Are low doses of alcohol taken at 2 pm objectively and subjectively more decrement for novices drivers than for more experienced drivers?

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To cite this version:

Catherine Berthelon, Edith Galy, Hugo Loeches de La Fuente. Are low doses of alcohol taken at 2 pm objectively and subjectively more decrement for novices drivers than for more experienced drivers?. 7th International Applied Human Factors and ergonomic conference (AHFE 2016), Jul 2016, Orlando, FL, United States. 7th AHFE - International Applied Human Factors and ergonomic conference 2016, 1p., 2016. hal-01352573

HAL Id: hal-01352573
https://hal.science/hal-01352573

Submitted on 11 Aug 2016
Are low doses of alcohol taken at 2 p.m objectively and subjectively more decrement for novices drivers than for more experienced drivers?

INTRODUCTION

Young Novice Drivers have a high risk of crashes, notably during the first year of driving [1]. They are also over represented in crashes linked to long period of drive or night driving [2] and it is well known that the major part of sleep (or fatigue)-related crashes takes place during the two periods of physiological decrease of alertness (early morning hours 2:00-6:00 a.m. and afternoon period 1:00-4:00 p.m. [3]). A monotonous road environment can also influence the level of alertness and the first effects of fatigue and drowsiness can rapidly occur [4]. Finally, Young Novice Drivers aged under 21 with BAC of 0.5 g/l have a crash risk multiplied by two compared to drivers aged over 21 [5].

The main hypothesis is that during a long monotonous driving task realized at a time of low alertness, performance will be impaired with BAC increased. This impairment could appear significantly earlier and be more pronounced for Young Novice Drivers (YND) than for Young Experienced Drivers (YED).

EXPERIMENTAL PROTOCOL

Sixteen Young Novice Drivers (YND: 18 years, less than two months of driving license) and fifteen Young Experienced Drivers (YED: 21 years, 3 years of driving license) participated in three simulated driving sessions in which BACs were randomly manipulated (0.0, 0.2 and 0.5 g/l). Every experimental session was between 1:45 and 3:45 p.m during postprandial period, around one hour after the drink. The task consisted to drive on a circuit representing typical highway road during 45 min and to maintain a steady speed (110km/h) and a stable position on the right lane. After each driving session participants estimated their workload (Thayer checklist). Driving performance was analyzed for each participant with the NASA-TLX (Thayer scale). Standard deviations of Lateral Position (SDLP) increased from placebo to 0.2 g/l and from 0.2 to 0.5 g/l. Results confirmed by subjective data obtained after driving show that workload and level of alcohol as a function of the alcohol level, results confirmed by objective performance. Thus, the stability of the lateral control (SDLP) and of the longitudinal control of the vehicle (SDspeed) are degraded with alcohol. Young drivers have therefore a good appreciation of their performance under the influence of alcohol.

RESULTS

Effect of alcohol

Placebo session produced lower estimation of time pressure, frustration and effort than 0.5 g/l session (NASA-TLX). Driving performance was estimated worse with alcohol (0.2 and 0.5 g/l sessions).

Effect of experience

YND’ frustration estimations were higher than YED’ ones and did not vary as a function of alcohol, conversely frustration of YED was higher with 0.2 and 0.5 g/l than with placebo (Table 1).

DISCUSSION, CONCLUSION

Subjective data obtained after driving show that workload is estimated higher with 0.5 g/l than without alcohol and that all the drivers estimated their performance degraded as a function of the alcohol level, results confirmed by objective performance. Thus, the stability of the lateral control of the vehicle (SDLP) and of the longitudinal control of the vehicle (SDspeed) are degraded with alcohol. Young drivers have therefore a good appreciation of their performance under the influence of alcohol.

Subjective data obtained after driving show that workload is estimated higher with 0.5 g/l than without alcohol.

REFERENCES


