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Supplemental Material

Short-Term Exposure to Wildfire Smoke and PM_{2.5} and Cognitive Performance in a Brain-Training Game: A Longitudinal Study of U.S. Adults

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Table S2. Change in attention score associated with a 10 $\mu\text{g}/\text{m}^3$ increase in daily and subdaily PM_{2.5} for western and contiguous U.S. users, overall and by age group, gender, and habitual behavior. A *P*-value of 0.05 was used to determine statistical significance. Exposure metrics include the maximum population-weighted hourly average PM_{2.5} in the 3 and 12 hours prior to gameplay (3 and 12-Hour Max), the population-weighted daily average PM_{2.5} the day of gameplay (Lag 0), and the cumulative population-weighted daily average PM_{2.5} in the 7 days prior to gameplay (7-Day Cumulative).

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Table S4. Results for all sensitivity analyses of the associations between daily and subdaily PM_{2.5} and attention score for western and contiguous U.S. users. A *P*-value of 0.05 was used to determine statistical significance. Exposure metrics include the maximum population-weighted hourly average PM_{2.5} in the 3 and 12 hours prior to gameplay (3 and 12-Hour Max), the population-weighted daily average PM_{2.5} the day of gameplay (Lag 0), and the cumulative population-weighted daily average PM_{2.5} in the 7 days prior to gameplay (7-Day Cumulative).

Table S5. Results for all sensitivity analyses of the associations between smoke density and attention score for western U.S. users. A *P*-value of 0.05 was used to determine statistical significance. Exposure metrics include the daily maximum smoke density the day of and day prior to gameplay (Lag 0 and Lag 1) and in the 1 week prior to gameplay (1-Week).

Figure S1. Screenshot showing the appearance of the *Lost in Migration* game. In this example, the center bird is flanked by four other birds oriented in a different direction.

Figure S2. Average learning curves (95% CI) across 20 plays of *Lost in Migration* for contiguous U.S. users by age group and device. Learning curves for other subgroup combinations in the western and contiguous U.S. can be viewed on the Dashboard (ehs-bccdc.shinyapps.io/PMSmoke_Attention_Dashboard/).

Figure S3. Distribution of the time of day played for all 20 plays of the contiguous U.S. study population.

Figure S4. Average learning curves (95% CI) across 20 plays of *Lost in Migration* for contiguous U.S. users by (A) age group, (B) gender, (C) habitual behavior, and (D) device. Learning curves for western U.S. user subgroups can be viewed on the Dashboard (ehs-bccdc.shinyapps.io/PMSmoke_Attention_Dashboard/).

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Figure S6. Maps of the (A) spatial and (B) temporal variability of daily PM_{2.5} across the contiguous U.S. Spatial variability was calculated as the average of the standard deviation of census tract-level daily average PM_{2.5} concentrations across each ZIP3 between 2017-2018. Temporal variability was calculated as the standard deviation of the ZIP3-level population-weighted daily average PM_{2.5} concentrations between 2017-2018.

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Figure S13. Sensitivity of the observed associations between attention score and (A) PM_{2.5} in the western U.S., (B) PM_{2.5} in the contiguous U.S., and (C) smoke density in the western U.S. to the number of plays required in the user inclusion criteria (i.e., users who completed less than 20 plays). To allow for comparison, users still must have completed each play across unique dates (e.g., a user with 18 plays must have completed the plays across 18 unique dates).

References