Effects of applying Virtual Reality in Cognitive Stimulation Therapy on cognition and functional communication of people with concurrent dementia and visual impairment: An initial Study

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Abstract:

Background:

Cognitive stimulation therapy (CST; Spector et al., 2003) is an evidence-based group therapy for people with dementia. Since multi-sensory input such as visual, auditory, and tactile stimuli is used during therapy, people with sensory deficit, e.g., visual impairment, may encounter difficulties in perceiving the stimuli presented. Meanwhile, the use of virtual reality (VR) in rehabilitation has been reported in various clinical populations, its benefits on people with concurrent visual impairment and dementia are yet to be explored. The current study aimed to investigate the effects of applying VR to CST on cognition and functional communication of individuals with concurrent visual impairment and dementia.

Method:

Five and seven participants with mild to moderate visual impairment completed 14 sessions of CST adopted from Wong (2018) in VR-CST and conventional conditions, respectively. Processed magnified visual stimuli were presented via head-mounted displays in the VR group, while stimuli used in the conventional treatment group was displayed via tablets. Participants' performance on general cognition, different cognitive components, language functions in word and discourse levels, and their functional communication was tapped three times within two weeks prior to/right after treatment, respectively. Tau-U statistics were applied for pre/post comparison.

Result:

No significant improvement was observed in all cognitive measures in the VR-CST group while positive changes in measures on general cognition, short-term and working memory, and executive functions were noted in the conventional CST group. Improvements in functional communication were observed in both treatment groups while gains in word comprehension were only seen in the conventional CST group (see Table 1).

Conclusion:

This study demonstrated preliminary evidence for the application of VR in CST among people with concurrent visual impairment and dementia.

References:

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Wong, G. H., Yek, O. P., Zhang, A. Y., Lum, T. Y., & Spector, A. (2018). Cultural adaptation of cognitive stimulation therapy (CST) for Chinese people with dementia: Multicentre pilot study. *International journal of geriatric psychiatry, 33*, 841-848.

Table 1

Averaged Performance of Participants in Each Treatment Condition on all Outcome Measures

Measures	VR CST		Conventional CST	
	Tau-U	*p* value	Tau-U	*p* value
MoCA-VI	.26	.241	.38	.047*
Digit span (forward)	.04	.845	.53	.005**
Digit span (backward)	.02	.922	.39	.039*
TEA Elevator counting	.11	.625	.14	.457
TEA Elevator counting with distraction	.02	.922	.17	.364
Verbal fluency (Animal)	.27	.241	.24	.216
Verbal fluency (Transportation)	.04	.845	.65	.0007**
Verbal fluency (Animal & Transportation)	.22	.329	.40	.039*
Synonym judgement	.24	.283	.39	.047*
Procedural description	.29	.20	.12	.51
CANELT (Total score)	.91	.0002***	.413	.047*
CANELT ("Opening")	.68	.003***	.11	.56
CANELT ("New Information")	.71	.002***	.52	.01*

Note: * = p < .05, ** = p < .01, *** = p <.001

Blue color indicates medium to large effect size 0.66 – 0.92