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BIOMARKERS

POSTER PRESENTATION

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NEUROIMAGING

Associations of cognitive debt and cognitive reserve with mixed brain pathology and cognition

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Abstract

Background: Behavioral risk or protective factors related to "cognitive debt" and "cognitive reserve" may influence brain pathology and cognition and thereby contribute to resilience in aging. This cross-sectional study examined direct and indirect associations of cognitive debt (risk factor) and cognitive reserve (protective factor) with mixed brain pathologies and cognition in older adults.

Methods: A sample of $N = 298$ non-demented older adults (mean age=70 years, 56% male) from the DELCODE study (DRKS00007966) were analyzed using structural equation modeling (SEM) and an a-priori path model. We assessed the association between cognitive debt and cognitive reserve (modelled as latent constructs) and global cognition (Preclinical Alzheimer Cognitive Composite 5 [PACC5] modelled as latent construct) through pathological pathways involving beta-amyloid (Aß) burden, hippocampal neurodegeneration, and white matter hyperintensities (WMH) in the corpus callosum splenium (CCs), while adjusting for age. A goodness-of-fit analysis ensured adequate model fit.

Results: Brain pathology was associated with lower PACC5 performance via direct pathways (for WMH in the CCs and hippocampal neurodegeneration) and indirect pathways (for Aß deposition via hippocampal neurodegeneration) (all $p < .05$). Cognitive debt and cognitive reserve were not significantly associated with brain pathology (all $p > .05$). Cognitive reserve, but not cognitive debt, was independently associated with better PACC5 performance ($p = .005$). Cognitive debt and cognitive reserve were associated at trend level ($p = .068$). Results are displayed in Figure 1.

Conclusion: Brain pathologies were linked to lower cognitive performance. Cognitive reserve, but not cognitive debt, was independently associated with better cognitive performance (1). There were no significant associations of cognitive debt and cognitive reserve with brain pathologies. The findings suggest that cognitive reserve may influence resilience through mechanisms independent of brain pathology (2). Future longitudinal studies are needed to investigate these pathways and clarify causal relationships.

References

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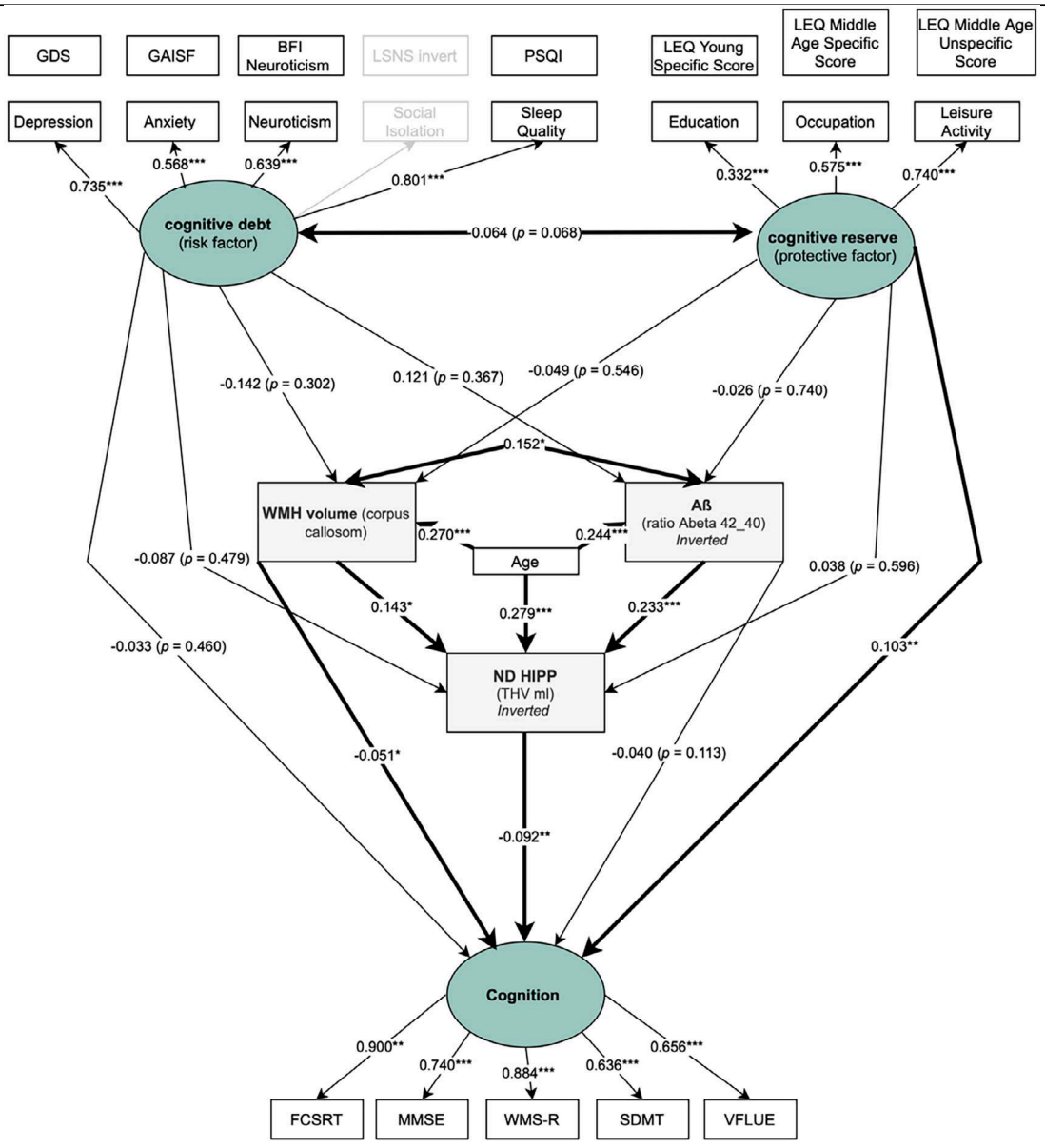
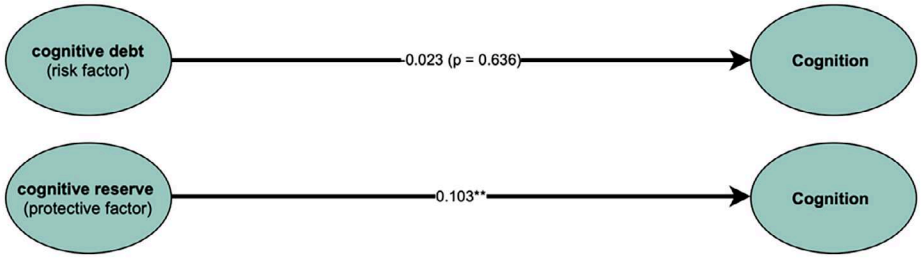

GDS
GAISF
BFI Neuroticism
LSNS invert
PSQI
LEQ Young Specific Score
LEQ Middle Age Specific Score
LEQ Middle Age Unspecific Score
Depression
Anxiety
Neuroticism
Social Isolation
Sleep Quality
Education
Occupation
Leisure Activity
0.735***
0.568***
0.639***
0.801***
0.332***
0.575***
0.740***
cognitive debt (risk factor)
-0.064 (p = 0.068)
cognitive reserve (protective factor)
-0.142 (p = 0.302)
0.121 (p = 0.367)
-0.049 (p = 0.546)
-0.026 (p = 0.740)
0.152*
WMH volume (corpus callosom)
Aß (ratio Abeta 42_40) Inverted
0.270***
0.244***
Age
-0.087 (p = 0.479)
0.038 (p = 0.596)
0.143*
0.279***
0.233***
-0.033 (p = 0.460)
0.103**
ND HIPP (THV ml) Inverted
-0.051*
-0.040 (p = 0.113)
-0.092**
Cognition
0.900**
0.740***
0.884***
0.636***
0.656***
FCSRT
MMSE
WMS-R
SDMT
VFLUE


cognitive debt (risk factor)
0.023 (p = 0.636)
Cognition
cognitive reserve (protective factor)
0.103**
Cognition