

# RESEARCH PROJECT: Development of an assessment protocol sensitive to the cognitive processes necessary for driving after stroke

21<sup>st</sup> November 2022

## PLAN ANALYSES

### **ANALYSIS TO IDENTIFY THE TESTS OR SET OF TESTS THAT SIGNIFICANTLY PREDICT THE ON-ROAD TEST.**

- Linear regression models will be used to assess the predictive ability of the different tests on the performance measure in the on-road test - response variable.
- Furthermore, participants will be divided into those who are fit to drive, those who are doubtful and those who are unfit based on the on-road test. Based on this, a discriminant function analysis will be performed.
- The diagnostic accuracy of the tests included in the protocol will be performed for the identification of fit/unfit/borderline patients for the on-road test through a receiver operating characteristic (ROC) curve analysis, where larger areas under the curve (AUC) indicate better diagnostic accuracy. The optimal cut-off points will be determined by the Youden index formula, where the highest Youden index indicates maximisation of sensitivity and specificity. For each cut-off point we will calculate sensitivity (the probability that participants with skills can get a pass in the On-Road driving test) and specificity (the probability that participants without skills will get a fail in the On-Road driving test).

### **VALIDATION OF COMAP AND THE SPANISH VERSION OF SDSA**

The validation of the COMAP, as a newly created scale, will be carried out by calculating the following psychometric properties:

Convergent validity, through correlation analysis.

- Semantic memory: Road Sign Recognition Test. SDSA\*.
- Selective attention: UFOV, Trail Making test.
- Working memory: PASAT
- Planning, inhibition, working memory, mental flexibility and strategy use: Spanish Weekly Calendar Planning Activity\*.

Incremental Functional Validity: On-road driving report, through regression analysis.

External Validity: Comparison with parametric (Student's t-test) or non-parametric (Mann Whitney U) tests between Stroke/unaffected persons.

Reliability: Crombach's alpha

Sensitivity and specificity: ROC Curve

\*Only for COMAP validation.

## **CREATION and VALIDATION EDEC**

### **CREATION**

**Phase 1.** Initially, the working team composed of all the researchers of this project will meet to elaborate a first version of the driving assessment test with the simulator. The starting point will be the work published on different scales validated in other languages and contexts: P-Drive (Patomella, Tham, Johansson & Kottorp, 2010; Patomella & Bundy, 2015). Test ride for investigating practical fitness to drive (TRIP) (Test to investigate practical fitness to drive) Driving Performance Inventory (DPI) (Lew et al., 2005).

**Phase 2.** A panel of experts will be formed using the DELPHI technique with the aim of achieving a reliable consensus among the opinions of a group of experts, through the sending of the draft assessment tool initially proposed by the working team, which will be answered anonymously. Objective to meet content validity.

Initially, the experts will be informed about the features of the DriveSiM simulator, as well as a possible route to be created for the test. In this sense, the experts will access a virtual platform where they will independently state their degree of agreement with the proposed items of the assessment tool. The degree of agreement will be established with a Likert-type scale (from 1 to 5) and, in addition, a space will be included where they will be able to make their comments freely, which will be considered a posteriori by the work team and will be used for the following rounds of consultation.

After each round, the working group will meet to resubmit a new questionnaire based on the results of the first round, in order to be re-evaluated by the expert committee, so that they can reconsider their answers, aided by the information received from the other experts.

The criteria for reaching a consensus will be a minimum of 2 rounds, at least 75% of the group of experts must agree or strongly agree on each item and an Interquartile Range / each item of less than 3 points.

The committee of experts will be composed of at least 7 persons, among them

- Occupational therapists in the field of neurology who are familiar with the potential and limitations of stroke patients.
- Professionals in the field of rehabilitation (occupational therapists among others) who have experience in the rehabilitation of driving in people with stroke.)
- Professionals in the field of driving in general.
- Scientists whose lines of research are focused on driving.

**Phase 3.** Test design. Once the measuring instrument has been designed and agreed upon by the team of experts, all the final assessment items of the new tool will be collected in writing.

### **VALIDATION**

The validation of the EDEC as a newly created scale, will be carried out by calculating the following psychometric properties:

Convergent validity, through correlation analysis.

- Semantic memory: Road Sign Recognition Test. SDSA.
- Selective attention: UFOV, Trail Making test.
- Working memory: PASAT

- Planning, inhibition, working memory, mental flexibility and strategy use:  
Spanish Weekly Calendar Planning Activity.

Incremental Functional Validity: On-road driving report, through regression analysis.

External Validity: Comparison with parametric (Student's t-test) or non-parametric (Mann Whitney U) tests between Stroke/unaffected persons.

Reliability: Cronbach's alpha

Sensitivity and specificity: ROC Curve