

Press Release: European College of Neuropsychopharmacology

## ***Fast driver, fast life: genetics and everyday behaviour reflected in risky driving***

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A new long-term psychological study of drivers has found an association between driving convictions, accidents and everyday behaviour such as eating junk food or alcohol consumption. The researchers have also uncovered evidence that this relationship is associated with genetic variation in serotonin metabolism – the same neurotransmitter targeted by many antidepressants. This suggests that risky behaviour in driving and in life may have a common psychological basis.

In an innovative study, researchers from Professor Jaanus Harro's team at the University of Tartu (Estonia) combined psychological, genetic, and biochemical data from the unique *Estonian Psychobiological Study of Traffic Behaviour* with police and insurance records

817 drivers (49.2% male, 50.8% female) participated in the study. Over a period of time they completed questionnaires to measure such factors as impulsivity and aggression: in addition, they underwent a series of blood tests and genetic analysis. Linking these results to the police and insurance databases the researchers began to uncover some of the links associated with risky driving. Presenting their findings to the ECNP Conference in Lisbon, they report that 137 drivers who had been cautioned for exceeding the speed limits tended to have faster reaction times, but that they also scored higher on physical and verbal aggression, undertaking more strenuous physical activity, and had higher consumption of junk foods (including energy drinks).

According to lead researcher *Tõnis Tokko*:

*"We were able to pick out lots of associations between everyday risk taking and risky driving. For example we found that subjects who drink energy drinks at least once a week were twice as likely to speed as those who didn't drink energy drinks as often. We think the energy drink consumption may be related to a need for excitement, rather than the drinks themselves being a direct cause of traffic violations; the drivers' underlying psychological makeup may lead them both to speed, and to want to consume more energy drinks or junk food. Similarly, our psychological tests showed us that those with fast decision making skills were 11% more likely to speed, and those with higher excitement seeking were 13% more likely to speed".*

*He continued:*

*"Driving history is an excellent platform to study behavioural regulation; most people drive, and driving convictions or accidents are objective records - they remain in databases. We found that significant associations exist between risky traffic behaviour and a range of lifestyle behaviours, such as undertaking strenuous exercise, alcohol consumption, or junk*

*food and energy drink consumption.*

The researchers also looked at genetic traits in the volunteer drivers. They found that certain variants of a gene which controls serotonin transport (the 5-HTTLPR polymorphism) were associated with risky driving. Serotonin is the neurotransmitter which is thought to be involved in depression, and which is also regulated by many antidepressant drugs. *“We found that certain gene variants are associated with risk-taking behaviour in both driving and in other areas of life; but this is an early finding and still needs to be confirmed”* said Tõnis Tokko.

The Estonian Psychobiological Study of Traffic Behaviour is a long-term study that started collecting data in 2001 – it is believed to be the world’s only long-term study to follow drivers while considering psychology, and the related biology. Initially it aimed to identify behaviour patterns of drunk drivers and speeding drivers to try to prevent these behaviours, but it has since expanded to consider other factors.

Tõnis Tokko said *“We are able to follow various driving-related factors over a period of years, including psychological behaviour, blood tests to understand biological changes, and genetics. We also have a firm idea of which of these drivers have committed traffic violations or have been in accidents. We believe this to be a unique system. This study shows that people who are reckless in traffic also tend to take chances in other areas of life, and our research shows that there may be a biological tendency to this behaviour”*.

Dr Oliver Grimm, senior psychiatrist at the University Clinic Frankfurt, commented:

*“This study is very interesting, as it is already known from large registry studies that ADHD and traffic accidents are more common in adults. This specific study from Estonia now helps to better understand how this accident-prone group is constituted from both the genetic risk and personality traits.”*

Professor Oliver Howes, Professor of Molecular Psychiatry at King’s College, London, said:

*“This study adds to other work showing that psychological and biological traits are linked to how people behave in the world. It's important to recognise that the associations don't mean that one leads to the other”*

*These are independent comments; neither Dr Grimm nor Professor Howes were involved in this work.*

This work is presented at the 34<sup>th</sup> ECNP Annual conference, which takes place in Lisbon and online from 2-5 October. See <https://www.ecnp.eu/Congress2021/ECNPcongress> . The European College of Neuropsychopharmacology is Europe’s main organisation working in applied neuroscience.

**ENDS**

**Notes for Editors**

## Conference Abstract

Unhealthy lifestyle is associated with risk-taking in traffic and moderated by the serotonin transporter gene promoter polymorphism

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**Background:** Road traffic injuries are a serious public health issue. Risk-taking behaviour, including in traffic, has been associated with impulsivity and aggression, and so is unhealthy lifestyle, including, alcohol and drug abuse, smoking, overeating, and greater fast-food consumption. Impulsive behaviour has been associated with low capacity of the central serotonergic system, and the serotonin transporter gene promoter polymorphism (5-HTTLPR) [1] has been associated with impulsivity, alcohol use, speed limit exceeding and traffic accidents [2;3]. The aim of this study was to examine whether subjects with less healthy lifestyles take more risks in traffic and whether impulsivity and the serotonin transporter genotype could mediate or moderate any such associations.

**Methods:** A sub-sample (n = 817, 49.2% males and 50.8% females) of the Estonian Psychobiological Study of Traffic Behaviour (EPSTB [2;3;4] with mean age (SD) = 36.6(12.4) years participated in this study. Subjects filled out lifestyle questionnaires, impulsivity was measured by Adaptive and Maladaptive Impulsivity Scale (AMIS) and aggressiveness by Buss – Perry Aggression [5] Questionnaire. Traffic violation data were obtained from the police database registered in a 5 year period. Genotyping for the triallelic classification of the 5-HTTLPR polymorphism in the EPSTB has been described previously [2;3]. We compared the l'/l' homozygotes with the s' allele carriers (n = 644; l'/l', 32.0%; s'/l', 49.2%; s'/s', 18.8%). Student's t-tests and structural equation path analysis were used in data analysis.

**Results:** Speed limit exceeders (n = 137) had higher fast decision making (mean(SD) = 20.0(4.5) vs 17.9(4.6), t(772) = -5.0, p < 0.001) and excitement seeking (21.7(4.6) vs 18.8(5.2), t(772) = -6.1, p < 0.001), physical and verbal aggression (mean(SD) = 17.1(5.9) vs 14.5(5.0), t(166.1) = -4.8, p < 0.001 and 14.0(4.0) vs 12.3(3.6), t(761) = -4.7, p < 0.001, respectively) compared to subjects with no speeding tickets in a 5 year period. Speeding subjects also had higher AUDIT score (mean(SD) = 5.6(4.7) vs 4.6(4.5), t(742) = -2.2, p = 0.027), they reported more vigorous physical activity (5.7(7.0) vs 3.7(6.4) hours per week, t(184.7) = -3.1, p = 0.002), drinking energy drinks more often (14.6% vs 7.5% drinking once a week or more,  $\chi^2 = 7.21$ , p = 0.007) and eating less healthy foods (healthy eating score, mean(SD) = 5.5(0.46) vs 5.6(0.48), t(814) = 2.2, p = 0.031). Path analysis revealed that higher AUDIT scores were associated with speeding via higher physical aggression. 5-HTTLPR was not directly associated with speeding, but the 5-HTTLPR s-allele carriers had higher AUDIT scores if they were junk food eaters and the other way around. All of the associations in the model were statistically significant, with a good fit to the model (RMSEA = 0.009, CFI = 0.99, and TLI = 0.99).

**Conclusions:** In conclusion, significant associations exist between risky traffic behaviour and aspects of lifestyle such as consumption of alcohol or junk food or energy drinks, as well as engagement in vigorous physical activity, while traits such as aggressiveness and the variation in the serotonergic system appear as mediating and moderating factors.