

THE INFLUENCE OF CONVERSATION, LOW-DOSE ALCOHOL AND DRIVING EXPERIENCE ON THE PERIPHERAL VISION SYSTEM

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Background

The peripheral vision system plays a very important role in the orientation system. Its task is to detect information and select the relevant from the irrelevant. Many accidents happen when drivers miss important information because their visual field is reduced. One reason for such a reduction is that the driver focuses his attention on something that has nothing to do with his driving. When the cognitive system has insufficient attention at its command, it compensates by neglecting the peripheral vision system and focusing on the central field of vision. Consequently, every action which needs a high degree of attention poses a potential danger, because it reduces the visual field and may cause an accident.

Aims

This study investigated whether legal everyday occurrences which take place while driving a motor vehicle and which require some attention, such as talking to a passenger or being under the influence of a low dose of alcohol (between 40 and 50 milliliters alcohol level), influence the scope of the driver's visual field. Alcohol in low doses does not damage a person's eyesight but reduces his cognitive attention. Also investigated was whether the effect is related to driving experience.

Methods

The peripheral vision reaction time of 60 persons was measured using the "Peripheral Vision Test" by Schuhfried. The test subjects were divided into three groups (n=20 each): Group 1 was asked to hold a conversation during the test; Group 2 took the test under the influence of a low dose of alcohol measured from the subject's breath using the "Alcotest 7410" (Dräger Sicherheitstechnik, Germany); Group 3 served as the control. Each group was divided into two subgroups, namely persons with average driving experience (more than 50.000 km) and persons having less driving experience (less than 5.000 km). All statistical analyses were performed on SPSS 8.1 for Windows. Differences between groups were tested for significance by means of analysis of variance and the non-parametric Mann-Whitney U Test.

Results

Significant differences in the average reaction time were seen between the control and the conversation groups (0.76 vs. 1.20 seconds; $p=0.01$) and also between the control and the alcohol groups (0.76 vs. 1.03 seconds; $p=0.04$). This difference is enhanced when we look at the reaction times in the subgroups, divided into experienced and less-experienced drivers:

group (subgroup)	average reaction time (seconds)	standard deviation
control (experienced)	0.70	0.185
control (less-experienced)	0.82	0.18
conversation (experienced)	1.03	0.23
conversation(lessexperienced)	1.18	0.35
alcohol (experienced)	0.89	0.14
alcohol (less-experienced)	1.17	0.25

The differences between the control group with experience and the conversation group with less experience is highly significant ($p=0.003$), as is the difference between the control group with experience and the alcohol group with less experience ($p=0.004$). The two alcohol subgroups also differ significantly from the control group with experience in terms of the average number of wrong reactions (0.8 vs. 1.8 ; $p=0.029$ and 0.8 vs. 2.8; $p= 0.002$).

Conclusions

Holding a conversation with a passenger while driving a car reduces the peripheral vision field. The same effect can be observed in persons under the influence of a low dose of alcohol. The effect is enhanced when the person also has limited driving experience. The difference between a driver holding a conversation and an inebriated driver is that the inebriated driver not only has a longer reaction time but also shows more wrong reactions.