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Older Drivers' Self-Regulation and Exposure

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16. Abstract
This study's goal was to gain insights into the extent to which older adults appropriately self-regulate their driving behaviors as their functional skills decline. The study examined relationships among functional abilities as assessed by a clinical test battery, behind-the-wheel (BTW) driving performance as measured during an on-road evaluation, and naturalistic driving behaviors (exposure) captured by video and tracking devices over a month of naturalistic driving. Many of the functional assessment measures predicted performance on the BTW evaluation. Notably, reduced visual acuity and contrast sensitivity, as well as poorer scores on Trail Making Tests A and B, simple and choice reaction times, and Snellgrove Maze Test completion times reliably predicted worse BTW performance. Analyses of the exposure data showed that many of the participants who exhibited poorer performance on the functional and BTW assessments limited their driving to less demanding contexts. Worse functional and BTW performance were associated with participants driving less in demanding driving contexts, especially higher speed and nighttime driving. The findings suggest that many people who experience functional declines may regulate to a certain extent when, where, and how they drive. However, some of those with the poorest functional and/or BTW scores did not appear to limit their driving.

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Background and Objectives

Substantial literature describes typical declines in cognitive and physical abilities associated with aging. The objective of this study was to examine whether older drivers self-regulate their driving in response to these declines. Drivers who self-regulate appropriately modify their habits to avoid driving under conditions they can no longer manage safely. Self-regulatory behaviors include limiting the conditions or times of day in which one drives, driving more slowly, or changing other driving habits related to safety. Ideally, self-regulating drivers appropriately avoid situations that overtax their driving skills. Without objective measures of driving exposure, however, it is impossible to know if older drivers self-regulate appropriately. This study analyzed measures of older drivers' functional abilities; on-road, behind-the-wheel (BTW) driving performance; and exposure collected in naturalistic settings.

Method

The study included 64 participants 60 to 88 years old from the Burlington, North Carolina, metropolitan area. Many were residents of two independent living retirement communities, who learned of the study from e-mails, posted flyers, and in-person presentations. Others were recruited through community contacts at churches and a local senior center, and by word-of-mouth. Qualified participants completed the consent process and had monitoring equipment installed in their vehicles. After 30 days of driving, participants returned to have the monitoring equipment removed and to complete a BTW evaluation and a battery of functional assessments.

Results

Reduced visual acuity, reduced contrast sensitivity, longer Trail Making Test A and B completion times, longer simple and choice reaction times, and longer Snellgrove Maze completion times predicted worse BTW performance. Analyses of the exposure data indicated that many of the participants who exhibited poor performance on the functional and BTW evaluations self-regulated when driving. For example, worse performance on functional and BTW evaluations was associated with reductions in high speed driving. Participants with poor functional scores logged fewer miles on limited access roadways and at night.

While many older drivers showed evidence of self-regulation, it is important to note that a few of the worst performers on the BTW evaluations *did not* appear to adapt their driving to their functional limitations. Conversely, some participants who scored well on the BTW and functional measures appeared to limit their driving exposure and avoid risky traffic conditions.

Discussion

This study supports the notion that many older drivers with functional declines avoid some risky driving contexts. However, some of the drivers with the poorest BTW and functional evaluation scores did not limit their driving. Self-regulation mitigates, but does not eliminate, the potential safety risk posed by older adults driving in situations that overtax their driving skills.

Introduction

The objective of this study was to examine whether older adults self-regulate their driving behaviors in response to age-related functional declines. Self-regulation involves an older driver modifying their driving habits to avoid driving under conditions they can no longer manage safely. Self-regulation may involve avoiding heavy traffic or nighttime driving, or driving more slowly. Ideally, drivers appropriately self-regulate by avoiding situations that overtax their driving skills, thereby balancing mobility and safety concerns.

Research suggests that older drivers who are most likely to self-regulate tend to:

- be female (Bryden et al., 2013; Charlton et al., 2006; Gwyther & Holland, 2012; Kostyniuk & Molnar, 2008; Molnar et al., 2013b; Rosenbloom & Santos, 2014; Vance et al., 2006; Bird et al., 2015);
- be older (Braitman & McCartt, 2008; Charlton et al., 2006; Kostyniuk & Molnar, 2008; Motak et al., 2014; Vance et al., 2006; Betz & Lowenstein, 2010);
- have, or think they have, cognitive impairment (Braitman & McCartt, 2008; Motak et al., 2014; Vance et al., 2006; O'Connor et al., 2010; O'Connor et al., 2013);
- have poorer health (Bryden et al., 2013; Rosenbloom & Santos, 2014; Motak et al., 2014; Vance et al., 2006);
- have less driving experience (Gwyther & Holland, 2012; Motak et al., 2014);
- have physical, including visual, impairment (Braitman & McCartt, 2008; Kostyniuk & Molnar, 2008; Bird et al., 2015);
- not be the primary household driver (Braitman & McCartt, 2008; Charlton et al., 2006).

Most research on older drivers' self-regulatory behavior is based on self-report data; however, participants may not have accurately assessed and/or reported their levels of cognitive or skill impairment and driving avoidance (Braitman & McCartt, 2008). Many of the studies listed above used cognitive or skills assessments as part of their evaluation efforts, but few included an on-road, behind the wheel driving (BTW) evaluation to determine if drivers appropriately self-regulated. Baldock et al. (2006) compared on-road driving performance with self-reported driving behaviors and found that on-road driving performance was not significantly associated with overall driving avoidance, although the authors reported associations with avoidance of driving in the rain, at night, and on rainy nights.

While older drivers may avoid certain driving situations, they may not avoid driving in general. Much of the recent literature suggests high levels of driving confidence among older adults (Baldock et al., 2006; Charlton et al., 2006; Oxley, Charlton, Scully, & Koppel, 2010) and low levels of overall avoidance/self-regulation (Baldock et al., 2006; Motak et al., 2014; Rosenbloom & Santos, 2014; Wong & Smith, 2014; Bird et al., 2015). Wong et al. (2012) and Wood et al. (2012) reported that older drivers with the weakest driving skills were *least* likely to recognize and accommodate to their limitations. These studies suggest that some older adults have poor insight into their functional limitations, which undermines their ability to

limit their driving exposure appropriately. Without objective measures of driving exposure, however, it is impossible to know the extent to which older adults self-regulate their driving. The current study explored this gap in knowledge by analyzing measures of older drivers' functional abilities, BTW scores, and naturalistic driving data.

Objectives

This study examined relationships among functional abilities as assessed by a clinical test battery, BTW driving performance as measured by an on-road evaluation, and naturalistic driving behaviors captured by video and tracking devices. The goal was to gain further insights on the extent to which older adults appropriately self-regulate their driving. The objectives of the study were to determine:

1. How clinical measures of functional abilities relevant to driving relate to older adults' BTW performance as assessed by a certified driver rehabilitation specialist (CDRS) (e.g., ability to monitor surrounding traffic, to maintain awareness of traffic conditions and hazards, to control the vehicle).

2. How clinical measures of functional abilities relevant to driving relate to older adults' driving exposure (e.g., number of trips, trip length, driving on high speed roadways, driving at night).

3. How BTW driving performance relates to older adults' driving exposure.

Method

OMB and IRB Approval

This study and associated data collection received approval from the Office of Management and Budget (OMB Control No. 2127-0722) and the Chesapeake/Advarra Institutional Review Board (IRB).

Participants

The study solicited participants from the Burlington, North Carolina, metropolitan area. The research team recruited participants from two independent living retirement communities using emails, posted flyers, and in-person presentations. Additional participants were recruited through community contacts at churches and a local senior center, and by word-of-mouth. The final sample included 21 participants 60 to 69 years old (M = 66.1 years, SD = 2.23; 52% female), 22 participants 70 to 79 years old (M = 75.5 years, SD = 2.76; 59% female), and 21 participants 80+ years old (M = 83.0 years, SD = 2.28; 52% female) for a total sample size of 64. Two additional participants dropped out of the study due to health issues. Specific criteria for inclusion in the study were:

- age 60 to 89 (with an effort to recruit across the distribution and avoid clustering at a single point on the age distribution);
- currently licensed driver in North Carolina;
- owner, lessee, or regular user of a vehicle without adaptive hand controls and in compliance with all North Carolina regulations;
- the primary user of the vehicle for the study;
- agreement to use only the primary vehicle during the study period to the extent possible;
- drive a minimum of three trips per week; and
- live within the Burlington city limits.

Material

Recruiting Material. Recruitment activities included a presentation at each retirement community, announcements in monthly newsletters, and flyers posted on bulletin boards at the other locales where recruitment took place. The flyers (see Appendix A) and newsletters contained researcher contact information for those interested in finding out more about the study or wishing to sign up.

Initial Screening and Consent. Screening took place in-person or via telephone using a screening questionnaire (Appendix A). Once a person was deemed eligible and agreed to participate, researchers scheduled a 30-minute meeting to complete the informed consent process and to install monitoring equipment in the participant's vehicle.

Video System. A dual-video camera system, commercially available KJB Security Products DP-210 Drive Proof, recorded interior and exterior views of the vehicle to a memory card. The system could store 105 hours of video. The camera plugged into the auxiliary power outlet (cigarette lighter adapter) of the vehicle and automatically powered itself on and off when the outlet received or lost power. Although the camera unit had an integrated microphone, it was disabled for the study. The camera unit was mounted on the lower center portion of the windshield so as not to obstruct the driver's view (see Figure 1). At the request of participants, power splitters were provided to ensure access to the 12-volt power outlet for other accessories such as a navigation system or cell phone charger.

Tracking System. The LandAirSea Flashback GPS tracker (Figure 1), a commercially available, stand-alone unit, provided trip information. This unit sampled and stored GPS position once every second, allowing for precise trip mapping. The system was accurate within 6 feet, recorded up to 50 hours of driving data on a single charge, and ran on a built-in battery. The tracker recorded date and time, route, speed, heading, elevation, latitude, and longitude. Trips could be played back using cloud-based software.

Figure 1. Tracking and Video Systems

Driving Test. Participants' driving performance was evaluated by a CDRS during a 45- to 60 minute BTW driving session. The test vehicle was a Honda Accord with a dual-brake system that allowed the CDRS to take over braking if needed. Participants were randomly assigned to drive one of two standardized routes. Study staff tested the routes to ensure they were comparable in terms of length and overall driving demands.

Appendix A contains copies of the driving score sheets. It is a modified version of the Miller Road Test with scoring on operational, strategic, and tactical driving skills. The Division of Bus and Traffic Safety of North Carolina created the test for training and testing driving instructors. Although the test is widely used, there was no published research documenting its validity or reliability. The CDRS scored participants on a variety of behaviors, including:

Operational Skills

- steering
- signaling
- seat belt use
- mirror adjustment
- gear selection

Tactical Driving Skills

- scanning the driving environment
- checking blind spots
- maintaining centered lane position
- following at an appropriate distance/maintaining a lateral cushion
- turning into the proper lane
- selecting safe gaps
- coming to complete stop at stop signs
- regulating speed
- braking smoothly
- yielding when necessary

Strategic Driving Skills

- route planning
- attending to the driving environment
- anticipating hazards
- following directions
- following rules of the road

Each participant received a score for each category of skills based on number of errors. A higher score indicated worse performance.

Functional Assessments

Researchers assessed participants' visual, cognitive, and psychomotor abilities using a computer-based battery of tests employed in previous research projects (e.g., Staplin et al., 2012). Each of these measures has shown promise in prior research of being related to crash risk and/or changes in older adults' driving behavior (e.g., self-reported reduced driving exposure). Participants completed all assessments, except for the initial visual acuity and contrast sensitivity tests, on a touch-screen computer in a private room. A proctor was present to ensure participants fully understood all instructions. The proctor emphasized salient parts of the instructions and answered participants' questions before a test began. Once a test started, the proctor did not provide additional assistance.

Visual Acuity. Visual acuity is a measure of the ability to resolve stimuli such as numbers or letters at a given distance and under good lighting conditions. Research has shown that some older drivers with impaired acuity restrict their driving (e.g., Keeffe et al., 2002). The current study assessed distance acuity using a Snellen eye chart at 20 feet and near acuity using the

Rosenbaum pocket vision screener hand-held card. The proctor recorded the near and far visual acuity scores.

Contrast Sensitivity. Contrast sensitivity is a measure of the ability to detect and identify objects when there is little contrast between the object and background (e.g., a light gray letter on a white background). Age-related deficits in contrast sensitivity have been associated with crash involvement (Owsley, 2010). The current study used the Mars Letter Contrast Sensitivity Test, a 9-by-14-inch chart with 48 letters (6 letters in each of 8 rows). The contrast of each letter, reading from left to right and continuing on successive lines, decreases by a constant factor of 0.04 log units. The computer program prompted the proctor to enter the last letter that the participant read correctly.

Simple and Choice Reaction Time. The study used a dual pedal to obtain brake response time measures. Instructions presented on a computer display directed participants to press the accelerator pedal with their right foot and to move their foot from the accelerator to the brake pedal as quickly as possible when a STOP sign appeared. After each response, the participant returned his/her foot to the accelerator. Participants completed five trials, and the computer recorded brake reaction time for each correct trial as well as the number of misses (no brake application). Choice brake reaction time trials followed the simple reaction time trials using the same apparatus. Instructions directed participants to begin each trial by pressing on the accelerator pedal and then to shift their right foot to press on the brake *only* if a NO LEFT TURN symbol sign appeared on the monitor. For distractor trials, other signs were presented. Participants completed 15 trials, with the NO LEFT TURN sign presented one-third of the time (trials number 1, 6, 9, 10, and 15). Distractor trials included 5 trials with a NO U TURN sign and 5 trials with a NO RIGHT TURN symbol. The brake reaction time on each trial was recorded as well as the number of errors (no brake press) and the number of false alarms (pressing the brake on distractor trials). As reported in Staplin et al. (2012), false alarms on the choice brake reaction time test have been found to be a significant predictor of intersection crash involvement.

Cued Recall. Working memory supports awareness of one's immediate surroundings. It is relatively limited in capacity, and generally declines with age. Working memory deficits have been found to significantly predict older driver crash involvement (Staplin et al., 2003). For this study, the computer display informed participants to remember three words and instructed them to press a button on the screen to hear the words. Once participants heard the three-word memory set, they used a keyboard on the touchscreen to type each word. The system provided auditory feedback as each character was touched. When all three fields were complete, the participant was instructed to remember the words in order to recall them later. If a participant typed in an incorrect response, the program prompted the participant that one or more of the words entered was incorrect. The incorrect response was highlighted, and the participant was instructed to listen again and correct his/her entries before proceeding. Phonetic spellings (apple, appel, apel) were allowed. After completing several other tasks, the participant was cued to recall the words and type them on the screen again.

Visual Closure and Sign Completion. These measures tested the ability to visualize a whole object when only part of it was in view. The assessment in this study included 13 stimuli (line drawings) from the Visual Closure sub-score of the Motor-Free Visual Perception Test,

third edition, items 22-34 (Colarusso & Hammill, 2003) and 11 line drawings presenting traffic sign shapes (pentagon, octagon, rectangle, inverted triangle, diamond) and symbols (circle with slash, person in a wheelchair, arrow, bicycle, picnic table, and crossroad). The participant's task was to touch one of four images at the bottom of the screen that could be completed to match an image at the top without moving or taking away any lines. This was not a timed test, but if a participant failed to respond to a stimulus within 30 seconds, the display prompted the participant to respond without further delay. Failure to respond within an additional 10 seconds caused the program to score the response incorrect and proceed to the next page.

Useful Field of View. UFOV tests the extent of the area over which a person can detect and attend to briefly-presented visual stimuli without eye or head movements. It also can test the amount of time required to detect and identify a stimulus when the visual field area is fixed. Consistent with the second approach, participants in this study were asked to focus on a central target and to report the location of a second target appearing at one of eight locations distributed in a radius of approximately 30 degrees around the central target. Poor UFOV performance has been linked to declines in mobility for older drivers (Edwards et al., 2009). For the current study, the test consisted of customized versions of two subtests of the UFOV test protocol: Subtest 1 (speed of visual information processing) and Subtest 2 (information processing speed with divided attention). For Subtest 1, the program recorded the shortest duration at which the participants could correctly identify a central stimulus 75% of the time. For Subtest 2, the program recorded the shortest duration at which the participant could identify the central stimulus *and* locate the outside stimulus 75% of the time.

Trail Making Test. This assessment included two measures that have been associated with a variety of cognitive functions including working memory, visual scanning, and divided attention. The measures were touchscreen versions of the TMT-A (connecting numbers sequentially: 1 – 2 – 3 …) and TMT-B (alternating between connecting numbers consecutively and letters in alphabetical order: 1 – A – 2 – B – 3 …) which have been shown to significantly predict the risk of older driver crash involvement (Staplin et al., 2014) as well as BTW performance (Classen et al., 2008). The program recorded time to complete each measure.

Snellgrove Maze Test. For this test of cognitive planning abilities, participants traced a path through mazes presented on a touchscreen monitor. Research suggests performance on this task significantly predicts older driver crash risk (Staplin et al., 2013). The program recorded total time to complete each maze.

Procedure

Participants completed the recruitment and screening process as described above. All qualified, interested participants completed the consent process, had the monitoring equipment installed in their vehicles, and received $50 for this first session. After 30 days of driving, participants returned to have the monitoring equipment removed and to complete the BTW driving evaluation followed by the functional assessments. Participants received an additional $150 upon finishing all aspects of the study.

Results

Descriptive Statistics

Descriptive statistics for the functional assessments, BTW evaluation, and selected naturalistic driving measures are presented in the tables that follow. Table 1 provides the mean (M), standard deviation (SD), and median for the functional assessment measures for the 64 participants. Visual acuity is not included in the table; 66% of the participants had a near visual acuity score of 20/20 or better, and 59% had a distance visual acuity score of 20/20 or better.

Table 1. Selected Functional Assessment Results

Measure	M (SD)	Median
Contrast Sensitivity	1.70 (0.09)	1.72
Simple Reaction Time (seconds)	0.93 (0.30)	0.84
Choice Reaction Time (seconds)	1.01 (0.19)	0.98
Visual Closure (errors)	3.13 (2.36)	3.00
Sign Completion (errors)	2.63 (2.40)	2.00
Working Memory (errors)	0.19 (0.48)	0.00
UFOV (milliseconds)	198.98 (122.06)	167.00
TMT-A (seconds)	38.80 (17.84)	33.47
TMT-B (seconds)	108.60 (49.45)	97.52
Maze (seconds)	22.20 (12.00)	19.37

Table 2 provides statistics for the BTW operational, tactical, and strategic scores for the 64 participants. Operational scores were not analyzed further because too few participants made any errors in this category to allow for valid analyses. All BTW analyses used the sum of the strategic and tactical scores. The large standard deviation indicates substantial variation among the participants with the distribution positively skewed due to higher tactical scores (more errors) among a few participants.

Table 2. Behind-the-Wheel Scores

Score	M (SD)	Median
Operational	0.48 (1.55)	0.00
Strategic	2.59 (4.80)	0.00
Tactical	39.44 (37.46)	25.50
Total Road (sum of Strategic and Tactical)	42.02 (40.01)	29.50

Table 3 provides statistics for driving exposure measures across the 64 participants for the 30-day driving period.

Table 3. Driving Exposure Measures

Measure	M (SD)	Median
Total Miles Driven	638.59 (269.52)	586.05
Number of Trips		
Total Number of Trips	115.34 (63.35)	100.50
Speed > 50 mph	24.25 (25.56)	15.00
Speed > 60 mph	11.69 (14.65)	5.00
Speed > 70 mph	7.41 (11.61)	3.00
Trip distance > 5 Miles	23.16 (23.41)	14.50
At Night	5.53 (7.13)	3.00
On Limited Access Road	10.31 (13.47)	5.00
In rain	8.83 (10.41)	5.00
With Passenger(s)	31.95 (26.88)	24.00
To Commercial Destination	46.09 (27.04)	38.50
In Moderate to Heavy Traffic	3.47 (5.88)	2.00
Speed		
Trip Average Speed (mph)	22.95 (5.64)	22.56
Trip Max Speed (mph)	41.26 (7.01)	41.13
Highest Speed Recorded (mph)	71.86 (10.90)	74.50

Table 4 provides the average percentage of trips that included the factors listed. Researchers determined the percentage of trips each participant took under each condition and calculated the average percentage across the sample. Table 5 shows the percentage of the participants who drove at least once under each of the conditions listed.

Table 4. Average Percentage of Trips Under Selected Conditions

Measure	M (SD)	Median
Speed > 50 mph	21.27 (18.04)	16.53
Speed > 60 mph	10.09 (11.23)	6.34
Speed > 70 mph	6.14 (9.18)	3.27
Trip > 5 Miles	20.36 (17.09)	14.54
At Night	4.28 (4.78)	2.82
On Limited Access Road	8.31 (10.44)	4.81
In Rain	6.45 (6.27)	4.22
With Passengers	29.19 (19.91)	30.67
To Commercial Destination	40.78 (13.97)	42.07
In Moderate to Heavy Traffic	3.20 (5.36)	1.42

Table 5. Percentage of Sample Ever Drove Under Selected Conditions

Measure	% of Sample
Speed > 50 mph (%)	93.75
Speed > 60 mph (%)	76.56
Speed > 70 mph (%)	60.94
Trip > 5 Miles	93.75
At Night	68.75
On Limited Access Road	81.25
In Rain	79.69
With Passengers	93.75
To Commercial Destination	100.00
In Moderate to Heavy Traffic	76.56

Regression Analyses

Analyses focused on whether functional assessment measures reliably predicted driving performance (measured by BTW scores), and whether they reliably predict measures of driving exposure (based on naturalistic data) as well as whether BTW scores predicted driving exposure. If older drivers self-regulated appropriately, then poorer BTW scores would predict reduced exposure.

Researchers used linear regression to analyze continuous measures of driving exposure (e.g., counts of trips, average speed) and applied logistic regression to dichotomous exposure measures (e.g., ever drove on a limited access road, ever drove at night). For linear and logistic regressions, effects sizes are reported as Adjusted R^2 and Nagelkerke R^2, respectively. In either case, an R^2 of .01 indicated a small effect size, .09 a medium effect size, and .25 a large effect size (Cohen, 1992). Some statistically significant relationships with meaningful effect sizes are described below (see Table 6 and Table 7). Appendix B provides the results for all assessments.

Functional Measures and Driving Performance (BTW Scores)

Findings showed that poor performance on many of the functional measures predicted higher (poorer) BTW scores, with small to medium effect sizes. Scores on the second maze task, contrast sensitivity, TMT-A and TMT-B, simple and choice brake reaction times, and the Sign Completion Test were moderately associated with BTW scores, while effect sizes for near and distance acuity were small (see Table 6).

Table 6. Regression Results for Functional and BTW Scores

Functional Test	*F*	*P*	Adj. R^2	Poorer BTW scores predicted by
Distance acuity	5.71	= 0.02	0.07*	poorer distance acuity
Near acuity	5.43	= 0.02	0.07*	poorer near acuity
Contrast sensitivity	16.5	< 0.01	0.20**	poorer contrast sensitivity
Simple brake RT	9.06	< 0.01	0.12**	longer RT
Choice brake RT	7.83	< 0.01	0.10**	longer RT
Visual Closure, errors	7.95	< 0.01	0.10**	more errors
Sign Completion errors	5.32	= 0.02	0.06*	more errors
Sign Completion time	7.14	= 0.01	0.09**	longer completion time
TMT-A	9.34	< 0.01	0.12**	longer completion time
TMT-B	12.90	< 0.01	0.16**	longer completion time
Maze 2	16.70	< 0.01	0.20**	longer completion time

Note: Degrees of freedom are (1,62) for all analyses.
* small effect size; ** medium effect size.

Functional Measures and Driving Exposure

Logistic regression findings for driving exposure (did the participant ever drive under the exposure measure listed, y/n) were similar. Participants with poorer functional scores were less likely to drive in complex conditions such as at night, in heavy traffic, or at high speeds. The largest effects sizes were for TMT-A and TMT-B and ever driving faster than 60 mph; TMT-B and ever driving on limited access roads; and for Maze 2 and ever driving faster than 70 mph (see Table 7).

Table 7. Logistic Regression: Functional Test Scores and Exposure Measures

Functional Test	Exposure Measure (y/n)	X^2	*p*	*Adj.* R^2	*Those with poorer functional scores were* ***less*** *likely to drive*
Distance acuity	Speed >70	4.40 [a]	= 0.04	0.09**	> 70 mph
	At night	6.19 [a]	= 0.01	0.13**	at night
	With passengers	5.25 [a]	= 0.02	0.13**	with passengers
	Heavy traffic	7.95 [a]	< 0.01	0.16**	in heavy traffic
Near acuity	Limited access	6.58 [a]	= 0.01	0.16**	on limited access roads
	50+ mph roads	5.53 [a]	= 0.02	0.13**	on 50+ mph roads
Contrast sensitivity	50+ mph roads	6.40 [a]	= 0.01	0.15**	on 50+ mph roads
Simple brake RT	Speed > 60	5.98 [b]	= 0.01	0.15**	> 60 mph
	Limited access	6.97 [b]	< 0.01	0 .17**	on limited access roads
Choice brake RT	Speed > 60	4.59 [b]	= 0.03	0.11**	> 60 mph
	Limited access	7.80 [b]	< 0.01	0.19**	on limited access roads
Visual Closure errors	Speed > 70 mph	5.91 [a]	= 0.02	0.12**	> 70 mph
	Heavy traffic	4.23 [a]	= 0.04	0.09**	in heavy traffic
Traffic Sign errors	Speed > 70	4.44 [a]	=0.04	0.09**	> 70 mph
UFOV	Limited access	3.94 [a]	< 0.05	0.10**	on limited access roads
TMT-A	Speed > 60 mph	1.13 [a]	< 0.01	0.24***	> 60 mph
	Limited access	5.71 [a]	= 0.02	0.14**	on limited access roads
TMT-B	Speed > 60 mph	13.5 [a]	< 0.01	0.31***	> 60 mph
	Limited access	12.8 [a]	< 0.01	0.29***	on limited access roads
Maze 2	Speed > 70	13.20 [a]	< 0.01	0.26***	> 70 mph
	Drive at night	4.97 [a]	= 0.03	0.11**	at night

[a] Degrees of freedom are (1,64); [b] Degrees of freedom are (1,63).
* small effect size; ** medium effect size; *** large effect size.

Linear regression findings showed only small to medium effect sizes. Participants with poorer functional performance drove less, drove more slowly, and were less likely to carry passengers (see Table 7). Figure 2 shows the relationship between TMT-B score and highest maximum speed.

Table 8. Linear Regression: Functional Test Scores and Exposure Measures

Functional Test	Exposure Measure	*F*	*p*	*Adj. R^2*	*Those with poorer functional scores had fewer trips*
Distance acuity	% trips > 5 miles	5.58[a]	= 0.02	0.07*	longer than 5 miles
Contrast sensitivity	Trips with passengers	7.40[a]	< 0.01	0.09**	with passengers
Simple brake RT	% of trips > 5 miles	6.89[b]	= 0.01	0.09**	longer than 5 miles
Choice brake RT	With passengers (y/n)	7.55[b]	< 0.01	0.10**	with passengers
UFOV	Trips with passengers	4.03[b]	< 0.05	0.05*	with passengers
TMT-A	Maximum speed	7.93[a]	< 0.01	0.10**	at high speeds
TMT-B	Number of trips	5.30[a]	= 0.03	0.06*	during the study interval
	Maximum speed	15.00 [a]	< 0.01	0.18**	at high speeds

[a] Degrees of freedom are (1, 62); [b] Degrees of freedom are (1,61).
* small effect size; ** medium effect size.

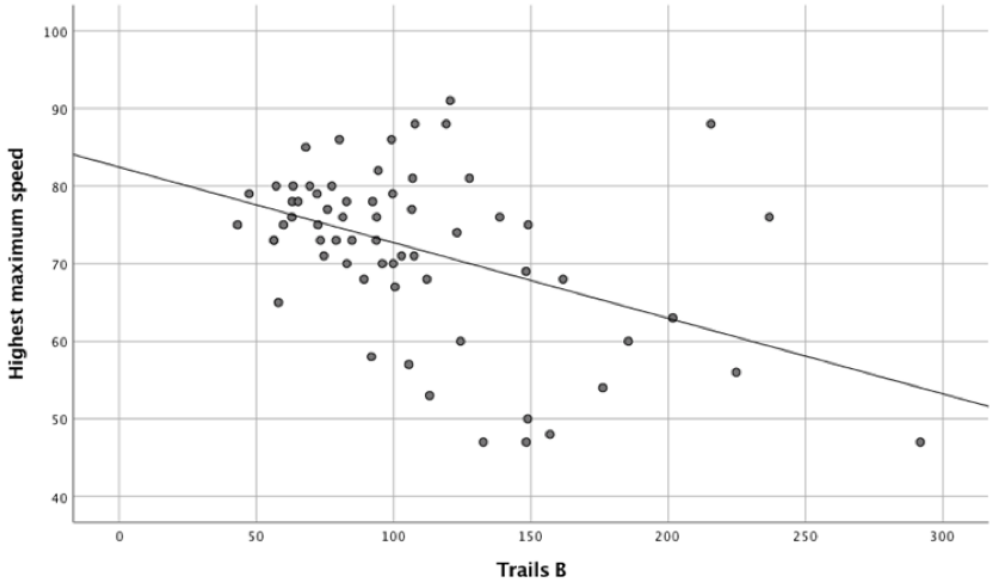

Figure 2. Highest Speed Ever Driven as a Function of TMT-B Task Time (seconds)

Driving Performance and Exposure

Statistical analyses explored relationships between driving performance as measured by the BTW scores and driving exposure measures. Worse BTW score weakly predicted fewer trips ($F(1, 62) = 4.59$, $p = .036$, Adjusted $R^2 = .054$) and fewer trips with passengers ($F(1, 62) = 5.69$, $p = .020$, Adjusted $R^2 = .069$). The full results, including those with small effect sizes and/or non-statistically-significant findings, appear in Appendix B.

Curvilinear analyses provided some insights into BTW measures that can be used to model driving exposure. As shown in Figure 3, a quadratic model was the best fit for BTW scores predicting highest maximum speeds ($F(2, 61) = 3.56$, $p = .04$, $R^2 = .10$). A subset of participants who scored poorly on the BTW evaluation exceeded 70 and 80 MPH at least once over the study period. However, note that the shape of the curve relies on just a few scores, so may not be robust.

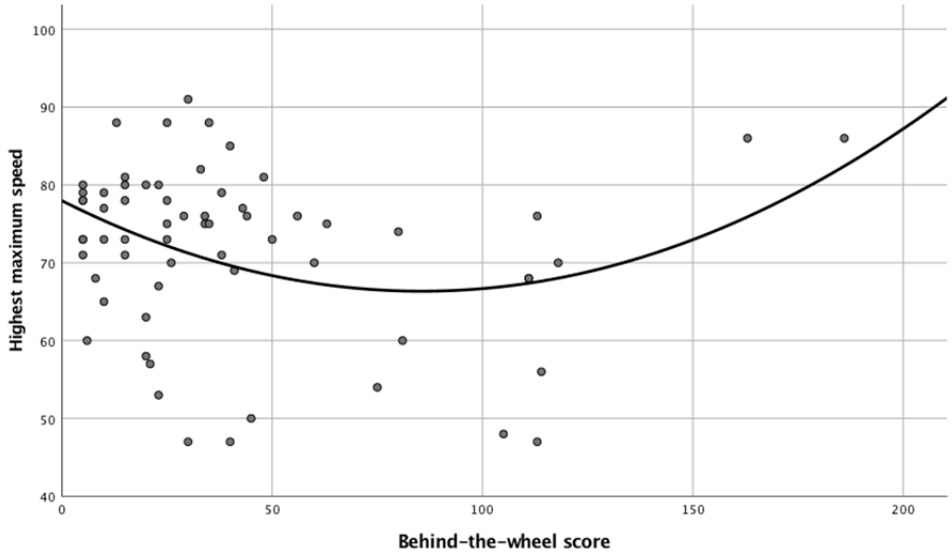

Figure 3. Quadratic Model Fit for BTW Score and Highest Maximum Speed

Discussion

To gather the data necessary to answer the research questions of interest, researchers placed video and tracking systems in the vehicles of participants to record their normal driving patterns for 30 days. This naturalistic driving period was followed by a BTW driving evaluation with a CDRS and then a battery of functional assessments. Many of the functional assessment measures predicted performance on the BTW evaluation. In general, poorer performance on the functional assessments predicted worse performance during the driving evaluation with the CDRS. Notably, reduced distance visual acuity, reduced contrast sensitivity, longer TMT-A and TMT-B completion times, longer simple and choice reaction times, and longer Maze 2 completion times predicted poorer BTW scores as rated by the CDRS.

The primary objective of the study, however, was to determine whether older drivers who exhibited functional deficits reduced their exposure to demanding driving contexts. The results showed that many participants who exhibited poorer performance on the functional and driving assessments logged fewer miles on high-speed roadways and made fewer trips of more than five miles. The findings were consistent with worse functional and driving performance (e.g., longer completion times, poorer visual acuity and contrast sensitivity, worse BTW scores) associated with reduced exposure to a variety of measures of potentially risky driving, especially driving at higher speeds. There was also evidence of reduced driving on limited access roadways and less nighttime driving among those with poorer functional scores. The findings suggest that most people who experience functional declines self-regulate by driving less under demanding driving conditions (e.g., high speed roadways, at night).

It is important to note that not all participants with poor BTW and functional assessment performance avoided potentially risky situations. Among those with the poorest BTW scores, five drove faster than 65 mph, and three drove faster than 75 mph. This finding is consistent with reports in the literature that some older drivers with poor driving skills fail to recognize and accommodate to their limitations (Wong et al., 2012; Wood, et al., 2012).

This study did not endeavor to rate the safety of participants' driving during the naturalistic portion of the study. It is possible that participants who performed poorly on the BTW and functional abilities tests drove safely in the naturalistic portion. It is also conceivable that those participants who appeared to self-regulate on some measures drove unsafely with respect to other measures. Avoiding risky driving situations does not necessarily indicate competent driving. For example, a driver may fail to maintain lane position while driving at a relatively slow speed.

Also of note, some participants who scored well on the BTW and functional measures appeared to limit the types of conditions under which they drove. It is not clear if these participants intentionally reduced their driving to accommodate a perceived deficit or simply had no reason to drive in more demanding contexts.

This study supports the notion that older drivers with cognitive and/or psychomotor declines limit the extent to which they drive under demanding conditions such as in high-speed traffic or at night. It is important to reiterate, however, that even though a study participant may have limited the conditions under which they drove, the extent to which they drove safely is unknown. The findings also show that some participants who exhibited poor performance on the driving evaluation and functional assessments did not limit their driving exposure. In the absence of a direct safety measure, however, it is not clear that these participants represent a risk to themselves and other road users. The results do suggest that many older drivers, including some of those with functional limitations, self-regulate their driving exposure. Development and dissemination of guidance on driving self-regulation strategies may be an effective countermeasure.

Limitations

This study employed a convenience sample of 64 participants in their 60s, 70s, and 80s, most of whom resided in two active living retirement communities. Participants were selected because they reported driving at least three times per week. This eliminated the subpopulation of older adults who drove less than this and whose risk may be higher; these drivers may have already significantly reduced their driving due to self-regulation. Thus, the sample should not be considered representative of all drivers of the ages studied.

The functional assessment apparatus and BTW testing approach also may have affected participants' performance. Most functional tests were administered on a touchscreen computer, which may have been unfamiliar to participants who do not normally use such devices. Also, the BTW evaluation was completed in an unfamiliar study vehicle and, therefore, may not accurately represent participants' performance in their own vehicles.

Finally, while the study results show that some participants self-regulated, this study did not assess the appropriateness of this self-regulation relative to participants' functional limitations.

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Appendix A: Study Material

Research Study of Driving Habits

A research study funded by the U.S. Department of Transportation, National Highway Traffic Safety Administration is seeking volunteer participants **between the ages of 60 and 89** who have a **valid driver's license** and **drive at least 3 times per week.** The purpose of this research is to examine the conditions under which drivers in various age groups choose to drive and how general driving habits vary with age. The study involves 5 simple steps:

- Completion of a brief questionnaire about you and your driving habits
- Installation of unobtrusive data collection equipment
- Driving your vehicle for 30 days just as you normally would
- Driving a short fixed route with a driving specialist as passenger
- Completing a brief computer task

You will be paid for the time you volunteer if you are accepted into this study. You will receive $50 at the time the data collection device is installed in your vehicle (Step 2). You will receive an additional $150 for your participation in the study if you complete the 30-day driving period, drive with the driving expert, and complete the brief computer task (Steps 3, 4, and 5).

The study will take place in the Burlington, NC area. All data collected will be confidential, and results will only be reported at the group level.

If you have questions or would like further information, please call Dr. Dennis Thomas at the research company Dunlap and Associates, Inc. [redacted] or email [redacted] and put "Driving Habits Study" in the subject line of the email.

OMB#: 2127-0722
Expiration Date: 01/31/2020

Older Drivers Self-regulation and Exposure
(To be read by researcher before asking items below)
The purpose of this research is to examine the conditions under which drivers in various age groups choose to drive and how general driving habits vary with age. To determine if you are eligible for the study, I need to ask you a few questions. You don't have to answer any question you don't want to answer. Your answers will be recorded, but your information will only be used for the purposes of this study. Do I have your permission to proceed?
□ Yes □ No (Stop, it cannot be determined if they qualify for the study)
(Oral interview to be conducted by researcher)

1. Will you be spending the next 60 days in this area and be available to participate in this study?
   □ Yes □ No (Stop, they are not eligible for the study)

2. What is your date of birth? _____

3. Do you have a valid driver's license, and if so, when does it expire?
   □ Yes □ No (Stop, they are not eligible for the study)

   Expiration date: _____

4. Do you have any restrictions on your driver's license?
   □ Yes □ No

   If yes, what are they (List all):
   _____

5. Do you use adaptive controls in your car?
   □ Yes (Stop, they are not eligible for the study) □ No

6. About how many times per typical week do you drive? _____
   (Must be at least 3 to qualify)

7. Do you drive one particular vehicle for 90% or more of these trips?
   □ Yes □ No (Stop, they are not eligible for the study)

8. Do you have to get anyone's approval or permission each time you want to use that vehicle?
   □ Yes □ No

   If yes, please explain?_____
   (If when and where this individual drives is largely controlled by someone else, stop, they are not eligible for the study)

9. Is this vehicle available to use as your primary vehicle for at least the next 30 days as part of this study?
   □ Yes □ No (Stop, you are not eligible for the study)

10. Who owns the vehicle?
    □ Yourself □Your spouse □Jointly owned by respondent and someone else
    □Other family member □ Other_____

11. Which statement best describes who drives this vehicle?
    □ I'm essentially the only driver
    □ I do the majority of its driving
    □ I share it about equally with someone else
    □ Someone else does the majority of its driving

12. Do you drive the majority of trips for your household?
    □ Yes □ No

13. Are there any types of roadways, traffic situations, or weather conditions you try not to drive in?
    □ Yes □ No

    If yes, what are they? (Do not prompt with these answer categories)
    □ Alone
    □ Bad weather (e.g., rain, snow)
    □ Night in bad weather
    □ Rush hour
    □ Unfamiliar areas
    □ Interstates/limited access highways
    □ High speed roads
    □ Night
    □ High traffic roads
    □ Long distances
    □ Other _____

Subject # _____

Weather Conditions: ___Sunny ___Overcast ___Rainy ___Windy ___Other: _____

Behind the Wheel Scoring Sheet*: *NHTSA RFP no.___
Older Drivers' Self-regulation and Exposure
ROUTE ONE; 13.94 MILES

Operational Skills	*Tally*	*Total*
Independent access to vehicle (1)	_____	_____
Negotiation of driver door (1)	_____	_____
Seat adjustment (3)	_____	_____
Wheel adjustment (3)	_____	_____
Mirror adjustment (3)	_____	_____
Fastens seat belt (3)	_____	_____
Ignition Control (3)	_____	_____
Gear selection appropriate (3)	_____	_____
Brake pedal use (3)	_____	_____
Accelerator pedal use (3)	_____	_____
Steering (5)	_____	_____
Signal ability (5)	_____	_____
Adjusts Heating and Air/Radio if needed(5)	_____	_____
Turn Signal/Lights/Wiper/Cruise controls used if necessary (5)	_____	_____
Parking brake used if necessary (5)	_____	_____
Operational Points off	_____	_____

Comments:

Tactical Skills	*Tally*	*Total*
Visual Skills:		
Fails to scan environment/tunnel vision (10)	_____	_____

NOTES:

Awareness of signage (5)	_____	_____
Fails to check speedometer(5)	_____	_____

NOTES:

Vehicle Position:		
Lane maintenance/centered position (5)	_____	_____
Drives in proper lane (5)	_____	_____
Follow distance/Lateral Cushion (5)	_____	_____
Stopping position (5)	_____	_____
Response to other traffic (5)	_____	_____

NOTES:

Subject # _____

Intersections/Turns *(Right)*

Check Traffic (5)	_____	_____
Fails to signal (3)	_____	_____
Proper Lane (5)	_____	_____
Speed (3)	_____	_____
Safe gap selection/yield (10)	_____	_____
Fails to make complete stop, obvious roll (10)	_____	_____
Fails to make complete stop (3). (Very near stop but vehicle does not settle back)	_____	_____
Runs red light (100)	_____	_____

Location of above infraction: 10 Right Turns

___R out of Harris Teeter onto Church Street
___R onto Boone Station Road
___Right on Garden Street
___Right on Boone Station Road (again)
___Right in front of McDonalds
___ Right onto University Dr.
___Onto Alamance Church Road out of K&W
___Right off 40 merge ramp onto Huffman Mill Road
___Onto Edgewood from Church St.
___Right off Williamson into Food Lion

Intersections/Turns *(Left)*

Check Traffic (5)	_____	_____
Fails to signal (3)	_____	_____
Proper Lane (5)	_____	_____
Speed (3)	_____	_____
Safe gap selection/yield (10)	_____	_____
Fails to make complete stop, obvious roll (10)	_____	_____
Fails to make complete stop (3). (Very near stop but vehicle does not settle back)	_____	_____
Runs red light (100)	_____	_____

Location of above infraction: 13 Left turns

___Left on Forestdale
___ Left onto St. Marks Church Road
___In Target parking lot alongside McDonalds
___Off exit 143 onto Alamance Church Road
___Into K&W Parking lot off of Alamance Church Road
___Out of K&W parking lot
___Off Huffman Mill Road onto Church Street
___Off Edgewood onto Shadowbrook
___Left on Sadleclub Road
___Left on Front Street
___Left on Haggard
___Left on Williamson
___Left off Westgate onto Westbrook

Subject # _____

Lane changes:

Fails to signal (5)	_____	_____
Fails to use mirrors to check traffic (5)	_____	_____
Fails to perform necessary blind spot checks (5)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Lane (5)	_____	_____
Safe gap selection/yield (10)	_____	_____

Location of Infraction
___ On Church Street to prepare for L on St. Marks
___ Request Lane Change on Interstate
___ On Huffman Mill preparing for left on church
___On Church Street preparing for right on Edgewood

Merges on/off limited access hwy

Judgment of space (5)	_____	_____
Signaling(5)	_____	_____
Speed regulation (5)	_____	_____
Visual scanning/Blind spot (5)	_____	_____

Location of above infraction: 2 Interstate Merges on and 2 off
___Onto 40 E (1st) at University Drive
___Off of 40 at exit 143
___ Onto 40 W (2nd) after K&W
___Off of 40 onto Huffman Mill Road

Vehicle Handling:

Judge and regulate speed (5)	_____	_____
Smooth steering (5)	_____	_____
Smooth accelerator (5)	_____	_____
Smooth braking(5)	_____	_____
Appropriate use of signals (5)	_____	_____
Response to traffic signal (5)	_____	_____
Parking : Approach (3)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Backing: Check Traffic (5)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Safe/yield (10)	_____	_____

Location of above infraction (parking and backing): 4 parking and backing instances
___Harris Teeter
___Target Parking Lot
___K&W parking lot
___ Food Lion

Subject # _____

3-pt turn around (5)	_____	_____
U-Turn	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Safe/yield (10)	_____	_____
Traffic Circle (5)	_____	_____
Tactical Points Off	_____	_____

Comments:

Strategic Skills	*Tally*	*Total*
Correct and safe decisions		
Residential (5)	_____	_____
City (5)	_____	_____
Limited access hwy (5)	_____	_____
Route planning(5)	_____	_____
Route logically sequenced (5)	_____	_____
Remembers and executes the route in the preplanned order (5)	_____	_____
Maintains/regulates conversation appropriately (5)	_____	_____
Problems following rules of the road (5)	_____	_____
Fails to make decisions in advance of Maneuvers (5)	_____	_____
Separates hazards (5)	_____	_____
Fails to observe cues from other road users (5)	_____	_____
Fails to anticipate(5)	_____	_____
Attention deficit – "looked but didn't see" (5)	_____	_____
Decreased Processing speed(5)	_____	_____
Impaired following directions (5)	_____	_____
Strategic Points Off	_____	_____

Comments:

SCORING: TOTAL POINTS OFF= (A – 0-24; pass with no restrictions), (B – 25-49; pass with recommendations), (C – 50-75; marginal with restrictions; marginal with training), (D – 76-99; Fail), (F – 100 up; Fail)

A vertical mark beside an item indicates points off (tally). The point value of each item is in parenthesis. Each item may have several vertical marks beside it representing the errors that were committed more than one time. Multiply the number of vertical marks times the point value in parenthesis to get the Points Off for that item (total).

100 or more Total Points Off is a failure.

TOTAL ROAD POINTS _____ **Score:**

Feedback provided to Participant:

Subject # _____

Weather Conditions: ___Sunny ___Overcast ___Rainy ___Windy ___Other: _____

Behind the Wheel Scoring Sheet: ***NHTSA RFP no.___***
Older Drivers' Self-regulation and Exposure
ROUTE TWO; 14.5 MILES

Operational Skills	*Tally*	*Total*
Independent access to vehicle (1)	_____	_____
Negotiation of driver door (1)	_____	_____
Seat adjustment (3)	_____	_____
Wheel adjustment (3)	_____	_____
Mirror adjustment (3)	_____	_____
Fastens seat belt (3)	_____	_____
Ignition Control (3)	_____	_____
Gear selection appropriate (3)	_____	_____
Brake pedal use (3)	_____	_____
Accelerator pedal use (3)	_____	_____
Steering (5)	_____	_____
Signal ability (5)	_____	_____
Adjusts Heating and Air/Radio if needed(5)	_____	_____
Turn Signal/Lights/Wiper/Cruise controls used if necessary (5)	_____	_____
Parking brake used if necessary (5)	_____	_____
Operational Points off	_____	_____

Comments:

Tactical Skills	*Tally*	*Total*
Visual Skills:		
Fails to scan environment/tunnel vision (10)	_____	_____

NOTES:

Awareness of signage (5)	_____	_____
Fails to check speedometer(5)	_____	_____

NOTES:

Vehicle Position:		
Lane maintenance/centered position (5)	_____	_____
Drives in proper lane (5)	_____	_____
Follow distance/Lateral Cushion (5)	_____	_____
Stopping position (5)	_____	_____
Response to other traffic (5)	_____	_____

NOTES:

Subject # _____

Intersections/Turns *(Right)*

Check Traffic (5)	_____	_____
Fails to signal (3)	_____	_____
Proper Lane (5)	_____	_____
Speed (3)	_____	_____
Safe gap selection/yield (10)	_____	_____
Fails to make complete stop, obvious roll (10)	_____	_____
Fails to make complete stop (3). (Very near stop but vehicle does not settle back)	_____	_____
Runs red light (100)	_____	_____

Location of above infraction: 14 Right Turns

___R out of Lowes Parking Lot onto Church Street
___R on Church Street
___Right onto 6th Street
___Right onto Mebane Street
___Right on Chapel Hill Road
___Right on Mebane Street
___Right on University
___Right onto Boone Station Road
___Right by Mattress Firm (in Alamance Crossing)
___Right between Hobby Lobby and Belk
___Right onto Garden Road
___Right on Delaney Street
___Right on Shadowbrook
___Right on Hickory

Intersections/Turns *(Left)*

Check Traffic (5)	_____	_____
Fails to signal (3)	_____	_____
Proper Lane (5)	_____	_____
Speed (3)	_____	_____
Safe gap selection/yield (10)	_____	_____
Fails to make complete stop, obvious roll (10)	_____	_____
Fails to make complete stop (3). (Very near stop but vehicle does not settle back)	_____	_____
Runs red light (100)	_____	_____

Location of above infraction: 12 Left Turns

___Left onto Pinecrest
___Left on Trail 8
___Left onto Alamance Road
___ Left into Alamance Crossing on Waltham Road
___Left at T intersection in parking lot between buildings
___Out of Cracker Barrel onto Huffman Mill Road
___Left on Alamance Road
___Left on Trail 6
___Left on Church Street
___ Left on Westbrook
___Left on Colonial
___Left on Neese

Subject # _____

Lane changes:

Fails to signal (5)	_____	_____
Fails to use mirrors to check traffic (5)	_____	_____
Fails to perform necessary blind spot checks (5)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Lane (5)	_____	_____
Safe gap selection/yield (10)	_____	_____

___ On Mebane Street to prepare for L on Alamance — 5 lane changes
___ On Alamance to prepare for interstate merge
___Request Lane Change on Interstate
___ On Huffman Mill preparing for merge onto I 40E

Merges on/off limited access hwy

Judgment of space (5)	_____	_____
Signaling (5)	_____	_____
Speed regulation (5)	_____	_____
Visual scanning/Blind spot (5)	_____	_____

Location of above infraction: — 2 merges on and 2 merges off interstate
___Onto 40 E (1st) at Alamance Road
___Off of 40 at exit 140
___Onto 40 W (2nd) at Huffman Mill Road
___Off of 40 at exit 143 Alamance Road

Vehicle Handling:

Judge and regulate speed (5)	_____	_____
Smooth steering (5)	_____	_____
Smooth accelerator (5)	_____	_____
Smooth braking(5)	_____	_____
Appropriate use of signals (5)	_____	_____
Response to traffic signal (5)	_____	_____
Parking : Approach (3)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Backing: Check Traffic (5)	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Safe/yield (10)	_____	_____

Location of above infraction (parking and backing): — 4 occasions for parking and backing
___At Lowes
___Belk
___Cracker Barrel Parking Lot
___Harris Teeter

Subject # _____

3-pt turn around (5)	_____	_____
U-Turn	_____	_____
Position (3)	_____	_____
Speed (3)	_____	_____
Safe/yield (10)	_____	_____
Traffic Circle at Alamance Crossing (5)	_____	_____
Tactical Points Off	_____	_____

Comments:

Strategic Skills	*Tally*	*Total*
Correct and safe decisions		
Residential (5)	_____	_____
City (5)	_____	_____
Limited access hwy (5)	_____	_____
Route planning(5)	_____	_____
Route logically sequenced (5)	_____	_____
Remembers and executes the route in the preplanned order (5)	_____	_____
Maintains/regulates conversation appropriately (5)	_____	_____
Problems following rules of the road (5)	_____	_____
Fails to make decisions in advance of Maneuvers (5)	_____	_____
Separates hazards (5)	_____	_____
Fails to observe cues from other road users (5)	_____	_____
Fails to anticipate(5)	_____	_____
Attention deficit – "looked but didn't see" (5)	_____	_____
Decreased Processing speed(5)	_____	_____
Impaired following directions (5)	_____	_____
Strategic Points Off	_____	_____

Comments:

SCORING: TOTAL POINTS OFF= (A – 0-24; pass with no restrictions), (B – 25-49; pass with recommendations), (C – 50-75; marginal with restrictions; marginal with training), (D – 76-99; Fail), (F – 100 up; Fail)

A vertical mark beside an item indicates points off (tally). The point value of each item is in parenthesis. Each item may have several vertical marks beside it representing the errors that were committed more than one time. Multiply the number of vertical marks times the point value in parenthesis to get the Points Off for that item (total).

100 or more Total Points Off is a failure.

TOTAL ROAD POINTS _____ **Score:**

Feedback provided to Participant:

Appendix B: Additional Results

Linear Regression Results: TMT-A and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Poorer TMT-A performance predicted
Mean average speed	2.08	.153	.017	No effect
Mean maximum speed	1.18	.282	.003	No effect
Maximum maximum speed	7.93	.007	.099	Lower maximum maximum Speed
Trip length	0.35	.557	.000	No effect
Num. trips	0.96	.330	.000	No effect
Num. trips > 50 mph	0.92	.342	.000	No effect
% of trips > 50 mph	1.51	.223	.008	No effect
Num. trips > 5 Miles	1.44	.235	.007	No effect
% trips > 5 Miles	1.52	.222	.008	No effect
Num. trips at night	1.51	.224	.008	No effect
Num. limited access trips	0.79	.377	.000	No effect
Num 50+ mph trips	0.72	.398	.000	No effect
Num. trips with passengers	2.27	.137	.020	No effect
Num. relative slow trips	0.02	.902	.000	No effect
Num. relative fast trips	1.25	.268	.004	No effect
Num. commercial dest. trips	2.46	.122	.023	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: TMT-A and Driving Exposure

Exposure measure	X^2	*p*	Nagelkerke *R2*	Those with longer TMT-A were
Ever Exceed 70 MPH	4.13	.042	.086	Less likely to exceed 70 MPH
Ever Exceed 60 MPH	1.13	.001	.236	Less likely to exceed 60 MPH
Ever Drive at Night	0.78	.386	.016	No effect
Ever Use Limited Access	5.71	.017	.138	Less likely to use limited access road
Ever Use 50+ MPH Rd.	3.44	.064	.080	No effect
Ever Drive w/Passengers	0.46	.496	.019	No effect
Ever Drive in Heavy Traffic	0.06	.802	.001	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: TMT-B and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with longer TMT-B had
Mean average speed	1.65	.204	.010	No effect
Mean maximum speed	1.09	.300	.001	No effect
Maximum maximum speed	15.00	<.001	.182	Lower maximum maximum Speed
Trip length	0.14	.706	.000	No effect
Num. trips	5.30	.025	.064	Fewer total trips
Num. trips > 50 mph	3.36	.072	.036	No effect
% of trips > 50 mph	3.83	.055	.043	No effect
Num. trips > 5 Miles	3.05	.086	.032	No effect
% trips > 5 Miles	3.55	.064	.039	No effect
Num. trips at night	0.77	.383	.000	No effect
Num. limited access trips	3.43	.069	.037	No effect
Num 50+ mph trips	2.10	.152	.017	No effect
Num. trips with passengers	5.33	.024	.064	Fewer trips with passengers
Num. relative slow trips	0.02	.874	.000	No effect
Num. relative fast trips	0.03	.854	.000	No effect
Num. commercial dest. trips	3.15	.081	.033	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: TMT-B and Driving Exposure

Exposure measure	X^2	*p*	Nagelkerke *R2*	Those with longer TMT-B scores were
Ever Exceed 70 MPH	13.1	< .001	.255	Less likely to exceed 70 MPH
Ever Exceed 60 MPH	13.5	< .001	.307	Less likely to exceed 60 MPH
Ever Drive at Night	2.8	.093	.061	No effect
Ever Use Limited Access	12.8	< .001	.293	Less likely to use limited access roads
Ever Use 50+ MPH Rd.	3.8	.053	.088	No effect
Ever Drive w/Passengers	1.7	.198	.069	No effect
Ever Drive in Heavy Traffic	2.5	.111	.054	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: UFOV and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with poorer UFOV scores had
Mean average speed	0.15	.700	.000	No effect
Mean maximum speed	0.03	.857	.000	No effect
Maximum maximum speed	4.07	.048	.047	Lower maximum maximum speed
Trip length	0.11	.746	.000	No effect
Num. trips	0.44	.508	.000	No effect
Num. trips > 50 mph	1.35	.251	.006	No effect
% of trips > 50 mph	0.47	.494	.000	No effect
Num. trips > 5 Miles	1.72	.194	.011	No effect
% trips > 5 Miles	1.12	.295	.002	No effect
Num. trips at night	0.09	.770	.000	No effect
Num. limited access trips	2.09	.154	.017	No effect
Num 50+ mph trips	0.05	.822	.000	No effect
Num. trips with passengers	4.03	.049	.047	Fewer trips with passengers
Num. relative slow trips	0.07	.793	.000	No effect
Num. relative fast trips	0.06	.800	.000	No effect
Num. commercial dest. trips	0.31	.577	.000	No effect

Note: Degrees of freedom are (1, 61) for all analyses

Logistic Regression Results: UFOV and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with poorer UFOV scores were less likely to
Exceed 70 mph	2.43	.119	.052	No effect
Exceed 60 mph	1.68	.195	.042	No effect
Drive at night	0.02	.879	.001	No effect
Use aimited access	3.94	.047	.097	Use limited access road
Use 50+ mph road	0.73	.392	.018	No effect
Drive w/passengers	1.79	.179	.075	No effect
Drive in heavy traffic	.202	.653	.004	No effect

Note: Degrees of freedom are (1, N=63) for all analyses

Linear Regression Results: Simple Reaction Time and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with longer Simple RTs had
Mean average speed	1.29	.261	.005	No effect
Mean maximum speed	1.67	.201	.011	No effect
Maximum maximum speed	4.06	.048	.047	Lower maximum maximum Speed
Trip length	0.15	703	.000	No effect
Num. trips	4.72	.034	.057	Fewer trips
Num. trips > 50 mph	5.58	.021	.069	Fewer trips above 50 mph
% of trips > 50 mph	6.19	.016	.077	Lower % of trips above 50 mph
Num. trips > 5 Miles	6.38	.014	.080	Fewer trips > 5 miles
% trips > 5 Miles	6.89	.011	.087	Lower % of trips > 5 miles
Num. trips at night	2.07	.155	.017	No effect
Num. limited access trips	2.41	.126	.022	No effect
Num 50+ mph trips	5.61	.023	.069	Fewer trips on 50+ mph roads
Num. trips with passengers	3.58	.063	.040	No effect
Num. relative slow trips	0.55	.462	.000	No effect
Num. relative fast trips	0.19	.665	.000	No effect
Num. commercial dest. trips	3.60	.062	.040	No effect

Note: Degrees of freedom are (1, 61) for all analyses

Logistic Regression Results: Simple Reaction Time and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with longer Simple RTs were less likely to
Exceed 70 mph	8.11	.004	.166	Exceed 70 mph
Exceed 60 mph	5.98	.014	.145	Exceed 60 mph
Drive at Night	3.04	.081	.066	No effect
Use Limited Access road	6.97	.008	.168	Use limited access roadways
Use 50+ mph road	1.11	.291	.027	No effect
Drive w/Passengers	0.76	.383	.032	No effect
Drive in Heavy Traffic	1.46	.063	.074	No effect

Note: Degrees of freedom are (1, N=63) for all analyses

Linear Regression Results: Choice Reaction Time and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with longer RTs had
Mean average speed	0.41	.522	.000	No effect
Mean maximum speed	0.58	.450	.000	No effect
Maximum maximum speed	4.52	.038	.054	Lower maximum maximum Speed
Trip length	0.41	.526	.000	No effect
Num. trips	3.26	.076	.035	No effect
Num. trips > 50 mph	1.66	.203	.011	No effect
% of trips > 50 mph	3.74	.058	.042	No effect
Num. trips > 5 Miles	2.26	.138	.020	No effect
% trips > 5 Miles	4.14	.046	.048	Lower % of trips > 5 mi.
Num. trips at night	0.09	.768	.000	No effect
Num. limited access trips	1.41	.239	.007	No effect
Num 50+ mph trips	4.04	.049	.047	Fewer trips on 50+ mph roads
Num. trips with passengers	7.55	.008	.095	Fewer trips with passengers
Num. relative slow trips	1.10	.299	.002	No effect
Num. relative fast trips	0.09	.771	.000	No effect
Num. commercial dest. trips	1.92	.171	.015	No effect

Note: Degrees of freedom are (1, 61) for all analyses

Logistic Regression Results: Choice Reaction Time and Driving Exposure

Exposure measure: Ever	X^2	*p*	Nagelkerke *R2*	Those with longer RTs were
Exceed 70 mph	5.01	.025	.105	Less likely to exceed 70 mph
Exceed 60 mph	4.59	.032	.113	Less likely to exceed 60 mph
Drive at Night	2.27	.132	.050	No effect
Use limited access	7.80	.005	.187	Less likely to use limited access road
Use 50+ mph road	1.54	.214	.037	No effect
Drive with passengers	0.03	.857	.001	No effect
Drive in heavy traffic	1.31	.253	.028	No effect

Note: Degrees of freedom are (1, N=63) for all analyses

Linear Regression Results: Visual Closure Errors and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Interpretation
Mean average speed	0.00	.960	.000	No effect
Mean maximum speed	0.00	.963	.000	No effect
Maximum maximum speed	3.68	.060	.041	No effect
Trip length	0.50	.484	.000	No effect
Num. trips	0.36	.550	.000	No effect
Num. trips > 50 mph	0.00	.983	.000	No effect
% of trips > 50 mph	0.16	.687	.000	No effect
Num. trips > 5 Miles	0.08	.781	.000	No effect
% trips > 5 Miles	0.74	.394	.000	No effect
Num. trips at night	0.66	.418	.000	No effect
Num. limited access trips	0.08	.778	.000	No effect
Num 50+ mph trips	0.497	.483	.000	No effect
Num. trips with passengers	3.18	.079	.033	No effect
Num. relative slow trips	.007	.932	.000	No effect
Num. relative fast trips	.188	.666	.000	No effect
Num. commercial dest. trips	.007	.933	.000	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Visual Closure Errors and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke R^2	Those with higher error scores were
Exceed 70 mph	5.91	.015	.122	less likely to exceed 70 MPH
Exceed 60 mph	4.16	.041	.102	less likely to exceed 60 MPH
Drive at night	3.45	.063	.074	No effect
Use limited access roads	.661	.416	.017	No effect
Use 50+ mph roads	1.19	.275	.028	No effect
Drive with passengers	.011	.918	.000	No effect
Drive in heavy traffic	4.23	.040	.089	less likely to drive in heavy traffic

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Visual Closure Completion Time and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with longer completion times had
Mean average speed	2.34	.131	.021	No effect
Mean maximum speed	.940	.336	.000	No effect
Maximum maximum speed	5.26	.025	.063	lower maximum maximum speed
Trip length	4.88	.031	.058	shorter trip length
Num. trips	2.70	.105	.026	No effect.
Num. trips > 50 mph	5.49	.022	.067	fewer trips > 50 MPH
% of trips > 50 mph	5.97	.017	.073	lower % of trips > 50 MPH
Num. trips > 5 Miles	6.05	.017	.074	fewer trips > 5 miles
% trips > 5 Miles	6.16	.016	.076	lower % of trips > 5 miles
Num. trips at night	4.85	.031	.058	fewer trips at night
Num. limited access trips	3.30	.074	.035	No effect
Num 50+ mph trips	3.21	.078	.034	No effect
Num. trips with passengers	.315	.577	.000	No effect
Num. relative slow trips	.458	.501	.000	No effect
Num. relative fast trips	1.75	.190	.012	No effect
Num. commercial dest. trips	1.95	.168	.015	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Visual Closure Completion Time and Driving Exposure

Exposure measure: ever	X^2	p	Nagelkerke R^2	Those with longer completion times were
Exceed 70 mph	2.80	.094	.059	No effect
Exceed 60 mph	6.91	.009	.165	less likely to drive > 60 MPH
Drive at Night	5.29	.021	.111	less likely to drive at night
Use limited access	2.88	.090	.071	No effect
Use 50+ mph road	6.85	.009	.156	less likely to use 50+ mph roads
Drive with passengers	.967	.325	.040	No effect
Drive in heavy traffic	.036	.850	.001	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Traffic Sign Errors and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Interpretation
Mean average speed	.280	.867	.000	No effect
Mean maximum speed	.000	.998	.000	No effect
Maximum maximum speed	.920	.341	.000	No effect
Trip length	.001	.973	.000	No effect
Num. trips	.251	.618	.000	No effect
Num. trips > 50 mph	.026	.873	.000	No effect
% of trips > 50 mph	.156	.694	.000	No effect
Num. trips > 5 Miles	.500	.482	.000	No effect
% trips > 5 Miles	.001	.976	.000	No effect
Num. trips at night	.324	.571	.000	No effect
Num. limited access trips	.000	.995	.000	No effect
Num 50+ mph trips	.029	.866	.000	No effect
Num. trips with passengers	.673	.415	.000	No effect
Num. relative slow trips	.228	.635	.000	No effect
Num. relative fast trips	.044	.834	.000	No effect
Num. commercial dest. trips	.282	.597	.000	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Traffic Sign Errors and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with more errors were
Exceed 70 mph	4.44	.035	.092	less likely to drive > 70 MPH
Exceed 60 mph	.520	.471	.013	No effect
Drive at Night	2.97	.085	.064	No effect
Use limited access	.214	.644	.005	No effect
Use 50+ mph road	.025	.875	.001	No effect
Drive with passengers	.100	.752	.004	No effect
Drive in heavy traffic	3.17	.075	.067	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Traffic Sign Completion Time and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with longer completion times had
Mean average speed	1.84	.180	.013	No effect
Mean maximum speed	.576	.451	.000	No effect
Maximum maximum speed	4.89	.031	.059	lower maximum maximum speeds
Trip length	4.74	.033	.057	shorter trip length
Num. trips	7,57	.008	.096	fewer trips
Num. trips > 50 mph	4.81	.032	.058	fewer trips > 50 MPH
% of trips > 50 mph	2.72	.104	.027	No effect
Num. trips > 5 Miles	6.02	.017	.075	fewer trips > 5 miles
% trips > 5 Miles	4.61	.036	.055	lower % of trips > 5 miles
Num. trips at night	5.13	.027	.062	fewer trips in the dark
Num. limited access trips	5.63	.021	.069	fewer trips on limited access roads
Num 50+ mph trips	3.25	.076	.035	No effect
Num. trips with passengers	2.56	.115	.025	No effect
Num. relative slow trips	.000	.997	.000	No effect
Num. relative fast trips	1.75	.191	.012	No effect
Num. commercial dest. trips	3.67	.060	.041	No effect

Note: Degrees of freedom are (1, 61) for all analyses

Logistic Regression Results: Traffic Sign Completion Time and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with longer completion times were
Exceed 70 mph	4.89	.027	.103	less likely to drive > 70 mph
Exceed 60 mph	7.02	.008	.169	less likely to drive > 60 mph
Drive at Night	8.38	.004	.175	less likely to drive at night
Use limited access roads	2.37	.123	.059	No effect
Use 50+ mph roads	9.29	.002	.210	less likely to use 50+ mph roads
Drive with passengers	.615	.433	.026	No effect
Drive in heavy traffic	.623	.430	.014	No effect

Note: Degrees of freedom are (1, N=63) for all analyses

Linear Regression Results: Far Visual Acuity and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with poorer acuity had
Mean average speed	3.56	.064	.039	No effect
Mean maximum speed	1.68	.199	.011	No effect
Maximum maximum speed	4.41	.040	.051	lower maximum maximum speed
Trip length	1.39	.242	.006	No effect
Num. trips	.429	.515	.000	No effect
Num. trips > 50 mph	1.13	.292	.002	No effect
% of trips > 50 mph	2.35	.130	.021	No effect
Num. trips > 5 Miles	2.93	.092	.030	No effect
% trips > 5 Miles	5.58	.021	.068	lower % of trips > 5 miles
Num. trips at night	.036	.850	.000	No effect
Num. limited access trips	1.40	.241	.006	No effect
Num 50+ mph trips	.727	.397	.000	No effect
Num. trips with passengers	2.46	.122	.023	No effect
Num. relative slow trips	.241	.625	.000	No effect
Num. relative fast trips	.977	.327	.000	No effect
Num. commercial dest. trips	.940	.336	.000	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Far Visual Acuity and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with poorer acuity were
Exceed 70 mph	4.40	.036	.092	less likely to drive > 70 MPH
Exceed 60 mph	2.91	.088	.072	No effect
Drive at Night	6.19	.013	.130	less likey to drive at night
Use limited access	5.25	.022	.127	less likely to use Ltd. Access
Use 50+ mph road	3.83	.050	.089	less likely to use 50+ MPH roads
Drive with passengers	.181	.670	.127	less likely to drive with passengers
Drive in heavy traffic	7.95	.005	.163	less likely to drive in heavy traffic

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Near Visual Acuity and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Interpretation
Mean average speed	.717	.400	.000	No effect
Mean maximum speed	.453	.503	.000	No effect
Maximum maximum speed	1.43	.236	.007	No effect
Trip length	.047	.829	.000	No effect
Num. trips	1.03	.315	.016	No effect
Num. trips > 50 mph	2.09	.153	.017	No effect
% of trips > 50 mph	2.06	.156	.017	No effect
Num. trips > 5 Miles	3.06	.085	.032	No effect
% trips > 5 Miles	3.70	.059	.041	No effect
Num. trips at night	.206	.652	.000	No effect
Num. limited access trips	2.11	.151	.017	No effect
Num 50+ mph trips	1.74	.192	.012	No effect
Num. trips with passengers	3.61	.062	.040	No effect
Num. relative slow trips	1.09	.300	.001	No effect
Num. relative fast trips	2.12	.150	.018	No effect
Num. commercial dest. trips	3.68	.060	.041	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Near Visual Acuity and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with poorer acuity were
Exceed 70 mph	3.45	.063	.072	No effect
Exceed 60 mph	3.44	.064	.085	No effect
Drive at Night	.568	.451	.012	No effect
Use limited access roads	6.58	.010	.158	less likely to use limited access roads
Use 50+ mph road	5.53	.019	.127	less likely to use 50+ mph roads
Drive with passengers	.789	.384	.032	No effect
Drive in heavy traffic	2.12	.146	.045	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Contrast Sensitivity and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with poorer contrast sensitivity had
Mean average speed	7.42	.008	.092	lower Lower average speed
Mean maximum speed	2.07	.155	.017	No effect
Maximum maximum speed	1.89	.174	.014	No effect
Trip length	3.11	.083	.032	No effect
Num. trips	3.09	.084	.032	No effect
Num. trips > 50 mph	4.09	.047	.047	Fewer trips above 50 mph
% of trips > 50 mph	2.26	.138	.020	No effect
Num. trips > 5 Miles	6.31	.015	.078	Fewer trips > 5 miles
% trips > 5 Miles	4.83	.032	.057	Lower % of trips > 5 miles
Num. trips at night	.911	.344	.000	No effect
Num. limited access trips	4.61	.036	.054	Fewer trips on limited access roads
Num 50+ mph trips	2.99	.089	.031	No effect
Num. trips with passengers	7.40	.008	.092	Fewer trips with passengers
Num. relative slow trips	0.91	.344	.000	No effect
Num. relative fast trips	0.61	.438	.000	No effect
Num. commercial dest. trips	5.08	.028	.061	Fewer trips to commercial destinations

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Contrast Sensitivity and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with poorer contrast sensitivity were
Exceed 70 mph	3.15	.076	.066	No effect
Exceed 60 mph	3.45	.063	.085	No effect
Drive at Night	0.20	.658	.004	No effect
Use limited access	2.66	.103	.066	No effect
Use 50+ mph road	6.40	.011	.146	Less likely to use 50+ mph roads
Drive with passengers	0.17	.680	.007	No effect
Drive in heavy traffic	2.98	.084	.063	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Maze 2 Completion Time and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with poorer Maze 2 performance had
Mean average speed	9.59	.003	.120	Lower mean avg. speed
Mean maximum speed	7.12	.010	.089	Lower mean Max Speed
Maximum maximum speed	5.02	.029	.060	Lower maximum speed
Trip length	.951	.333	.000	No effect
Num. trips	1.16	.285	.003	No effect
Num. trips > 50 mph	5.43	.023	.066	Fewer trips > 50 mph
% of trips > 50 mph	6.28	.015	.077	Lower pct. of trips > 50 mph
Num. trips > 5 Miles	5.61	.021	.068	Fewer trips > 5 miles
% trips > 5 Miles	5.71	.020	.070	Lower pct. of trips > 5 miles
Num. trips at night	2.90	.094	.029	No effect
Num. limited access trips	3.89	.053	.033	No effect
Num 50+ mph trips	2.56	.114	.024	No effect
Num. trips with passengers	2.62	.111	.025	No effect
Num. relative slow trips	0.18	.668	.000	No effect
Num. relative fast trips	0.03	.860	.000	No effect
Num. commercial dest. trips	1.71	.196	.011	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Maze 2 Completion Time and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Those with longer Maze 2 completion times were
Exceed 70 mph	13.2	< .001	.257	Less likely to drive > 70 mph
Exceed 60 mph	2.11	.146	.052	No effect
Drive at Night	4.97	.026	.105	Less likely to drive at night.
Use limited access roads	3.17	.075	.078	No effect
Use 50+ mph roads	1.43	.231	.034	No effect
Drive with passengers	0.30	.582	.013	No effect
Drive in heavy traffic	0.08	.783	.002	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Behind-the-Wheel Scores and Driving Exposure

Exposure measure	*F*	*p*	Adj. *R2*	Those with poorer BTW scores had
Mean average speed	0.72	.399	.000	No effect
Mean maximum speed	0.01	.934	.000	No effect
Maximum maximum speed	1.03	.315	.000	No effect
Trip length	0.17	.676	.000	No effect
Num. trips	4.59	.036	.054	Fewer trips
Num. trips > 50 mph	0.04	.846	.000	No effect
% of trips > 50 mph	0.03	.864	.000	No effect
Num. trips > 5 Miles	1.98	.165	.015	No effect
% trips > 5 Miles	3.18	.080	.033	No effect
Num. trips at night	0.00	.954	.000	No effect
Num. limited access trips	1.28	.263	.004	No effect
Num 50+ mph trips	3.57	.064	.039	No effect
Num. trips with passengers	5.69	.020	.069	Fewer trips with passengers
Num. relative slow trips	0.36	.550	.000	No effect
Num. relative fast trips	0.00	.975	.000	No effect
Num. commercial dest. trips	1.12	.295	.000	No effect

Note: Degrees of freedom are (1, 62) for all analyses

Logistic Regression Results: Behind-the-Wheel Scores and Driving Exposure

Exposure measure: ever	X^2	*p*	Nagelkerke *R2*	Interpretation
Exceed 70 mph	3.25	.071	.068	No effect
Exceed 60 mph	1.67	.197	.041	No effect
Drive at Night	0.14	.708	.003	No effect
Use limited access roads	2.67	.102	.066	No effect
Use 50+ mph road	3.17	.075	.074	No effect
Drive with passengers	0.00	.947	.000	No effect
Drive in heavy traffic	3.57	.059	.076	No effect

Note: Degrees of freedom are (1, N=64) for all analyses

Linear Regression Results: Functional Assessment and Behind-the-Wheel Scores

Exposure measure	*F*	*p*	Adj. *R2*	Poorer BTW scores were predicted by
TMT-A	9.34	.003	.117	Longer TMT-A
TMT-B	12.9	.001	.159	Longer TMT-B
UFOV	2.13	.150	.018	No effect
Simple RT	9.06	.004	.115	Longer RT
Choice RT	7.83	.007	.099	Longer RT
Visual Closure errors	7.95	.006	.099	More Visual Closure Errors
Visual Closure time	0.87	.356	.000	No effect
Traffic Sign errors	5.32	.024	.064	More Traffic Sign errors
Traffic Sign time	7.14	.010	.090	Longer completion time
Distance acuity	5.71	.020	.070	Poorer acuity
Near acuity	5.43	.023	.066	Poorer acuity
Contrast sensitivity	16.50	< .001	.198	Poorer sensitivity
Maze *2* time	16.70	< .001	.199	Longer completion time

Note: Degrees of freedom are (1, 62) for all analyses

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