

Journal of Science and Cycling

Breakthroughs in Cycling and Triathlon Sciences



Special number: World Congress of Cycling Science 2015, 1/2 July 2015, Utrecht

Editors: Mikel Zabala (PhD)
Greg Atkinson (PhD)



Science & Cycling
1 & 2 July 2015, Utrecht



OPEN ACCESS

www.jsc-journal.com

Differences in visual information-seeking behavior between expert and novice time-trial cyclists

¹Boya M , ¹Foulsham T, ¹Hettinga, F, ¹Parry D, ²Williams EL, ²Jones HS, ²Sparks SA, ²Marchant D, ²Ellison P, ²Bridge C, ²Midgley A, ²McNaughton L & ¹Micklewright D.

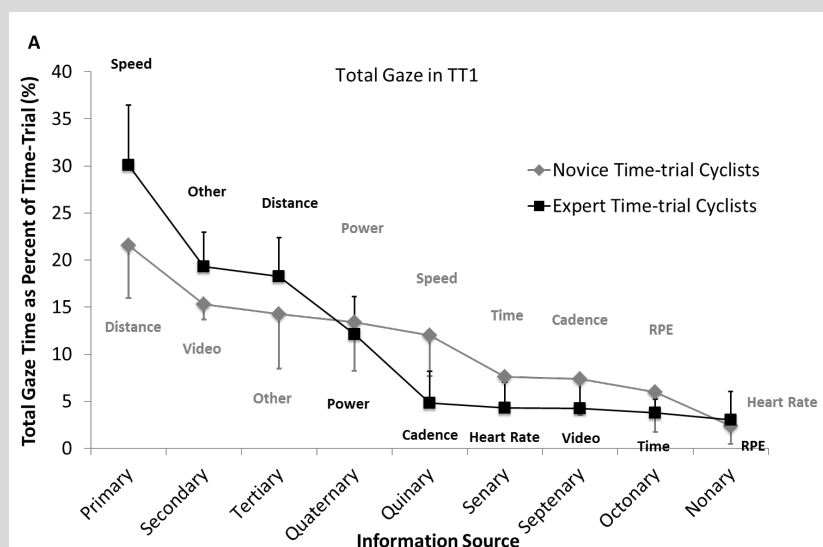
Abstract

Introduction: Pacing can be defined as an ability to distribute available energy resources during the race (Hettinga *et al.*, 2006). It's a determinant of athletic performance, affected by an interaction between previous experience, performance feedback and individual risk-traits (Micklewright *et al.*, 2014). Selective processing of internal physiological and external feedback information is a complex process that informs pace decision-making (Renfree *et al.*, 2014), but little is known about how athletes seek-out and interpret information to make pacing decisions. This study compared information-seeking behavior between novice and experienced cyclists.

Methods: Novice (n=10) and experienced (n=10) cyclists performed two 16.09 km self-paced time-trials (TT's), one week apart. Time-trials were performed on a Velotron cycle ergometer using a video simulated course. Performance information (power, speed, cadence, distance and time), heart rate and the 6-20 RPE scale were displayed in front of participants during TT's. A head-mounted eye-tracker was used to measure the frequency and duration of gazes towards each type of information. Gaze was coded as 'other' when participants were not looking at any of the information specified above. Cumulative gaze duration for each information source was calculated as a percentage of TT completion time. Between and within-subjects ANOVA's were used to compare performance, fixation times and fixation frequencies between groups and trials.

Results: Performance between TT's did not change for experts (27:55±1:21 vs. 27:42±1:30 mins:secs) or novices (30:53±3:14 vs. 30:16±2:56 mins:secs). Cycling speed in each segment was faster among experts compared to novices, but both groups maintained an even pace through the TT's. In TT1, experts primarily looked at speed (30.1%) followed by other (19.3%) then distance (18.3%). Novices were less selective during TT1, looking at distance (21.6%), video (15.3%), other (14.3%), and power (13.4%) (Fig 1A). Experts looked at speed more in TT2 (Speed 33.4%, Distance 17.7%, and other 16%) and novices looked at the video less (Distance 23.1%, Speed 14.4%, Power 13.8%, Other 13.6% and Video 10.5%) (Fig1B). Differences in fixation time were found between groups for primary (P=0.003) and secondary sources of information (P=0.043) (Fig 2A). Differences were also found in frequency for primary (P=0.003) and secondary source of information (P=0.04) respectively (Fig. 2B).

Discussion: Experts were found to look at speed as their primary source of information compared to novices who looked at distance. This may indicate a preference for performance related decision-making in experts compared to a focus on task completion among novices.



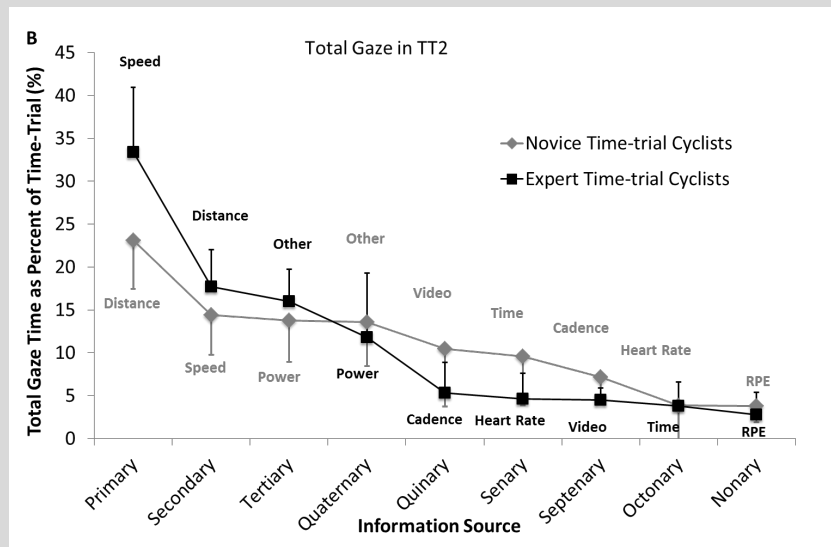


Figure 1. Percentage of overall time spent looking at each type of information between experts and novices for the first time trial (A) and the second time trial (B).

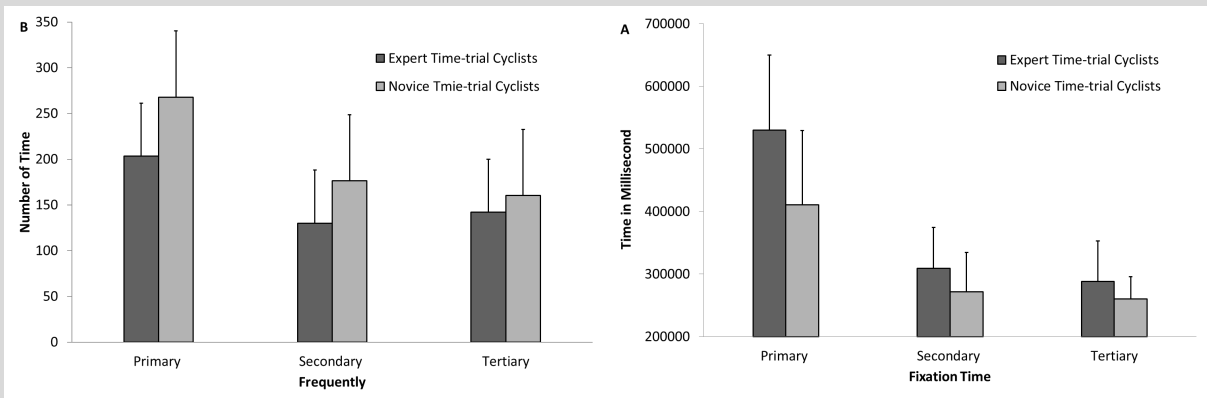


Figure 2. Fixation time (A) and gaze frequency (B) for primary, secondary, and tertiary sources of information between groups.

✉ Contact email: mnbboy@essex.ac.uk (M. Boya)

¹Sport, Performance & Fatigue Research Unit, University of Essex
²Sport Performance Group, Edge Hill University