



Older drivers' needs for safety and comfort systems in their cars

A focus group study in Sweden

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Preface

The focus group study presented in this report is part of the Safe Move project – (Safe Mobility for Older Drivers). A project carried out in collaboration between VTI, Mobilitetscenter and Volvo Cars in Sweden and IFSTTAR, CNRS, INSERM, University of Bordeaux, University of Caen, University Claude Bernard Lyon, OKTAL, Continental, Peugeot and Citroën in France.

A parallel focus group study using a different approach was performed in France and will also be reported within the Safe Move project.

The aim of the entire Safe Move project is to increase knowledge and practice of safe mobility for older drivers by three complementary approaches in three subprojects:

- SP1: Survey assessment of older drivers and assessment with on road test and cognitive tests.
- SP2: Simulator based assessment and training of older drivers.
- SP3: Assistance systems for older drivers.

The current study was done within SP3.

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Process for quality review

Internal peer review was performed on 22 September 2014 by Selina Mårdh. First author; Christina Stave has made alterations to the final manuscript of the report. The research director Jan Andersson examined and approved the report for publication on 9 October 2014. The conclusions and recommendations expressed are the author's/authors' and do not necessarily reflect VTI's opinion as an authority.

Process för kvalitetsgranskning

Intern peer review har genomförts 22 september av Selina Mårdh. Förste författaren, Christina Stave har genomfört justeringar av slutligt rapportmanus. Forskningschef Jan Andersson har därefter granskat och godkänt publikationen för publicering 9 oktober 2014. De slutsatser och rekommendationer som uttrycks är författarens/författarnas egna och speglar inte nödvändigtvis myndigheten VTI:s uppfattning.

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Summary

A focus group study with a total of 63 older drivers (70 years or older) in two rounds was conducted to identify needs and means for transportation as a passenger car driver. The aim was to understand attitudes to and use of advanced driver assistance technologies. Furthermore, the aim was to identify possible differences between drivers in terms of correct assessment of own driving performance.

Participants were recruited at two occasions, in 2011 and 2013. The first round was conducted with 36 participants in six groups and the second round with 27 participants in five groups. Participants in the first round were recruited with help of senior citizen organizations in the city of Gothenburg. Participants in the second round were recruited among respondents (more than 1,300) to a survey. These participants were living in the county of Västra Götaland.

All 63 participants had previously participated in an on-road driving assessment followed by an interview. The on-road assessment was done using a standardized protocol (expert assessment). The result was then compared to the driver's subjective assessment of driving performance. Based on this, three categories were formed depending on the consistency between own and expert assessment. One group comprised consistent estimators (expert and self-assessment coherent) and then there were one group with over estimators and one with under estimators (self-assessment was higher or lower respectively compared to the expert assessment). The first round of focus groups was set up with mixed categories. While the second round applied a homogeneous grouping approach. In total 26 (41%) of the 63 participants were female (50% in the first round and 30% in the second).

One researcher acted as moderator and led the discussion while the other researcher documented the discussion simultaneously. The focus group discussion was also voice recorded to facilitate the analysis. Each of the 11 sessions lasted for 2 hours with a 15 minute break. The moderator introduced three pre-defined themes to facilitate the discussion without any specific involvement in the discussions. The themes used were based on identified difficulties during the previous on-road assessment and interviews, i.e. planning the journey, driving through an intersection and speed adaptation.

Each session began by asking the participants about what driver assistance systems they had in their own cars and what assistance systems they would like to have. It was found that experience of assistive technology was highly variable, from low technology systems to advanced automatic systems. However, there was a general interest in assistance systems among the participants. Considering the three pre-defined themes the following was noted. They plan their driving more today and sometimes they avoid difficulties, such as night time driving and heavy traffic. A potential planning support could be a well-designed navigation system and improved road signs. Results from the second theme (intersections) showed that participants found it difficult to drive in

intersections and much of the discussion focused on traffic rules in roundabouts. However, most drivers confirmed that left turn intersections on rural roads were dangerous. Even so, they found it difficult to formulate what type of assistance they would like to have to resolve intersection problems, besides separate lanes for turning vehicles. When addressed with a possible automatic system they found this positive if it could improve safety. Those who were skeptical to driver assistance systems pointed to expected necessity to learn to use them, cost and need for repair. Concerning the third theme (speed adaptation), few of the participants recognized that they had not adjusted their speed according to the circumstances (i.e. driving too fast as the driving instructor who participated in the on-road assessment had reported). Participants rather claimed that they were the ones that drove according to the conditions. The majority had difficulties to relate to speed adaptation (according to the traffic), they preferred to talk about signed speed limits. Possible assistance for this problem could be more feedback of own speed, cruise control and assistance to improve hazard perception.

The focus group interviews were also further scrutinized to search for underlying themes and the following were found: Ageism, participants had a feeling of being discriminated in traffic because of their age. Speed, one group adjusted their speed upwards to others at almost any price or another group complained about others driving too slow. Difficulties to interact, claiming that others did not follow the traffic rules and that pedestrians and cyclists were unpredictable and hard to detect. Driving context, the car was seen as having priority over other road users and that traffic had become denser and faster. They expressed a demand for greater consideration as the traffic climate has become tougher. Realize aging, difficulties to reflect on own behaviour, not realising that reduced attention might be the cause and therefore do not adjust to own ability, e.g. experience that other road users appear surprisingly and suddenly.

The participants' opinions were also analyzed in relation to what estimator category they belonged to (over, under or consistent). The consistent estimators revealed an attitude of modesty, less complaints about other road users and a greater acceptance for the aging process. This group was the most positive to engage in education and driver training. The over estimators showed a more self-centered attitude in relation to other road users, they should give way and other drivers need training, i.e. they fail to realize their own aging process. The over estimators were positive to speeding and advocated a more offensive driving style. However, the under estimators were very difficult to analyze due to their small number and uncertain classification (only 12%).

Female participants were strategically recruited in order to get gender balance; they were not consistent in their opinion in relation to the predefined and underlying themes. Furthermore, over 50% of the females were classified as over estimators. Some of the female participants drove new large cars. However, other women in the study had older cars with older technique as compared to the male participants. Even so, these participants would appreciate new driver assistance systems if they could afford it.

Äldre förarens behov av säkerhet och förarstödssystem – en svensk fokusgruppstudie

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Sammanfattning

En fokusgruppstudie med totalt 63 äldre förare (70 år och äldre) genomfördes i två omgångar för att identifiera bilförarens behov och transportmöjligheter. Målet var att förstå attityder till och användning av avancerade förarstödssystem. Målet var också att identifiera potentiella skillnader mellan förare när det gäller att bedöma sin egen körförmåga.

Deltagarna rekryterades vid två tillfällen 2011 och 2013. Den första omgången genomfördes med 36 deltagare uppdelade i sex grupper och den andra omgången med 27 deltagare i fem grupper. Deltagarna i första omgången rekryterades med hjälp av pensionärsorganisationer i Göteborg. Deltagarna i andra omgången rekryterades bland personer boende i Västra Götaland som svarat på en enkät (mer än 1 300 respondenter).

Alla 63 deltagare hade tidigare deltagit i en körbedömning åtföljt av en intervju. Körbedömningen utfördes med hjälp av ett standardiserat protokoll (expertbedömning). Resultaten från körbedömningen jämfördes med förarens egen bedömning av sin körförmåga. Utifrån dessa resultat delades deltagarna upp i tre kategorier, det vill säga beroende på hur deras egna bedömningar överensstämde med expertbedömningen. En grupp bestod av de deltagare som skattat sin körförmåga i överensstämmelse med expertbedömningen, en grupp bestod av överskattare och en av underskattare (personer som över- eller underskattat sin körförmåga jämfört med expertbedömningen). Den första omgången av fokusgrupper sattes ihop av en mix från de tre kategorierna. I den andra omgången delades deltagarna upp i mer homogena grupper. Totalt 26 (41 %) av deltagarna var kvinnor (50 % i första omgången och 30 % i andra omgången).

Diskussionerna leddes av en forskare som var moderator medan den andra forskaren samtidigt dokumenterade vad som sades. Fokusgruppsdiskussionerna spelades också in på band för att förenkla analysarbetet. Var och en av de 11 sessionerna höll på i två timmar med 15 minuter rast. Moderatoren introducerade tre förbestämda teman för att underlätta diskussionen men undvek att själv delta i diskussionerna. De teman som användes baserades på svårigheter som framkommit under tidigare körtester och intervjuer, till exempel att planera sin resa, köra i korsningar samt situationsanpassad hastighet.

Varje session började med att moderatoren frågade vilka förarstödssystem som deltagarna hade i sina egna bilar och vilka system de skulle vilja ha. Det visade sig att erfarenhet av förarstödssystem varierade stort, från bilar med inga eller få system till avancerade automatiska system. Det fanns ett generellt intresse för stödssystemen bland deltagarna.

Utifrån de tre teman som var förbestämda kunde följande noteras. Deltagarna planerar sin körning mer idag och undviker ibland svåra situationer som mörkerkörning och körning i rusningstrafik. En hjälp för att planera sin resa skulle kunna vara ett bra utformat navigeringssystem och förbättrade vägskyltar. Resultat från det andra temat (korsningar) visade att deltagarna tyckte det var svårt att köra i korsningar och en stor del av diskussionerna fokuserade på trafikregler i rondeller. De flesta förarna bekräftade

att de tyckte att vänstersväng i korsningar på landsväg var farliga. Trots detta var det svårt för dem att komma på vilken typ av hjälp de skulle vilja ha för att lösa problemen i korsningar, med undantag för att införa separata filer för svängande fordon.

De intervjuade var i stort sett positiva till automatiska förarstödsystem som kan öka säkerheten. De som var mer skeptiska till stödsystemen pekade på nödvändigheten att lära sig systemen, kostnader och behov av underhåll och reparationer.

När det gäller det tredje temat (situationsanpassad hastighet) så var det få av deltagarna som insåg att de inte anpassade farten till omständigheterna i trafiken under körbedömningen (det vill säga de ansåg inte att de körde för fort som instruktören i körtestet hade rapporterat). Deltagarna ansåg istället att det var de som anpassade sig till situationen. Majoriteten hade svårt att relatera till hastighetsanpassning utifrån trafikförhållandena och föredrog att tala om skyltade hastighetsgränser. Hjälp när det gällde hastigheter skulle kunna vara mer återkoppling när det gäller hur fort man kör, farthållare och hjälp för att förbättra möjligheterna att undvika olyckor och uppfatta faror.

Fokusgruppsintervjuerna gjordes också för att leta efter underliggande teman och följande kunde identifieras:

- Åldrande – deltagarna hade en känsla av att de blev diskriminerade i trafiken på grund av sin ålder.
- Hastighet – vissa deltagare uppgav att de anpassade sin hastighet genom att inte köra för sakta till varje pris och en annan grupp klagade på att andra körde för sakta.
- Svårigheter att interagera – de uppgav att ”andra” inte följer trafikreglerna och att gångtrafikanter och cyklister är oförutsägbara och svåra att upptäcka.
- Trafikklimat – deltagarna ansåg att bilen skulle prioriteras över andra trafikanter och att trafiken på senare tid ökat och att hastigheterna ökat. Deltagarna uttryckte en efterfrågan på större hänsyn eftersom trafikklimatet blivit tuffare.
- Deltagarna visade på svårigheter att inse att åldrande påverkar körningen genom att inte anpassa sitt beteende efter egen förmåga. Upplevelse av att andra trafikanter dyker upp plötsligt och överraskande kopplas inte till kognitiv förmåga.

Deltagarnas åsikter analyserades också i relation till vilken kategori de tillhörde (överskattare, underskattare eller de som bedöma sin egen körförmåga mer korrekt). Den senare gruppen visade en mer ödmjuk attityd, klagade mindre på andra trafikanter och hade större acceptans när det gällde sitt åldrande. Denna grupp var mest positiv till att engagera sig i utbildning och körträning.

Överskattarna visade en mer självcentrerad attityd i relation till andra trafikanter, de ansåg att andra skulle väja och andra behövde mer träning, det vill säga de insåg inte att deras eget åldrande krävde förändringar i körbeteenden. Denna grupp var mer positiv till att köra för fort och framhöll en mer offensiv körstil.

Underskattarna var svåra att analysera eftersom de var så få och att de var svåra att klassificera (endast 12 % klassificerade som underskattare).

Kvinnliga deltagare rekryterades strategiskt för att få en könsbalans. Denna grupp var inte homogen i sina åsikter när det gällde de förbestämda och underliggande teman som

diskuterades och över 50 % klassificerades som överskattare. En del av de kvinnliga deltagarna körde nya stora bilar. Andra kvinnor hade äldre bilar med äldre teknik men skulle uppskatta nya förarstödssystem om de hade råd.

1 Introduction

1.1 Background

Faced with the aging of the population, it is crucial for older drivers to keep driving in order to ensure their mobility and autonomy in daily life as long as possible. Driving is a complex task, requiring a range of visual, psychomotor and cognitive abilities. As people age, a number of physical and cognitive changes, as well as health problems, may affect their driving ability. The regulation of driving activity according to one's actual motor, visual and cognitive state is crucial for being able to drive in a safe manner, for maintaining mobility and autonomy and for reducing accident risk (Lallemant et al., 2013).

The SafeMove project is based on the hypothesis that a correct estimation of one's driving ability is necessary for safe driving (Peters et al., 2013). A set of reports have been produced in the project so far. First, a review of the literature on self-assessment of situations/scenarios that are challenging for older drivers was carried out (Lallemant et al., 2013). Accident statistics and surveys on drivers' confidence in different situations were combined with the aim to show the relation between situations which older drivers consider difficult and situations where accidents occur. Gender differences were also identified in the survey. Examples of safety critical conditions/situations associated with frequent crashes for which older drivers are confident (both genders) are driving alone and left turns. Other situations associated with high crash risk are overtaking and merging on high speed roads and driving in intersections. However, for these conditions there is a gender difference such that females show a lack of confidence or avoidance behaviour compared to males. Such data provided input to the setup of the present study.

Furthermore, two cohort studies were conducted as a postal questionnaire in Sweden (more than 1300 respondents) and personal visits in France to fill out a questionnaire and conduct some cognitive tests (France) to identify determinants of driving regulation, i.e. factors leading to under- and overestimation of cognitive performances and driving ability (Sweden – Henriksson et al., 2014). Part of the questionnaires included questions on driving habits, avoidance behaviour and use of driver assistance systems. The Swedish survey showed that changes in driving behaviour often (attributed to ageing drivers, e.g. driving more slowly, less frequently and over shorter distances), are applicable in the case of about one-third of the drivers in the Swedish survey. Most respondents indicated that they had not changed their driving habits at all over the past years concerning the three specific dimensions, and a few followed an opposite path from what is usually reported in the literature, i.e. even increased driving with increasing age. Some typical gender differences still exist, e.g. women stop driving at a lower age and drive less frequently than men do. Findings from the survey indicate that preventive action, such as retraining or developing driver assistance systems could be a way to promote sustained safe mobility for older drivers.

On-road assessments with sub-sets of the survey respondents were performed in Sweden as well as in France. During the on-road assessment in Sweden a driving instructor identified some situations that seemed to be difficult, e.g. driving in intersections and speed adjustment. This observation was also used as input to the present study.

Finally, a state-of-the-art and literature review of driving assistance systems for older drivers was also carried out (Chin et al., 2013). This review provided also input to the

design of the focus groups. This review together with the results from the focus groups reported here will help develop a Driver-Vehicle Interaction System (DVIS) to monitor and control Advanced Driver Assistance Systems (ADAS) according to driver needs, which is also an objective within the SAFEMOVE project.

1.2 Objective

The overall objective for this sub-project was to identify possible needs and means of driver support to help improve mobility and safety for elderly drivers. Additional aims was to further understand attitudes towards and use of possible advanced driver assist technologies and more so if there is a difference between estimator categories of drivers as well as difference between genders. The results will provide input to develop a demonstrator with Advanced Driver Assistance System (ADAS) adapted to the target group – older drivers.

2 Method

A focus group study was chosen in order to get a deeper understanding and more diverse information in drivers need for driving or mobility. A qualitative approach is particularly relevant when studying phenomena that are relatively unexplored and aims at enfolding experiences, attitudes, needs and motives (Morgan, 1996). In the present explorative approach quality rather than quantity was the lead word and strives for consensus or counting frequencies in the groups or categories was not of interest. Focus group interviews support interaction amongst participants, which can enrich data in a way individual interviews cannot do (Kitzinger, 1994).

2.1 Recruitment

The focus groups were conducted at two occasions with approximately two years in between, 2011 and 2013. An attempt was made at the first occasion to recruit homogeneous groups in relation to self-estimation of driving ability. Since this was not fully achieved a second occasion was conducted with another composition. The first occasion with 36 participants in six groups and the second with 27 participants in five groups. Participants were recruited from 80 older drivers who previously had individually completed an on-road assessment, performed by an expert occupational therapist (Broberg and Willstrand, 2014). In this preceding study they were also interviewed about their driving behaviour and habits after the drive and from the interview it was derived if the driver considered him/herself as a good or poor driver. Identifying the estimator category for each participant was on one hand based on the expert assessment (number of errors) and on the other hand the self-assessment of the drivers own driving ability, in the interviews. These observations were compared and three types of driver categories were formed depending on the consistency between the assessments. One group comprised consistent estimators (expert and own assessment was the same), one with over estimators and one with under estimators (self-assessment was higher or lower respectively than that of the expert assessment).

The participants in the first round of focus groups were recruited through the National Pensioners' Organisation and the Swedish Association for Senior Citizens, in the Gothenburg area in Sweden. They were all 70 years or older, had a valid drivers' licence and were still active drivers fulfilling the visual acuity requirement of 0.5 (binocular) for drivers in Sweden. They did not have any medical conditions that could affect their driving, i.e. dementia. An invitation letter and information about the study was sent to the senior citizen organisations, which generated a list of 80 volunteers. From the list, 39 drivers were contacted via telephone and 36 recruited to participate in the focus group study. The selection criteria were based on age; the oldest subjects were contacted first whilst balancing between gender (Broberg and Willstrand, 2014). The classification of the 39 contacted drivers in the first round of focus groups can be seen in Table 1.

Table 1 Classification of participants contacted for the first round of focus groups based on on-road assessment in 2011.

		Expert-assessment		
		Good	Poor	Total
Self-assessment	Good	15 (consistent)	16 (over)	31
	Poor	3 (under)	5 (consistent)	8
	Total	18	21	39

A second round of focus groups was conducted with the purpose to arrange more homogeneous groups in order to get a further understanding of the classification of categories. The second round of focus group participants were recruited among 40 participants in an on-road assessment conducted in 2013. These 40 participants were selected from a group of 177 respondents to the previously mentioned questionnaire (Henriksson et al., 2014). These 177 of in total 1362 respondents to the questionnaire had indicated that they were interested in participating in an on-road assessment. The target population was living in the region of Västra Götaland, which includes both cities and rural areas; however only five persons, one in each sub group were from outside Greater Gothenburg. Participants fulfilled the same criterion as the participants in the first focus group round. The 40 participants were classified into consistent, over and under estimators using the same principle as used for the 39 above (see Table 2). Seven of those were contacted by telephone and recruited to participate in the focus group study. Women were prioritised in order to get gender balance (Peters et al., 2014).

Table 2 Classification of participants contacted for the second round of focus groups based on on-road assessment in 2013.

		Expert-assessment		
		Good	Poor	Total
Self-assessment	Good	18 (consistent)	20 (over)	38
	Poor	0 (under)	2 (consistent)	2
	Total	18	22	40

2.2 Participants

The total amount of participants in the focus groups was 63. The two rounds of focus groups applied different grouping principles with regard to estimator classification. The first round of focus groups used mixed groups with in total 20 consistent, 13 over and 3 potentially under estimators (see below for grouping). The second round of focus groups were more homogeneous. However, as can be seen in Table 2 there were no under estimators. Thus, in an attempt to form an under estimator group 2 participants were selected from the poor/poor classification and 3 were selected from the good/good classification (see Table 2 above). This was done based on more tentative information collected during the interview in the previous study. The second round of focus groups

included 13 consistent, 9 over and 5 potential under estimators. In total, there were 33 consistent, 22 over and 8 potential under estimators in the focus groups.

The 36 participants in the first round of focus groups were grouped as follows:

- 5 participants, 4 consistent estimators, one over estimator (all men)
- 6 participants, 4 consistent estimators, two over estimators (2 women, 4 men)
- 6 participants, 3 consistent estimators, three under estimators (3 women, 3 men)
- 6 participants, 1 consistent estimator, five over estimators (3 women, 3 men)
- 6 participants, 2 consistent estimators, four over estimators (5 women, 1 man)
- 7 participants, 6 consistent estimators, one over estimators (5 women, 2 men)

The 27 participants in the second round of focus groups were composed as follows:

- 5 participants, all consistent estimators, (1 woman, 4 men)
- 8 participants, all consistent estimators, (1 woman, 7 men)
- 4 participants, all over estimators, (2 women, 2 men)
- 5 participants, all over estimators, (3 women, 2 men)
- 5 participants, all tentatively under estimators, (1 woman, 4 men)

2.3 Themes and Procedure

A structured interview guide was used for the procedure of the interviews. Three pre-defined themes were used to get the discussion going. The themes were derived from the preceding studies of Broberg and Willstrand, (2014) and Peters et al. (2014) where difficulties were observed during an on-road assessment. The two first themes were based on comments made by a driver instructor and an occupational therapist on maladaptation of speed for different situations and difficulties driving through an intersection. A third theme, planning your journey with a car, was chosen as the participants said that the planning have become a larger part of their travels during the in-depth interviews. As an introductory “warm up” topic, participants were asked what driver assistance or safety technology they had in their cars today.

Focus group procedure:

- Two hours in total including a short, 15 min. break, after one hour.
- The researchers aimed to provide a positive and open atmosphere with e.g. coffee and cake.
- One researcher acting as moderator and one documenting and recording the discussion. The role as moderator was shared between the two researchers, shifting moderator/assistant between meetings.
- Very little moderator involvement, just introducing themes and facilitate the discussion among the participants. If a person was very silent in the group he/she could direct a question to that person, in order to assist the group.
- No expectation of consensus within the groups or quantitative analysis!

2.4 Analysis

All focus groups were audio recorded and notes were taken. After each focus group a debriefing was performed in order to see if the researchers had a common understanding of what they had just heard. Then, the researchers who performed the focus groups listened to the recordings to extract answers, first individually and secondly together. For the three pre-defined themes covered as well as the introductory question a simple form of content analysis was performed on the basis of the study questions. As a complement to the pre-defined themes, a simplified form of thematic analysis were performed (Braun and Clarke, 2006). By repeated listening to the recordings, meaningful words and sentences were written down and categorised. Subsequently, comparisons were made based on similarities and differences in the various groups, which thus sorted into preliminary categories. The analysis resulted in five underlying themes describing the participants' driving experience in interaction with the environment, which affects both the needs and possible solutions. Attempts were also made to find similarities and differences between different estimator classes (under, over and consistent estimators) as well as between men and women.

3 Results

3.1 Driver assistance systems in the participants' cars today

Table 3 provides a summary of what driver assistance systems the participants had in their own cars and what they wanted to have. Both focus group rounds are presented together.

Table 3 Driver assistance systems in the participants' car today and what they would like to have.

What the participants said they had	What the participants wanted to have
Automatic gearbox	Automatic gearbox
Cruise Control	Cruise Control
GPS is mentioned but few had own experience, GPS/Phone with audio	GPS with better display and with audio
Parking sensors, rear camera	Reverse alarm and reversing camera
Extra mirrors	Adaptive Cruise Control
Door mirrors with blind spot warning	Distance alert together with cruise control for those behind
Temperature detector at the road surface	The car should tell you if you are too close, tailgating
ABS	Display showing actual speed limit
Traction control (ESP)	Poor visibility in today's cars, improve!
4 wheel drive	Wide-angle mirrors
AC (Climate control)	Temperature detector at the road surface
Mobile phone is important with hands-free	Automatic parallel parking
Car computer informing about how many km left until refuel, washer fluid etc.	Better dashboard display, will not be needing the manual
(When automation were introduced, some told that they had collision warning or auto break)	Adjustable safety belts, now too far behind
	Support for difficult/many lane changes
	Support for driving in mist

There was a big difference between participants concerning the age of their cars and how the cars were equipped (assistance systems). As the focus group discussions progressed it became clear that participants actually had more advanced systems than what they initially stated but they were not sure of how to use the systems or what they could be used for, e.g. Forward Collision Warning (FCW).

3.2 Attitude towards driver assistance systems and automation

During each theme; planning for the journey, driving through an intersection and situational speed adoption, the groups were asked how they looked upon driver assistance systems and automation. Most participants were positive and in favour of driver assistance systems and automation "it is good for safety", but many said, "You have to learn how to use them first". Thus, there was a usage concern. Those who

already had assistance systems in their cars waited for improvements and others meant that when buying the next car they would get, for example cruise control. Some participants however, were hesitant towards advanced driver assistance systems and said "one must be able to master it". When asked about the possibility that the car can take over and perform maneuvers on its own, someone said, "it would feel unpleasant if the car brakes heavily without me knowing". Participants felt that as long as it is based on the driver's state (sleepy, inattentive etc.), it is positive; new technology must meet the needs of the drivers. Those who were reluctant argued that technology is taking over more and more enhancing the risk of falling asleep or being inattentive. One driver said, "the pleasure of driving will be gone then". Another said "it is a necessary evil" or "there should not be too much technology to focus on while driving". Advanced technology was also mentioned as expensive and complicated to repair when it breaks and the pre-assumption was that it will break since it is electronics. Those who were not as familiar with new technology said, "the new technology is for the young". *However, despite some concern the general conclusion was that participants were interested in new driver assistance technology and that if it is designed based on the driver's needs, made understandable and not too expensive the acceptance would be high.*

3.3 Pre-defined themes

Here follows a summary of the general findings for the three pre-defined themes. Common difficulties and solutions of the problems from all groups are summarised. In addition, underlying themes that were found during the discussions are presented which may be 'factors' that can help explaining how older drivers understand their environment and behaviour in traffic. These are presented in section 3.

3.3.1 Planning the journey

The majority of the participants agreed that things take more time nowadays so they allocate additional time to get more margin, i.e. not to be late to appointments. They are comfortable with this since they have more time now, as seniors, to plan and do activities. They feel that they do not need to be in such a hurry anymore compared to when they were actively working. They also often tell that it is nice not to plan too much as they are much more flexible now and that it is not necessary to set a fixed time of arrival when travelling. In planning a trip they often take into account possible information about weather, distance, the traffic situation, parking, time of the day, specific roads or places to avoid, different kinds of breaks (rest, sleep, food, refuel).

They try to avoid driving in darkness, especially if there is a risk of being blinded by headlights and if it is winter conditions. Nowadays, the traffic is perceived as denser and many (other road users) do not follow the speed limits. In the second round of focus groups, driver's stated that they avoided driving where they had to make many lane changes, because they were not always let into the lane or it could be hard to observe surrounding cars.

There was a difference among the participating drivers, some still go on longer trips, even abroad, but for most of them there was a need to plan even for shorter trips, specifically if it concerned new destinations. However, generally it is not a big problem as they do not visit new locations very often and they tend to use the well-known roads as they have done for many years. Their need of planning, or generally more rerouting, is limited to when they are confronted to a change in their route due to i.e. roadwork. They experience difficulties when they need to re-plan their route spontaneously in

similar situations. Some would like to see better visible road signs (that can also be seen at a longer distance) for these types of situations.

Many participants do not drive into the city centre, some park outside the city and use public transportation to access the city centre, especially when parking is free of charge. Driver assistance with parallel parking was requested as well as less demanding driving and ticket handling in multi-storey car parks. Parking close to public transportation was also requested. Others still would like to have better public transportation and some women used the car in order to avoid standing alone waiting for the bus in the evening. In the first rounds of focus groups the participants stated that when they were visiting a shopping centre, they plan their shopping by stopping at all shops on the right side first and then stopping at the shops on the left side on their way back. In this way they avoid tricky left turns in often crowded and small shopping centre.

When travelling to a new location, the participants plan their trips by using maps, computer with different websites offering trip planning or an old fashion telephone directory which contain elementary maps. GPS based navigation is not used very often and they do not trust it at all. Better interfaces were requested and perhaps voice guided GPS. They talked about it as something for the future and they made fun of different stories where people ended up in the wrong place. They agree that GPS is a future solution that will be good for route planning, travel time and refuel information and more. Traffic information through radio was also considered a good source of information to plan or reroute. Those who used cell phones stated that “the cell phone gives a sense of security and you can call for help and communicate if you have any problems”.

3.3.2 Driving through an intersection, visual attention

Most of the participants agreed that intersections could be difficult, especially when turning left on rural roads. “I feel stressed when the traffic is pushing from behind, trying to find a gap ahead while determining the speed of the oncoming cars”. “There are also risks with those who are close behind, are there any driver assistance systems for that?” one driver asked reflecting on several comments regarding the problem with those who don’t keep a safe distance.

The right of way is important and the participating drivers did not want to give way to someone if they didn’t have to, since this could mean unnecessary interruptions in the traffic flow. To explain their lack of attention or scanning, they often blamed external factors such as vegetation in roundabouts, which made it difficult to observe potential vehicles entering the roundabout from other directions. They also blamed other road users (drivers, pedestrians and cyclists) for not giving way, which make them confused and create difficulties.. “It is mostly young people who drive very fast into the intersections and brake hard; you cannot trust that people will stop at the intersection”.

The participants stated that they were more cautious now, looking more and using the direction indicator more often. “It’s hard when you do not know the area”. Pedestrian crossings were also considered difficult; many people walk right into the road. “One cannot trust others in traffic, they do not use the direction indicator and do not always follow the traffic rules”. Cyclists were often mentioned as very problematic and dangerous. “The cyclists often drive very fast so that the drivers do not have time to see them coming.” Automatic road signs actually showing that a cyclist is approaching were given as an example of a good solution. Another suggested solution was to drive through an intersection or roundabout with more care, looking more often to the sides

and also using the rear mirrors, being more attentive and careful or trying to avoid those locations in the first place. One person suggested “having good foresight and automatic transmission so that no attention is spent on changing gears”.

From the infrastructure side, one could implement better and more signs to help inform about the way so that it becomes easier to plan the driving. One could also replace dangerous intersections with roundabouts which are highly appreciated and perceived as safer compared to other crossings. To build separate lanes to be able to turn left in a safe way without being in the way of other traffic or to introduce traffic islands to clearly separate traffic are other ways of improving infrastructure. Some participants stated that the visibility in new cars has been reduced and better mirrors could be a possible improvement. Aid to see cars in the blind spot was also welcomed. A lower tempo in traffic as a whole was requested by many.

3.3.3 Situational speed adaptation

This theme covered speed adaptation to the situation i.e. in city scenarios with many objects requiring your attention or where drivers need to be cautious with narrow streets, parked cars, pedestrians and other road users that unexpectedly could appear in your driving path. This tended to be difficult for the participants to grasp and for many of the groups the discussion instead dealt with driving too fast compared to the posted speed limit. Most of the participants did not recognise themselves as driving too fast under the circumstances and in relation to their ability. There was a general high acceptance for driving too fast and the participants seldom discussed that their own high speed would be a problem. Quite the contrary, many considered people driving slowly as more dangerous, possibly causing dangerous situations.

There were many different explanations as to why they were driving too fast. Difficulties in knowing the actual speed limit was one. In Sweden 2011 the authorities made a reform regarding speed limits where several new speed limits were implemented giving that signs posting 30, 40, 50, 60, 70, 80, 90, 100, 110 and 120 km/h are present on the roads. The participants also mentioned that it could be that they do not see the speedometer when driving. Another reason often mentioned is the traffic rhythm, i.e. you have to follow the flow to keep your position in traffic, and it is perceived as more important than to respect the speed limit. They mentioned that if you do not follow the traffic flow, dangerous overtaking situations could appear. In addition it was specifically mentioned that it was important to respect 30-km/h signs posted at schools. For the consistent estimators, the attitudes towards speed limits were more forgiving and humble. They generally had a higher acceptance of letting people drive faster and overtake them, so that they themselves could keep driving according to their own pace.

Solutions mentioned were more signs to frequently remind drivers of the speed limit. An alternative considered was having a display in the car to inform the driver about the current speed limit. Many were positive to signs in the infrastructure that give feedback on actual speed. Cruise control and GPS were also mentioned as means. They also mentioned 2+1 roads or highways where it is possible for other drivers to overtake safely so that they could keep driving at their own pace “without being in the way”. Infrastructure solutions such as speed bumps were suggested to help control speed but were also noted as negative if not correctly designed or easy to detect. Chicane type speed reductions were mentioned as better, than speed bumps. Additional suggestions were to decrease the variations in speed limits, longer ramps to make it easier to enter onto highways and a friendlier climate in traffic.

3.4 Underlying themes

Several underlying themes were discovered when listening to the focus group recordings several times, in order to be able to read between the lines, i.e. what they chose to talk about during the moderated discussion or what they did not talk about and what their common values/opinion regarding traffic, safety and driving were. It is also a link to wider circumstances affecting answers to the direct questions asked in relation to the pre-defined themes and the overall question of how older people could be assisted in safe mobility.

3.4.1 Ageism

When it comes to traffic, participants expressed a feeling of being discriminated in society in general because of their age and they even discriminated older drivers themselves. They believed that older people in traffic are "the old men wearing a hat", those who drive slowly during the weekends, often old men who can't really handle the situation. What could be read between the lines when the participants are talking, is that the "old man wearing a hat" is not expected to drive anymore and should stop driving. There is not really room for them in traffic because they are dangerous drivers. Why the old men wearing a hat are dangerous is mostly because they are driving too slowly and are inattentive. Driving slowly means that you become an obstacle for others, you become a "brake pad", you cannot follow the traffic flow anymore.

3.4.2 Speed

The participants felt that they have to follow the traffic flow even if it means driving too fast or driving over their own ability. Driving slowly and in a defensive way was not perceived as good driving practice. The ideal driving is driving fast and in a more offensive way, which indicates that you are a skilled driver with great control of the car and with an ability to quickly and accurately scan and perceive all road users. It creates a problem for those who need more time since the worst thing that could happen, according to the participants, is to stop the traffic flow.

3.4.3 Difficulties to interact

A recurrent subject heard in the discussions were that the interaction between road users does not work smoothly. The participants meant that they do not trust that people will stop at an intersection or zebra crossing, or they do not trust cyclists. Furthermore, they meant they cannot follow the give way sign as they should, since they do not trust that the others will stop and as a consequence they hesitate and find themselves in an unwanted situation.

Some participants complained about other road-users' behaviour. They requested an improved compliance to traffic rules among others. Furthermore, they also complained about other drivers' inattention when using cell phones. When faced with the driving instructor's criticism of the lack of speed adaptation from the previous on-road assessment, some participants showed an arrogance or even annoyance towards the comments. They expressed that the other road users were causing the problems.

3.4.4 Driving context

The traffic environment has changed a lot since our participants got their driver's license, also the view of the car and its status and impact has changed. Some participants' opinions were that the car has obvious priority over other road users and that pedestrians and cyclist always should give way for cars.

Another opinion was that new traffic rules to facilitate public transports sometimes impair their mobility as car drivers. An example was mentioned; buses that suddenly drive out from a bus stop and into their own lane. They meant that the traffic had become denser and faster "everyone drives over the speed limit." Many called for a greater consideration in the traffic, meant that the climate has become tougher and that people seldom give way for you when you need to change lanes. Some changes in infrastructure to prevent speeding and to improve the environment were seen as unwanted obstacles to the older road users, for example streets with mixed road users, changing and leaner lanes, and fewer parking spaces.

3.4.5 Realizing aging

Some participants were irritated that society is adapted to the younger generation, who can handle all technology. Older drivers have learned information handling in other ways (e.g. reading the instruction book). Nowadays a new way of thinking is required and for new technology you have to pass that threshold, otherwise options could be limited. What the participants were expressing indicates that some drivers compensated (which means that one is aware of one's weakness) and some adjusted to others in the traffic (more unaware of weakness). Many of the participants felt that others needed to learn how to drive better, but few were willing to train and update their own skills, which can be seen as a sign of a low acceptance of aging. Many of the drivers said that the automatic transmission was good because it was less demanding when attention began to be limited. Attitudes towards assistance from car technology were in most cases positive but the systems must meet with the driver needs and be designed so that it supports but doesn't disturb.

3.5 Different estimator categories of drivers

The classification used to determine estimator category into coherent, over and under estimators was a bit rough and need to be further developed. However, by using a more coherent classification in the second round of focus groups the possibility to classify was confirmed. The focus group leaders could observe that some drivers had not been correctly classified, which confirms that a classification could be made.

The different groups of estimators revealed some differences in attitudes to other road users and themselves. The consistent estimators were more humble in their attitude to others and had better insight compared to the over estimators. One driver said "you get older and think slower and alertness is slower", which could mean that you need more assistance or training in order to maintain your driving ability. Furthermore, the consistent estimators said that other drivers were driving fast, even over the speed limit, often overtaking them. They did not become upset when being overtaken or having to let past those who wanted to drive fast, unlike the over estimators. They did not complain but felt a pressure to follow the traffic flow and feared getting a heavy truck very near behind them or running into them. The consistent estimators also were the most positive to engage in driver education and training (refresher courses).

A mutual behaviour for the over estimators was speeding – they admitted that they often drive fast and even get tickets for speeding. This group complains about the drivers who drive too slowly and mean that it could be dangerous not to follow the traffic flow. The over estimator group showed a more self-centred attitude in relation to others; other should give way to them and other drivers should consider further education and training. This group seemed to be unaware of their mistakes and worse in realizing their own aging process.

An attempt was made to form a group of under estimators during the second round of focus groups. This group did probably also contain some consistent estimators, however mostly under estimators. These drivers revealed a humble and somewhat self-critical attitude, talking less space than others and therefore harder to analyse. Therefore, it is noted that it is difficult to recruit and also to detect under estimators and their significance and few have been present as participants within this study.

3.6 Gender differences

An effort was made to get an equal gender distribution. However, the majority were male drivers (60%). The first round of focus groups comprised 50% women and the second 30% women. In the group of female drivers 13 out of 25 were classified as over estimators. Thus, 60% of the over estimators were females. The women did not differ from men in their opinions with respect to both the predefined and underlying themes. Some women had new high-tech cars but others pointed out that they cannot afford to buy new cars or technology, even if they wanted to. Driving your own car provide freedom but also security, e.g. being able to visit friends and play bridge in the evening without being dependent on public transportation. The women in the study admitted to lack of knowledge, facing difficulties and problems more often than the male participants. However, a few men were gate openers by admitting their own shortcomings which induced discussions about needs and wishes for change.

Table 4 Gender in relation to estimator groups in the first and the second round of focus groups.

Gender at the first occasion (2011) :	Gender at the second occasion (2013):
In total 17 of 36 were women	In total 8 of 27 were women
8 of 20 consistent estimator's were women	2 of 16 consistent estimators were women
8 of 13 over estimator's were women	5 of 9 over estimators were women
1 of 3 under estimator's were women	1 of 2 under estimators were women

4 Discussion

4.1 Driver assistance systems

All the focus groups were successfully performed and gave valuable insight into older drivers' experiences, thoughts and expectancies about driver assistance systems, from braking systems (ABS) to Adaptive Cruise Control (ACC). Their knowledge of advanced driver assistance systems available in new cars of today was limited to the systems they use in their own car and their general technical knowledge. Table 3 shows what type of driver assistance systems that could be found in the participants' own cars today and what they would like to have.

When presented with potential new technology most participants were positive. However, assistance systems may need to be designed or adapted to older drivers' needs and abilities (Middleton and Westwood, 2001). An important aspect of safe driving is the interaction with other road users and being able to read and predict other driver's actions and to show others your own intents. In difficult and demanding traffic situations requiring fast (re)actions, handling of assistance systems while driving may add a load on the driver with a risk of overload if the system is not designed for the old driver. When designing new technology it is important to reduce and not to add to the mental workload on the driver. The participants stressed this by saying "you have to learn to use them and it should be simple and not impose extra load".

4.2 The pre-defined themes

The theme '*planning the journey*' was the one theme the majority of the participants could relate to. The need for more planning now than before was however not seen as a problem since they now, as seniors, had more time. Some of the drivers tried to avoid certain difficulties in driving, situations which even may be demanding for younger drivers. However, this avoidance strategy may restrict their mobility.

Left turn in non-regulated intersections was found to be difficult and assistance for this was appreciated. However, most of the discussions focused on traffic rules in roundabouts. Rules and regulation are easier to discuss than own ability.

Most of the participants did not relate to poor *speed adaptation*, despite this was a phenomena observed among the participants by the driving instructor in the preceding study. They rather talked about speed limits and that others drove faster than what they themselves did. Adaptation of speed to match risk and own capacity is thus an important subject to highlight for the older driving population e.g. in driver training. The risk associated with cyclists appearing unnoticed and sometimes very fast and not following the traffic rules was specifically discussed. The focus of the discussion often turned to other road users since the driver's own capacity might be more difficult to comprehend and delicate to discuss, especially if there is an underlying feel of ageism. To blame others and lack of understanding the behaviour of others may also be due to a degraded ability to interpret other road user's intentions.

4.3 Underlying themes

Ageism was a more pronounced topic in the first round of focus groups but was also found in the second round of focus groups. The feeling of not being accepted and sometimes being in the way may push the drivers to drive beyond their capacity. Many older drivers have the feeling that they drive too slow, which is also a common saying,

but in fact many drive too fast, specifically considering their own ability. They feel that the traffic flow and behavioural norms are set by others and that other road users do not comply with the mandatory traffic rules. Speed seems to be an important behavioural sign for being able to drive, if a driver does not follow the pace he/she is seen as dangerous, therefore many participants said that it was better to drive too fast than too slow. They did not consider driving over their ability dangerous.

In addition some seemed to be unaware of their mistakes by not noticing that others are compensating for their mistakes, this also gives a false feedback that you drive ok. Older drivers can therefore conclude that nothing has happened so they must be good drivers. From their fellow drivers the participants wanted to have more patience and a friendlier climate in traffic which conforms to previous studies of safety culture in traffic (Kissinger, 2007). They also wanted greater compliance of the traffic rules and education for the younger road users. When new traffic rules and signs are introduced, it should be better communicated to all drivers.

The ageism is also connected to the realization of becoming older. Aging occurs gradually and can be difficult to detect in oneself. Depending on your life situation and your life story, you have different ability to accept the aging process and that one day you have to stop driving. When the participants experienced that other road users appeared surprisingly and suddenly, it's hard to be introspective and see that the cause might be your own reduced attention and therefore do not adjust to your own ability. A slowly progressing disease can also affect our ability to drive, and since some of our driving is automated you follow old patterns and habits.

Ageism can be found both among older and younger people and in society in general. To become old is not rewarding in our society. Old and young people share the same stereotype for older driver which is 'old man wearing a hat' If you feel respected, taken into account and have different transportation alternatives it is easier to accept aging. Keys to changes can be better information about potential assistance systems and to strengthen their self-esteem. Furthermore, learning and understanding other older drivers' problems and solutions might be a way forward. Another option could be training and feedback on driving performance. Education is often associated with lack (negative) but should rather be linked to opportunity (positive) and the simulator training experiment within the SAFE MOVE project will try to improve the self-assessment of over or under estimators into consistent estimators as a foundation for further improvement and increased safe mobility.

The context in which older drivers live and drive is not only related to other road users but the whole society and how elderly are perceived. The change of the infrastructure is another contextual factor to be considered. Countermeasures to improve safety in order to reduce speed, such as narrowing lanes, and environmental concerns, such as fewer parking places, can make driving more difficult for elderly drivers. Improvements suggested in the infrastructure to help safety and mobility included better traffic signs, marked lanes, better sight length in roundabouts, longer ramps, separate lanes for turning left, alternatives to speed bumps, easier to drive in parking houses and fewer speed limit changes. This however, may not be in line with the general aim of society to reduce the number of cars in urban areas to improve the environment. Public transportation is often the alternative to driving your own car. This alternative may not be realistic to choose if you are not physically fit, have heavy luggage/bags or are afraid to wait for/riding public transports.

4.4 Estimator groups

Some attributes (e.g. personal coping strategies), were noticed in relation to the different estimator categories (over, under and consistent), even though this must be further investigated. The three categories could, in relation to safety as well as mobility, require different means. It is possible however that these categories may be more related to personality than ageing per se. It may also reflect self-esteem and power relations in the society and could be a coping strategy in order to handle declining ability. Research concerning young drivers (Lewin and Forward, 2010) has found personalities that could be compared to the over estimator group, such as aggressive drivers that overestimate their ability to control and their attitudes to justify offenses, neglecting risks justified by social norms.

Unfortunately the tentative group of under estimators in this study was very small and hence difficult to analyse. Drivers who under estimate their driving ability may have stopped driving prematurely and thus less likely to participate in this type of research. If estimation is linked to self-esteem, participants might be more reluctant to speak about their driving and thus less likely to influence the results. Under estimators would probably profit from training in a controlled setting helping them to a better self-confidence.

In the second round of focus group there may be a bias in the selection of participants even if the original selection of the respondents (3000 license holders) to the questionnaire was made randomly (Henriksson et al., 2014). It is also likely that the 177 willing to participate in the on-road assessment were quite confident and less likely to under estimate their driving performance and even more so the 40 finally selected. Furthermore, participation was voluntary all the way. However, conducting the second round of focus groups provided a means to get more insight in the participants' estimator type. Thus, it was found that most of the focus groups participants were classified correctly. There were a few exceptions. The second round of focus groups included a group of potentially under estimators as described above. The aim was to catch some aspects from under estimators. The few under estimators were closer to consistent estimators with a tendency to be humble. However, the findings from this group is only tentatively representative of under estimators.

4.5 Gender differences

Who determine the traffic flow? Who should give way to others? Is the young car driver the norm for whom the traffic is designed? These were issues raised by both male and female participants. The car provides status and symbolizes power. The groups were inhomogeneous in terms of type of car owned (size and age). With new large, heavy cars, it is easier to feel safe advocating a more aggressive driving style, while with an old small car, it is easier to get the feeling that you are second-class and have to make way for other drivers. Furthermore, the car is often a male responsibility, and many women automatically place themselves in the passenger seat and let the male drive. Henriksson et al. (2014) found that women (13 %) more than men (8 %) expected that driving cessation would not change their lives and Peters et al (2010) found that men found it more insulting than women to have to give up driving. Thus, more women may not be so dependent of a car, and therefore have other transport options. Henriksson et al. (2014) also showed typical gender differences, e.g. women stop driving at a lower age and drive less frequently than men, only 20% of the women drove almost every day. Thus, women in general might be more frequently under estimators and reluctant to

participate. Consequently, the female participants might be less representative to old female drivers, which is also supported by the finding that more than 50% were classified as over estimators. Some of the female participants drove new large cars. However, other women in the study had older cars with older technique as compared to the male participants. Even so, these participants would appreciate new driver assistance systems if they could afford it.

4.6 Methodology

The first and second round of focus groups showed more resemblance than differences even though the participants were selected and grouped differently. Both between and within groups many discussions were alike despite the fact that the participants as a group was not homogenous as have been found in previous research (e.g. Heikkinen and Henriksson, 2013).

Some examples of resemblance between the two rounds of focus groups were; the majority of women were overestimating, the majority liked to drive and many drove regularly in both rounds. The second round of focus groups may have had more pronounced interest in car technology and a somewhat less concern of ageism.

Data from the previously mentioned survey (Henriksson et al, 2014) showed that those who were willing to participate in further studies differed in several aspects from the ones not interested e. g. they were significantly younger, more often men, rated themselves as healthier and better car drivers, drove a car more often and longer distances. This may indicate that the participants were not fully representative of the population, however in order to make people engage in research projects, interest in the subject under study is of importance.

All participants had been exposed to the discussion topics prior to the focus groups; in the survey, during the on-road assessment and in the following in-depth interview. This may have affected their focus for discussion in the focus groups as well as the representativeness of the results. Respondents probably drive more frequently and are more confident in car driving etc. as compared to non-respondents. Participants with many driver assistance systems may be overrepresented in our group since this was a known focus of the study. However, participants questioned new technology and showed their needs and demands on system design e.g. by pointing out that you need to understand and learn them in order to use them. This barrier is true for drivers of all ages (Stave and Strand, 2014). It is difficult to say what assistance you would need if you do not know what already exists (Nåbo et al., 2013) but a previous interest in car technology would probably help.

It seems that older drivers often have the same trouble as all drivers have, however, there are some complex situations that are cognitively demanding and requires fast reactions and decision making that may be more demanding for the older driver (Walker et al., 1997). The problem is that if you do not realize your decreasing ability, you are not interested in training or getting assistance of driver support. However, if you realize and accept the aging process you have the potential to improve your driving and use of assistance systems. On the other hand, you may become alarmed by the fact of decreased ability and cease driving premature. In this case it may be difficult to reach the driver with support and training. The senior drivers may be the group that would need advanced driver assistance systems (ADAS) the most, which is a great challenge when designing the new cars and driver assistance systems. That's why it is of great

importance to focus on efforts to recognize and improve the traffic situations which are more difficult for older drivers.

5 Conclusions

The aim of this study was to identify possible needs and means for driver support for older drivers in order to promote a safe mobility. And also to explore older drivers' views as drivers in relation to other road users as well as themselves. The following findings can be highlighted:

- This study confirms that older drivers are a heterogeneous group. However, they share many common problems and needs, for example, the need for larger time margins, problems with high-density traffic, degraded perception of the environment and other road users and a wish for more respect of older drivers.
- Difficulties in traffic was reported in intersections especially left turns, crossings with pedestrians and cyclists, road signs, lane changes, parallel parking, driving in darkness and other drivers coming up too close behind. However, they did not confirm difficulties to situational speed adaptation, which was reported in the preceding on-road assessment. This may be linked to an unconscious overestimation.
- This study indicates that older drivers are interested in using driver assistance systems to improve safety but are concerned with cost and need for learning/training to use the systems.
- The classification that was previously made into different categories of estimators; (over, consistent and under) was for over and consistent estimators confirmed by different attitudes and behavior. For example, over estimators were more positive to speeding, more self-centered and expected that other drivers should be better educated. Consistent estimators drove more slowly, were more humble and willing to learn and train. Differences between these two categories were not found in relation to driver assistance systems but should be further explored, including under estimators.
- Surprisingly, no large gender differences were found in this study. This may be explained by a bias in the recruitment of women as they seems to drive more frequent and are tougher in traffic as compared to women in general. Consequently, the female participants might be less representative of old female drivers. This was also supported by the finding that more than 50% were classified as over estimators. Underestimating women seems to be difficult to engage in studies with focus on driving, but this struggle should proceed and gender differences in relation to driver assistance systems explored.
- Older drivers could profit from new assistance technology and efforts to change their view on own driving performance. There are also circumstances in the society such as ageism, norms for how a skilled driver acts, acceptance for speeding, tougher traffic climate and a change in the role of the automobiles and their position in relation to other road users. These factors affect all drivers but to a larger extent in a negative way for older drivers.

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