

# The effects of an immersive virtual reality and telemedicine-based multi-component intervention in individuals with subjective cognitive decline: study protocol of a randomized controlled trial

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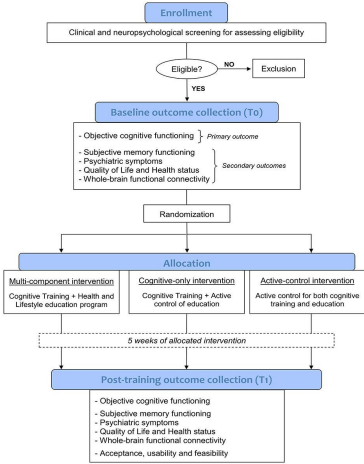
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## Introduction

Older adults with subjective cognitive decline (SCD) are at high risk of developing dementia and frequently experience subclinical symptoms (e.g., anxiety, depression) which are themselves associated with an increased dementia and cognitive decline risk. This study aims to evaluate the effectiveness of an immersive virtual-reality (IVR) and telemedicine-based multi-component intervention, combining cognitive training and a health and lifestyle education program, on objective and subjective cognitive function, psychiatric symptoms, quality of life and brain connectivity in older adults with SCD.

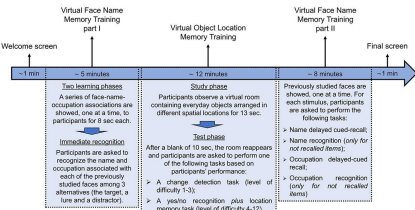
## Study design



This 5-week randomized controlled trial (RCT) will employ a double-blinded, three-parallel group design adhering to CONSORT guidelines. Participants with SCD will first undergo a baseline assessment (T0), including clinical/neuropsychological evaluation and 3T MRI scan. They will then be allocated using a stratified randomization method and blinded to one of three experimental conditions:

- **Multi-Component Intervention (MC-I):** SCD-tailored cognitive IVR training plus a health and lifestyle education program.
- **Cognitive-Only Intervention (CO-I):** SCD-tailored cognitive IVR training plus an active control for the education program.
- **Active Control Intervention (AC-I):** Active controls for both the cognitive training and the education program.

### Temporal organization of an individual session of cognitive training.



## Immersive Virtual Reality Training

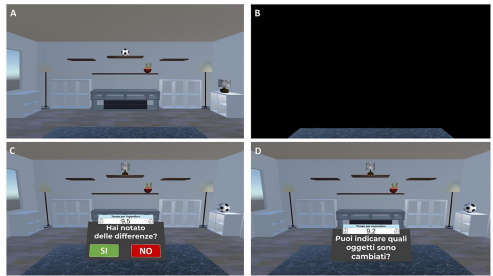
### IVR apparatus and telemedicine platform



### Virtual Face Name Memory training

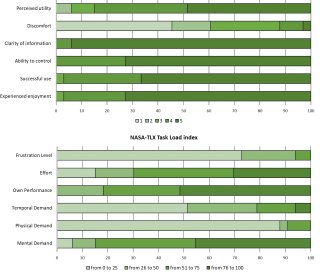


### Virtual Object Location Memory training



Preliminary results of 33 young healthy volunteers about self-report questionnaires administered immediately after the IVR task session

VRQ: User Satisfaction Evaluation Questionnaire



## Conclusions

The results of this randomized controlled trial will provide crucial evidence regarding the effectiveness of a novel multi-component intervention, integrating cognitive training and health education delivered via immersive virtual reality and telemedicine, for individuals at high risk of cognitive decline and dementia (SCD). Given its relatively low cost and accessibility, this approach has the potential to significantly contribute to primary prevention and early cognitive rehabilitation efforts aimed at reducing dementia risk.

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## Progetto PRIN PNRR

Preventing cognitive decline and dementia through an innovative immersive virtual reality and telemedicine-based multi-component intervention: a randomized controlled trial

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