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Supporting Statement

B. Collections of Information Employing Statistical Methods

NHTSA is seeking approval to conduct an experimental study to gather objective data regarding older drivers' performance using an electronic navigation system (ENS) as compared to using a paper map with turn-by-turn printed directions. Participants' performance in entering addresses into the system will also be documented. In the second part of the study, researchers will develop and evaluate a training protocol largely based on errors drivers tend to make in the first segment.

For Segment 1 of this study, up to 120 participants (40 ages 60-69 and 40 ages 70-79; 40 optional participants of age TBD), who meet inclusion criteria and agree to participate will be enrolled in the study; half of the participants in each age group will be familiar with using an ENS, the other half will be unfamiliar (based on self-report). Participants will complete a clinical functional evaluation to 1) ensure that the person does not pose an unacceptable risk to study personnel in subsequent data collection activities and 2) to provide a measure of functional ability for data analysis purposes. Participants will complete a series of four test drives: the first to a familiar location (to provide baseline driving performance measures), two unfamiliar drives, one using a paper map with turn-by-turn directions and one using an ENS (a research team member will provide the maps or enter the destination for these drives), and a final unfamiliar route (to provide data to analyze effects of more familiarity with an ENS on drivers' performance). All test drives will be similar in length and complexity. Following the test drives, participants will enter destinations into the ENS; this will provide data about which elements of the data entry task pose the most difficulty for participants.

Researchers will ask each potential participant eleven questions regarding their age, sex, race, driver licensing status, personal vehicle, driving habits, ENS use and whether they are interested in participating (see attached questionnaire). Those selected, and who agree to participate in Segment 1 of the study will be asked to schedule and take part in two data collection sessions:

1) Complete a functional evaluation;
2) Complete test drives and destination entry tasks as described above.

Segment 2 of the study will include 40 participants age 60 and older, all unfamiliar with ENS use. Screening questions for this group will be the same as for Segment 1. Those selected who agree to participate in Segment 2 of the study will:

1) Complete the training protocol;
2) Complete test drives and destination entry tasks as described above.

Data Analysis Plan

Questionnaire responses will be used to establish participants' eligibility, group assignment, and as covariates in statistical analyses. The focus of this study will be to compare driving performance, as measured by a driving rehabilitation specialist (DRS)

and an electronic tracking system, of older drivers while driving to unfamiliar destinations using an ENS and using a paper map with associated turn-by-turn printed directions.

Given the nature of the study design and data to be collected, the primary analysis approach will be based on analysis of variance (ANOVA) to determine if any group level differences appear in the data. More specifically, a Doubly Multivariate ANOVA approach will likely be warranted as an omnibus test given the combination of between-subjects and within-subjects independent variables (IVs) and multiple dependent variables (DVs) of interest. The results of such analyses, however, can be difficult to interpret and generally require further exploration of the data using simpler approaches such as Repeated Measures ANOVA or basic ANOVA.

All of the above analyses involve researchers conducting comparisons of measures based on various combinations of driver age group (between subjects IV), ENS familiarity group (between subjects IV), and drive (within subjects IV). The primary dependent variables of interest will be DRS scores of driving performance, deviations from prescribed routes, measures created from tracking data (trip time, distance, speed, and accelerations), and destination entry measures (number of screen touches, errors, entry time, successful entries). The initial questionnaire responses and AMPS scores will be included as covariates in the analyses to assess their impact on the results.

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

The potential respondent universe includes all drivers between the ages of 60 and 79 in the Greenville, NC vicinity. According to the US Census 2010 estimate, Greenville, NC has approximately 84,554 total residents with 7,863 of those being 60 to 79 years old.

The study requires 160 qualified participants. As such, researchers estimate a need to collect questionnaires from up to 320 potential participants to arrive at the final sample of 160 qualified participants. This estimate is based on prior experience in similar studies. Fewer qualifying questionnaires may be needed if respondents strictly adhere to the details of the solicitation, which will be aided to the extent recruitment takes place in-person (e.g., senior center) where researchers can clearly explain the qualification criteria to potential participants.

Potential Respondent Universe

Group, Population, Greenville, NC Ages 60-79	Universe	N Contacted	Expected Response Rate	Sample
Licensed Drivers	**7,863**	**320**	**50%**	**160**

The geographic area of the study was chosen because of the proximity to East Carolina University where the study sessions will take place. This will be a convenience sample and is not intended to be representative of all drivers in the age range.

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

NHTSA intends to recruit participants from a number of venues in the Greenville, NC metropolitan area. The East Carolina University and Medical School offer sources of potential participants. Both have email listservs available to this project from which "blast" emails are routinely sent and that can be used to recruit interested parties. The emails will briefly describe the purpose of the study, detail compensation, and express that extended family members and friends of the person receiving the email within the desired age groupings are invited to participate. Flyers will be posted throughout the University System advertising the study to staff members or others (e.g., patients) who may qualify. Researchers also have contacts at various religious and social organizations in the area from which participants will be recruited. All recruitment methods will ask potential volunteer participants to contact the research team by email or by phone in order to complete the qualifying questionnaire. If authorized by an organization, a researcher may visit a location where multiple potential volunteers are present and make a short presentation on the project including the request for volunteers.

The questionnaire will be administered via telephone or in-person. A researcher will contact the potential participant at the telephone number indicated in their response to the recruiting materials, or meet with them if that is more convenient. The respondent will not be paid for completing the questionnaire. The interviewer will record respondents' answers and identify those who qualify for and elect to join the study. If the person meets the study criteria and elects to join, the researcher will schedule the participant for the first study session. If the person does not meet the criteria, the researcher will thank them for their time and explain that they did not meet the criteria for this study.

Following acceptance into the study, the procedure for collecting functional and driving performance data includes two sessions as follows:

Study Segment 1 (two sessions):

- Session 1: participant will complete functional assessment, schedule driving session;
- Session 2: participant will complete driving and destination entry tasks as described above.

Study Segment 2 (one session):

- Participant will complete training protocol and then driving and data entry tasks.

B.3. Describe methods to maximize response rates.

The recruiting materials will provide a clear, concise description of the study and its general participant requirements (e.g., availability of a properly insured vehicle) along with the study compensation plan for qualified participants, reducing the likelihood that those not interested or qualified will contact the research team. The materials will clearly state that if a person qualifies after completing the initial questionnaire, they will be paid $50 for the first study session at the ECU laboratory and $100 for the second study session drives. The materials will also indicate that participation in the study can have no impact on an individual's driver's license.

To the extent possible, researchers will address multiple potential respondents at a single location which will allow the team to answer any general questions about the study before conducting qualifying questionnaires. Answers to any questions will not mention the qualification criteria, but will describe the general study approach which may lead to a more efficient recruitment process.

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

We do not anticipate substantive changes to the simple method and modest question set proposed, however, we intend to remain sensitive to the nature of responses we receive and will respond with modest changes as needed to meet our participant counts.

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

The following individuals have reviewed technical aspects of this research plan:

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