The psychological, economic, and social costs of air pollution

Feb 3, 2020

Why It Matters

Air pollution's destructive consequences go beyond breathing. Research links it to anxiety, dementia, missed work, criminal behavior, and much more.

Air pollution’s toll on human health is well documented. It is the leading cause of mortality in India, contributing to the death of more than 1.6 million people annually. It is responsible for 1.1 million premature deaths each year in China. And in the U.S., about 111 million Americans — 35% of the population — live in counties with unhealthy air, which makes them more susceptible to lung cancer, heart attacks, and strokes.

Now, a new, large-scale review demonstrates that air pollution is not only detrimental to people's physiological health, but also their psychological health. The review, conducted by MIT Sloan assistant professor Jackson Lu, systematically examines the psychological, economic, and social effects of air pollution. His findings appear in the April edition of “Current Opinion in Psychology.”
“Many of us tend to think about air pollution in terms of its harm on the environment and human health, but it also negatively impacts our psychological health and behavior,” Lu said.

In a review of 178 research articles, Lu found evidence that points to the destructive consequences of air pollution. Across the board, air pollution — a mixture of particulate matter, metals, and other gases and compounds — causes decreases in happiness and increases in depression. Cognitively, it impairs functioning and decision-making. Economically, it hurts work productivity. And socially, it exacerbates criminal behavior.

Other research shows that air pollution negatively predicts people’s life satisfaction and well-being. This effect has been observed in countries around the world, including Australia, Canada, China, the U.S., and Europe. Air pollution is also associated with elevated anxiety and increased mental disorders, such as depression, schizophrenia, and autism. Air pollution may be also a risk factor for substance abuse, self-harming behaviors, and suicide.

“Physiologically, exposure to air pollutants can trigger anxiety by increasing oxidative stress and systemic inflammation,” Lu said. “Psychologically, the experience of air pollution can trigger existential anxiety about one’s health and future.”

In addition, air pollution harms cognitive functioning across all life stages, from prenatal development, to childhood, to young adulthood, and even into old age. One study, which looked at students in China taking multiple standardized math and verbal tests, found that contemporaneous exposure to air pollutants adversely predicted performance. Exposure during these exams also negatively predicted post-secondary educational attainment and earnings over time.
Air pollution may also lead to cognitive disorders, such as dementia and attention deficit hyperactivity disorder. Research has shown that people living in places with excessive amounts of PM$_{2.5}$ — a microscopic pollutant commonly caused by burning from power plants, car exhaust, and wildfires — have a heightened risk for dementia by 92%.

"Psychologically, the experience of air pollution can trigger existential anxiety about one's health and future."

Jackson Lu  |  Assistant Professor

Air pollution impairs decision-making abilities. For example, professional baseball umpires are more likely to make incorrect calls when ambient air pollutants are at high levels. Another recent study found that air pollution intensifies the disposition bias, or investors' tendency to sell winning assets while retaining failing assets.

According to Lu's research, air pollution has critical economic and social implications. Some research suggests that air pollution reduces work productivity in two critical ways. First, it increases absenteeism: Even moderate levels of pollution reduce the working hours of adults, likely because of their sickness or need to care for small children and the elderly. And second, it decreases individual employee productivity when workers are on the job.

Research also shows that air pollution is associated with increased criminal and unethical behavior. In a study that analyzed a nine-year panel of 9,360 U.S. cities, air pollution positively predicted both violent crimes (murder, rape, robbery, and assault) and property crimes (burglary and motor vehicle theft).
In recent years, the Trump administration has taken steps to roll back pollution controls from coal-fired power plants, weaken climate regulation, and loosen environmental protection rules.

“At a time when the U.S. and governments around the world are making important policy decisions regarding the future of the air we breathe, they need to bear in mind not only the physiological and environmental costs of air pollution, but also its psychological, economic, and societal costs,” Lu said. “Air pollution corrupts not only the health of individuals, but also the health of society.”