Do Older Drivers At-Risk for Crashes Modify Their Driving Over Time?

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Five-year driving habit trajectories among older adults (n = 645) at-risk for crashes were examined. Performance measures included Useful Field of View (UFOV). Motor-Free Visual Perception Test, Rapid Walk, and Foot Tap. Self-report measures included demographics and the Driving Habits Questionnaire. Longitudinal random-effects models revealed that drivers at-risk for subsequent crashes, based upon UFOV, regulated their driving more than the lower-risk participants. Restricted driving was present at baseline for the at-risk group and was observed in longitudinal trajectories that controlled for baseline differences. Results indicate that persons at-risk for subsequent crashes increasingly limit their driving over time. Despite this self-regulation, a larger sample of such older drivers was twice as likely to incur subsequent at-fault crashes. Results suggest that self-regulation among older drivers at-risk for crashes is an insufficient compensatory approach to eliminating increased crash risk. UFOV is a registered trademark of Visual Awareness, Inc.

Key Words: Crash risk—Older drivers—Self-regulation—UFOV.

ALTHOUGH some modifications in daily living may be necessary during the aging process, one change with an array of negative consequences is mobility loss. Driving is a form of mobility that is increasingly relied upon by older adults as a main source of transportation (Barr, 2002; Jette & Branch, 1992). A number of negative consequences may arise from reductions in driving mobility and driving cessation. Persons who limit their driving distances, or who have stopped driving altogether, are at an increased risk for depressive symptoms (Fonda, Wallace, & Herzog, 2001), entering a long-term care facility (Freeman, Gange, Muñoz, & West, 2006), and decreased out-of-home activities (Marottoli et al., 2000).

Given such negative consequences, several predictors of reductions in driving mobility and driving cessation have been identified. Demographic factors indicative of reduced driving or driving cessation are female sex (Campbell, Bush, & Hale, 1993) and increased age (Campbell et al., 1993; Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001; Marottoli et al., 1993). Psychomotor abilities, which are susceptible to age-related decline, have also been an area of interest in driving mobility research (Anstey, Windsor, Luszcz, & Andrews, 2006; Marottoli et al., 1993; Stelmach & Nahom, 1992). For example, older persons who failed a walking assessment were more likely to restrict their driving (West et al., 2003), and less physical activity (e.g., walking one-half mile, climbing stairs, heavy housework) was predictive of

driving cessation (Marottoli et al., 1993). Impairments in cognitive domains such as attention, visuoperceptual abilities, processing speed, memory, and reasoning are also associated with reduced driving mobility (Ackerman, Edwards, Ross, Ball, & Lunsman, in press; Anstey et al., 2006; Ball et al., 1998; Edwards et al., 2008). Older drivers with poorer cognitive functioning avoid more situations (Ball et al., 1998; Okonkwo, Crowe, Wadley, & Ball, 2007) and are more likely to reduce or cease driving (Ackerman et al., in press; Anstey et al., 2006; Ball et al., 1998; Edwards et al., 2008; Freund & Szinovacz, 2002). In particular, the Useful Field of View (UFOV) test emerged as an independent predictor of driving mobility even after considering age, vision, physical performance, health as well as other cognitive measures such as visuospatial abilities and memory (Ackerman et al., in press; Edwards et al., 2008).

Generally, except in situations where there is an acute onset of disease or disability, older adults exhibit a gradual decrease in driving mobility via reduced exposure and increased avoidance of challenging situations prior to driving cessation (Dellinger et al., 2001; Hakamies-Blomqvist & Wahlström, 1998), indicating self-regulation of driving behaviors. Applying Bäckman and Dixon's (1992) theoretical framework of psychological compensation, older adults may self-regulate or change their driving behaviors due to an awareness of the mismatch between their current reduced skills and the environment. As such, they modify their driving behaviors by avoiding certain

situations which require a higher level of skill. However, it should be noted that reductions in driving are not always found in cases of persons with severe cognitive impairment, indicating a lack of awareness or comprehension of reduced driving skill (Freund & Szinovacz, 2002; Okonkwo et al., 2007).

Although many older adults gradually modify their driving, concerns arise about decreased driving competence or increased crash risk among some older adults with reduced functional abilities. Researchers now understand that increased crash risk is not an issue of age per se but rather an issue for a small group of older adults with functional and cognitive difficulties, many of whom may already self-regulate their driving (Anstey, Wood, Lord, & Walker, 2005; Ball & Owsley, 2003; Ball et al., 2006; Hakamies-Blomqvist & Wahlström, 1998; Langford, Methorst, & Hakamies-Blomqvist, 2006). Many of the factors predictive of reduced mobility are also predictive of crash risk, such as increased age (Ball et al., 2006), psychomotor difficulties (Anstey et al., 2005; Margolis et al., 2002; Marottoli et al., 1998), and cognitive difficulties (Anstey et al., 2005; Ball et al., 2006). Psychomotor and cognitive abilities are paramount to safe driving according to Fuller's (2005) model of driving behavior. One of the strongest and most reliable predictors of crashes is processing speed, specifically the UFOV test, which has repeatedly been shown to predict both reductions in driving mobility (Ackerman et al., in press; Ball et al., 1998; Edwards et al., 2008) and crashes (Ball et al., 2006; Clay et al., 2005; Owsley et al., 1998).

Although many older adults modify their driving, it is not clear if such modifications are effective for reducing crashes in older adults with functional impairments who are at an increased risk for unsafe driving. There is ample evidence that older drivers tend to overrate their own driving ability (Freund, Colgrove, Burke, & McLeod, 2005; Goszczynska & Roslan, 1989; Marottoli & Richardson, 1998). Freund and colleagues (2005) found that persons who were more than four times more likely to be unsafe drivers rated themselves as better than other drivers their own age.

The aim of the current analyses was to investigate driving mobility trajectories as a function of crash risk while simultaneously considering other factors predictive of driving mobility. As Man-Son-Hing, Marshall, Molnar, and Wilson (2007) noted, the relationship between self-regulation and prospective crash risk is unclear. Crash risk will be assessed with the UFOV test. Poor performance on the UFOV test has repeatedly predicted both reductions in mobility (Ackerman et al., in press; Edwards et al., 2008) and poor driving behavior via state-recorded accidents, on-road driving, and driving simulator performance (Ball et al., 2006; Clay et al., 2005; Owsley et al., 1998). Previous analyses (Ball et al., 2006) found that persons within the present data set who scored in the 80th percentile or worse (UFOV Subtest 2 ≥353 ms) were 2.02 (95% confidence interval 1.28–3.19) times more likely to experience a subsequent at-fault vehicle crash over five years. Based on these

earlier analyses, and the previous research demonstrating that UFOV predicts crashes (Ball, Owsley, Sloane, Roenker, & Bruni, 1993; Ball et al., 2006; Clay et al., 2005; Owsley et al., 1998), the current study defined persons with a baseline UFOV score of 353 ms or slower on Subtest 2 as at-risk for crashes. Prior research has consistently demonstrated that poor UFOV performance is associated with driving restrictions. At the same time, poor UFOV performance has been associated with increased crash risk. Based upon this evidence as well as Bäckman and Dixon's theory, we hypothesized that individuals at-risk for crashes based on UFOV performance would limit their driving over time.

Methods

Participants and Procedure

The Maryland Motor Vehicle Administration project was a prospective cohort study designed to investigate driving crash risk, competency, and general mobility among older adults. The data in these analyses were collected between 1998 and 2004. After renewing their driver's licenses, persons ($N = 4,285$) aged 55 years and older were approached at three Maryland Motor Vehicle Administration (MVA) locations to participate in assessing a new test battery designed to predict crash risk. The potential participants were informed that participation would not affect their driver's license status. Additionally, participants at a local retirement facility were administered the same test battery during on-site license renewal. Participants all had 20/70 or better visual acuity and a continuous field of vision of 110 degrees or better to meet the Maryland state driver's license requirements. The Maryland MVA battery consisted of cognitive and physical performance assessments and a mobility questionnaire.

Study enrollment continued for two years and resulted in a sample size of 2,114 persons 55 years of age and older who consented to participate. A random subsample of participants willing to take part in follow-up telephone interviews was selected ($n = 787$) with a mean education of 14.1 years (range 5–20). All participants voluntarily signed the informed consent approved by the institutional review board. The first telephone interviews occurred four months ($SD = 1.5$) after the MVA visit, on average. The demographic, cognitive, and physical performance measures collected during the MVA visit and the mobility indices collected during the first telephone interview constitute baseline measures for the current analyses. Participants were then reinterviewed annually four additional times, for a total of five telephone interviews, which are referred to as Annuals 1 through 4.

Materials

Driving Habits Questionnaire.—Driving habits were assessed using a modified and shortened version of the Driving Habits Questionnaire (DHQ) at baseline and throughout

the four annual follow-up assessments (Owsley, Stalvey, Wells, & Sloane, 1999). *Driving frequency* was measured as the number of days participants reported driving in an average week (0–7), with more days per week driven indicating greater driving frequency. *Driving avoidance* was measured via avoidance during the previous three months of driving on high traffic roads, driving in unfamiliar areas, driving alone, driving on highways or expressways, making left-hand turns across oncoming traffic, driving in bad weather, driving at night, driving during rush-hour traffic, making lane changes, and passing up opportunities to go shopping, visit friends, etc., due to driving concerns. Participants responded with respect to whether or not they avoided a particular driving situation with "always" (5), "usually" (4), "sometimes" (3), "rarely" (2), or "never" (1). Items were summed with a resulting composite ranging from 10 to 50, with higher scores indicating more avoidance. *Driving space* was assessed with five questions, which asked whether participants drove to places beyond their neighborhood, more than 10 miles from their home, more than 25 miles from their home, outside their state (Maryland), or outside the mid-Atlantic region during the last year. These items were summed to form a composite that ranged from 0 to 5, with higher scores corresponding to larger driving space.

Demographic measures.—Demographic information on age and sex were used as covariates.

Psychomotor.—Lower limb strength and flexibility were measured with the Rapid Walk and Foot Tap tests at baseline. Rapid Walk required the participants to walk along a pre-marked 10-foot path on the floor and then return to the starting point. The amount of time in seconds taken to complete this assessment was recorded. Foot Tap required the participants to alternate touching the right and left side of a 9 × 12-inch notebook with their right foot five times as quickly as possible, and time taken (s) was recorded. Both tasks required speeded manipulation of the same lower extremities that are needed to operate a standard vehicle and have very similar distributions and ranges (Rapid Walk: $M = 6.60$, $SD = 2.06$, range = 3.19–19.41; Foot Tap: $M = 6.25$, $SD = 2.19$, range = 3.12–18.00). In accordance with other work (Vance et al., 2006), missing values for Rapid Walk were replaced with existing values for Foot Tap. This procedure reduced missing data for this measure by 18 participants, yet did not significantly change any descriptive or range data for the Rapid Walk variable ($M = 6.5$, $SD = 2.02$, range = 3.19–19.41).

Visuospatial ability.—Visuospatial ability was measured at baseline using the Visual Closure subtest of the Motor-Free Visual Perception Test (MVPT). This subtest presented participants with a target figure and four options that have missing elements. Participants were then asked to select the option that when completed would match the target figure. The number of errors out of 11 trials was recorded.

Processing speed.—The UFOV test assesses cognitive processing speed and has been shown to be a valid and reliable predictor of mobility outcomes and vehicle crashes in older adults (Ball et al., 1998, 2006; Clay et al., 2005; Okonkwo et al., 2007; Owsley et al., 1998). Due to time and economic costs, only Subtest 2, which measures speed of processing for a divided attention task, was included in the baseline Maryland study battery. Prior analyses found that poor performance on this subtest is indicative of increased crash risk (*OR*s 2.02–2.10) (Ball et al., 2006; Clay et al., 2005; Owsley et al., 1998). The UFOV test is administered via a personal computer with a standard touch-screen monitor. Participants are instructed to sit approximately 60 cm from the monitor, and for Subtest 2, are simultaneously presented with peripheral (car) and central (car or truck) targets (2 cm by 1.5 cm) at varying, brief display durations (16.67–500 ms). A full-field, white noise, visual mask is then presented followed by the response screen. Participants are asked to identify the central target and to localize the peripheral target from the previous stimuli screen. The display duration at which the participant can perform this subtest accurately 75% of the time is measured, with smaller durations indicating faster processing speed. Physical reaction time is not assessed or measured during the UFOV test. The current analyses used an *a priori* UFOV score of greater than or equal to 353 ms as a grouping variable for slower processing speed, as this score was previously found to be predictive of subsequent at-fault vehicular crashes over five years in a larger sample of persons from this study (Ball et al., 2006). Those with a score of less than 353 ms were classified as lower-risk.

Analyses

Linear random-effects regression models were estimated using Proc Mixed in SAS software v9.1.3 (2006). Separate models were used to describe the longitudinal trajectories of driving frequency (days per week driven), driving space, and driving avoidance. In each model, random effects for the intercept and for the mean-centered time of each assessment since baseline were included. Despite the efforts of the investigators, the intervals between the annual assessments varied for participants; thus, the random effect of time was estimated. UFOV Subtest 2 risk category was included as the primary predictor of interest along with the mean-centered values of the dependent measures at baseline and time. In order to assess the relationship between crash risk and driving mobility, other factors previously found to predict both crash risk and driving mobility were included within each model. As such, age, sex, Rapid Walk, and MVPT were included to determine the covariate-adjusted effects of each predictor on the outcome of interest. Centering was necessary to adequately assess the UFOV Risk Category × Time and Baseline × Time interaction effects which were also included in the models (Singer & Willett, 2003). The linear trajectories for at-risk versus individuals who were not
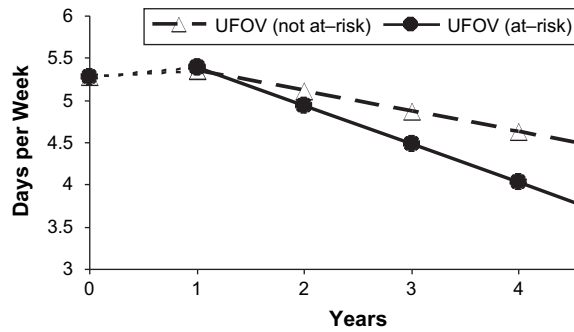
Figure 1. Model-predicted, covariate-adjusted linear trajectories for driving frequency over 5 years, range 0–7.
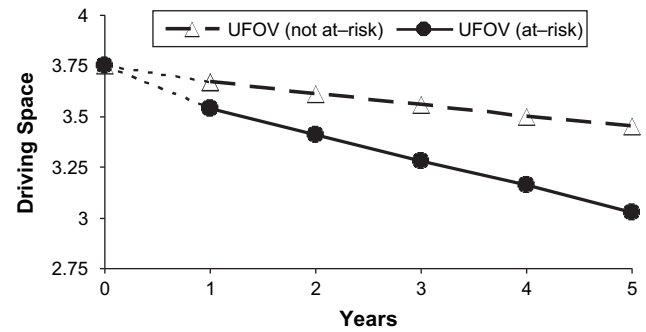

Figure 2. Model-predicted, covariate-adjusted linear trajectories for driving space over 5 years, range 0 (not driving outside of an individual's neighborhood in the past year) to 5 (driving outside of the mid-Atlantic region in the past year).

categorized as at-risk based upon UFOV performance were visually displayed using model-predicted, covariate-adjusted scores over a five-year period (see Figures 1–3).

RESULTS

Participants

Of the 787 interview participants, 645 (82.0%) provided complete data for the measures of interest at baseline and one or more of the four yearly follow-up phone interviews and were the focus of this investigation. The 142 (18.0%) individuals who were not included in the analysis were older, had more errors on the MVPT test, and were more likely to be male, p values < .05. Group differences on Rapid Walk, driving exposure, driving space, and driving avoidance did not reach statistical significance. In order to be consistent with previous work on prospective crash risk in this sample (Ball et al., 2006), and because over 60% of the participants provided Annual 4 data that were actually more than four years since baseline, trajectories were estimated five years following the baseline assessment. Baseline statistics for study variables are reported in Table 1. At baseline, individuals categorized as being at-risk based upon their UFOV Subtest 2 performance were significantly older, had slower Rapid Walk times, had more errors on the MVPT, drove fewer days per week (less driving frequency), had smaller driving space, and reported more driving avoidance than older adults who were lower-risk. Additional descriptive statistics revealed that 5.9% of participants in the at-risk group experienced an at-fault, prospective crash compared with 3.5% in the group that was not characterized as at-risk based upon their UFOV performance. These percentages are consistent with the findings of Ball et al. (2006) based on 1,910 older adults where individuals found to be at-risk were twice as likely to be involved in an at-fault crash. Further, the predictors were standardized to have a mean of 0 and an SD of 1 to compute additional standardized estimates (see Tables 2–4).

Driving Frequency

Driving fewer days at baseline, increased age and female sex were each individually predictive of less driving

frequency over time. There was also a trend for a longer time to complete the Rapid Walk assessment predicting a lower driving frequency (Table 2). Driving frequency decreased across time for both at-risk and lower-risk groups. The Group × Time interaction revealed that over time, the driving frequency for the at-risk group decreased at a faster rate than for the lower-risk group (see Figure 1).

Driving Space

The results of the random-effects regression model with driving space as the outcome are displayed in Table 3. A restricted driving space at baseline, increased age, female sex, more errors on the MVPT and being at-risk for crashes as categorized by UFOV Subtest 2 were all predictive of a smaller driving space, p values < .01. Driving space also significantly decreased across time for both groups (see Figure 2).

Driving Avoidance

High levels of driving avoidance at baseline and increased age, were each individually predictive of more driving avoidance longitudinally (Table 4). Additionally, there was an overall increase in driving avoidance over time. The Group × Time interaction revealed that driving avoidance in the at-risk group increased over time at a faster rate compared with their lower-risk counterparts (see Figure 3).
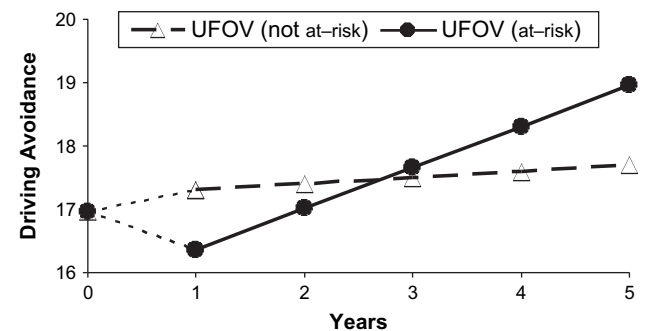

Figure 3. Model-predicted, covariate-adjusted linear trajectories for driving avoidance over 5 years, range 10–50.

Table 1. Baseline Statistics for Demographics and Study Variables

	UFOV (Lower-risk) (n = 577)	UFOV (At-risk) (n = 68)	p	Range
Age, M (SD)	70.5 (7.7)	74.9 (7.5)	<.001	55–92
Female sex, n (%)	314 (54.4)	34 (50.0)	.489	
Rapid walk time, M (SD)	6.5 (2.0)	7.0 (2.4)	.035	3.19–19.41
MVPT, M (SD)	1.4 (1.6)	2.6 (2.2)	<.001	0–11
Driving frequency, M (SD)	5.3 (1.8)	4.7 (2.0)	.008	0–7
Driving space, M (SD)	3.8 (1.1)	3.2 (1.2)	<.001	0–5
Driving avoidance, M (SD)	16.6 (7.4)	19.7 (9.1)	.002	10–50

Note: MVPT = Motor-Free Visual Perception Test.

DISCUSSION

This study sought to investigate driving mobility and behavior while addressing crash risk in a prospective study, an area highlighted where further research is needed (Man-Son-Hing et al., 2007). In order to accomplish this task, demographic, psychomotor, and cognitive factors previously found to be related to both crashes and driving mobility were included in each model. On average, as is consistent with previous literature (Dellinger et al., 2001; Hakamies-Blomqvist & Wahlström, 1998), the older adults in this sample reduced their driving mobility and reported increased driving avoidance over the five years. However, participants within the high-risk group reduced their driving frequency and space and increased their driving avoidance over time more than their lower-risk counterparts. The change in slopes between the two groups revealed similar patterns but with greater changes for the at-risk participants across all three outcomes. These results held even after accounting for baseline driving, age, sex, Rapid Walk, and MVPT covariates. By pairing these results with our prior research (Ball et al., 2006), we may conclude that despite increasing self-regulation across time, these participants were twice as likely to incur an at-fault crash over five years. Thus, self-regulation may not be sufficient to offset crash risk in this subsample of participants.

The current results are consistent with previous research, indicating that older adults who drive smaller distances have elevated crash rates (Langford et al., 2006) and that persons with reduced processing speed perform poorly in on-road assessments (Baldock, Mathias, McLean, & Berndt, 2006; Roenker, Cissell, Ball, Wadley, & Edwards, 2003), the "gold standard" of driving evaluations. However, the current analyses go a step further by examining the predictors (demographic, physical, and cognitive) of several indices of driving behavior and mobility, while addressing a statistically significant increased risk of crash in a large sample. It is important to note that at no point in this study were suggestions made to participants as to how to reduce crash risk. Neither were participants given feedback on their baseline performance. As such, it is unlikely that participants would have used these baseline assessments in an active decision-making process concerning their driving. As Evans (2004) discusses, given the relative infrequency of crashes, knowing that one's chances of crashing are increased may not be enough to force drastic changes in driving habits. Rather it is our contention that functional changes in processing speed may lead to a decrease in driving proficiency (e.g., increase in near misses, others reacting to one's driving performance, etc.) that is detectable to the individual and that in turn may result in voluntary alterations of driving exposure and avoidance.

With regard to the significant demographic predictors of driving behavior, being female was found to be an independent predictor of reduced driving space and frequency but not of driving avoidance. This sex inconsistency has been found in other studies (Dellinger et al., 2001), and it is likely that the influence of sex upon driving mobility is due in part to societal differences (Hakamies-Blomqvist & Siren, 2003) and cohort effects. As in previous studies, increased age was predictive of reduced driving mobility across all three outcomes. Given the increased mobility declines with older age, and the age of the current sample, this finding was not surprising.

More errors on the MVPT were associated only with smaller driving space but not overall driving frequency or avoidance. Although similar cognitive measures have been used in other research for assessing driving capabilities (Bouillon, Mazer, & Gelinas, 2006; Oswanski et al., 2007), these indices did not provide substantial information concerning future driving mobility. The relationship between

Table 2. Predictors of Change in Driving Frequency Over 5 Years

Effect	Estimate	SE	Standardized Estimate	df	t	p
Intercept	6.03	0.48	—	638	12.5	<.001
Baseline driving frequency	0.70	0.03	0.70	1,108	23.1	<.001
Age	−0.02	0.01	−0.07	1,108	−2.7	.008
Sex (male vs. female)	0.19	0.09	0.05	1,108	2.0	.044
Time	−0.001	0.0002	−0.29	606	−5.2	<.001
Walk time	−0.04	0.02	−0.04	1,108	−1.7	.088
Baseline MVPT	0.01	0.03	0.01	1,108	0.2	.839
UFOV risk (lower-risk vs. at-risk)	0.30	0.18	0.16	1,108	1.7	.095
UFOV Risk × Time	0.0006	0.0003	0.14	1,108	2.3	.021
Baseline Driving Frequency × Time	−0.000008	0.00004	−0.003	1,108	-0.2	.850

Note: UFOV = Useful Field of View.

Table 3. Predictors of Change in Driving Space Over 5 Years

Effect	Estimate	SE	Standardized Estimate	df	t	p
Intercept	4.71	0.27	—	639	17.8	<.001
Baseline driving space	0.52	0.03	0.52	1005	20.2	<.001
Age	−0.02	0.004	−0.13	1005	−5.1	<.001
Sex (male vs. female)	0.21	0.05	0.09	1005	3.9	<.001
Time	−0.0004	0.0001	−0.14	585	−3.0	.003
Walk time	−0.02	0.01	−0.03	1005	−1.3	.186
Baseline MVPT	−0.05	0.02	−0.07	1005	−3.0	.003
UFOV risk (lower-risk vs. at-risk)	0.24	0.09	0.22	1005	2.7	.006
UFOV Risk × Time	0.0002	0.0001	0.08	1005	1.6	.104
Baseline Driving Space × Time	−0.00003	0.00003	−0.01	1005	−1.0	.337

Note: UFOV = Useful Field of View.

MVPT and smaller driving space may be due to persons with declining visuospatial ability being able to function in everyday, familiar environments such that there are no changes in exposure or avoidance behaviors. However, these difficulties may be challenging when traveling to less frequented, less familiar areas, resulting in a smaller driving space.

The screening measures used in the Maryland battery can be quickly and objectively administered in an MVA field office setting by a variety of staff (for more information on the DrivingHealth® Inventory, see http://www.drivinghealth.com). In addition to identifying persons at-risk for driving mobility loss, this brief assessment battery also provides valuable information on potential crash risk, ability to perform timed instrumental activities of daily living (IADLs), reduced life space, and falls (Ball et al., 1993; Owsley et al., 1998; Owsley & McGwin, 2004; Owsley, Sloane, McGwin, & Ball, 2002; Vance et al., 2006).

In addition to being an effective assessment for persons undergoing normal age-related slowing, the UFOV test in particular has been found to be sensitive to cognitive declines experienced by older adults with early Alzheimer's disease, and it is a valid assessment of crash risk for this population as well (Duchek, Hunt, Ball, Buckles, & Morris, 1998; Rizzo, Anderson, Dawson, Myers, & Ball, 2000). Relicensing policies for older drivers vary greatly among countries and even between states. Yet, although the majority of older drivers remain safe, there is a small subset of persons that pose a greater risk on the road. More longitudinal research is needed to investigate the societal and personal effects of self-regulated driving behavior, as well as the sensitivity and specificity of various multifunctional screening assessments before enacting policy changes.

Interestingly, one study with drivers aged 75 years and older concluded that it was more cost-effective to provide all drivers with a cognitive intervention, speed of processing training, than to screen all such drivers (Viamonte, Ball, & Kilgore, 2006). This training improves cognitive processing speed and transfers to everyday abilities (Edwards, Wadley, Vance, Roenker, & Ball, 2005), driving competence (Roenker et al., 2003), and the maintenance of health-related quality of life over time (Wolinsky et al., 2006). Incorporating both the theory of psychological compensation by Bäckman and Dixon (1992) and Fuller's (2005) theory of driving behavior, such training may allow older drivers to improve their skill level (given that processing speed is linked to safe driving) while modifying their behaviors to better meet the task demands of driving. Of course, in cases where driving is no longer a safe option, interventions to reduce the negative consequences of driving cessation and alternative transportation programs to maintain mobility (Windsor & Anstey, 2006) should be considered.

Driving mobility and crash risk are still clearly areas where future longitudinal research is needed. Such research

Table 4. Predictors of Change in Driving Avoidance Over 5 Years

Effect	Estimate	SE	Standardized Estimate	df	t	p
Intercept	9.96	1.56	—	639	6.4	<.001
Baseline driving avoidance	0.72	0.02	0.72	1000	32.6	<.001
Age	0.10	0.02	0.10	1000	4.7	<.001
Sex (male vs. female)	−0.45	0.31	−0.03	1000	−1.4	.149
Time	0.002	0.0007	0.10	583	2.6	.009
Walk time	0.11	0.08	0.03	1000	1.5	.140
Baseline MVPT	−0.07	0.09	−0.02	1000	−0.8	.404
UFOV risk (lower-risk vs. at-risk)	0.06	0.54	0.01	1000	0.1	.913
UFOV Risk × Time	−0.002	0.0007	−0.09	1000	−2.1	.033
Baseline Driving Avoidance × Time	−0.00003	0.00003	−0.01	1000	−1.2	.240

Note: UFOV = Useful Field of View.

should include additional measures of driving behaviors and exposure, especially given recent concern regarding the validity of often used self-reported mileage outcomes (Staplin, Gish, & Joyce, 2008). Such measures included in analyses of retrospective and prospective crash rates and risk will provide a better picture of older adults' driving. Additional screening measures and the cost-effectiveness of such measures in terms of saving lives and financial costs should also be addressed. Finally, given the importance of driving to older adults, the impact of cognitive or other relevant training programs upon driving mobility trajectories and driving cessation should also be investigated. Interventions that are found to maintain safe driving or reduce consequences of driving cessation will be of the utmost importance not only to individuals and their caregivers/families but also to the rest of society.

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