

Study suggests heat waves during childhood can adversely impact adult earnings

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(Phys.org)—A trio of researchers affiliated with multiple institutions in the U.S. has found evidence that suggests children exposed to high temperatures for even short periods can experience lower earnings as adults. In their paper published in *Proceedings of the National Academy*

of Sciences, Adam Isen, Maya Rossin-Slater and Reed Walker describe comparing temperatures in the U.S. decades ago with earnings data for adults today to find patterns of changes in earnings due to heat exposure.

As the planet continues to heat up due to global warming, scientists seek ways that humans might be impacted. In this new effort, the researchers wondered if exposure to [high temperatures](#) as [children](#) might cause problems for people later on in life. To find out, they dug through weather data covering several states over the period 1969 to 1977 which impacted approximately 12 million people. The team looked specifically for heat waves or days with temperatures above 32 °C. They looked at government [earnings](#) records for adults today who had been children during the earlier weather events. The researchers found that children, even those still in utero, who were exposed to high temperatures, experienced lower than average earnings as adults. They found also that the more days of heat a child exposure, the lower their earnings were as adults. More specifically, they found for every day that a child (from birth to age one) was exposed to high heat, they experienced a 0.1 decrease in earnings as an adult.

The researchers note that their statistics apply only to children directly exposed to heat, not all those who lived in an area experiencing high heat—those with air conditioning were found to have average incomes as adults. They further note that their findings have relevance to the future—as the planet warms, it appears likely that those children living in homes without [air conditioning](#) are likely to experience income stress as they grow older because they will be exposed to more days with high temperatures. The researchers cannot say why children experiencing high [heat](#) impacts their earnings potential, but speculate that it could be related to missing school or nerve damage that impairs ambition, cognition, self-control or assertiveness.

More information: Adam Isen et al. Relationship between season of

birth, temperature exposure, and later life wellbeing, *Proceedings of the National Academy of Sciences* (2017). [DOI: 10.1073/pnas.1702436114](https://doi.org/10.1073/pnas.1702436114)

Abstract

We study how exposure to extreme temperatures in early periods of child development is related to adult economic outcomes measured 30 y later. Our analysis uses administrative earnings records for over 12 million individuals born in the United States between 1969 and 1977, linked to fine-scale, daily weather data and location and date of birth. We calculate the length of time each individual is exposed to different temperatures in utero and in early childhood, and we estimate flexible regression models that allow for nonlinearities in the relationship between temperature and long-run outcomes. We find that an extra day with mean temperatures above 32 °C in utero and in the first year after birth is associated with a 0.1% reduction in adult annual earnings at age 30. Temperature sensitivity is evident in multiple periods of early development, ranging from the first trimester of gestation to age 6–12 mo. We observe that household air-conditioning adoption, which increased dramatically over the time period studied, mitigates nearly all of the estimated temperature sensitivity.

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