

Influence of the geography on healthy aging: comparative analysis of cognition and electrophysiology in older people

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What if rural areas were not as favorable as people generally think? Older adults living in urban areas have better cognitive, functional and emotional well-being.

INTRODUCTION

RURAL ENVIRONMENT

↑ Cognitive decline ratio¹
↓ Cognitive stimulation^{1,2}
↓ Education level^{1,2}

URBAN ENVIRONMENT

↑ Depressive symptoms³
↑ Stress levels³
↑ Exposure to pollutants⁴

↓

OBJECTIVE

Explore the cognitive, functional, and lifestyle differences among older adults in rural and urban areas.

METHODS

PARTICIPANTS



N = 41 ♂ 12 ♀ 29
Age = 83.24 ± 5.24
Years of education = 6.59 ± 3.31
MMSE = 26.15 ± 2.75



N = 40 ♂ 14 ♀ 26
Age = 84.18 ± 2.71
Years of education = 14.33 ± 5.86
MMSE = 28.45 ± 1.22

ANALYSIS

General Linear Multivariate model (GLMm)
Effect of geographic environment on cognitive and functional status

Sensor-level power spectral analysis
Alpha and beta bands

Wilcoxon rank-sum test
Rural vs. Urban groups.

-Matched groups
Age and sex.

RESULTS

Environment *
Rural vs. Urban

Years of education*

DF

DB*

CDT*

TMT-A*

PF*

SF*

PM*

Figure 1. GLMm of the environment and education (covariate) on neuropsychological tests (F = 4.30, p = 0.001; F = 2.38, p = 0.032). The interaction environment - education was not significant. (*): significant results (p < 0.05). See the QR code for the tests.

2a

DB

YEARS OF EDUCATION

2b

CDT

YEARS OF EDUCATION

2c

TMT-A

YEARS OF EDUCATION

2d

PF

YEARS OF EDUCATION

2e

SF

YEARS OF EDUCATION

2f

PM

YEARS OF EDUCATION

Figure 2. Scatter plots of the significant cognitive factors. 2a) DB (F= 6,631; p= 0,012; η²_p=0,09); 2b) CDT (F= 8,756; p= 0,004; η²_p=0,12); 2c) TMT-A (F= 7,226; p= 0,009; η²_p=0,1); 2d) PF (F= 7,519; p= 0,008; η²_p=0,1); 2e) SF (F= 4,168; p= 0,045; η²_p=0,05) y 2f) PM (F= 9,287; p= 0,003; η²_p=0,12). Blue dots represent the rural sample, while red dots indicate the urban one.

Environment *
Rural vs. Urban

SPPB

MNA

Barthel

MEDAS*

GDS-15*

L&B*

4a

MEDAS

ENVIRONMENT

4b

L&B

ENVIRONMENT

4c

GDS-15

ENVIRONMENT

Figure 3. GLMm model of the environment's effect on performance on functional tests (F = 4.41, p = 0.001). (*): significant results (p < 0.05). See the QR for the tests.

Figure 4. Box plots of significant functional variables: 4a) MEDAS (F= 4,424; p= 0,039; η²_p=0,16); 4b) L&B (F= 4,828; p= 0,031; η²_p=0,07); 4c) GDS-15 (F= 13,251; p= 0,001; η²_p=0,17).

Power spectral analysis showed **no significant effects** in alpha or beta frequency bands.

CONCLUSIONS

OUR FINDINGS

Older adults living in urban areas have **better cognitive, functional, and emotional well-being.**

↓ why?

Greater access to resources in cities and a **more complex daily routine** as protective factors in aging.^{16,17,18}

REFERENCES



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