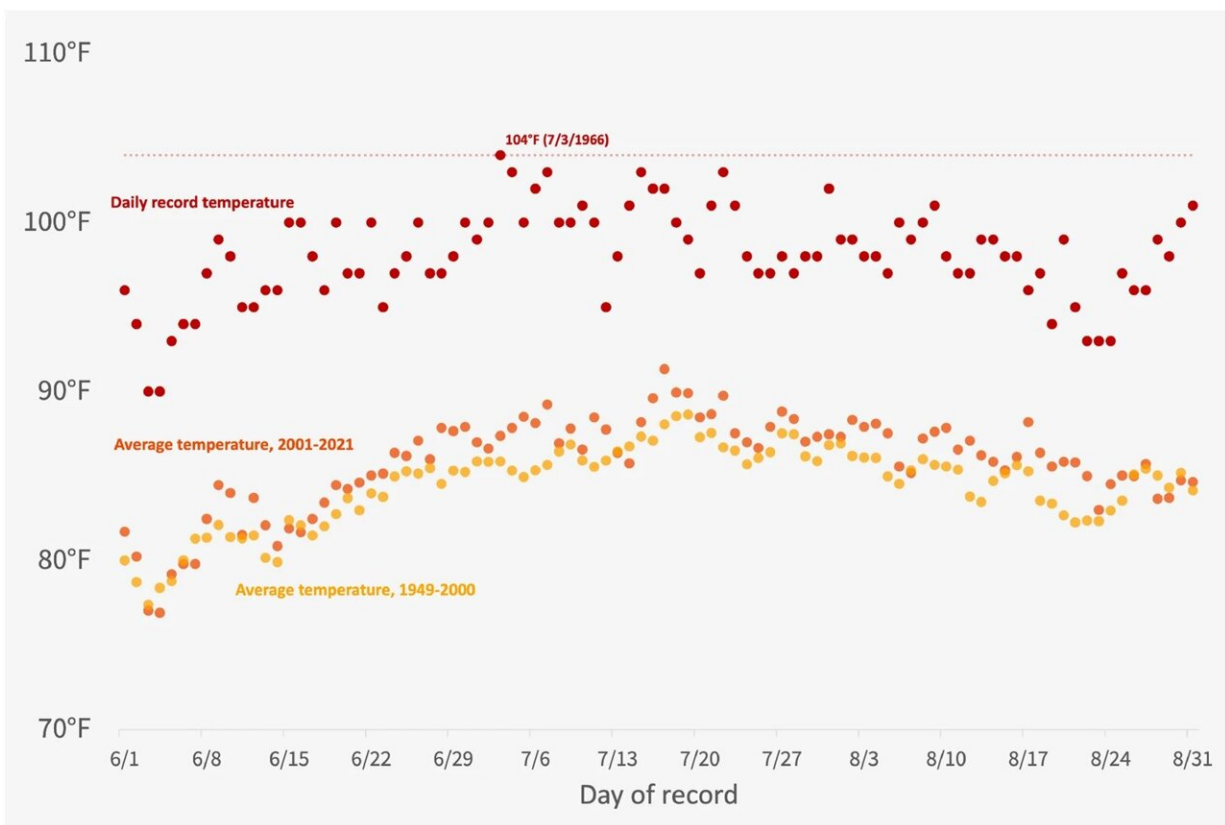


Experiencing record-breaking heat days affects perception of weather trends, study shows

October 11 2023



Daily high temperature records for Philadelphia, 1949–2021. Mean and record high temperatures at Philadelphia International Airport for each calendar day in June, July and August, as calculated from records in the Global Historical Climatology Network database. Credit: *Scientific Reports* (2023). DOI: 10.1038/s41598-023-41317-9

New research published by a team at the Annenberg Public Policy Center of the University of Pennsylvania finds that experiencing days in which the temperature exceeds previous highs for that time of year affects people's perception of weather trends.

Published in *Scientific Reports*, [the study](#) "Record-breaking Heat Days Disproportionately Influence Heat Perceptions" finds that living in an area with record-breaking heat effectively increases perceptions that the [weather](#) is getting hotter.

The research was co-authored by economist Timothy Hyde, a postdoctoral fellow in APPC's Science of Science Communication Division, and psychologist and communication scholar Dolores Albarracín, the Alexandra Heyman Nash University Professor at Penn and director of the Science of Science Communication Division.

In December 2022, the authors surveyed a nationally representative sample of 1,605 U.S. adults to determine whether more frequent record-breaking weather events affect weather change perceptions. The participants were asked, "To the best of your knowledge, how did excessive daytime heat across the United States in 2022 compare with previous years?"

Hyde and Albarracín linked answers to this question with meteorological data collected by the National Climatic Data Center from 1949, when meteorologists first implemented a reliable record of climatic data, to 2022. Doing so allowed the researchers to determine which days in 2022 constituted a heat record in a particular area before correlating heat recordings with perceptions that temperatures were higher relative to previous years.

The study found that while record-breaking heat days have little or no effect on beliefs in the existence of climate change, they do affect

evaluations of how much hotter the weather has become compared to previous years. This effect of record-heat days is such that the difference in answers between a respondent who experienced no record-breaking heat days and another who experienced 16 record-breaking heat days is as large as the average difference in responses between independent and Democratic respondents.

Record-breaking heat days

Whether a day has reached a record-breaking [temperature](#) in a locale can only be known after the fact. The [average person](#) cannot determine whether any particular day is a record heat day by simply walking outside. Instead, individuals must learn that a day broke the existing heat record by checking the news.

Nor is the absolute temperature itself the key metric; what is important is whether the temperature surpasses records set in the same place over the last 72 years. "It doesn't matter whether one day is 100 degrees and the next is 101. What matters to people is if one of those days gets the big red stamp that says 'record-breaking'," Albarracín said.

The study also found that other indicators of climate change, including average heat levels, non-record-breaking extreme heat days, and severe weather, did not significantly affect the respondents' views.

Perceptions in different seasons

The season in which the record heat days occur is also associated with effects. Since the hottest days of the year typically occur in the summer, the scholars hypothesized that heat records during that time of year would have the most significant impact, as those days would have the highest temperatures a person would see in a year.

Instead, they found that record-heat days in winter affect people's perceptions of worsening heat most strongly. "This may be due to the difference in media coverage of temperature during different times of the year," Hyde said. "That is likely because it sticks out to people when media discusses how warm a day is during what is supposed to be the coldest time of the year."

Effects on other beliefs

While exposure to record-heat events has been found to cause people to believe that the temperature is hotter than in previous years, it had little effect on perceptions of the existence of climate change. These beliefs are less likely to change, the researchers said, because they are associated with political stances. "Since discussing changes in weather patterns is not necessarily political, it is reasonable to assume that people are more willing to update their opinions on weather change than climate change," Hyde noted.

"Just because a record heat day can change a person's opinions on the weather doesn't mean it holds the key to changing opinions on climate change," added Albarracín. "Even if it did, we could not expose populations to extreme heat as we see fit to generate change. The most critical element is understanding how record-breaking heat days change opinions and then seeing whether communications about these events can change people's beliefs."

Next: Understanding the media's role

Exposure to a record-breaking heat day in a [local area](#) significantly affects individuals' perceptions of increasing temperature, supporting the hypothesis that record-heat days can drive changes in the general [perception](#) that the weather is worsening.

"Since an individual can only recognize record-heat days through [media reports](#) and only understand the severity of them through media coverage, we know that continued research into how record-heat days change can't *only* be about record-[heat](#) days. Understanding media reports on them will also be important for learning how to affect climate change perceptions," Hyde said.

More information: Timothy Hyde et al, Record-breaking heat days disproportionately influence heat perceptions, *Scientific Reports* (2023). DOI: [10.1038/s41598-023-41317-9](https://doi.org/10.1038/s41598-023-41317-9)

Provided by Annenberg Public Policy Center of the University of Pennsylvania

Citation: Experiencing record-breaking heat days affects perception of weather trends, study shows (2023, October 11) retrieved 2 May 2024 from <https://phys.org/news/2023-10-experiencing-record-breaking-days-affects-perception.html>

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