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Adapting Hazard Perception Testing for the Czech Driver Licensing

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- The **European Transport Safety Council** (ETSC) highlights hazard perception testing as a key recommendation to governments across Europe, recognising its proven effectiveness in improving road safety, particularly for young and novice drivers, as part of the EU's 2020–2030 Road Safety Priorities.

- Studies show that hazard perception training leads to reduced collision rates (Well et al., 2008; Horswill et al., 2015).

- Hazard perception testing can be successfully adapted for use in different countries (Ventsislavova et al., 2019).

The project re-assessed the Czech theoretical driving licence examination and explored the feasibility of integrating a hazard perception component into the official testing process.

Timeline: January 2022- December 2024

Palacký University Olomouc

Nottingham Trent University

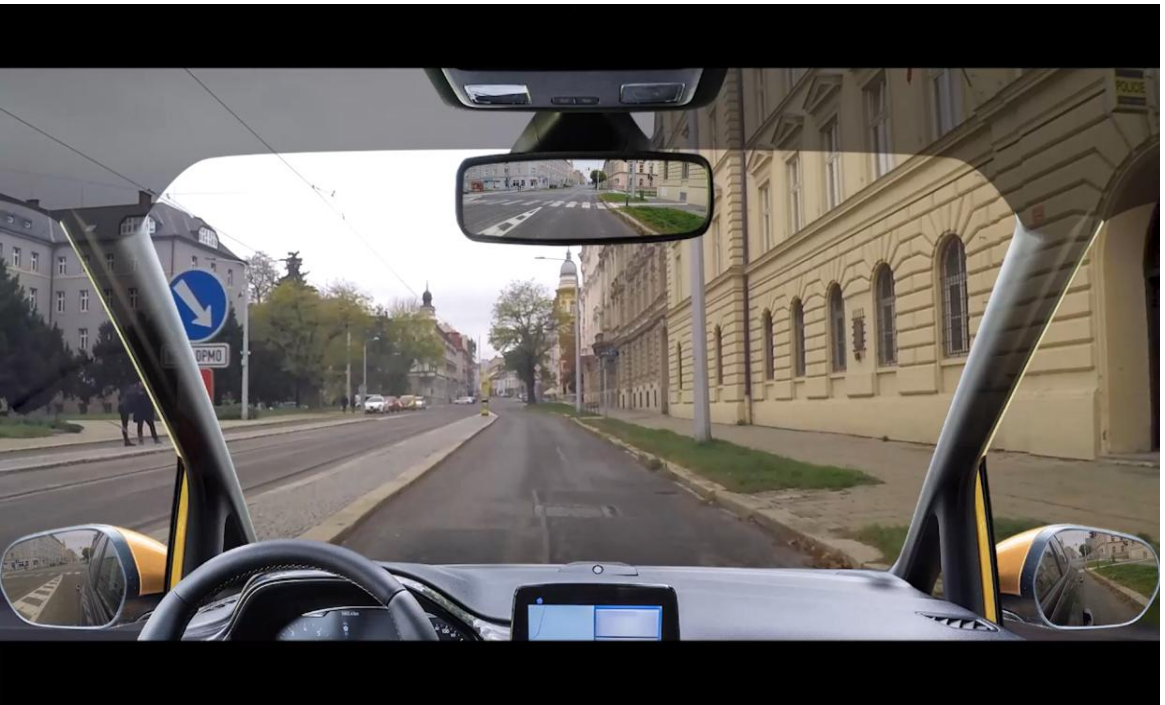
T A
Č R

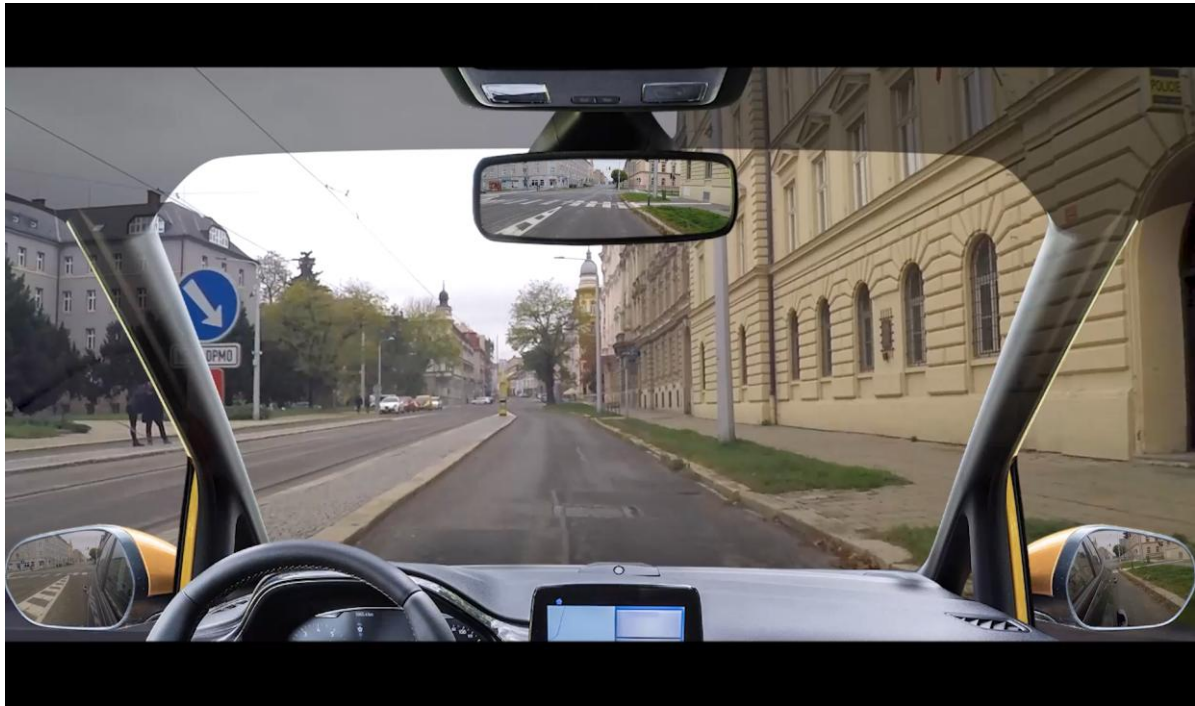
Hazard Perception or Hazard Prediction?

- Hazard perception tests should be adapted to the cultural driving context where they will be implemented for optimal results
- Criterion bias can impact hazard perception performance (Lim et al., 2014; Ventsislavova et al., 2019)
- In a hazard perception test, participants must judge when a situation becomes hazardous enough to warrant action

Capturing the unique aspects of the Czech driving environment

- Real driving footage - a protocol for developing hazard perception clips (Ventsislavova & Crundall, 2018)
- 17 hours of bespoke driving footage were filmed in October 2022
- 79 initial hazardous clips – 37 video clips were discussed during a focus group – 31 clips were selected for a pilot study
- Hazard perception (right) and hazard prediction tests (left) (identical hazardous situations across test type)

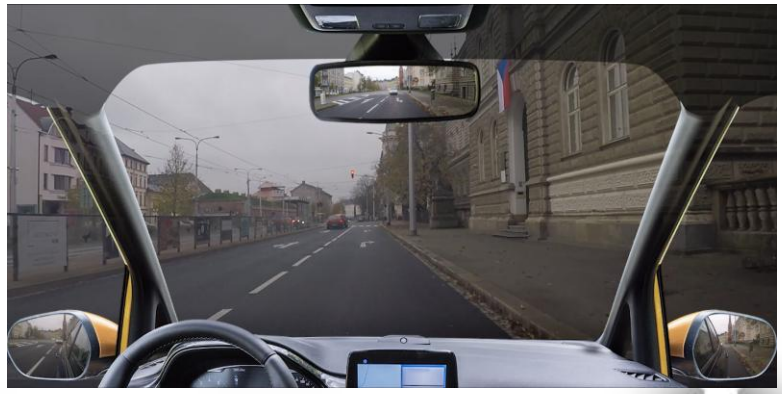




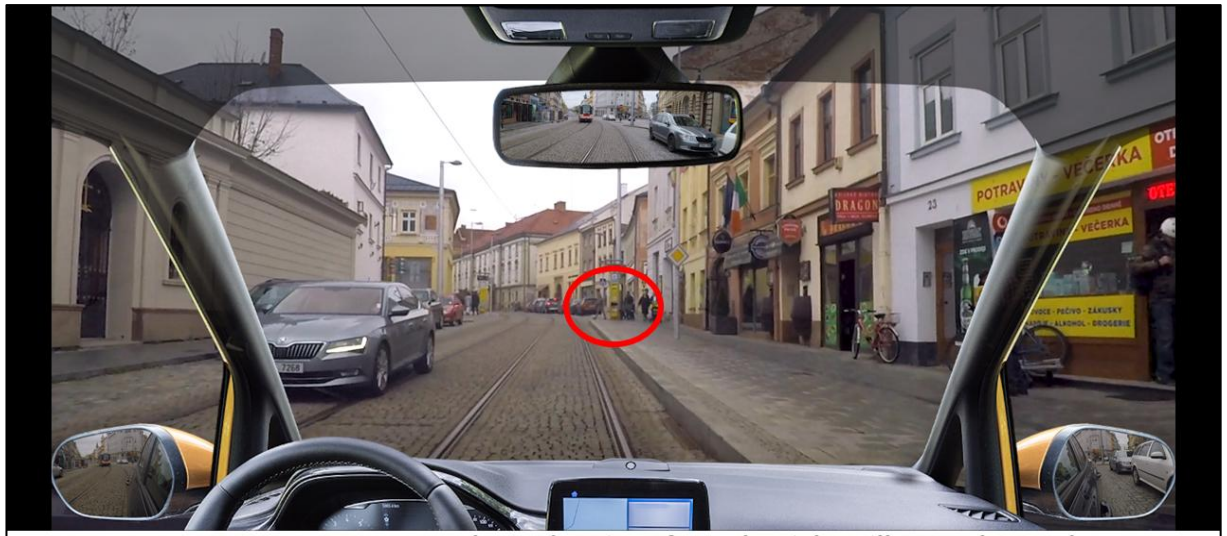
Pilot Study – Video Clips Selection

Expert focus group

Video clips selection



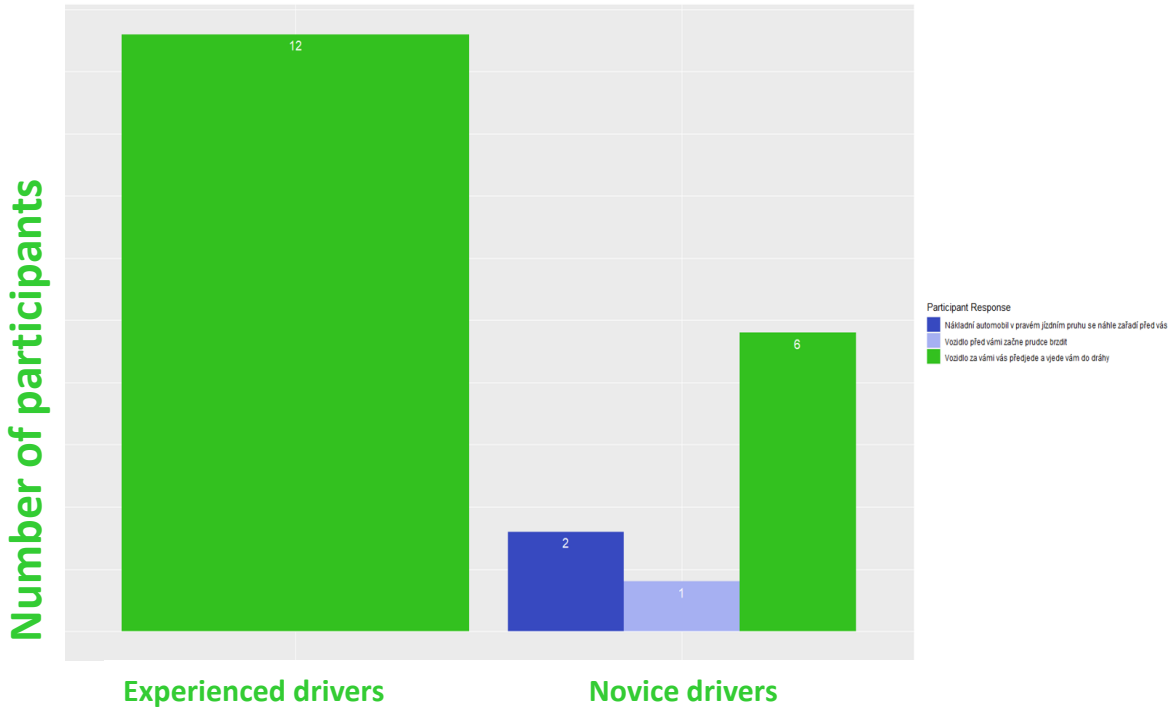
Multiple-choice options selection



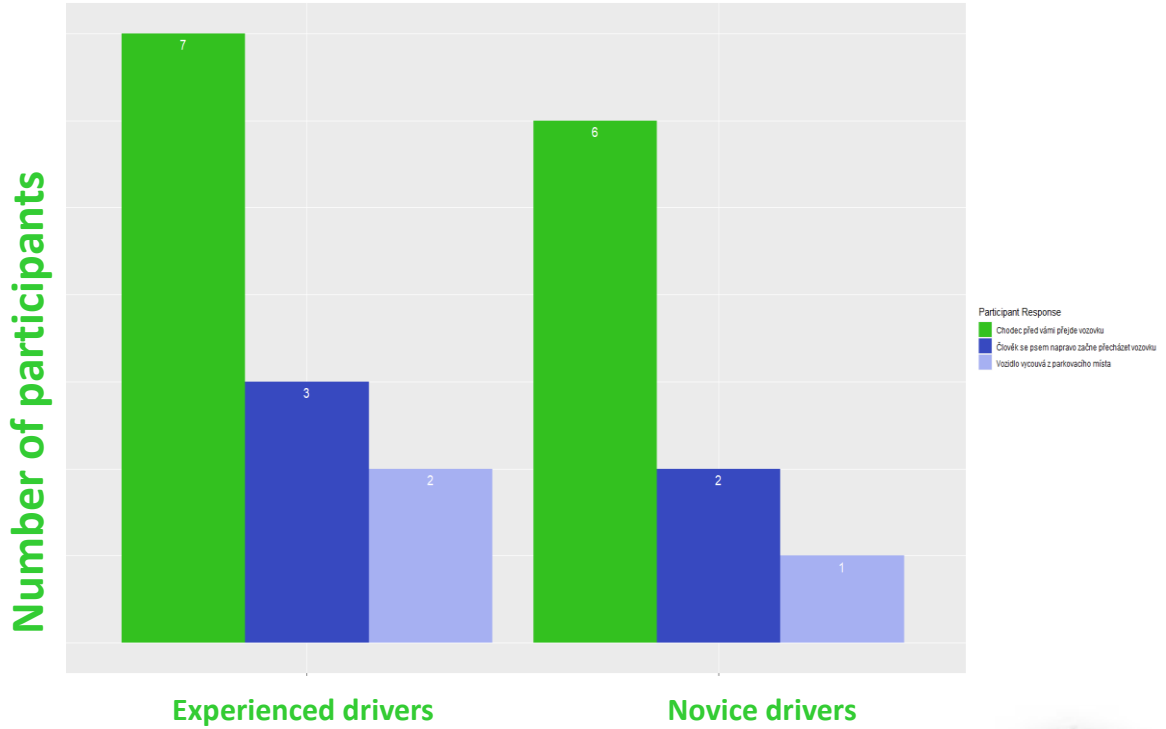
1.Too easy or too hard?	**1. The pedestrians from the right will cross the road**
2. Are there better MC options?	2. The grey car parked on the right pulls out in front of you
3. Any reason to not use?	3. A cyclist crosses the road on the right
	4. The tram emerges from around a bend in the road

Pilot Results – Multiple Choice Options

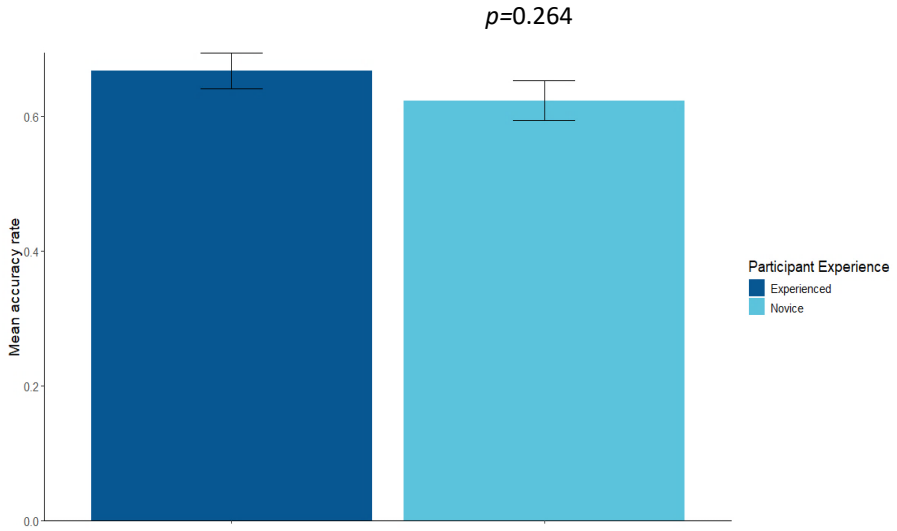
Video Clip 1

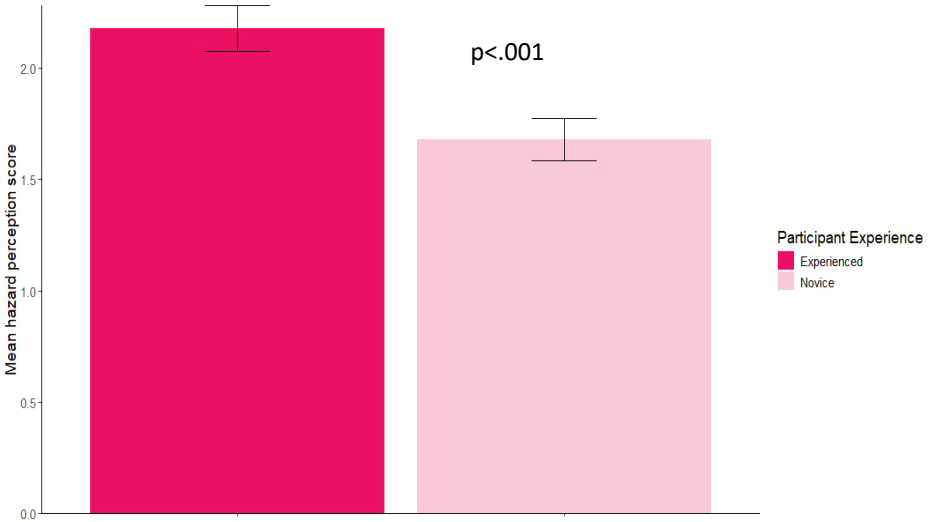


Video Clip 2

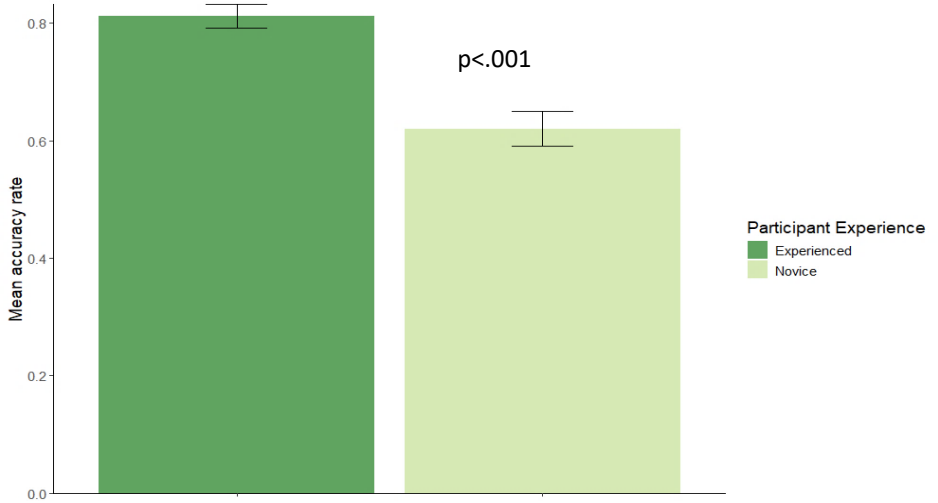


Hazard *Perception* Pilot Results





Hazard *Prediction* Pilot Results



Pilot Participants

	Hazard Perception		Hazard Prediction	
	Experienced	Novice	Experienced	Novice
N Participants	10	9	12	9
Average Age	30.10	19.22	32.83	19.11
Age *SD*	8.24	0.44	7.84	0.33

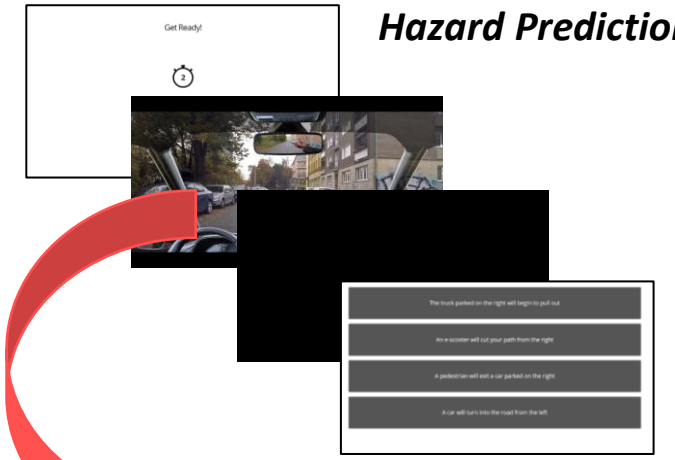
Pilot Results

- Experienced drivers produced more clicks than the novices for the hazard perception clips.
- No significant differences were observed between novice and experienced drivers in the number of null responses, suggesting experienced drivers did not have an advantage in understanding the task instructions.
- Both experienced and novice drivers were performing above chance (25%) for the hazard prediction clips, suggesting that their correct responses were not selected at random.
- Borderline responses (responses just before the hazard window) were examined, identifying 12 clips with at least one borderline response.
- The final selection of clips was based on their ability to differentiate between experienced and novice drivers, as well as the observed effect size.
- Final selection of 18 hazard perception clips and 18 hazard prediction clips

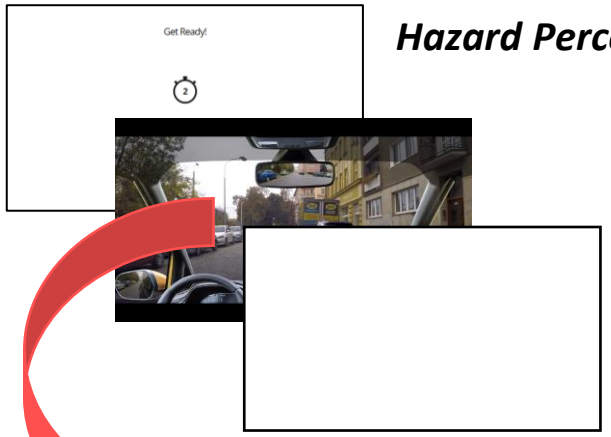
Confirmatory Study
Procedure, Participants, and Results

Study Procedure

Hazard Prediction



Hazard Perception



Participants

	Hazard Perception		Hazard Prediction	
	Experienced drivers	*Novice drivers*	*Experienced drivers*	*Novice drivers*
№	60	59	52	54
	40.19 (16.32)	18.44 (3.04)	37.98 (14.11)	20.39 (12.80)
	34	29	32	20
	24	30	19	32
Prefer not to say	2	0	1	2
Driving Experience	22 years	8 months	17 years	7 months
	0	42	0	38
	31	10	28	6

Main Results

There were two main measures of interest across experience and collisions groups:

- The response times to hazards
- Accuracy in identifying and predicting the hazards

Hazard perception –hazard window - the scoring system ranged from 0 to 5:

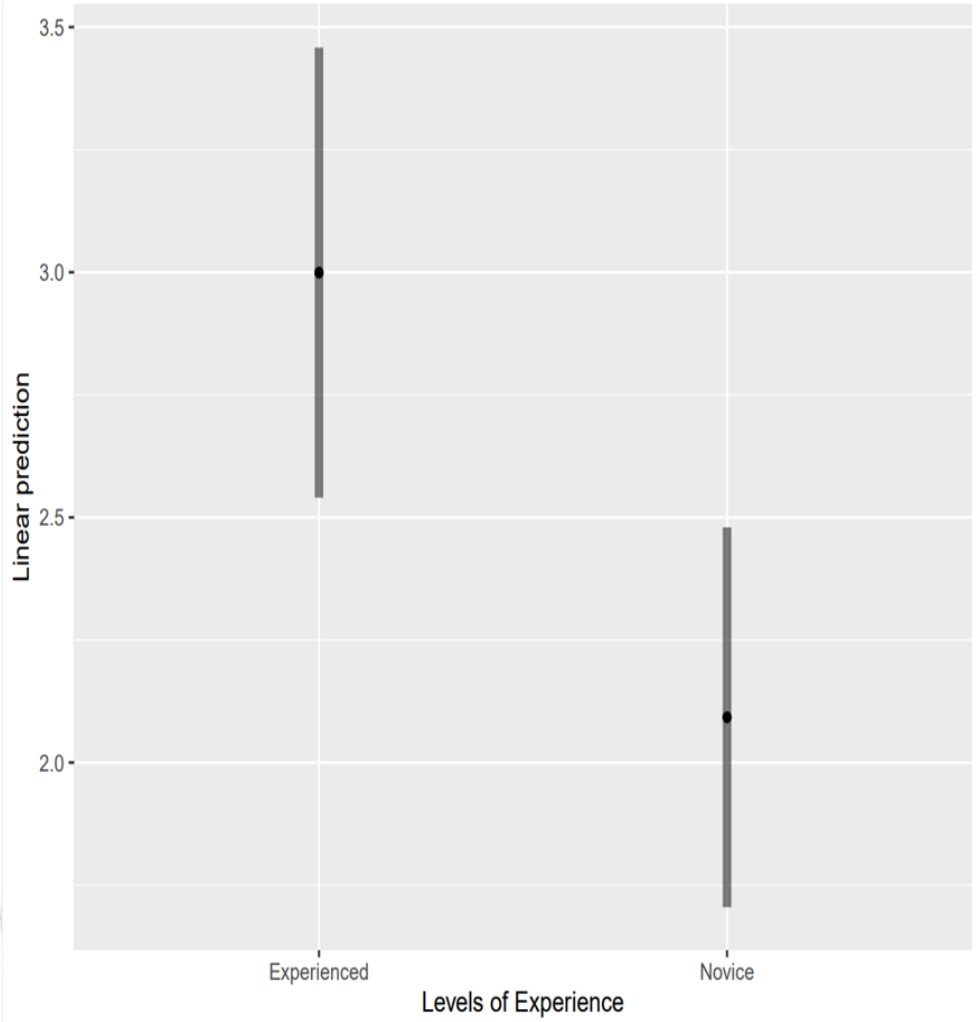
- 5 points indicating the fastest response within the hazard window
- 1 point indicating the slowest response within the hazard window
- 0 points indicating no response within the hazard window

Hazard prediction – Multiple choice question

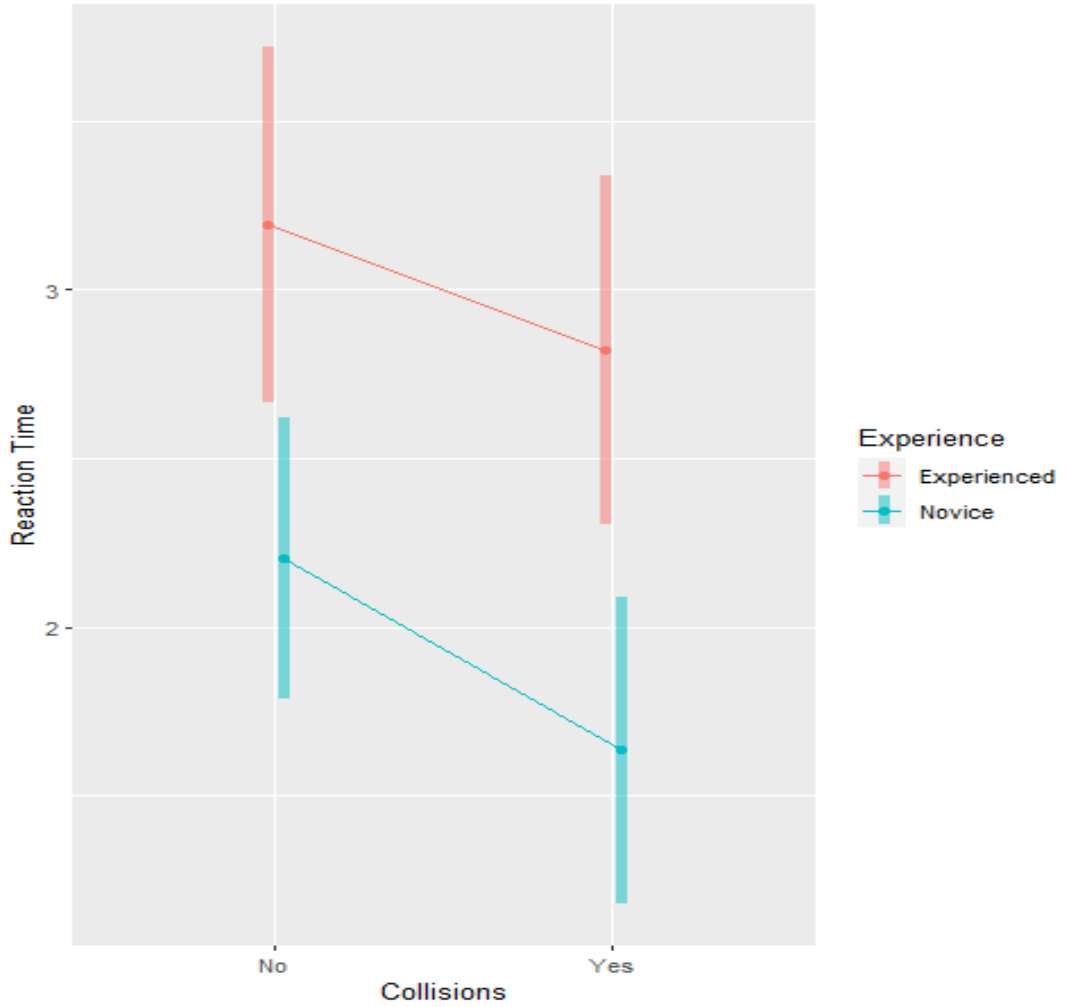
- Correct response = 1 point / Incorrect response = 0 points

Hazard Perception Reaction Time

Experienced drivers were significantly faster at detecting hazards than the novices (M=3.01 vs. M=2.1) ($\Delta\chi2$ (1) = 27.24, $p < .0001$)

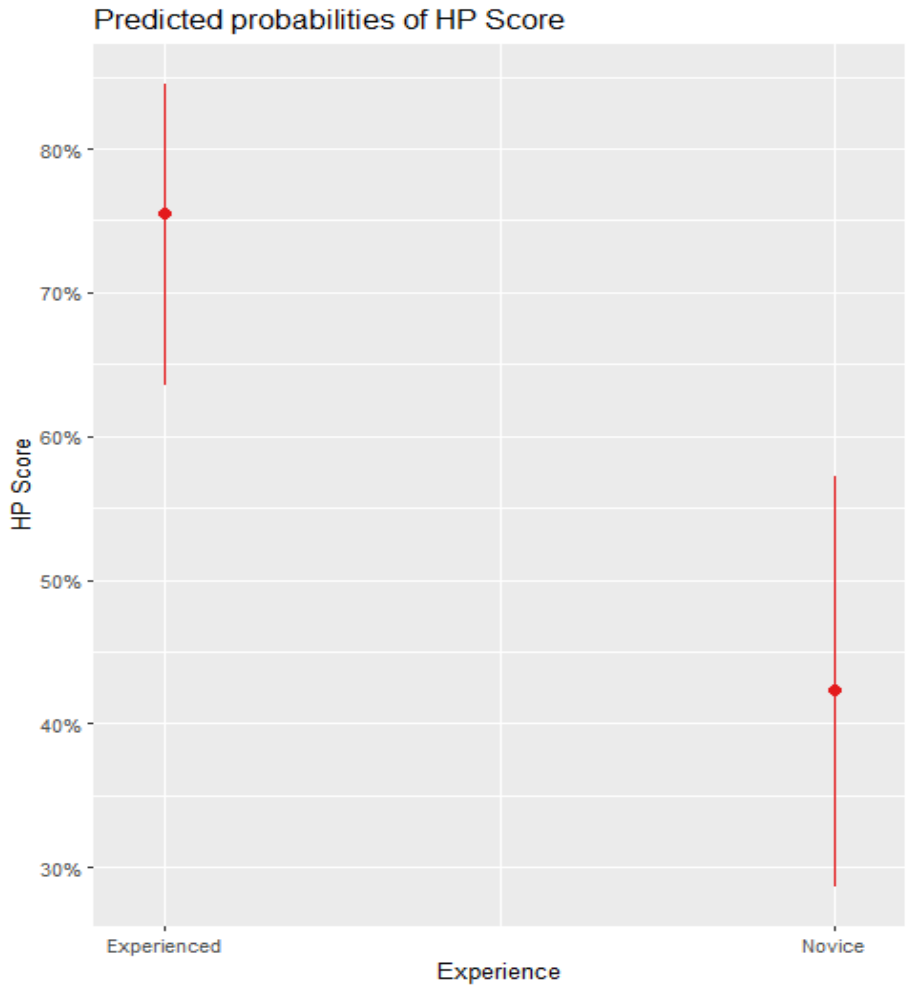


Those drivers who have never been involved in a collision were slightly faster than those who have previously been involved in collisions (M=2.70 vs. M=2.23) ($\Delta\chi2$ (1) = 5.27, $p < .05$), though the effect size was smaller

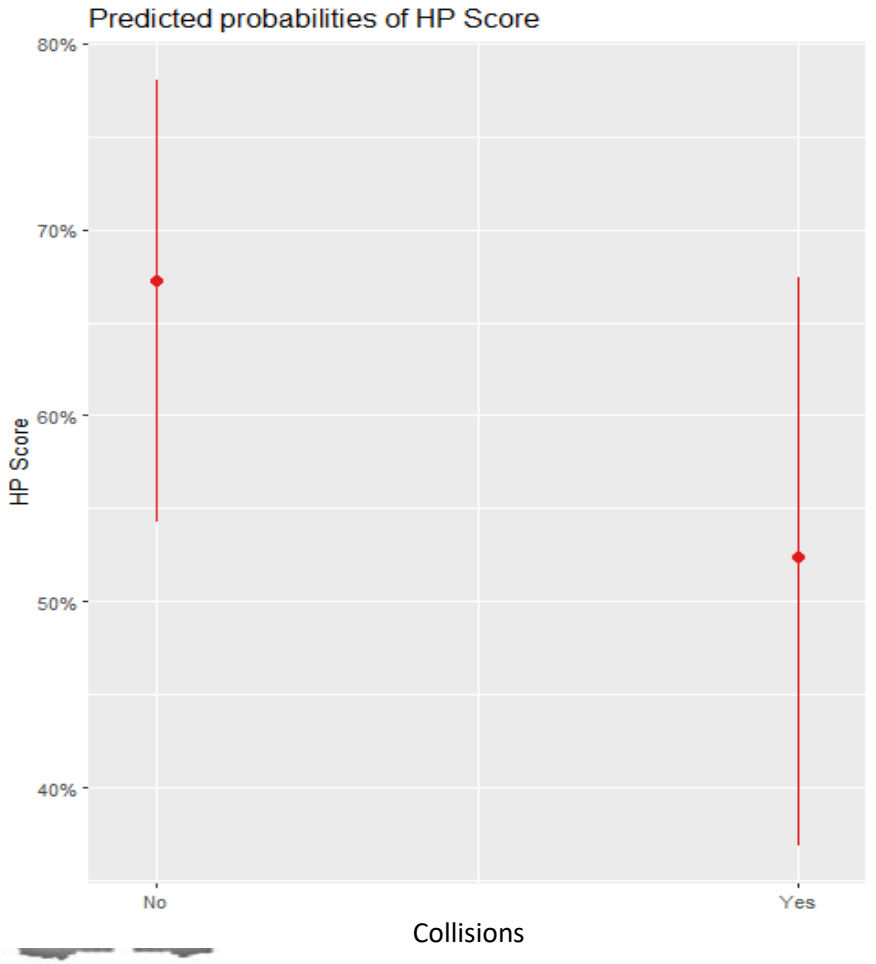


Hazard *Perception* Accuracy

There was a significant difference between the experienced groups in hazard perception accuracy $\Delta\chi 2$ (1) = 25.33, p <0001, with experienced drivers showing better HP accuracy than the novices (M=75% vs M=42.3)

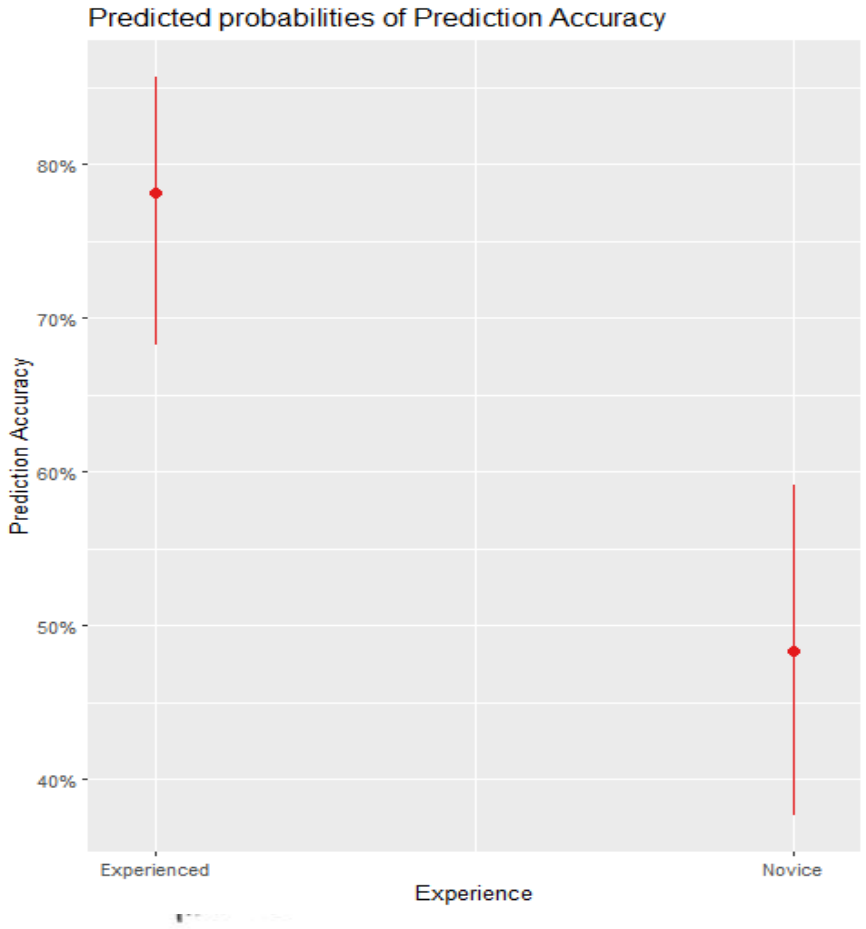


Those drivers that were involved in collisions were less accurate in spotting hazards than those that have never been involved in collisions $\Delta\chi 2$ (1) = 4.58, p <.05, (M=67% vs M=52%), though the size effect was very small.

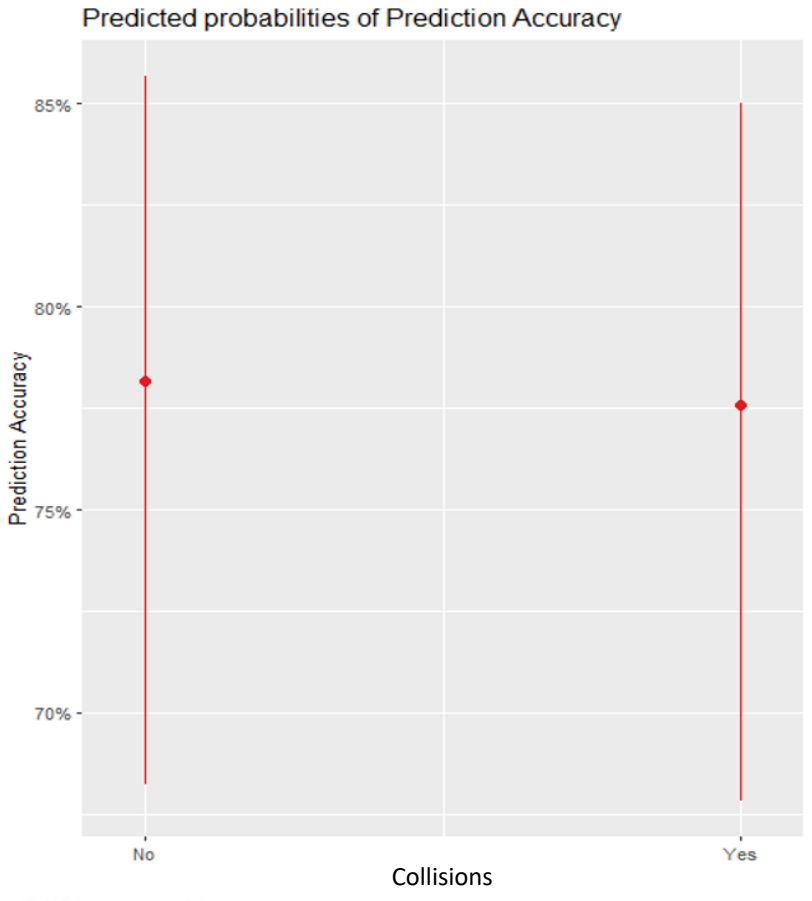


Hazard *Prediction* Accuracy

There were significant differences between the experienced and novice drivers in their ability to predict hazardous situations ($\Delta\chi 2$ (1) = 30.35, p >.0001), (M= 78% vs. 48%)



No significant differences were found between drivers who had not been involved in collisions and those who had ($\Delta\chi^2(1) = 0.02$, p = .89), with mean accuracy rates of M=78% and M=77.5%, respectively



Conclusions

- Both tests successfully distinguished between experienced and novice drivers, suggesting strong potential for integration into the Czech licensing process.
- The hazard *perception* test also showed better ability to differentiate between drivers with and without collision history, indicating it is fit for purpose.
- **Hazard perception testing is planned for inclusion in the theoretical component of the Czech driving examination within the next 3 to 4 years**.

THANK YOU

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Connect with me:

A huge thanks to the research team:

Petya Ventsislavova, Matus Sucha, Jiri Novotny,

Lydia Harrison, Beata Suriakova, Mikulas Toman

David Crundall, Ralf Risser, Petr Zamecnik

New driving school exam test
Pilot test

Ing. Jiří Novotný
Vice president for Education at the Association of driving schools in the Czech Republic
Main safe driving instructor of the Czech NPO Road safety team

Why the new concept?

- 25 test questions

What can we implement?

- Several types of clips (CGI animations, real traffic)


HJC

Rules for the new exam concept

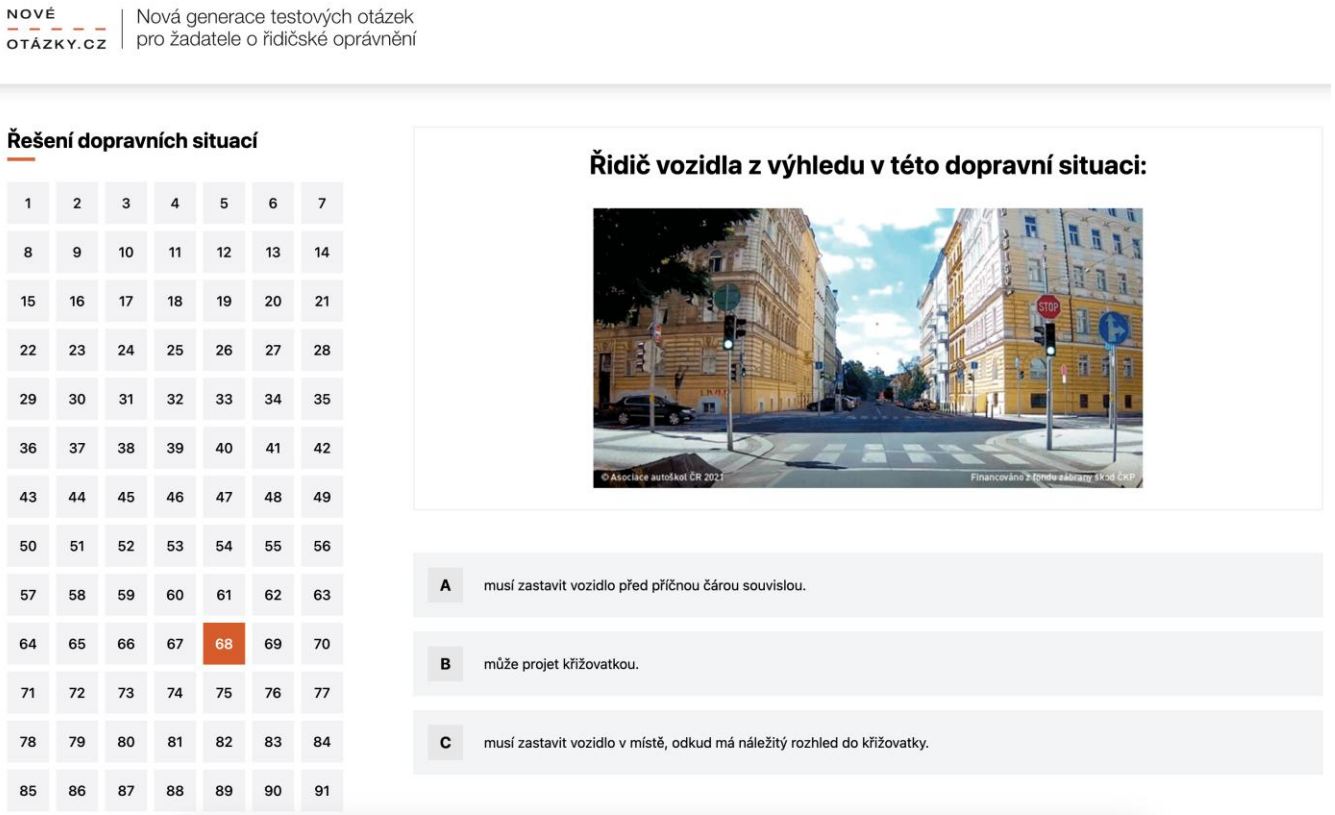
- The new concept of the exam has 2 parts:
  theoretical knowledge
  theoretical skills sections
- The target success rate at least 80 %
- The total test time should not exceed 60 min

Testing within the TAČR project

- Over 100 participants tested
- Pilot testing of the new final exam:
  - 1st round 36 knowledge based questions + 10 clips on hazard perception
  - 2nd round 40 knowledge based questions + 15 clips on hazard perception

New concept of the final exam

- Partner work group from the Ministry of Transport



Example of knowledge test questions

Tato dopravní značka označuje:

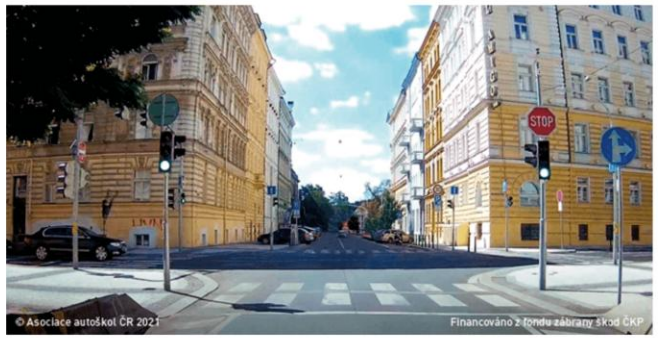
- **A** Konec hlavní pozemní komunikace.
- **B** Vedlejší pozemní komunikaci.
- **C** Hlavní pozemní komunikaci

Tato dopravní značka:

- **A** Upozorňuje řidiče na zatáčku (směrový oblouk) vpravo, jehož bezpečné projetí vyžaduje výrazné snížení rychlosti jízdy.
- **B** Označuje zejména nebezpečnou zatáčku a usměrňuje provoz ve směru šipky.
- **C** Vyznačuje skutečný tvar hlavní pozemní komunikace.

Example of knowledge test questions

Řidič vozidla z výhledu v této dopravní situaci:



- **A** musí zastavit vozidlo před příčnou čárou souvislou.
- **B** může projet křižovatkou.
- **C** musí zastavit vozidlo v místě, odkud má náležitý rozhled do křižovatky.

Na této frekventované pozemní komunikaci jste se zařadili do levého odbočovacího pruhu. Na křižovatce jste zjistili, že jste měli jet vpravo. Jak se zachováte?

- **A** Odbočíte vlevo a budete počítat se zajížďkou.
- **B** Zvukovým výstražným znamením upozorníte ostatní řidiče, že odbočujete vpravo.
- **C** Zastavíte a pokusíte se couváním zařadit do správného odbočovacího pruhu.

Results of the pilot study

Tabulka 2.2: Výsledky pilotního šetření – 2. kolo

Výsledky:

	Časová náročnost (od spuštění po odevzdání testu)				Znalostní část		
ID uživatele	Trvání celé zkoušky [hh:mm:ss]	Trvání znalostního testu [hh:mm:ss]	Trvání části s klipy [hh:mm:ss]	Poměr trvání částí (v %)	Max. možné skóre (= počet otázek)	Získané skóre (= počet správných odpovědí)	Tj. úspěšnost (v %)
58	0:41:33	0:22:15	0:19:18	54 : 46	40	37	92,5 %
59	0:42:09	0:22:21	0:19:48	53 : 47	40	31	77,5 %
60	0:48:55	0:30:03	0:18:52	61 : 39	35	30	85,7 %
61	0:48:23	0:30:03	0:18:20	62 : 38	38	33	86,8 %
62	0:31:00	0:11:03	0:19:57	36 : 64	40	37	92,5 %
63	0:44:00	0:23:55	0:20:05	54 : 46	40	38	95,0 %
69	0:40:50	0:22:38	0:18:12	55 : 45	40	34	85,0 %
70	0:47:05	0:17:02	0:30:03	36 : 64	40	35	87,5 %
71	0:33:04	0:13:32	0:19:32	41 : 59	40	36	90,0 %
72	0:49:11	0:30:03	0:19:08	61 : 39	33	23	69,7 %
79	0:32:47	0:14:04	0:18:43	43 : 57	40	27	67,5 %
80	0:34:37	0:15:14	0:19:23	44 : 56	40	31	77,5 %
82	0:30:02	0:10:45	0:19:17	36 : 64	40	40	100,0 %
85	0:39:14	0:20:06	0:19:08	51 : 49	40	29	72,5 %
86	0:33:43	0:15:55	0:17:48	47 : 53	40	35	87,5 %
90	0:51:55	0:28:52	0:23:03	56 : 44	40	26	65,0 %
91	0:45:44	0:25:23	0:20:21	56 : 44	40	28	70,0 %
93	0:42:23	0:22:55	0:19:28	54 : 46	40	37	92,5 %
94	0:43:31	0:22:58	0:20:33	53 : 47	40	32	80,0 %
99	0:31:47	0:12:20	0:19:27	39 : 61	40	35	87,5 %
Průměr:	0:40:36	0:20:34	0:20:01	–	–	32,7	83,11
Sm. odch.:	0:06:55	0:06:30	0:02:36	–	–	4,5	10,08
Minimum:	0:30:02	0:10:45	0:17:48	–	–	23,0	65,00
Medián:	0:41:51	0:22:18	0:19:25	–	–	33,5	86,28
Maximum:	0:51:55	0:30:03	0:30:03	–	–	40,0	100,00

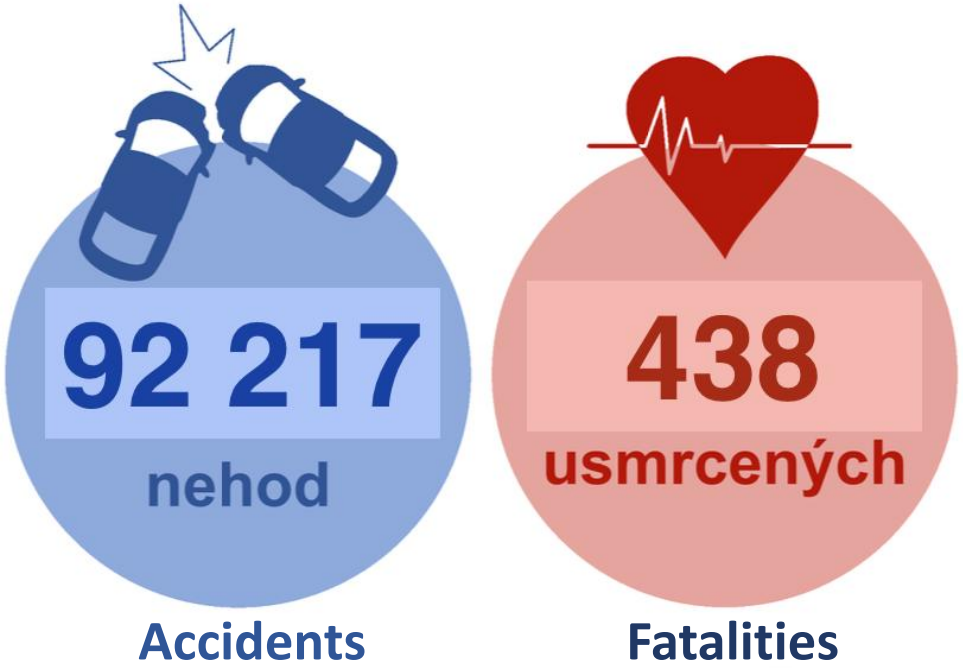
Results of the pilot study

- knowledge part - 83 %,
- skills part - 75 %

Proposal for a new concept

- **Knowledge part** – 40 questions (text or image), time limit 30 min.
- **Skills part –** 15 clips

In 2024 in the Czech Republic



Accidents

Fatalities

Thank you for your attention

Jiri Novotny
Petya Ventsislavova