

**Information Collection Request Supporting Statement: Section B**  
**Older Driver Rearview Video Systems**

NHTSA is seeking approval to conduct a field experiment to gather objective data regarding the effects of a rearview video system (RVS) on backing performance and the effects of RVS training on backing performance of older drivers aged 60 and older. The first part of the experiment will evaluate the effects of RVS on driver performance by comparing backing performance for 40 participants who use RVS at least once a week to the performance of 40 participants who do not use RVS at least once a week. The observed performance differences between the drivers who are more experienced with RVS and those who are less experienced, as well as data on participant error types, will be used to develop a training video for drivers unfamiliar with RVS.

For evaluating the effect of RVS training on backing performance, 120 participants who use RVS less than once a week will be recruited. Half of the participants (60) will view the RVS training video, and the other half (60) will view a video that has nothing to do with RVS (placebo or control). NHTSA will determine the effectiveness of the training by comparing differences in backing performance across the trained and control groups. A power analysis indicated that the sample size of 120 for the second part of the experiment, 60 in each group, should have substantial statistical power to detect meaningful training effects. A key dependent variable is the number of obstacles successfully 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 1 successful trial at a 0.05 significance level. Another key variable is the number of times to complete the trial. Assuming that this variable is normally distributed with a mean of 2 and a standard deviation of 0.5, there will be a 78% chance of detecting a statistically significant difference of 0.25 average attempts at a 0.05 significance level.

Study participants will use an instrumented vehicle to complete 13 trials in a section of a parking lot to provide backing performance measures. Twelve of the trials involve completing each of three backing tasks (e.g., leaving a parking space, making a 3-point turn, straight-line backing) under four conditions (using mirrors or RVS and with or without an obstacle). The thirteenth trial is more naturalistic and involves an unannounced obstacle. The measures of backing performance include the number of times to complete the trial, number of obstacles successfully avoided, and number, duration and direction of glances while backing.

The current plan is for the contractor to produce a draft technical report in 2020 with publication of a final technical report in 2021. The technical report will provide aggregate (summary) statistics and tables as well as the results of statistical analysis of the information, but it will not include any personal information.

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

The researchers plan to focus data collection efforts in Bucks County, Pennsylvania (PA). The potential respondent universe is comprised of all drivers age 60 and older who hold a valid driver's license, who drive at least three times a week, and who do **not** (1) have any (self-reported) medical condition (e.g., sleep apnea) that could potentially interfere with driving performance or exposure or (2) use any adaptive vehicle controls. While it is not known how many residents would be eligible for this study, the 2015 American Community Survey indicated that 142,994 or 23% of Bucks County residents are 60 or older.

The research team will coordinate with social, recreational, and wellness directors at various community organizations in the Quakertown, PA vicinity, to use newsletters and other media to advertise the opportunity to participate in this research project. These media will invite interested persons to attend an information session. Individuals who sign up to learn more about the study will be telephoned later to determine whether they qualify for study participation. Those who are eligible, as determined by Form 1398, will be invited to participate in the study. In both parts of the experiment, the goal is to have an equal number of drivers aged 60 to 69 and aged 70 and above with comparison group.

For the first part of the experiment, participants will be accepted on a first-come, first-serve basis based upon their experience with RVS and their age. For the second part of the experiment, participants also will be accepted on a first-come, first-serve basis and will be randomly assigned to training (treatment) versus placebo (control) groups.

The sample size of 120 for the second part of the experiment, 60 in each group, should have substantial statistical power to detect meaningful training effects. A power analysis indicated that the sample size of 120 for the second part of the experiment, 60 in each group, should have substantial statistical power to detect meaningful training effects. A key dependent variable is the number of obstacles successfully 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 1 successful trial at a 0.05 significance level. Another key variable is the number of times to complete the trial. Assuming that this variable is normally distributed with a mean of 2 and a standard deviation of 0.5, there will be a 78% chance of detecting a statistically significant difference of 0.25 average attempts at a 0.05 significance level.

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

As described above, a research assistant will call potential participants who attended an information session and left a telephone number to be contacted for more information. The research assistant will screen potential participants for study eligibility using Form 1398 and will give eligible participants instructions for next steps. We expect that 67% (about two-thirds) of those interviewed will be eligible for the study.

On the day of the experiment, participants will complete the informed consent form (Form 1399). For the first part of the experiment, participants will complete 13 trials to obtain backing performance measures. All driving performance information will be collected automatically using an instrumented vehicle used by all drivers for the study. Driving behaviors captured during the field experiment will include glances to mirrors and RVS, speed and lane position while backing, distance and time to detect backing obstacles, and the percentage of backing obstacles detected. A Driving Rehabilitation Specialist (DRS) will be in control of the instrumented vehicle at all times using a passenger-side brake, and a confederate field worker will assist with various tasks outside of the instrumented vehicle. However, neither will collect any data. The research team will extract the performance measures from video and logs of vehicle dynamics.

For the second part of the experiment, half the drivers will view a 30-minute RVS training video to be developed for this project; the remaining participants will view an unrelated video (placebo group). After watching the video, the procedures for data collection are the same as above.

### **B.3. Describe methods to maximize response rates.**

While participation in this study is voluntary, the research team will rely on the active support of the community providing services to older residents to inform them about the opportunity for study participation and to encourage them to participate. These professionals understand that this research will support their mission to help their residents remain safely mobile in their communities, which is vital to healthy aging. Also, the consent form provides written assurances of confidentiality, such that no individual will be identified in reports of the study's findings, nor will any driver's data be shared with any licensing regulatory authority. Finally, study participants will be offered \$100 as compensation for completing the experiment.

Our past experience indicates that anything less than the proposed \$100 compensation would likely result in failure to recruit enough participants to provide adequate statistical power. In addition to the time demands related to the training and evaluations, many older adults avoid driving evaluations such as is included in the proposed study because they believe that a poor score will lead to their losing their license, even though this could not happen to participants in the proposed study. Recent studies by NHTSA, which have involved compensation ranging from \$100 for one-time training to \$200 for multi-session trainings, have confirmed that this level of compensation is necessary to meet recruiting requirements.

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

Regarding test of procedures, the contractor will enlist at least three older drivers aged 60 and above to pilot test the study protocol in order to identify potential problems with procedures or equipment. Regarding methods, statistical methods planned to determine differences across the groups in terms of backing performance will focus on ANOVA and in some cases linear regression since most of the measures of performance are continuous variables.

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

Kathy Sifrit, PhD  
Research Psychologist, National Highway Traffic Safety Administration  
202-366-0868

Ken Gish, PhD  
Principal Investigator, TransAnalytics, LLC  
215-538-3820

Loren Staplin, PhD  
Behavior Scientist, TransAnalytics, LLC  
215-538-3820