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Feedback intervention for senior drivers (II)



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Contents

1. Preliminary remark	04
2. Aim of the project	04
3. The feedback intervention	05
3.1 Instruments and materials.....	05
3.2 Conducting the feedback intervention.....	08
3.3 Observers.....	09
4. Effect of the feedback intervention.....	10
4.1 Methodology	10
4.1.1 Experimental design	10
4.1.2 Sample	11
4.1.3 Data collection	11
4.2 Results	12
4.2.1 Improvement of driving competencies	12
4.2.2 Acceptance and evaluation of the feedback intervention	13
5. Summary and recommendations.....	15
References	16

1. Preliminary remark

The so-called “**feedback intervention for senior drivers in real traffic situations**” was developed as part of a UDV pilot project undertaken in 2019 in order to maintain the driving competencies of senior car drivers in the long term or even to improve these [1]. The feedback intervention comprises a one-time, standardised observation drive during which the driving competencies of the participating driver are systematically observed and give rise to a feedback report. In this way, senior drivers receive a feedback of their driving competencies from the observer which they can then compare with their own personal appraisal. Drawing attention to correct practices can also help bring about appropriate adaptations to these adults’ driving behaviours. The results of the feedback intervention **do not affect** the participant’s entitlement to continue to hold a driving licence. The feedback intervention is intended for active drivers aged 75 and who are **still fit to drive**. As of an age of between 70 and 75 years, a number of (non-pathological) changes to physical and mental capabilities occur which may have an impact on driving competencies. At the same time, the statistical risk of causing an accident involving personal injury increases as of the age of approximately 75 years. The feedback intervention is however **not** suitable for assessing fitness to drive or estimating an “individual accident risk”.

2. Aim of the project

The aim of this study was to further develop the feedback intervention for senior car drivers that was elaborated during the pilot project for implementation nationwide. This comprised reviewing the observational instruments, designing and testing training for observers and conducting and evaluating the feedback intervention again in an empirical study in order to provide further evidence of its effectiveness.

The scientific background of the revised feedback intervention and the results of the evaluation are documented in UDV research report No. 84 [2]. The report is available for download on the UDV website (www.udv.de). In addition, a training concept has been developed for potential observers [3].

3. The feedback intervention

The psychological observation of driving behaviour, a standardised, direct observation of driving behaviour, has been qualified as a suitable method for assessing driving competencies [4]. In the past, however, these observations have mostly concentrated on assessing fitness to drive and have been less concerned with the maintenance or improvement of driving competencies. Therefore, for in the feedback intervention, systematic observation of drivers is complemented by face-to-face feedback on eye-level. Following the observation drive, the senior drivers receive a qualified feedback about their driving competencies from the observer. In addition, potential discrepancies between the driver's own assessment and that of the external expert can be revealed and taken into account. Participants receive personalised recommendations how to maintain their driving competencies in the long term or even improve these. In addition, possible alternative forms of mobility may be identified and discussed if appropriate. In this way, driving behaviours can be adapted without any threat of sanctions or pressure to achieve any particular performance level.

Psychological observations of driving behaviour are usually highly standardised in order to provide an objective assessment or prognosis (e.g., the route, the observational procedure, limit values). However, this leaves little scope for taking individual needs into account or to interact with participants, for example in the form of feedback. That is why the feedback intervention is only partially standardised. In addition, observers need appropriate basic qualifications and specific training to be able to produce comparable feedback and at the same time respond to each participant's individual situation. During the development of the feedback intervention, particular importance was attached to standardising the following aspects:

- Observational instruments and criteria for designing a route (not the route itself!) that comprise **everyday driving tasks** of medium difficulty that are relevant to senior drivers
- **Guidelines relating to the behaviour of observers**, including the social situation during such feedback interventions
- Criteria for **giving meaningful, motivating feedback**

3.1 Instruments and materials

For the feedback intervention, it was first necessary to develop a catalogue of suitable driving tasks, design appropriate test routes and elaborate a system of observational categories. In addition, a training concept was developed for the observers, including example procedures, materials for conducting the observation and instructions for subsequent qualified feedback. The materials from the pilot project were taken as the starting point.

The **catalogue of driving tasks** provides a detailed description of all the driving tasks (target behaviour) and types of behaviour regarding which feedback should be given. The following driving tasks have been defined:

1. Route including driving straight ahead, curves, changing lane, overtaking, narrow road sections, obstacles
2. Approaching intersections
3. Intersections, junctions, roundabouts
4. Merging and leaving a traffic stream
5. Pedestrian crossings, bus stops, rail traffic
6. Driving on a very narrow road section: Entering and leaving traffic, reversing, turning

The driver's behaviour when performing these driving tasks is described on the basis of five categories: **traffic monitoring, communication, distance, vehicle positioning, speed adjustment**. The tasks are subdivided into various subtasks, for each of which typical errors and particularly considerate behaviours are listed. The considerate behaviour indicates the participant's strengths, which are also included in the feedback.

The **Observation Manual** contains a total of 29 cross-task driving errors subdivided into eight categories (e.g. speed-related behaviour, distance-related behaviour) that are described in detail. This Manual guides the observer's behaviour during the intervention because it (in part independently of the driving task) makes clear when an error should be noted.

All the listed driving errors from the driving task catalogue and the Manual are incorporated in the **observation checklist** (error list). This permits a rapid overview during the drive. Each error is assigned a code which appears both in the driving task catalogue and in the Observation Manual (Fig. 1). In addition, there are cross-task observations of driving dynamics (e.g. entering traffic) and adaptation to the traffic situation (e.g. driving in the traffic stream) that are recorded on a seven-point rating scale.

The driving task catalog, the manual and the observation checklist are interrelated. For example in the driving task catalogue, the subtask "3.4 Bending right of way" of task "3. Intersections, junctions, roundabouts" and the corresponding (target) driving behaviour are described in detail in text form. Below the description, typical driving errors are listed together with the associated error code, e.g. "Excessive speed ..." (1). In the Observation Manual, this typical error is assigned to the category "Speed-related behaviour" irrespective of the driving task. There is also a detailed description of when this "Excessive speed ..." error should be coded. It should be remembered that these error descriptions reflect the aim of maintaining everyday driving competencies and therefore sometimes differ from the demands of a driving test. To ensure a clear presentation and permit rapid, efficient coding during the drive, all the error codes are listed accompanied by a short designation in the observation checklist. This is used by the observer as an aid during the drive.

3.2 Conducting the feedback intervention

The feedback drive takes place in the participant’s own car in order to create a situation very similar to everyday driving and ensure habitual behaviour. The right-hand rear seat has been found to be the most suitable seating position for the observer. This permits attentive observation, including via the inside mirror, without causing too much distraction of the driver. The observer provides navigation instructions throughout the entire route. If possible, there should be no other interactions or conversations. All observations are documented in writing. The feedback conversation takes place directly after the drive.

Face-to-face feedback conversation: The feedback conversation is the core element in the feedback intervention. The aim of the feedback is to stimulate self-reflection and changes in behaviour based on the principle “speak plainly but thoughtfully”. The conversation is based on two fundamental principles:

- 1. Let the participant speak first.
- 2. Observations come before judgements and advice.

Because the focus is placed on encouraging a realistic self-assessment, the observations and appraisals of the senior driver are just as important as those of the observer. The participant’s view is first explored by the observer and then extended on the basis of his or her observations. By combining the different perspectives, it is possible to have a constructive discussion leading to tips and behavioural intentions for future driving. When developing these intentions for the future, the participant’s strengths observed during the drive should also be taken into account.

When communicating important aspects that have not been mentioned by the participant, The focus should be on what can lead to genuine hazards or overload in everyday situations. To do this, it is necessary to follow the principle set out in Figure 2. The observer speaks about their own observations and impressions in the same way that they previously spoke about the participant’s observations. Generalisations such as “but that really wasn’t difficult to see” tend to lead to debate rather than constructive conversations about solutions for the observed problems.

The feedback conversation finally results in cooperatively elaborated solutions and intentions for future driving behaviour that are to be implemented by the senior driver in the light of their individual everyday circumstances. These include driving-related adaptations as well as the consideration of other forms of mobility.

Face-to-face feedback

Figure 2 · Phases of the feedback conversation



The participant receives a certificate to remind them of the feedback intervention and the intentions as a result of it. Judgements or formulations such as “successfully participated” should be avoided.

3.3 Observers

In terms of the required basic qualifications and competencies, **officially certified experts** or **driving examiners** (aaSOP), **traffic psychologists** or **driving instructors** are suitable as observers.

A training has been developed to prepare them to conduct the feedback intervention. Alongside the training of specific skills regarding relations and communications with older people, the training also ensures that the different observers act and react in similar ways. In general terms, the training is subdivided into three parts:

- Instruction on how to design a route
- Instruction on the conduct of the intervention (recruitment of participants, observation)
- Instructions how to give a meaningful and motivating feedback

4. Effect of the feedback intervention

4.1 Methodology

4.1.1 Experimental design

The effects of the feedback intervention were tested using a randomized control group design with two groups (one Feedback group = FG and one control group = CG) and two measurements (two observed drives) (Tab. 1). Nine driving instructors in Munich and Ingolstadt acted as the observers. Before the drives, they were given the training for driving observers as well as additional information about the project.

Experimental design

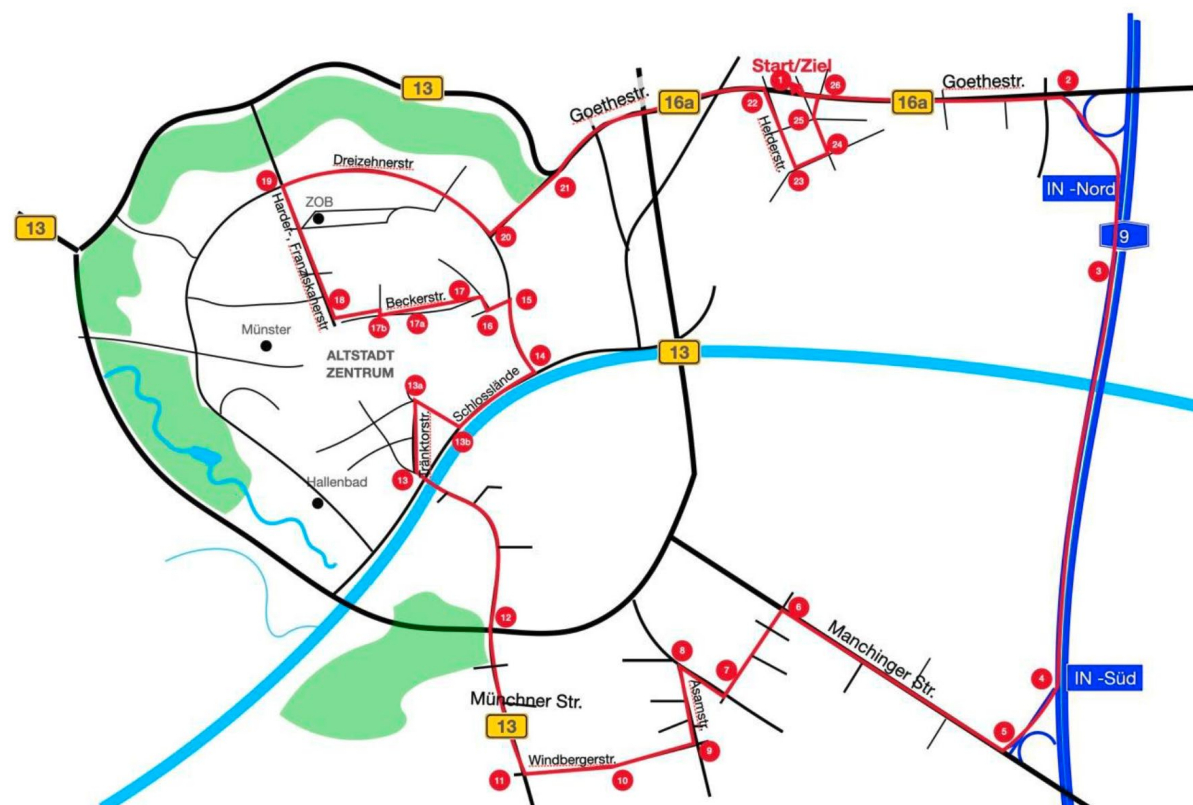
Table 1 · Overview of the groups and measurements

Group	Pre-intervention		Post-intervention
Feedback group	1st drive	Feedback	2nd drive
Control group	1st drive		2nd drive

Source: UDV

Route used to evaluate the feedback intervention

Figure 3 · Example route in Ingolstadt



The two groups drove the same route twice separated by an interval of three months. The drives took place between May and December 2021 in the participants' own vehicles in Munich and Ingolstadt (Fig. 3). During the drive, the observers provide standardised navigation information or destinations and documented the participants' driving behaviour. Following the first drive, qualified feedback was given to the feedback group on the basis of the notes taken during the observation. The drives made by the control group followed the same procedure. However, the participants in this group did not receive feedback until after the second drive. A total of 216 drives were made in Munich and Ingolstadt.

4.1.2 Sample

A total of N = 108 active drivers took part in the study, 54 of whom were assigned to the feedback group (FG) and 54 to the control group (CG). A comparison of the samples from the current study and the pilot project of 2019 can be found in Table 2. On average, the participants in the current study were slightly older than those in the pilot project because the target population consisted of senior car drivers aged 75 years or more. There was a balanced gender ratio compared to the pilot project.

Comparison of the characteristics of the samples

Table 2 · Experimental design

	Current project (2022)	Pilot project (2019)
Number of participants	108	135
Control group	54	44
Experimental group	54	46 (EG 1); 45 (EG 2)
Gender distribution (male vs. female)	55 % vs. 45 %	77 % vs. 23 %
Average age	81 years	77 years
Age range	75 – 96 years	70 – 91 years
Driving observers	Driving instructors (6 Munich; 3 Ingolstadt)	One officially recognized expert or examiner (aaSoP) and one traffic psychologist

Source: UDV

4.1.3 Data collection

Before the feedback intervention was performed, the participants completed a pre- questionnaire. This collected only sociodemographic data, information on the participants' mobility-related behaviour, information on their self-assessments, self-regulation, self-efficacy expectation, compensatory behaviours and any changes they were envisaging concerning their future mobility.

After this, the drives were conducted as described above. To permit an before-after comparison of the participants, the questionnaire was administered again after the second drive. The participants in the feedback group were also asked additional questions about the feedback they had received, e.g. on the usefulness of the comments.

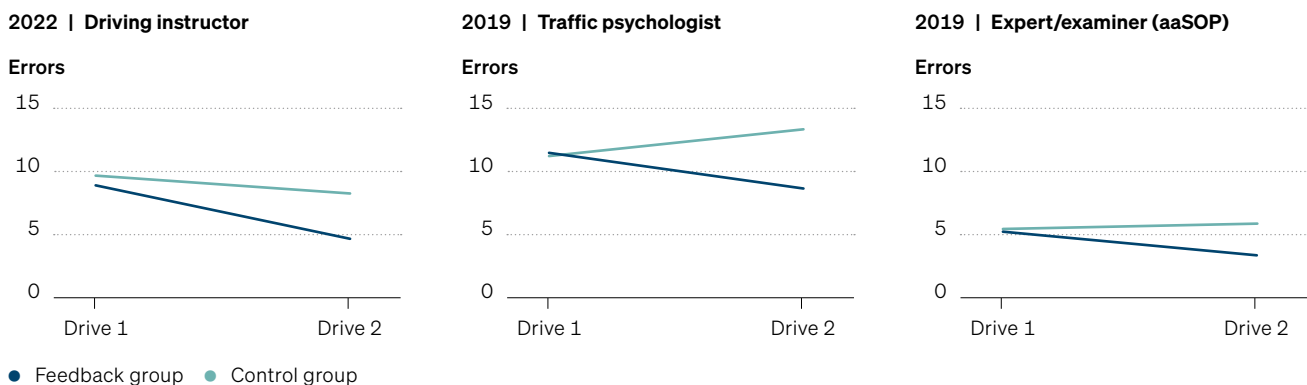
4.2 Results

4.2.1 Improvement of driving competencies

The results show that the feedback intervention clearly improves the driving competencies of senior car drivers. Figure 4 presents a comparison of the average number of driving errors in the first and second drives. The chart on the left shows the results of the current project with driving instructors as observers. In the feedback group, the reduction in the mean number of errors was statistically significant and was also greater than in the control group (statistically significant interaction effect). After the first drive and prior to feedback, there was no difference between the two groups. Their performances prior to feedback were similar. The middle and right-hand charts show the results of the pilot project for comparison. The observers in each case were a traffic psychologist and an officially recognized expert or a driving examiner (aaSOP). Already in the pilot project, the feedback group showed a reduction in driving errors compared to the control group, while the two groups had the same initial level (interaction effect) (Fig. 4).

Comparison of current results with those of the pilot project

Figure 4 · Comparison of the mean number of errors from the first to the second drive



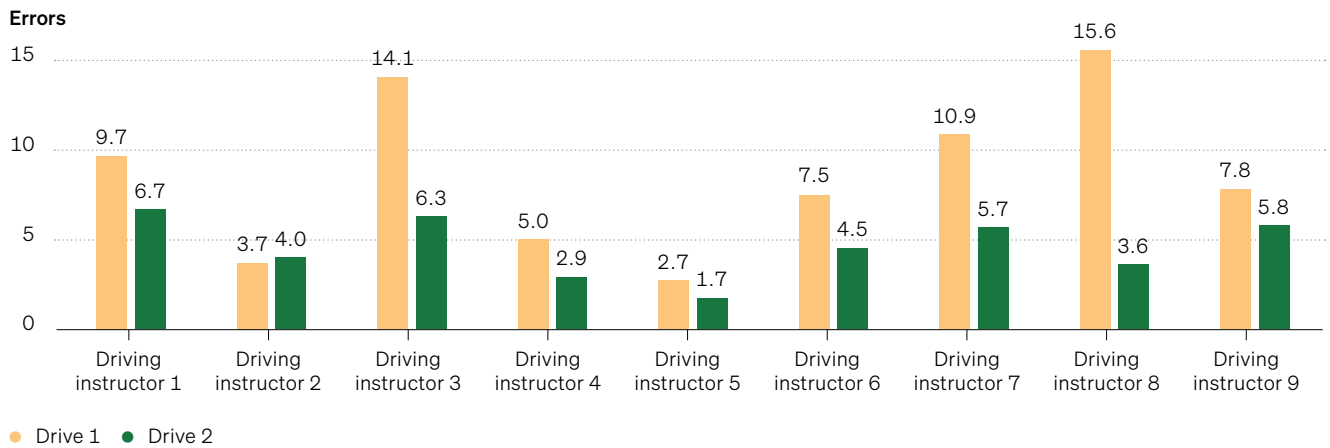
Source: UDV

Figure 5 shows the individual total of driving errors for each observer (driving instructor) for the first and second drives (in relation to the number of participants per instructor). The greater reduction in driving errors from the first to the second drive in the feedback group is again visible. Moreover although the total number of driving errors differs between observers, it becomes apparent the same effect is found for all observers. This means that the judgements of the driving instructors all followed the same direction. The partially standardised observation and feedback therefore led to comparable results between all observers.

The corresponding effects can also be seen in other indicators, e.g. the total numbers of errors, the groupings of error types and the individual errors as well as errors by different locations (in town/urban area vs. motorway, Munich vs. Ingolstadt). This all provides comprehensive proof of the effectiveness of the feedback intervention. The instruments have been reliably standardised and ensure the comparability of the results. This means that the qualified feedback intervention is suitable for nationwide implementation.

Influence of the observer on improving driving competencies in the feedback group (N = 54)

Figure 5 · Standardised total errors per driving instructor (N = 9)



Source: UDV

It is noteworthy that the participants aged 80 years or more benefited particularly greatly from the feedback.

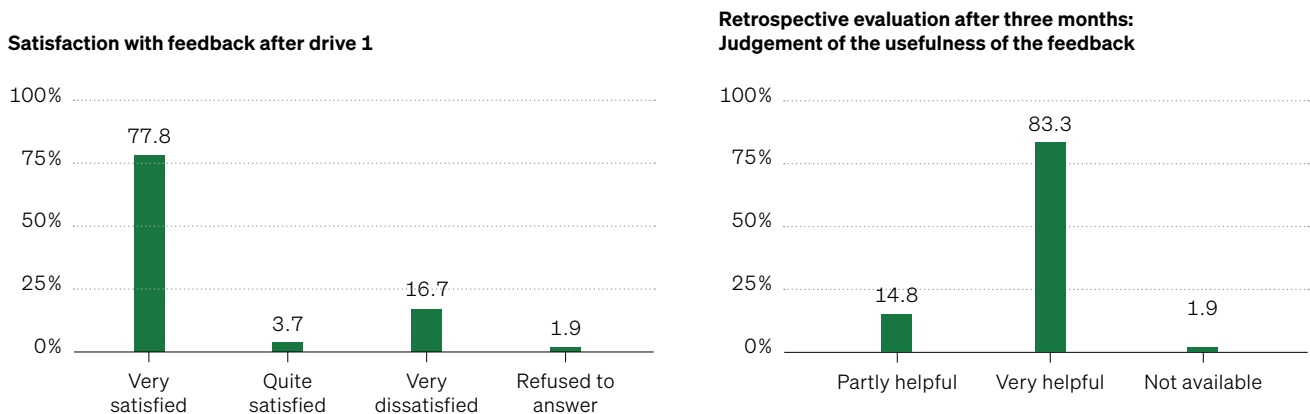
No evidence was found to suggest that participants possibly overestimated their own abilities due to the feedback regarding driving competencies.

4.2.2 Acceptance and evaluation of the feedback intervention

As had already been observed in the pilot project, the feedback intervention was very well accepted by most of the participants (Fig. 6). More than two thirds were very satisfied with the explanations and information given by the observer as well as by the ease with which they could be understood. More than 83 percent of the senior drivers considered the feedback to be very helpful after the second drive.

How satisfied were the senior drivers with the feedback?

Figure 6 · Comparison of answers after drive 1 and 2, in % (N = 54)



Source: UDV

When the participants were asked about feedback that they found particularly helpful, it was found that this was clearly related to the improvements in the various error groups. For example, the participants cited the feedback given regarding “more precise lane following, grip on the steering wheel, e. g. in order not to stray onto cycle lanes, steering less when driving straight ahead” from the error category “lane driving”. In this error category, there were also highly significant improvements after the second drive. This illustrates the causal connection between the feedback and the improvement in driving behaviour.

The driving instructors answers regarding their experience of the feedback intervention further underscored these results. They reported how interested the participants were about the feedback, how seriously they took it and how much effort they made to put it into practice.

5. Summary and recommendations

This project developed of the qualified feedback intervention further. It is a tool that makes it possible to systematically observe, appraise and report on the driving competencies of senior drivers in real traffic.

It provides an objective, effective instrument to feed back driving competencies of senior drivers and is suitable for nationwide implementation. The effectiveness of the feedback intervention was positively evaluated in a total of 108 participants. The results show that, as an easily accessible offer, it is highly suitable for maintaining and improving driving competencies in senior drivers. It was also very well accepted by the target group. At the same time, it should be noted that the participants in this study were presumably quite motivated by and open to the intervention because they freely volunteered to take part. At the national level, the potentially affected senior drivers will undoubtedly differ from the investigated sample in terms of their motivation, health, social status and driving abilities, and possibly also in terms of their understanding and willingness to change. But that also offers a considerably greater scope for improvement.

It is important that the feedback is not misinterpreted as another driving test or assessment of fitness to drive. The aim is to interact face-to-face with senior drivers in order to show them ways of continuing to be safe behind the wheel.

Due to the high demands on observers they must entail a minimum level of psychological and pedagogic skills. To ensure this a comprehensive training concept for driving observers has been developed and tested. In this way, the feedback intervention has been standardised up to a certain point, thus ensuring objectivity and high-quality conduct, evaluation and feedback. So the recording and evaluation of driving competencies becomes transparent for the participants ensuring acceptance and reflection on critical feedback. There is a qualified exchange of views with the participants which leads to behavioural intentions and recommendations for the future.

Consequently, implementation of the intervention should initially be offered on a voluntary basis and be optimised in practice. However, if this approach proves unable to access the target group adequately then mandatory participation should also be considered. However there only the participation should be mandatory. The results of the observation should not be used for any kind of assessment. That is to avoid the unintended negative side-effects of age-based screening schemes [5].

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