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A Study on the relationship between reaction time and cognitive perceptual function

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Background and aims

The ability to safely drive depends on reaction time and cognition. The aim of this study was to investigate the relationship between the perceptual aspect of cognitive functions and reaction time in automobile drivers.

Method

96 drivers aged 20~82 (mean: 45.30) participated in this study. Cognitive perceptual functions were assessed by CPAD (Cognitive Perceptual Assessment Driving) consisting of 8 sub-tests(Depth perception, Sustain attention, Divided attention, Stroop test, Digit span, Field dependency, Trail making test A, Trail making test B and Weight total score). The DTS (Drive test station) was used to test the reaction times of pedal and left and right hand controllers by measuring time to reach the break threshold when a red light signal was given. The pedal and hand controller acceleration thresholds were set at 4 kg, 3.1 kg respectively and the break thresholds of those were set at 20 kg and 8 kg.

Result

The pedal reaction time was negatively correlated with Depth perception(r=-.523), Sustain attention(r=-.532), Divided attention(r=-.377), Stroop test(r=-.425), Digit span(r=-.527), Field dependency(r=-.368), Trail making test A(r=.-642), Trail making test B(r=-.653) and Weighted total score(r=.-670). The left and right hand controller reaction times were negatively correlated with Depth perception(r=-.456, -.536), Sustain attention(r=-.440, -.387), Divided attention(r=-.402, -.274), Stroop test(r=-.380, -.347), Digit span(r=-.442, -.357), Field dependency(r=-.345, -.285), Trail making test A(r=-.533, -.465), Trail making test B(r=-.530, -.455) and Weighted total score(r=.-564, -.467).

Conclusion

The present study demonstrated that the perceptual aspects of cognitive functions influenced reaction times in automobile drivers; therefore, perceptual cognitive tests are necessary for driver's safety

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