

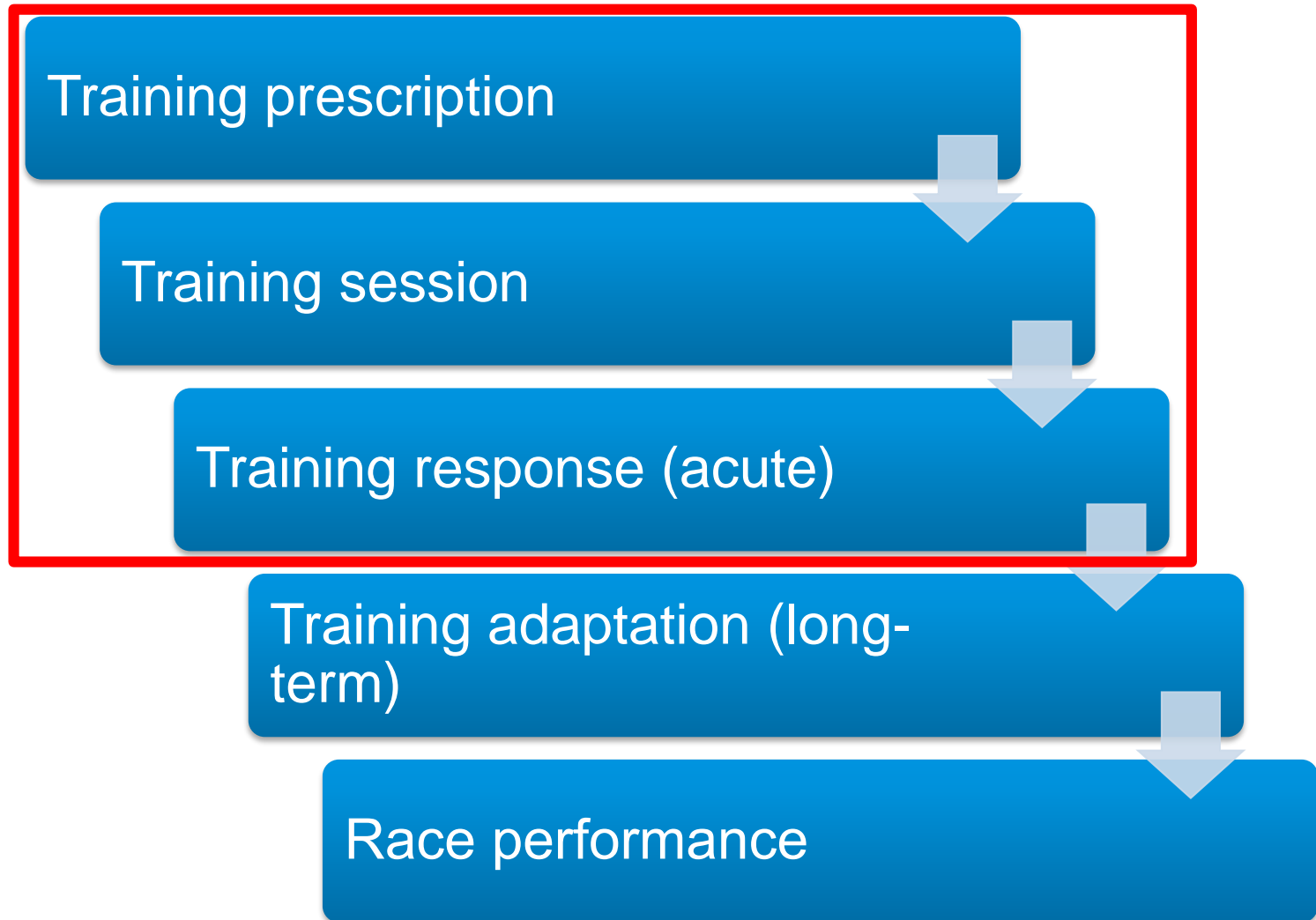
RELIABILITY OF ACUTE TRAINING RESPONSES ELICITED BY EXHAUSTIVE WORK INTERVALS PRESCRIBED WITH THE DELTA CONCEPT

Science & Cycling, 2019

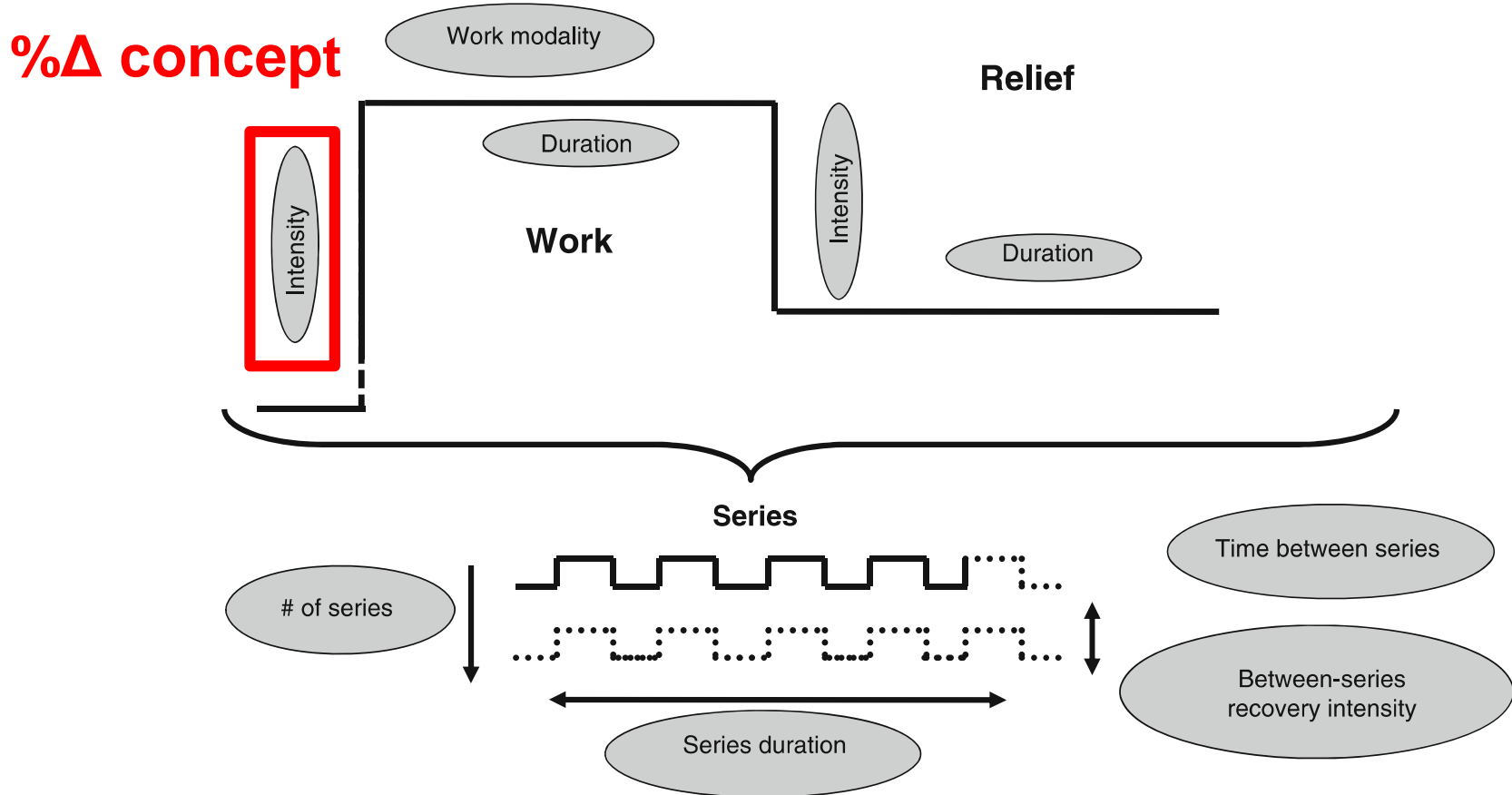
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James Hopker, PhD*



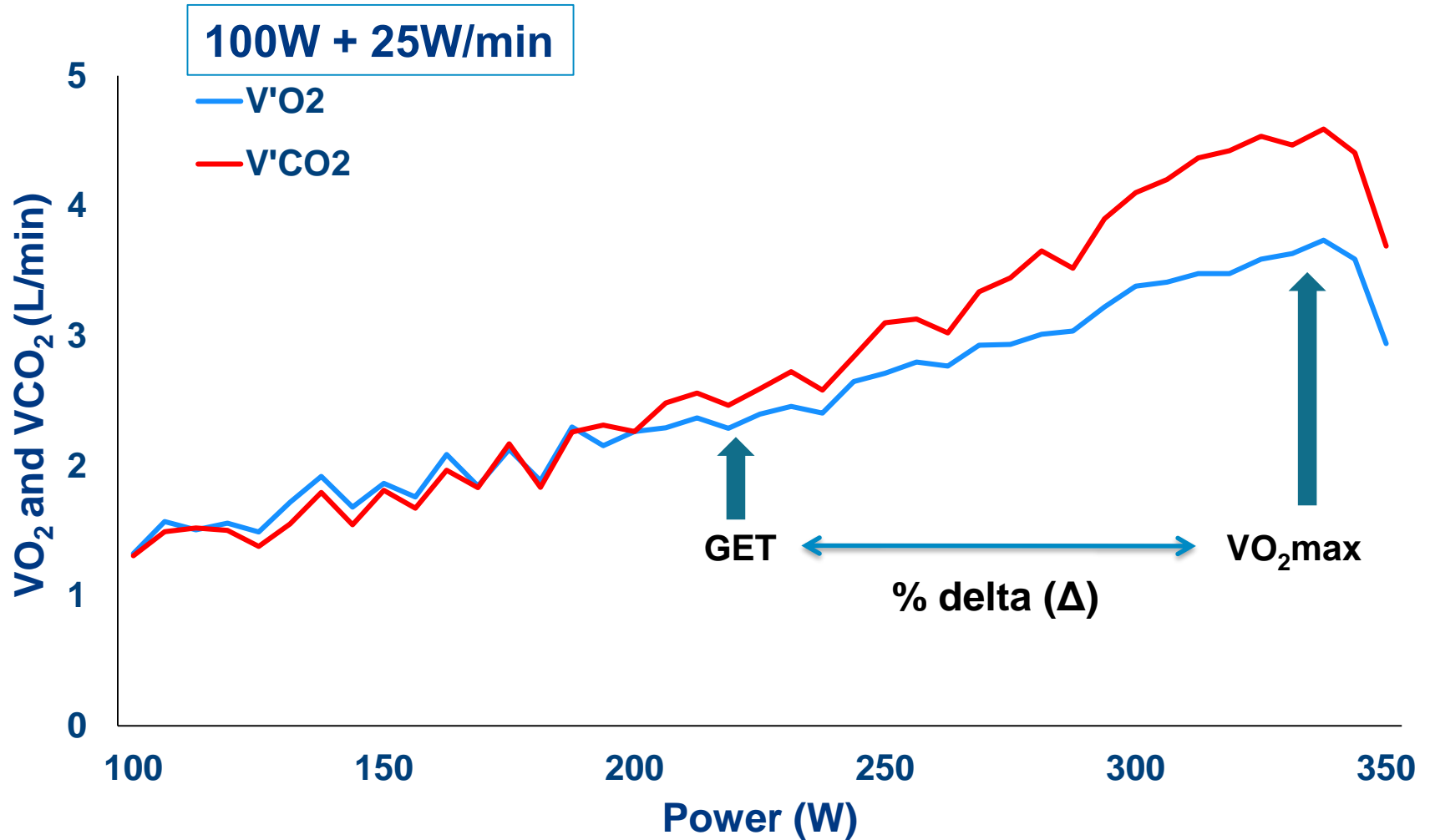
Training process



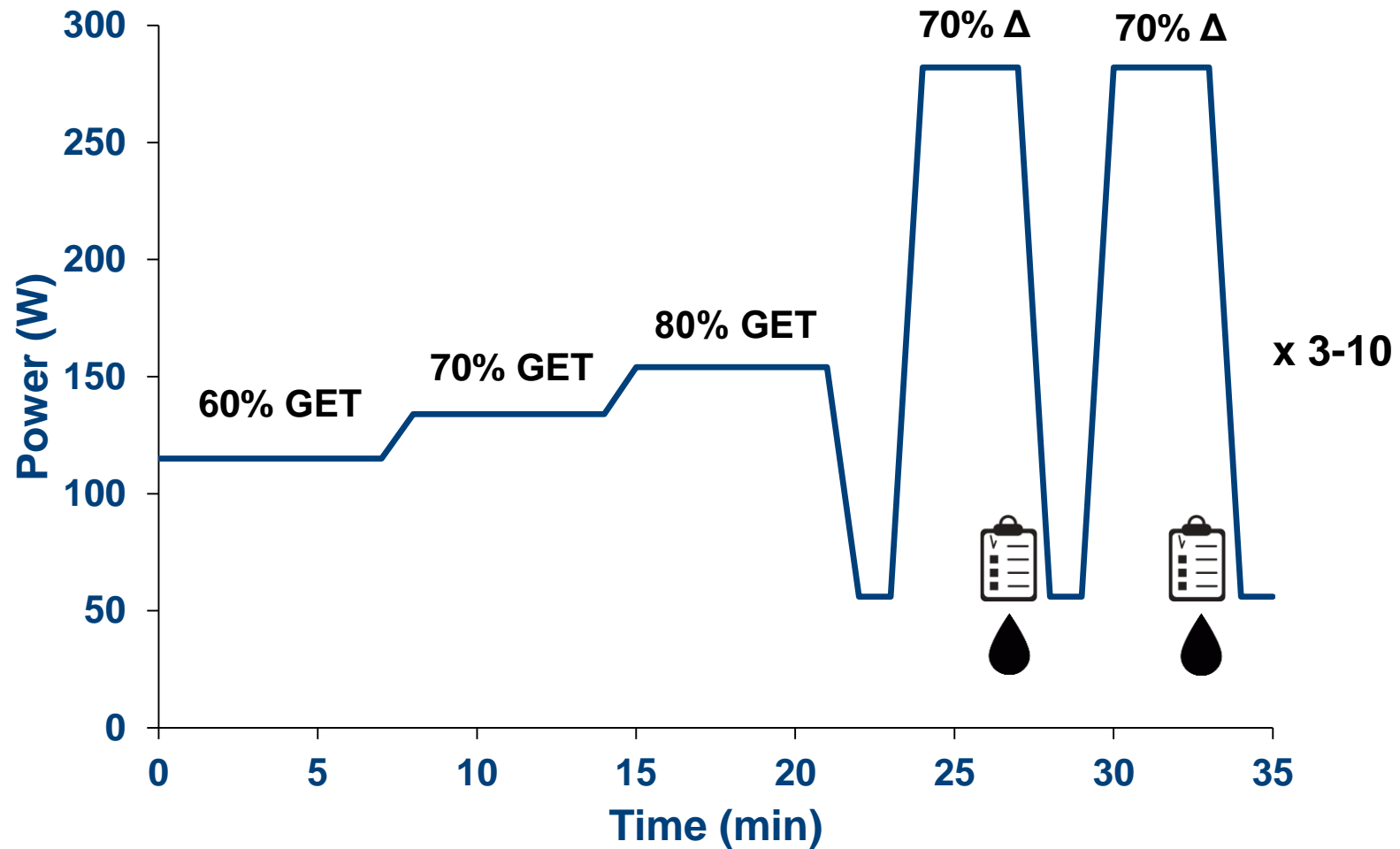
Variables defining HIIT session



% Δ concept calculation from ramp protocol



Training session: 4x



Why...

... this research?

- Little knowledge of acute training responses in HIIT
 - Between participant variability
 - Within participant variability in cycling

.... the % Δ concept?

- Increased consistency between participants in **constant-work-rate exercise** compared to %VO₂max

Participant information

N = 22

Age (years)	36 ± 12
Height (cm)	178 ± 10
Body mass (kg)	75 ± 13
VO ₂ max (ml/kg/min)	52 ± 5
PPO (W/kg)	4.7 ± 0.5

70%Δ

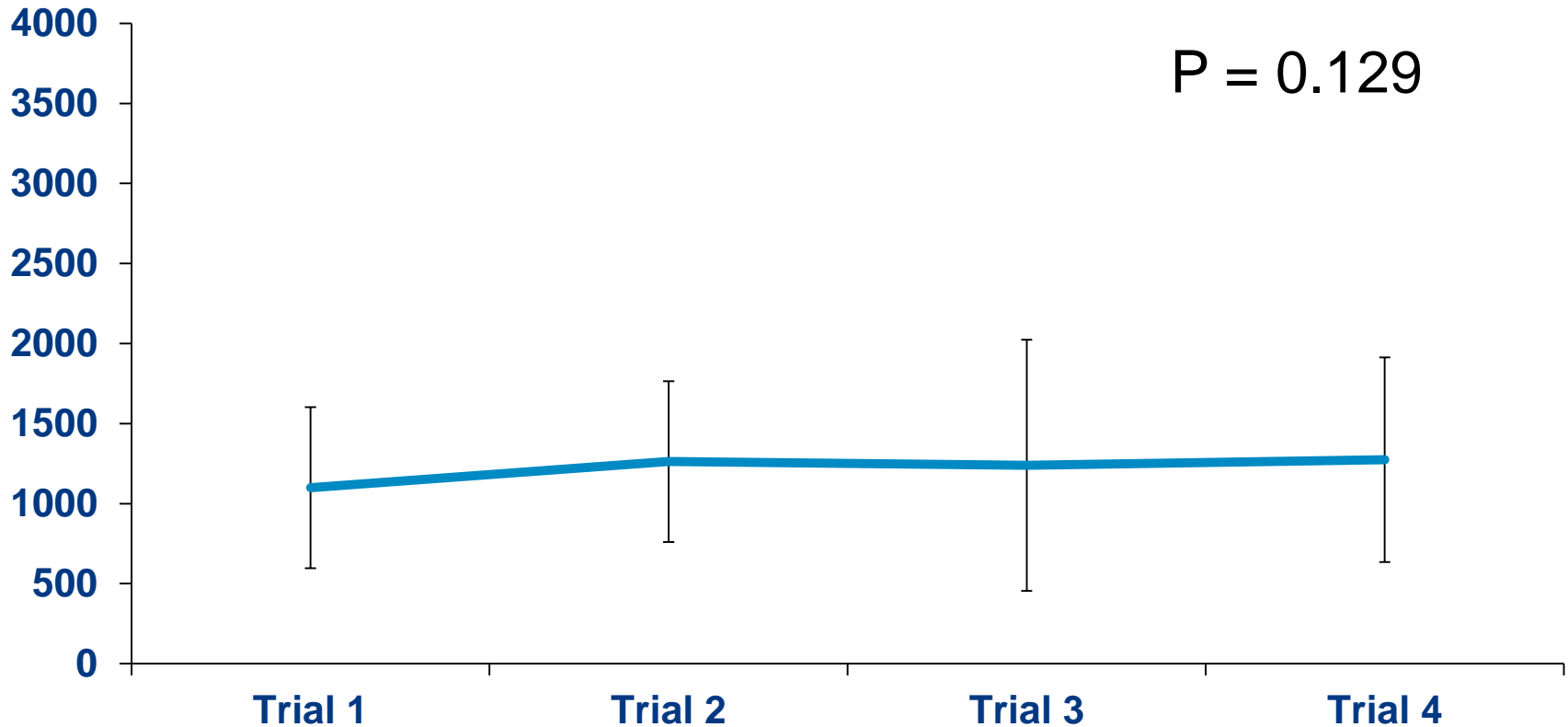
4.0 ± 0.4 W/kg

85 ± 2.7 %PPO

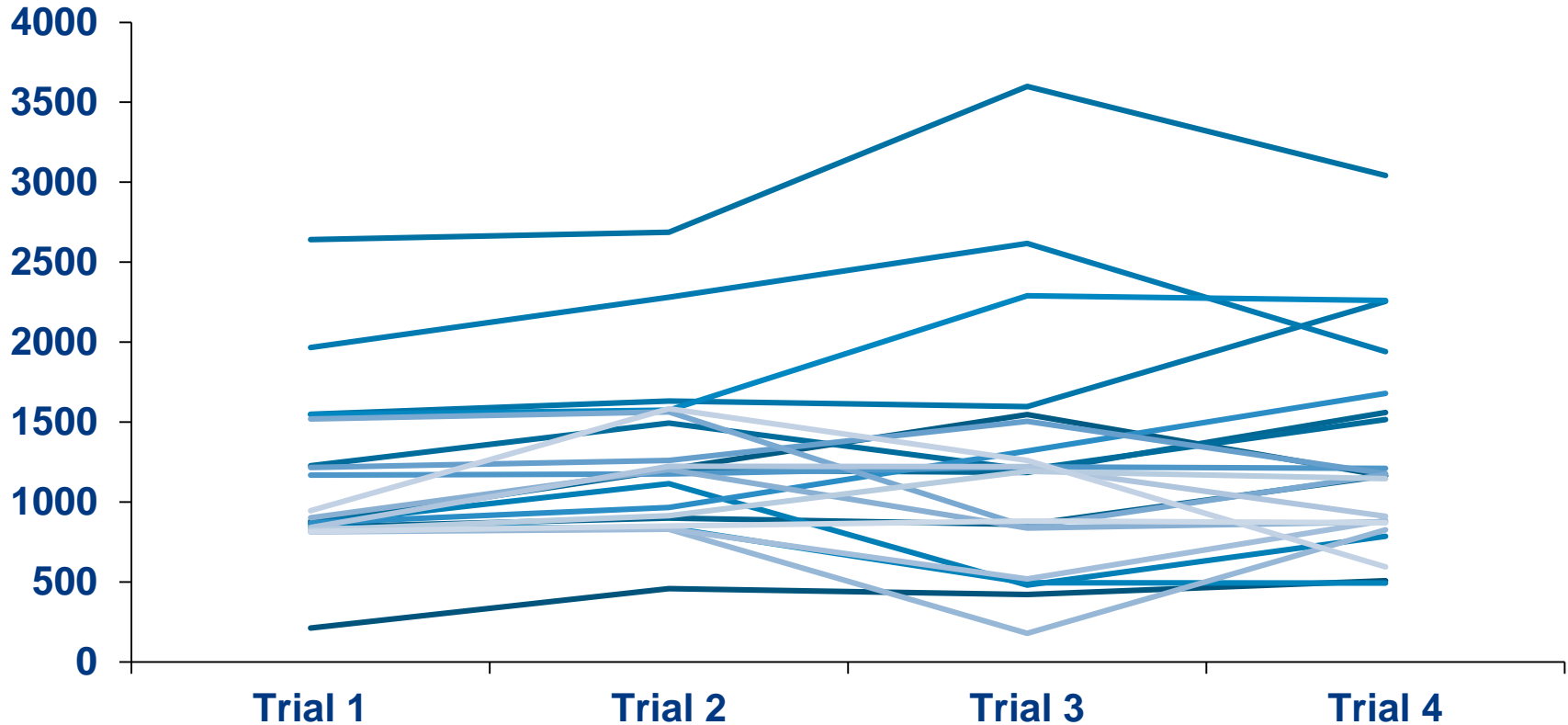
Peak physiological training responses

	Mean \pm SD	ICC	CV _{between} n	CV _{within}
RPE _{peak}	19.6 \pm 0.8	0.85	4.7%	1.9%
HR _{peak} (bpm)	179 \pm 11	0.97	6.2%	1.2%
[La] _{peak} (mmol/L)	14.3 \pm 2.3	0.45	20.4%	15.0%

Time to exhaustion - group



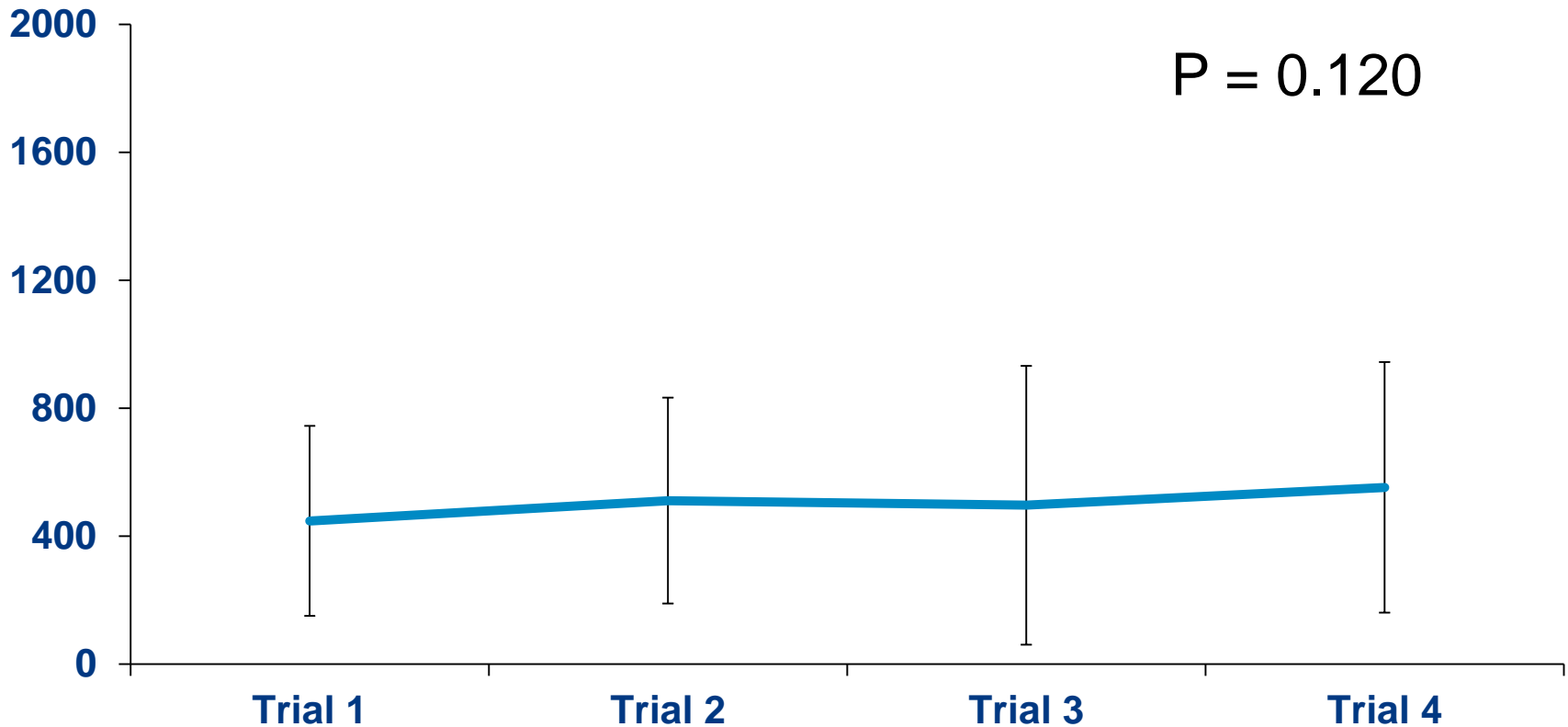
Time to exhaustion - individual



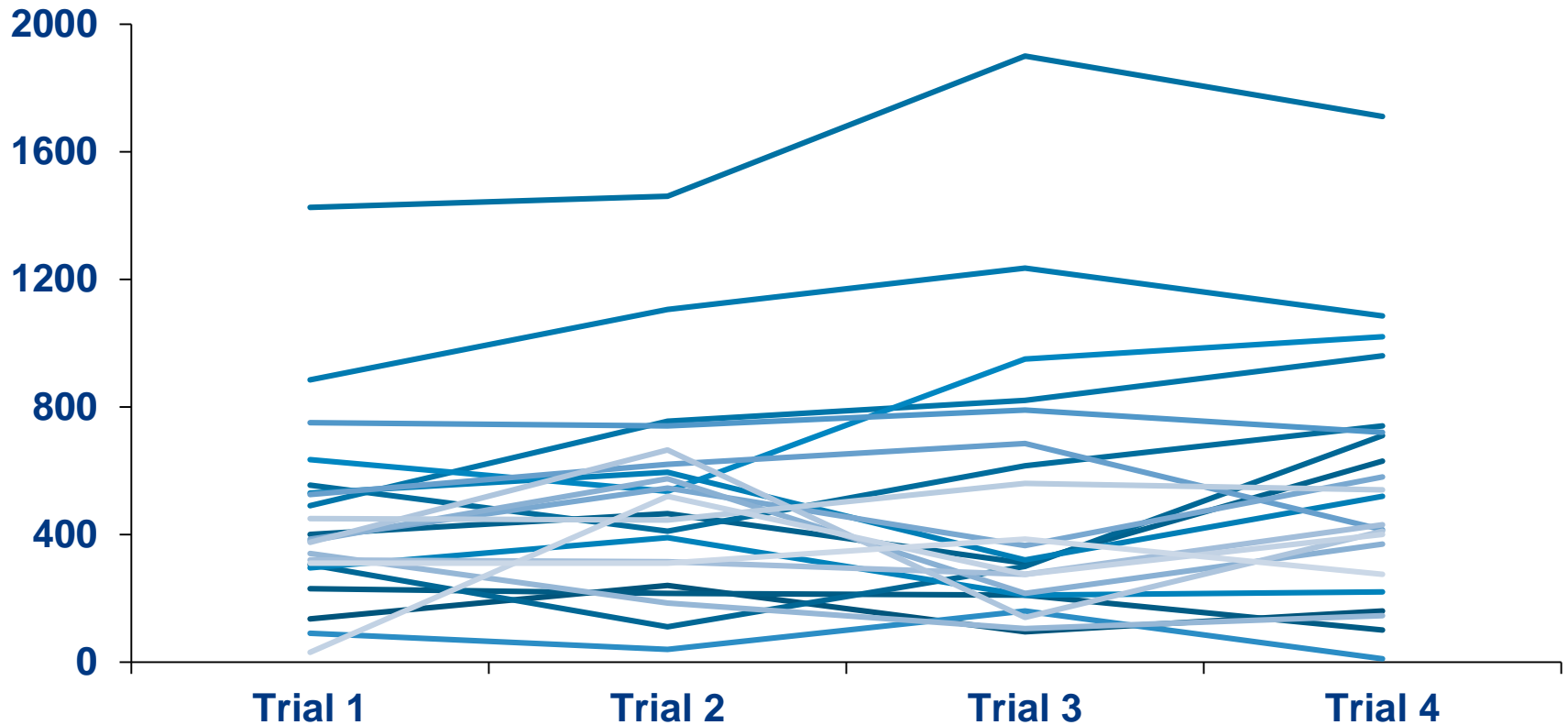
	Mean \pm SD	ICC	CV _{between} n	CV _{within}
Time to exhaustion (s)	1219 \pm 618	0.86	67.0%	31.0%

Source: S. Gill, 2015

Absolute time at $>90\%V\dot{O}_2\text{max}$ (s) - group

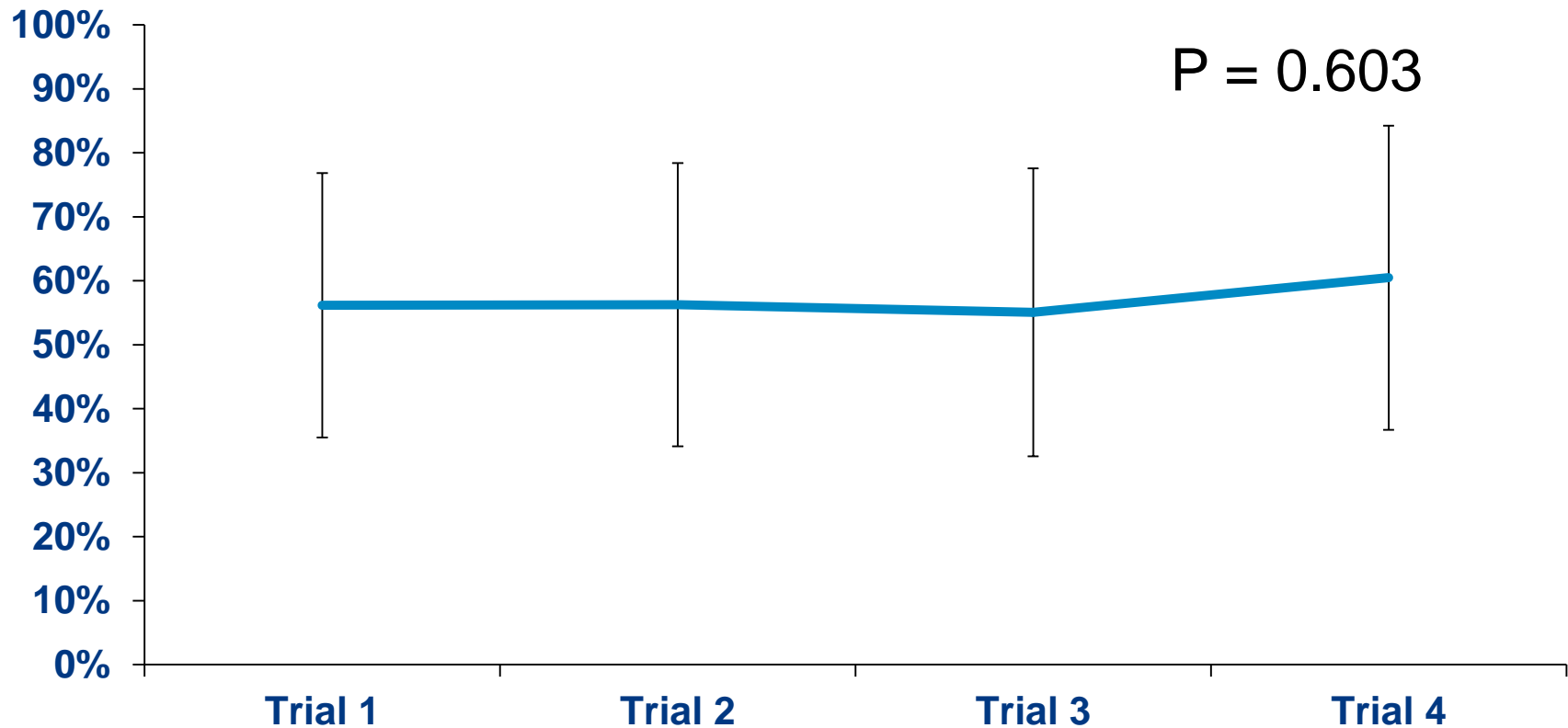


Absolute time at >90% $\dot{V}O_2$ max (s) - individual

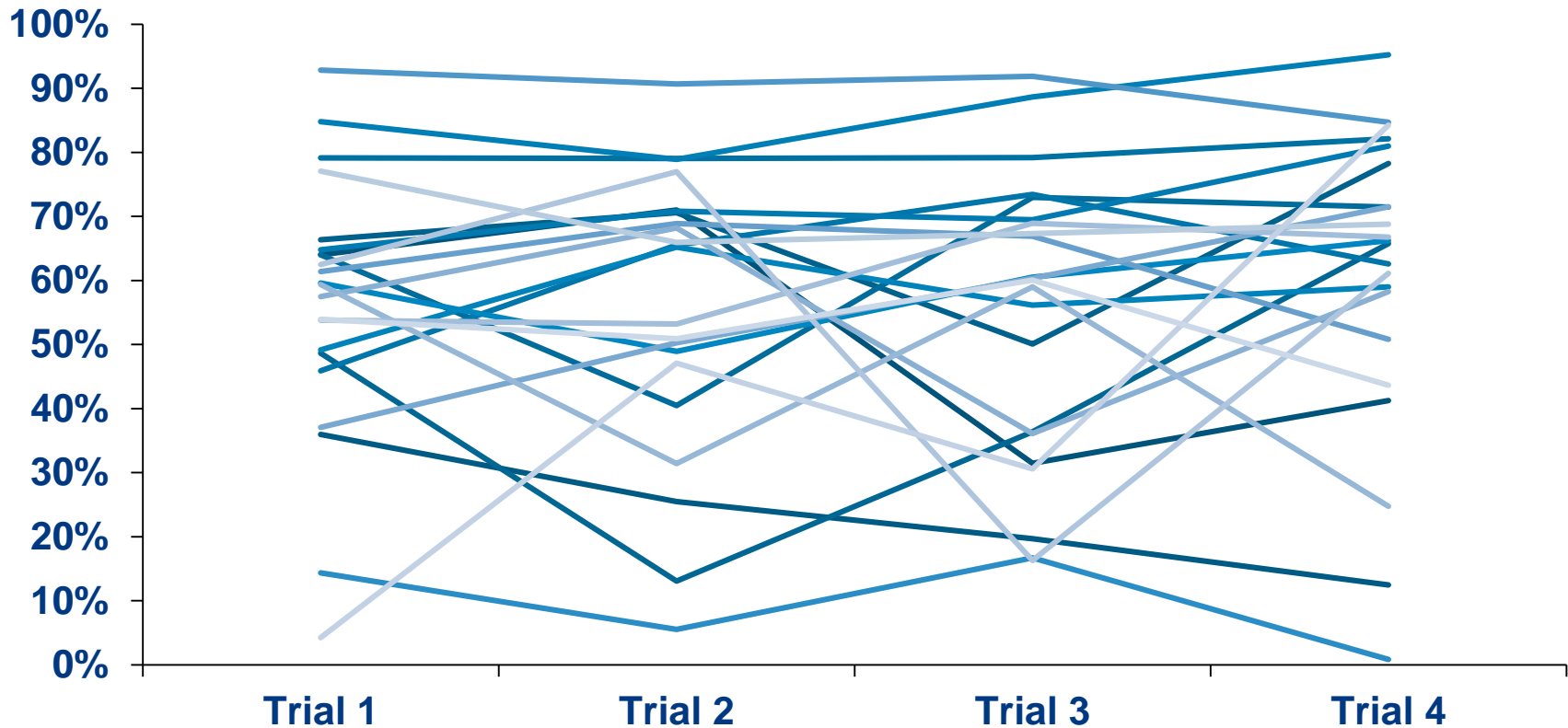


	Mean \pm SD	ICC	CV _{between} n	CV _{within}
Absolute time at >90%$\dot{V}O_2$max (s)	502 \pm 366	0.87	139.3%	67.0%

Relative time at $>90\% \dot{V}O_2\text{max}$ (s) - group



Relative time at >90% $\dot{V}O_2$ max (%) - individual



	Mean \pm SD	ICC	CV _{between} n	CV _{within}
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Relative time at >90% $\dot{V}O_2$ max (%) 57 \pm 22 0.61 109.2% 63.7%

Sample size estimation

	2%	5%	10%	20%	30%
Time to exhaustion	1411	228	59	17	9
Absolute time at $>90\% \dot{V}O_{2\max}$	2854	458	116	31	15
Relative time at $>90\% \dot{V}O_{2\max}$	2421	389	99	27	13

Conclusion

- What you give is not always what you get
- Importance of (subjective) monitoring of training
- Scientific quest to normalise training response continues

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