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Indicators of Self-rated Driving across 3 Years among a Community-based Sample of Older Adults

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Abstract

These secondary analyses were conducted to identify predictors of self-rated driving ability over three years in community-dwelling older adults. From the Staying Keen in Later Life (SKILL) study, baseline and 3-year follow-up data for 426 older drivers were analyzed. Health, visual, physical, psychological and cognitive abilities were examined as prospective predictors of self-rated driving ability over a 3-year period, controlling for baseline self-rated driving. Results indicated that lower baseline ratings of self-efficacy and a diagnosis of osteoporosis independently predicted lower self-rated driving ability at 3-year follow-up. Interestingly, functional performance, such as visual, physical and cognitive abilities, were not predictive of self-ratings of driving ability across three years. Older drivers' self-ratings are more reflective of perceived self-efficacy rather than functional abilities. Self-screening tools for older drivers may be effective in improving the correspondence between perceived ability and actual ability in order to promote better informed decisions about driving regulation.

Keywords

Self-rated ability; older drivers; speed-of-processing; Useful Field of View

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1 Introduction

The number of drivers over the age of 65 is expected to double over the next 30 years, and the annual mileage among older drivers will nearly triple (Lyman, Ferguson, Braver, & Williams, 2002). This growth may lead to a corresponding increase in older driver involvement in motor vehicle crashes (Lyman et al., 2002). Because many states do not assess older drivers (Insurance Institute for Highway Safety, 2006), it is particularly important for older adults to accurately recognize their own abilities and make appropriate decisions for driving safety (Anstey, Wood, Lord, & Walker, 2005; Parker, MacDonald, Sutcliffe, & Rabbitt, 2001). It is not clear, however, whether older adults recognize their driving abilities. There have been conflicting reports about the accuracy of drivers' self-ratings, and virtually no examination of factors associated with drivers' self-ratings over time. The present study examines predictors of change in older adults' in self-ratings of driving across time.

1.1 Self-Regulation of Driving

Research shows that at least some older drivers adjust their road-use behaviors to feel safer while on the road (Ball et al., 1998; Holland & Rabbitt, 1992; Reuchel, 2005). There is controversy, however, regarding whether these self-regulations are commensurate with and compensatory for declines in functional abilities. Some researchers (Holland and Rabbitt, 1992; Owsley, Stalvey, Wells, & Sloane, 1999; West et al., 2003; Baldock et al., 2006) have found that older drivers aware of declines in their sensory abilities or health were more likely to report regulating their driving behavior, while their levels of cognitive function were not related to driving regulation. In contrast, other investigators have found that poorer cognitive abilities were associated with decreased driving exposure and increased avoidance of difficult driving situations (Stutts, 1998; Ball et al., 1998; Okonkwo et al., 2008). Thus, it is unclear whether older drivers adjust their driving based on cognitive abilities. One way to begin answering this question is to examine whether visual and cognitive abilities are related to change in drivers' self-ratings.

1.2 Self-Rated Driving Ability

Research exploring the link between self-regulation of driving behavior and self-perceptions of driving competence suggests that perceived driving competency predicts restrictions in driving behavior among cognitively unimpaired older adults (Parker et al., 2001; Baldock, Mathias, McLean, & Berndt, 2006), and to a lesser degree among those with cognitive impairments (Dobbs, 2000). However, there is some debate regarding the overall accuracy of self-rated driving ability, with evidence suggesting that many older adults overrate their own driving abilities and driving safety (Freund, Colgrove, Burke, & McLeod, 2005; Goszczynska & Roslan, 1989; Marotolli et al., 1998). Such overestimation of ability may lead to insufficient risk perception and encourage unsafe driving behavior (Anstey, Wood, Lord, & Walker, 2005; Parker McDonald, Sutcliffe, & Rabbitt, 2001), particularly among experienced older drivers, as research suggests that experienced drivers judge their skills as higher and report lower driving safety concerns than inexperienced drivers (Lajunen & Summala, 1995). Inflated self-assessments, in general, are linked to poor metacognitive skills (Kruger & Dunning, 1999), and older drivers with reduced awareness of deficits may fail to properly regulate their driving (Freund et al., 2005).

It is apparent that a variety of factors potentially impact self-regulation, including self-rated driving ability. An examination of factors that may underlie a change in drivers' self-ratings over time could potentially provide insight into the relationship between self-ratings of abilities and driving self-regulation. If such change is related to factors that are associated with objective measures of driving ability, this would provide support for the accuracy of

self-ratings and may suggest ways to enhance older adults' awareness of their driving-related abilities. Receiving feedback regarding driving-related abilities may increase awareness, which may in turn encourage appropriate decisions regarding driving self-regulation.

The present study represents an intermediate next step in the field by examining a variety of cognitive performance indicators in addition to vision, health, physical functioning, and psychological variables as predictors of change in self-rated driving ability over three years. The study uses a large community-based sample and includes a measure of visual attention and processing speed known to predict both on-road performance and self-regulation of driving (Ball et. al, 1998; Clay et. al, 2006). Identifying indicators of self-rated driving ability over time may help illustrate the reasons older adults adjust their self-rated driving, which previous research suggests is linked to older adults' driving self-regulation. Although research has clearly indicated that cognitive performance is often the best predictor of driving safety (i.e., Clay et al., 2006; Ball et al., 2006), it remains unclear if changes in older adults' self-rated driving over time correspond to such abilities.

The purpose of the current study was to prospectively identify longitudinal predictors of self-rated driving ability across three years in a community-based sample of older adults. Baseline measures of cognitive performance, vision, physical performance, health, psychological, and demographic factors were examined as predictors of self-rated driving ability across three years.

2 Method

2.1 Procedure

Secondary data analysis was conducted among control group participants from the Staying Keen in Later Life (SKILL) project. Baseline data from the SKILL project was collected at the University of Alabama at Birmingham (UAB) and Western Kentucky University between 2000 and 2003. Follow-up data were collected by phone between 2003 and 2006. Participants provided written consent to participate in this IRB-approved study. During the initial investigation, adults age 60 years and older completed a screening visit to collect data regarding demographics, performance on driving-related sensory and cognitive measures, everyday mobility, and driving practices. A subset of the screening sample ($N = 895$) were eligible for and agreed to complete a more extensive baseline cognitive and physical battery as well as extensive health and medication questionnaires and a measure of depression. Further details of this study have been published elsewhere (Edwards et. al, 2005; Wood et. al, 2005).

2.2 Participants

Participants included in these secondary analyses were 426 community-dwelling older adults who completed the SKILL study at UAB, were current drivers at the time of their baseline study visit, remained current drivers when successfully contacted for interviews 3 years later, and did not participate in speed of processing training. Eleven of the eligible baseline drivers (2%) had ceased driving by the time of follow-up contact. General descriptive characteristics of the sample of 426 older drivers are displayed in Table 1. Fifty-four percent of the participants were women; education levels ranged from 6th grade to doctoral degree. These characteristics match those of the overall baseline SKILL study sample. Of the 144 participants eligible for 3-year follow-up who were not interviewed, 36 could not be reached due to incorrect contact information (5%), 30 were deceased (5%), and 78 (12%) refused to participate in the follow-up telephone interview.

2.3 Measures

2.3.1 Self-Rated Driving Ability—The outcome variable for this study, participants' self-rating of their driving ability, was ascertained by asking the following question "How would you rate the quality of your driving?" Responses were coded as *excellent* (1), *good* (2), *average* (3), *fair* (4), and *poor* (5) (Owsley et al., 1999; Stalvey, Owsley, Sloane, & Ball, 1999). At baseline, 34.4% of this sample rated their driving as excellent, 55.3% rated their driving as good, 8.1% rated their driving as average, and 2.3% rated their driving as fair. None of the participants rated their driving as poor at baseline. At 3-year follow-up, 31.3% rated their driving as excellent, 55.7% rated their driving as good, 11.1% rated their driving as average, 1.6% rated their driving as fair, and 0.2% rated their driving as poor.

2.3.2 Health—Medical conditions were measured by self-report of whether a doctor or nurse had ever told participants they had the following: arthritis, asthma or other breathing problems, cancer, chronic skin problems, diabetes, heart disease, heart problems, high cholesterol, hypertension, multiple sclerosis, osteoporosis, Parkinson's disease, stroke/mini stroke/TIA, cataracts, diabetic retinopathy, dry eye syndrome, glaucoma, macular degeneration, optic neuritis, or retinal detachment.

Participants also completed a medication audit. The total number of prescription medications was tallied and used in analyses.

2.3.3 Physical Functioning—Balance was assessed using Steinhagen-Theissen, and Borchelt's (1999) Turn 360 task. Participants were asked to stand and turn in one complete circle. The number of steps required to make one full turn was counted, with fewer steps indicating better balance. An average number of steps taken across two attempts was computed, and the averaged score was utilized in analyses.

Digit Symbol Copy test (Tun, Wingfield, & Lindfield, 1997) is a measure of motor speed in which participants filled in a grid of 93 empty squares with symbols. They were instructed to copy the symbol located above each square, working as quickly as possible. No time limit was imposed, but the test was timed. The score used in these analyses was time required to fill the grid with symbols, with higher score reflecting slower motor speed.

2.3.4 Vision—Far visual acuity was assessed using a GoodLite Model 600A light box with ETDRS letter chart. Participants stood 10 feet from the chart, and were tested binocularly, first without corrective lenses then with corrective lenses (if worn). Scores were based on a scale of 0 to 90, depending on number of letters correctly identified (0 is equivalent to Snellen score of 20/125; 90 to Snellen score of 20/16), with higher scores reflecting better far visual acuity.

Near visual acuity was assessed using the Lighthouse Near Visual Acuity Modified ETDRS chart. Testing began with the chart at a distance of 40 cm from the participant's eyes. If the participant was unable to identify any letters at 40 cm, the chart was moved to 20 cm (scoring system adjusted for chart distance). Near vision was tested binocularly, first without corrective lenses, then with corrective lenses (if worn). Log Minimum Angle Resolvable scores were used, ranging from 1.30 to -0.10 (1.30 is equivalent to Snellen score of 20/400; -0.10 is equivalent to Snellen score of 20/16), with lower scores indicating better near visual acuity.

Contrast Sensitivity was measured using the Pelli-Robson Contrast Sensitivity Chart (Pelli, Robson, & Wilkins, 1988). Participants stood 40 in. from the chart, and read each row of letters from left to right, and top to bottom, until they can no longer correctly identify any letters. The 8 rows of letters on this chart are organized against a white background with 2

sets of 3 letters on each row. The contrast of the letters against the background gradually decreases from black at the top left, becoming much less distinct at the bottom right. Possible scores range from 0.00 (poorest performance) to 2.25 log 10 (best possible performance). Score used in these analyses was the log contrast sensitivity score associated with the last set of letters in which 2 of the 3 letters were correctly identified.

2.3.5 Psychological Measures—The self-efficacy scale (Rodin & McAvay, 1992) included 8 items intended to assess efficacy across the domains of health, transportation, relationships, finances, safety, and productivity. Each item was rated on a 4-point scale from *strongly agree (1)* to *strongly disagree (4)*, with lower scores reflecting higher self-efficacy.

The Center for Epidemiologic Studies-Depression Scale (CES-D) was used to obtain self-report of depressive symptoms. The 20 items of the CES-D inquire about the frequency of depressive symptoms during the week prior to the assessment (Radloff, 1977). Response options range from *rarely, or none of the time (0)* to *most, or all of the time (3)*, with total scores for the CESD ranging from 0–60. Higher scores reflect the presence of more depressive symptoms.

2.3.6 Cognitive Measures—The PC, touch, four-subtest version of the Useful Field of View (UFOV®) test (Edwards et al., 2005) was administered and used to measure cognitive processing speed for several visual attention tasks. Standard testing procedures were used as detailed elsewhere (Edwards et al., 2005). A recent meta-analysis (Clay et al., 2005) of eight studies reported that poorer UFOV® test performance is associated with poor performance on numerous indicators of driving ability such as on-road evaluations, review of state motor vehicle collision records, and driving simulator performance. A composite score of subtests 1–4 was utilized for the purposes of this study, with higher scores reflecting slower cognitive speed of processing (e.g., longer display durations).

The Shape Color Size (SCS) task (adapted from Miller & Vernon, 1997) was a computerized measure of executive functioning. Participants made same/different judgments about two objects that varied by shape (triangle, square, and circle), color (red, green, and blue) or size (small, medium, and large). For each trial, participants compared the stimulus object on only one specified dimension and were required to react as quickly as possible by clicking the corresponding button (left button for same, right button for different stimuli) on the mouse. In the present study, the test was given in 8 blocks. In four of the blocks, the dimension to be compared was random at each presentation. In the other four blocks, the trials were structured so that questions about color, shape, and size were each grouped together. Participants were cued prior to the start of each section whether the trials would occur randomly or be structured. Response accuracy and the time from the presentation of a stimulus to the reaction by the participant was measured. The score used in these analyses was the mean reaction time (RT) for all correct responses across both conditions (SCS RT).

The Stroop task (Spreen & Strauss, 1998; Stern & Prohaska, 1996) measured executive function using a computerized adaptation (Trenerry, Crosson, DeBoe, & Leber, 1989) of the original task. Participants were asked to read a series of color words (red, blue, green, and yellow) during which they were timed. Next, they were timed while asked to identify the color of several blocks (also red, blue, green, and yellow). Then the participants were asked to name the color of ink in which a series of color words was written. For the present analyses, a score was derived from the difference between the time required to complete the third (ink color naming) task and the second (color block naming) task, adjusted with a time penalty for the number of uncorrected mistakes made during the third task.

The Trail-Making Test (A and B) (Spreen & Strauss, 1991), a measure of executive function, was administered with paper and pencil. In Trails A, participants are instructed to draw a line connecting 25 numbered circles in numerical order as quickly as possible. In Trails B, participants draw a line connecting 25 circles in alternating sequence of letters and numbers in order as quickly as possible (e.g., 1 – A – 2 – B). The score used in this analysis was time in seconds required to complete each task.

The Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975) was administered to measure general cognitive status, and assesses the domains of orientation, attention/concentration, memory, language, and constructive ability. Scores greater than 23 indicate grossly intact cognitive status. Possible scores on the MMSE range from 0 to 30, with lower scores indicating lower cognitive function.

Pattern Comparison (adopted from Salthouse & Babcock, 1991) was used to measure processing speed. Paired sets of randomly selected consonants (3, 6, or 9 items) are shown. Thirty-four sets per page were presented, and participants were required to compare the pairs to determine if they were the same (indicated by writing “s”) or different (indicated by writing “d”). All sets on a page were of the same length. Each set size (3, 6, or 9 items) was tested twice, and participants given 20 seconds to complete each page. Mean number of sets answered correctly across six pages was used, with higher scores reflecting better performance.

Similarly, Letter Comparison (adopted from Salthouse & Babcock, 1991) is also a measure of processing speed. In this test, participants compared paired sets of line drawings to determine whether the pairs were the same (indicated by writing “s”) or different (indicated by writing “d”). A total of 12 pages (4 pages each of 3, 6, or 9 lines) were presented, with 20 seconds allotted to complete each page. Average number of sets answered correctly across all 12 pages was used, with higher scores reflecting better performance.

Digit Symbol Substitution Test (Wechsler, 1997) is a measure of cognitive processing speed in which participants were shown a key of nine symbols paired with the numbers one through nine. A row of blocks with a number in the top block and a blank space in the block below it was presented, and participants were given 90 seconds to fill in the correct symbol for each number, based on the key given. The number of correct substitutions made was used in this analysis.

The Road Sign Test (Ball & Owsley, 2000) was used to measure everyday cognition. During this computerized task, participants responded to changing displays of road signs. Multiple road signs (in groups of 3 or 6) appeared on the screen simultaneously, and participants were instructed to react as quickly as possible to any road sign that was presented without a red slash through it. Depending on which sign was presented, responses included clicking the mouse button (in response to a bicycle or pedestrian sign), moving the mouse to the left (in response to a left turn sign), or moving the mouse to the right (right turn sign). Multiple signs were displayed at each presentation, but no more than one sign requiring a response appeared in a single display. Some displays contained only signs with red slashes, requiring no response from participants. The amount of time between the presentation of each stimulus and performance of the correct response was calculated. The score used in these analyses was the combined average reaction time across all (both 3- and 6-sign) conditions.

3 Results

Variables from four domains of the SKILL data set which could potentially impact self-rating of driving ability were included in the analyses. These domains included (a)

demographics, (b) physical performance, health and vision, (c) psychological factors, and (d) cognition.

All analyses were calculated using SPSS 14.0 for Windows. Where there were cases of missing data, the mean was substituted. This method was used for the Trails B task ($n = 8$), Turn 360 Test ($n = 3$), number of prescription medications ($n = 3$), Road Sign Test ($n = 2$), self-efficacy ($n = 3$), and CES-D ($n = 3$).

3.1 Analyses

In order to reduce the number of predictor variables in the regression models, Spearman correlations were conducted to examine the relationships among self-rated driving ability and demographic, vision, physical abilities, health, psychological, and cognitive variables. These analyses indicated that, with regard to demographic variables, being of younger age and being more educated were associated with higher 3-year self-rated driving ability ($ps \leq .05$). When considering physical performance, vision, and health conditions, we found that no report of heart problems or osteoporosis, having fewer prescription medications, and better performance on the Turn 360 and Digit Symbol Copy tests were associated with higher subsequent self-rating ($ps \leq .05$). With regard to psychological factors, higher self-efficacy scores and fewer depressive symptoms were related to higher 3-year self-rating ($ps \leq .05$). Better cognitive performance, as indicated by performance on the MMSE, RST, and Trails B tests, was also associated with higher subsequent self-rated driving ability ($ps \leq .05$).

Thus, we chose for inclusion in our regression analyses the demographic, health, vision, physical functioning, psychological, and cognitive variables that were significantly correlated with self-ratings. Variables that were not correlated with self-rated driving ability were not explored further.

Hierarchical multiple regression analysis was conducted using the enter method to assess the longitudinal associations of variables from within each domain with self-rated driving ability at 3-year follow-up: (a) demographic factors, (b) physical functioning, health, and vision variables, (c) psychological variables, and (d) cognitive performance. We first adjusted all models for baseline self-rated driving ability. For all models, lower self-rated driving ability at baseline was significantly associated with lower subsequent rating ($ps < .001$). Results of these four models are presented in Table 2.

None of the demographic variables were significant predictors of self-rated driving ability across 3 years. Of the health, vision, and physical functioning variables, self-report of having osteoporosis was predictive of lower 3-year self-rated driving ability ($p = .005$). Of the psychological variables, self-efficacy was a significant psychological predictor of self-rated driving after 3 years ($p = .046$). None of the cognitive variables were significant predictors of self-rated driving ability across 3 years.

We used the results of these regression analyses to examine predictors of 3-year self-rated driving ability in a final multivariate model simultaneously examining significant demographic, health, vision, and physical function, psychological and cognitive factors. Self-rated driving ability at 3-year follow-up was examined using the enter method, controlling for baseline self-ratings. We entered self-efficacy on the second step, and entered osteoporosis on the final step. Results of the final model are presented in Table 3. Analyses indicated that, after we controlled for self-rated driving ability at baseline, significant predictors self-rated driving ability at 3-year follow-up included self-efficacy and diagnosis of osteoporosis. Higher baseline ratings of self-efficacy were associated with higher

subsequent self rated driving ability ($p = .015$). Individuals with a diagnosis of osteoporosis at baseline were more likely to rate their driving ability as lower after 3 years ($p = .009$).

4 Discussion

The purpose of this study was to identify prospective predictors of self-rated driving ability across a period of three years in a community-based sample of older adults. After adjusting for baseline self-rated driving ability, health and psychological factors were the only factors found to be reliably associated with self-rated driving ability across time. Cognitive, visual, or physical functioning were not associated with a change across three years in self-rated driving ability. Among the health conditions explored, only a diagnosis of osteoporosis was predictive of lower subsequent self-rated driving. To our knowledge, no other studies have connected osteoporosis to self-rated driving ability. This is an interesting finding deserving of further investigation, particularly because gender was not found to be a significantly associated with self-rated driving ability.

Participants with lower baseline self-efficacy also rated their own driving ability significantly lower after 3 years. This suggests that self-ratings of driving are a reflection of one's overall self-efficacy rather than an awareness of functional deficits and the impact that such deficits may have on driving ability. Previous research has found that confidence in specific driving situations is associated with overall self-rated driving (Baldock et al., 2006; Parker et al., 2001), and that drivers with higher self-evaluated perceptual-motor skills tend to overestimate their driving abilities (Lajunen, Corry, Summala, & Hartley, 1998). The results of the current study extend previous findings regarding self-efficacy, because the measure used in the SKILL study included items from across the domains of health, transportation, relationships, finances, safety, and productivity, with only one item specifically addressing transportation-related self-efficacy. It seems intuitive that individuals with lower belief in their capabilities across a range of behaviors would also have lower belief in one specific ability (i.e. self-rated driving). However, if lower self-efficacy reflects changes in or poorer functioning, driving ability could also be impacted by such changes or poorer functioning. If so, the association between lower self-efficacy and a decrease over time in self-rated driving ability would suggest that the self-rating is not inaccurate.

Older adults may be reluctant to alter their opinion of their own driving ability, even if aware of changes in driving-related abilities. Changes in ability that can be compensated for while driving (for example, through self-regulation) may not cause an older driver to change their self-rating. There is also some question as to how long an individual must experience a decline in ability before altering their opinion of their driving ability. Another possible explanation is that participants did not experience change in their driving ability over the 3 years of this study. Examining change in self-rated driving ability over a longer period of time may yield different results.

Most prior research in this area has been cross-sectional in nature, and one strength of this study is the use of longitudinal data to investigate predictors of self-rated driving ability prospectively while controlling for baseline self-ratings. However, no objective measures of driving ability (such as state-recorded crashes or on-road evaluation) were included in the SKILL study, so direct comparisons between self-rated driving and objective driving ability were not possible. Sundström (2008) has suggested that the most valid and reliable way to assess the appropriateness of self-rated driving is to incorporate external criterion (measurement of actual driving skill).

Although no direct measures of driving ability were collected, participants were administered a measure of visual speed of processing (UFOV[®]) that has been found to be

indicative of crash risk over a subsequent 5-year period (Ball et al., 2006). Interestingly, UFOV[®] performance was unrelated to change in self-rated driving ability in this sample. These results may suggest that change over time in older adults' self-rated driving ability is not necessarily reflective of their driving-related abilities (Freund et al., 2005; Marottoli & Richardson, 1998). Alternatively, older adults' with poorer cognitive or physical functioning at baseline may have already adjusted their self-rated driving to reflect such functioning at baseline (baseline self-rated driving was controlled for in all regression models). It is also possible that older adults in this study were unaware of changes in their cognitive functioning, such as speed of processing ability, and so were unable to adjust their self-rated driving ability based on changes in functioning. If this is the case, providing feedback regarding changes in physical or cognitive functioning may foster more accurate self-rated driving ability.

These results may also reflect general stability in self-rated driving ability over time, regardless of functional abilities. Sixty-four percent of this sample did not experience any change in their self-rated driving ability over 3 years, indicating that self-rated driving ability was stable over time for the majority of participants. This result is consistent with other research indicating that self-ratings of driving ability are relatively stable over time and across driving tasks (Groeger & Grande, 1996). Some research suggests that accountability may help correct overestimation of drivers' skill and safety. Groeger and Grande (1996) reported that feedback given by instructors during an on-road driving task influenced subsequent self-assessments of driving ability, but only when the errors were regarded as "serious". Other research (McKenna & Myers, 1997) has found that participants whose self-ratings were confidential had significantly higher ratings of their general and specific driving skills than participants who were told their driving skills would later be tested by a government examiner.

Although the SKILL study included participants with some visual and cognitive impairment, similar analyses in a more impaired sample may yield differing results. The health measures included in our analyses, most of which were not significantly predictive of 3-year self-rated driving ability, relied upon self-report. Health conditions may be more informative as predictors of self-rated driving ability when assessed directly, or assessed by impact on functioning. Because the majority of participants in this study rated their driving as good or excellent, ceiling effects may have limited our findings. Such ceiling effects could weaken the relationship between self-ratings at 3-year follow-up and the proposed baseline predictors. On the other hand, these results add to those of others, indicating that older drivers consistently rate themselves as being good or excellent drivers even across a three year period.

4.1 Conclusion

Several researchers have suggested that older adults may not be aware of deficits in physical or cognitive abilities that can impact driving (Freund et al., 2005). Our research suggests that at least some older drivers may adjust their self-ratings of driving ability over time based on health factors (such as diagnosis of osteoporosis) and self-efficacy, rather than cognitive abilities, visual function, physical performance, or demographics. Providing feedback regarding possible age-related changes in physical or cognitive functioning may foster more accurate ratings of self-efficacy. Recently, a self-screening tool for older drivers, Roadwise Review (AAA, 2004), has been developed that may be effective to this end. Improving the relationship between perceived ability and actual ability may promote better informed decisions about driving regulation.

The results of this study, as well as others, clearly indicate that older adults' self-rated driving ability is not related to their cognitive function either cross-sectionally or

longitudinally. More research is needed to tease out the relationships between self-rated ability, objective measures of driving ability, and driving self-regulation. The SKILL Study included several measures of driving self-regulation. The relationship between drivers' self-ratings of ability over time and their driving self-regulation warrants further investigation and represents the logical next step in this line of research.

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Table 1

Sample Description and Variables Significantly Correlated to Self-Rated Driving Ability

Baseline Characteristic	<i>M</i>	<i>SD</i>	Range
Demographics			
Age	72.35	5.11	63–90
Education	14.27	2.72	8–20
Gender (percent female)	54		
Physical Function and Health			
Turn 360 Test	6.78	1.48	2–16
Digit Symbol Copy	90.01	5.50	53.56–290.06
Number Prescription Medications	3.28	2.57	0–13
Osteoporosis (% with diagnosis)	15.50		
Heart Problems (% with diagnosis)	26.30		
Psychological			
Self-efficacy	14.90	3.06	8–22
CES-D ^a	7.52	6.92	0–51
Cognition			
MMSE ^b	28.38	1.70	20–30
Trails B	112.07	66.78	42.38–480.00
Road Sign Test	1.82	.61	1.06–7.50
Baseline Self-Rated Driving Ability	1.74	.63	1–4
3-Year Self-Rated Driving Ability	1.81	.69	1–5

CES-D = Center for Epidemiologic Studies-Depression Scale; MMSE = Mini-Mental Status Exam.

Table 2

Regression Models Examining Indicators of Self-rated Driving Ability at 3-year Follow-up

Model	<i>B</i>	<i>SE B</i>	β	<i>p</i>
<u>1. Demographics</u>				
Age (in years)	.011	.006	.082	.058
Education	-.019	.011	-.074	.087
<u>2. Physical Function, Health, & Vision</u>				
Turn 360 Test	.022	.021	.046	.303
Digit Symbol Copy	.002	.001	.072	.109
Number of Prescription Medications	.001	.012	.005	.918
Osteoporosis	.237	.084	.123	.005
Heart Problems	.104	.071	.066	.144
<u>3. Psychological</u>				
Self-efficacy	.021	.010	.092	.046
CES-D ^a	.007	.005	.073	.109
<u>4. Cognition</u>				
MMSE ^b	-.020	.020	-.50	.306
Trails B	.000	.001	.044	.374
Road Sign Test	.060	.056	.053	.282

Note: models adjusted for baseline self-rated driving ability; CES-D = Center for Epidemiologic Studies-Depression Scale; MMSE = Mini-Mental Status Exam

Table 3

Final Multivariate Model of Indicators of Self-rated Driving Ability at 3-year Follow-up

Variable	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Baseline Self-Rated Driving Ability ^a	.471	.047	.430	<.001
Osteoporosis	.221	.082	.116	.007
Self-Efficacy ^a	.025	.010	.112	.010

^aSmaller numbers reflect better scores