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IMPACTS OF MULTITASKING ON SELECTIVE ATTENTION AND COGNITIVE PERFORMANCE OF STUDENTS

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Relevance. In the present academic environment, multitasking has become a more frequently used habit, where students switch between different tasks at the same time, thus dividing their attention accordingly. Regular toggling between tasks increases the mental workload and strain in processing information, thus reducing the attention span and cognitive performance levels. Constant task switching while multitasking results in difficulty in sustaining attention on a task, simultaneously decreasing the information processing ability and accuracy in a task, while also impairing memory performance in everyday activities and in long-term memory, specifically in tasks that require selective attention and high cognitive performance.

Aim: this study aimed to investigate the effect of multitasking on selective attention and cognitive performance among students by comparing task accuracy and response efficiency in individual and combined cognitive task conditions.

Materials and methods. The study was conducted on 25 medical students, none of whom reported history of neurological disorders. The participants were tested based on three experimental models, each consisting of 12 trial blocks. For the single-task conditions, a Stroop test was conducted, in which the participants had to respond by pressing a key according to the font color of the word displayed on the screen. The stimulus screen was presented for 750 ms. Then, based on the Sternburg test, a memory task including numbers was conducted. In each trial, the stimulus screen displayed a set of 5 digits for 2000 ms, and the participants were instructed to remember this number sequence. On the next screen, a probe number was displayed for 1500 ms, where the participant had to respond by pressing 1 if the number was present on the number set and 0 if the number was absent. Finally, for the multitasking condition, the participants took part in a task that combined both the single-tasking conditions within the same time limit. Additionally, non-lyrical background music was played as an auditory stimulus to facilitate an external environmental distraction, thereby enhancing cognitive load during task execution. Descriptive statistical data were calculated from the responses collected to determine the mean and standard deviation of the reaction times and response accuracy. Moreover, a one-way test (ANOVA) and Pearson correlation were conducted to assess the statistically significant differences in reaction time and accuracy across the three task conditions. A p-value of <0.05 was considered statistically significant.

Results and their discussion. The final statistical data showed that the reaction time and accuracy differed across all three tasks. The mean reaction time of the Stroop test was 554.64 ± 72.4 ms, with a mean accuracy of 61.33 ± 17.9 %. The mean reaction time for the Sternburg memory task was 897.24 ± 235.46 ms, with a mean accuracy of 87.66 ± 15.24 %. The mean reaction time for the final multitasking condition was 68.16 ± 108.12 ms, with a mean accuracy of 57.9 %. Accordingly, the reaction time slowed during the multitasking test compared to the Stroop test. The participants had higher accuracy during the Sternburg test and moderate accuracy in the Stroop test; however, it was observed that the accuracy was the lowest in the multitasking test condition. One-way ANOVA showed that both the reaction time ($p < 0.001$) and accuracy ($p < 0.001$) differed significantly in all three tasks, indicating that the task type had a strong effect on the participants performance. Pearson correlation analysis revealed a weak negative relationship between reaction time and accuracy in the Stroop and Sternburg memory tests and a weak positive correlation in the multitasking conditions.

Conclusions. This research shows that multitasking significantly affects cognitive performance and selective attention by increasing the mental workload, resulting in slower reaction times and reduced accuracy compared to performance during single-task conditions.