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Heart Rate, Perceived Exertion, and Speech Characteristics across Cycling Exercise Intensity Levels

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The *Talk Test* is a non-invasive measure of exercise intensity and is useful in identifying safe levels of exercise intensity. Previous investigations of the *Talk Test* have used exhaustive exercise bouts to examine the impact on physiological and speech production variables such as the perception of speech difficulty. Other critical speech measures, such as the ability to sustain a sound (e.g., maximum phonation test; MPT) or breathing frequency (BF) during exercise, are less clear. Moreover, the responses of these variables during submaximal, self-selected exercise intensities are yet unknown. **PURPOSE:** The purpose of this investigation was to examine the responses to heart rate, speech production, and ratings of perceived exertion measures across a range of exercise intensities. **METHODS:** Sixteen college-aged participants completed three 15-minute bouts of cycling exercise at three intensities: (a) self-selected (SS, as measured by Watts), (b) 20% below (-20%), and (c) 20% above (+20%) the self-selected intensity wattage in a randomized counterbalanced manner. Pre- and post-exercise, participants performed an MPT test and read a paragraph from *The Rainbow Passage*. Passage analysis was conducted to determine the number of breaths per passage reading. Heart rate (HR) and perceived exertion (RPE) were recorded at end of exercise. One-way repeated measures ANOVAs were performed on BF, MPT, HR, and RPE. **RESULTS:** Main effects were observed for all dependent variables (all $p < .05$). Post hoc tests for HR revealed the -20% condition ($M = 122.75 \pm 16.30$) was less than the SS ($M = 134.69 \pm 16.82$; $p = .005$) and +20% ($M = 141.38 \pm 20.31$; $p < .0001$) condition. The -20% condition RPE ($M = 12.00 \pm 2.37$) was less than the +20% ($M = 14.81 \pm 2.97$; $p = .003$). MPT evidenced significant differences between +20% ($M = 9.56 \pm 3.50$ s) and both -20% ($M = 12.19 \pm 3.58$ s; $p = .012$) and SS ($M = 11.06 \pm 3.42$ s; $p = .030$). BF was significantly different between -20% ($M = 6.00 \pm 1.86$) and both SS ($M = 7.63 \pm 3.32$; $p = .024$) and +20% ($M = 7.68 \pm 3.28$; $p = .019$). **CONCLUSIONS:** Results suggest that difficulty producing speech may occur at lower intensities than those previously investigated. Findings may have implications for those working in the fitness and rehabilitative environments.