

# Study shows air pollution may be causing cognitive decline in people

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A trio of researchers from Beijing Normal University, Yale University and Peking University has found a link between air pollution and human cognitive decline. In their paper published in *Proceedings of the National Academy of Sciences*, Xin Zhang, Xi Chen, and Xiaobo Zhang outline their study and what they found.

Most everyone knows that [air pollution](#) can cause physical ailments,

particularly those associated with the lungs, but new evidence suggests it can also cause mental harm. In this new effort, the researchers have built on the findings of other studies that have suggested air [pollution](#) can cause cognitive decline.

The study by the trio consisted of carrying out math and verbal testing of 25,000 people living in 162 counties in China and then comparing those results with air pollution conditions. The researchers noted that the tests were given to people of both genders from teens to geriatrics.

In looking at their results the researchers report finding that the higher the levels of pollution the lower the test scores as people grew older. They note that the biggest impact was on males, especially those with less education. The researchers suggest this was likely because less educated men work outside more in China and are thus more exposed to [polluted air](#). They note also that the fact that the decline was seen as progressive over time is a strong indicator of air pollution being the cause, rather than other sources. They suggest their findings offer additional evidence of long-term exposure to air pollution causing a decline in cognitive abilities. They note also that they found some evidence of an increase in the rate of neurodegenerative diseases.

The researchers acknowledge that they do not know how pollution might be causing [cognitive decline](#), but suggest it might have some impact on white matter in the brain, considering the role it plays in coordinating communications between brain regions. Also, it is not clear which air pollution constituent might be to blame. In their study, the researchers tested only for nitrogen, sulfur dioxide and particulates smaller than 10 micrometers in diameter. That left out a whole segment of possibilities including carbon monoxide, ozone and larger particulate matter.

**More information:** Xin Zhang et al. The impact of exposure to air pollution on cognitive performance, *Proceedings of the National*

*Academy of Sciences* (2018). [DOI: 10.1073/pnas.1809474115](https://doi.org/10.1073/pnas.1809474115)

## **Abstract**

This paper examines the effect of both cumulative and transitory exposures to air pollution for the same individuals over time on cognitive performance by matching a nationally representative longitudinal survey and air quality data in China according to the exact time and geographic locations of the cognitive tests. We find that long-term exposure to air pollution impedes cognitive performance in verbal and math tests. We provide evidence that the effect of air pollution on verbal tests becomes more pronounced as people age, especially for men and the less educated. The damage on the aging brain by air pollution likely imposes substantial health and economic costs, considering that cognitive functioning is critical for the elderly for both running daily errands and making high-stake decisions.

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