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Supplemental Material

Associations between Fine Particulate Matter Components, Their Sources, and Cognitive Outcomes in Children Ages 9–10 Years Old from the United States

Kirthana Sukumaran, Katherine L. Botternhorn, Joel Schwartz, Jim Gauderman, Carlos Cardenas-Iniguez, Rob McConnell, Daniel A. Hackman, Kiros Berhane, Hedyeh Ahmadi, Shermaine Abad, Rima Habre, and Megan M. Herting

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Table S7. Associations between each $PM_{2.5}$ source factor and cognitive outcome in 9–10-year-old participants from the ABCD Study cohort (n=8,580), 2016-2018, including parental education as an additional covariate.

Figure S1. Directed Acyclic Graph (DAG) of potential confounders that may predict link between exposure to air pollution (based on residential location) and cognitive performance of children. A) Dagitty model of potential confounders to identify minimally sufficient set (i.e. adjusted variables = white circles). B) Simplified DAG of confounders adjusted for in final models based on A.

Figure S2. Correlation [Spearman] matrix of 15 $PM_{2.5}$ components estimated at the child's residence of all 9–10-year-old participants from the ABCD Study cohort (n=8,589), 2016-2018.

Figure S3. Distributions of residential $PM_{2.5}$ component exposure concentrations of all 9–10-year-old participants from the ABCD Study cohort (n=8,589), 2016-2018, plot by site. Study sites are color coded by U.S. geographical region. Abbreviations: SO_4^{2}- for sulfate; NO_3^- for nitrate; NH_4^+ for ammonium; OC for organic carbon; EC for elemental carbon; Zn for zinc; V or vanadium; K for potassium; Si for silicon; Pb for lead; Ni for nickel; Fe for iron; Cu for copper; Ca for calcium; Br for bromine. Numeric data for Supplemental Figure 3 can be found in Excel Table S9.

Figure S4. Weights of PM components, clustered by source factor groups, contributing to significant grouped mixture effects on neurocognitive outcomes in 9–10-year-old participants from the ABCD Study cohort (n=8,589), 2016-2018. A) Weights for associations seen for general cognitive ability and crustal (negative association), industrial (negative association), and traffic (positive association) related components. B) Weights for association seen for learning & memory and ammonium nitrate-related components (negative association). C) Weights for associations seen for executive function and traffic (negative association) and biomass burning (positive association) related components. Abbreviations: NO_3^- for nitrate; NH_4^+ for ammonium; OC for organic carbon; EC for elemental carbon; Zn for zinc; K for potassium; Si for silicon; Pb for lead; Ni for nickel; Fe for iron; Cu for copper; Ca for calcium; Br for bromine. Numeric data for Supplemental Figure 4 can be found in Excel Table S10.

References

Additional File- Excel Document