

The Effects of Prior Caffeine Ingestion on Respiratory and Cardiovascular Responses During Submaximal Exercise in Trained and Untrained Women

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ABSTRACT

INTRODUCTION: Caffeine consumption prior to exercise has been shown to produce beneficial effects during subsequent exercise in trained men. These benefits include decreased RPE, reduced respiratory exchange ratio (RER), and decreased oxygen deficit. While these effects have been demonstrated in men, little work has been done to evaluate the effects of prior caffeine ingestion on exercise responses in untrained women. **METHODS:** Twelve women (6 trained, 6 untrained) completed two submaximal bouts of cycling, at 60% of maximal HR, 45 min after consuming either caffeine (3 mg/kg) or a placebo. During these bouts, RPE, RER, VO_2 , and HR were measured, and oxygen deficit was calculated post-exercise. Data were analyzed using a mixed model ANOVA with two independent groups, trained and untrained, and two caffeine conditions repeated across participants. **RESULTS:** Caffeine was found to significantly decrease RER values during exercise ($F_{(1,10)}=22.62$, $p<0.01$) across groups with caffeine being responsible for about 69% ($\eta^2=0.69$) of the change in RER. Although not significant, all participants reported lower RPE values during exercise after caffeine ingestion ($F_{(1,10)}=4.42$, $p=0.06$), caffeine being responsible for about 31% ($\eta^2=0.306$) of the change seen in RPE. Caffeine was not found to have a significant effect on VO_2 ($F_{(1,10)}=2.00$, $p=0.19$) or HR ($F_{(1,10)}=2.40$, $p=0.15$) during exercise, or on measures of oxygen deficit ($F_{(1,10)}=0.48$, $p=0.51$); however, the trained group did have a significantly higher oxygen deficit than the untrained group ($F_{(1,10)}=5.35$, $p=.04$). There were no significant interactions between the caffeine treatment and group for any dependent variable. **CONCLUSION:** These results indicate that ingesting caffeine 45 min prior to exercise can lead to increased fat oxidation and lowered RPE without affecting VO_2 or HR during submaximal exercise.

