

PRELIMINARY RESULTS OF A STUDY ABOUT THE INFLUENCE OF AN ACTIVE ACCELERATOR PEDAL ON NOVICE AND YOUNG DRIVERS IN AUSTRIA AND THE CZECH REPUBLIC

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ABSTRACT: In this presentation preliminary results of a PhD Thesis carried out in the framework of the NoE HUMANIST will be presented. The thesis itself concentrates on novice and young drivers, their driving behaviour and the possibility to influence them towards a safer driving behaviour. This paper will deal with some descriptive statistics about the first answered questionnaires and the first results about attitudes towards advantages and disadvantages of ISA directly after the use of the system and some months later.

1 Objectives

Novice and young drivers of the age from 15 to 19 are in many countries the group with the highest accident risk in road traffic. In Austria for this age group the risk to get involved in an accident is three times as high as for the general population [15]. Adolescent and young adults are those who are injured and killed mostly on Austrian roads [16]. Additionally it can be stated, that badly adapted speed is the main reason for their accidents [14].

These facts have been the main reasons to focus on this specific driver group, novice and young drivers aged from 18 to 30, and on Intelligent Speed Adaptation, in combination (ISA, see page 2). It is of general interest to learn whether there are methods to make young drivers safer drivers, for instance with the help of telematic devices and/or specific training measures.

2 Methods

The study was based on three important types of methods; driver behaviour observation, psychological group training and questionnaires. The first step was a behaviour observation of novice and young drivers between the age of 18 to 30, using the method of the “Wiener Fahrprobe”, while driving a driving school car along standardise routes in Vienna (Austrian novice and young drivers) and in Brno (Czech novice and young drivers). The observed behaviour at this point can be seen as a kind of baseline reflecting “usual” driving behaviour of the participants.

The “Wiener Fahrprobe” is a standardised observation method that gives a structured impression of an observed individuals driving behaviour. The subjects were observed by one person sitting in the back of the car behind the front passenger seat. The route included sections of different road types, such

as rural roads, motorways, inner city roads, etc., and was divided into sections. For each section the observer had to fill in a sheet concerning standardised, more descriptive variables like lane keeping, behaviour at traffic lights, etc., and non-standardised variables, mostly referring to types of behaviour which could not be predicted a priori for a certain time and space, like communication with other road users.

Additionally, drivers had to fill in four questionnaires. One of them, called “questionnaire for the ISA-study” was developed especially for this study and is based on recent literature [4, 5, 6, 8, 9 & 10], on informal expert interviews, but also on two in-depth interviews with persons belonging to the target-group. Participants had to report about their attitude concerning traffic in general, traffic safety, speeds and ISA. Furthermore the Manchester Driving Behaviour Questionnaire [6] which contains questions about the driving style, risks and mistakes was applied. Another questionnaire was about the type of drivers the subjects themselves thought they belonged to. It was developed by the psychonomics AG for the Axa Gruppe and can be found at <http://www.autofahrertypen.de/> [17]. Participants had to answer questions about emotions which are important, their attitudes towards the vehicle, which motives are related to driving and so on. The last questionnaire was administered directly in combination with the psychological group training and thus can be seen as an evaluation instrument.

Some months later all participants drove an ISA (Intelligent Speed Adaptation) equipped car along the same standardised test routes. ISA devices have been studied for more than 15 years mostly in Sweden and safety effects are estimated [2, 3 & 11]. In those studies it was often pointed out that ISA has a positive influence on the communication of the drivers with other road users. One explanation for this phenomenon is that because of the reduced speed drivers do have more resources to concentrate on the environment, including the social environment. The system used in the study reported here was an Active Accelerator Pedal that gives feedback to the driver by means of pedal resistance as soon as the legal speed limit is reached [12 & 13]. During the ride with the ISA equipped car drivers were observed with the help of the “Wiener Fahrprobe”. Again they had to fill in questionnaires; the “questionnaire for ISA-study” and the one about the type of driver one believes one belongs to.

As a next step, a psychological group training was developed where half of the drivers should participate. The goal of the training was to shape participants' opinion concerning traffic safety in general, speed and speeding but also concerning ISA and the advantages/problems connected to the system. Two sessions were held within two weeks, each of them lasting two hours. The first session focused on motives related to driving and emotions associated to the car. As a consequence of the discussion young drivers should become aware of discrepancies between different motives, like e.g. the need for safety on the one hand and the wish to have fun on the other hand. The second session focused on speed aspects like speed limits, reasons for speeding, problems of speeding, on the advantages and problems of the ISA system, etc..

Finally the driving behaviour of all participants in Vienna and Brno was again observed during a last test ride on the standardised route, so that the practical part of the PhD was finished in August/September 2007.

2.1 Hypotheses

Different Hypotheses have been developed in the frame of this study, mainly based on the assumptions that have been made and discussed before, completed by the preparation work carried out here. The main ones were the following:

Hypothesis 1: The use of an ISA system will improve the communication between the driver and other road users.

Hypothesis 2: Only short-term use of ISA will not be enough to achieve a long term effect on the drivers' attitudes and behaviour.

Hypothesis 3: Special training programs as envisaged in connection with the PhD thesis presented here can change negative attitudes towards ISA and towards speed behaviour in general.

Hypothesis 4: Such training measures have the potential to improve drivers' attitudes and behaviour for a longer period of time.

2.2 Limitations in this paper

There have to be mentioned two limitations of this paper. One limitation is related to the study design. This PhD thesis started as a very ambitious project, with many ideas about how to reach these very specific subjects. In reality it turned out to be more difficult to attract novice drivers to take part in the study. The real number of participants related to answered questionnaires can be seen in table 1. In Austria and the Czech Republic different methods turned out to be successful. In Austria people have been recruited through a webpage where students search for jobs. In the Czech Republic thanks to our partner CDV a driving instructor helped us to search for participants, which was not possible in Austria. That is the reason, why the Austrian subjects are in average older than the Czech ones but also why subjects in Austria have already quite a high driving experience which can be seen in the next chapter. It also has to be noticed that the test and the control group do not have the same size because of practical reasons. It was quite difficult to motivate the young drivers to participate in the group discussion. All results presented here but also those which will be provided in the future will have to be evaluated with respect to these constraints.

Table1. Study design, pictured by an overview of number of answered questionnaires

Steps of the study		Number of people in country			Drop Out
		AUT	CZ	Sum	
Step 1	Drive in a driving school car	47	27		
	Fill in "ISA" questionnaire	47	27	74	0
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Step 2	Drive an ISA equipped car on an extra route to get used to the system	40	23		
	Drive an ISA equipped car on the original route	40	23		
	Fill in "ISA" questionnaire	40	23		
	Fill in MDBQ	40	23		
	Fill in "Type" questionnaire	40	23	63	11
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Step 3 Test group	Participate in the psychological group training	15	8		
	Fill in "ISA" questionnaire	15	8		
	Fill in MDBQ	15	8		
	Fill in "Type" questionnaire	15	8		
	Fill in "Training" evaluation	15	8	23	
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Step 4 Test group/ Control group	Drive in a driving school car	15/20	8/15		
	Fill in "ISA" questionnaire	15/20	8/15		
	Fill in MDBQ	15/20	8/15		
	Fill in "Type" questionnaire	15/20	8/15	58	16

The other limitation concerns the results presented here. This paper will not yet deal with all of the central hypotheses of the research, but will concentrate on general attitudinal aspects of the subjects whom we have communicated with, concerning their view on what are safe and unsafe drivers, and how an ISA system, according to their point of view, could interfere with the traffic system. The latter aspect was analysed with the help of open-ended questions. The spontaneous answers are summarised in the result chapter. Additionally a first analyse of the answers given concerning ISA will be presented in this paper.

2.3 Participants sample

74 novice and young drivers could be motivated to participate but only 58 finished the study. The others dropped out because of different reasons and at different steps of the study. Out of those 58 just 57 filled in all questionnaires. 34 participants come from Austria and 23 from the Czech Republic. All of them are aged between 18 and 30 years. The mean age in Czech Republic was 19, in Austria 23. The distribution of sex was different in both countries. In the Czech Republic only few women took part whereas in Austria about half of the drivers were female.

Five participants did not have a valid driving licence at the moment of the first ride. 52 had a driving licence allowing them to drive passenger cars and some of them also had a driving licence for other vehicles, like motorbikes or lorries. The driving experience with vehicles of category B can be seen in figure 1.

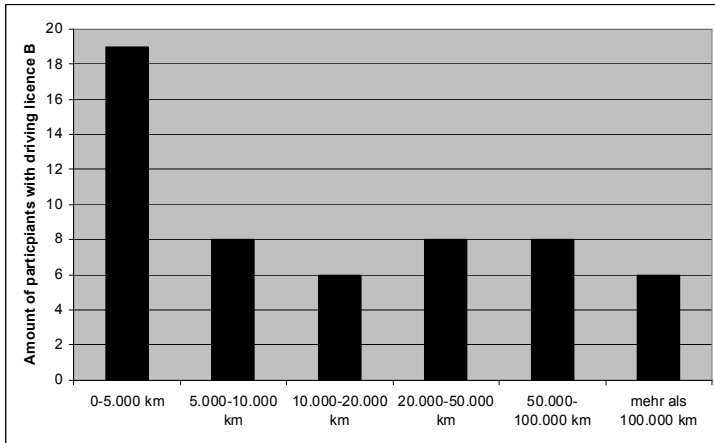


Fig.1. Driving experience

The driving experience was in average about 42 months although it has to be said, that the driving experience of the two groups was quite different. In Austria participants had acquired their licence in average 61 months ago, in the Czech Republic this was only about 12 months ago.

3 Results

Concerning their self-perception most novice and young drivers experience themselves as safe drivers but not all of them feel safe in traffic. In the Czech Republic participants feel less safe than in Austria. Good drivers according to participants' view are those, who behave according to the law, who drive anticipatorily and safely, while drivers who endanger others, drive aggressively, do not behave according to the law, drive too fast and reckless. According to the interviewed subjects, speed limits are necessary and are considered as "quite ok" in both countries.

Adolescents in this study have not been aware of ISA that much but all of them have been able to think about advantages and problems of such a system. The most frequent statements (given spontaneously) that reflect advantages of the system were:

- the system makes the driver aware of speed limits
- gives possibility to control one's behaviour
- can increase traffic safety.

The most frequent disadvantages assumed by novice and young drivers were:

- ISA could be a handicap if someone wanted to overtake

- the system would take too much control so that the driver could not behave as he/she likes
- there could be some delegation of responsibility to the system, like speeding when the system was out of function, or speeding in areas where the system would not work
- the system might produce possible errors like setting an erroneous limit, etc.

However, some of the participants believe that ISA does not have any disadvantages at all. All in all, the young drivers that we communicated with are rather neutral concerning the question whether they would use such a system or not. At this point of time it is legitimate to say that their attitude to ISA is not clearly positive, but it is definitely not negative either.

As a next step, the attitudes of novice and young drivers regarding ISA shortly after the use of the system (step 2) compared to their attitude about one year later (step 4) distinguished between the group of subjects with (test group) and without (control group) participating at the group discussion will be reported here as well. The test group consists of 23 subjects whereas in the control group 35 subjects participated. This difference resulted because of practical reasons which already have been mentioned above. It can be seen in figure 2 and 3 that all novice and young drivers assess the advantages of ISA quite positively. On a 5 point scale there are only one to two advantages that are assessed with a value higher than 3 in average (“No control look on speedometer necessary.” and “No control look on traffic signs necessary”). Within the control group, people who did not take part in the group discussion, there are no significant differences between the answers given directly after using the ISA system and those given about one year later after the last test ride. Those participants who underwent the group discussions (test group) assess the advantage “Making aware of speed limits” significantly ($t=-2,806$; $df=21$; $p=0,011$) better directly after using the ISA system (step 2). This result goes against hypothesis 3 at a first step. Further work will have to concentrate on the reasons of that finding.

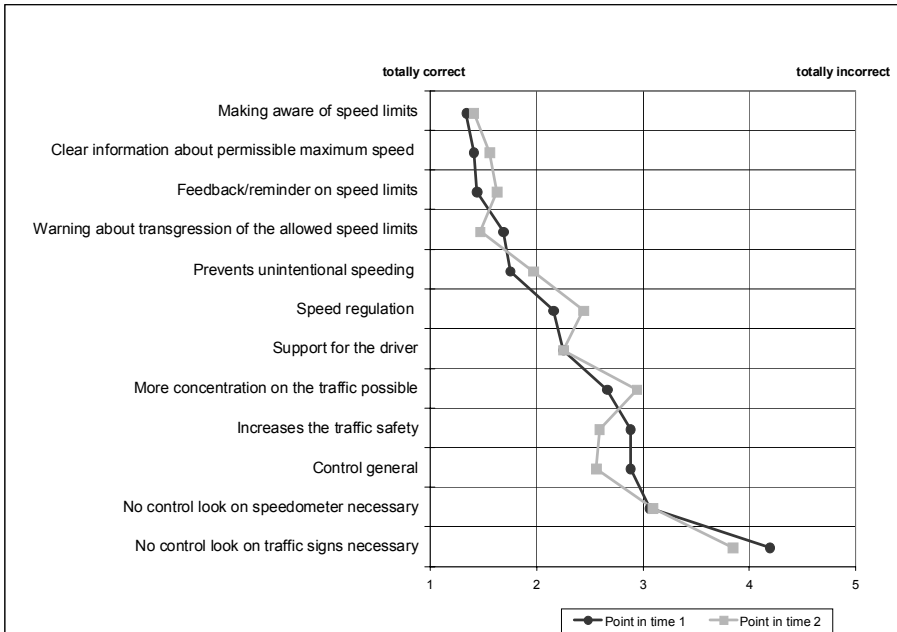


Fig.2. Advantages of ISA without group discussion

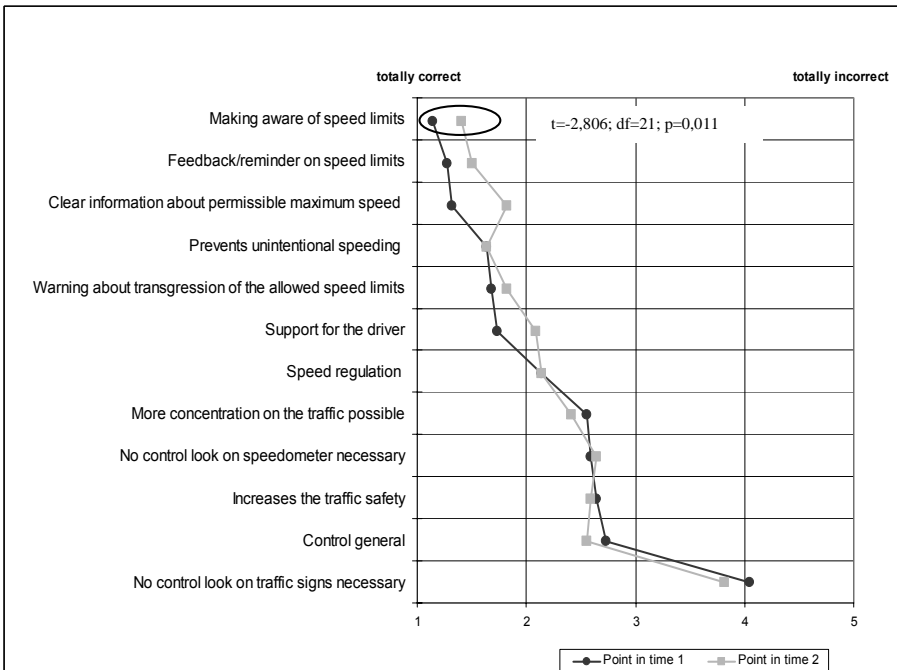


Fig.3. Advantages of ISA with group discussion

It is about the same for the disadvantages, shown in figure 4 and 5. Most of the participants agree on the mentioned disadvantages of the ISA system. Within the answers regarding to disadvantages of ISA there is a quality difference. For

instance to realise that ISA might make people rely on the system too much indicates awareness of possible dangerous results. In contrast to this, if ISA is seen as an annoying system it shows that one does not want to renounce fun in order to get safety. In the control group there is one significant difference ($t=2,272$; $df=31$; $p=0,030$) in their rating concerning the reliability of the system. Subjects answered in the last questionnaire (step 4) that ISA users might rely too much on the system, which they thought directly after the use of ISA (step 2) as well. On the other hand there are five significant differences in the attitudes between the two points in time within the test group again. Just two of them "One relies too much on technology. " and "Uncertainty, if one is unaccustomed to this." are in the expected direction. The other three statements suggest that the attitudes of the test group towards ISA had deteriorated despite the group discussion in comparison to the control group.

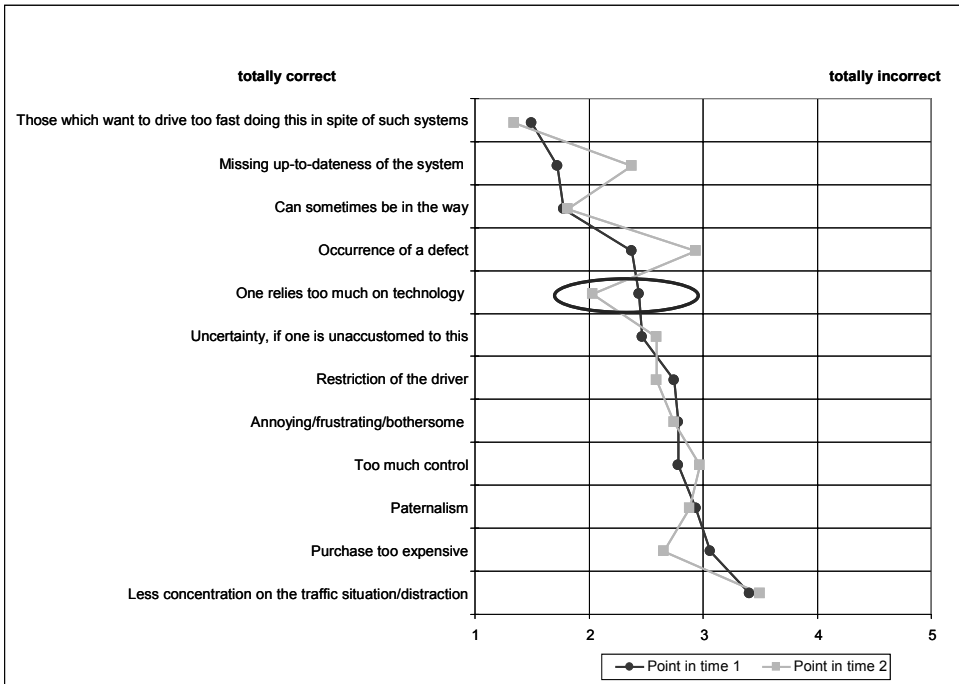


Fig.4. Disadvantages of ISA without group discussion

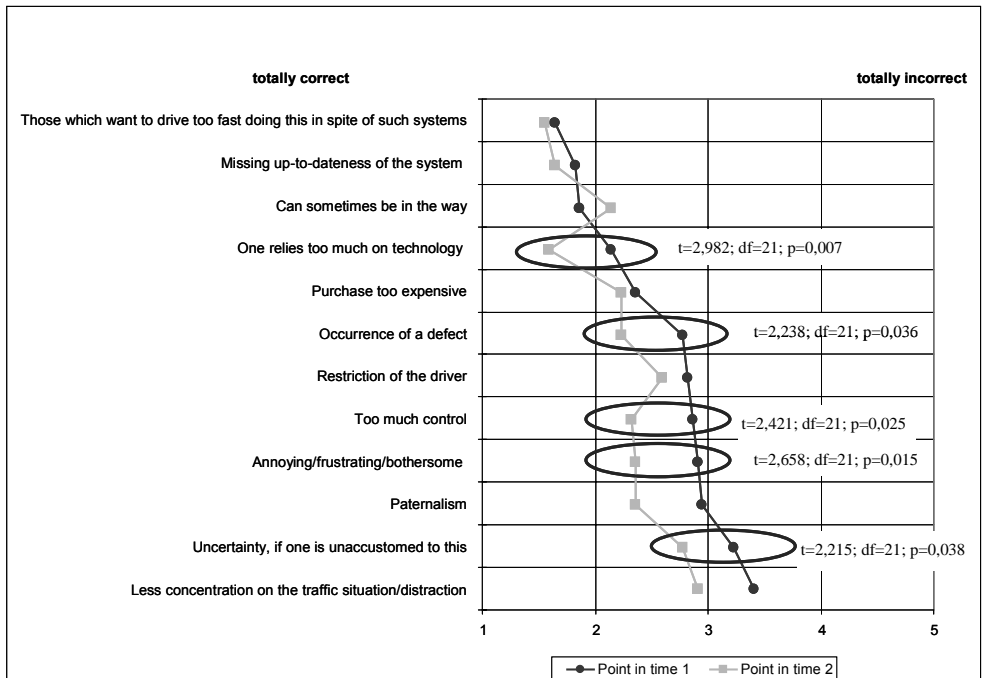


Fig.5. Disadvantages of ISA with group discussion

4 Conclusions

It was found that novice and young drivers in our sample do feel quite safe in traffic and also have many different ideas about attributes of a safe driver and a driver who endangers others. They also have a good imagination about what ISA could accomplish and where the limitations of such a system could lie.

There can be given just few and very restricted answers to hypothesis 3. So far it must be stated that the type of group discussion, realised within this study, did not work in the right way. A reason for this findings might be a group effect of the test group, or it could be that a sensitisation of the test group in regard to problems ISA might have taken place. But this new hypothesis has to be discussed in further steps of analysis. For instance, a comparison of both groups concerning each point in time, broken down into step 2 and 4, will help to find out whether there are significant differences between the test and the control group.

So far it can be stated that a very restricted group discussion in terms of time, as implemented in the frame of the thesis, ad-hoc does not have the potential to change the attitudes towards more traffic safety of novice and young drivers. Maybe this group training at least can cause a sensitisation. Nevertheless for future work a different, "more sophisticated" type of group work has to be considered. Especially, it will have to be more extended in time, as also asked for in connection with legally applied group procedures in, e.g., Austria and Germany [1].

Concerning ISA, in contrast to earlier results, attitude did not change in a positive way after the use of ISA, and those who took part in the group sessions even became more negative, at least in some argument. This might be an effect of age, where one may assume that the attitude towards ISA generally is not that positive and that discussion in the groups even could produce reactance.

To provide comparisons of different nationalities was not possible, due to the differences of the two groups, but this actually never was planned, although it would be interesting. But in any case, the study can provide insight into the structure of attitudes of young drivers and how they can be influenced. But this will only be possible after final provision and analysis of data.

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