

Information Collection Request Supporting Statement: Section B
Rearview Video System Training for Older Drivers

OMB Control No. 2127-0731

Abstract: The National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation is seeking approval to reinstate an information collection to recruit 120 older licensed drivers, 60 between ages 60 and 69 and 60 age 70 and older, for a one-time voluntary research study to assess whether training on the use of Rear Video Systems (RVS) could improve the ability of older drivers to back safely. NHTSA expects 180 volunteers will complete screening over the telephone to determine their eligibility for the study. Recruiting participants for the reinstated collection has an estimated burden of 15 hours (five minutes per respondent). NHTSA expects that among the 180 who are screened, 120 will be eligible and willing to participate in the study. These 120 participants will complete an informed consent form (15 minutes per participant or 30 burden hours), participate in either RVS training or equal-time placebo group (30 minutes per participant or 60 burden hours), and complete a series of backing tasks on a closed test-track (60 minutes per participant or 120 burden hours). The overall expected burden for screening (15 hours) and the experiment (210 hours) is 225 hours. NHTSA has completed the first phase of this study, observing older drivers while they completed backing tasks, and using the findings to inform the development of a training video. However, the second phase, to assess the effects of training developed based on the finding from the first phase, could not be completed under the previous approval due to the public health emergency in 2020 and 2021. NHTSA will use the information to produce a technical report containing summary statistics and tables. No identifying information or individual responses will be reported. The technical report will be made available to a variety of audiences interested in improving highway safety through the agency web site and the National Transportation Library. This project involves approval by an institutional review board, which the contractor will obtain before contacting potential participants. This collection will inform the development of behavioral safety countermeasures to improve older driver safety, particularly older driver training.

B.1. Describe the potential respondent universe and any sampling or other respondent selection to be used.

The potential respondent universe is comprised of all residents of the New River Valley and Roanoke Valley regions in Virginia who are age 60 and older. From this universe, the new data collection screening questionnaire will be administered to an estimated 180 potential participants to qualify a total sample of 120 volunteer drivers, 60 between ages 60 and 69 and 60 who are 70 and older. This is an experimental study that will compare backing performance of participants who view a Rearview Video System (RVS) training video with that of participants who view an unrelated (placebo) traffic safety video. Participants in this experimental research design are not expected nor intended to be a representative sample of all drivers in the United States. That said, the Virginia Tech Transportation Institute's (VTTI's) recruiting coordinator is working with local faith-based groups, community groups, and other organizations, and they are pushing recruiting efforts into the Salem/Roanoke area to recruit diverse participant groups. Care will be taken to recruit participants from a wide cross-section of the

population in the study area to ensure people of all demographics (e.g., race, ethnicity, sex, socioeconomic status) have equal opportunity to volunteer to participate.

Raw data will include six camera views providing a complete picture of events in and around the vehicle, precise vehicle position via dGPS, throttle position, brake status, gearshift position, and multi-axis acceleration data. Analyses will focus on between-subjects (training and age) groups. Specific dependent measures will include:

- Successful avoidance of obstacles vs. collisions or near-collisions
- Counts of positioning errors in the long backing maneuver
- Driver glance behavior, including the number of glances and glance allocation among RVS, mirrors, and over-the-shoulder, in the aggregate and for each included backing task/maneuver.

A power analysis indicates that the sample size of 120 for the experiment, 60 in each group, should have adequate statistical power to detect meaningful training effects. A key dependent variable is the number of obstacles avoided during the seven trials with obstacles. Assuming that this variable is normally distributed with a mean of 4 and a standard deviation of 2, there will be a 78% chance of detecting a statistically significant training improvement of at least one successful trial at a 0.05 significance level.

These variables will be subject to multivariate analyses across groups and conditions, allowing comparisons to be made on performance metrics between age and training groups, and maneuver type.

B.2. Describe the procedures for the collection of information.

Before the experiment begins, the researcher will obtain informed consent. Participants will be told that the purpose of the research is to study their scanning behavior, in particular what aids they use when backing, and that they may encounter obstacles while backing. The consent form will be approved by the Virginia Tech Institutional Review Board (IRB). Participants will be assigned to either the training (RVS video training) or control (traffic safety video unrelated to backing) group.

Participants in both the control and training groups will individually view a training video. Viewing will be conducted in a private research room at VTTI with a comfortable viewing environment, and an experimenter will be present to start the video and ensure participant comfort. Participants in the training group will view the RVS training video, while participants in the control group will view a video of equal duration about an unrelated driving safety topic such as driving in inclement weather. The experimenter will not elaborate upon the videos beyond basic questions of clarification to ensure as consistent a training experience across participants as feasible. Each participant will be offered a brief break following the training video presentation, then will be escorted to a closed course where evaluation data collection will proceed.

Data collection will be conducted on a controlled test track facility by a trained researcher who has completed Virginia Tech-approved IRB training as well as specific training on working with senior drivers, including the operation of the secondary vehicle brake. The experimenter will be assisted by one or more research assistants who will

serve as confederates in various supporting roles, including surreptitious object placement and removal, as needed.

A partial factorial design including eight backing trials is planned for the field experiment. Backing tasks (backing out of a garage, long backing with curve, backing into and out of a parking spot, and experiencing a surprise trial) will be completed by all participants. However, the presence versus absence of an obstacle will be tested only for three of the four maneuvers; no obstacles will appear in the long backing with curve task as the focus is on the participant's ability to maintain proper vehicle position throughout this task. The final surprise trial will also include an obstacle. The long backing, backing-in, and backing-out of spot trials will be counterbalanced across participants, as all participants will start by backing out of the garage and finish with a surprise trial after they believe the experiment has concluded. For the three conditions that have obstacles, obstacle presentation will be counterbalanced.

B.3. Describe methods to maximize response rates.

Participation in this study is voluntary. To maximize participation, the contractor will contact people via e-mail or phone who have previously indicated interest in similar past studies and have agreed to be contacted about future opportunities. In addition, the contractor will post the opportunity on social media platforms likely to be seen by eligible participants (e.g., Facebook, Nextdoor), and provide it to existing contacts in the surrounding communities (e.g., managers at community centers or independent senior living facilities; university professors; local businesses) who have assisted the study team in prior recruiting efforts.

The contractor also will maximize participation by offering financial incentives to respondents if they qualify for study participation. We will pay \$50 to all study participants at the time they provide informed consent and complete the study session. Experience from recent studies including the initial phase of this study, has shown that an incentive of approximately \$30 per hour is necessary to successfully recruit participants in a study such as this one. For example, a similar recent study that involved 7.5 hours of study activities and no planned driving paid \$250 per participant.¹ Another similar study paid up to \$500 if participants drove over 1,200 miles and completed all other study activities.² The current study's compensation of \$50 is in line with these past similar efforts given the activities required of participants here.

Additionally, the contractor will provide written assurances of data security and de-identification in analysis files and reporting, such that no individual will be identified in reports of the study's findings or in data sets received by the government, nor will any drivers' data be shared with any licensing regulatory authorities.

¹ Liang, D., Lau, N., Baker, S., and Antin, J. F. (2020). Examining senior drivers' attitudes towards advanced driver assistance systems after naturalistic exposure. *Innovation in Aging*, 4(3), 1-12. <https://rosap.ntl.bts.gov/view/dot/56075>

² Russell, S. M., Blanco, M., Atwood, J., Schaudt, W., A., Fitchett, V. L., & Tidwell, S. (2018, November). *Naturalistic study of Level 2 driving automation functions* (Report No. DOT HS 812 642). National Highway Traffic Safety Administration. <https://rosap.ntl.bts.gov/view/dot/41939>

B.4. Describe any tests of procedures or methods to be undertaken.

Study staff used these study procedures in the recently completed study of backing performance that preceded this one. The data collection in the earlier study worked quite well and demonstrated that the data collection method was feasible.

B.5. Provide the name and telephone number of individuals consulted on statistical aspects of the design

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