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157 **Report** by Daniel Graeber, Laura Schmitz, and Franziska Holz

Climate concerns are increasingly affecting Germans

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- Later birth cohorts are more concerned than earlier birth cohorts
- Climate concerns increase steadily over the course of a person's life

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AT A GLANCE

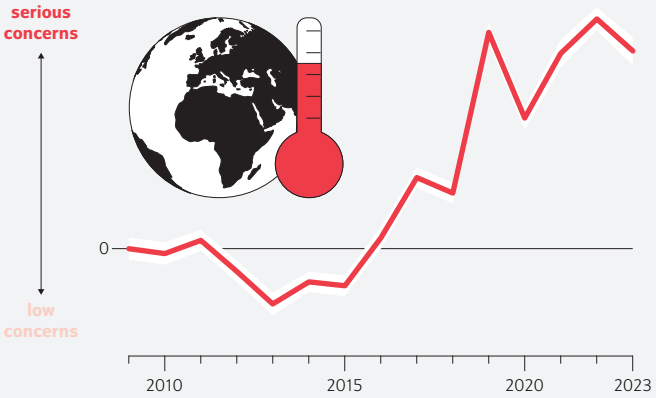
Climate concerns are increasingly affecting Germans

By Daniel Graeber, Laura Schmitz, and Franziska Holz

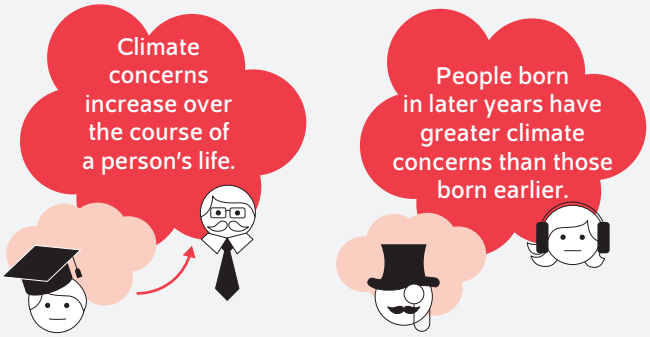
- According to data from the German Socio-Economic Panel, climate concerns have been growing since 2013 across all age groups—not just among young people
- Later birth cohorts are more concerned than earlier birth cohorts
- Climate concerns increase steadily over the course of a person's life
- Extreme weather events and social mobilization amplify climate concerns across society, thus creating favorable conditions for climate policy
- Early education about the consequences of climate change is important for shaping attitudes; information resources for the older population are also essential

Climate concerns in Germany have been growing since 2013—especially among younger generations and older people

Climate concerns among all respondents



Climate concerns by age and birth year



Sources: SOEP v40.1, weighted, own calculations.

FROM THE AUTHORS

"Contrary to the widespread impression, climate concerns are not an issue limited to the younger generation. This opens opportunities for decisive climate policy: for example, in the expansion of renewable energy or in European emissions trading."

— Franziska Holz —

Climate concerns are increasingly affecting Germans

By Daniel Graeber, Laura Schmitz, and Franziska Holz

ABSTRACT

Climate change triggers anxiety in many people. Concerns about the consequences of climate change vary significantly not just by age and generation but also over time. Using German Socio-Economic Panel (SOEP) data, this Weekly Report examines the extent to which these differences stem from age-related effects, generational socialization, or year-specific events. The results show that climate concerns among the German population have been generally increasing since 2013. This points to the influence of external events such as extreme weather and societal mobilization processes. Cohort effects are more pronounced than age effects, with younger generations systematically exhibiting greater climate concerns. Contrary to widespread assumptions, climate concerns also grow within respective generations as people age. Thus, climate policy communication should not focus just on one specific age group but rather should address all generations. Since extreme weather events often lead to increased public and political attention, these windows of opportunity should be seized. They offer the chance to advance both short-term support measures and long-term climate policy strategies.

Climate change is one of the central challenges of our time.[1] However, public perception and their associated concerns about its consequences are by no means uniform: these vary not just across age groups and generations but also change over time. In 2018–19, climate change came more into the spotlight, as reflected, among other things, by the Fridays for Future movement. Initially, this was primarily a movement of the younger generation. However, the European Green Deal in 2019 was driven by a broad societal consensus that the climate crisis must be addressed. With the COVID-19 pandemic beginning in 2020 and the energy crisis in 2022, the public focus shifted to other issues. This Weekly Report shows that, despite dwindling media and public attention, concerns about climate change among the population have not declined: although public attention fluctuates, the German population's concerns do not.

A better understanding of the population's perceptions of climate change is important not only for climate research but also for the political economy of climate protection: Societal acceptance of climate policy measures and thus their political enforceability critically depend on who is worried about the consequences of climate change. Climate concerns are more than just a subjective snapshot. Social science research shows that individuals who are concerned about the climate are more likely to support climate policy measures and are more willing to change their behavior. This trait is more influential than someone's sociodemographic characteristics or political orientation.[2]

This Weekly Report examines how climate concerns in Germany vary by age, birth cohort, and survey year using German Socio-Economic Panel (SOEP) data from 2009 through 2023. SOEP's data, with its long duration and panel

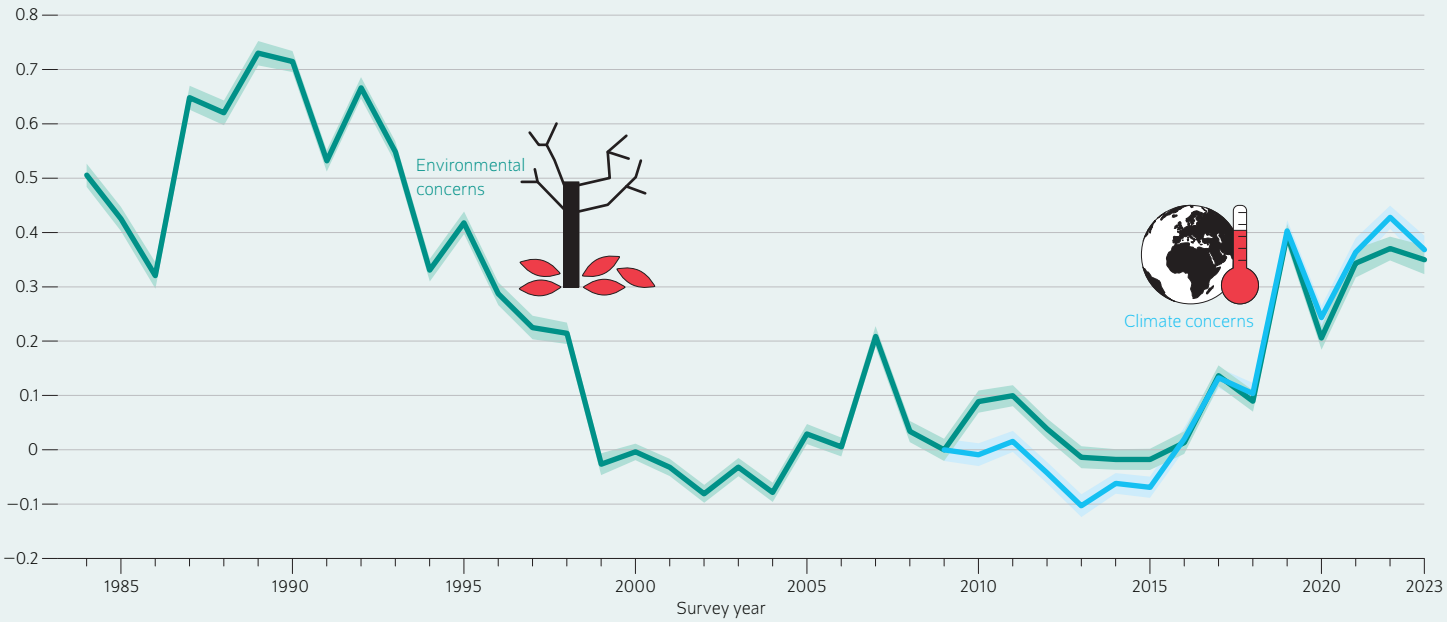
1 IPCC (2023): Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. In: H. Lee and J. Romero (eds.): Intergovernmental Panel on Climate Change. Geneva (available online, last accessed on April 16, 2026. This applies to all online sources cited in the report, unless otherwise noted).

2 Sander van der Linden (2017): Determinants and measurement of climate change risk perception, worry, and concern. In: Matthew C. Nisbet et al. (eds.): Oxford Encyclopedia of Climate Change Communication. Oxford University Press (available online).

DOI: https://doi.org/10.18723/diw_dwr:2026-18-1

Figure 1

Climate and environmental concerns over time
Level of concern[1]



1 Average climate and environmental concerns by survey year in standard deviations (standardized to mean 0, standard deviation 1); the reference group consists of respondents from 2009. The shading indicates the 95% confidence intervals. Values above 0 represent greater concerns than in the reference year 2009; values below 0 represent lesser concerns.

Source: SOEP v40.1, weighted.

Environmental concerns were more pronounced in the late 1980s than climate concerns today.

structure, provides a particularly suitable data source for this research question. Methodologically, the age-period-cohort (APC) analysis approach is employed (Box).[3]

Concerns about climate and the environment have risen significantly since 2013

Climate concerns have been surveyed in the SOEP since 2009. This complements another item regarding concern for environmental protection, which has been surveyed since the first SOEP survey in 1984 (Figure 1).[4] A clear trend of growing climate concerns has been evident since 2013. It surged again in 2019 and has remained at a high level ever since, with the exception of 2020, the first year of the COVID-19 pandemic. The comparison with the longer time series of environmental concerns is noteworthy: Even the current peak levels of climate concerns are still well below the level that environmental concerns reached in the late 1980s, a period marked by the Chernobyl nuclear disaster and the debate over forest dieback. Thus, the current concerns about climate change are intense, but not unprecedented from a historical perspective. The following analysis focuses on climate concerns.

Age profiles are stable, while the level of concern fluctuates considerably

When examining climate concerns across different age groups, initially there appear to be significant fluctuations (Figure 2). Among younger people, climate concerns are usually relatively high at first, then drop until a turning point is reached. In earlier survey waves (2009 to 2015), this turning point occurred around age 25; it recently shifted to the early 40s. Subsequently, climate concerns rise again and reach a second peak in older age, before dropping significantly toward the end of life.

It is striking that, while the age profiles remain largely stable in shape across survey years, their levels vary considerably. For instance, climate concerns were noticeably lower across all age groups from 2009 to 2016 than in more recent years. Particularly striking is a significant increase starting in 2019, which coincides with two major external developments: intensified public climate protests, which gained broad

3 James J. Heckman and Richard Robb (1985): Using Longitudinal Data to Estimate Age, Period, and Cohort Effects in Earnings Equations. In: William M. Mason and Stephen E. Fienberg (eds.): Cohort Analysis in Social Research: Beyond the Identification Problem. Springer, New York, 137–150 (available online).

4 Environmental concerns and climate concerns are surveyed consecutively in the same questionnaire, along with other potential concerns such as job security and retirement provisions (see SOEP questionnaire, available online). It can be assumed that respondents distinguish between environmental and climate concerns.

Box

Data & Methods

From a statistical perspective, no reliable conclusions about age, cohort, or time profiles can be drawn without additional assumptions. Age, birth cohort, and survey year are deterministically linked: knowing any two determines the third. This identification problem means that the three effects cannot be estimated simultaneously: For example, if the year of birth and the year of observation are known, a person's age follows directly from these. To resolve this, this report adopts a proxy approach that approximates period effects using observable external variables.[1]

Specifically, annual indicators are replaced by observable external variables that capture the underlying concept—in this case, climatic conditions. This breaks the perfect linear dependence between age, cohort, and period effects. The analysis uses linear, quadratic, and logarithmic terms of the annual average temperature as well as the annual number of very hot and very rainy days. Including these variables instead of annual indicators makes it possible to draw conclusions about age and cohort profiles. It should be noted, however, that the estimates do not permit conclusions about the absolute level of concern. Instead, effects are interpreted relative to a reference group – here, individuals who were 18 years old in 2009.

The data is from the German Socio-Economic Panel (SOEP), a representative longitudinal survey of private households in Germany that has been collecting information on living conditions since 1984.[2] Since 2009, the survey has also asked about concerns regarding the consequences of climate change, in addition to environmental concerns surveyed since 1984. Responses are rated on a scale from 1 ("no concerns") to 3 ("major concerns").[3] For the present decomposition, the data were standardized so that values can be interpreted as standard deviations relative to the reference group (18-year-olds in 2009 or respondents in 2009 in Figure 1).

The analyses are weighted to allow inference about the underlying population. Data on average temperature (degrees Celsius), the number of hot days (daily maximum ≥ 30 degrees Celsius), and the number of days with heavy precipitation (≥ 20 millimeters per day per square meter), each as an annual average, are from the German Weather Service (DWD).[4]

1 Heckman and Robb (1985), op. cit.

2 The SOEP is a representative annual panel survey of private households that has been conducted in West Germany since 1984 and in East Germany since 1990; see Jan Goebel et al. (2019): The German Socio-Economic Panel (SOEP). Journal of Economics and Statistics, tics, 239(29), 345–360 (available online). For this publication, the SOEPv40.1 data version was used for this publication.

3 The raw data from the SOEP survey can be viewed online, including the data on climate concerns (available online).

4 German Weather Service: Climate Data Center (available online).

societal attention from 2018 onwards,[5] and a sustained series of extreme weather events, including unusually high annual temperatures and numerous days exceeding 30 degrees Celsius (Figure 3). This suggests that the observed differences in the level of climate concerns between years are largely shaped by year-specific events—so-called period effects.

Difficulty in distinguishing between age, cohort, and year effects

Differences between age groups within a single year cannot readily be interpreted causally as age effects. People of different ages were born in different years under distinct social, political, and climatic conditions. These formative differences are referred to as cohort effects. Conversely, if one tracks a birth cohort over time, its members are inevitably observed in a different calendar year with specific events for each year of life. The exceptionally hot summer of 2018 and the climate protests are striking examples of a period or year effect.

Age, cohort, and survey year are deterministically linked: knowing any two determines the third. The three effects therefore cannot be identified simultaneously without further assumptions (Box).

For climate policy, however, it is crucial to understand whether observed differences in climate concerns are related to age, or stem from the formative experiences of specific birth cohorts, or are driven by specific events in individual years. Different policy implications can be derived from this.

Weather events as a proxy of year effects

To disentangle the close relationship between age, cohort, and year effects, this report includes additional variables that approximate the year effects (Box). In this context, these variables represent weather events. Specifically, the average annual temperature, the number of hot days, and the number of days with extreme rainfall are used to statistically isolate their influence (Figure 3).

During the period under review, from 2009 to 2023, the average annual temperature rose from 9.2 to 10.6 degrees Celsius, an increase of 1.4 degrees Celsius.[6] Simultaneously, the number of hot days (with temperatures of 30 degrees Celsius or higher) more than doubled: from five in 2009 to eleven in 2023.Yet, this time series shows substantial variation between

5 Julia Zilles (2023): August 20, 2018: Beginn der Klimaproteste Fridays for Future. Bundeszentrale für politische Bildung, Hintergrund aktuell (in German; available online).

6 The rise in temperatures is similarly high across the rest of Europe; see Copernicus Climate Change Service (2024): European State of the Climate 2023 (available online). The 1.5-degree Celsius warming target of the Paris Climate Agreement is a global target. However, even on a global average, warming of more than 1.5 degrees Celsius compared to pre-industrial levels was already reached in 2024 (see Climate Change Service (2026): Global State of Climate 2025 (available online).

years, with a maximum of 20 hot days in 2018. Only the number of days with extreme rainfall (with precipitation of at least 20 millimeters per day per square meter) remained relatively stable over the period. In the following analysis, these weather events serve as proxy variables for year effects in the age, cohort, and period effect decomposition.

Climate concerns increase with age

When adjusted for cohort differences and weather conditions in each year, a clear, nearly linear relationship emerges between age and climate concerns (Figure 4). This finding contradicts the widespread assumption that climate concerns are primarily a phenomenon among younger people. Instead, climate concerns increase steadily with age.[7] Starting from a relatively low level in young adulthood, concerns grow throughout the life course. Compared to 18-year-olds, the climate concerns of 90-year-olds are on average approximately three standard deviations higher.[8] Thus, people aged approximately 80 to 90 have the highest average climate concerns within a cohort.

This result differs significantly from the purely descriptive analysis of age profiles (Figure 2). While the raw data for each year suggest a horizontal S-shape, a stable and clearly interpretable positive age effect emerges after statistically separating age, cohort, and year effects. Differences between age groups in the raw data are partially masked by differences between birth cohorts or by year-specific influences.

One hypothesis is that older people, due to their greater life experience, are more aware of changes in climatic conditions or are more acutely confronted with the potential individual health consequences—as well as the societal consequences—of climate change. At the same time, priorities and perceptions of risk can also change over the course of a lifetime.

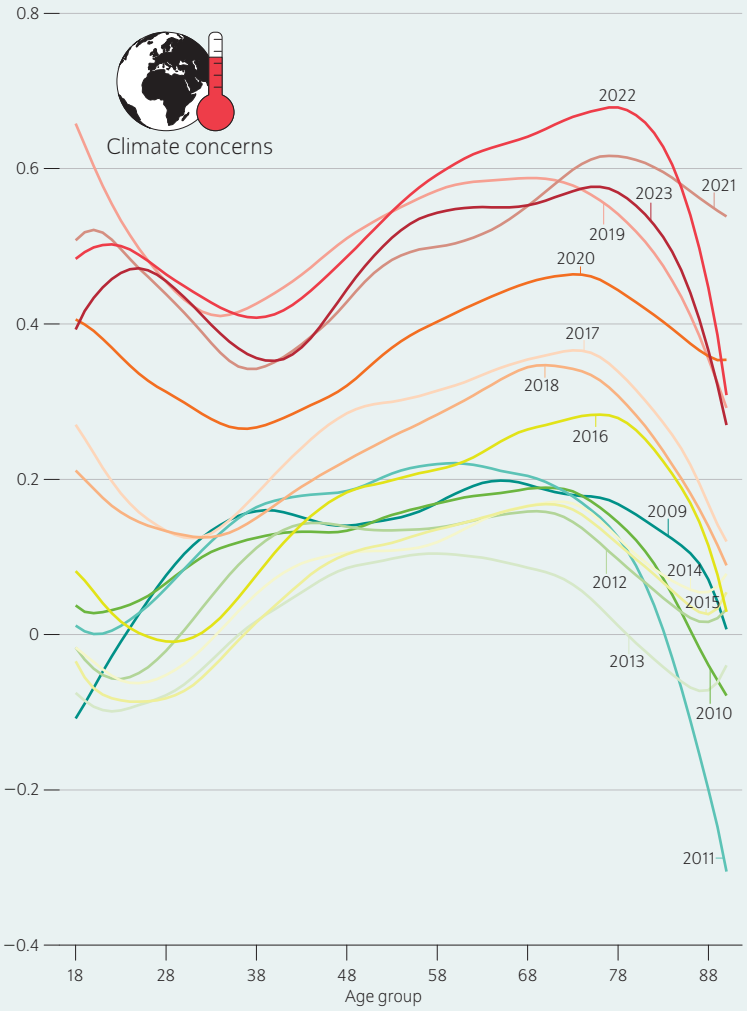
Climate concerns increase from one birth cohort to the next

In addition to age-related effects, significant differences can also be observed between birth cohorts. After controlling for age and climatic conditions, older cohorts born in the first decades of the 20th century exhibit significantly lower levels of climate concern than the reference cohort (born in 1991). With younger birth cohorts, the estimated effects rise continuously and almost linearly (Figure 5).

One possible explanation lies in different socialization: younger cohorts have grown up with climate change as a prominent public issue, whereas for older generations it was of little significance for a long time. Thus, two forces are at work simultaneously: climate concerns rise both with age and across cohorts.

Figure 2

Climate Concerns by Age Group and Survey Year
Severity of Climate Concerns[1]



1 Each line shows the smoothed relationship (LOWESS smoothing) between age and climate concerns for a given survey year, presented as a standard deviation relative to the reference group: 18-year-olds in 2009. Color gradient from green (earlier years) to red (recent years).

Interpretation: 18-year-olds in 2021 were significantly more concerned about climate change than 18-year-olds in 2009. People between the ages of 70 and 80 are more concerned than 18-year-olds.

Source: SOEP v40.1, weighted.

In more recent surveys (2019 to 2023), concerns are higher across all age groups than in older surveys.

Conclusions: Rising climate concerns widen scope for ambitious climate policy

The findings of this Weekly Report suggest several conclusions: First, climate concerns have been rising significantly across all age groups since 2013. This suggests that events

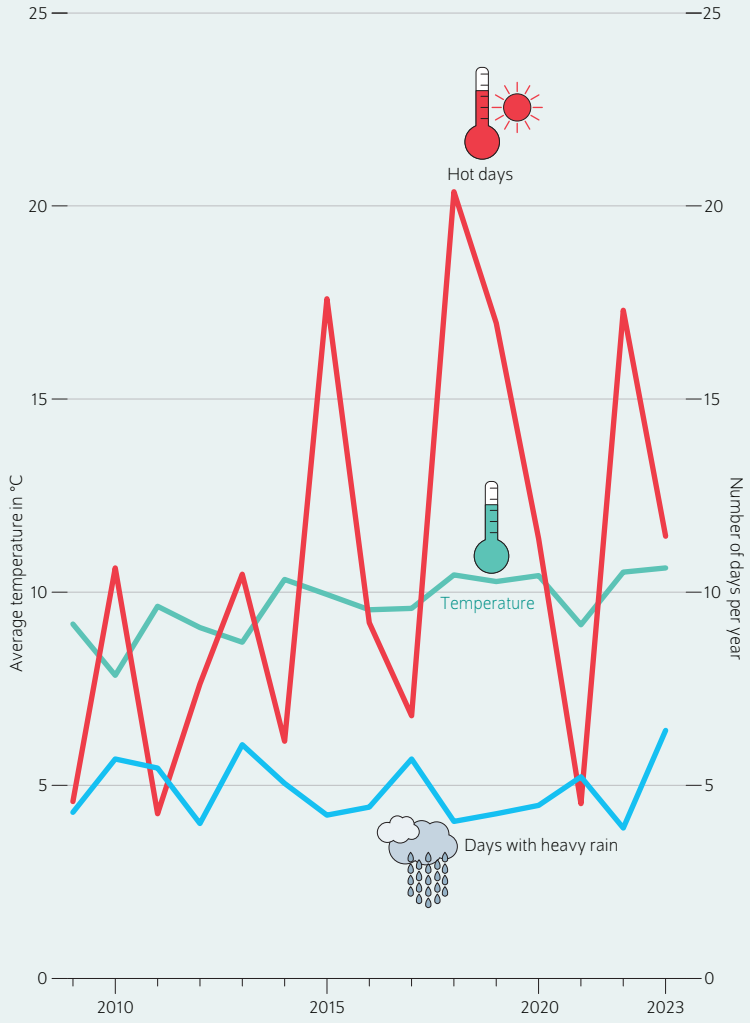
7 This finding confirms and even reinforces earlier findings by the German Center for Aging Research; see Mareike Bünning et al. (2024): Wahrgenommene Bedrohung durch den Klimawandel in der zweiten Lebenshälfte. dza-aktuell: Deutscher Alterssurvey, 01/2024. Berlin: Deutsches Zentrum für Altersfragen (in German; available online).

8 The effect sizes are reported here in standard deviations (SD). A standard deviation measures the dispersion of climate concerns within the population. An effect of 0.1 SD corresponds to a small shift within this distribution, such as a slight increase in concerns compared to the average level; 0.2 SD is considered moderate and 0.5 SD large. This scaling makes it possible to compare effects independently of the specific unit of measurement for climate concerns.

Figure 3

Indicators of climate change over time

Annual average temperature in degrees Celsius (left axis), number of hot days and days with heavy rain per year (right axis)[1]



1 Days with temperatures of 30 degrees Celsius or higher are considered hot days; on days with heavy rain, precipitation of at least 20 millimeters per square meter is measured.

Source: German Weather Service (DWD).

The number of hot days more than doubled between 2009 and 2023.

such as extreme weather or social mobilization can amplify climate concerns throughout society. It is also noteworthy what the report does *not* show: Contrary to the widespread impression that climate change has fallen out of the public spotlight since the COVID-19 pandemic and the energy crisis resulting from the war in Ukraine, individual climate concerns have not declined in recent years.

Second, both age and cohort effects are steadily increasing. Thus, the common perception that climate concerns are primarily a phenomenon among younger people is only a partial truth. While younger cohorts have, on average, greater climate concerns, the age effects show that people become more concerned about climate change over the course of their lives. Thus, climate concerns are increasing not only across generations but also over the course of an individual's life.

Third, cohort effects are quantitatively more significant than age effects. When the variance of cohort effects is compared to the variance of age effects, cohort effects vary about 50 percent more.[9] This suggests that climate-related attitudes are significantly shaped by the socialization of each generation. Younger cohorts grew up at a time when climate change was a central social and political issue, whereas for earlier cohorts, climate change played hardly any role in public discourse. The remaining age effects can be attributed more to life-cycle-related differences in life experiences and the extent to which individuals are affected.

These findings are highly relevant for policymakers. Given existing climate concerns, they have more favorable conditions for an ambitious yet socially acceptable climate policy than is typically assumed today.

The general increase in climate concerns since 2013 suggests that climate policy measures can face broad societal acceptance—across all age groups. Furthermore, the pronounced period effects suggest that extreme weather events and societal mobilization increase the willingness to accept political action across society as a whole, thereby opening windows of opportunity for ambitious climate protection measures.

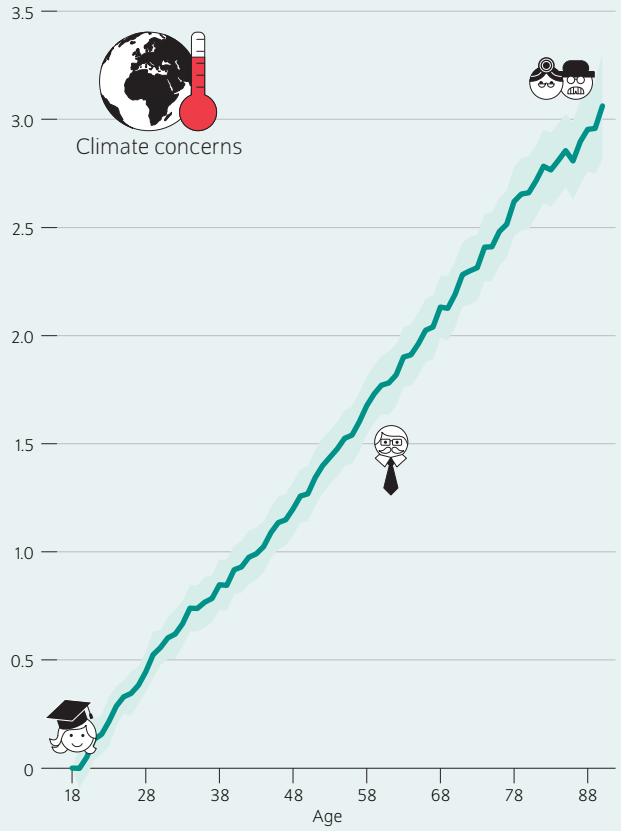
This is particularly relevant for climate policy measures that directly affect households—such as the European Emissions Trading System for buildings and transportation (EU ETS 2) planned for 2027, the issue of social compensation through a climate dividend, or the further expansion of renewable energies. Such measures can only be politically implemented if they are supported by a broad majority of the population. The present findings show that, for the observation period up to 2023, the conditions for this are better than the media debate suggests. The age profiles also illustrate that climate policy communication should specifically target older demographic groups as well—not just the younger generation, which dominates the public image of the climate movement. In the future, to better design climate policy measures and increase their acceptance, information and participation formats aimed at shaping and increasing acceptance of climate policy measures should also target older people more strongly.

Finally, the dominance of cohort effects points to the particular importance of early socialization. Since preferences are formed in younger years and become increasingly entrenched over the course of a lifetime, early education about the consequences of climate change—in schools, across curricula, and through accessible participation formats for children

9 The coefficient of variation for cohort effects is approximately 0.91, and that for age effects is approximately 0.60.

Figure 4

Association between climate concerns and age
Severity of climate concerns[1]



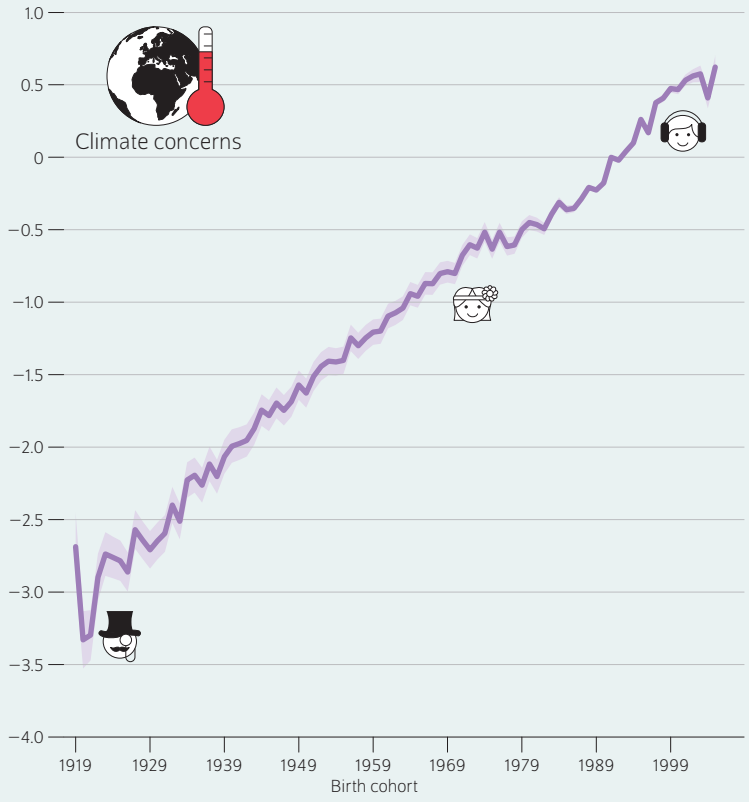
1 Estimated age effects on climate concerns, coefficients relative to the reference category in standard deviations (reference group: 18-year-olds in 2009) with 95% confidence intervals.

Source: SOEP v40.1, weighted, own calculations.

Climate concerns rise almost linearly with increasing age.

Figure 5

Relationship between birth cohorts and climate concerns
Level of climate concerns[1]



1 Estimated cohort effects on climate concerns, coefficients relative to the reference cohort in standard deviations (reference group: 18-year-olds in 2009) with 95% confidence intervals. Compared to the reference group of those born in 1991, earlier birth cohorts exhibit lower levels of climate concerns, while later birth cohorts exhibit higher levels.

Source: SOEP v40.1, weighted, own calculations.

Younger cohorts have greater climate concerns than older ones.

and adolescents—is a long-term lever for shaping attitudes toward climate change.

It should be noted, however, that climate concerns are an indicator of societal openness to climate policy, but no guarantee of support for concrete measures. Whether the observed concern about climate change translates into political support for specific instruments depends on their design—in particular on their short-term costs and the distribution of societal burdens.

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