

Deceptively-Altered Visual Feedback Alters 4km Cycling Time Trial Performance in Trained Cyclists

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Introduction

The brain maintains a performance reserve capacity by regulating fuel utilization. One method of overriding the governor is the utilization of deception. The purpose of this study is to examine the effect of deceptively-modified feedback on time to completion during a laboratory based 4000m time trial.

Methods

12 trained cyclists (8 Male, 4 Female) age 41.6 ± 12.3 years with a mean peak aerobic capacity of 51.3 ± 6.5 ml/kg/min. Participants completed a VO_2 peak test followed by two baseline 4km time trials without the influence of a virtual avatar competitor. The participants completed two more time trials in randomized order competing against an avatar representing 100% (control) or 102% (deception) of their fastest baseline trial. Participants were told that they were competing against their previous fastest baseline trial during time trials 3 and 4.

Results

Time to completion during the deception condition was shorter than the control condition -3.62 ± 0.8 sec $p = .004$ 95% CI $[-5.99, -1.24]$. Average power output was greater during the deception trial compared to the control trial 7.1 ± 2.28 w $p = .033$ 95% CI $[0.55, 13.66]$. Power output was greater during the deception trial at 30% and 40% of the trial compared to the control trial 12.0 ± 2.4 w $p = .001$ 95% CI $[5.36, 18.6]$ and 12.4 ± 2.5 w $p = .001$ 95% CI $[5.5, 19.4]$. Rating of Perceived Exertion was lower during the first 25% of the deception trial compared to the control $-1 \pm .348$ $p = .046$ 95% CI $[-1.98, -.018]$.

Discussion and Conclusions

It is possible a lower RPE during the first 25% of the time trial allowed for increased power output during the middle portion of the deception trial. The increased power output could have led to the improved time to completion in the deception trial.

Key words: Deception, Cycling Performance, Trained Cyclists, Perceived Exertion

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