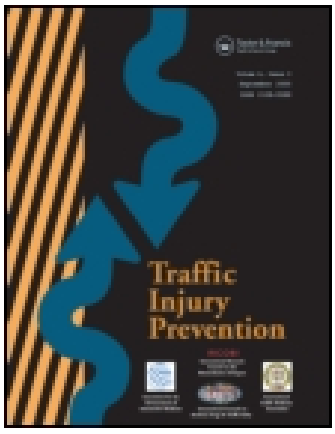

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Awareness Tool for Safe and Responsible Driving (OSCAR): A Potential Educational Intervention for Increasing Interest, Openness and Knowledge About the Abilities Required and Compensatory Strategies Among Older Drivers

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Awareness Tool for Safe and Responsible Driving (OSCAR): A Potential Educational Intervention for Increasing Interest, Openness and Knowledge About the Abilities Required and Compensatory Strategies Among Older Drivers

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Objective: This pilot study aimed to verify the impact of the awareness tool for safe and responsible driving (OSCAR) on older adults' (1) interest, openness, and knowledge about the abilities and compensatory strategies required for safe driving; (2) awareness of changes that have occurred in their own driving abilities; and (3) actual utilization of compensatory strategies.

Methods: A preexperimental design, including a pretest (T_0) and posttest (T_1) 8 to 10 weeks after exposure to the intervention, was used with 48 drivers aged between 67 and 84. The participants had a valid driving license and drove at least once a week.

Results: Overall, the results demonstrate that OSCAR increased interest, openness, and knowledge about the abilities and compensatory strategies of older drivers ($P < .01$). After exposure to OSCAR, the majority of the participants confirmed that changes had occurred in at least one of their abilities. Moreover, half of the older drivers reported having started using 6 or more compensatory strategies.

Conclusion: In summary, in addition to increasing older adults' interest, openness, and knowledge to discussion about driving, OSCAR also improved awareness of the changes that could negatively impact safe driving and enhanced utilization of compensatory strategies. While promoting safe driving and the prevention of crashes and injuries, this intervention could ultimately help older adults maintain or increase their transportation mobility. More studies are needed to further evaluate OSCAR and identify ways to improve its effectiveness.

Keywords: transportation mobility, older adults, driving skills, self-regulation, compensation, aging

Introduction

Driving is important for mobility, social participation, and quality of life of older adults (Classen et al. 2010; Eberhard et al. 2006). Often a primary means of transportation (Audet et al. 2007; Wang et al. 2009), driving is also a symbol of pride and freedom, allowing older drivers to be independent. Although a privileged activity, driving is a complex task that requires efficient and proper use of motor, sensory, and cognitive functions (Audet et al. 2007). As the integrity of sensory (vision, hearing, touch), motor (strength, coordination, flexibility), and cognitive (attention, memory, decision making, judgment) functions deteriorates in normal aging and with illnesses, a decline in driving ability is likely to occur. Specifically, visual–perceptual, attention, and cognitive deficits have been shown to be the best predictors of collision risk among older drivers (Audet et al. 2007). In addition to jeopardizing

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older drivers' safety, diminished ability to drive can cause injuries to other users of public roads (Canadian Association of Occupational Therapists (CAOT) 2009; Gauthier 2008).

By improving interest, openness, and knowledge about driving, awareness interventions can foster safe driving among older drivers (CAOT 2009). Increased awareness can help older drivers recognize changes occurring in their abilities required for safe driving. One recent study demonstrated that being older and having more than one medical condition increased the likelihood of self-regulation of driving (Sargent-Cox et al. 2011). Another study found that cognitive problems recognized by drivers were associated with discomfort in and avoidance of certain driving situations (Meng and Siren 2012). By recognizing sensory, motor, and cognitive changes affecting safe driving, older people who have good insight and coping abilities can further improve their skills through education and training (Eby 1998; Eby et al. 2003). Effective education and driver training programs are now available for older drivers (CAOT 2009; Marmeleira et al. 2009; Marottoli, van Ness et al. 2007; Marottoli, Allore, et al. 2007). Nevertheless, to benefit from training programs, older drivers need to be aware of them and be willing to participate, and the effectiveness of the programs must be demonstrated. The impacts of such programs on behavior and safety outcomes are inconsistent (Korner-Bitensky et al. 2009; McCarthy 2005; Oxley et al. 2013). Among educational programs without practical training, some have been shown to improve driving at intersections (Bao and Boyle 2009), road scanning behavior (Romoser 2008), or self-regulatory practices (Owsley et al. 2003; Oxley et al. 2013), but others were ineffective with respect to driving improvements (Bédard et al. 2004; Bérubé 1998) or crash reductions (Owsley et al. 2004). In fact, one program has even been demonstrated to be associated with an increased number of crashes for men aged 75 years and older using fewer strategies to cope with their declining skills but had no effect on subsequent crashes of younger men and women of all ages (Nasvadi and Vavrik 2007). Among programs with practical training, most have been found to be effective in improving driving performance overall (Bédard et al. 2008; Lavallière et al. 2009; Marottoli, van Ness, et al. 2007; Marottoli, Allore, et al. 2007), at intersections (Romoser and Fisher 2009), or for hazard recognition (Horswill et al. 2010). However, some studies demonstrated an association between self-reported abilities and driving performance (Eby et al. 2003; Molnar et al. 2010), whereas others did not (Bédard et al. 2011; Scialfa et al. 2010); evaluations of such programs are complex. Knowing more about psychosocial factors related to driving such as driver perceptions, beliefs, and openness to change would help to maximize the fit between education program content and outcomes (Tuokko et al. 2007) and further improve older drivers' skills.

Even in situations where it may not be possible to improve older drivers' skills, compensatory strategies can be used to enhance safe driving. Compensatory strategies are conscious means used by a person to compensate for diminished abilities (Blesedell et al. 2009), such as avoiding driving in the dark or choosing a vehicle that is easier to drive (automatic transmission, power options, etc.) when some musculoskeletal problems (e.g., joint pain) occur.

Of the 19 driving tools specifically developed for older drivers that we identified in the scientific and grey literature (i.e., unpublished reports and theses; see Levasseur et al. 2013a, 2014), few were rigorously developed and validated to foster awareness, and most are screening tools (i.e., designed to identify older drivers at risk who need further assessment). One of them, the awareness tool for safe and responsible driving (known in French as *Outil de Sensibilisation des conducteurs âgés aux capacités requises pour une Conduite Automobile sécuritaire et Responsable* [OSCAR]; Appendix 1, see online supplement), was built on a systematic review of the scientific literature (i.e., rigorous method used to identify relevant studies) related to the abilities and compensatory strategies required for safe driving and developed based on an expert consultation process (see Levasseur et al. 2013a, 2014). Concise, clear, and written in accessible language, OSCAR has several advantages, namely, it is based on theoretical models, is easy to understand and complete, has a short completion time, and has sections that can be divided and used separately (Levasseur et al. 2013a, 2014). Moreover, OSCAR leads older adults to question themselves directly about changes that may occur with aging and are related to safe driving and can be useful when discussing their own concerns about their driving. Finally, the changes that have occurred are related more clearly to personalized tips regarding habits and strategies to modify, including available resources for drivers (Levasseur et al. 2013a, 2014; Appendix 1). Although OSCAR has also been validated with 12 older drivers who confirmed its relevance and usefulness to foster awareness and enable older drivers to identify changes in themselves and learn about compensatory strategies and resources they can use (Levasseur et al. 2013a, 2013b), its impact needed to be more rigorously evaluated. This study aimed to document OSCAR's impact on older adults' (1) interest, openness, and knowledge about abilities and compensatory strategies required for safe driving; (2)) awareness of changes that had occurred in their own abilities; and (3) utilization of compensatory strategies. The main hypothesis was that, following exposure to OSCAR (see Intervention section below), the participants would report an increase in their interest, openness, and knowledge about the abilities and compensatory strategies required for safe driving. Knowledge available in OSCAR specifically focused on road safety information and abilities required for safe driving and about the impact of aging on abilities and compensatory strategies. Moreover, we hypothesized that participants would report greater awareness of the changes that had occurred in their own abilities to drive and increased utilization of compensatory strategies.

Methods

Participants

Forty-eight participants were recruited using a list of volunteers from a previous study and through posters and contacts in community organizations. During the recruitment phase, volunteers who were aged 65 and over, understood and spoke French, had a valid driving license, and drove at least once

a week were invited to participate until a total of 24 women and 24 men was reached. This study was approved by the Research Ethics Committee of the Health and Social Services Centre of the University Institute of Geriatrics of Sherbrooke (CSSS-IUGS).

Study Design and Procedures

This pilot study used a preexperimental design, including a pretest (T_0) and posttest (T_1). At T_0, the questionnaire Interest, Openness, and Knowledge (IOK), the main outcome measure, was administered. Immediately after T_0 and in the presence of the research assistant, participants were exposed to the intervention (i.e., they were invited to read OSCAR but were not allowed to keep it). This limited exposure was intentional to reproduce minimal intervention and recall conditions, such as when someone reads a document only once. Eight to 10 weeks after exposure to the intervention (T_1), participants answered the same IOK questionnaire. This time delay was a compromise to decrease recall bias (time between the 2 assessments) and identify the impact of the intervention. In addition, the participants completed 2 other questionnaires to report changes that had occurred in their abilities related to driving (COA) and their utilization of compensatory strategies (UCS). These 2 questionnaires verified the impact of OSCAR as perceived by older drivers themselves. Finally, the participants completed one other questionnaire about sociodemographic and clinical variables and driving habits (see Variables and Questionnaires section). Most participants were met in a private room at the Research Centre on Aging of the CSSS-IUGS and all signed an informed consent form. Data collection took about 20 min at T_0 and 30 min at T_1.

Intervention

The awareness tool for safe and responsible driving (OSCAR) is a written document containing a series of 15 questions and 15 related tips linked to aging and driving (Levasseur et al. 2013a, 2014; Appendix 1). The intervention targets many abilities, including vision, judgment, reaction time, concentration, strength, and flexibility. OSCAR also includes questions and tips about one's driving record and habits, medication, and alcohol consumption. Currently available only for research purposes, the intervention also encompasses various suggested resources including compensatory strategies, courses, and assessment resources. As mentioned, OSCAR was developed following a rigorous and iterative process of evaluative research, and a first validation step confirmed its relevance and usefulness to foster awareness and enable older drivers to identify changes in themselves and learn about compensatory strategies and resources they can use (Levasseur et al. 2013a, 2013b).

Variables and Questionnaires

Sociodemographic and Clinical Variables and Driving Habits

Variables, including age, gender, marital status, living arrangement, schooling, income, and occupation, were collected. Clinical variables such as health and functioning as well as driving habits were also recorded as reported by the participants.

Outcome Variables

Three questionnaires were developed by the research team to verify the impact of OSCAR on (1) interest, openness, and knowledge about abilities and compensatory strategies required for safe driving, (2) COA, and (3) UCS. The first questionnaire (IOK) was completed at T_0 and T_1, and the last 2 (COA and USC) were completed at T_1 only. The 3 questionnaires were developed by our research team following a systematic review of the scientific literature, an expert consultation, and consideration of existing theoretical models. The questionnaires have been shown to present good face and content validity, as well as moderate to high internal consistency (Cronbach's alphas: .61 to .92). The IOK questionnaire about abilities and compensatory strategies required for safe driving contains 27 questions, the majority of which are answered by selecting the right answer from one of 3 to 5 options. The IOK includes 3 parts with varying numbers of questions and score ranges for each dimension: (1) Interest in information about driving and openness to discussion about one's own abilities to drive and utilization of compensatory strategies (5 questions; for example: "Have you discussed your health concerns that may affect your driving with a relative, your doctor or another health professional?"; range: 0–19); (2) knowledge about road safety information and abilities required for safe driving (9 questions; for example: "What is the impact of aging on peripheral vision?"; range: 0–9); and (3) knowledge about impact of aging on abilities and compensatory strategies (13 questions; for example: "How is it possible to compensate for diminished strength and flexibility?"; range: 0–13). Total score ranges from 0 to 41, with a higher score indicating greater interest, openness, and knowledge about driving. However, for comparison purposes, dimensions and total scores were reported in percentages. The second questionnaire was used to record older drivers' awareness of COA. The COA contains questions answered on a 3-point Likert scale indicating whether changes occurred or not in 11 abilities and whether they were confirmed (the older driver had noticed changes and the intervention confirmed it) or observed (the older driver had not noticed any changes but after the intervention was able to observe them) because of OSCAR. For example: "Did OSCAR allow you to observe or confirm changes that had occurred in your ability to brake quickly when something unexpected happens?" Finally, the UCS questionnaire includes questions about the 20 compensatory strategies reported in OSCAR using a 4-point Likert scale (were newly used because of OSCAR, were used before, intended to use, or did not intend to use). For example: "Following OSCAR, did you begin to avoid situations which required turning left?" The second (COA) and third (UCS) questionnaires reported changes observed by the older drivers after exposure to OSCAR, and their scores are reported as frequencies and percentages overall and for each of the 11 abilities or 20 strategies individually.

Table 1. Participant characteristics ($n = 48$)

Continuous variables	Mean ± SE
Age	74.7 ± 7.4
Age–driver's license	24.4 ± 11.2
Categorical variables	*n* (%)
Socioeconomic variables	
Gender (women)	24 (50.0)
Marital status	
Single	2 (4.2)
Widowed	9 (18.8)
Married/common law	30 (62.5)
Divorced	7 (14.6)
Living arrangement	
With spouse	30 (62.5)
With children	3 (6.3)
Alone	15 (31.3)
Schooling (years)	
≤11	17 (35.4)
12–14	11 (22.9)
≥14	20 (41.7)
Income (Canadian $)	
≤25,000	9 (18.8)
25,001–40,000	19 (39.6)
>40,000	20 (41.7)
Occupation	
Full-time employment	0
Part-time employment	5 (10.5)
Retired	43 (89.5)
Health and functioning	
Health—presently	
Poor	1 (2.1)
Quite good	27 (56.3)
Very good	20 (41.7)
Health—comparison 5 years ago	
Worse	13 (27.1)
The same	31 (64.6)
Better	4 (8.3)
Health—comparison same age	
Worse	1 (2.1)
The same	21 (43.8)
Better	26 (54.2)
Activities of daily living—without help	
Phone use	47 (97.9)
Groceries, other shopping	46 (95.8)
Meal preparation	44 (91.7)
Housework	38 (79.2)
Medication use	45 (93.8)
Budgeting	46 (95.8)
Driving habits	
Driving exposure (km per week)	
1–50	13 (27.1)
51–100	11 (22.9)
101–150	8 (16.7)
151–200	8 (16.7)
>200	8 (16.7)
Driving frequency (days per week)	
1–2	4 (8.3)
3–6	17 (35.4)
7	27 (56.3)

Table 2. Results on the IOK questionnaire (T_0 and T_1; $n = 48$)

IOK dimensions (number of questions; score)		Descriptive statistics % (SD)	Min	Max	Comparison of means *P* value
Interest in information about automobile driving and openness to discussion about own abilities to drive and utilization of compensatory strategies (5; 19)	T_0	47.6 (20.5)	10.5	89.5	<.01*
	T_1	55.0 (18.8)	15.8	94.7	
Knowledge about road safety information and abilities required for safe driving (9; 9)	T_0	84.0 (10.5)	55.6	100	<.01*
	T_1	87.4 (10.4)	55.6	100	
Knowledge about impact of aging on abilities required and compensatory strategies (13; 13)	T_0	78.4 (17.0)	30.8	100	.74
	T_1	79.0 (19.6)	30.8	100	
Total	T_0	65.3 (12.2)	39.0	90.2	<.01*
	T_1	69.8 (12.0)	43.9	92.7	

*Statistically significant

Statistical Analysis

The participants' characteristics were described with means and standard deviations or frequencies and percentages according to the type of variable (continuous or categorical, respectively). Paired *t* tests compared the pre- and post-IOK scores (individual dimensions and total). Frequencies and percentages were used to report results on the COA and UCS questionnaires. Although 2 participants reported that they had already received a similar intervention, *Drivers 55 Plus* (American Automobile Association 1994), since they were compared to themselves, they were retained in subsequent analyses. A sample size of 48 people allowed detection of a standardized difference smaller than 0.42 between 2 means based on a significance level of 5% and power of 80% (Machin et al. 2009). All analyses were conducted using SPSS Statistics, version 18.0 (SPSS, Chicago, IL).

Results

All 48 participants completed the study. Participants were aged between 67 and 84 years, the majority had more than 11 years of schooling, and their income was over 25,000 Canadian dollars (Table 1). Most of them were retired, lived with their spouses, rated their health as good, and did their daily activities without help. The majority drove every day and the number of kilometers covered varied widely (Table 1). The participants had lower scores on interest and openness to discussion about driving than on knowledge about road safety information and abilities required for safe driving (Table 2). Overall, the results of the pre–post analyses demonstrated a small but statistically significant increase on the overall IOC scores and for the dimensions "interest and openness" and "knowledge about road safety information and abilities required for safe driving" ($P < .01$). No statistically significant difference was observed for the dimension "knowledge about impact of aging on abilities and compensatory strategies."

The majority (85.4%) of the participants reported, because of OSCAR, observing changes that had occurred with age

Table 3. Overall results for COA (T_1; $n = 48$)

Number of abilities	Types of change: Yes, I observed it because of OSCAR *n* (%)	Yes, I already knew it and OSCAR confirmed it for me *n* (%)	No, no change in this ability *n* (%)
0	7 (14.6)	22 (45.8)	11 (22.9)
1–4	16 (33.3)	20 (41.7)	17 (35.4)
5–8	12 (25.0)	6 (12.5)	9 (18.8)
9–11	13 (27.1)	0	11 (22.9)

in at least one of their abilities, and more than a quarter observed it in more than 8 abilities (Table 3). In addition, for more than half the participants (54.2%), OSCAR allowed them to confirm at least one change in their abilities. Less than a quarter (22.9%) of the participants reported no change in 9 or more abilities (Table 3). More specifically, "staying alert when tired" was the ability where most (27.1%) participants observed change (Table 4). For the majority of the participants, OSCAR confirmed changes in the following 6 abilities: "stay alert on the road when you are preoccupied," "clearly see what happens on both sides of you," "brake quickly when something unexpected happens," "clearly see far ahead," "react quickly," and "maintain a steady speed without feeling tired." Lastly, "stay alert on the road when you feel pain" was the only ability where the majority of the participants did not notice any change (Table 4).

Following the intervention, half of the participants reported using 6 or more compensatory strategies or intended to use between one and 10 strategies (Table 5). Moreover, a majority (52.1%) reported that they already used more than 10 strategies. Most (87.5%) older drivers reported at least one strategy that they did not intend to use (Table 5). More specifically, the 5 strategies mainly used by most participants following OSCAR were "leave more distance between your vehicle and the one in front" (45.8%), "avoid peak hours" (43.8%), "be more aware of what is happening all around you" (43.8%), "be more vigilant at intersections" (47.1%), and "listen to comments from your friends and family about your driving" (47.1%; Table 6). The strategies mainly used by most participants before OSCAR were "plan to buy a car with automatic transmission" (70.8%), "plan your route in advance" (66.7%), and "watch for traffic, traffic signs, traffic lights, cyclists, and pedestrians when approaching intersections" (66.7%; Table 6). "Drive at the speed limit" (68.8%), "follow an exercise program to improve your strength and flexibility" (16.7%), and "install special mirrors on your vehicle" (16.7%) were the strategies that most participants intended to use, but less than one out of 8 (12.5%) planned to use the other strategies. Finally, "install special mirrors on your vehicle" (68.8%), "avoid busy highways" (41.7%), and "choose routes that require few lane changes" (37.5%) were the 3 strategies that most participants reported not having any intention to use (Table 6).

Discussion

This study examined the impact of OSCAR, an awareness tool for safe and responsible driving, on older adults' (1) interest, openness, and knowledge about the abilities and compensatory strategies required for safe driving; (2) awareness of changes that had occurred in their own driving abilities; and (3) utilization of compensatory strategies. Consistent with the main hypothesis, following exposure to OSCAR the participants showed increased interest, openness, and knowledge about the abilities and compensatory strategies required for safe driving. Moreover, the majority of participants reported greater awareness of changes that had occurred in at least one of their abilities required for safe driving and utilization of 6 or more compensatory strategies. These results are consistent with previous studies that demonstrated the benefits of educational driving interventions. For example, in the study by Owsley and colleagues (2003), drivers in the educational intervention group reported significantly fewer days driving and fewer trips made per week compared to those not receiving the intervention. Another study found that specific driving situations avoided by older adults were those in which they had less confidence and which were easiest to avoid, such as parallel parking and driving at night in the rain (Baldock et al. 2006). That study also found that the least avoided situation was driving alone, but this strategy was not suggested in the present study. Based on our results, utilization of strategies seems to be more complex and might be associated with older

Table 4. Results for COA for each ability (T_1; $n = 48$)

Did OSCAR allow you to observe or confirm changes that have occurred in your ability to drive safely; that is, to . . .	Types of change: Yes, I observed it because of OSCAR *n* (%)	Yes, I already knew it and OSCAR confirmed it for me *n* (%)	No, I did not notice any change in this ability *n* (%)
Clearly see far ahead	3(6.3)	24 (50.0)	21 (43.8)
Clearly see what happens on both sides of you	2(4.2)	27 (56.3)	19 (39.6)
Judge the speed and distance from other vehicles	9(18.8)	21 (43.8)	18 (37.5)
React quickly	6(12.5)	24 (50.0)	18 (37.5)
Process information from different sources	7(14.6)	20 (41.7)	21 (43.8)
Stay alert on the road when you are preoccupied	6(12.5)	27 (56.3)	15 (31.3)
Stay alert on the road when you are tired	13(27.1)	22 (45.8)	13 (27.1)
Stay alert on the road when you feel pain	10(20.8)	12 (25.0)	26 (54.2)
Look over your shoulder	8(16.7)	22 (45.8)	18 (37.5)
Brake quickly when something unexpected happens	3(6.3)	25 (52.1)	20 (41.7)
Maintain a steady speed without feeling tired	5(10.4)	24 (50.0)	19 (39.6)

Table 5. Overall results for UCS (T_1; $n = 48$)

	Types of change			
Number of strategies	Yes *n* (%)	No, I already used it before *n* (%)	No, but I intend to use it *n* (%)	No, and I do not intend to use it *n* (%)
0	11 (22.9)	1 (2.1)	24 (50.0)	6 (12.5)
1–5	13 (27.1)	10 (20.8)	23 (47.9)	33 (68.7)
6–10	14 (29.2)	12 (25.0)	1 (2.1)	9 (18.8)
11–15	10 (20.8)	16 (33.3)	0	0
16–20	0	9 (18.8)	0	0

adults' perceptions of the usefulness of the strategies. For example, "install special mirrors on your vehicle" was a strategy that most participants reported not having any intention to use, probably not because of its complexity, but because they may not see the need for it.

Although the OSCAR awareness tool increased older drivers' knowledge about the necessary abilities as well as compensatory strategies for safe and responsible driving, changes were modest. Older adults were healthy drivers not yet experiencing problems and exposure to OSCAR was minimal (i.e., the older drivers were invited to read it but were not allowed to keep it). However, such results might suggest that to increase older adults' interest, openness, and knowledge about abilities and compensatory strategies required for safe driving, an intervention needs to be repeated and personalized for them. Indeed, one study demonstrated that an intensive, in-class interactive 4-session program was more effective than a self-guided program involving one required in-class and one optional session (Jones et al. 2012).

In addition, to improve the impact of awareness interventions, older drivers might need to be accompanied by a health professional, a driving instructor, or a relative. Previous studies showed that some older drivers might lack insight into the effects of aging and health problems on their driving abilities. One recent study conducted with 307 older drivers aged 65 to 96 found no association between objective performance and self-rated confidence (Horswill et al. 2011). Another study demonstrated that poorer performance on a driving test was not related to overall avoidance of difficult driving situations (Jones et al. 2012). Moreover, some older adults need help to adopt new behaviors such as changing driving habits or using compensatory strategies. In fact, one recent study showed that self-regulation is a complex process that cannot be defined simply by the driving modifications reportedly made by drivers (Molnar et al. 2013). The motivations for these behaviors varied and differed considerably across driving situations and were closely related to lifestyle or preferences. Another study found that older drivers with declining cognitive abilities might not self-regulate their driving and appeared unlikely to self-refer to driving programs (Wong et al. 2012). Nevertheless, one study demonstrated that drivers' perceptions are associated with actual self-regulatory practices (Blanchard and Myers 2010).

The complexity of utilization of compensatory strategies can be highlighted by Prochaska's transtheoretical model (Prochaska and Velicer 1997). To change behavior, an individual first needs to recognize that her or his driving abilities have diminished, understand the importance of this reduction, and identify possible changes. Then she or he needs to have a concrete plan to change her or his habits. Lastly, the changes must be maintained while avoiding a return to old habits (relapses). These steps usually take place over several weeks, or even months, and most of the time require coaching from a relative or an advocate. Support and increased access to resources are thus necessary to increase the efficiency of any awareness intervention. To our knowledge, 5 interventions, "Health in the Driver's Seat" (Société de l'Assurance Automobile du Québec 2013), "How to Help an Older Driver" (American Automobile Association 2000), *Elderly Drivers: Is Your Loved One Driving Safely?* (Senior Solutions of America 2007), "We Need to Talk—Family Conversations With Older Drivers" (The Hartford Financial Services Group 2010), and "Older Drivers in Canada and Their Families" (Canadian Association of Occupational Therapists 2009), were developed or include a section for family members. Moreover, the OSCAR is currently being adapted for caregivers.

The help of a driving instructor or health professional might also be needed. According to a study by McNamara et al. (2013), older people are more likely to relinquish their driver's license due to advanced age and low confidence in driving ability and in situations where their local doctor advises them to stop driving. Suggestions from other individuals to limit or stop driving may be more influential than self-assessment of driving abilities (Ross et al. 2012). For example, one study showed that drivers who had received an educational intervention were more likely to acknowledge that their eyesight was less than excellent and report a higher frequency of avoiding challenging driving situations and using more self-regulatory practices (Owsley et al. 2003) but had similar crash rates as the usual care group (Owsley et al. 2004). Other findings indicated a need for improved dissemination of evidence-based health information and education for older drivers and their doctors. For example, one recent study indicated that the majority of older drivers reported not receiving advice about the potential impact of their medical condition and driving from their doctor (Sargent-Cox et al. 2011). However, 4 recent interventions have been developed to assist health professionals with older drivers' challenges: *Physician's Guide to Assessing and Counseling Older Drivers* (Wang et al. 2009), *Promising Approaches for Enhancing Elderly Mobility* (Molnar et al. 2003), *Driving Transitions Education. Tools, Scripts, and Practice Exercises* (American Society on Aging and NHTSA 2009), and "Older Drivers in Canada: Health Professionals" (Canadian Association of Occupational Therapists 2009). As for interventions developed for family members, such interventions can enrich and complete OSCAR.

Lastly, another explanation for the limited amount of change over time is the relatively high initial score. Although this points up older adults' interest, openness, and knowledge about abilities and compensatory strategies required for safe driving, it might also limit improvement possibilities. Moreover, *t* tests might hide important differences in mean scores (i.e., changes involving both decreased and increased scores). Nevertheless, the present results are encouraging regarding the potential of such an older drivers' awareness intervention.

Table 6. Results for UCS for each strategy (T_1; $n = 48$)

Since reading the tool (OSCAR) at the first meeting, did you begin to...	Yes	Types of change: No, I already used it before	Types of change: No, but I intend to use it	Types of change: No, and I do not intend to use it
	n (%)	n (%)	n (%)	n (%)
Avoid driving in the dark	5 (10.4)	25 (52.1)	4 (8.3)	14 (29.2)
Be more vigilant at intersections	20 (41.7)	26 (54.2)	2 (4.2)	0
Look to the right of the road rather than at the headlights of oncoming cars	14 (29.2)	26 (54.2)	4 (8.3)	4 (8.3)
Avoid situations which require turning left	12 (25.0)	16 (33.3)	5 (10.4)	15 (31.3)
Avoid busy highways	12 (25.0)	13 (27.1)	3 (6.3)	20 (41.7)
Avoid peak hours	21 (43.8)	16 (33.3)	1 (2.1)	10 (20.8)
Leave more distance between your vehicle and the one in front	22 (45.8)	25 (52.1)	1 (2.1)	0
Be more aware of what is happening all around you (by looking ahead, behind in the rearview mirror, and on both sides of you)	21 (43.8)	27 (56.3)	0	0
Do physical exercise	15 (31.3)	28 (58.3)	4 (8.3)	1 (2.1)
Watch for traffic, traffic signs, traffic lights, cyclists and pedestrians when approaching intersections	15 (31.3)	32 (66.7)	0	1 (2.1)
Plan your route in advance	14 (29.2)	32 (66.7)	2 (4.2)	0
Plan to buy a car with automatic transmission	7 (14.6)	34 (70.8)	0	7 (14.6)
Avoid driving under conditions that may interfere with your ability to concentrate (e.g., emotional preoccupations, fatigue, medication, pain)	15 (31.3)	26 (54.2)	6 (12.5)	1 (2.1)
Reduce distractions while driving (e.g., turn off the radio, limit conversations, avoid handling electronic devices)	15 (31.3)	30 (62.5)	3 (6.3)	0
Install special mirrors on your vehicle	1 (2.1)	6 (12.5)	8 (16.7)	33 (68.8)
Choose routes that require few lane changes	9 (18.8)	18 (37.5)	3 (6.3)	18 (37.5)
Follow an exercise program to improve your strength and flexibility	9 (18.8)	22 (45.8)	8 (16.7)	9 (18.8)
Drive at the speed limit	14 (29.2)	3 (6.3)	33 (68.8)	1 (2.1)
Wonder about the reasons for other drivers' negative reactions towards you (e.g., honking at you, flashing their headlights or driving aggressively around you)	19 (39.6)	24 (50.0)	1 (2.1)	4 (8.3)
Listen to comments from your friends and family about your driving	20 (41.7)	25 (52.1)	2 (4.2)	1 (2.1)

Study Limitations and Strengths

This exploratory study was a first step carried out with a convenience sample of older drivers, which may positively influence their interest, openness, and knowledge about abilities and compensatory strategies required for safe driving. The strengths of the study are the rigorous preexperimental design and the self-administered intervention and questionnaires involving limited exposure to reproduce minimal intervention and recall conditions for the testing of OSCAR. In subsequent studies, the impact of OSCAR needs to be examined with a representative sample and experimental control group and on objective measured driving tasks, not only on self-reported measures. For example, impacts could be measured using the Situational Driving Frequency and Avoidance scales, which quantify usual self-regulatory practices, and perceptions could be measured using the Driving Comfort and Perceived Driving Abilities scales (Blanchard and Myers 2010; Meng and Siren 2012) or data derived from a geographic information system and collision data. Cross-cultural and cohort studies are also needed. If widely implemented in the community, the impact of OSCAR on the prevention of crashes and injuries on the roads needs to be demonstrated. In addition, as mentioned by Siren and Meng (2012) and Lyman and colleagues (2001), the involvement of health professionals in driving safety efforts may be an untapped resource, where communication needs to be improved. Because women are more likely to self-regulate by not driving (Hakamies-Blomqvist and Wahlstrom 1998; Kostyniuk and Mulnar 2008; Tuokko et al. 2007), future studies need to have large sample sizes to allow for gender analyses. Finally, it is important to better understand how driving practices change over time and what factors influence decisions to restrict or stop driving.

In summary, this study demonstrated that OSCAR, an awareness tool for safe and responsible driving, may have resulted in a small increase in older drivers' interest, openness, and knowledge about abilities and compensatory strategies required for safe driving. In addition, OSCAR improved awareness of changes that may negatively impact safe driving and enhanced participants' utilization of compensatory strategies. This intervention could ultimately promote safe driving and the prevention of crashes and injuries, while allowing older adults to maintain or increase their mobility in the community. More studies are needed to further evaluate OSCAR and identify ways to improve its effectiveness.

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Supplemental Materials

Supplemental data for this article can be accessed on the publisher's website.

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