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The Effect of Mental Preparation on Voluntary Torque Production and Cortico-Cortical Communication

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Mental preparation refers to using self-directed cognitive strategies to enhance arousal and confidence when preparing for psychomotor performance. **PURPOSE:** To determine if mental preparation i.e. psyching (PSY), will contribute to higher muscular performance (maximal knee extension) and heightened cortico-cortical networking when compared to distracting conditions mental arithmetic (MA), reading comprehension (RC). **METHODS:** Fifteen healthy participants (19-30 years of age), were recruited and required to have a minimum of one year weight training experience. Eleven of the participant data for analysis. Electroencephalography (EEG) and torque production (Isokinetic) were measured. The study consisted of two visits. Visit one consisted of informed consent, a background questionnaire and isokinetic practice trials for familiarization. EEG collection was conducted on visit two, included the same warm-up and exposure to three different conditions (PSY, RC, and MA). Conditions consisted of three trials (total of nine) with a rest interval between each trial. During each trial, a 20-second task period was provided (PSY, RC, MA). For each trial, EEG data was collected and participants determined their rate of perceived exertion by using the Borg RPE scale. **RESULTS:** EEG data analysis revealed a heightened level of networking in PSY as indexed by high alpha band coherence [$F(2,20) = 5.885$; $p = 0.010$]. Torque production averages within participant for PSY (144.80 N*m) were higher compared to MA (122.05 N*m) and RC (125.19 N*m). A significant difference existed between PSY and MA (0.008), PSY and RC (0.005) and no significant difference for the distractions (RC and MA). Participants rated their perceived exertion (RPE) with higher ratings for the PSY (16.80) condition in comparison to MA (15.38) and RC (15.83) with a significant difference between PSY and MA (0.026). **CONCLUSIONS:** PSY appeared to produce higher torque output averages and a higher perceived exertion in comparison to RC and MA. PSY appears to produce higher overall cortico-cortical communication, compared to RC and MA. The study suggests promising results in mental preparation (psyching) as a method to increase muscular performance cortical networking in young healthy adults.