

INFLUENCE OF EXERCISE DURATION ON PERCEIVED EXERTION DURING CONTROLLED LOCOMOTION¹

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Summary.—During racewalk task of long duration the variation of perceived exertion classically reported with fatigue could be affected by the cognitive strategy adopted by the 5 experienced subjects.

Ratings of perceived exertion (RPE) have been classically suggested as a useful adjunctive measure to standard physiological responses associated with exercise constraints (e.g., Borg, 1970); however, if high correlations could be expected between some physiological variables (heart rate, minute ventilation, or lactate concentration) and perceived exertion, no concrete theory of perceived exertion permits *a priori* the supposition of a causal relationship between them (e.g., Delignières & Brisswalter, 1996; Russell, 1997). For one thing, several works have shown the importance of psychological variables in the perception of exertion (e.g., Rejeski, 1985). Among them, the adoption of an association or a dissociation strategy could lead to different effects of physiological changes on RPE and, consequently, to a positive or a negative evaluation of the task constraints. During exercise of long duration a positive or a negative evaluation could therefore lead to either the continuation or the cessation of the task. This could be particularly important in racewalking where competition rules impose on the subjects maintenance of their walking gait despite the effect of fatigue.

Within this framework, an experimental study was conducted on five high-level racewalkers. Oxygen consumption (VO_2), heart rate (HR), minute ventilation (VE), lactate concentration (LA), and scores of perceived exertion (RPE 6-20 scale) were recorded during a 3-hr. racewalk task conducted at the competition pace ($12.2 \pm 0.5 \text{ km} \cdot \text{h}^{-1}$). Oxygen consumption and minute ventilation were assessed during two submaximal tests on a treadmill before and immediately after the 3-hr. overground walk. The respect of racewalk rules was controlled using a video motion-analysis system with a camera operating at a nominal rate of $50 \text{ frames} \cdot \text{sec}^{-1}$, i.e., double phase support; knee of the supported leg straight in the vertical position of each stride.

Means and standard deviations are presented in Table 1. Despite a sig-

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nificant increase in physiological constraints of the walking task (VO_2 , HR, VE, $p < .05$), no significant effect of exercise duration was found for perceived exertion. During all tests, the mean score corresponded to ratings of moderately hard on the Borg scale. Further, for these highly trained subjects no significant alteration of the walking pattern was observed at the end of the 3-hr. walk.

TABLE 1
PHYSIOLOGICAL PARAMETERS AND PERCEIVED EXERTION SCORES RECORDED
BEFORE (TEST 1) AND AFTER (TEST 2) THE 3-HR. OVERGROUND WALK

Parameter	Test 1		Test 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
VO_2 ($\text{ml} \cdot \text{kg}^{-1} \cdot \text{min.}^{-1}$)	46.8	2.5	50.4	1.8
VE ($l \cdot \text{min.}^{-1}$)	85.3	8.0	88.7	10.2
HR ($\text{bt} \cdot \text{min.}^{-1}$)	146.5	4.4	153.2	6.0
LA ($\text{mmol} \cdot l^{-1}$)	0.9	0.2	0.9	0.5
RPE	12.4	0.8	12.7	1.5

Thus, in this study stability in RPE could reflect a dissociation strategy involving a diversion of attention away from body sensations. In racewalking, competition rules imposed on the subject required maintaining their walking gait apart from the effect of fatigue. Therefore, we made the assumption that, in such well-trained and motivated subjects, the competition constraint leads them to focus their attention efficiently on control of locomotion rather than on body sensations. According to the hypothesis made by Rejeski (1985) distinguishing perception and focal awareness, this dissociative strategy could lead to a stability in RPE despite an increase in physiological cues. Further work is necessary to validate this hypothesis.

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