THE ROLE OF AGE, COGNITIVE RESERVE AND DEPRESSON IN EXECUTIVE FUNCTIONING

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INTRODUCTION

Cognitive reserve (CR) is known to reduce or even protect against the negative effects of ageing on cognitive functioning by facilitating the use of compensatory strategies. CR has also often been associated with compensatory mechanisms related to executive functions (EFs), which in turn can be affected by depression. In particular, evidence suggests reduced performance on processing speed, inhibition and attention in presence of depression. Evidence has also demonstrated executive impairments tend to increase with age. Less is known about the relationship between age, depression and CR across age groups and, how they may affect specifically EFs.

RESEARCH QUESTIONS

- Age, CR and Depression predict EFs?;
- Do CR (and depression) moderate the relationship between age and EFs?

PARTICIPANTS

The sample consisted of N= 55 younger LJMU students (22.91 ± 3.45, 36 females) and N= 55 older adults (69.45 ± 6.7, 33 females), recruited from the MeNu lab's database.

Older adults were selected if aged 60 or above. All participants had no history of neurological conditions or psychiatric disorders.

Participants age-related differences in both demographics and cognitive performance reported in Fig 1.

Fig.1 Demographics and comparisons of mood and cognitive performance in younger and older participants.

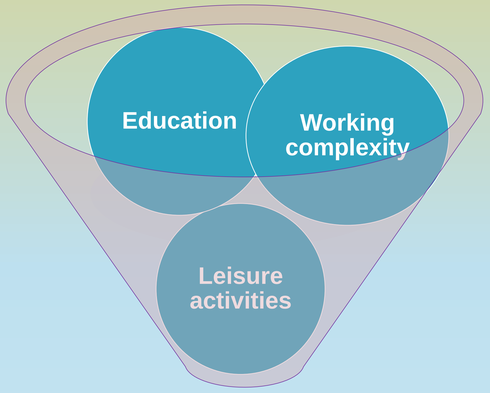
	Younger (N= 55)		Older (N= 55)		
	Mean (Standard Deviation)		Mean (Standard Deviation)		*p*
Age	22.91 ± 3.45		69.45 ± 6.7		<0.001
Gender (females)	36 (65%)		33 (60%)		0.056
Education (years)	17.15 ± 20.94		14.39 ± 3.25		<0.001
	Mdn	**Min-Max**	**Mdn**	**Min-Max**	
MOCA	27	24-30	27	13-30	0.314
TMT-A	22	11-60	32	14-60	0.005
TMT-B	50	26-106	75	31-185	<0 .001
CRIq	93	84-116	129	93-164	<0 .001
STAI	37	23-68	31	20-55	<0 .001
PHQ-9	4	0-23	2	0-12	< 0.001

Note. MOCA= general cognitive assessment; PHQ-9= Depression questionnaire; CRIq= Cognitive Reserve questionnaire; TMT= Trail Making Test; DSS= Digit Symbol Substitution test.

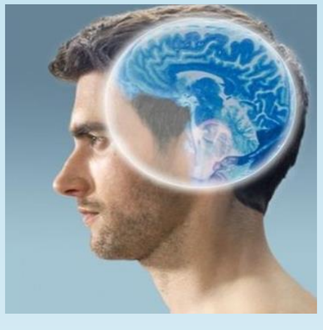
PROCEDURE

- General cognitive abilities were assessed using the Montreal Cognitive Assessment (MOCA);
- CR was assessed with three proxies of the Cognitive Reserve Questionnaire (CRIq): education, working complexity and leisure activities (see Fig. 1.1);
- Depression was assessed with the Patient Health Questionnaire (PHQ-9);
- Executive functioning was investigated using Trial Making Test (TMT-A-/B) and Digital Symbol Substitution test (DSS). EFs scales score was computed by the sum of z-scores of TMT-A/B and DSS.

Fig.1.1 Cognitive reserve proxies



CR CONTRIBUTORS



RESULTS

- Regression analyses showed that Age and CRIq predicted all executive tasks (see Fig.1.2);
- Depression was a significant predictor only of TMT-B;
- Moderation analysis did not show the moderating effect of CR on the association between age and EFs across age groups.

Fig.1.2 Predicting executive functions in TMT-A/B and DSS

	TMT-A		TMT-B		DSS	
Predictors	β	*p*	β	*p*	β	*p*
Age	0.748	<.001	0.848	<.001	-960	<.001
CRIq	-0.395	0.008	-0.353	<.001	0.371	0.003
PHQ-9	0.090	0.315	0.174	0.037	1.426	0.037

CONCLUSIONS

Finding from this study showed:

- The significant role of age and CR on influencing the performance in executive tasks;
- A significant association of depression with tasks based on multiple skills (TMT-B) and no with tasks that require speed processing (i.e., TMT-A and DSS);
- No moderating effect of CR (and depression) on the association between age and EFs across age groups and so a limited role of CR to the prediction of EFs.

FUTURE DIRECTION

Further studies should investigate:

- Alternative proxies to estimate CR;
- Other executive tasks;
- Middle-age groups;
- Age as categorical variable;
- Moderation effect of CR across age-groups.

IMPLICATIONS

-Development of preventive strategies across the life span;
-Clinical practice in terms of diagnosis and prognosis.

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