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LETTER TO THE EDITOR

Hands-free mobile phone conversation impairs the peripheral visual system to an extent comparable to an alcohol level of 4–5 g 100 ml

Dear Editor

The peripheral vision system plays a very important role in the orientation system where it has the task of detecting information and selecting relevant from irrelevant data. As might be expected the system has a highly important role in driving and accidents can occur when the functioning of the peripheral vision system is impaired such that a driver's visual field is reduced. One possible reason for such a reduction in visual field might be that the driver focuses his or her attention on something that has nothing to do with 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 (Brown *et al.*, 1969; Brookhuis *et al.*, 1993; Burns *et al.*, 2002). Consequently, every action that needs a high degree of attention poses a potential danger, because it reduces the visual field and increases the potential risk of accident (Strayer *et al.*, 2003; Laberge-Nadeau *et al.*, 2003).

The aim of this study was to investigate whether a driver's visual field is influenced by everyday occurrences that might take place while driving a motor vehicle. Two situations that might reduce a driver's visual field are driving under the influence of low-dose alcohol and holding a conversation whilst driving. Alcohol in low doses (4–5 g alcohol/100 ml blood) has no effect on visual acuity but produces a reduction in levels of attention whilst holding a conversation and reduces the levels of attention available for use by the peripheral visual system. The study attempted to investigate the effects of both of these situations on the peripheral visual system and also investigated possible interactions with driving ability.

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 ($n = 20$): 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 a subgroup with average driving experience (more than 50 000 km) and a subgroup with less driving experience (less than 5000 km). All statistical analyses were performed on SPSS for Windows. Differences between the groups were tested for significance by means of analysis of variance and the Mann–Whitney *U*-test.

Significant differences in the average reaction time were found between the control and the conversation groups (0.76 vs 1.20 s; $p = 0.01$) and also between the control and the alcohol groups (0.76 vs 1.03 s; $p = 0.04$). This difference between groups was enhanced in the subgroup of less experienced drivers (Table 1).

The difference between the control group with greater driving experience and the conversation group with less experience was highly significant ($p = 0.003$), as was the difference between the control group with experience and the alcohol group with less experience ($p = 0.004$). Significant differences between the groups were also found for the average numbers of wrong reactions. The more experienced alcohol group was found to be significantly different from the experienced control group (1.8 vs 0.8 wrong reactions respectively; $p = 0.029$) as was the less experienced alcohol group (2.8 vs 0.8 wrong reactions; $p = 0.002$).

Holding a conversation while driving a car reduces the peripheral visual field. The same effect can be observed in persons under the influence of a low-dose of alcohol and in both cases the effect is enhanced when the individual also has limited driving experience. In addition, drivers under the influence of alcohol also produced significantly more incorrect reactions in comparison with the control group, an effect that was not found in the group of drivers holding a conversation.

Table 1. Average reaction time in different groups

Group (subgroup)	Average reaction time (s)	Standard deviation
Control (experienced)	0.70	0.19
Control (less-experienced)	0.82	0.18
Conversation (experienced)	1.03	0.23
Conversation (less experienced)	1.18	0.35
Alcohol (experienced)	0.89	0.14
Alcohol (less-experienced)	1.17	0.25

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