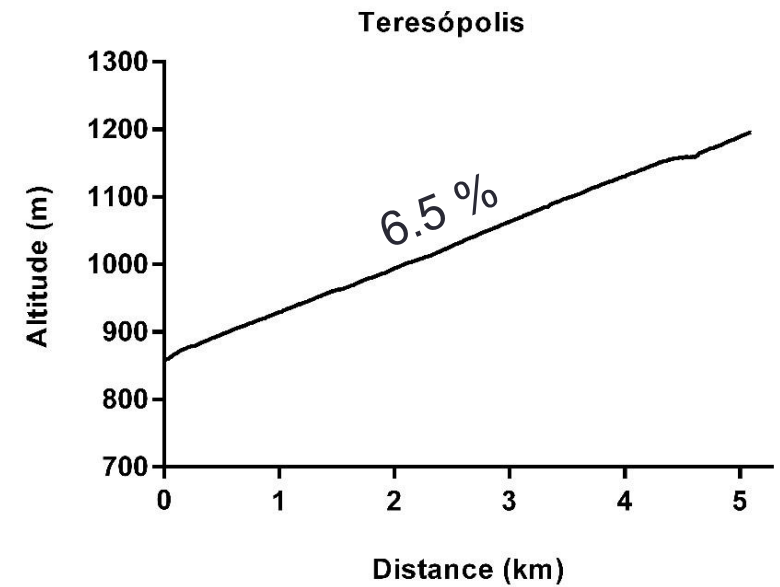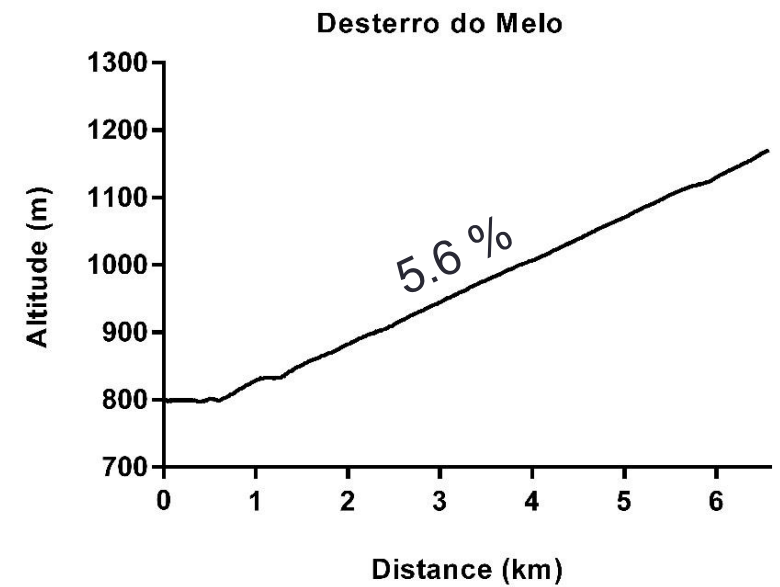
Methods

- 18 trained cyclists
  - 31.8 ± 7.6 years; 71.6 ± 8.3 kg; 1.74 ± 0.08 m

- **4** field-based 20-min uphill time-trials
  - 7 days apart

  - top 9 & bottom 9 performers

Teresópolis

6.5 %

n = 8

Desterro do Melo

5.6 %

n = 10

Today's Date: _____
_____

Time	Food/Beverage	Amount	Notes

Today's Date: _____
_____

Time	Food/Beverage	Amount	Notes

- Data were log-transformed to describe mean power output reliability
  - ICC, TE and CV

- Within-participant differences in mean power output
  - One-way repeated measures ANOVA

$$PI = \frac{\text{segment mean power output}}{\text{overall TT mean power output}} * 100$$

Davies et al. (2016)

pacing strategy × TT order × performance level × course
2-way and 3-way ANOVAs

$P \leq 0.05$

Hopkins (2015)

Results

- GXT$_{PPO}$: 350 ± 36 W; 4.92 ± 0.45 W.kg^{-1}
  - PL 3 (trained)   De Pauw et al. (2013)

- Range of reliability measures (all participants, separated by performance levels, or by courses)

ICC: 0.95 – 0.97
TE: 6.67 – 7.47
CV: 2.5 – 2.6

| $F = 0.150$ | $P = 0.855$ | $\eta_p^2 = 0.009$ |

Bossi et al. (2017)
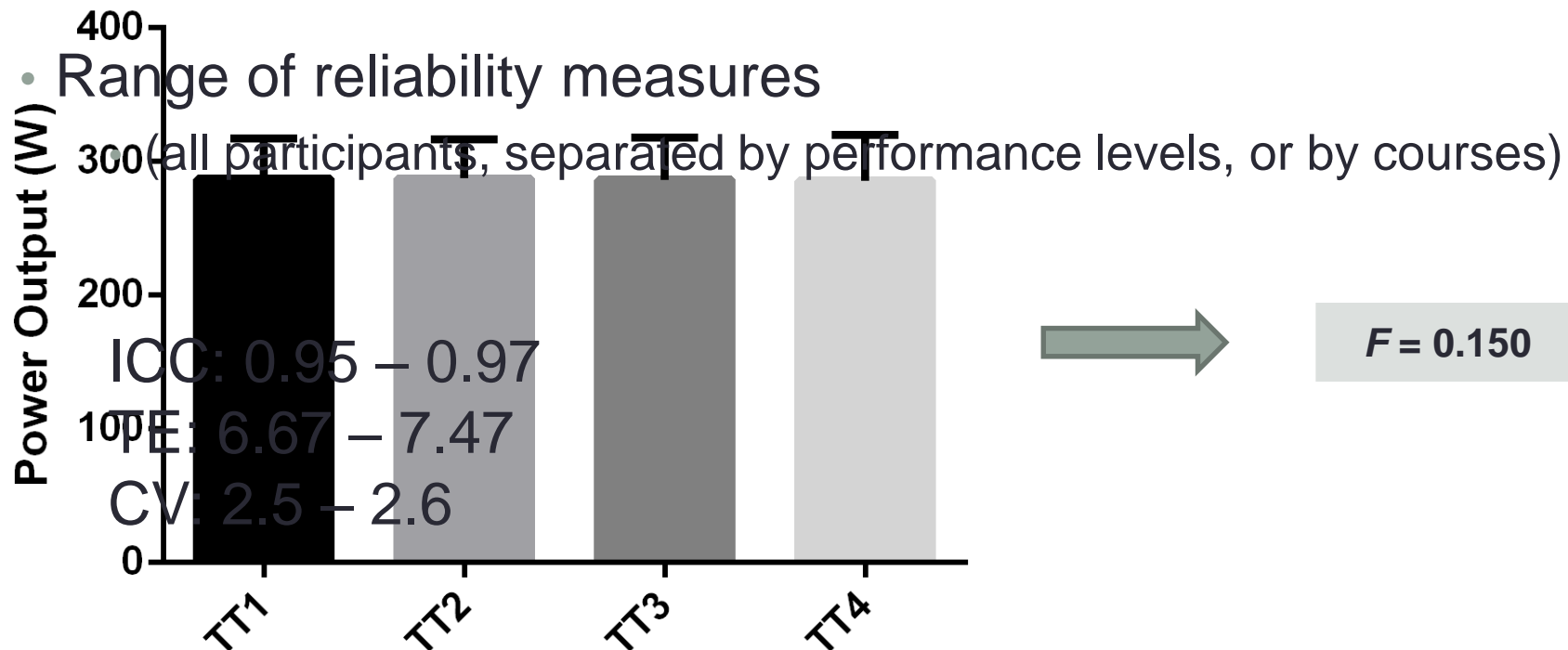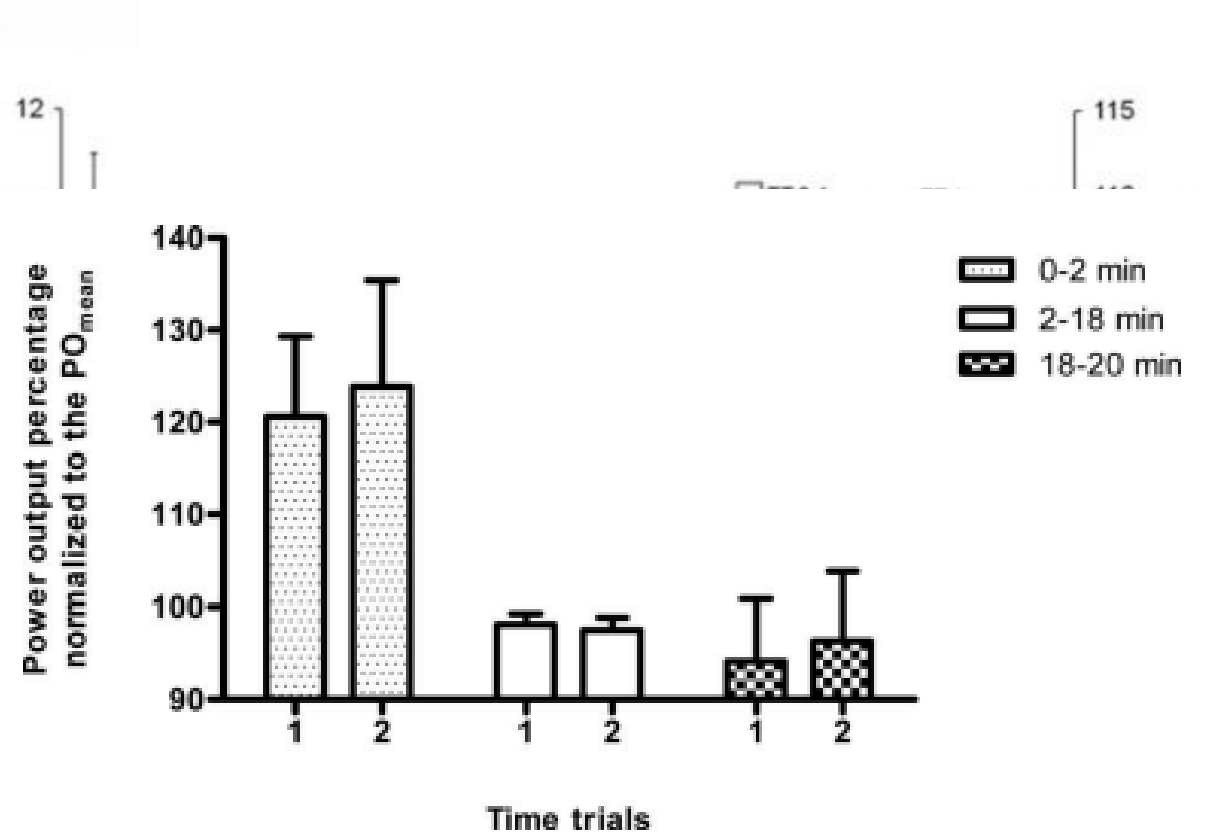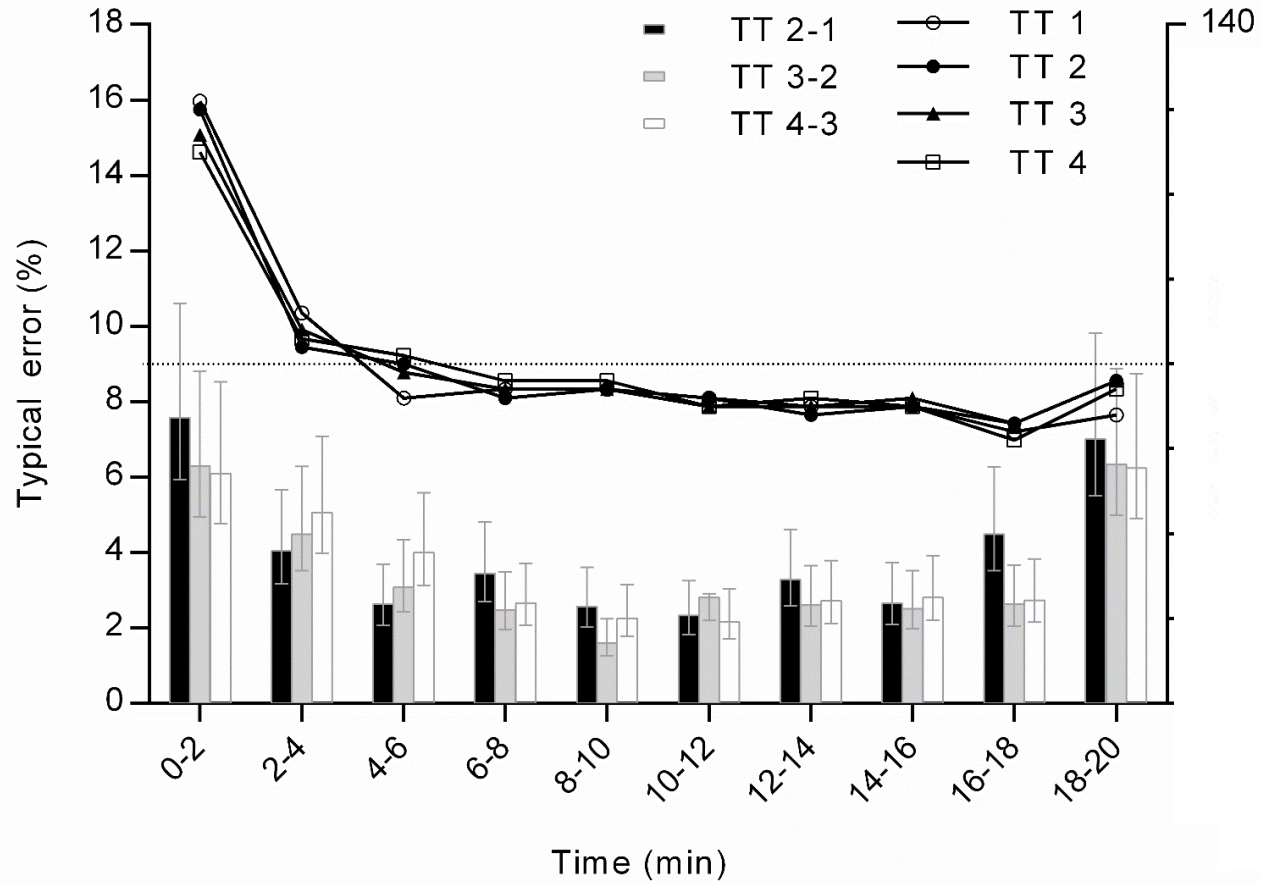
Table 1. Effects on pacing strategy

	F	P	
Time segment	96.134	< 0.001	
TT order	1.970	0.060	
Performance	1.052	0.399	
Courses	4.861	0.006	
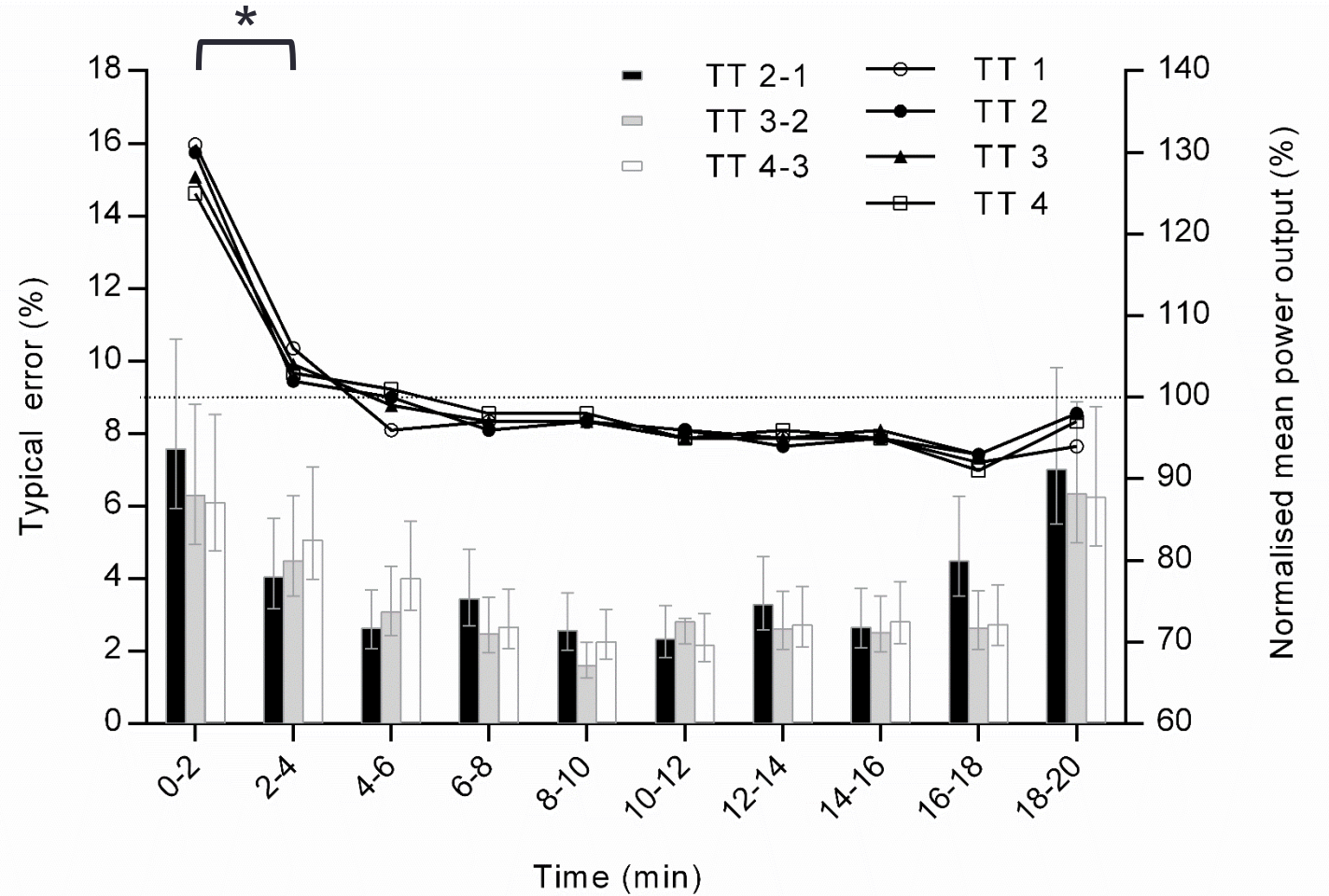
Summary

- High reliability of performance and no learning effects during 20-min uphill TTs, both overall and after splitting cyclists in groups

- Positive pacing strategies found in all TTs, with higher variability at the first and last time segments, but without a learning effect

- Cyclists' performance level does not seem to influence pacing strategy, but course selection does

Practical applications

- TE: 7 W * 2 = 14 W
  - odds of a real change: 92%

- CV: 2.5 %

- Observed difference: 1.5% ∴ uncentainty: 1.5 ± 2.5 = -1.0% to 4.0%
- Observed difference: 4.0% ∴ uncentainty: 4.0 ± 2.5 = 1.5% to 6.5%

Hopkins (2000)

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