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Neurological Evidence for Frontal Lobe Involvement in Serial Visual Search

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NEUROLOGICAL EVIDENCE FOR FRONTAL LOBE INVOLVEMENT IN SERIAL VISUAL SEARCH

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This experiment explores the role of the frontal lobes in attentional tasks. Treisman's (1980) theory of feature integration divides attention into a serial process requiring directed attention and a parallel process which is pre-attentional. Research has shown that young children and older adults have greater difficulty than young adults with serial but not parallel processing. Knowing that both children and the elderly have frontal lobe deficits, perhaps these lobes control serial searches. The inhibition deficit theory suggests this outcome by proposing that people with frontal lobe damage are unable to efficiently inhibit distracting stimuli. Using people with brain damage localized in the frontal lobes could verify this hypothesis. 10 frontal lobe patients, 10 elderly adults and 10 college students will be tested with a task similar to that used by Plude and Doussard (1989). For each trial the subjects' reaction time will be measured as they decide on the presence or absence of a sideways T in three different conditions that have either 5, 10 or 15 stimuli on the screen. In the simple condition subjects will verify the presence or absence of the target in an array of upright P's. In the conjunction condition half the distractors are sideways P's and the other half upright T's. In the unconfounded condition two distractors are sideways P's and the rest upright T's. Each subject will complete 288 trials, half with the target absent and half with target present. Using a 3 factor analysis of variance it is expected that all subject types should perform equally in the simple condition since it only requires parallel processing which is not believed to be controlled by the frontal lobes. Frontal lobe patients and elderly adults should react significantly slower than college students in the conjunction condition since it is a serial process, and this difference will increase with the number of stimuli present. In the unconfounded condition, a mainly parallel search task, subjects should again perform equally with minimal differences at larger display sizes. If the frontal lobe patients perform as expected then it can be suggested that frontal lobe functioning may be responsible for changes in serial processing across the life span.