

## **A comparison of treadmill versus outdoor running economy in recreational runners**

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There has been a large uptake in recreational running in recent years, as people see it as an easy way to improve fitness, and 5 km is considered an accessible entry level distance. This is due in part to the widespread use of apps such as Couch to 5k, free from the NHS, and the growth of parkrun, including GPs prescribing parkrun. Given this large cohort of recreational runners, there is a dearth of research examining this population and their physiological makeup. It is widely accepted that running economy (RE), the metabolic cost of steady-state running, is a reliable indicator of running performance at 5 km distances (Saunders et al., 2004, *Sports Medicine*, 34(7), 465-485). However, research has predominantly examined elite and well-trained runners, on a laboratory treadmill. Hence little is known about the outdoor RE of recreational runners. The aim of this study was to examine the differences in RE over the two conditions, to determine whether measuring RE only in an external environment can be considered a useful measure. Eight recreationally active participants (5 female) (mean  $\pm$  SD: age 33.25  $\pm$  10.39 years; stature 1.72  $\pm$  0.93 m; body mass 66.19  $\pm$  13.66 kg) provided written informed consent before taking part in the study which had institutional ethical approval. Participants wore a portable COSMED K5 metabolic analyser and ran, in a randomised order, at a self-selected comfortable 5k running pace for 5 minutes on a treadmill (TD), and at the same speed for 5 minutes outside (OG), using an accompanying bike to pace the runner. Rating for perceived exertion (RPE) was recorded post-test, and the RE for each condition determined during the final minute of the test. A t-test showed there was a statistical difference in RE between the two conditions ( $P = 0.03$ ; TD mean  $\pm$  SD: 221.58  $\pm$  56.25 ml.kg<sup>-1</sup> .km<sup>-1</sup> ; OG mean  $\pm$  SD: 187.48  $\pm$  33.98 ml.kg<sup>-1</sup> .km<sup>-1</sup> ), although there was a strong correlation between them ( $R = 0.784$ ,  $P = 0.021$ ), the effect size (Hedges'  $g = 0.68$ ) suggested there is a moderate difference. Participants reported a statistically significantly lower RPE ( $P < 0.01$ ) when running outside (TD mean  $\pm$  SD: 14  $\pm$  1.84; OG mean  $\pm$  SD: 10  $\pm$  3.23). The results suggest that further studies should examine possible reasons for the differences between RE in the two conditions as there may be limitations in assessing one condition and applying results to the other.