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Association between greenspace exposure and different domains of cognitive function in the French CONSTANCES cohort

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ABSTRACT

BACKGROUND AND AIM - Greenspace has been suggested to be associated with better cognitive function in adults. We assessed the association between residential surrounding greenspace and different domains of cognition in the French CONSTANCES cohort. METHODS - We included 76,482 participants aged 45 and older, who performed tests at enrollment (2012-2019) on three cognitive domains: episodic memory (fast free and cued recall), language skills (semantic and lexical fluency), and executive functions (digit-symbol substitution, trail making test part A and B [TMT-A and TMT-B]), and a global cognitive score (a composite of these six tests). Residential surrounding greenspace was quantified using satellite-based Normalized Difference Vegetation Index (NDVI) at 300m buffer around the participant's home in the enrollment year. We modeled the cross-sectional associations for urban, suburban, isolated cities, rural, and Paris separately, using multiple linear regressions on standardized outcomes (TMT-A and TMT-B were log-transformed) adjusted for age, sex, education, recruitment center, neighborhood deprivation, and air pollution. RESULTS - The participants were 57.6±7.2 years old, 54.9% women, and 49.7% with university education. Average NDVI at 300m buffer (IQR: 0.26) was 0.58±0.14, 0.67±0.12, 0.71±0.11, 0.81±0.08, and 0.35±0.09 for urban, suburban, isolated cities, rural, and Paris respectively. We found significant beneficial association between residential surrounding greenspace and semantic fluency at urban, suburban, isolated cities, and rural areas (ß=0.048 [95% CI: 0.018, 0.079], 0.068 [0.037, 0.098], 0.105 [0.033, 0.177], 0.096 [0.033, 0.158] respectively). We also observed similar beneficial associations for executive functions in urban and suburban areas. No associations with greenspace were found for episodic memory, lexical fluency, and global cognitive score in most communes of residence. CONCLUSION - Exposure to greenspace could be beneficial for cognition, especially semantic and executive functions, in adults. Urban and suburban residents probably gain more cognitive benefits from greenspace.

KEYWORDS: Natural environment; Cognitive function; Alzheimer's disease; Environmental epidemiology

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