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Naturalistic and simulated driving tests:

Recruiting and management of volunteers over a long period

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Abstract

Recruitment and management of volunteers is very important in road safety projects involving a naturalistic driving test phase, and it becomes crucial when a considerable time lapse occurs between multiple tests needing the same persons: a high rate of abandon may jeopardize noticeable research efforts. Economic compensation is important, but cannot be the sole approach, due to project budget issues; moreover, a fully involvement of the volunteers through adequate motivation and feeling of “being part of a project” will lead to more accuracy in performing the tests. An adequate balance between compensation, involvement in the project and clear information is the key for guarantee the correct basis for a naturalistic driving test and in general every research involving healthy persons. This document explains the procedures adopted for the recruitment, selection, training and retention of a group of volunteers aged from 50 to 70 years for more than twelve months.

Keywords: simusafe, naturalistic driving test, volunteering, motivations, participants’ management, driving simulator.

1. Introduction

Recruitment and management of volunteers is very important in road safety projects involving a naturalistic driving test (NDT) phase, and it becomes crucial when a considerable time lapse occurs between multiple tests needing the same persons: a high rate of abandon may compromise the test results, thus jeopardizing noticeable research efforts. Even if there is a broad literature related to the selection, recruitment and management of volunteers for clinical research studies, public evidence of a similar approach for healthy people to be involved in naturalistic driving tests or in general in non-clinical research is lacking, with particular evidence to their retention during the whole test period. In fact, while people with diseases have their personal interest in participating in clinical trial, the interest of possible volunteers for driving tests is in general very low, with a high risk of abandon. Economic compensation is important [Samuels et Al.(2018)] but cannot be the sole approach, due to project budget issues; moreover, a fully involvement of the volunteers through adequate motivation and feeling of “being part of an important research project” will lead to more accuracy in performing the test and finally to better results. An adequate balance between economic compensation, involvement in the project and clear information about personal data management is the key for guarantee the correct basis for a naturalistic driving test and in general

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every research involving healthy persons. This document explains the procedures adopted for the recruitment, selection, training and retention of a group of volunteers aged from 50 to 70 years and how this group was managed up to become a close-knit that could then be used for other projects.

2. Background

SIMUSAFE (an acronym for “SIMUlator of behavioural aspects for SAFER transport”) is an Horizon 2020 project focused on analyzing and defining the individual variables related with risky uptake behavior in urban traffic situations, trace cause - consequence data to evaluate risk awareness and perception, and determine core factors of risky behavior and affected decision-making processes. The ultimate goal is to obtain natural data from different actors (car drivers, motorbike drivers, bicycle drivers and pedestrians) in order to develop a next generation of driving simulator whose Artificial Intelligence components behave in the most realistic possible way. The project involved the involvement of several groups of volunteers who would have to drive their vehicle in an urban environment for at least three months: the vehicle was equipped with three external video cameras and an internal one aimed at the driver's face. In case another person would have driven the car, the volunteer would have had to switch the device off using a special switch. No biometric sensors were used in these tests. All data collected was transmitted in encrypted form via the cloud, anonymized and then used for the simulator's artificial intelligence model. A subsequent phase of the first research cycle was focused on the same volunteers who carry out a guide to the simulator where the most critical situations encountered during real life are repeated, all in order to better calibrate the agents of the software of the final advanced simulator.

Due to the time needed to set up the first version of the simulator's software containing the most critical situations encountered by each volunteer, the simulation phase started one year after the naturalistic driving tests.

3. Methodology

The research group based in Rome (Italy) was charged to select train and manage 15 volunteers aged between 50 and 70 driving a car in urban environment; the objective of the selection phase was to gather a group with adequate gender balance and homogeneous characteristics. The volunteers' compensation was defined as a lump sum reimbursement covering travels to the venue for training, NDT devices installation, periodic checks of the devices status and interviews during and after the driving period.

The amount of the lump sum was established in 50€ per each half day spent for the project; the time needed for the preliminary meetings, Vienna tests, self-confrontation interviews, checks of the NTD devices plus driving at the simulator were estimated as a total of 16 half days.

Announcement, filtering and selection

A first broad recruitment was launched with a public announcement through flyers in public spaces in Rome, internet and social media, also by taking into account Bramstedt (2007), with a general explanation of the project, the amount of the lump sum and the following volunteers' required characteristics:

- Age between 50 and 70 years.
- Being a native Italian speaker.
- Holding a driving license for cars since at least 10 years: the license must be valid for the entire period of the test.
- Have driven a car in the last 10 years with an average annual mileage of at least 10.000 km.
- Having, at the time of selection, at least 15 points on the driving license (out of 20)
- Driving regularly (at least three times each week) in an urban area
- Being the owner of the vehicle used for the NDT, or having a written consent by the owner.

63 applications were gathered in two weeks and each applicant received an email with a document explaining the details of the tests, the guarantees about the protection of personal and sensible data, plus a specific questionnaire asking about social and health status, driving experience and other info needed for the identification of the optimal volunteers' profile. All the answers were forwarded in an anonymous way (names substituted by codes) to the team of psychologists based in Milano, who sent back the 20 better profiles (15 + 5reserve) selected on the basis of gender balance, age classes coverage, health status and driving habits.

Training and preliminary tests

During a first physical meeting with the 20 selected volunteers, each involved researcher introduced herself/himself, then detailed explanations on the project were given, particularly about the importance of the volunteers' role in the overall research project, as well as about the relevance of the research results and the benefits for the road user. It was clearly explained that each volunteer could have left the test at any time without consequences and that a "pro quota" compensation would have been paid in any case. The team of psychologists participated in video conference and explained how the preliminary test (Vienna tests) and self-confrontation interviews would have been conducted. After a Q&A session, the volunteers were invited for a drink at a nearby bar to establish also an important informal contact which was then maintained throughout the test period through a dedicate mailing list with periodic updates (in average 1 message per week). Given the age of the group, neither social media, no smartphone applications were used, in order to reduce the risk of texting and driving. Two days after the first meeting each volunteer, including the reserve ones, received a very detailed package including the following explanations:

- Non technical explanation of the SIMUSAFE project, arranged for a general public
- Expected benefits from the project outputs
- Explanation of tests procedures
- Instructions for having the vehicle equipped for the NDT, including a detailed description of the methodology of installation of the cameras and other devices in their cars by using only bi-adhesive tapes, thus avoiding any damage at the end of the test
- Instructions in case of a car accident during NDT
- Info on data usage and privacy
- Possibility of quitting without any consequence
- Lump sum reimbursement for participation in the test
- Data use within and after the research
- Staff contacts for normal questions and for emergency cases
- Participant informed consent form, to be signed before starting the test

The 15 selected volunteers were advised well in advance about several possible dates for the installation of the NDT devices of in their cars, in order to offer them the maximum of flexibility; they assisted at the initial phase of the installation in a specialized garage, where the technicians explained how to check the correct functioning of the system. Then they were accompanied by one person of the team to the venue for the preliminary psychologic test (Vienna Test) and back to their car at the end of the test. In average the time for the whole process, installation and Vienna test, took around three hours.

One volunteer was rejected because the installation of the NDT system in his car was impossible, due to the particular characteristics of his car; he was replaced by one volunteer (same gender) of the reserve list. Since all the volunteers of the reserve list were trained together the main list ones, the replacement was immediate. The rejected volunteer got a compensation equivalent to one half day of test.

Naturalistic Driving Tests

The naturalistic driving test were conducted in Rome during the spring/summer period with an average duration of three months; the high temperature inside the cars parked under the sunshine, sometimes caused the detachment or a wrong position of several cameras, thus obliging the volunteers to return to the garage for fixing these problems, plus other ones occurred within the period. The communication method established during the training and the preliminary operations, every problem was reported in time, the volunteers were able to choose the day to go to the garage according to their needs, and the adjustments were made in average within a week from the date of reporting. At the end of the test all the 15 volunteers received their compensation and were advised about the next simulated test, then a light communication channel was maintained during the following months.

Simulated driving test

After one year from the beginning of the NDTs, the 15 volunteers were advised about the simulated driving session: 13 out of 15 answered to the preliminary call.

4. Conclusions

References

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