# Unsupervised analysis of cognitive complaint in not-demented elderly

## Problem

As population ageing increases, the proportion of people having dementia will become more important in the coming years [1]. Identifying people at risk of develop dementia has become an important research challenge that can improve preventive strategies. Dementia is generally preceded by preliminary symptoms, which include subjective cognitive decline (SCD), usually assessed by multiple choice questionnaires. However, there is neither an accepted self- nor informant-scale to classify an individual with SCD [2].

## Solution

A group of 180 elderly participants were evaluated on socio-demographic, cognitive and functional features to assess SCD in non-demented people. The analysis of categorical information can be done using innovative tools that have the capacity to capture the complexity of different types of questionnaires and extract the essential information that can reliably differentiate people in an unsupervised way.

## Method

Multiple-choice questionnaires were analyzed using Multiple Correspondence Analysis (MCA), a method that accurately describe the diversity of the participants using fewer variables [3], [4]. Also, a clustering method was applied to the data mapped in these reduced variables in order to group participants according to different schemes.

## Variables and metrics

We assess the precision of dimensionality reduction by the explained variance ratio of every component. The importance of a given question is calculated by the projection of it in the principal components, which can be then compared to the existing literature on instruments to assess SCD.

## Hypothesis

The importance of questions to assess SCD can be found by using MCA based on finding the principal components that best explain participant's variance, and by doing this, participants can be clustered in groups.

## Objectives

1. Apply MCA to SCD questionnaires.
2. Find principal components that best explain the variance among participants.

3. Project each individual on principal components.
4. Apply clustering methods to participant's projection to principal components.

# Preliminary Results

The subjective cognitive complaint questionnaire composed by 11 questions was reduced to 2 dimensions with an explained variance ratio of 42%. The relative importance of each question was analyzed, finding agreement with published evidence [2]. The participants seems to be clusterized, but more questionnaires need to be added.

# Outlook

Assessment of participants using categorical variables is found in several medical studies, and a solid methodological framework can help extract information and compare groups using a common scale.

# References


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