
Reducing traffic risks using Virtual Reality based on Estonian example

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As an introduction, the following questions need to be answered:

- Why did we develop a VR solution as a combination of science and technology?
- What is it that we do? What makes a VR solution different from other media?

Both questions could be answered at length, based on scientific approaches. Aim is to respond as resource-efficiently as possible.

Experience so far:

In 2004, became familiar with intervention courses in DEKRA, Germany.

Since 2004: courses for university students, driving school instructors, professional drivers, traffic insurance experts, traffic police and other target groups. >5,000 participants to date.

Since 2007: in Estonia, the prevention course "Clear Sight...!?" is offered to high school graduates, of whom >80% are driving school students or novice drivers.

To date, >50,000 students from more than 130 educational institutions have participated in the course.

Since 2011: in Estonia, rehabilitation courses for traffic offenders.

Since 2014: rehabilitation courses for police and prosecution clients, with an emphasis on drunk drivers. >10,000 participants to date.

With any previous pedagogic models, it is hard to find a model built on feedback. Therefore, our approach is untraditional.

Since 2007, the development of a traffic risk assessment instrument (questionnaire) was started in 2007, in order to shape a standardized structure for feedback to the participants.

We calculate the traffic risk level of each participant, including deviation from the norm. The result is expressed as a report. Group-based feedback is provided to all course participants.

Today we use the instrument when working with all target groups.


An example of instrument „old style“ results, to which you can find a correlation in the handouts.

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Your driver risk evaluation report

There are contradictions between the answers you have given.

It is possible that you have made some errors when filling in the questionnaire or have given incorrect answers. This means the final report in your case may not be entirely correct.



We evaluated your traffic-related risks based on your responses and calculated your general level of risk. Moderate risk based on our current traffic behavior. The general level of risk is presented on the principle of traffic light familiar to traffic: green - low risk; yellow - moderate risk; red - high risk.

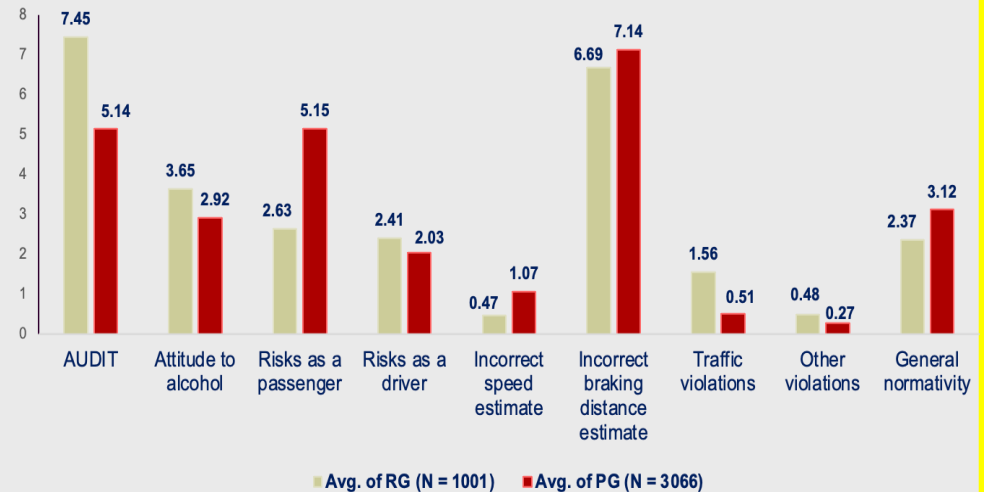
Read about the factors that influenced your risk level the most from the feedback part of the Riskfactors report.

Feedback on risk factors

THREAT ASSESSMENT

Comparative analysis of traffic behavior patterns in two groups

(n = 4067)

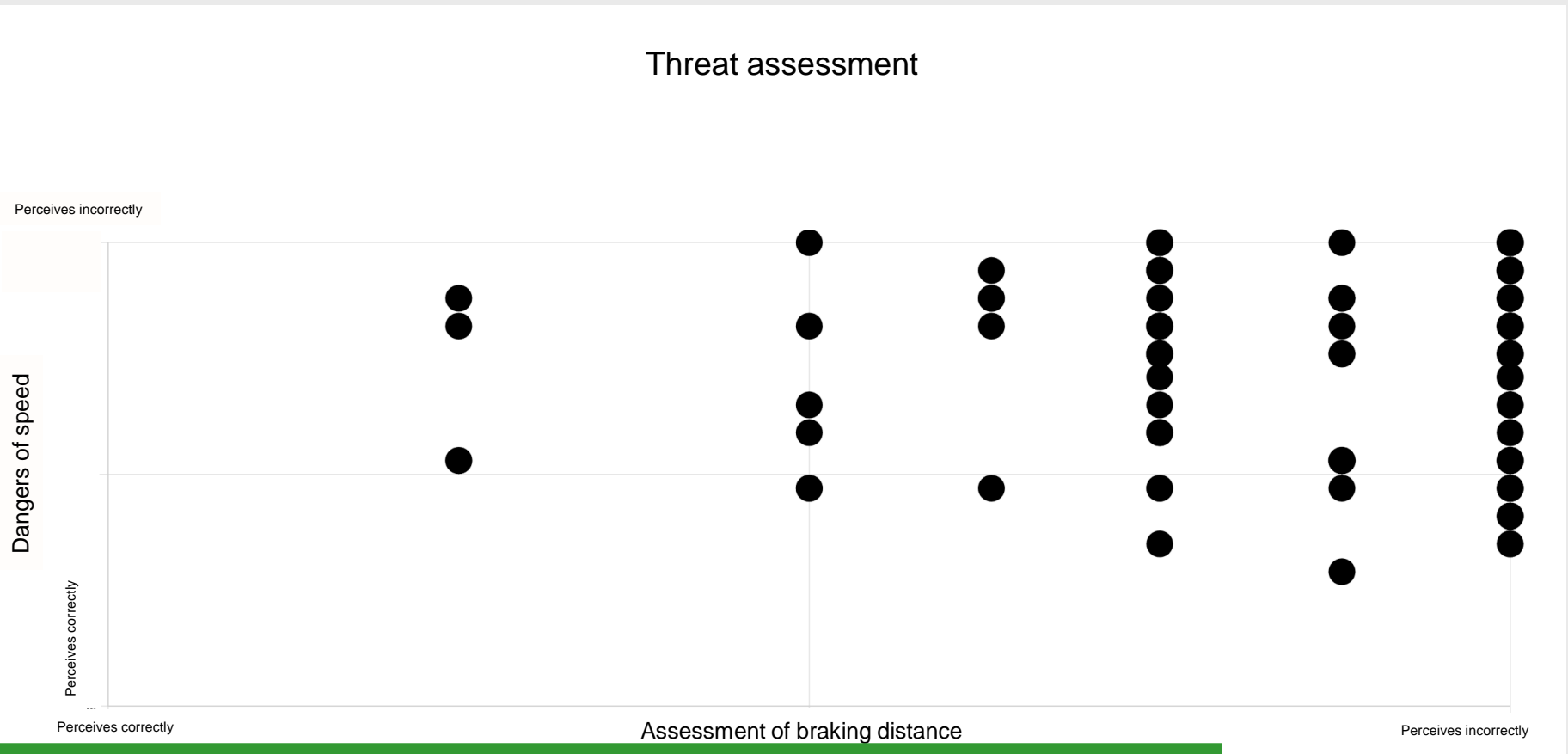


All differences on all scales are significant:

$p < 0.001$

In general, three important points emerged during the courses, which prompted to come up with 'new solutions':

1. Misbehavior in traffic is based on subjective justifications. At the same time, there is a massive knowledge deficit. See an example: (n=130):



In general, three important points emerged during the courses, which prompted to come up with 'new solutions':

2. Traffic violations are committed knowingly. For example, drunk drivers claim:

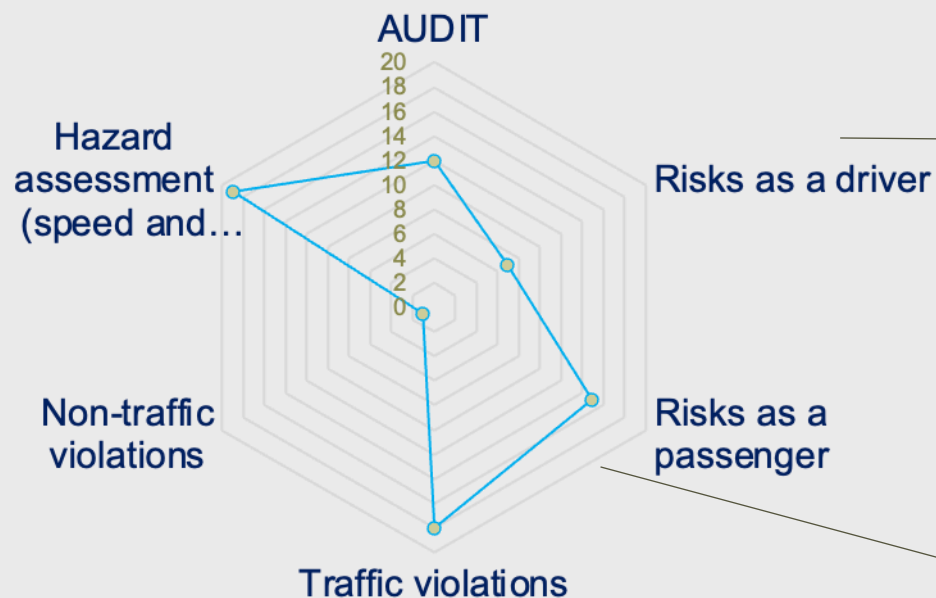
- 'I was hoping to slip through'
- 'There have never been cops here'
- 'The boss called that I had to come to the office/I had to pick up my child from kindergarten'
- 'I was not feeling well, but I also did not feel like I was drunk'
- etc.

3. Drivers (including experienced ones) do not perceive traffic risks in essence, but 'have learned' formally to pass traffic tests

In this context, we decided to go 'into the traffic risks'.

An example of instrument „*new style*“ results, to which you can find a correlation in the handouts.

Individual risk profile



Attitude to alcohol

Your attitude to alcohol poses a significant danger to your health, a tendency to abuse

Violations of traffic laws as a driver

You should significantly change your driving behavior. Based on the data from your answers, we can say that ...

.....

Summary animation from the beginning to the end of the course:

<https://www.youtube.com/watch?v=VmdJz-bBB3w>



Virtual **R**eality solutions for traffic **safety** training

To clarify the objectivity related to traffic risks, we first decided to construct an *immersive* experience based on a traffic crash.

To do this, we chose a traffic crash that actually happened, and reconstructed it based on the court materials.

The person who caused the crash gave permission to use court materials.

In addition, he was willing to share his experience.

Experts explain the theoretical background systems and practical experiences related to the crash.

What's been done – what's coming next

1. As described, we have built an *immersive* experience based on a traffic crash.

By fall 2024, the following will be started:

- Viewing conditions caused by alcohol
- Traffic risks – reaction distance
- Traffic risks – breaking distance

In the fall of 2024, it is planned to implement a short course using VR at a calm-down stop in cooperation with the Estonian police.

In the fall of 2024, we will start building the alcohol harm modules. Agreements have been concluded for cooperation with the Estonian Forensic Science Institute and other international researchers.

What are the benefits of using a VR system:

- Immersiveness allows you to get closer to traffic risks than with any other medium.
- VR enables to communicate procedural (“knowing how”) and declarative („knowing what“) knowledge more efficiently.
- In VR, it is possible to actively involve the participants.
- VR allows to reduce the workload of pedagogues/psychologists.
- VR makes it possible to neutralize the (anti-)sympathy of pedagogues, psychologists.
- VR enables countless statistical explanations to be delivered when AI is involved.

Now, it is time for VR