

Deception of pre-heating and body core temperature improves self-paced running of females in hot, humid conditions

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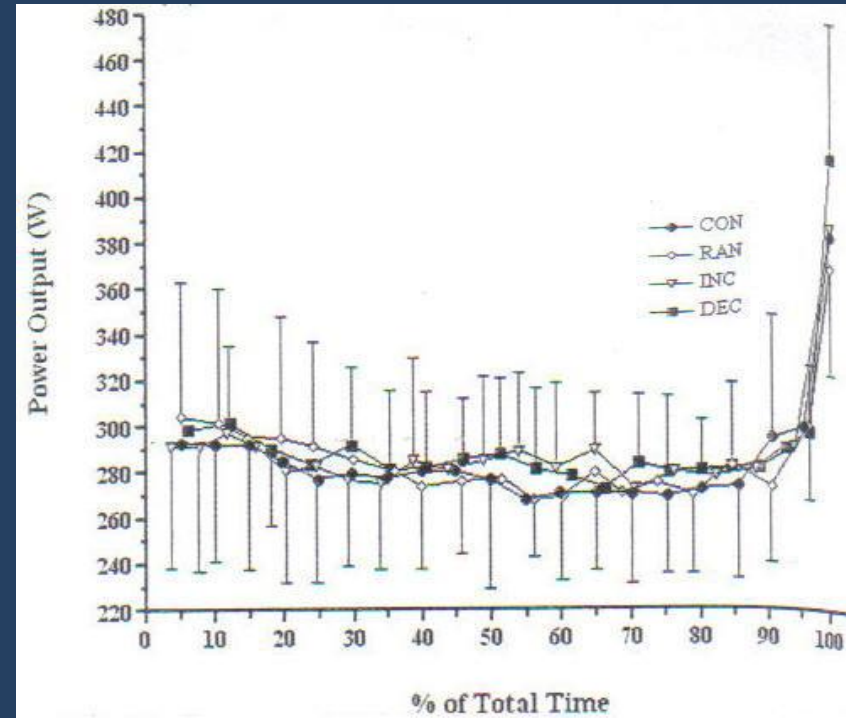
Introduction: Deception & Pacing Studies

Distance Feedback Before Exercise

	Trial 1	Trial 2	Trial 3
Long Distance (km)	30	36	30
Time (min)	61.5 ± 3.1	76.1 ± 2.9	53.3 ± 2.6
Short Distance (km)	30	24	30
Time (min)	66.4 ± 3.4	53.5 ± 2.4	74.8 ± 2.1
Control Distance (km)	30	30	30
Time (min)	63.4 ± 3.4	62.3 ± 2.6	61.8 ± 2.0

Paterson & Marino (2004). *Percept Motor Skills* 98: 1017-1026

Distance Feedback During Exercise



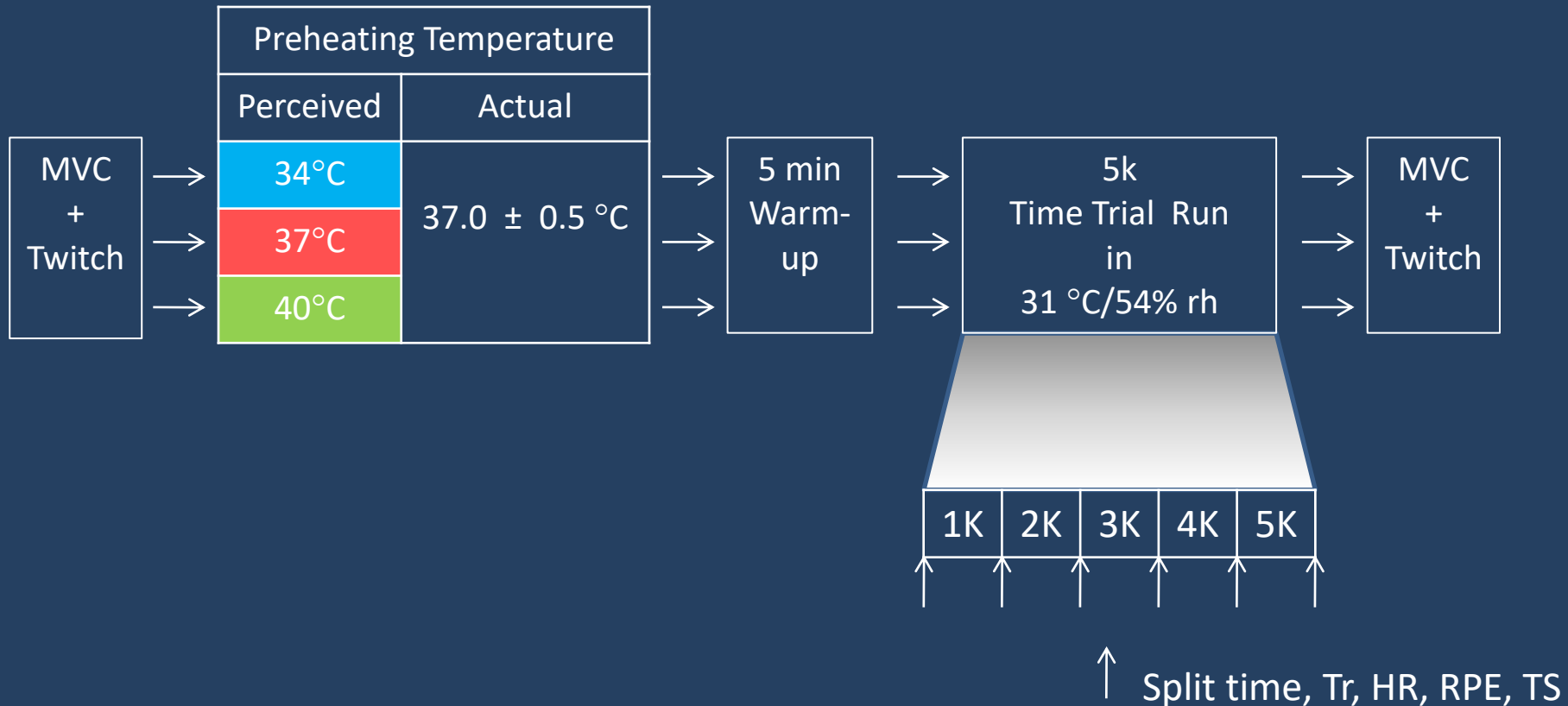
Albertus et al (2005). *MSSE* 37(3): 461-468

Aim: to investigate whether providing incorrect information of the preheating and core temperature would alter self-paced, 5K running in the heat.

Methods: Participants and Experimental Design

- N = 10 females
- 3 main trials
- Main trials during follicular phase

Variable	Mean ± SD
Age (years)	22 ± 3
Weight (kg)	60 ± 8
Height (cm)	169 ± 9
$\dot{V}O_2$ max ($\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$)	46 ± 3



Methods: Deception Procedure

Preheating Temperature

Verbal Cues Used:

- ❑ 34°C: “this is the coolest temperature so you shouldn’t feel as hot today”
- ❑ 37°C: “today you will be in the middle water tank temperature”
- ❑ 40°C “today’s bath is going to feel very hot” and “careful as you get in the water as it is the hottest temperature today”

Perceived Temperature:	34°C	37°C	40°C
Actual Temperature:	37.0 ± 0.5°C		

Core Temperature Feedback

- ❑ 34°C: -0.3°C
- ❑ 37°C: actual temperature used
- ❑ 40°C +0.3°C

- ❑ Reference temperature created

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Deep Body Temperature

38.1 Deg C

Cal Check 0:00:15 Elapsed Time

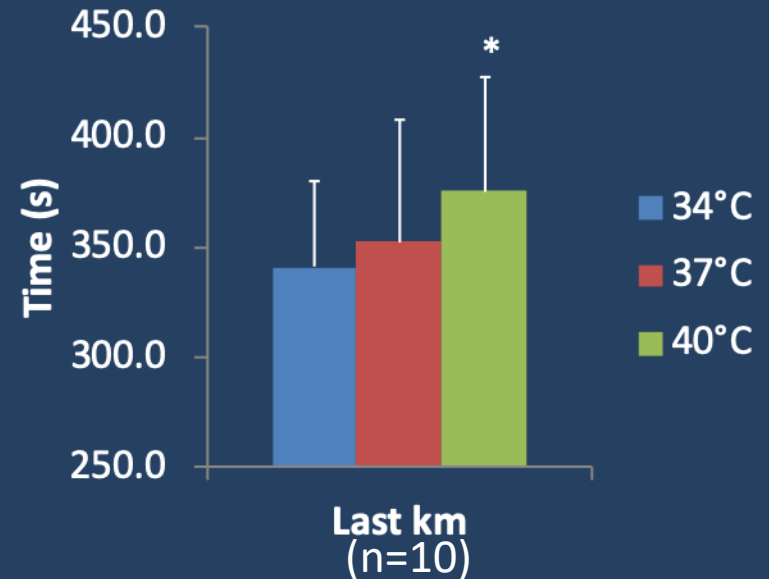
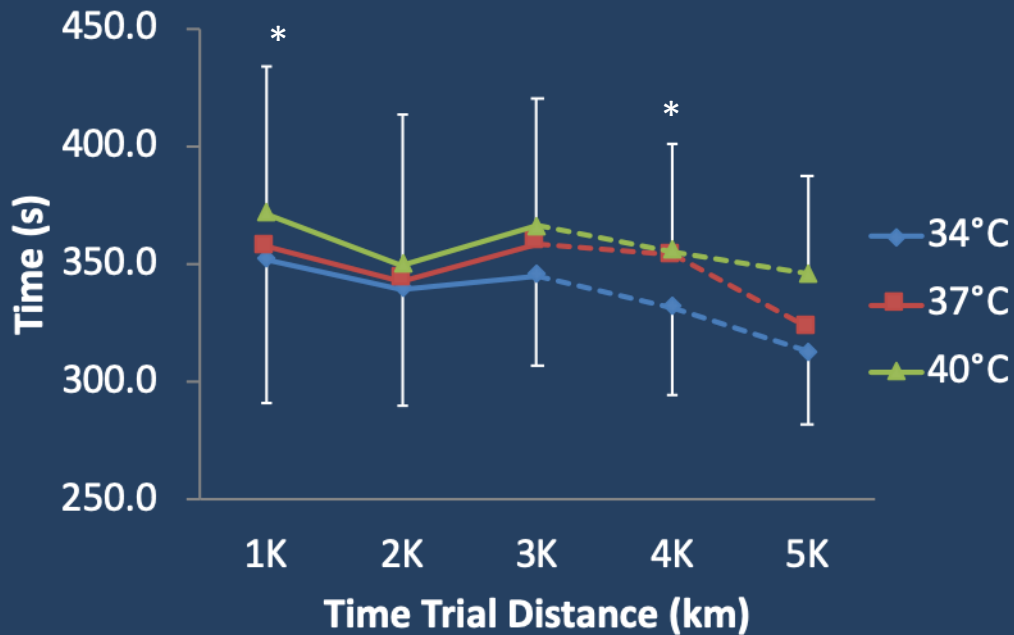
Calibrated to national standards, traceable to BS 1334-6 and EU 223.16 (+/- 0.02% +/- 1 dig)

Start Pause Reset Quit

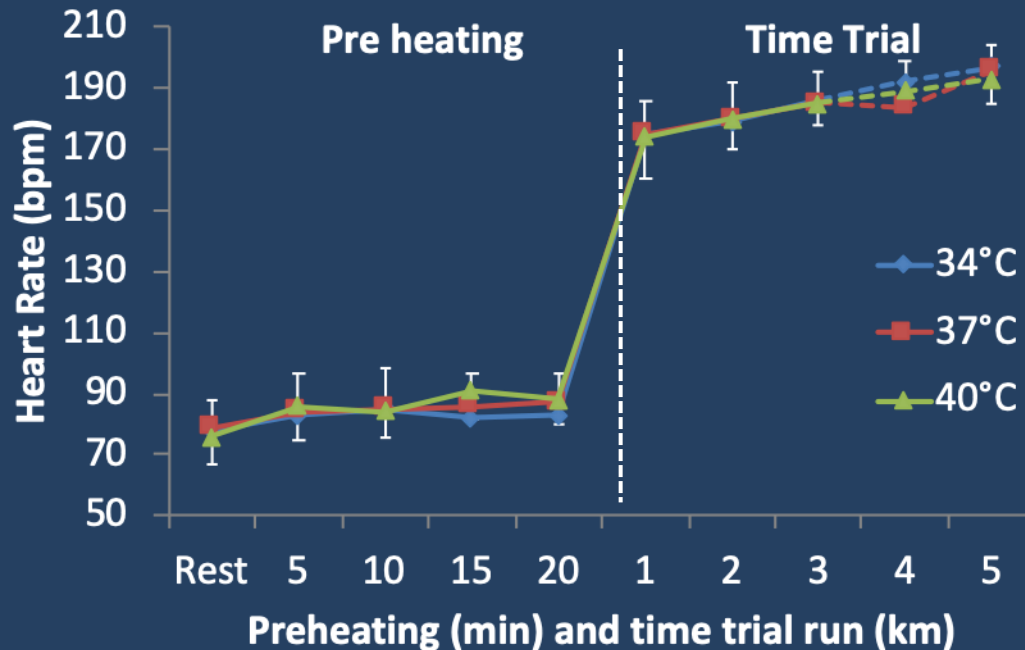
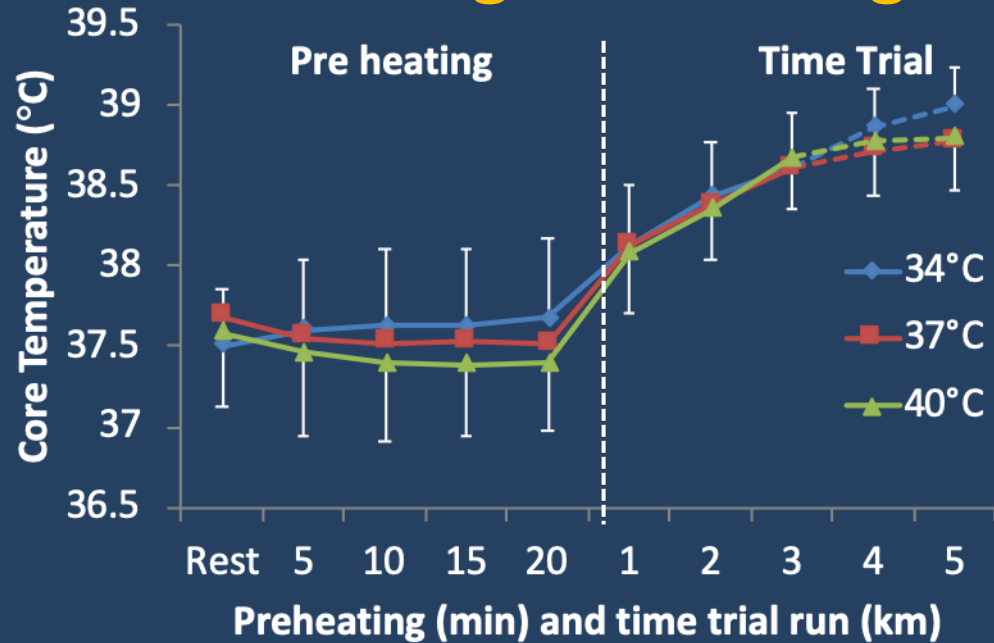
Body Temperature Monitor version 1.3 by A.Allchorn Oct 2005

Results: Time Trial Performance

		Distance (km)				
		1	2	3	4 (n=6)	5 (n=5)
34°C	Seconds (s)	352 ± 61	692 ± 109	1037 ± 139	1297 ± 137	1610 ± 174
37°C		357 ± 51	700 ± 93	1059 ± 118	1360 ± 90	1673 ± 140
40°C		371 ± 63*	721 ± 108*	1087 ± 160*	1374 ± 151*	1731 ± 201*



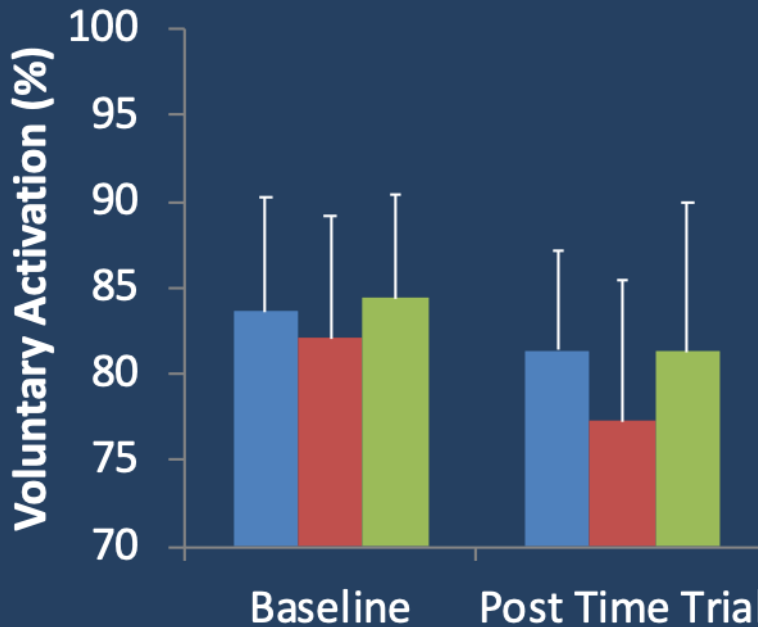
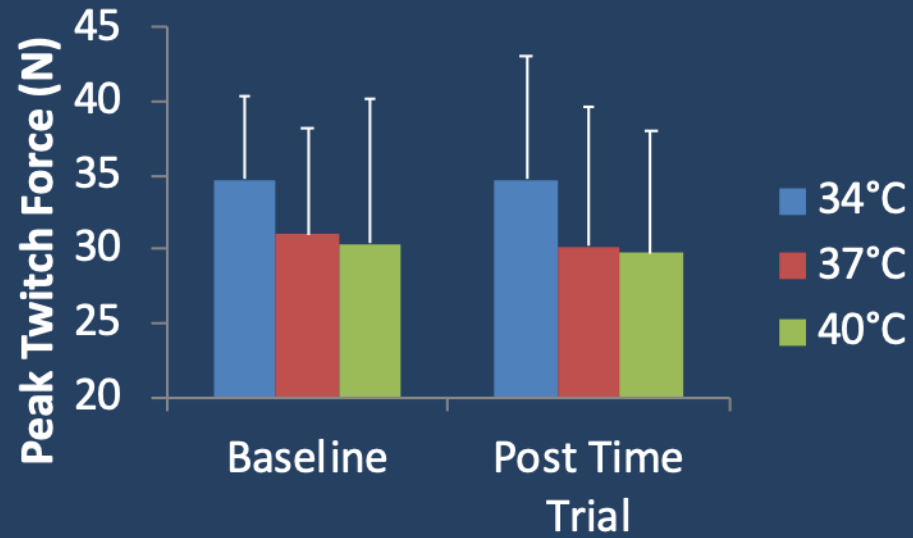
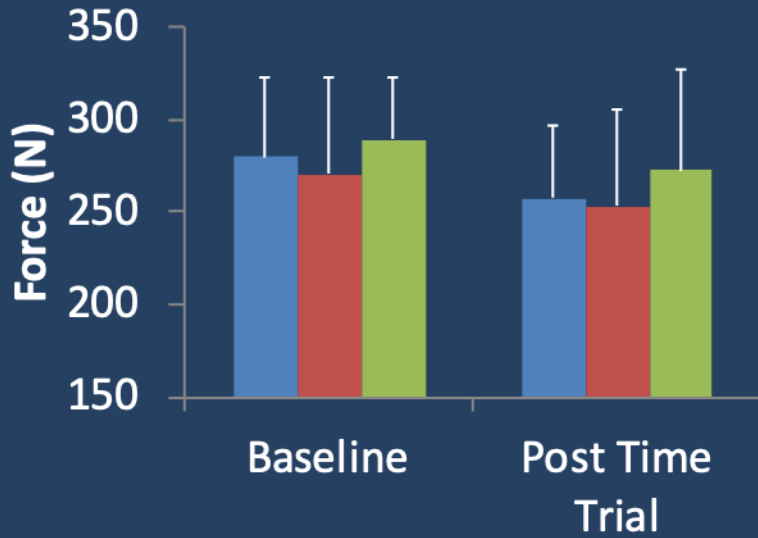
Results: Tc & HR During Preheating and Time Trial



Results: Perceptual Responses During Time Trial

	Distance (km)				
	1	2	3	4 (n=6)	5 (n=5)
RPE					
34°C	13.0 ± 1.1	14.9 ± 1.4	16.1 ± 1.5	17.7 ± 0.5	19.2 ± 0.5
37°C	13.1 ± 1.4	14.5 ± 1.5	15.6 ± 1.5	17.2 ± 1.5	18.6 ± 0.9
40°C	13.4 ± 1.7	14.8 ± 1.9	16.4 ± 1.2	18.0 ± 1.1	18.6 ± 1.1
TS					
34°C	6.0 ± 0.6	6.6 ± 0.4	6.9 ± 0.5	7.3 ± 0.4	7.4 ± 0.4
37°C	5.7 ± 0.7	6.3 ± 0.6	6.7 ± 0.7	6.8 ± 0.9	7.1 ± 0.8
40°C	6.0 ± 0.7	6.5 ± 0.7	6.8 ± 0.5	7.0 ± 0.8	7.4 ± 0.4

Results: Voluntary & Evoked Muscle Properties



Conclusion

- ❑ Pacing strategy was manipulated; in this study by incorrect perception of temperature.

	Distance (km)				
	1	2	3	4	5
34-40°C (%)	5.1	4.0	4.6	5.6	7.0
TEM as CV(%)	4.1	2.7	2.1	1.5	2.4

- ❑ Supports evidence that preheating reduces endurance performance in the heat
- ❑ Incorrect perception of temperature may have resulted in a mismatch between the previously learnt **conscious and subconscious pacing strategy**.
- ❑ Deception of preheating temperature **before** rather than core temperature **during** time trial responsible for the altered pacing strategy
- ❑ **Implication:** Correct knowledge of internal and external temperature could be important for athletes, otherwise they may underperform if they perceive a greater heat load to exist.