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Effect modifiers of the association between black carbon and cognitive performance in a French population cohort

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**ABSTRACT**

**INTRODUCTION** - Our previous work found associations between black carbon (BC) and episodic memory, semantic fluency, and executive function (DSST, TMT-A and TMT-B). In this analysis, we aimed to assess the effect modifiers of such associations. **METHODS** - In CONSTANCES cohort, cognitive tests were assessed at recruitment among 61,560 participants aged 45-75 years. Land use regression was used to estimate BC and PM<sub>2.5</sub> at participants' residential address. Multivariate linear model was used to assess the association between BC and z-score of outcomes, adjusted for covariates. Confounding by PM<sub>2.5</sub> was addressed using residuals of BC regressed on PM<sub>2.5</sub>. Stratification analyses were performed, and interaction term was tested. **RESULTS** - BC residual was significantly associated with worse cognitive performance. This association was modified by sex, history of solvent exposure and depression. For DSST, an interquartile increase in BC residual was associated with  $\beta$  coefficients of -0.005 (95%CI: -0.022, 0.013) and -0.046 (-0.064, -0.029) in men and women, -0.037 (-0.067, -0.006) and -0.026 (-0.040, -0.013) in those exposed and not exposed to solvents, and -0.049 (-0.077, -0.022) and -0.020 (-0.034, -0.006) in those with and without depression, with P-interaction < 0.05. Similar trends were found for other cognitive tests. **DISCUSSION** - BC was linked with cognitive impairment, independently of PM<sub>2.5</sub>, with stronger effects in females, persons with history of solvent exposure, or depression.

**KEYWORDS:** -

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