EFFECTS OF A 50 HZ MAGNETIC FIELD ON HUMAN VISUAL DURATION DISCRIMINATION AND RECOGNITION MEMORY

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ABSTRACT

The purpose of this study was to investigate the direct and delayed effects of a sinusoidal 100 μT, 50 Hz intermittent magnetic field on human performance measures. Eighty participants (aged 19-53 completed the experiment which involved a visual duration discrimination task and a recognition memory task. Initially all participants completed the study phase of the recognition memory task in which 40 abstract shapes were presented in a random order. A two alternative forced choice visual duration discrimination task followed in which participants had to decide which of two consecutive light flashes was longer in duration. The duration discrimination task had only one hard level of difficulty over the 200 trials with a standard flash duration of 50 ms paired with an alternative hard flash duration of 65 ms. During the duration discrimination task, 40 participants were sham exposed while the remaining 40 were exposed to a 100 μT, 50 Hz magnetic field. Participants were randomly assigned to either the sham or exposure groups and the study was conducted under double-blind procedures. Reaction time and percentage of correct decisions were recorded during a total exposure time lasting approximately 11 minutes. The two alternative forced choice recognition memory testing phase was then conducted in which participants viewed 40 pairs of abstract shapes, each pair presented for six seconds. Participants had to decide which of the two shapes (left or right) they had previously seen during the study phase. In addition, participants had to rate their confidence in each of the 40 decisions on a four point rating scale (1 = very sure to 4 = unsure). Both percentage of correct decisions and confidence ratings were recorded for each participant. Participants were only exposed to the magnetic field during the visual duration discrimination task. The results of an earlier investigation were unsupported as the present results found no field-effects between sham and exposure groups on both measures of reaction time and percentage of correct decisions during the visual duration discrimination task. However, a reduction in the percentage of correct decisions and confidence during the recognition memory task was observed for participants who had been previously exposed to a magnetic field. Differences in experimental parameters and insufficient power render comparisons with other human magnetic field studies impossible. The need for exact replication studies with maximum design sensitivity was discussed within the context of a research field that is to produce small effect sizes.

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