

COGNITIVE PROCESSING TIME IN A SIMPLE VISUAL REACTION TIME TASK

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Simple visual reaction time (SRT) is an indicator of attention. It is the commonly measured component in the assessment of perceptual-motor skills. A reaction time (RT) task consists of three components, namely, the afferent nerve impulse, cognitive processing of the visual stimulus and the desired motor response. The authors have already reported that there was no significant difference in SRT between racket game players and sedentary controls. However, this study did not include the afferent and efferent components under the cognitive domain. The present study therefore aims to determine the cognitive processing time (CPT) in a simple visual reaction time task, using indirect methods (i.e. neurophysiological studies), and to compare the CPT in normal adult males and females.

A group of 23 normal healthy individuals, (15 males, 8 females) were selected. Each participant underwent a simple visual reaction time task, which involved pressing a key in a computer keyboard in response to a randomly timed white flash appearing on the screen. SRT was measured with this test. The time duration of the afferent nerve impulse (from the retina to the visual cortex) was measured with P100 latency of visual evoked potentials. The efferent neuronal impulse duration, from motor cortex to muscles (i.e. total motor conduction time (TMCT)) was measured by electromagnetic stimulation of motor cortex and recording the motor evoked potential from the forearm muscles. CPT was calculated using these measurements [CPT = SRT - (P100 latency + TMCT)].

There was no significant difference in the age between males and females ($p=0.172$). As established by many previous studies, simple visual reaction time of males (243.6ms) was significantly shorter than that of females (275.5ms) ($p=0.039$). However there was no significant difference in P100 latency (males=104.2ms, females=102.3ms: $p=0.385$) or in TMCT (males=16.6ms, females=15.6ms: $p=0.080$). CPT of males (121.4ms) was significantly shorter than that of females (158.1ms) ($p=0.027$).

The results show that males are faster than females in performing a simple visual reaction time tasks and are in agreement with previous studies. The present study also suggests that this is due to faster cognitive processing in males, in comparison to females. More normal individuals would be assessed in the future to establish normal values for males and females. These normative data would help as reference values when assessing perceptual-motor skills in reaction time oriented sports in future studies.