PDH Certification Information

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at <u>TRBwebinar@nas.edu</u>

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.

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Purpose Statement

This webinar will examine the extent to which current driver skills exams identify high-risk drivers before they begin driving independently. This webinar will explore findings from BTSCRP Research Report 16: Predicting High-Risk Driver: Skills Examination and Scoring Guidelines, which evaluated the driver skills test used in Washington State. The study investigates how current road test scoring captures, or fails to capture, key behavioral indicators linked to crash risk.

Learning Objectives

At the end of this webinar, you will be able to:

- Identify limitations in current driver skills examination and scoring practices

- Explain evidence-based methods to improve driver skills testing and scoring for identifying high-risk drivers prior to licensure

Questions and Answers

- Please type your questions into your webinar control panel

- We will read your questions out loud, and answer as many as time allows
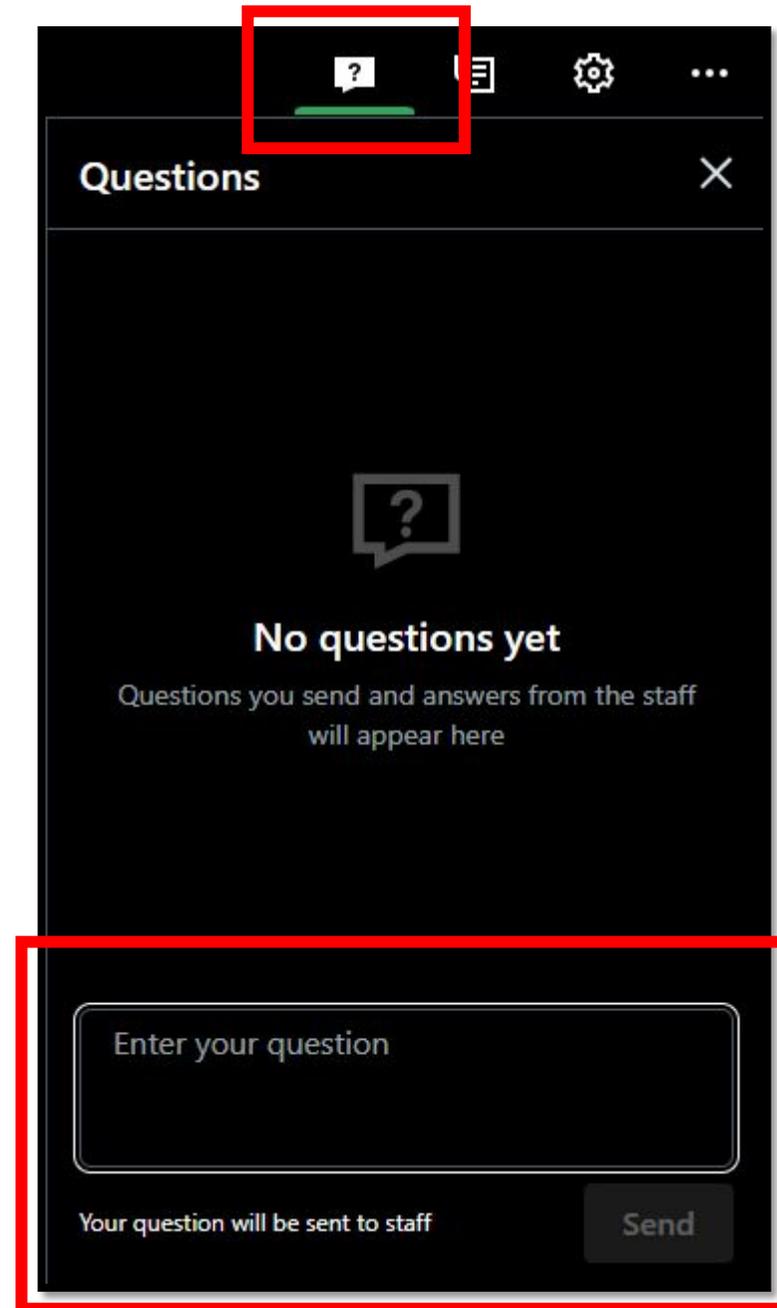
Today's presenters

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Michelle Duren
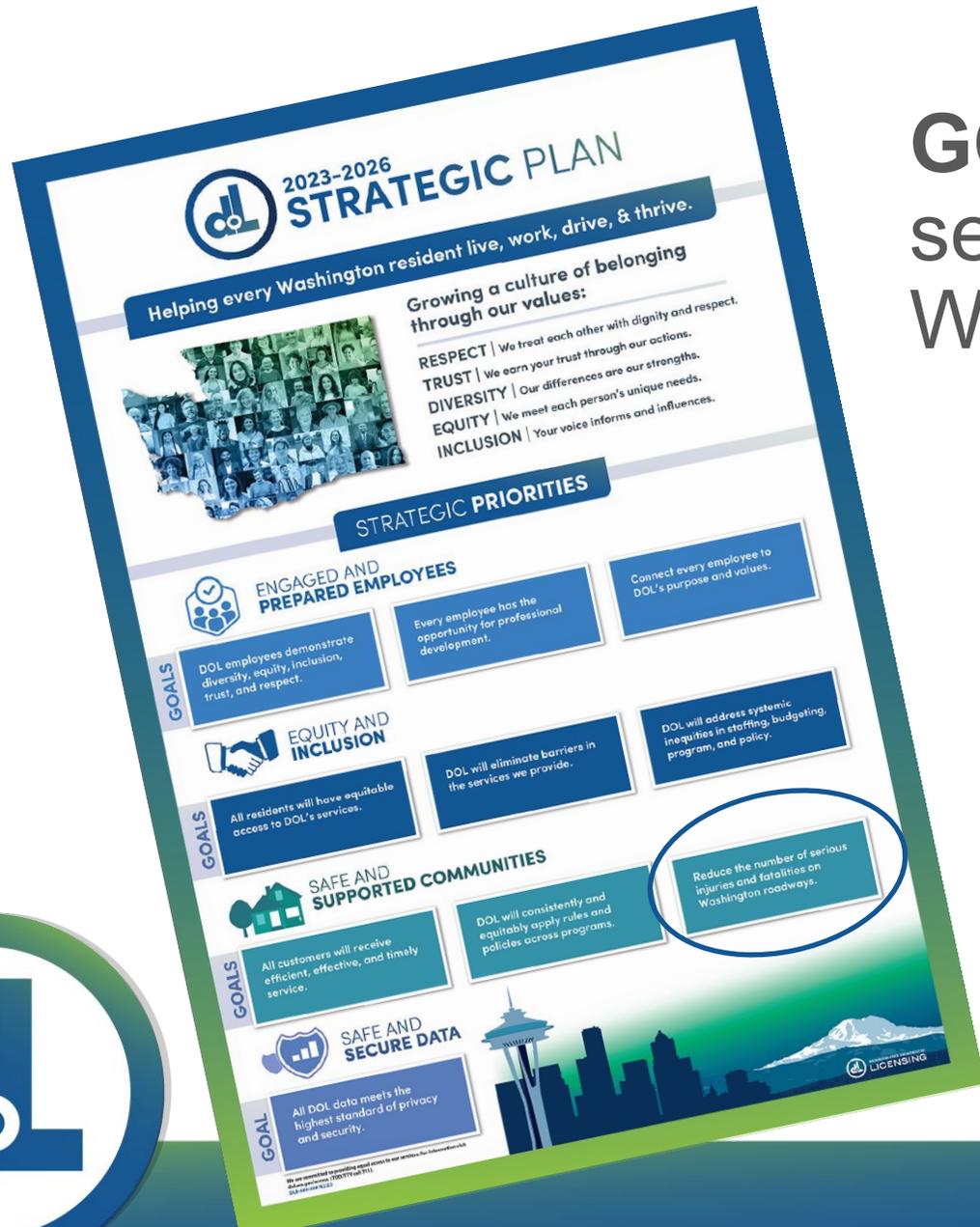mduren3@jhmi.edu

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WASHINGTON STATE DEPARTMENT OF
LICENSING

NATIONAL ACADEMIES
Sciences
Engineering
Medicine

GOAL: Reduce the number of serious injuries and fatalities on Washington roadways

Initiative: Improve education and assessments

Updating knowledge and skills tests.

- Reflect the modern driving environment for road users, vehicles, and infrastructure

- **Data-driven;** How and where Washington drivers and riders face challenges

- Incorporate **hazard awareness** and risk perception training and assessments into the licensing process.

- **Support all road users:** young and old.

  - Assessments must evaluate those who pose a risk to themselves or others, not just the novice.

Washington's Problem:

The driving environment and drivers have changed, but the assessments for drivers hasn't.

Need:

- Advance a national conversation about driver testing
- Determine the extent to which current testing practices are based on scientific evidence
  - Measure the impact of introducing elements of a model driving test and provide recommendations and guidance to states

BEHAVIORAL TRAFFIC SAFETY COOPERATIVE RESEARCH PROGRAM

BTS-16

Developing Driver Skills Examination and Scoring Guidance for Evaluating and Predicting High Safety Risk Drivers

Transition to Johnathon

Acknowledgements

Project Team

- Academic Partners: Johns Hopkins University, TRL UK

- Implementation Partners: Washington State Department of Licensing, 911 Driving Schools

Funding

- Behavioral Traffic Safety Cooperative Research Program of the Transportation Research Board (BTS 16)

- Cooperative Agreement with the National Highway Traffic Safety Administration: Strategies to Enhance Driver Licensing

Objective of the Project

Develop **guidance** and **methods** for **driving skills examinations** and **scoring** that **identify high risk drivers**.

Background

14
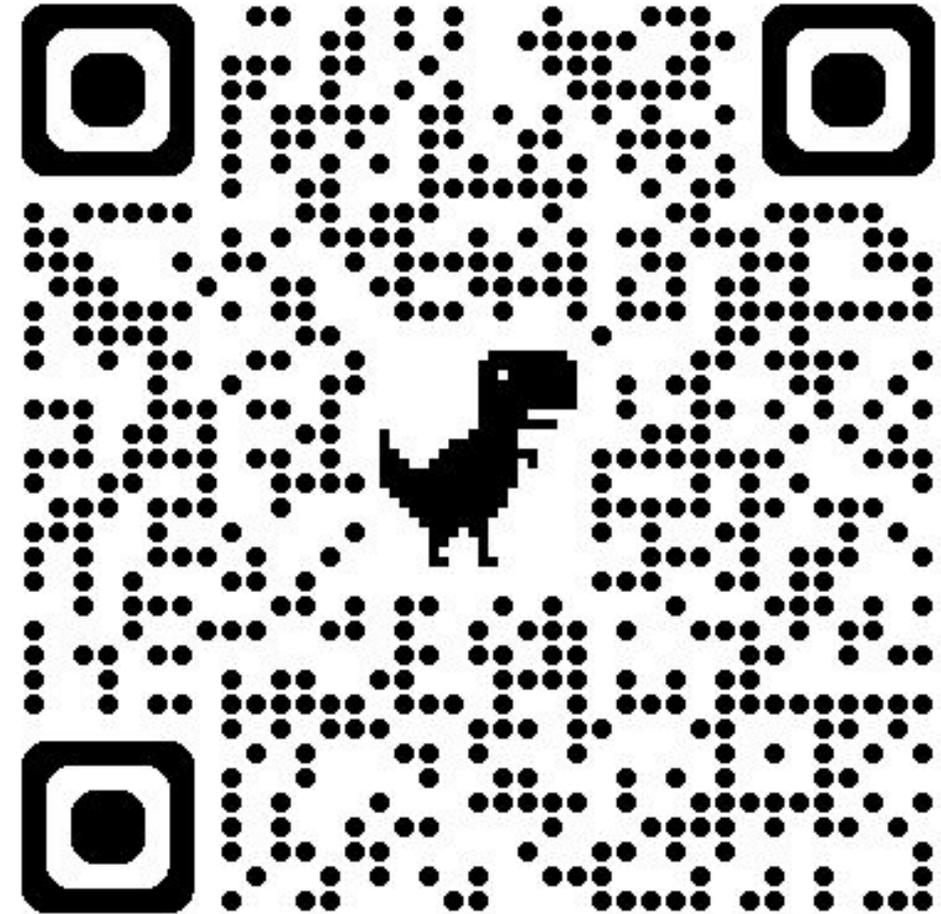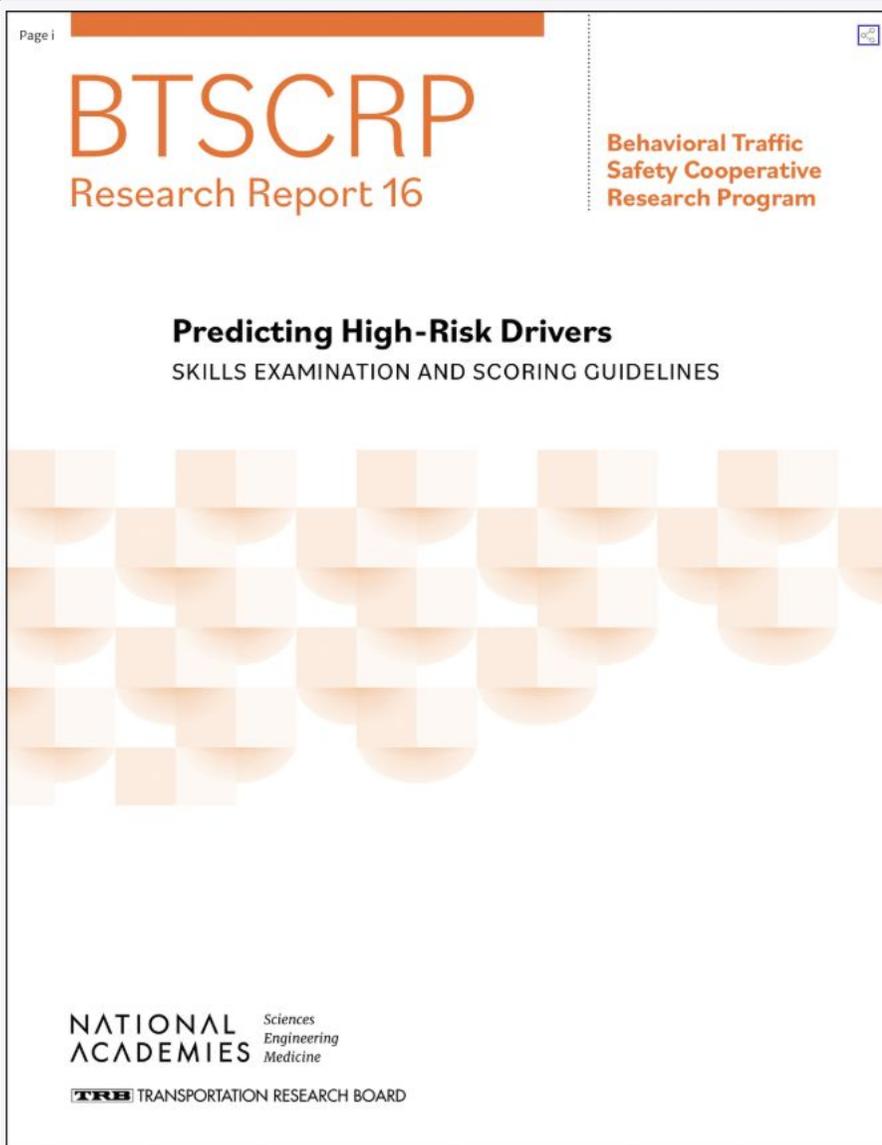
Driving examinations are required for all new drivers in the US

All new drivers complete two exams:

1. Knowledge/theory test

2. On-road/behind-the-wheel test

Despite their ubiquity, the evidence base linking exams to safety outcomes is thin

Scientific Evidence on the Knowledge (Theory) Exam

Accid. Anal. & Prev. Vol. 14, No. 3, pp. 187–192, 1982
Printed in Great Britain.

0001–4575/82/030187–06$03.00/0
Pergamon Press Ltd.

AN EXPERIMENTAL EVALUATION OF DRIVER LICENSE MANUALS AND WRITTEN TESTS†

A. JAMES MCKNIGHT
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(*Received 2 March 1981; in revised form 20 June 1981*)

Abstract—Written manuals and tests dealing with safe driving practices were designed for licence applicants in three categories: New Drivers, Renewals and Older Drivers. Contents were based upon an analysis of the critical information requirements of each group. The manuals and tests were evaluated in an experiment involving over 30,000 license applicants. Among New Drivers, the treatment group had significantly fewer accidents than a control group administered the regular driver's manual. Among Renewals, the treatment group had significantly fewer accidents with convictions than a control group not required to take a test. No consistent effects were found for Older Drivers. It was concluded that well-designed manuals and tests are a cost-effective accident countermeasure.

Written driver license tests have evidenced very little validity in predicting accidents. Significant but extremely low correlations have been reported by Kaestner [1964], McRae [1968], Creech and Grandy [1974] and Dreyer [1976], all of whom concluded that written tests have too little validity to be utilized in screening drivers. What is most questionable about these studies is not their results but the assumption that written license tests are even expected to serve as part of a screening process. As defined by

Only one peer-reviewed evaluation: Virginia study from ~40 years ago (McKnight & Edwards, 1982)

Standard exam/manual vs revised exam/revised manual

Revised materials were associated with a small but statistically significant reduction in crashes compared with the control group

Limited modern evaluation evidence for the knowledge exam

McKnight, A.J. and Edwards, R. (1982) "An experimental evaluation of driver license manuals and written tests," *Accident Analysis & Prevention*, 14(3), pp. 187–192. Available at: https://doi.org/10.1016/0001-4575(82)90027-6.

Scientific Evidence on the Behind the Wheel (On-Road) Exam

Number 399 — November 2010

Driver License Testing of Young Novice Drivers

Driver license tests are designed to ensure that people using public roadways have a minimum level of driving skill and an awareness of safe driving practices and road laws. License applicants proceed through the administrative processes of their respective licensing agencies, and must take and pass the actual examinations. In addition to successfully navigating the testing process, young novice drivers also must adhere to graduated driver licensing (GDL) policies, which govern driving practice both before and after licensure.

Popular belief holds that license tests of increased difficulty require more preparation, and that more study and practice increase knowledge and driving competence, leading to safer driving. While a logical assumption, the relationship between testing rigor and safe driving is unclear. This relationship was explored via contract work, supported by the National Highway Traffic Safety Administration. The researchers documented the methods of driving licensure in the United States, classified the tests by quality and difficulty, and compared States with more rigorous testing to States with less rigorous testing in terms of teens' self-reported risky driving behaviors, teen crashes, suspensions, and convictions. The

Table 1. Licensing Requirements and Testing Information

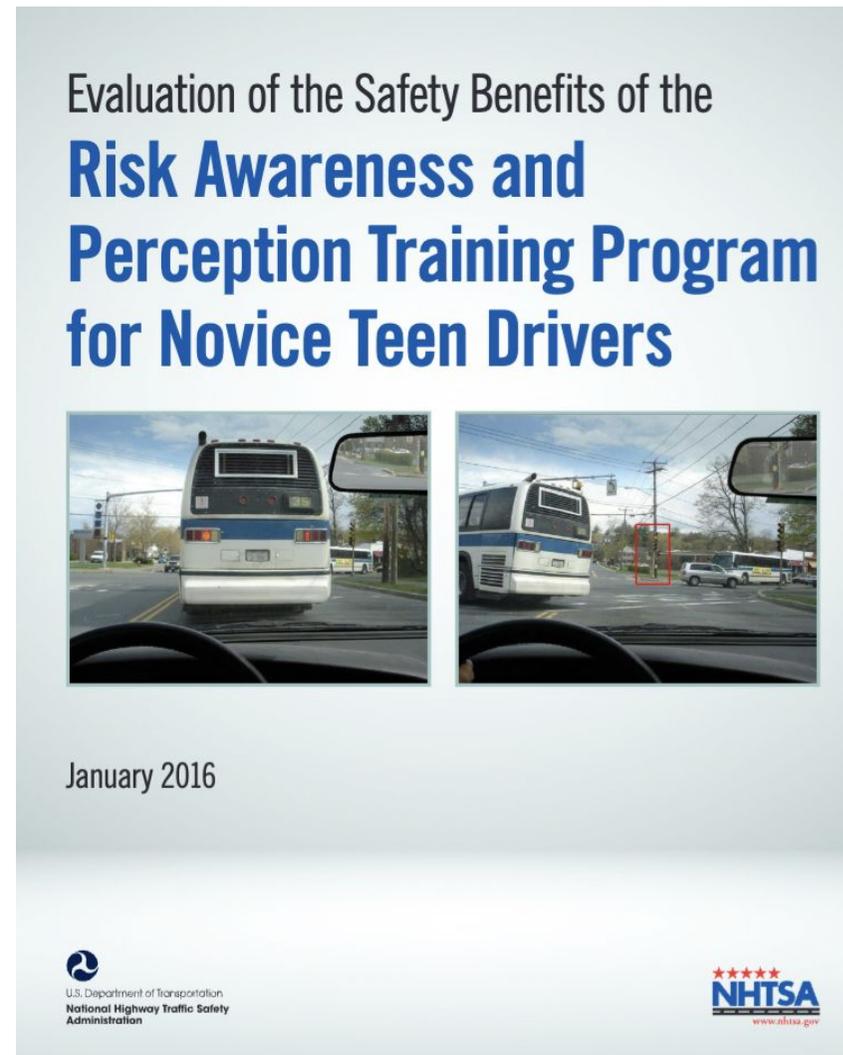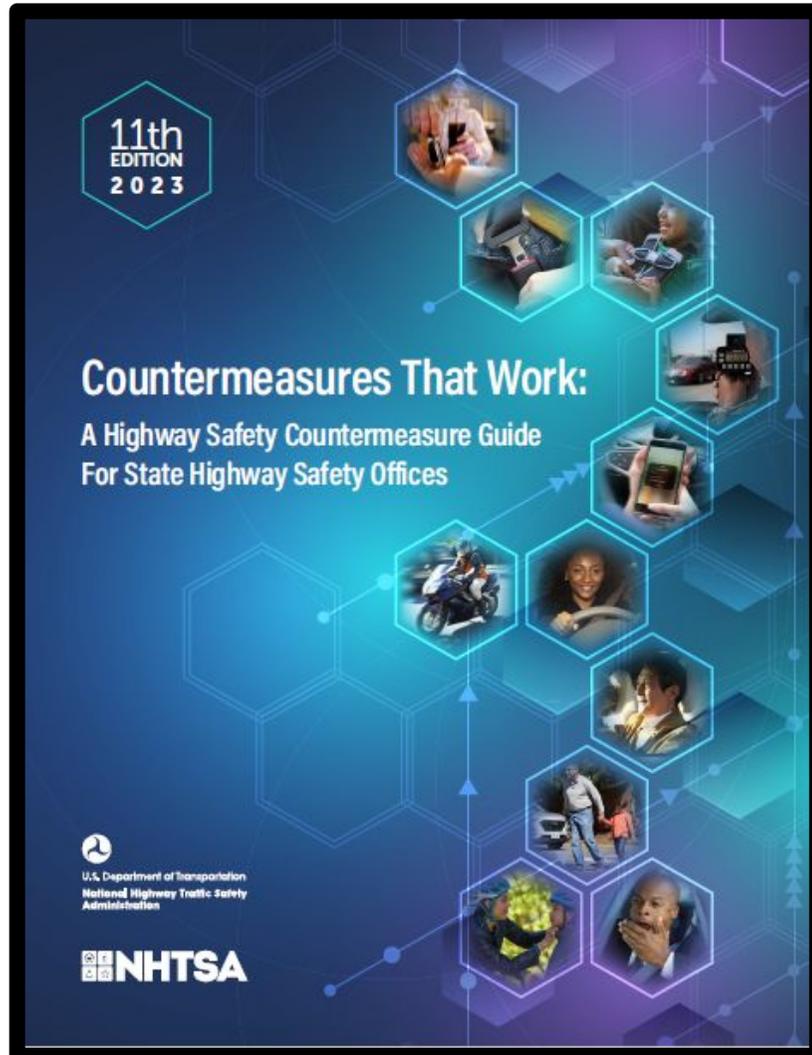| Knowledge Test Components | Whether the test is optional |
	Number of content areas
	Length of test
	Scoring criteria
	Method of delivery
	Number of languages available
	Average amount of time to complete
	Length of time required before retest
In-Vehicle Test Components	Whether the test is optional
	Scoring criteria
	Testing environment
	Use of personal versus testing vehicle
	Availability of interpreters
	Average amount of time to complete
	Length of time required before retest
Vision Test Components	Whether the test is optional
	Level of visual acuity
	Visual field perception
Test Failure Rates	Not available for all States

Are "more difficult" on-road exams associated with better safety outcomes (fatal crashes)?

"Difficulty" was measured by failure rates, which can reflect preparation, scoring practices, and test rigor

No association between perceived exam difficulty and fatal crash rates

Fatal crashes are influenced by factors not captured in road tests (e.g., impairment, restraint use), so they may be a weak outcome for detecting test effects

Haire, E.R. *et al.* (2011) *Driver License Testing of Young Novice Drivers [Traffic Tech]*. Number 399. National Highway Traffic Safety Administration. Available at: https://doi.org/10.21949/1525877.

Scientific Evidence for Hazard Perception Training

Pathway to Hazard Perception Training to Testing

Hazard perception test 2025: official DVSA guide

Hazard perception test 2025: official DVSA guide

Disconnect Between Research and Practice – Why?

Conducting Research on Driving Examinations is Hard

- DMVs and testing locations are primarily focused on operations

- Examination are often paper-based and need to be manually entered into DMV systems

- Data on individual test maneuvers is not always captured – only pass or fail

- Safety outcomes i.e. crashes take time to measure (typically 2-3 years post license)

Innovative Features:

- Prospectively enrolled a cohort of 1,500+ teenage drivers at the start of driver education

- Leveraged multiple data streams from driving schools and Washington Department of Licensing: Driver education milestones and behind the wheel test results

- Participants used a smartphone app to measure driving behavior, including distraction, speeding, and hard braking

- Random assignment to a hazard perception training versus vehicle maintenance training

- All participants completed baseline surveys, a pre-intervention hazard perception assessment, an post-intervention hazard perception assessment, and a 3-month post-intervention hazard perception assessment
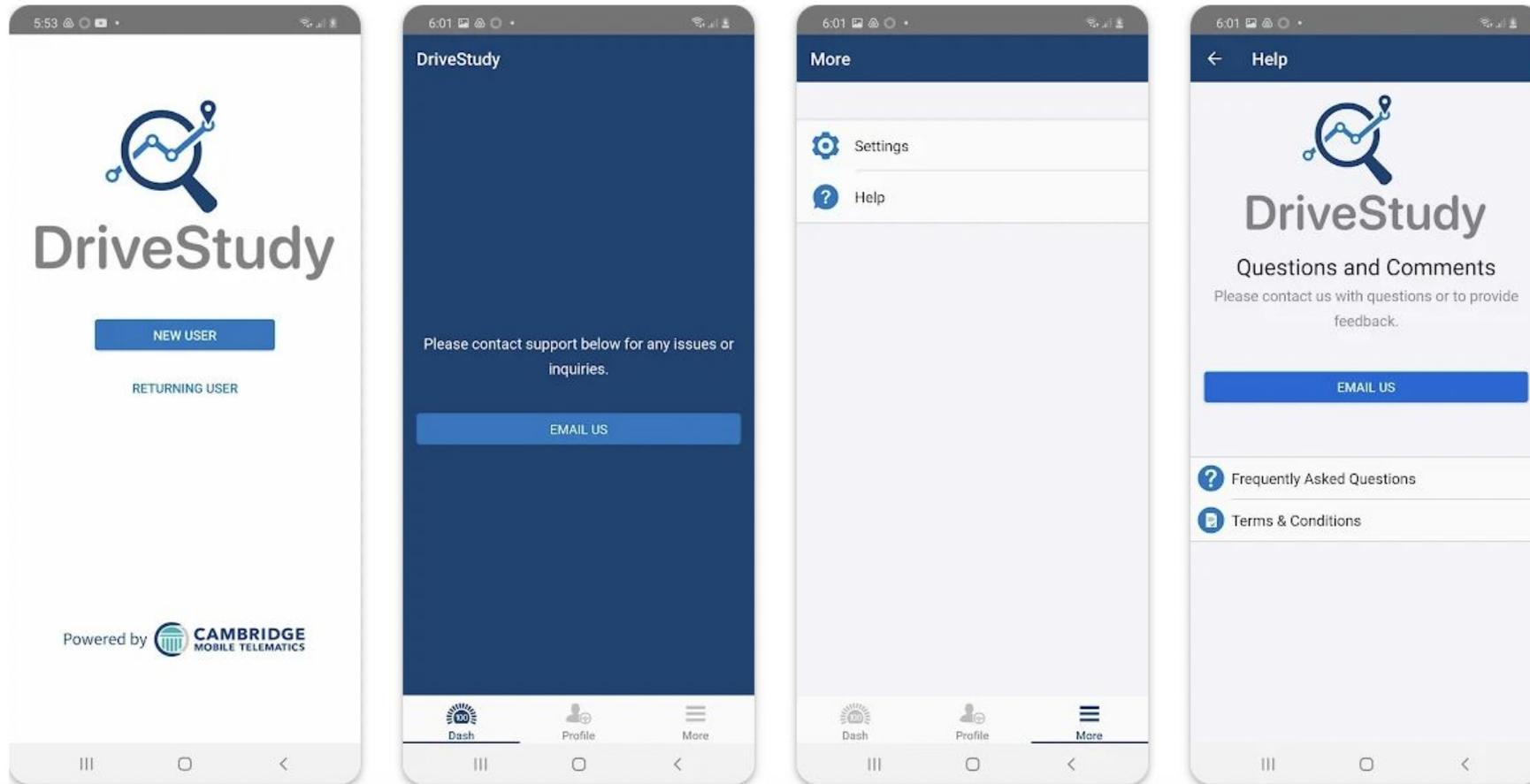
Transition to Michelle's Slides

Study Design
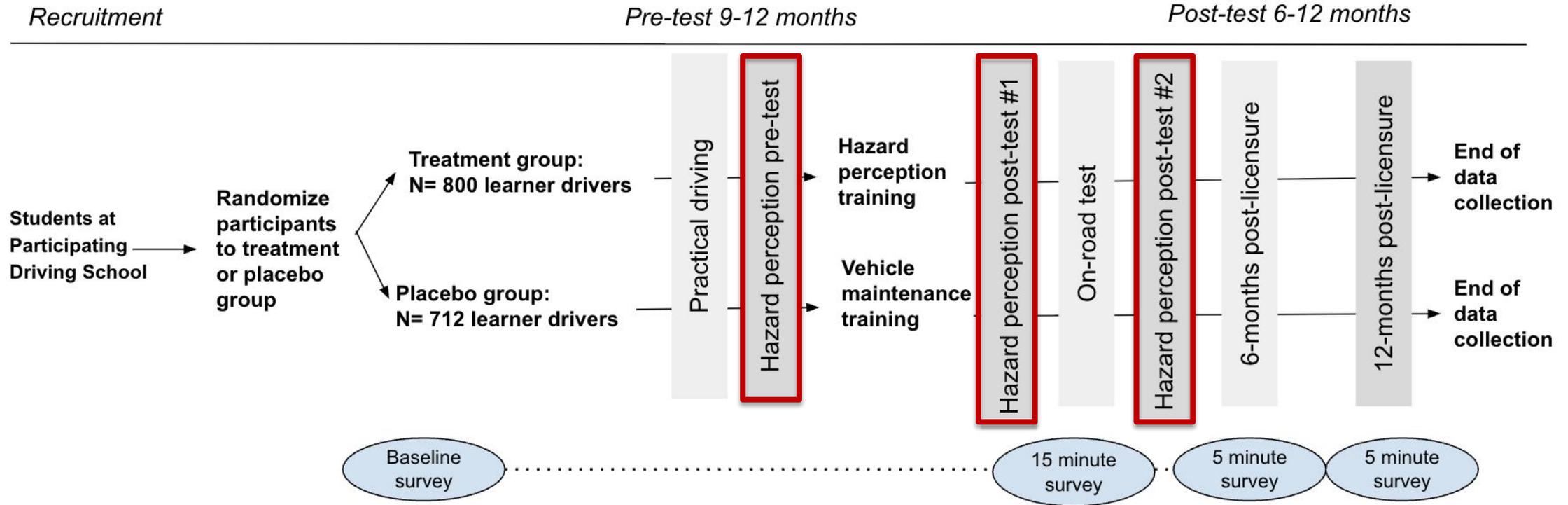
Data Collection – Naturalistic Driving Behavior

Data Collection – Hazard Perception and Driving Test Outcomes

Hazard perception test data:

- Captured during completion of the test scenarios.
- Each scenario was scored as correct or incorrect
- Percentage total correct scenarios was calculated

Driving test data:

- Linked student data to driving test scoring for tests taken at participating driving school locations
- Linked driver permit number to Washington Department of Licensing databases to determine driving test outcomes (pass/fail)

Sample

- Participants came from 7 driving school locations across Washington state.

- Enrollment occurred at initiation of driver education

- Final sample: N = 1,512 participants.

- 1,089 installed a telematics app.

- Detailed road test data for 470 participants (as of May 6, 2025).

Factor	Control Group [N=712]	Intervention Group [N=800]
Average Age	15.2	15.6
Percent Female	46.7%	47.8%
Percent Complete Quiz 1	96.1%	94.1%
Percent Complete Quiz 2	94.4%	86.0%
Percent with Telematics	67.8%	81.6%

Road Test Performance
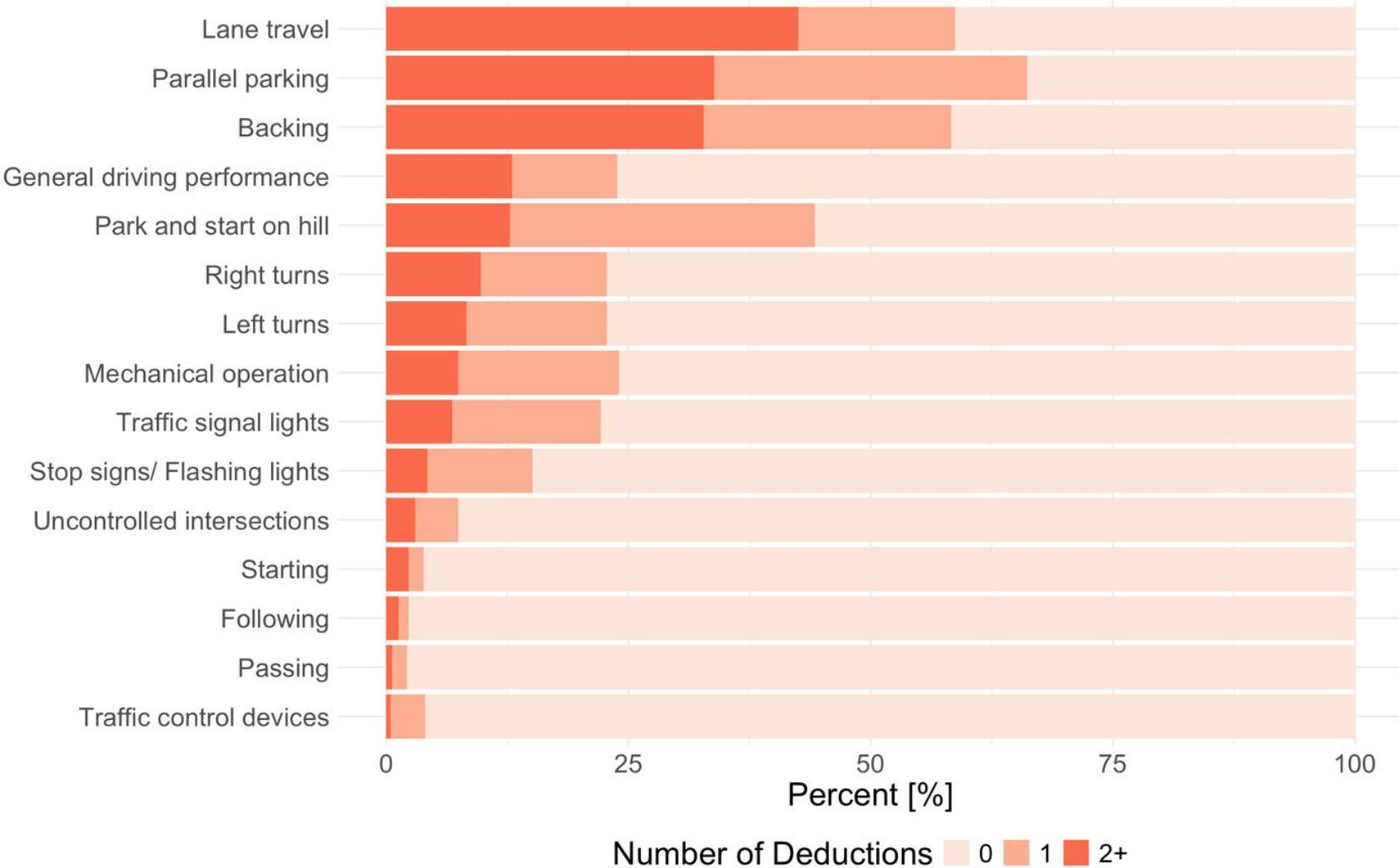
Identifying High Risk Drivers

Cluster ID	Number of Participants	Percent of Sample	Mean Event Count Per 100 Miles Driven	Mean Event Duration (min) Per Hour Driven
Low Risk	263	30.7%	10.3	0.6
Moderate-Low Risk	230	35.0%	25.3	1.4
Moderate-High Risk	239	27.9%	42.4	2.4
High Risk	56	6.5%	70.9	3.6

Notes: The sample size is reduced for this section, since the variables used to derive the cluster require post-intervention telematics data. The total n equals 858 for this section, with 462 participants in the intervention and 396 participants in the control group.

Predictive Modeling Results

► Performance on the hazard perception test on items related to rear-end collisions was associated with high-risk driver classification.

► Participants who performed better on test items related to rear-end-collision hazards were less likely to be classified as high risk.
- For each 10 percent increase in performance on the rear-end module, the odds of being classified as a high-risk driver decrease by approximately 20 percent.

► This suggests performance on rear-end hazard perception test items can be used to predict high-risk drivers.

Road Test Analysis (Ongoing) – Preliminary Findings

► Factor analysis identified **12 distinct patterns** of items from the 82 driving exam items.
- Two of these factor groupings were strongly associated with increased driving risk:

    1- **Parking Failures** –a set of items that measure basic vehicle control through testing an ability to parallel park and to park securely on a hill.

    2- **Lane Control and Intersection Speed**—a set of items that measure judgment, including knowing when it's necessary to change lanes or when to decrease speed when approaching an intersection.

- Performance on **82 of 122 of the driving exam maneuvers had some predictive value** for driving risk.
  - A model based on these 82 items was able to successfully classify 36 percent of participants in an out-of-sample test set.

Road Test Analysis Conclusions

► The WA driving exam screens for the least capable drivers with most items relating to basic vehicle control.

► A second category of items relates to judgement and decision-making surrounding driving in traffic that the exam begins to but may not fully capture; more space and weight in the exam should be given to these items.
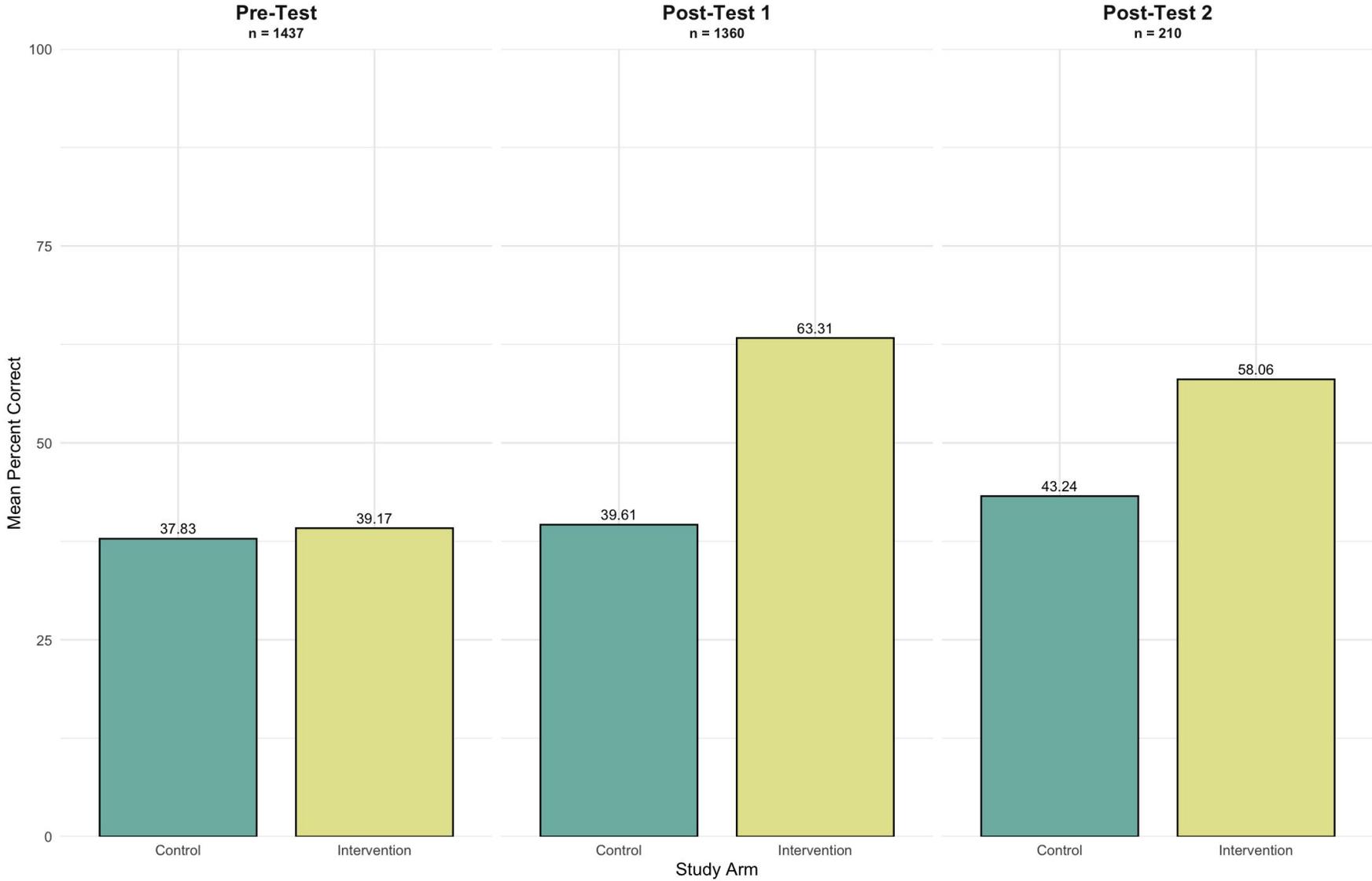
Hazard Perception Analysis

► WA Department of Licensing data extracted as of 9/15/25

    ► 1,159 completed a road test

    ► 1,132 obtained their license

► Increased hazard perception quiz completion

    ► Quiz 1 completion increased from 95 to 97 percent

    ► Quiz 2 completion increased from 90 to 93 percent
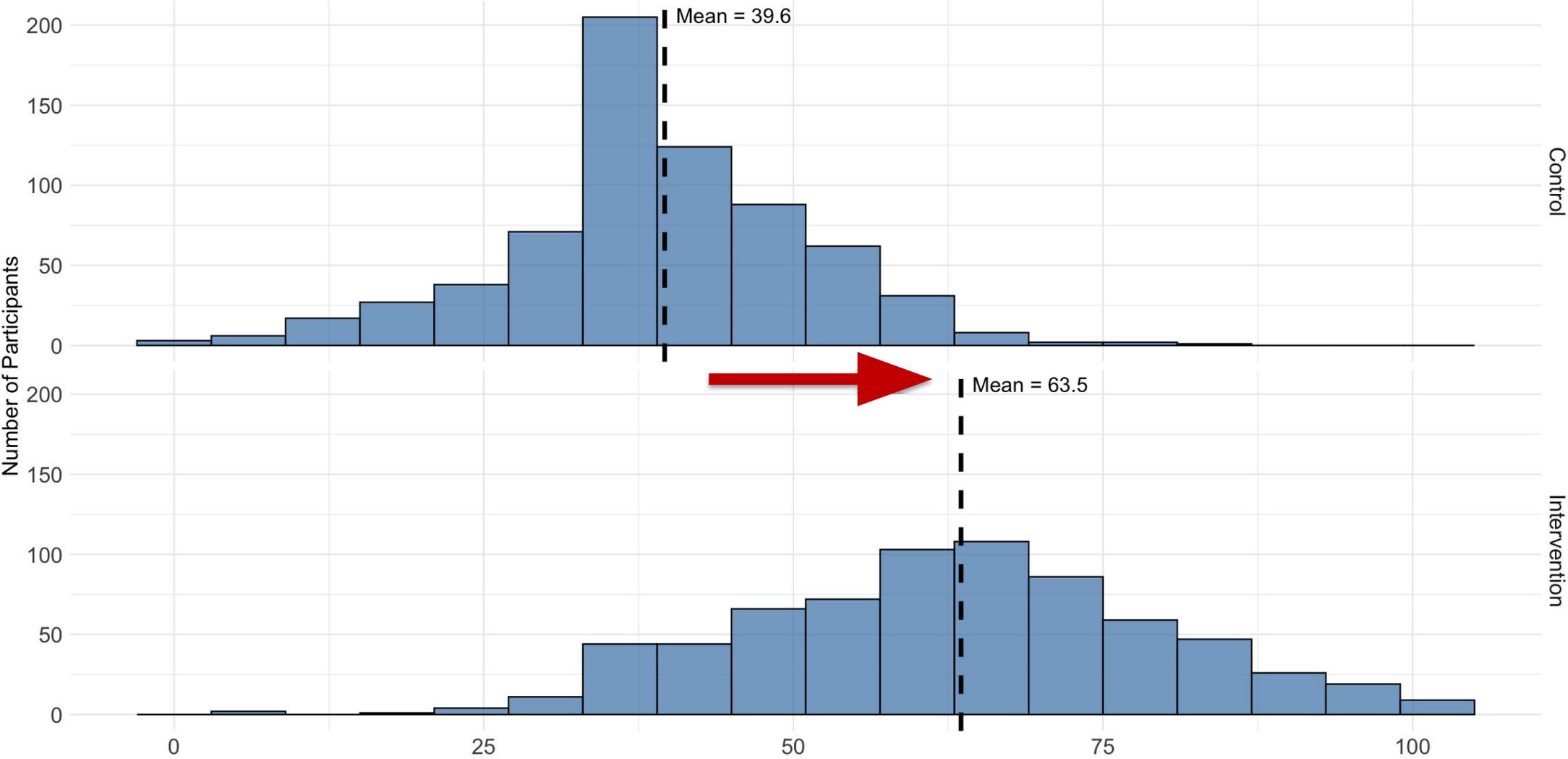
Driving Exposure by Study Arm

- 3.2 million miles of driving, corresponding to over 450,000 trips collected during the study.

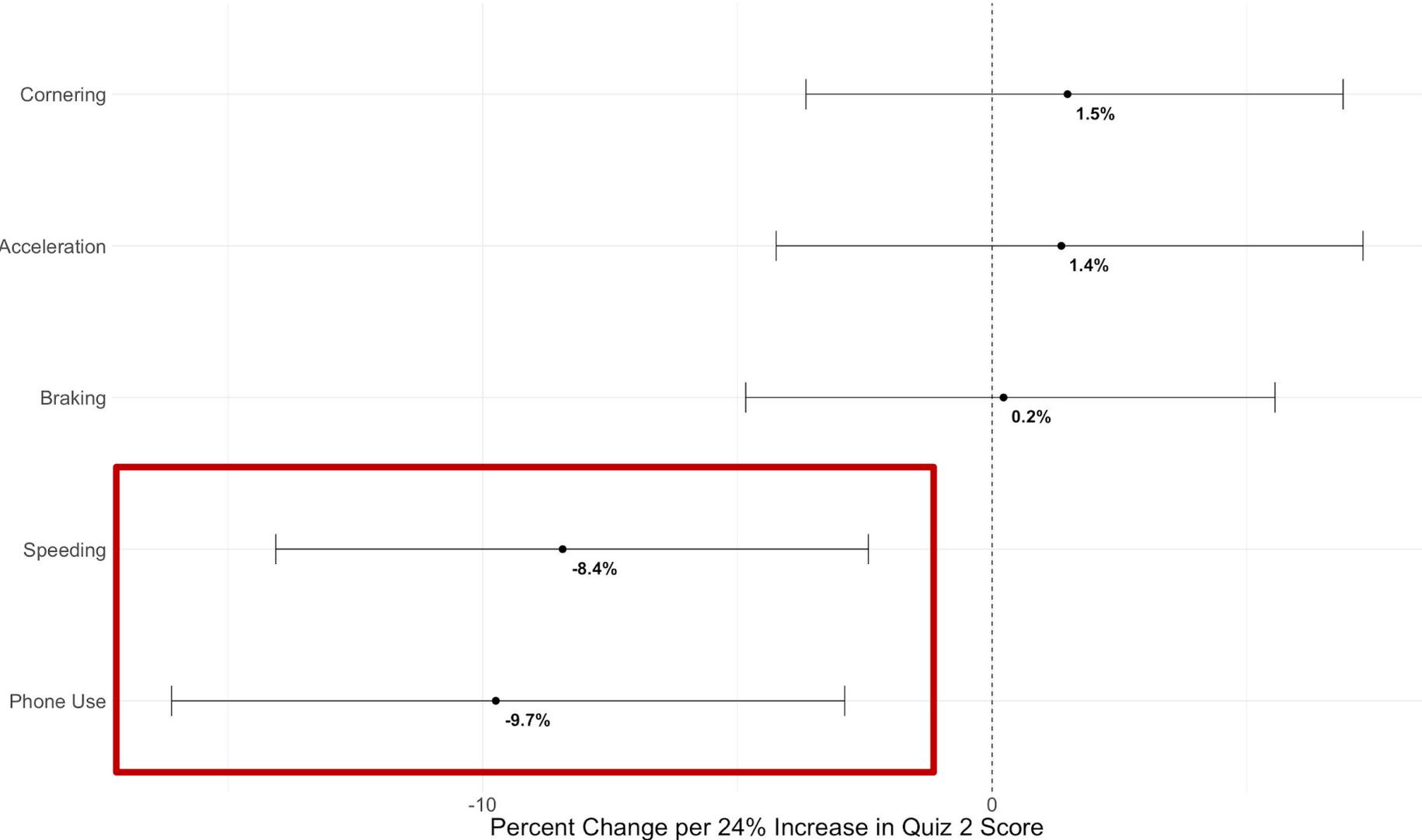| Factor	Control Group	Intervention Group	Kruskal-Wallis chi-squared test p-value
Average Miles Driven	2,751	3,192	0.046
Average Number of Trips	408	464	0.056

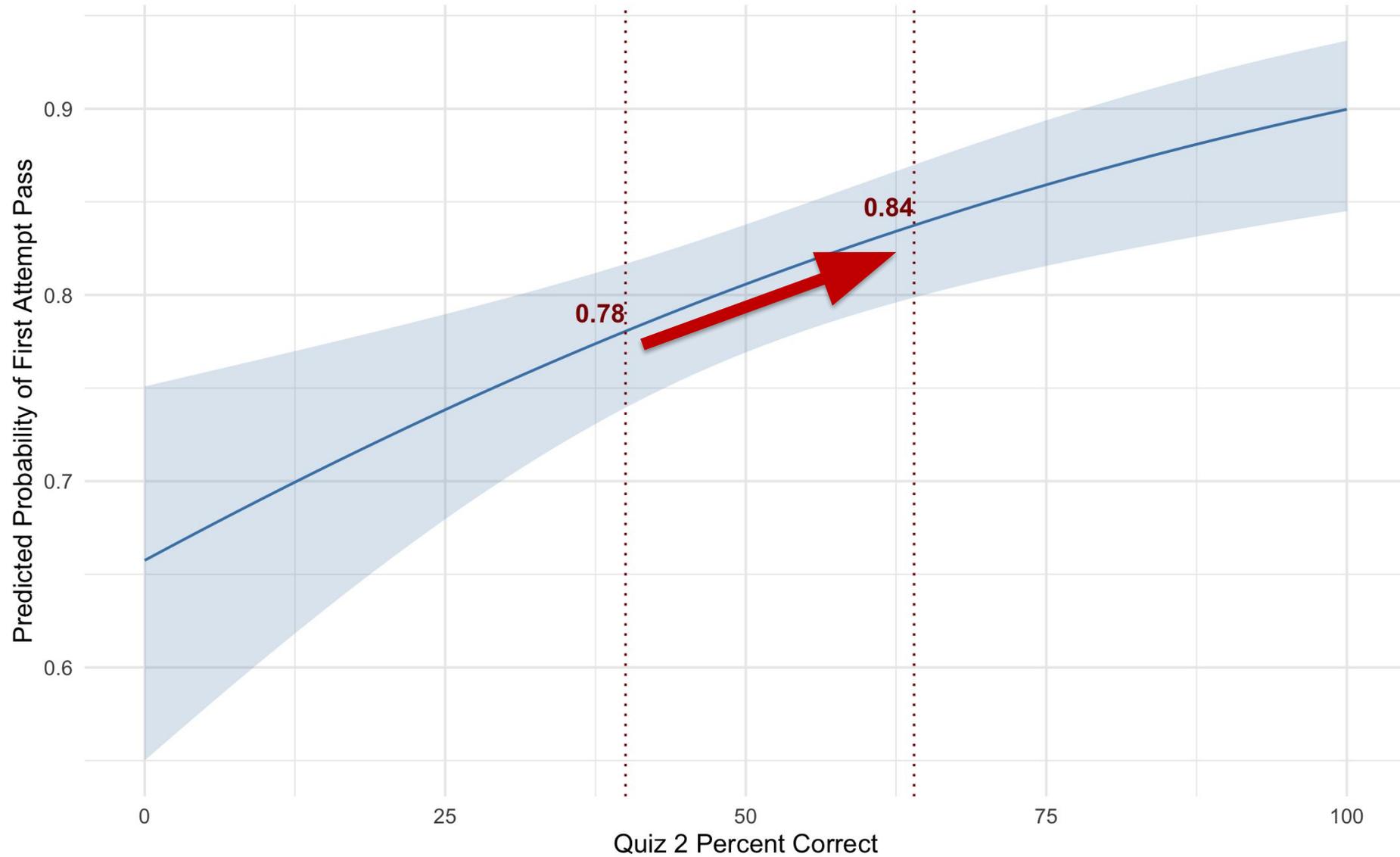# Performance on Hazard Perception Tests by Study Arms

36

Hazard Perception Test Score by Study Arm

Telematics Based Driving Outcomes

Cornering   1.5%

Acceleration   1.4%

Braking   0.2%

Speeding   -8.4%

Phone Use   -9.7%

-10   0

Percent Change per 24% Increase in Quiz 2 Score

38

Road Test Outcome

Summary of Findings

▶ **_Driving Behavior:_** Significant **_reductions_** in **_speeding_** (8 percent) **_and phone use_** (10 percent) corresponding to a 24 percent increase in post-test score**.**

▶ **_Road Test: 6 percent increased_** probability of passing road test **_on first attempt_** when shifting from average post-test score of control group (40 percent) to the intervention group average (64 percent).

Hazard Perception Analysis Conclusions

- Hazard perception training results in a significant increase in hazard perception skill.

- Performance on the hazard perception test can identify high risk drivers (specifically the rear-end collision test items).

This is just the beginning

- Designing a driver licensing test that is predictive of safety outcomes is a formidable challenge

- Expertise is needed in theories of learning and skill development, test development, and scoring

- Knowledge is needed of experimental trial methods, including longitudinal study designs that can assess long-term post-test behavioral outcomes

- Experience in participant recruitment and retention for experimental research (including obtaining consent from minors below 18), and in data collection and analysis, policy development, and coordination research among State agencies

- This will require ongoing research and implementation and have far-reaching impacts for safety

It can be done!

PUBLISHED PROJECT REPORT PPR828

Transforming the practical driving test

Final report

Helman S, Wallbank C, Chowdhury S, Hammond J,
Kinnear N, Buttress S, Jenkins R, Grayson G

GOV·UK

Home > Transport > Driving and road transport > Driving and motorcycle tests > Car driving tests

News story

Driving test changes: 4 December 2017

English

The driving test will change from Monday 4 December 2017 to include following directions from a sat nav and testing different manoeuvres.

From: **Driver and Vehicle Standards Agency** and **Andrew Jones**
Published 15 April 2017
Last updated 5 October 2017 — See all updates

Thank You

Johnathon Ehsani, jpehsani@jhu.edu
Michelle Duren, mduren3@jhmi.edu

- Targeting Young Driver Safety
  - ESHB 1878

- Looking Across the Spectrum
  - Risk assessment isn't just for Novices

- Integrating Technologies

- Redefining the Rubric
  - Hazard Perception, Situational Understanding, and Spatial Awareness
- Curriculum Alignment
  - Testing doesn't exist in a vacuum
- Examiner Training
  - Change is easy – implementation is HARD

" Helping every Washington resident
LIVE, WORK, DRIVE, AND THRIVE. **"**

QUESTIONS AND COMMENTS

Dan Cooke, Administrator – DOL – Licensing, Endorsements, and Traffic Safety

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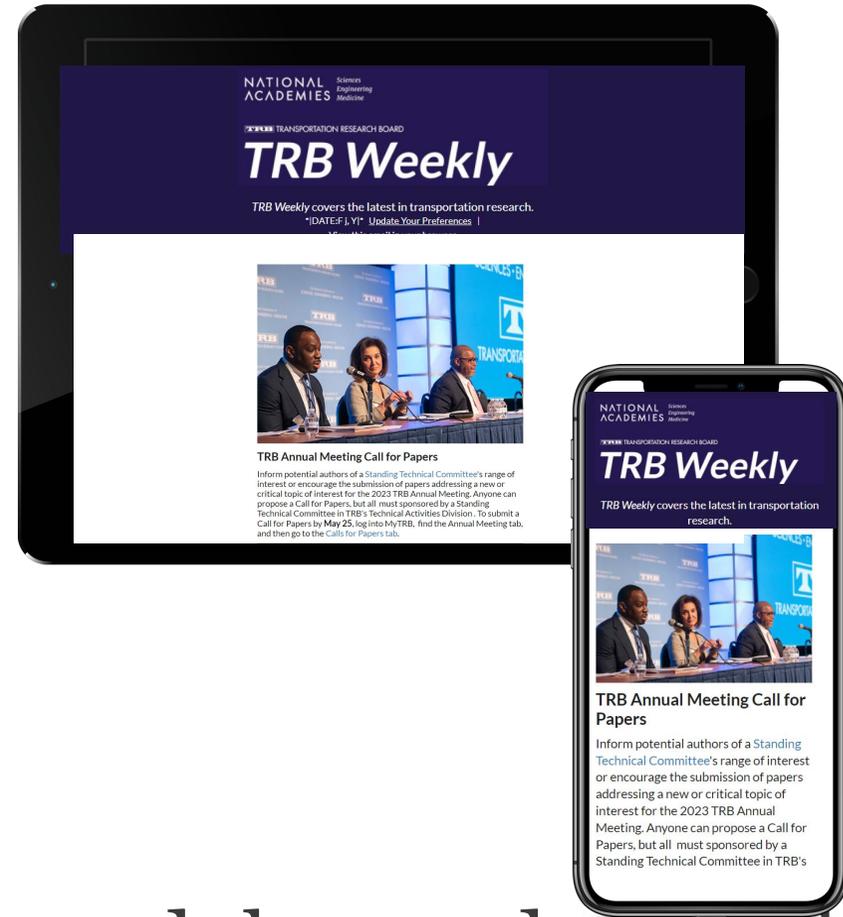
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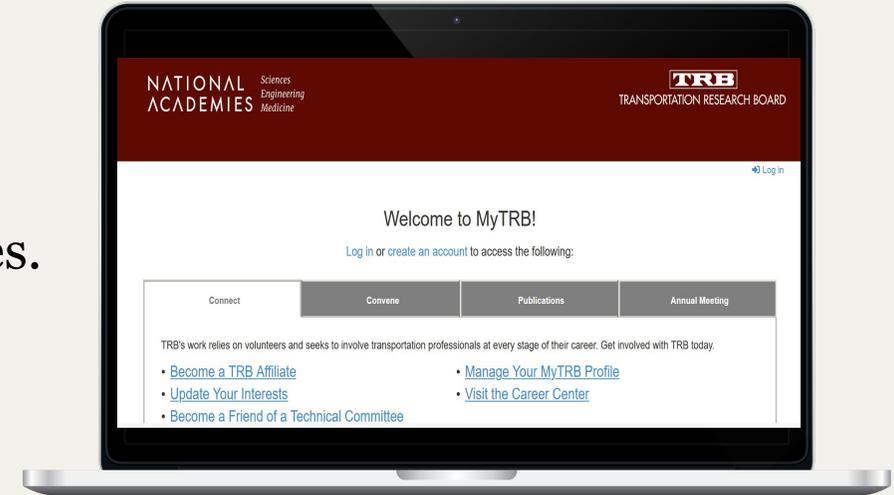
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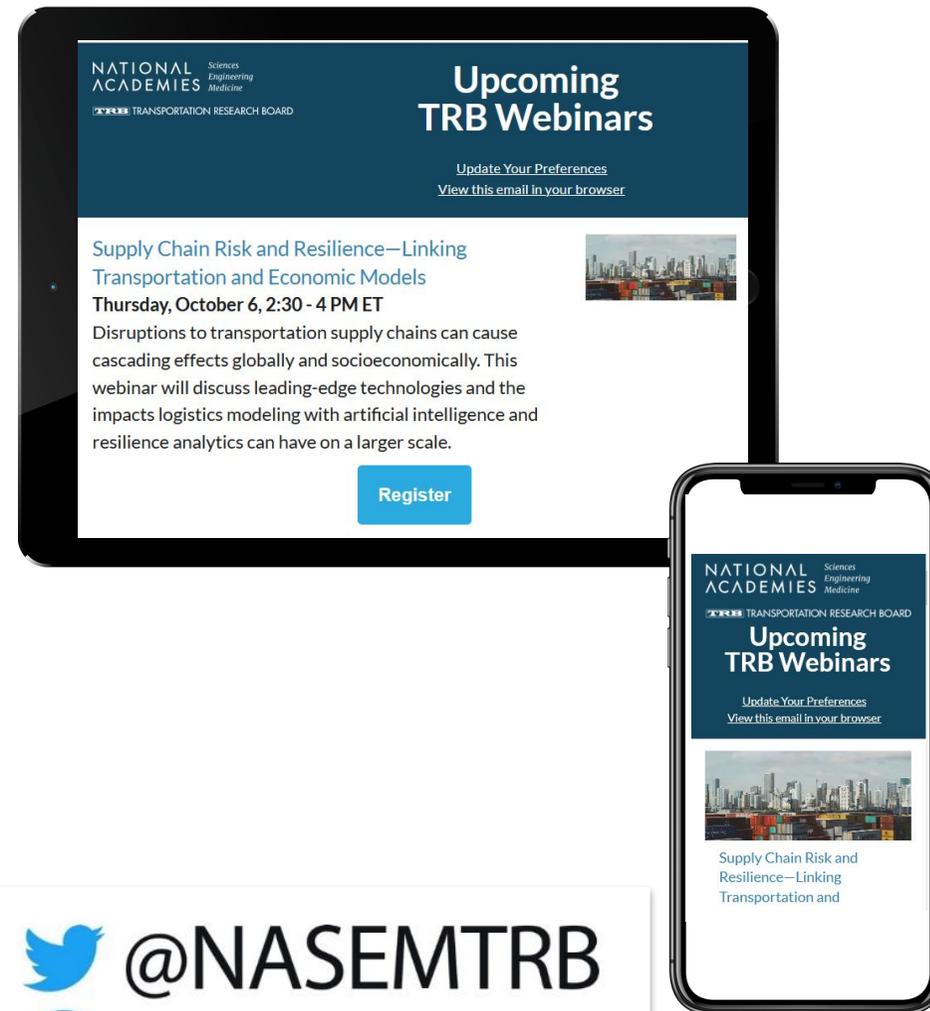
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