ABSTRACT

Motivation has consistently been examined as an antecedent to physical performance. Concurrent verbal encouragement is often used during the Wingate Anaerobic Cycle Test (WACT) (Bultert-D, O. R. (1987). Sports Med., 4, 381-394) as an extrinsic motivational factor to encourage task completion. Previous research has discovered concurrent verbal encouragement to positively influence performance on the WACT in non-athletic males (Karduna- Jakovic, D., et al. (2007). Med. Sci. Sports Exerc., 40, 231-238). However, this effect has not been examined in populations of females or athletes. Traditionally, females and athletes report engaging in physical activity for more intrinsic reasons (e.g., pleasure, curiosity, challenge) than males and non-athletes, who report engaging in physical activity for more extrinsic reasons (e.g., social status, material rewards) (Valerand, R. et al. (1988). Can J Beh Sci., 20, 219-250). Such findings suggest that extrinsic motivation to the form of concurrent verbal encouragement may vary based on population, and not affect female athletes in the same manner as the male non-athlete population previously examined.

PURPOSE

The purpose of the study was to examine the effect of concurrent verbal encouragement on the performance of the WACT in female athletes vs. female non-athletes.

METHODS

• IRB Approval: The study was approved by the Institutional Review Board (Human Subjects) at Texas A&M University-Kingsville.

• Subjects: All subjects provided informed consent prior to participation. Nineteen college-age volunteers were recruited from the female student population at Texas A&M University-Kingsville. Ten of the subjects were active intercollegiate athletes (ATH, n=10) and nine were non-athletes (NON, n=9). The WACT was novel to all subjects. All subjects were blinded to the purpose of the study.

• Pre-participation Screening/Testing: All subjects underwent a health screening according to guidelines set forth by the American College of Sports Medicine. Only subjects classified as low risk for participation, as defined by age and body composition, were included. Anthropometric and body composition measurements were obtained before the start of the study. Anthropometric measurements included body mass (kg), body stature utilizing a stadiometer, and percent body fat (ATH=24.1±4.9, NON=27.9±5.1 %) or fat mass (ATH=17.0±4.3, NON=16.4±7.8 kg). Percent body fat was measured via dual energy X-ray absorptiometry (Lunar Prodigy, GE Medical Systems, Madison, WI) using the software provided by the manufacturer. Fat-free mass was calculated as the difference between body mass and fat mass.

• Wingate Anaerobic Cycle Test (WACT): The WACT is a 30 sec cycle ergometer task where subjects pedal as fast as possible against a resistance that requires a maximal effort for the 30 sec duration. The flywheel resistance is determined as a fraction of the subject’s body mass (kg) x 0.3 kg/body mass (kg) for female adult athletes, 0.085 kg/body mass (kg) for female adult non-athletes. The test is preceded by a test-specific warm-up lasting 4 min (0-1 min = 10 rpm against 0 kg; 1-3 min = 50 rpm against 0 kg). Following the warm-up, subjects have a 5 min rest period before the actual test begins. Recovery from the 30 sec test includes at least 5 min of pedaling against a light-moderate resistance (1 kg) with a 5 min rest period between trials. Three investigators were present for this session.

• Experimental Design: WACT Trials: 2-3: Once becoming familiar with the WACT, subjects performed the WACT twice, once with concurrent verbal encouragement (VE) and once without (NVE), in a balanced cross-over design. The three WACT trials were performed at least one week apart. Three investigators were present for all trials. An attempt was made to give each participant the same amount of verbal encouragement during the VE trials and for the NVE trials within each subject.

• Measurements: Mean power output (W/kg), peak power output (W kg⁻¹), and total work output (1kg⁻¹) were measured via computer interface with the cycle ergometer (Monark, Varberg, Sweden). Statistical Analysis: Mean power output (W/kg), peak power output (W kg⁻¹), and total work output (1kg⁻¹) were compared between ATH and NON across VE and NVE using an ANOVA (1 between, 1 within). α=0.05. Age and body composition differences between ATH and NON were examined using independent t-tests. α=0.05.

• WACT Performance:

RESULTS

• Age and Body Composition: ATH and NON did not differ significantly (p>0.05) with regard to age (ATH=20.5±1.5, NON=21.4±1.3 yr), body mass (ATH=70.7±3.1, NON=64.3±9.1 kg), body stature (ATH=170.6±6, NON=162.5±6 cm), BMI (ATH=24.5±2.2, NON=24.1±2.9 kg·m⁻²), percent body fat (ATH=24.3±4.8, NON=27.9±5.1 %) or fat mass (ATH=17.0±4.3, NON=16.4±7.8 kg). However, the groups did differ in fat-free mass (ATH=53.7±6.6, NON=46.1±5.7 kg) (p<0.05).

• Experimental Design, cont.

• WACT Trials 2-3: Athletes vs. Non-Athletes. METHODS, cont.

• Experimental Design, cont.

• Experimental Design: WACT Trial 1: All subjects performed a familiarity WACT trial without concurrent verbal encouragement. Three investigators were present for this session.

• Experimental Design, cont.

• RESULTS, cont.

CONCLUSIONS

Contrary to findings with athletes concurrent verbal encouragement does not affect performance on the WACT, for athletes or non-athletes, in females. These results lend support to previous research suggesting females to be more intrinsically motivated than males, whether they are athletes or not. However, while the athletes did outperform the non-athletes, as was expected given the greater fat-free mass in the athletes, the verbal encouragement did not affect the two groups differently. Given this lack of significant interaction, it could be argued that gender appears to be the key determinant of intrinsic motivation. It should be noted that all of the subjects were volunteers, and the majority of the non-athletes were assigned to participate, while not all college intercollegiate athletes were interested athletes, most at the high school level. All of the true non-athletes who volunteered did not agree to participate in the study. This may have led to the unexpected finding showing no differences between athletes and non-athletes with regard to their performance response to concurrent verbal encouragement during the WACT, and should be explored in future research.