



## **EFFECTS OF ADHD ON DRIVER ATTENTION AND SPEED, EVALUATED IN A DRIVING SIMULATOR**

Birgitta Thorslund

VTI

Olaus Magnus väg, Linköping, Sweden

Phone: + 46 709 430 440 E-mail: [birgitta.thorslund@vti.se](mailto:birgitta.thorslund@vti.se)

Co-author; Björn Lidestam, VTI

### **1. BACKGROUND**

Drivers with Attention Deficit Hyperactivity Disorder (ADHD) have been considered to have a 3–4 times higher crash risk than control drivers without ADHD. A core issue which has not been properly dealt with is the role of comorbid diagnoses which frequently appear together with ADHD, especially Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD), sometimes generically referred to as “conduct problems”. The increased crash risk associated with ADHD diagnosis presented in the literature is often based on studies performed with participants with more than one diagnosis. This means that the comorbidity may be high and, consequently, the effect of ADHD on traffic safety may be overestimated. This has been shown in a meta-analysis presenting a relative risk of 1.30 (Vaa, 2014) instead.

The existing research on drivers with ADHD is unsatisfying when it comes to methodology, specifically concerning inclusion and exclusion criteria for participants. This has led to a misunderstanding of the driving ability for people with ADHD, which has been cited and spread in the literature for two decades. People with ADHD diagnosis might suffer from this misinterpretation and the specific effects of ADHD on driving behavior remain unclear. There is a potential for better control for confounding factors, for exposure (mileage) and for comorbidity, especially CD and ODD.

### **2. AIM**

The aim of this study was to examine differences in driving behavior between experienced drivers with and without ADHD, respectively.

### **3. METHOD**

In this study, conducted in a driving simulator at VTI, 40 drivers diagnosed with ADHD and 20 drivers without ADHD participated, both men and women. In the group with ADHD, 6 men (30%) were professional drivers. To control for this, the same proportion of male professional drivers were included in the control group. The age distribution was similar in the groups, with the mean value for men around 35 years and for women around 31 years. Upon arrival, all participants received written and oral information about the study and signed an informed consent before data collection started. A pre-questionnaire covering age, gender, professional driver or not, diagnosis, medicine, driving habits, and



self-rated driving skills was filled in before the simulator drive. Before running the scenario used in this study, the participants were introduced to the driving simulator by driving a test scenario for approximately 5 minutes. The route included urban road, rural road and motorway. No secondary tasks were included, and the data collected with the driving simulator was speed, attention and reaction time to events including other road users. After the drive, the participants were asked to fill in a post-questionnaire covering subjective driving behavior and performance.

#### 4. PRELIMINARY RESULTS

The pre-questionnaire showed that in the group with ADHD, 70% of the men and 80% of the women used medicine for their diagnosis. Sleeping problems were more common in the ADHD group, 30% among men and 80% among women, compared to 10% among men and 20% among women in the control group. Women in the group with ADHD had received their driving license later (mean = 24.0, SD = 5.6) than women in the control group (mean = 19.8, SD = 2.0). Men with ADHD drive significantly more kilometers per week, regardless if they are professional drivers (mean = 1804.2, SD = 1572.8 compared to mean = 475.2, SD = 330.7) or regular drivers (mean = 405.4, SD = 259.0 compared to mean 245.0, SD = 174.8). There was no difference between groups regarding joy of driving or self-rated driving skills. Results from the analysis of driving behavior and the post-questionnaire will be presented at the conference.