Virtual Reality in Neuropsychological Intervention Programs for People with Intellectual Disabilities

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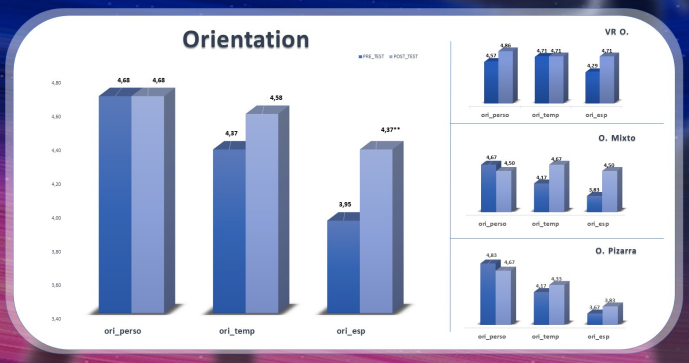
Introduction: Virtual Reality (VR) is offered as a new and motivational tool which is very useful in neuropsychological intervention programs allowing the user work with 3D objects in environments that thanks to its technology are far immersive that in other more conventional techniques.

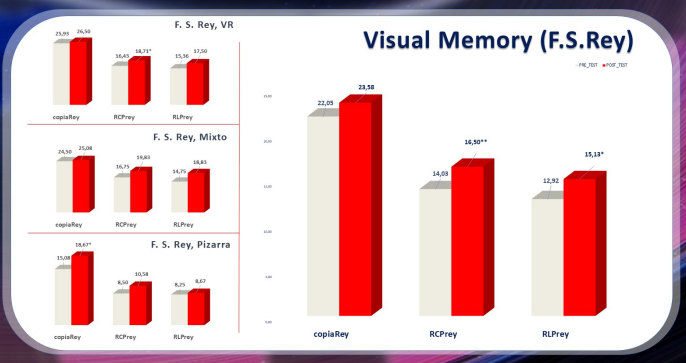
Objective: the target of the present study was to compare the impact of the use of VR in the superior cognitive functions, as tool in the neuropsychological intervention programs in people with intellectual disability.

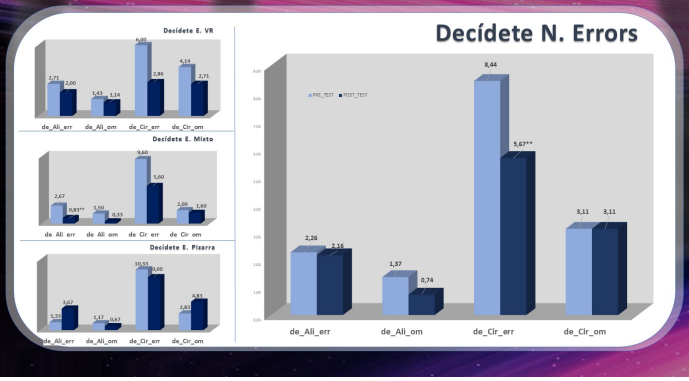
Method: the study sample was form by 19 people with mild-moderate intellectual disability, users of Occupational Center CIVITAS from Gran Canary, Spain with a mean age x = 41.19 years. All of them were taking part of a cognitive stimulation program, receiving a total of 40 1-hour sessions, with a periodicity of 2 times per week. The sample was divided in three experimental groups: Group1 (VR) received all the sessions with the Virtual Reality technology, Group2 (VR + Digital Whiteboard (DW)) received 20 sessions with VR and another 20 with DW. Group3 (DW) received all the session with the DW. In the VR sessions "The Lab", "Goaltender" and "Snow Games" were the software chosen from the Valve's Steam Platform, meanwhile "Neotrie-VR" developed by Virtual Dor, an external software company as well as "La Isla" a CIVITAS Association's internal Project were as well used. In the DW sessions PowerPoint created activities were used as well as free use digital resources and the Smart Brain platform.

Results: the neuropsychological assessment instruments used were: Orientation Questionnaire, A Test, Direct/Reverse Weschler Verbal Span, Corsi, TAVEC, COWAT, Simple King Figure (SKF), 5 Digits test and Decide Task (food and circles). As statistic, the T-Student was used for related samples. When analysing the related data, highly significant statistical differences were found in spatial orientation (t= 3.024; df= 18; p≤.007), in SKF short-term memory (t= 4.357; df= 18; p≤ .000) and in the decrease of errors in Decide Circles (t= -3.426; df= 18; p≤.003) and statistically significant differences in SKF long-term memory (t= 2.740; df= 18; p ≤.013). In experimental groups, statistically significant differences were found in the VR group in SKF short-term memory (t= 2.525; df= 6; p≤.045). In the Mixed group there was a statistically significant decrease in errors in the Decide Food task (t= -4.568; df= 5; p≤.006), an improvement was also found in SKF short and long-term memory and although the data were not statistically significant, they were close (t= 2.498; df= 5; p≤.055), (t= 2.467; df= 5; p≤.057) respectively. In the whiteboard group, statistically significant data were found in the SKF copy (t= 2.678; df= 5; p≤.044).

Conclusions: although there was a generalized improvement in the different cognitive areas evaluated, statistically very significant or significant differences were only found in spatial orientation and in both long- and short-term memory of visual material as well as in the decrease of errors in the Decide task due to its way of presentation predominantly visual. This may be explained by the use of VR as an intervention tool, as both VR group and the mixed group, worked with VR, the visual area, the visuospatial and visuoperceptive functions have been significantly favoured as they've been able to perform cognitive tasks with a more immersive and three-dimensional character







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