Psychophysical testing of peripheral color vision after low level alcohol consumption

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Alcohol consumption is a major hazard in driving accidents. This is one reason why several effects of alcohol on human perception and reaction have been investigated and reported. However there is one factor which scientific literature does not agree upon. This is the effect of low level alcohol consumption on the peripheral vision.

Former psychophysical tests have shown reduction in achromatic flickering pattern recognition towards the periphery after low level alcohol consumption (Moskowitz, 1976) while other studies didn't confirm the significance of this (Quintyn, 1995). Moreover the application of chromatic targets is generally neglected.

Our research, supported by the National Police of Hungary was aimed to measure the effect of alcohol consumption on the human peripheral vision with chromatic stimuli commonly used in traffic signals.

We have built a flat perimetry based test equipment using a software controlled DLP projector. The field of view of ten subjects with normal color vision were tested monocularly with three different color stimuli at seven viewing angles in five different low level alcohol consumption states checked by a calibrated alcohol probe. Effects of stimulus size, luminance and target speed were also measured and considered in the setup.

The test results have shown decrease in the FOV at the maximum alcohol consumption level (0.205 mg/l) compared to the sober state. However higher significance in the differences were only found at viewing angles less than 60° at red ($p<0.05$), green ($p<0.05$) and yellow ($p<0.1$) stimuli. Differences at viewing angles above 60° could not be considered significant.

Based on the test results we can conclude that alcohol consumption has significant effect on specific areas of peripheral color vision. Therefore beside alcohol's known effects on human performance (ie. reaction time, loss of concentration, etc.) the change in the FOV also shall be considered while driving.