Title: Effects of residual fatigue on pace regulation during sprint-distance triathlon running.

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Introduction: It has been suggested that unique relationships exist between perceived exertion, pacing and physiological responses during triathlon (Parry et al., 2011). However, research to date has not clearly established how the interaction of these factors is affected by residual physiological fatigue, particularly during running performance over distances relevant to sprint-distance triathlon. This study therefore investigated the effects of the preceding swim and cycle on pacing strategy, perceived exertion, and physiological status during sprint-distance triathlon running.

Methods: Eight amateur male triathletes (mean ± SD: age 36.0 ± 5.7 yrs, mass 75.7 ± 5.3 kg) completed two field-based performance trials. The first was a sprint-distance triathlon (0.75 km swim, 20 km cycle, 5 km run) and the second an isolated 5 km run time-trial, each separated by 7-18 days and utilising the same flat out-and-back road course. Wrist-mounted GPS devices (Garmin 310XT, UK) recorded performance time, running speed ($km \cdot h^{-1}$) and heart rate during each trial. Participants recorded ratings of perceived exertion (Borg 6-20 scale) every kilometre using a wrist-mounted recording sheet and pen. Core temperature (CorTemp, HQInc, USA), blood lactate concentration (Lactate Pro, Kodak, Japan) and body mass (to 0.1 kg; Seca 875) were also measured immediately prior to, and after, each run.

Results: Performance time for isolated running (19:28 ± 00:32) was ~7% quicker than triathlon running (20:48 ± 00:43) ($p<0.01$), with a similar positive pacing strategy displayed throughout both trials (figure 1). Initial core temperature, blood lactate concentration and heart rate values were all significantly higher for the triathlon run compared to the isolated run ($p<0.01$), with no differences in final values for these measures. No significant differences were observed for initial RPE, rate of RPE increase, or final RPE between runs.

Discussion/Conclusion: Prior swimming and cycling impair performance but do not affect pacing strategy during sprint-distance triathlon running. Reduced performance may be attributed to the residual physiological strain observed at the start of the triathlon run. However, the maintenance of scalar-linear increases in RPE appears to be the primary regulator of pacing strategy during triathlon running, with physiological responses only indirectly related to this process.

References:

Parry, D., Chinnasamy, C., Papadopoulou, E., Noakes, T., & Micklewright, D. (2011). Cognition and performance: Anxiety, mood and perceived exertion among ironman triathletes. *British Journal of Sports Medicine, 45*(14), 1088-1094.

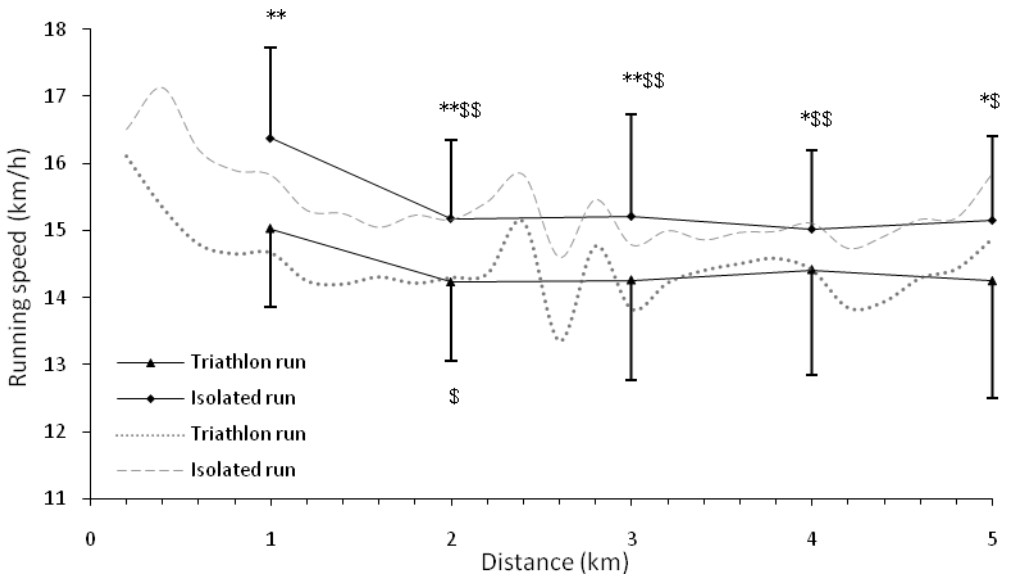

Figure 1 Mean group running speed for each 1 km (solid lines) and 200 m (dashed lines) completed in both running conditions. *Significantly different from isolated run value, $p<0.05$. **Significantly different from isolated run value, $p<0.01$. $ Significantly different from the initial value, $p<0.05$. $$ Significantly different from the initial value, $p<0.01$.