Cognitive Reserve, depression and executive functions: a 10-year follow-up study in 416 older adults

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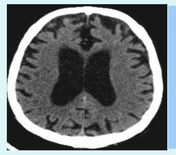
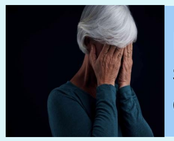
Introduction



Mild Cognitive Impairment (MCI) represents the transitional state between normal aging and dementia, involving cognitive problems (memory and thinking abilties).

Cognitive reserve (CR) is a set of lifetime experiences that build a reserve of mental abilities. Among all mental abilities, **Executive Functions (EFs)** allow individuals to compensate for aging, cognitive decline and brain pathology.



Depression represents a risk factor and/or prodromal symptom for MCI and may be associated with the early stages of dementia.

Participants

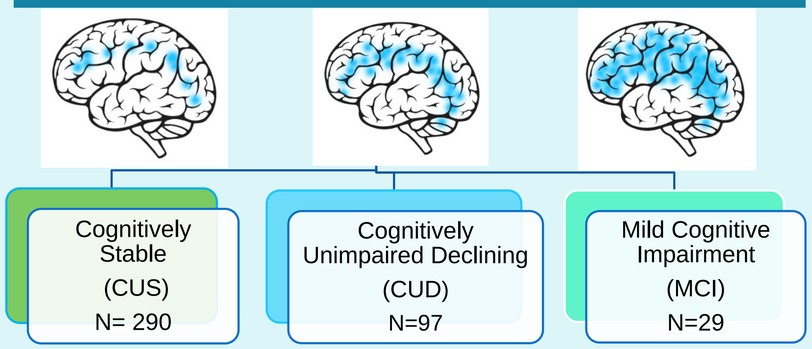


Table 1. Sample Characteristics

Measures at baseline	CUS (*n* = 290)	CUD (*n* = 97)	MCI (*n* = 29)	*p*
Age	56.57 ± 4.20	57.74 ± 4.34	59.03 ± 4.45	.002
Gender (females)	209 (72%)	63 (61%)	22 (76%)	.34
Years of education	16.38 ± 2.68	16.14 ± 2.75	14.97 ± 2.26	.03*
APOE-e4	57 (20%)	20 (21%)	11 (38%)	.14
Depression (CES-D)	6 ± 2.30	10.59 ± 7.38	11.21 ± 7.38	<.001***

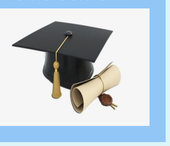
Cognitive reserve may reduce the risk of dementia by 45%

Method and Materials

- ❑ Longitudinal study from the Wisconsin Registry for Alzheimer's Prevention dataset.
- ❑Hierarchical linear regression, controlling for age, gender, APOE-e4 and diagnosis (CUS, CUD, MCI) in Model 1, CR and depression in Model 2, and the CR*Depression interaction in Model 3 was performed.
- ❑Multinomial logistic regression was used to predict conversion to CUD and MCI from healthy baseline (CUS).

10-year follow-up

Cognitive Reserve: Premorbid IQ (i.e., WRAT-4 reading test) + years of education

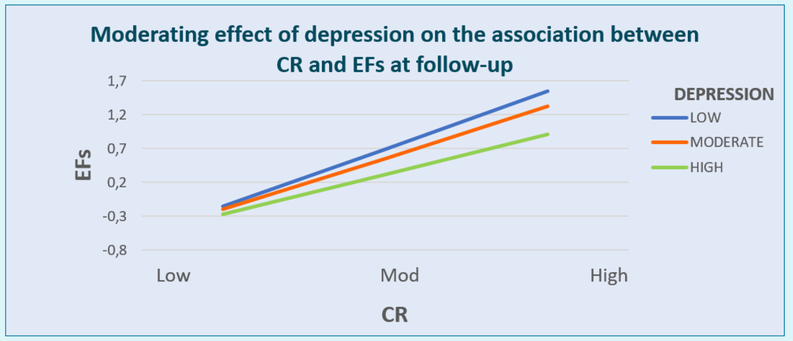


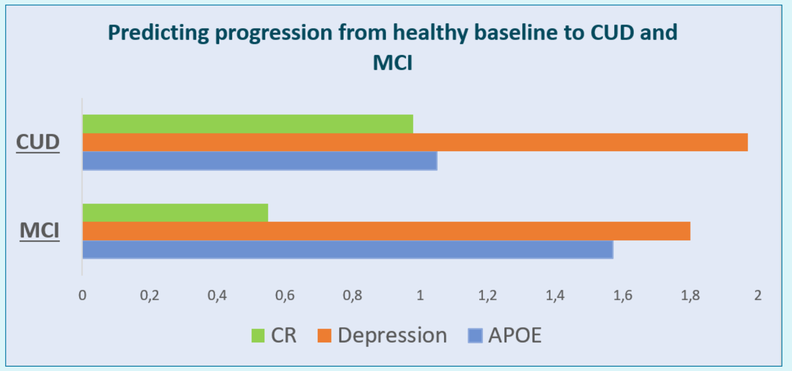
Depression: Center for Epidemiologic Studies Depression Scale (CES-D)

Apoe ε4 gene: via blood analysis

Executive Functions: CFL, Digit Span test and Letter-Number sequencing test

Results





Bar chart displays the Odds Ratio values.
CUD= CR(ß= -.02; *p*=.78), CES-D(ß=.68; *p*=.000***), APOE-e4 (ß=.05; *p*=.69);
MCI = CR (ß=-.56; *p*=.000***), CES-D (ß=.61, *p*=.001***, APOE-e4 (ß=.45; *p*=.01).

Conclusion

The current study supports the hypothesis that CR is a protective factor leading to preserved EFs over 10 years. Additionally, beneficial effect of CR on EFs seems to be mitigated by increasing levels of depression. Finally, depression predicted conversion from CUS to CUD whereas CR, depression and APOE-e4 predicted conversion from CUS to MCI.
In future, different proxies of CR and their predictive value should be investigated in normal and clinical populations.

References

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•Stern, Y. (2007). *Cognitive reserve: Theory and applications.* Taylor & Francis.