Influence of Deception of Task Duration on the Lung- and Leg-Specific Perceptual Responses to Whole-Body RPE-Clamp Cycle Ergometry

Pasquale J. Succi[1], Brian Benitez[1], Minyoung Kwak[1], Clara J. Mitchinson[1], Timothy A. Butterfield[1], Michael A. Samaan[1], Jody L. Clasey[1], and Haley C. Bergstrom[1]

[1]*University of Kentucky, Lexington, KY*

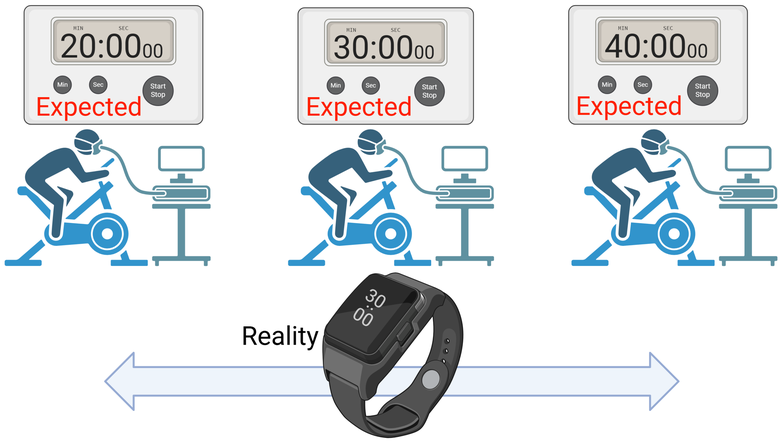
Introduction

- Several theories exist to explain the contribution of various factors that influence the rating of perceived exertion (RPE) during exercise, and therefore exercise pacing and performance, which often include the expectation of the duration or length of exercise.
- However, it is unclear if the expectation of exercise duration influences the local RPE during exercise

PURPOSE

- This study examined the influence of the expectation of exercise duration on the lung- and leg-specific perceptual responses to whole-body RPE-clamp exercise anchored to RPE15 where participants were deceived into believing the RPE-clamp exercise would last for either 20-, 30-, or 40-min, but all trials were actually 30-min.

Methods



- Fourteen males (Age=22.8±3.0yrs) and fifteen females (Age=21.7±2.6yrs) completed a graded exercise test followed by randomly ordered RPE-clamp trials at RPE15 (“hard”) on the Borg 6–20 scale where subjects were deceived into expecting exercise to last either 20-, 30-, or 40-min, but the actual duration for each trial was 30-min.
- Prior to each RPE-clamp trial, participants were given the explicit definition of RPE as “the sensation of how hard, heavy, and strenuous the physical task is", without including any sensations of pain or discomfort, and were instructed to manually adjust the power output to maintain whole-body RPE15.
- During each RPE-clamp trial, lung- and leg- specific RPE was recorded every 3 min once whole-body RPE15 was reached. Total work for each trial was calculated as the product of the average power output over the course of the trial and the duration of the trial in seconds (1800 seconds).
- Separate 3 (Deception [20-min, 30-min, 40-min]) x 11 (Time [0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30 min]) repeated measures analyses of variance (ANOVAs) with appropriate follow-up ANOVAs, and Bonferroni-corrected pairwise comparisons were used to examine changes in lung- and leg-specific RPE.
- A one-way repeated measures ANOVA was used to examine differences in total work between trials.

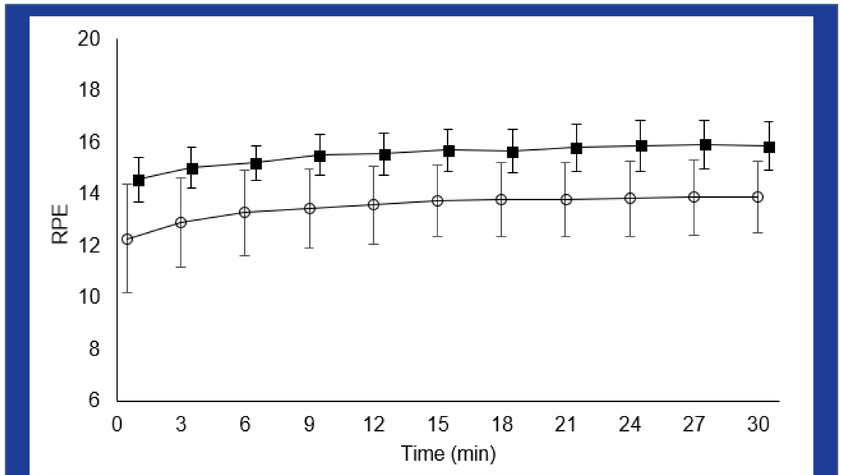


Figure 1. Time-course (mean ± SD) Leg- (dark circle) and Lung- (open circle) specific RPE response during the whole-body RPE-clamp exercise, collapsed across Deception. Both Leg- and Lung-specific RPE increased from the onset of RPE15 to the end of the trial ($p < 0.001$)

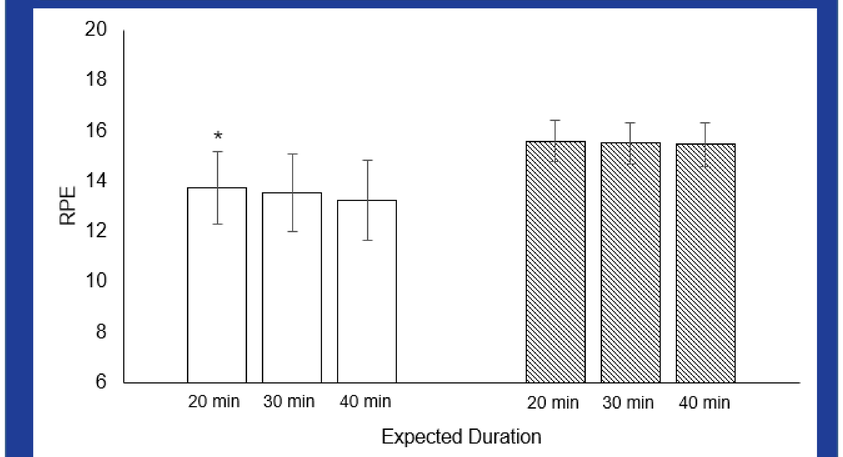


Figure 2. Mean ± SD Leg- (shaded bar) and Lung- (open bar) specific RPE response during the whole-body RPE-clamp exercise, collapsed across Time. *Lung-specific RPE was greater when it was expected to exercise for 20-min compared to 40-min ($p = 0.006$), but neither expectation condition was different than when it was expected to exercise for 30-min ($p=0.288$-0.641). There were no differences in Leg-specific RPE ($p=0.624$).

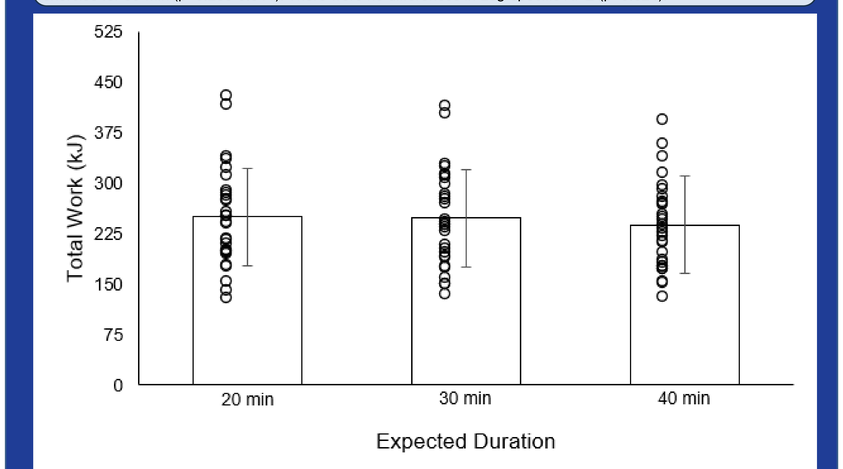


Figure 3. Individual (open circles) and mean ± SD (bars) total work performed during the RPE-clamp trials when the expected duration of exercise was 20-, 30-, and 40-min, while the actual exercise duration was 30-min for all trials. There were no differences in total work between trials ($p = 0.08$).

Results

- Leg-specific RPE exhibited no Deception x Time interaction ($p=0.423$), nor main effect for Deception ($p=0.624$), but there was a main effect for Time, which indicated that leg-specific RPE increased from the start of the trial to the end of the trial, regardless of expected exercise duration ($p<0.001$).
- Lung-specific RPE demonstrated no Deception x Time interaction ($p=0.437$), but similarly there was a main effect for Time, which indicated lung-specific RPE increased from the start of the trial to the end of the trial ($p<0.001$).
- There was also a main effect for Deception, which indicated that the lung-specific RPE was greater when the expected duration of exercise was 20-min (RPE=13.7±1.4) than when the expected duration of exercise was 40-min (RPE=13.2±1.6) ($p=0.006$), but neither were significantly different than when the expected duration of exercise was 30-min (RPE=13.5±1.5) ($p=0.288$–0.641).
- Lastly, there were no differences in total work between trials ($p=0.08$).

Conclusions

- Despite similar amounts of work across deception trials anchored to a whole-body perceptual intensity that was considered “hard”, when participants believed they were exercising for longer than reality (40-min), lung-specific RPE was significantly lower compared to when participants expected to exercise for a shorter duration (20-min).
- This finding supports the pacing awareness model that suggests exercise performance is partly predicated on conscious, situation-specific information.

Practical Applications

- Coaches and practitioners may be able to manipulate an athlete’s perception of exercise by altering their expectations of that exercise.
- However, future research should examine similar responses in running, in addition to examining the potential effects on exercise adherence and training outcomes.

Acknowledgements/Funding

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