Investigation of the acceptance of a handbook for safe driving at an older age

Sophia Vardaki[1*] and George Yannis[2]

[1]*Ph.D., Senior Researcher, Department of Transportation Planning and Engineering, School of Civil Engineering, National Technical University of Athens, 5, Iroon Polytechniou St, 15773, Zografou Campus, Greece, tel.+30-210-7721282, e-mail: sophiav@central.ntua.gr*

[2]*Associate Professor, Department of Transportation Planning and Engineering, School of Civil Engineering, National Technical University of Athens, 5, Iroon Polytechniou St, 15773, Zografou Campus, Greece,tel.+30-210-7721326, e-mail: geyannis@central.ntua.gr*

[*] Corresponding author, e-mail: sophiav@central.ntua.gr

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The objective of this research is the investigation of older drivers' attitudes towards a handbook for safe driving at an older age. The handbook was developed with the purpose of increasing elderly drivers' awareness of their driving abilities and providing information about the effects of ageing on driving and about safe driving practices and compensation strategies. A survey was carried out in which sixty-four active drivers between 65 and 74 years of age participated. Participants regard the handbook for safe driving as useful, interesting, providing knowledge and relevant information. More than half of them reported that they had become more aware of changes in their driving after reading it. Binary logistic analysis was conducted to identify individual driver characteristics that might predict acceptance of the handbook by active older drivers in terms of reported increased awareness and intended repeated use. The findings of the research indicate a positive attitude of elderly active drivers towards the handbook, implying acceptance by its users. The characteristics of the drivers' who reported increased awareness after reading have been identified.

Keywords: driver awareness; older driver education; driver behavior; aging; ***self-screening*** of driving ability; driving handbook

Introduction

The population of older adults aged 65+ in EU member States will increase from 16% in 2004 to 30% in 2050, with the highest proportions expected in Spain (36%), Italy (35%) and Greece (33%) (EUNESE, 2006). Similarly, the percentage of elders will increase from 12.4% to 20.7% in the USA and from 12.6% in 2000 to 25.2% in Australia between 2000 and 2050 (OECD, 2001; GAO, 2007). According to the OECD (OECD, 2001), driving licence rates for people aged 65+ projected to 2030 are 22.1% for Australia (from 12.6% in 2000) and 20% for the USA (from 12.6% in 2000). This increase in population age, combined with a resulting rise in older-driver licensing rates and expected increase in mobility needs (Fuller and Santos, 2002; Langford & Koppel, 2006; NHTSA, 2009), implies that older drivers will be increasingly exposed to crash risks (GAO, 2007). According to Hakamies-Blomqvist (Hakamies-Blomqvist, 2004) future developments in licensing rates, driving habits and crash rates are difficult to predict, since true age effects may be confounded by time-related variation, cohort and gender-related variations and interactions and system changes. However, despite the uncertainty in these predictions, older drivers' safety is a cause for serious concern (Hakamies-Blomqvist, 2004).

The normal ageing process leads to functional declines in the vision, memory, physical strength and flexibility needed for safe driving, which do not affect individuals to the same extent or in the same way (TRR Special Report 218-1, 1988); the degree of change varies between older people. Functional declines result in a

reduction of driving skills. Although great variability in driving skills among the older population has been recognised, only a small portion of older drivers is significantly deficient in driving-related activities (Eby, Molnar, Shope, Vivoda & Fordyce, 2003; McKnight, 1988). Research indicates that moderate functional changes related to normal ageing do not necessarily lead to a discernible increase in crash risk. Furthermore, an important part of the risk of the oldest driver groups is probably attributable to patterns of functional deficits, which in turn are related to certain illnesses whose prevalence increases with age, especially those leading to cognitive deterioration, such as different dementias (Hakamies-Blomqvist, 2004).

In general, older driver accidents are markedly different from those of other age groups. Differences may reflect weaknesses but also self-regulation, i.e. driving less frequently and fewer miles, and under less demanding conditions (Staplin,, Lococo, Stewart & Decina, 1999), general driving habits and compensatory behavior. These compensatory actions reflect both an age-related maturity and a behavioral adaptation to age-related changes in certain functions important for safe driving (Hakamies-Blomqvist, Sirén & Davidse, 2004). Many older-driver collisions occur at intersections. Additionally, they face difficulties with increasingly complex road design and traffic conditions, particularly when driving at higher speeds (Holland, 2001) and on freeways (Knoblauch, Nitzburg, & Seifert, 1997; Lerner & Ratté, 1991; Vardaki, 2008). Driving-performance problems include a reduced capacity for comprehending instructions and judging gaps, decreased visual search and problems in maintaining speed (McKnight & Mcknight, 1999). Relevant studies on pre-crash maneuvers and contributing factors to freeway crashes indicate that older drivers are much more likely than younger drivers to be merging or changing lanes, or passing/overtaking prior to a crash (Staplin, Lococo, Byington & Harkey, 2001).

A major point of concern is that reduction (and more particularly cessation) of driving as a result of health and medical changes, either voluntarily (following a decision made by the individual) or involuntarily (due to withdrawal of driving privileges) is associated with an increase in depression, loss of confidence and status, or even death (OECD, 2001; Foley, Heimovitz; Guralnik, & Brock, 2002; Whelan, Langford, Oxley, Koppel & Charlton, 2006). Another point to consider is that if driving cessation results in increased trips as a pedestrian, it follows that an individual's overall crash risk involvement may increase, since research indicates that from the mid-50s onwards, each pedestrian trip has a greater risk of fatality than trips as car occupants or bus passengers. Furthermore, premature cessation as a result of age-mandatory assessment systems protects an individual against crash involvement as a driver, but might cause reduced mobility as a possible safety disbenefit (Whelan, Langford, Oxley, Koppel & Charlton, 2006; Mitchell, 2008).

When considering older-driver issues as summarised above, it is evident that older-driver safety should be approached as a complex and important issue of serious community and road safety concern. Potential implications for the safety and mobility of older people should be considered when designing measures to address it.

Safety and mobility strategies for older drivers include those addressing driving behaviour. Educational and training programmes are behavioral strategies that aim to educate and train older drivers to ***self-screen***, improve their skills and limit their driving to circumstances where they can drive safely (NHTSA, 2009). Appropriate education could prove useful for the current cohort of older drivers, many of whom had little formal driving education (Whelan, Langford, Oxley, Koppel & Charlton, 2006). In research it is stressed that there is a real need for awareness, education and training programmes with a particular focus on how older drivers can adopt safe driving practices in order to reduce crash risk and maintain mobility. There is some evidence that education can help older drivers compensate for the effects of deficiencies by suggesting compensation mechanisms (Whelan, Langford, Oxley, Koppel & Charlton, 2006; Dickerson et al, 2007). Assistance to older drivers could be provided through education and specifically through ***self-screening*** (Smiley, 2004).

Various ***self-screening*** instruments and educational materials have been developed for older drivers (see NCHRP, 2005, for an extensive list and description) with the purpose of assisting them to drive more safely and to plan for their future transport needs before serious problems occur in their mobility and safety. According to the results of existing reviews (Whelan, Langford, Oxley, Koppel & Charlton, 2006), evaluations of older driver education and training programmes are limited. A study aimed at determining the effect of educational material on older drivers with moderately unclean crash or conviction records indicates (Kelsey & Janke, 2005) that educational materials tailored to a particular driving population can produce a knowledge gain in the recipients. The Driving Decisions Workbook (Eby, Molnar & Shope, 2000) developed by the University of Michigan was assessed on the basis of reported self-awareness, general knowledge and usefulness as well as correlations between workbook responses and observed actual problems. The results of the research showed that the workbook may be a useful first-tier assessment instrument and educational tool for the older driver (Eby, Molnar, Shope, Vivoda & Fordyce, 2003). A generally acknowledged limitation of self-screening tools is that they are not expected to be used as intended by drivers who experience serious cognitive limitations, and who are actually in need of these tools but are unable to appreciate their performance, since they may overestimate their abilities (Staplin, Lococo, Stewart & Decina, 1999; Eby, Molnar, Shope, Vivoda & Fordyce, 2003).

The Handbook for Safe Driving at an Older Age (Vardaki, Kanellaidis & Yannis, 2009) was developed as part of a research project funded by the Hellenic Ministry of Infrastructure, Transport and Networks, the purpose of which was to provide older drivers with a tool for understanding and recognising current problems in their driving, in order to strengthen their knowledge and awareness so that they are able to anticipate potential future driving problems. Another purpose of developing the handbook was to advise older drivers on good decisions regarding their driving safety.

The objective of this research is to investigate older drivers' attitudes towards the handbook with an emphasis on increased awareness. To this end, sixty-four active older drivers aged 65-74 read the handbook and then filled in a questionnaire to assess it. Individual driver characteristics that might predict acceptance of the handbook in terms of reported increased awareness and intended repeated use of the handbook were then identified through the development of related prediction models.

Structure of the handbook

The structure of the Handbook for Safe Driving at an Older Age (Vardaki, Kanellaidis & Yannis, 2009) is presented in Figure 1. The key components of the handbook are related to: (i) ***self-screening***, leading potentially to sensitisation and increased awareness of age-related declines in driving ability and the need for adaptation, (ii) driving-related knowledge, to develop concern for safety and influence (driving-related) motives for appropriate adaptation, and (iii) advice, guidance and support that help drivers make good driving decisions regarding safer driving, or make a smooth transition to gradually restricted driving or driving cessation..

Readers of the handbook are requested to think about their own potential problems and difficulties in relation to these factors and are then given the relevant information and guidance to make good decisions regarding tactical and strategic driving choices, the evaluation of their driving abilities as well as transportation alternatives when driving is reduced (Figure 1).

(Figure 1)

The Handbook for Safe Driving at an Older Age (Vardaki, Kanellaidis & Yannis, 2009) is organised into the following sections and subsections:

- Safety within the car: Seat belt use; Keeping the vehicle in good condition; Dealing with accidents.
- Safety in traffic: Driving at intersections; Keeping safe distances; Paying attention to other users; Priority rules; Checks and use of mirrors; Slow driving.
- Safe practices on freeway: Traffic rules and traffic signs; Lane changing; Entering manoeuvre; Exiting manoeuvre.
- Driving and emotions: Dealing with anger; Dealing with anxiety.
- Driving in good condition: Influence of medication; Good health practices.
- Driving problems and age-related changes: Slower reactions while driving; Wandering thoughts while driving; Vision problems while driving; Difficulties while driving in unfamiliar areas; Difficulties while driving at night; Difficulties while driving in the rain; Difficulties while driving in heavy traffic; Fatigue while driving; Difficulties while driving and doing another activity; Difficulties in finding a specific sign when driving; Memory

problems and driving; Difficulties in reversing and turning the head; Difficulties in using the pedals and the steering wheel.

- Indications of serious concern about driving ability: Family and friends' concerns about driving ability; Traffic violations in the last one or two years; Road accidents within the last one or two years; Eye diseases; Chronic diseases; Awareness of health conditions; preparation for transition to restricted driving or cessation of driving.
- General information: Driving licence renewal; Visiting the doctor; Contacting a driving instructor; Using public transport; Ways of getting around.

The handbook's sections and subsections refer to broad areas of assessment of aspects of driving performance, age-related conditions potentially affecting driving safety, serious safety concerns about driving ability, the assessment of possibilities for improving driving performance and information about safe transport alternatives to driving.

Certain driving difficulties and problems addressed in the assessment questions were identified in a study on the driving behaviour of active elderly drivers aged 65-74 on a freeway in Greece (Vardaki, 2008). An analysis of actual driving performance and self-assessed performance indicates that active older drivers might be aware of their performance inadequacies on the freeway. Specifically, performance deficiencies on the freeway were found to be related to drivers' assessment of their own driving performance on the freeway (overall performance and performance on entering and exiting manoeuvres), as well as to drivers' stated feeling of danger due to their own driving performance. Some performance deficiencies are linked to adjustments to driving behaviour to overcome potential difficulties, implying that active older drivers are characterised by a lack of knowledge of traffic regulations and of safe driving practices that are particularly important in freeway driving, such as in-time observation, use of side mirrors, use of signals, not driving on the hard-shoulder and appropriate lane use for driving speed (Vardaki, 2008).

A draft version of the handbook was pilot tested using a questionnaire which was completed during interviews with older drivers. The purpose of the pilot test was to improve the handbook in the light of potential users' comments on specific issues (positive and negative aspects such as content, scope, usefulness and clarity as perceived by readers) which were discussed during the interviews. The handbook was finalised after making minor adjustments, mainly revising subsections in respect of (common) driving practices that were perceived as having no added value (i.e. they were known and thus redundant) by the majority of experienced drivers who answered the questionnaire.

Data collection and descriptive analysis

Participants

Sixty-four active drivers, fifty male and fourteen female, between 65 and 74 years of age, participated in the study. Random localisation of participants, a door-to-door survey, was used as method of recruitment. Answers to recruitment questionnaire were cross-checked (validated) with the answers to the research questionnaire. The prerequisites for participation were: possession of a valid driving licence (having passed the required medical screening); no advice from a doctor to restrict or stop driving; no more than one accident in the previous year; minimum current driving activity of at least fifteen kilometres per week at least two days per week; completion of basic education, at least.

The drivers were given the handbook to read and the next day were asked to fill in a questionnaire to assess it. Participants were then given the Mini Mental State Exam (MMSE), which is a 30-point screening evaluation for cognitive impairment (Folstein, Folstein &McHugh, 1975). Questionnaires were considered valid for drivers who completed the MMSE with an outcome indicating a normal cognitive function. The aforementioned requirements regarding their present driving activity, medical status and accident history (Marottoli, Cooney, Wagner, Doucette & Tinetti, 1994), were prerequisites for participation in the study, since it was important to exclude serious cognitive impairments that would prevent the participants from being able to ***self-screen*** their driving performance (Christ, 1996; Staplin, Lococo, Stewart & Decina, 1999; Whelan, Langford, Oxley, Koppel & Charlton, 2006). MMSE scores are dependent on the person administering the examination. In addition, when using MMSE scores, it is important to account for age, gender, and education, especially in populations where the educational level is low (Crum, Anthony, Bassett & Folstein, 1993), (Grigoletto, F. et al, 1999). The MMSE was administered by a specialist (neurologist). Subjects were young-old drivers (Hakamies-Blomqvist, Sirén & Davidse, 2004) with a higher than basic educational level. The education level prerequisite allowed for control of the influence of education on MMSE scores and it was considered important for the drivers to be able to comprehend the handbook. To account for age and education the cutoff level of 27 was used to identify participants with normal cognitive function. (Crum, Anthony, Bassett & Folstein, 1993). In Table 1, the number and percentages of participants per gender and age group are shown.

(Table 1)

Questionnaire

To collect the data required for this investigation, a questionnaire was developed to provide an insight into the drivers' attitudes towards the use of the handbook. The questionnaire included questions similar to those used in a study evaluating a ***self-screening*** instrument (Eby, Molnar, Shope, Vivoda & Fordyce, 2003). After reading the handbook, the drivers filled in the questionnaire answering yes/no questions (shown in Table 2). They also reported: on their driving experience (i.e. years of driving); whether driving was a means of doing their job (i.e. whether they had a high

level of driving experience); their current driving activity (i.e. kilometres driven per week); and number of trips as drivers per week. The drivers also reported on the number of accidents that they might have been involved in as drivers and the number of accidents and traffic violations experienced in the previous year. The personal data collected concerned age, gender, educational level and whether they were physically active. The individual characteristics were considered as variables in the statistical analysis which was carried out, since they have been shown to be important and relevant to safety and mobility issues for older drivers (Hakamies-Blomqvist, Sirén & Davidse, 2004; Whelan, Langford, Oxley, Koppel & Charlton, 2006).

Descriptive analysis

The percentages of drivers answering "yes" to questions about the handbook are shown in Table 2.

(Table 2)

The results indicate that a large majority of the drivers answered that the handbook informed them about changes that come with age which may influence their driving. All the women responded "yes" to this question. After reading the handbook, more than half the drivers responded that they had become more aware of changes that come with age which may influence their driving, with men and the younger age group more frequently answering positively to this question. According to a large majority of the drivers, especially those in the older age group, the information given in the handbook was a useful reminder of things they knew. Almost all the drivers (and all the female drivers) responded that they had continued reading the handbook even if its contents were known or thought not to concern them. After reading the handbook, over sixty percent of the drivers were thinking of using some of the information given in their driving.

A clear majority of the drivers would like to read the handbook again in the future, although the percentages for the women and the older age group were smaller; still, over two-thirds of them responded positively. Almost all the drivers would recommend the handbook to their friends. The majority of the drivers, and more frequently the younger age group, thought that it provided an opportunity for discussion with family or friends. More than two-thirds of the drivers found the handbook very useful, while all of them rated its usefulness positively.

Development of prediction models

Binary logistic regression analysis (Field, 2005) was used to predict the drivers' (reported) increased awareness after they had read the handbook and their intention to reread the handbook (dichotomous dependent variables) from a set of predictors (independent variables) i.e. the drivers' characteristics. The inclusion of the MMSE score in the models would be indicative of the potential influence of cognitive status

on reported increased awareness and intention to reread the handbook. The MMSE is a standardised method to grade cognitive mental status (Crum, Anthony, Bassett & Folstein, 1993) and a fairly crude measure for assessing cognitive impairment. Furthermore, the study participants fall within the normal cognitive functioning category. Therefore the MMSE score was used as a dichotomous categorical variable, recognising that the actual four scores, 27-30 (used as dummy variables in the models) would not have a practical application in better predicting self-reported increase in self awareness and reported intention to reread the handbook. Although the modeling technique used is rather sophisticated, the use of dichotomous categorical variables, which refer to quantitative reported estimates of driving activity and experience, simplifies the model application. The statistically significant models are presented in the following paragraphs.

Awareness

Logistic regression was conducted to assess whether various combinations of predictor variables significantly predicted whether, having read the handbook, there was any increase in the drivers' (reported) awareness of any changes that come with age which may influence their driving. The model was developed with the intention of significantly predicting increased awareness and it predicted the probability (probability values between 0 and 1) of increased awareness for a given person that is closest to the observed probability. The model was statistically significant at 0.05 level and predicted the probability from the specific combination of predictors (driver's characteristics).

The awareness model predicted responses of increased awareness after reading the handbook drivers, on the basis of total years of driving experience (considered as a continuous predictor variable), the result in MMSE (considered as categorical-dichotomous variable: 29 and 30 scores taken as the base) the number of accidents in which they have been involved as drivers (considered as a continuous predictor variable) and whether the number of kilometres driven per week were more than fifty (considered as categorical-dichotomous variable: more than fifty kilometers driven per week takes as the base). When the four variables were considered together, they significantly predicted whether or not a driver reported increased awareness after reading the handbook. The model is described in Table 3. The odds ratios presented suggested that: the odds of a driver with a certain number of years of driving experience also reporting increased awareness were lower than those of a driver with one year less of driving experience; the odds of a driver with a MMSE score of 28 or 27 also reporting increased awareness were lower than those of a driver with MMSE score of 29 or 30. The odds of a driver with a certain number of reported accidents also reporting increased awareness were higher than those of a driver with one accident less. Finally, the odds of a driver who reported less than fifty kilometers driven per week (although more than fifteen kilometers per week) also reporting increased awareness were lower than those of a driver who reported more than fifty

kilometers driven per week. In the model (Table 3), the constant was not statistically significant at 0.05 level. Other variables included in the model, which were not statistically significant are: gender (categorical dichotomous; male taken as the base), education (categorical dichotomous; middle level of education taken as the base), age (considered as continuous predictor variable), high level of driving experience (categorical dichotomous; high level of driving experience taken as the base), physical activity (categorical dichotomous; physical activity taken as the base), reported days' use of a car / days of driving per week (categorical dichotomous ; more than two days taken as the base), reported accident in the previous year (categorical dichotomous; an accident taken as the base), number of tickets received for traffic violations (considered as continuous predictor variable).

(Table 3)

Rereading

A model (statistically significant at 0.05 level) predicting whether or not drivers reported that they would read the handbook again in the future was developed on the basis of reported number of days driving per week (more than two days or two days) and reported accidents in the previous year (an accident or no accidents). The model developed predicted who would respond that they would read the handbook again in the future on the basis of whether they had had an accident in the previous year (considered as a categorical-dichotomous variable; an accident taken as the base). The variable significantly predicted whether or not drivers reported that they would reread the handbook in the future. The model is described in Table 4. The odds ratio presented suggested that the odds of a driver who had had no accident in the previous year also reporting that she/he would reread the handbook were higher than those of a driver who had had an accident in the previous year. As is shown in Table 4, the constant was not statistically significant at 0.05 level. Other variables included in the model, though not statistically significant are the result in MMSE (considered as categorical dichotomous variable; 29 and 30 scores taken as the base) and reported days' use of a car/ days of driving per week (categorical dichotomous; more than two days taken as the base).

(Table 4)

Discussion and conclusions

The research presented in this paper aims to investigate active older drivers' attitudes towards the handbook as a first attempt to assess its acceptance and impact. The aim of the handbook is to help older drivers increase their self-awareness regarding the effects of age-related changes on their driving safety and the need for driving behaviour adaptation; to improve knowledge and develop a concern for their safety that influences their motives for appropriate adaptation; and to guide them to make

appropriate driving decisions. To this end, the handbook addresses factors that determine task demands and driver capability and provides knowledge and guidance in order to support their driving decisions. The handbook was based on ***self-screening*** and educational material, which was analysed especially for the purposes of this research. The results of a recent study on older drivers' behaviour in a currently expanding freeway network were also considered for the development of the handbook.

The handbook was assessed by a group of sixty-four active drivers, aged 65-74, with normal cognitive functioning. Drivers' attitudes after reading the handbook were investigated, with particular emphasis on reported increased awareness of declines in driving abilities that come with age. To this end, individual driver characteristics were identified that might predict reported increased awareness after reading the handbook and intended repeated use of the handbook (driver's intention to reread the handbook in the future).

Having read the handbook, the drivers were asked to fill in a questionnaire specially designed for this survey. According to the results of the analysis, elderly drivers had positive attitudes towards the handbook. Most of them reported that their general knowledge regarding the effects of age-related functional declines on safe driving had increased. More than half of them reported that they had become more aware of changes in their driving after reading it. Almost all of them found it useful and most of them would recommend it to their friends. More than half of them reported that they would use information from the handbook to improve their driving. Most of them also reported that they had continued reading it although its content was known or did not concern them. The majority of the drivers reported that they would like to read it again in the future. Finally, most of them thought that the handbook gave an opportunity for discussion with family members and friends.

Binary logistic regression analysis was conducted to predict reported increased awareness and reported intention to read the handbook again in the future from sets of predictors made up of the drivers' characteristics.

According to the results of the analysis, The odds correctly estimating who will report increased awareness (of any changes that come with age and which may influence their driving) are higher for more active drivers (driving more than fifty kms per week) with higher scores in the MMSE –within the range of normal cognitive functioning- , reporting more accidents and who have less years of driving experience. The results indicate that increased awareness maybe reported by active drivers within the lower age group (although age is not a predictor it is positively correlated with years of driving, with a correlation coefficient of 0.344, statistically significant at 0.01), with good cognitive functioning, (possibly being sincere of) reporting more accidents.

The rereading model predicts who will respond that he/she will read the handbook in the future, on the basis whether he/she has had an accident in the previous year (given that no more accidents had happened). The odds correctly estimating who will report

an intention to reread the handbook in the future are higher for those drivers have had no accidents in the previous year.

The positive attitudes of older drivers towards the handbook, which are revealed from the present research, imply that the handbook may be accepted by older drivers having the individual characteristics of the survey, i.e. being active drivers, aged 65-74, with normal cognitive functioning, who may have a good level of ***self-screening***. These drivers in general regard the handbook as useful and interesting, providing knowledge and information regarding safe driving practices, compensation strategies and the effects of ageing on driving. The individual characteristics predicting acceptance of the handbook by active older drivers in terms of reported increased awareness and intended repeated use of the handbook could be of particular importance when designing and addressing education and assessment programmes targeting older drivers.

The purpose of the study is to investigate acceptance of the Handbook by older adults who might be able to recognise potential problems or difficulties in their driving. Therefore, in this first step of the evaluation, the investigation focussed to the attitudes of young old (aged 65-74) active drivers with normal cognitive functioning. The Handbook was assessed positively by the study participants and these findings are indicative of the potential of the handbook to support these elderly drivers regarding their driving-related decisions. These drivers may have the opportunity to identify problems early, even though several of the issues raised in the handbook may not yet be salient to them. These drivers might be able to obtain a broad picture of the issues related to ageing and driving so that they are in a position to anticipate potential future problems when they enter the older old (>74) population. They are encouraged to use the handbook again, at a later time, as a reference for safe driving. Interestingly, the results show that most of them reported that they would do so, indicating that the handbook is promising in prompting (the idea of) regular self-screening. It follows that the findings of the present study may be applied to a rather select group of older adults with the characteristics of the study participants. A limitation of the present study is that it is based on a sample which is not representative of the older driver population in the country. While the sample is representative with regard to the actual ratio of male to female drivers of this age group (65-74), there is no data available concerning, in particular, the educational level, exposure (amount and context of driving), health status and income of the elderly driver population. It is suggested that there should be further investigation of the acceptance of this handbook by samples of older drivers of more advanced age, who are more representative of the older driver population.

Although the findings are actually preliminary in regard to the acceptance of the handbook (and consequently its evaluation), the modeling results are indicative of the drivers who may benefit most from the handbook and who, in the end, constitute the target group, also giving a direction to efforts that should be undertaken to increase awareness.

Future research could also cover the influence of the handbook on user's behaviour and decisions concerning their driving, after a period of several months, specifically, the driving strategies adopted in terms of amount and context of driving, possible changes in driving style and driving practices, control of temporary conditions, concerns addressed to doctors and driving instructors, the use of alternatives to driving and re-use of the handbook. In addition, this future research could also investigate the correlation between responses to the handbook questions and drivers' on-road performance as well as results of clinical assessments. These findings may give an indication of the validity of the Handbook as a self-screening tool.

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Table 1: Participants per gender and age group

Participants	Overall	Male	Female	65-69	70-74
Number	64	50	14	39	25
Percentage	100%	78%	22%	61%	39%

Table 2: Percentages of drivers answering "yes" to questions about the handbook

Question	Overall	Men	Women	65-69	70-74
Did the handbook inform you about changes that come with age which may influence your driving?	91%	88%	100%	90%	92%
After reading it, have you become more aware of changes that probably influence your driving?	53%	56%	43%	56%	48%
Do you think that the information given in the handbook was a useful reminder of things you know?	92%	92%	93%	90%	96%
Did you continue reading the handbook even if its content was known or did not apply to you?	95%	94%	100%	95%	96%
Having read it, are you thinking of using any of the information included in the handbook?	62%	62%	64%	62%	64%
Would you like to read the handbook again in the future?	80%	82%	71%	82%	76%
Would you recommend the handbook to your friends?	97%	98%	93%	97%	96%
Do you think that the handbook is an opportunity for discussion with your family or friends?	88%	88%	86%	92%	80%
How useful do you find the handbook?					
Very useful	69%	70%	64%	67%	72%
Fairly useful	30%	30%	29%	33%	24%
Slightly useful	1%	0%	7%	0%	4%
Not at all useful	0%	0%	0%	0%	0%

Table 3: Logistic regression predicting reported increased awareness after reading the handbook

Variable	**B**	**P**	**SE**	**Odds ratio**
Years of driving experience	-0.22*	0.002	0.07	0.80
MMSE	-1.76*	0.042	0.86	0.17
Accidents in total	0.75*	0.024	0.33	2.11
Kms per week	-2.50*	0.016	1.04	0.08
Gender	-1.78	0.088	1.04	0.17
Education	0.68	0.439	0.88	1.97
Age	0.05	0.658	0.11	1.05
High level of driving experience	2.42	0.056	1.27	11.23
Physically active	0.50	0.595	0.95	1.66
Days per week	1.21	0.357	1.32	3.36
Accidents in the previous year	1.35	0.269	1.22	3.86
Tickets received in the previous year	-2.22	0.150	1.54	0.11
Constant	2.49	0.763	8.26	12.02

Note: R^2= 0.36 (Hosmer & Lemeshow), 0.39 (Cox & Snell), 0.53 (Nagelkerke), *statistically significant at 0.05 level

Table 4: Logistic regression predicting drivers' intention to reread the handbook in the future

Variable	**B**	**p**	**SE**	**Odds ratio**
Accidents in the previous year	2.72*	0.025	1.22	15.15
MMSE	2.42	0.072	1.34	11.19
Days per week	-1.92	0.057	1.01	0.15
Constant	-1.21	0.306	1.18	0.30

Note: R^2= 0.21 (Hosmer & Lemeshow), 0.19 (Cox & Snell), 0.30 (Nagelkerke),
*statistically significant at 0.05 level

Figure 1. Structure of the Handbook for Safe Driving at an Older Age.