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Experience of economic hardship and right-wing political orientation hinder climate concern among European young people

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Abstract

While there is extensive literature about public concern about climate change, most studies rely on cross-sectional static data. Based on a unique panel survey conducted in nine European countries in 2018 and 2019, we make a rare investigation of factors that explain why some young people (age 18-34) are, have become or have lost their concern about climate and environmental issues at times of widespread discussions about the climate emergency. The analysis tests arguments about the importance of individual-level factors such as values and political orientations and consider the role of cross-national variations, the experience of extreme weather events, and youth-led climate strikes. Our results support prior studies as we find that young people with libertarian rather than authoritarian values, with more positive views towards immigration and redistribution policies, tend to be more concerned about climate change and the environment. We find little effect of contextual factors. Young people who have experienced economic hardship and have a right-wing political orientation are less likely to become concerned for climate and environmental issues. Socio-economic conditions, values and political orientations are crucial to understanding climate concern among young Europeans, affecting youth climate engagement at times of increasing inequalities and polarization.

Keywords: young people/youth, climate change, European public opinion, left-right ideology, panel survey

Introduction

The September 2019 climate strikes, also known as Global Week for Future, marked a historic moment for both Greta Thunberg's inspired Fridays for Future (FFF) movement and the world. With the mass mobilization of over six million people across 150 countries on the 20th of September, three days before the UN Climate Change Summit, the strikes can be considered the largest climate protest in world history. As young people initiated these actions and formed a significant part of the activists (de Moor et al. 2020; Fisher 2019), there has been an increasing scholarly and public interest in their climate concern. Indeed, there is a general agreement that young people are more supportive of the environment than older generations (Inglehart 1990; Guber 2003; Johnson and Schwadel 2018; for a review, see Corner et al. 2015), and they are the most exposed to the outcomes of policy failures to tackle climate change. Still, young people are likely to change their minds more quickly than the elderly; they also have many other issues than climate to worry about, for example, precarious job market, unemployment, education system, physical and psychological health. Therefore, it was not surprising that a considerable number of our young panel survey respondents from nine European countries changed their minds over a relatively short period – from 2018 to 2019. While in 2018, about 18% of the respondents of age 18-34 chose concern over climate and environmental issues above other potential sources of concern, in 2019 – after a year of various extreme weather events, media focus on climate change, and ongoing climate strikes, the respective concern among these same young people had increased to 28% on average. A smaller group (6%) stopped being concerned about environmental or climate issues and listed other problems as more essential. In this paper, we investigate why and what factors account for the *change* in the level of climate concern among young people? When do climate and environmental concerns become more or less salient for young people?

While we build on the increasing research investigating the varying public attitudes towards climate change (Capstick et al. 2015; Poortinga et al. 2019; Weber 2010, 2016), our contribution is primarily related to the reasons for change rather than the general degree of climate concern among young people. Prior studies of changing climate concerns have focused on personal experiences, as well as socio-economic and political determinants. At the individual level, these include political variables such as ideology, human values, scientific knowledge, and socio-demographic features such as age, race, gender, education, income and religiosity (Ballew et al. 2020; Poortinga et al. 2019; Lewis et al. 2018). Other scholars have added to these micro-level effects the experience of anomalous weather events (Hamilton and Stampone 2013; Howe et al. 2019), the influence of media coverage and exposure (Carmichael and Brulle 2017), the impact of economic and financial meltdowns (Scruggs and Benegal 2012; Shum 2012; Kenny 2020), and the rise of populist right-wing parties (Duijndam and van Beukering 2020; Stanley et al. 2019).

Still, there is no universal empirical support for all factors proposed to explain the varying climate concern: for example, there are doubts concerning the effect of extreme weather events (Palm et al. 2017), as well as the role of different political, social and cultural events (Johnson and Schwadel 2018; Carlisle and Clark 2017). While some of the conflicting empirical findings might be related to different measures of the dependent variable – focusing on climate change beliefs or concerns –, or diverse populations in empirical analysis – children, adolescents, young people or the general population –, major problems arise due to use of cross-sectional rather than panel data. Cross-sectional data is beneficial for comparing different levels of climate concern among groups and countries (e.g., Lewis et al. 2019; Kvaløy et al. 2012; Tvinnereim et al. 2020), but static approaches hardly allow for explaining the reasons for change and demonstrating *causal* relationships.

Hence, we contribute to the field in two ways; first, by focusing on *change*. Our empirical analyses draw on original representative panel survey data with booster samples for young people conducted in the framework of the 'Reinventing Democracy in Europe: Youth Doing Politics in Times of Increasing Inequalities' (EURYKA) project, covering nine European countries. This panel data enables us to show which changes in young people's lives can be related to changing concerns about climate and environmental issues and set the results of prior studies to empirical scrutiny. Second, this piece of research helps advance our knowledge by focusing on young people from a comparative perspective. While young people are the driving force behind increasing concern for climate change and mass mobilizations around it worldwide (Fisher 2019; Hagedorn et al. 2019; Wahlström et al. 2019)[1], little attention has been paid to this age subset of the population. For instance, a review by Corner et al. (2015) did not include any comparative study using empirical data on climate concerns of people aged 18 to 34— indeed, most of the prior studies focus on adults (Weber 2010) and children or adolescents (review in Lee et al. 2020). Further, the existing panel studies tend to be focused on one country at the time, such as Sweden (Ojala 2015) or the US (Palm et al. 2017).

Our results demonstrate that individual-level determinants, particularly the experienced economic grievances as well as changed value and ideological orientation, are the most critical factors related to young people's changing climate and environmental concerns across nine European countries. Despite significant cross-national variations, contextual factors such as extreme weather events or the number of youth-led climate strikes did not have any significant effect.

The article is structured as follows: next, we introduce key debates around young people's public opinion and mobilization towards climate change and environmental issues to

[1] See also https://www.nytimes.com/2019/09/20/climate/global-climate-strike.html.

map relevant explanatory factors and develop our theoretical contribution. We then present our data and discuss our results. The article concludes by underscoring our main findings and their implications, signaling some avenues for further research.

Macro-level drivers of concern over the environment and climate change

It is common to use macro- or micro-level factors for explaining the varying concerns about environmental issues and climate change. The first usually refers to the importance of personal experience or exposure to extreme weather events, media coverage, access to accurate scientific information, elite cues, or social movement advocacy (Brulle et al. 2012; Spence et al. 2011). For example, extreme weather events, such as heatwaves or storms, impact individuals' concerns over climate change in the US (Shao 2017; Bergquist et al. 2019). There is also some experimental evidence that students with a direct experience of extreme weather events grow more pro-environmentalist than those without a similar experience (Rudman et al. 2013). The change might be an immediate weather effect or an indirect result of media attention and exposure (Andrews and Smirnov 2020). Indeed, Carmichael and Brulle (2017) demonstrate that media coverage of climate change directly relates to the aggregate public concern about climate change in the US, while only the most extreme weather events had a small direct effect. Given the increasing frequency of natural disasters related to climate change, it would not be surprising that people grow more worried about the climate. European countries have been hit by several significant storms, floods, and extreme temperature changes during 2018-2019.[2] Hence, we expect that those young people who have directly or indirectly

[2] See, e.g., https://www.euronews.com/2019/07/28/storms-across-europe; https://ec.europa.eu/jrc/en/news/more-countries-ever-hit-forest-fires-2018; https://www.bbc.com/news/world-44941999.

experienced extreme weather events would be more likely to be concerned about climate and environmental issues (H.1).

Extreme weather events impact climate concerns because they increase the salience of the climate and environmental issues. The mobilization of massive protests could achieve the same effect, as elite cues from politicians and advocacy work from social movements significantly impact the public concern for climate change (Brulle et al. 2012; Carmichael and Brulle 2017). Indeed, the school strikes for climate have cast the subject into the media spotlight and political agenda worldwide since 2018 (de Moor et al. 2020). Therefore, we would expect that in the countries where there was more mobilization around climate change, young people had more pressure to see climate change as a pressing problem and became more concerned over the issue as part of a larger "bystander public" (Han and Strolovitch 2015; H.2). Such a change might have happened because of social identification (van Zomeren et al. 2008) – seeing that other young people are concerned and protesting might increase concern among similar youth. As protesters were predominantly well-educated and middle-class (de Moor et al. 2020), similar young people are expected to be and become more concerned about climate and environmental issues.

Micro-drivers of climate concern

A recent meta-analysis by Hornsey et al. (2016) has revealed that the impact of weather events is overshadowed by more stable individual-level factors such as basic human values, worldviews and ideology. The importance of such factors is related to cultural cognition and social identity theories, emphasizing the importance of individuals' risk perception, group membership, and the motivation to maintain prevailing social structures (Hornsey 2021). These, in turn, are related to two axes of fundamental human values: conservation versus

openness-to-change and self-transcendence versus self-enhancement (Schwart 1992; Cheung et al. 2014).

Values form individuals' beliefs and attitudes towards social issues, including shaping their attitude and behavior towards the environment or climate change (Stern 2000). For instance, some scholars have found that self-transcending values correlate with higher levels of climate concern (Corner et al. 2015; Poortinga et al. 2019), and conservation values rather than openness to change have a negative relationship with climate concern (Poortinga et al. 2019). This finding is also supported by studies that have found that climate skepticism is more widespread among politically conservative men (Stern et al. 1998; McCright and Dunlap 2011; Milfont et al. 2015; Guber 2013; Rootes 2014; Lewis et al. 2018). In the US, conservatives and those who endorse hierarchies tend to favor the free market and oppose any regulations and taxes targeting climate change (McCright and Dunlap 2011; Hornsey 2021). Moreover, values related to openness-to-change – e.g., libertarian rather than authoritarian values –increase the likelihood of concern over climate and environmental issues (McCright and Dunlap 2011; Eggert and Giugni 2012; Hornsey et al. 2016; Kvaløy et al. 2012; Lewis et al. 2019; Poortinga et al. 2019; Stevenson et al. 2019). Johnston and Deeming's (2016) results from the United Kingdom demonstrate that those who hold authoritarian values are more likely to deny climate change, while Lewis and colleagues (2019) show that the commitment to democratic values is strongly related to climate concern.

Although young peoples' worldviews are still developing, changes are arguably more likely to occur among age groups that are younger than young people in our sample, for instance, among teenagers (Stevenson et al. 2014). Still, we expect that some changes might take place, especially with changing authoritarian-libertarian values and ideological orientations. Social identity approaches posit that individual attitude formation follows political identities (Cohen 2003; Unsworth and Fielding 2014). Therefore, we expect that

young people whose value orientation is or has become more libertarian rather than authoritarian will also become more concerned about the environment and climate change (H.3).

While the effect of worldviews or values on climate concern is much related to individuals' social identity and risk perceptions, specific political attitudes and socio-economic factors might affect climate concern. These may be grounded in people's historically situated social and economic experiences and go beyond periods of economic hardship and other social crises, but they can also relate to the "finite pool of worry" mechanism (Weber 2006; Linville and Fischer 1991). As people cannot worry about too many things simultaneously, it posits that individual concern for climate change may decrease once another issue becomes more pressing and salient (Duijndam and van Beukering 2020; Weber 2006). For example, Duijndam and van Beukering (2020) find a solid and positive cross-sectional and longitudinal relationship between economic performance and climate change concern at the country level, suggesting a trade-off between material prosperity and post-materialist concerns. Moreover, in their panel study of the adult population in the US, Palm and colleagues (2017) find that political ideology and party identification are more critical factors changing the relative concern about environmental conservation than the experience of extreme weather. The argument is similar to the aforementioned effect of macro-level drivers, with communication, elite cues or social movement advocacy potentially amplifying the salience of specific issues such as immigration or the economic crisis. Therefore, it is plausible to expect that individuals who become more critical of immigration or state economic policy (e.g., regulations) see other problems than climate change more concerning, at least in the short-term (H.4).

As it has been suggested that economic and financial crises decrease climate concern (Capstick et al. 2015; Harring et al. 2011; Elliott et al. 1997), we also propose that those young people who experience economic crisis would be or become less concerned about climate or

environmental issues (H.5). While there is no substantial evidence that the amount of income would affect individuals' climate concerns (Lewis et al. 2019, but see Duijndam and van Beukering 2021), the *change* of living conditions might play its role. The experience of economic hard times: income decrease, unemployment, or the perception that one's economic situation has worsened, might decrease the salience of climate change for adults and particularly for young people who are vulnerable to economic downturns and have been significantly affected by the recent economic crisis (della Porta 2015; Portos 2021).

Finally, although there is evidence that men, older age groups, and those with lower education tend to be skeptical about the anthropogenic nature of climate change (Poortinga et al. 2011), most recent empirical evidence suggests that human values and political orientation might be more consistent predictors for climate concern than demographic factors such as age or gender (Poortinga et al. 2019). Therefore, we do not expect these variables to predict changing climate concerns among young people significantly. Still, as studies about youth note that the relationship between age and climate concern is uncertain (see review in Lee et al. 2019), we include demographic variables in the models of analysis for control purposes and discuss eventual effects below.

Data and design

We use a rare cross-national representative panel data of young people aged 18-34 from nine countries: France, Germany, Greece, Italy, Poland, Spain, Sweden, Switzerland, and the United Kingdom. This data has two unique advantages compared to surveys used for studying climate concerns. First, while the dataset comprises at least 1,000 general population cases in each country, the first wave included two booster samples of young people of age 18-34 for each country. The specialized polling agency Qualtrics collected the data ad hoc by administering online surveys with balanced country quotas in terms of sex, age, region, social class, and

education level to match national population statistics (EURYKA 2018).[3] Considering our focus on youth, the possible limitations of the digital divide should be minimal. Second, data comes from the panel survey, where the first wave was conducted in 2018, and the second wave approximately 12 months later (2019)— see histograms in Figures A1-A2, Appendix. Our data includes 3,656 respondents representing this age group in their respective countries.[4] In sum, the data provides an excellent resource to examine shifting environmental and climate concerns among young Europeans more closely.

A growing body of literature emphasizes that the occurrence of unexpected events during public opinion survey fieldwork can have significant implications on the estimates and arguments we can draw (Muñoz et al. 2019). The timing of the fieldwork is also important for this study because of our expectation that the experience of extreme weather events and the mobilization of climate strikes might play a role in the change of young people's climate concerns. Table 1 brings forward the timing of the survey waves, as well as the counts of climate protest, the extreme weather-related deaths during these periods, and population size in each country. The latter is essential for setting the event and death counts into a relative perspective. In all countries, the first wave surfaced in April 2018, and the second wave began on the 1st of April 2019. Most responses from the second wave were received at the end of April 2019. We use the International Disaster Database (EM-DAT) maintained by the Center for Research on the Epidemiology of Disasters (CRED) for extreme weather events. This database contains detailed information on outbreaks and effects of natural disasters worldwide

[3] State-of-the-art checks were put in place for data quality as well as additional data scrubbing carried out post-fieldwork. These checks included detecting straight-liners, bad verbatim, inattentive participants, etc. Data cleaning was carried out for the two waves independently as standard practice. All panels which Qualtrics uses are part of ESOMAR.

[4] First wave socio-demographic data as well as wave II refreshments were validated by panel partner targeting against, e.g., age/year of birth, sex, education group, region.

and is much used in disaster management research (Guha-Sapir et al. 2016). We built a continuous indicator for extreme weather events measuring the number of deaths it caused (weighted by the population in the country). The weather event should have occurred between the last month of the first wave and the start of the fieldwork for the second wave. The number of climate strikes per country was obtained from the Fridays for Future (FFF) homepage (www.fridaysforfuture.org) between November 2018 and the 31st of March 2019. As activist groups themselves report the events on social media, the protest counts may be overestimated; however, we assume no significant cross-national patterns in this reporting bias.

Table 1. Timing of the fieldwork, extreme weather-related deaths, and climate protests

Countries	Start of wave I in 2018	Start of wave II in 2019	N of survey respondents	Extreme weather events (N of deaths)	Population (in millions)	No. of climate strikes
France	18/05	01/04	402	14	66.99	234
Germany	04/05	01/04	454	1	83.02	241
Greece	05/05	01/04	289	100	10.72	7
Italy	20/04	01/04	476	22	60.36	316
Poland	17/04	01/04	379	0	37.97	32
Spain	16/04	01/04	546	26	46.94	122
Sweden	16/04	01/04	274	0	10.23	327
Switzerland	16/04	01/04	389	4	8.57	29
UK	25/04	01/04	447	0	66.65	215

Note: extreme weather information is obtained from EM-DAT. Extreme weather events took place between the last month of wave I and the start of wave II. The number of strikes has been calculated from the FFF homepage for 11/2018-03/2019.

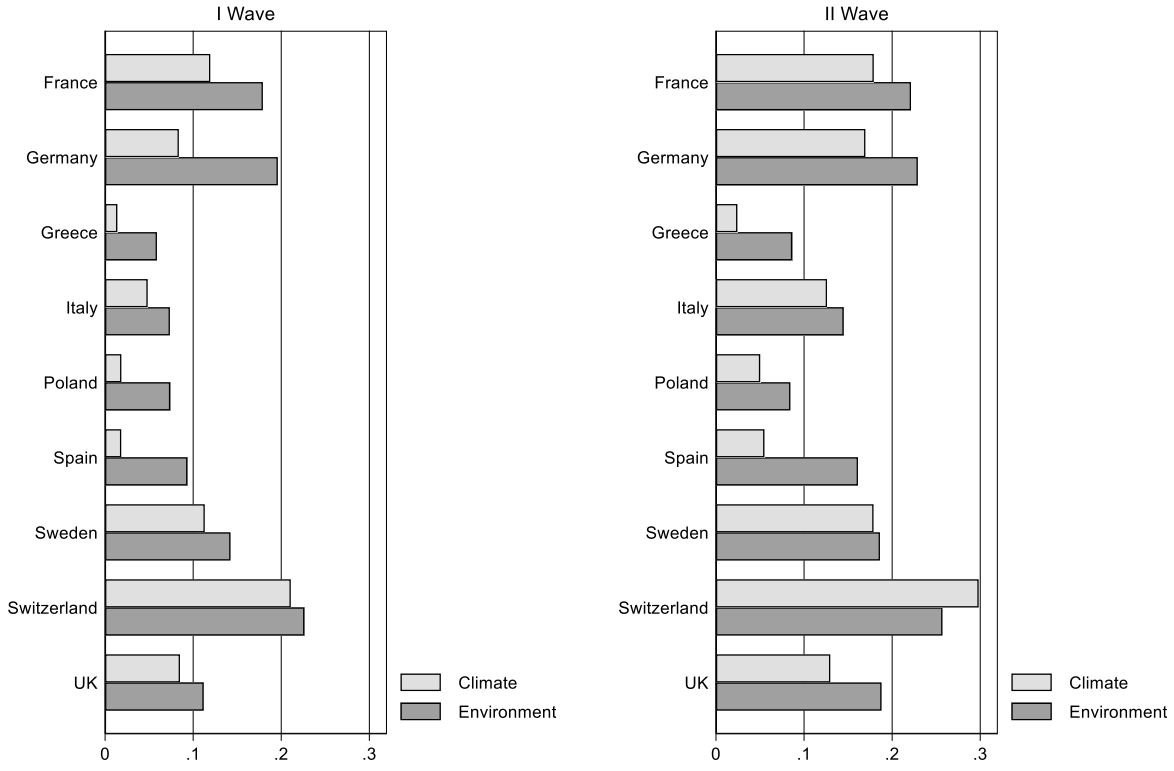
Dependent variable: concern for environment and climate issues

We are interested in young people's relative concern for the environment and climate rather than their absolute concerns for climate change. While the last usually asks people to what degree they are worried about the environment or climate, the first analyses the concern for environment and climate compared to other potential socio-economic sources of concern.

Thus, our dependent variable is based on responses to the question: *"Please select the two major personal concerns for you in the following* [randomly ordered] *list: inequality, corruption, unemployment, economic situation, rising prices/ inflation, Government debt, health and social security, crime, taxation, pensions, the education system, immigration, housing, the environment, climate and energy issues, terrorism, or other (please specify)".* The most frequently chosen issues at both waves were unemployment (25% in wave I, 21% in wave II) and immigration (20% in wave I, 15% in wave II)— see Figure A3, Appendix. Our binary dependent variable equals one if the respondent selected "climate and energy issues" or "the environment", as those concerned about the environment also tend to be worried about climate issues. In wave I, 18% of the respondents chose either of these issues, while in wave II 28% of the young people reported concern for the environment or climate and energy issues.[5] It might be that people who choose other issues over climate or environment still are concerned about climate or the environment, but for them, these do not seem as important as the other issues. Hence, when we observe people changing the selection from, e.g., climate to unemployment, it means that while the respondent might still be generally concerned over climate change, climate loses its relative importance at this particular time-point. Figure 1 illustrates how concern for climate has risen to a larger extent than the concern for the environment between the two waves. While the increase of concern for the environment or climate is generalized across countries, it also demonstrates significant cross-national variations.

[5] Young people clearly are more concerned about climate and environment than older age groups: among respondents older than 35 years-old, only 14% were concerned about climate and environmental issues in the first wave (in 2019 it was 22%).

Figure 1. Average climate and environmental concern by country in waves I (2018) and II (2019)



In Greece, only 2-3% of the young people are concerned about climate issues, whereas the number is about ten times greater in Switzerland. However, there is no country where more than half of young people are concerned about climate or environment. On the one hand, it is not surprising that after the financial crisis, which mainly affected Southern Europe, young people in Spain and Greece have pressing concerns, such as unemployment and healthcare, other than climate. It has been shown before that the concern over environmental issues declines during the economic downturn (Kenny 2020). On the other hand, it is also surprising that young people in relatively well-off countries such as Sweden and the United Kingdom express lower levels of concern over the environment than in France, Germany or Switzerland in 2018-2019.

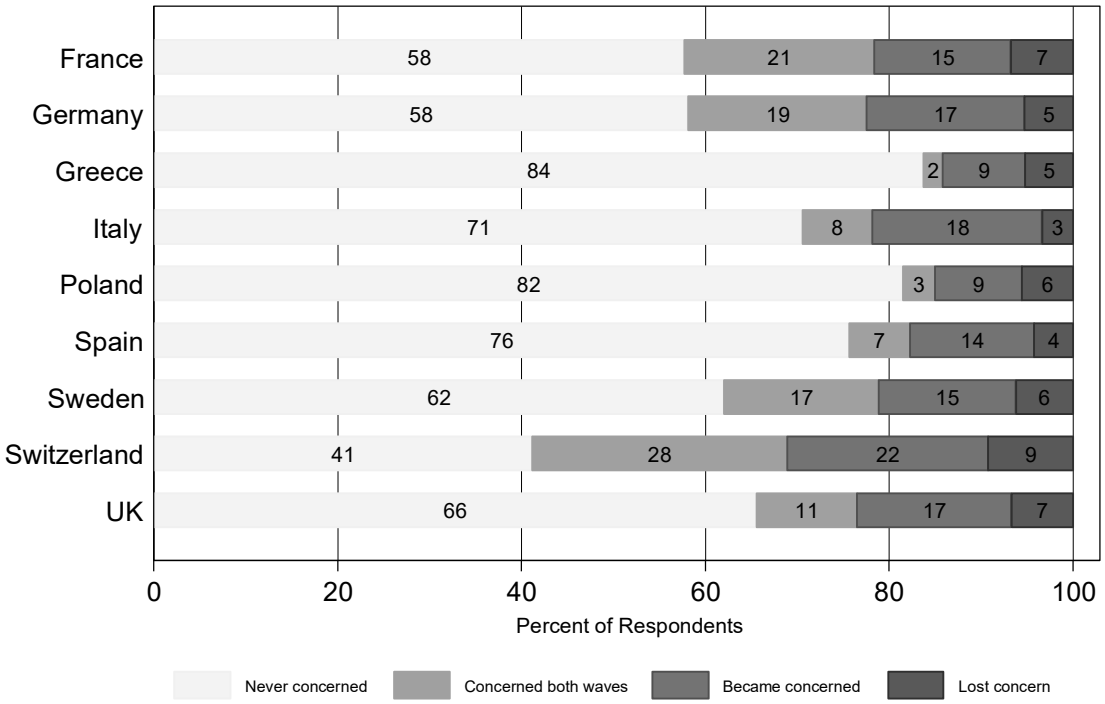
We are interested in change; hence, our panel data shows that there are four groups of young people: those who were worried over climate and environment in both waves (12.6%), those who were concerned in wave I, but became less concerned in the wave II (5.8%), those

who were not concerned in wave I, but became concerned in wave II (15.5%), and the ones who did not consider climate or environment as the issues of primary personal concern during both waves (66%). Those who became concerned about the environment and climate for wave II had previously been concerned over issues such as unemployment, inequality or immigration, while those who lost their environmental and climate concerns for wave II became instead worried about unemployment, inequality, corruption, and the general economic situation. Hence, although recent studies have advocated for a "nuanced revision" of the "finite pool of worry" hypothesis (Evensen et al. 2020, 2), in general terms our data seem to support the idea of a competition between concerns over environmental and economic issues.

The cross-country variations in changed concern over climate are visible in Figure 2. Young people in Switzerland are the most concerned about the environment and climate during both waves. There is also a significant proportion of those who "lose" their concern for the issue in wave II. Young people in Greece and Poland remain the least concerned during both two waves, though many respondents became concerned over these issues even there.

In the following analysis, we will use two methods for estimating which factors impact the levels and change in climate and environmental concern among young people. First, we use the binary value of being concerned for the environment or climate, measured both for wave I and wave II, and run logistic panel regression analyses. Second, we construct the variable which refers to the stability or change in environmental and climate concerns. It is based on the above-described four groups of young people, and the model applies multinominal logistic analysis, which is particularly suitable for comparing different groups with each other.

Figure 2. The average change of climate and environmental concern items between two waves by country, percentages of respondents



Individual-level predictors

The measurement of country-level independent variables – the experience of extreme weather events and the number of FFF protests between the two waves of the panel survey – were already listed in Table 1. Below we focus on the measures of individual-level variables. In the first analysis, the panel-set up, the variables indicate the change in the economic situation or, more specifically, the experience of economic difficulties, the changed ideological orientation in terms of changed view on state intervention and attitude towards immigration, as well as the changed adherence to authoritarian or libertarian values (details in Table 2).

The experience of economic strain is captured through relative deprivation, comparing one's material conditions with her own past (Grasso et al. 2019). Respondents were asked to indicate whether they have "experienced real financial difficulties (e.g., could not afford food, rent, electricity) in the past 12 months" or not.

The *ideological orientation* is not measured with the usual self-placement on the left-right scale as it taps into various meanings and structures of political competition in different contexts, especially among young people (see Uba and Bosi 2021). Instead, we distinguish between cultural and economic dimensions along the left-right ideological divide as proposed by other scholars (see Hutter and Kriesi 2013; Mair 2007). First, we use an 11-point scale measure of agreement with the statement—"cultural life is generally undermined or enriched by people coming to live here from other countries". This statement is meant to signify attitude and tolerance toward immigrants. Second, we use a 5-point Likert scale measure of agreement with the following information: "government should decrease taxes a lot and spend much less on social benefits and services." Here, the agreement is indicative of a more right-wing economic and ideological orientation.

Finally, we build a simple summated scale to detect the changes in *authoritarian-libertarian values*. Respondents were asked how much they agree or disagree with the following statements: "A woman has to have children in order to be fulfilled"; "Abortion should not be allowed in any case"; "Children should be taught to obey authority"; "People who break the law should get stiffer sentences"; "Homosexual couples should not be allowed to adopt children under any circumstances". All the items are measured through 5-point Likert scales ranging from strong agreement to strong disagreement; Cronbach's alpha ~ 0.6. The index takes the arithmetic average of these five items. Table 2 reports the summary statistics for these and other variables used in the models (see correlation matrix in Table A1, Appendix). While we use the varying values of these variables in the panel set up, in the multinominal analysis of group differences, the value of the independent variables comes from wave I.

Controls

As noted above, socio-demographic factors such as gender, age, and level of education will be used only for control purposes as it is likely that the variables have a different effect in different countries (Lewis et al. 2019; Poortinga et al. 2019). Hence, we use the reported sex on the respondent's birth certificate for constructing a dummy variable differentiating between female (1) and male (0) respondents. Age is a continuous variable, as reported by respondents. We use a simple 3-point interval measure for education: primary, secondary, and the higher level of education. Since urban citizens are more likely to embrace post-material values and thus report more concern about environmental and climate change issues (Inglehart 1981) and climate protests took place in the cities (Wahlström et al. 2019), we also control for the urban-rural cleavage through a 1-5 scale that best describes the area respondent lives in (1= "big city"; 5= "farm or home in the countryside").

In addition to the socio-demographic controls, we consider the channels through which young people might receive different information. To the detriment of traditional media, it is essential to consider interactions with peers and through digital media (Maher and Earl 2019). First, we account for social capital and network availability by measuring how often the respondent socially meets with friends (1-4 scale, from "less than once a month" to "almost every day"). Second, social media activism allows users to cultivate their politicization, expand one's networks, learn about specific events, increase opportunities for participation in and awareness of particular issues, including the environment and climate (e.g., Boulianne et al. 2020; Maher and Earl 2019). We control for young people's exposure to political information through social media sites (e.g., Facebook, Instagram, Twitter, YouTube, Snapchat), which is measured through a 5-point scale that ranges from "never" to "every day."

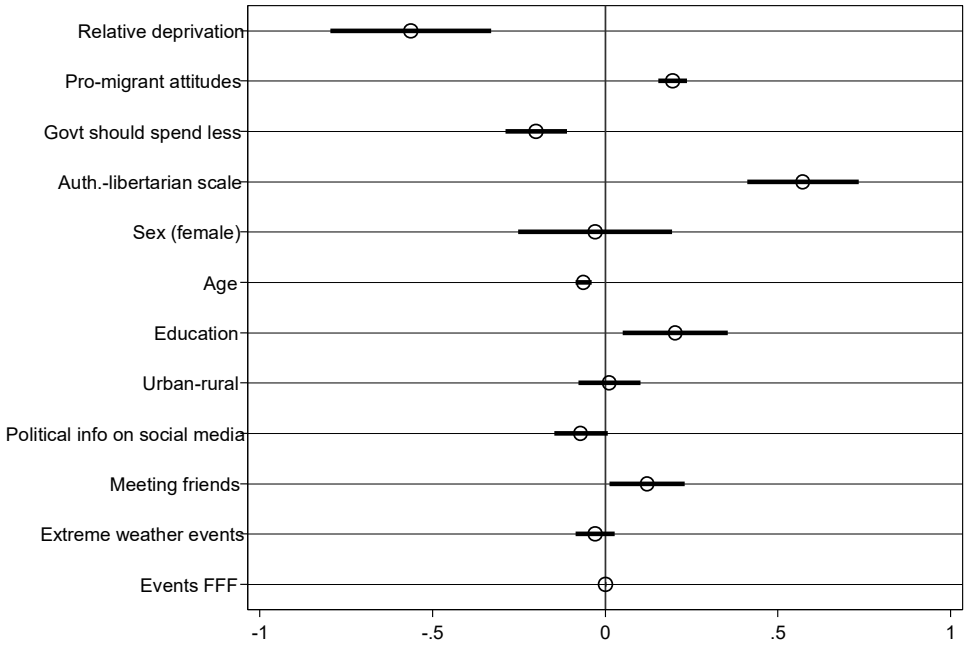
Table 2. Summary statistics of individual-level predictors and controls in wave I and II (N= 3,656)

	Wave I		Wave II			
	Mean	**SD.**	**Mean**	**SD.**	**Min**	**Max**
Relative deprivation	0.27	0.44	0.26	0.44	0	1
Govt. should spend less	2.98	1.19	2.94	1.18	1	5
Auth.-libertarian scale	3.33	0.72	3.36	0.73	1	5
Pro-migrant attitudes	5.59	2.67	5.65	2.65	0	10
Controls						
Female	0.56	0.50	0.56	0.50	0	1
Age	26.95	4.83	27.95	4.85	18	34
Education	2.16	0.75	2.28	0.72	1	3
Urban-rural	2.36	1.15	2.29	1.16	1	5
Meeting friends	2.65	0.92	2.63	0.92	1	4
Political info on social media	2.26	1.33	2.25	1.32	1	5

Explaining shifts in climate and environmental concern via panel analysis

We fit several panel regression models with random effects. We first include only micro-level predictors (Models 1-3) and controls (Model 4), with country-fixed effects that are accounting for the specific (institutional, historical, and cultural) characteristics of each country. We then include time-invariant controls in Model 5 and replace country-dummies with the contextual effects of extreme weather and protests in Model 6. In Model 7, we replicate the Model 5 specification with fixed effects. While all results are shown in the appendix (Table A2), Figure 3 represents Model 6.

Figure 3. Results of random effects logistic panel analysis (model 6, Table A2)



Note: the coefficients are presented with 95% confidence intervals. DV: composite index of environmental or climate concern.

These results show to what extent shifts in individual-level variables (i.e., relative deprivation, pro-migrant attitudes, the government should spend less, authoritarian-libertarian values) account for variation in environmental and climate concern attitudes. While there is a substantial level of variation in education, domicile, frequency of meeting with friends, and activism in social media sites between panel waves, we treat sex and age as time-invariant indicators in the panel regression models reported throughout.[6] Overall, our results provide some but not full support to the presented hypothesis. First, contrary to our expectations, the effects for aggregate level indicators are not substantial nor significant— i.e., H.1 and H.2 cannot be confirmed. The FFF protest event counts and the measure of extreme weather and natural disasters (deaths relative to population size) in the country do not change the propensity to shift the concern towards climate change and the environment among European young

[6] Treating them as time variants does not change the main results in any significant way. Obviously, age varies across time, but not at a different rate between individuals.

people. This finding supports the results of many prior studies, which also find no or only a weak link between the experience of extreme weather events and climate concerns (Hornsey et al. 2016; Palm et al. 2017). It also suggests that in the case of a relative concern, as measured in this study, micro-level factors might be more critical than the contextual experience of extreme weather or the mobilization of environmental movements. These macro-events might increase attention to climate, but their specific effect could be more context-dependent (Sisco et al. 2017) and certainly worth further analysis.

Second, experiencing economic grievances (deprivation) is negatively correlated with shifting concerns about the environment and climate, confirming H.5. Those who have experienced economic difficulties are much less likely to become concerned over climate and environmental issues— specifically, increased relative deprivation makes the likelihood of having the outcome 43% lower.

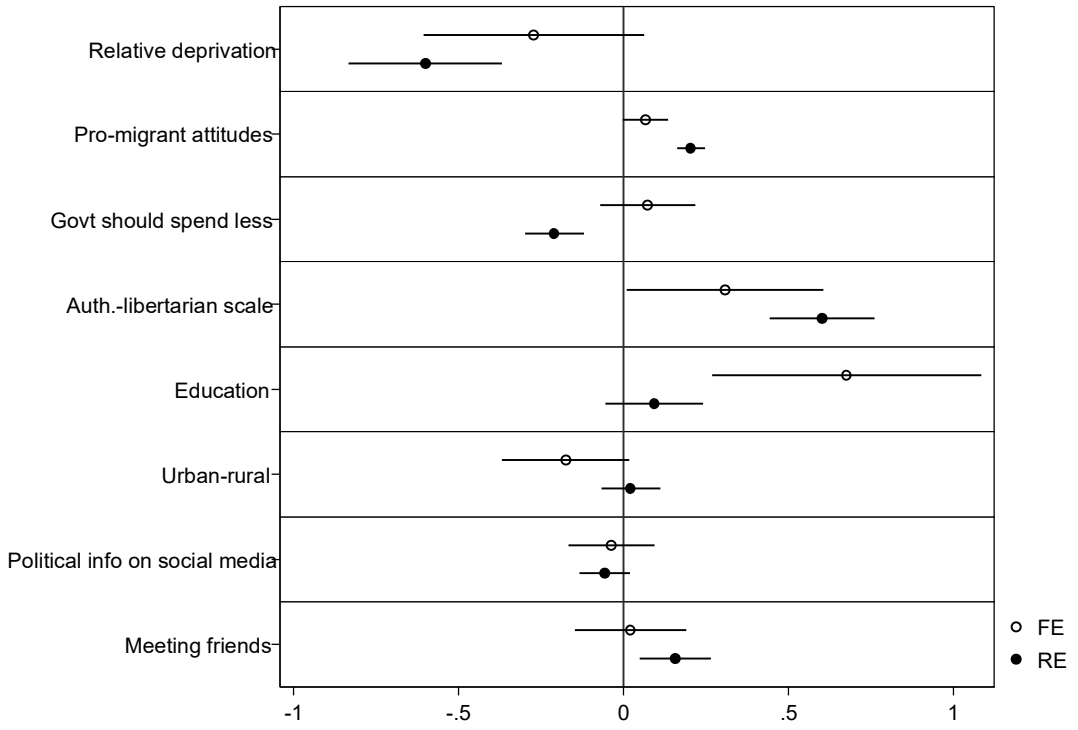
Third, changed ideological orientation also plays an important role. Those who became more positive towards immigration are more likely to be concerned about climate and environment (odds ratio is 1.22), while those who do not support the redistributive policies are less likely to choose climate or environment as the primary personal concern (odds ratio= .82). Similarly, embracing libertarian values increases the concern over climate or environment (odds ratio= 1.77). Hence, we find empirical evidence in support of H.3 and H.4. While we cannot test the elite cue argument, polarization and populist rhetoric could likely push towards these trends among young people.

Finally, the control variables have hardly any significant or substantive effect on changed climate concern. While the coefficient of socialization with friends is small and not robust, the exposure to political information on social media sites does not seem to impact environmental and climate change concerns (at least in the short term). However, there are some substantial effects of time-invariant variables: older and highly educated respondents are

more likely to shift concerns towards climate change than those younger or with low education. Compared with the mixed results within the literature on the role of education for climate concern (Guy et al. 2014; Smith et al. 2017; Lewis et al. 2018), our panel data focusing on young people provide here a solid answer. Still, at odds with these expectations, a change in domicile is not. The effects of age and education might be related to the protests of FFF and the fact that spokespeople for the movement are mainly young students. Yet, we do not find a significant impact of gender on changing environmental or climate change concerns.

We have also analyzed our model with fixed effects as an additional test, focusing only on the variables that change over time. The results which compare the random effects (between variance) and fixed effects (within-variance) are shown in Figure 4. The latter indicate that the major impact on changed concern comes from education and slightly also from attitudes towards migration and changed values. Attaining additional levels of formal education and becoming more libertarian predict change in opinion – becoming concerned about environment and climate. Hence, the experience of relative deprivation seems more likely to explain the generally low levels of environmental/climate concern.

Figure 4. Comparing random (RE) and fixed (FE) effects (models 5 and 7, Table A2)



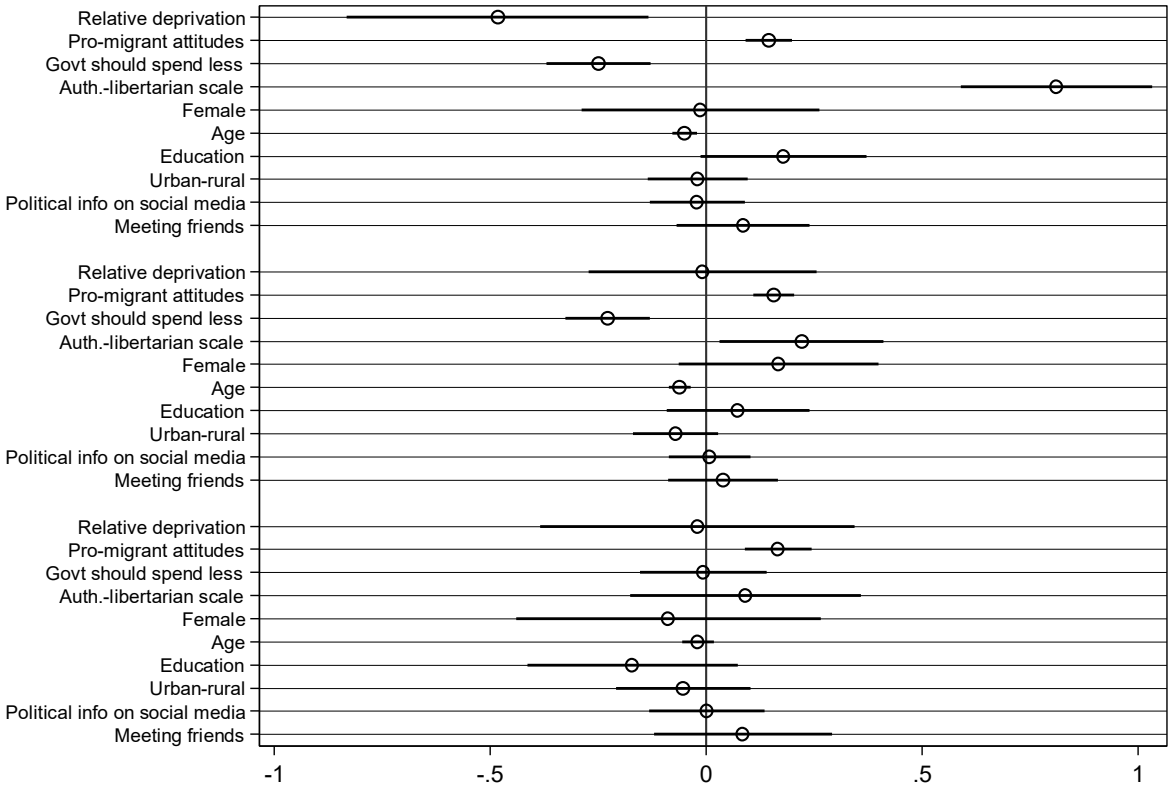
Considering that sample sizes in each country are relatively small, the estimated effects are hard to evaluate, but we did note some interesting cross-national variation in the fixed-effects analyses. While the increased level of education and change towards libertarian values lead to concern about climate or environment in Italy, elsewhere, the effects of these variables were smaller. More meetings with friends and moving to the countryside were associated with the decreased probability of becoming concerned in the UK. Consistent with Poortinga et al. (2019), these results suggest that some factors might have very different cross-national effects on climate concerns.

Comparing groups - the multinominal analysis

Another option for analyzing the changing concerns about climate and environmental issues is to focus on differences between the four groups mentioned above – those always concerned, those never concerned, those becoming concerned, and the ones losing concern during our

fieldwork in 2018-2019. The results of a multinomial analysis which use the same independent and control variables as discussed before are presented in Table A3 (Appendix); Figure 5 shows a multinomial regression model with country fixed effects (not reported in the figure), taking those respondents who were never concerned as the baseline category.

Figure 5. Multinominal regression, baseline= never concerned (model 2, Table A3)



These results, in general, confirm the findings from the panel analysis and allow us to describe the differences between the four groups better.[7] European youth who have experienced economic strain, are intolerant towards immigrants, do not support redistribution policies, and

[7] While the presented Figure reports the results of the Model 2, where the value of the independent variables comes from wave I, we have conducted a robustness check by analysing the same models for the case when the values of independent variables come from wave I (see Table A3 in appendix). The majority of the results remain the same. The only small differences appear in respect of the economic hardship (relative deprivation), though the effect remains significant and substantial for the comparison between groups of "never concerned" and "always concerned". Hence, we consider that the negative effect of economic hardship on concerns about climate and the environment are robust.

do not adhere to libertarian values, are less likely to belong to the group "always concerned" than the group "never concerned" about climate or environment. Interestingly, relative deprivation appears as a hinderance to becoming concerned about climate change. Those who are likely to belong to the group "became concerned" rather than "never concerned" differ from each other in terms of this experience, as well as the aforementioned political orientations. The values, which are known to change relatively slowly, have a more negligible effect here.

Finally, we find no significant differences between those young people who became concerned and lost concern about climate or environment. There is only a slight relationship between negative attitudes towards immigration and the likelihood of belonging to the group "lost concern" than "never concerned," supporting prior results of Ojala (2015). Adherence to libertarian values relates to the likelihood of belonging to the group "always concerned" rather than the group "lost concern". As immigration-related attitudes are changing faster and are much affected by polarization and different negative campaigns in society (Dennison and Geddes 2019), this might substantially impact young people and their concern for climate and the environment.

Discussion and conclusion

Since 2018, Fridays for Future-led youth climate strikes and mobilization for climate justice have gained momentum, and there is a renewed interest in climate activism across Europe and beyond. To understand better how the perceptions of climate change and concerns about climate and the environment develop among young people, we need to go beyond the usual cross-sectional one-country studies or cross-national comparisons. Based on the unique cross-national representative panel survey that focuses on young people aged 18 to 34, we have shown how changes, even over a relatively short period of time (2018 – 2019), impact youth concerns about climate and the environment.

While we can confirm the results of prior studies and agree that political orientation and individuals' worldviews or values are the most consistent factors defining the difference between those who do and do not express concerns about climate and the environment, we also bring forward another, sometimes forgotten, but essential topic. The experience of relative deprivation hinders young people from becoming concerned about climate and the environment. While several studies have expressed that there is a competition between support over the "economy" and the "environment", recent research has paid more emphasis to unpack the role of worldviews, values and political orientation. Still, partially in support of the "finite pool of worry" hypothesis, young people who have experienced economic difficulties are less likely to be concerned about climate or the environment. Therefore, while multiple factors grounded in people's historically situated and economic conditions concur in explaining different levels of concern, when young people suffer from increasing unstable and strenuous economic conditions, especially in the countries affected the most by the recent economic or health crisis, we deem crucial to consider their changing economic circumstances. In this way, our results are not new, as traditional environmental movements or even the recent climate activists (e.g., Extinction Rebellion) have been seen as representing more the well-off ones (de Moor et al. 2020). On the other hand, these results refer to the broader environmental significance of the policies which aim to decrease economic inequalities among youth.

Like other prior panel studies, we find almost no contextual effects in terms of climate protests (measured as FFF event counts in a country) nor the experience of extreme weather events and their related casualties. There may, undoubtedly, be some local and long-term effects we cannot measure. Hence, the relationship between climate protests, extreme weather events and youth attitudes towards climate is worth studying further.

To sum up, the paper advances our empirical knowledge by confirming that changing political attitudes and relative deprivation strongly relate to increasing climate concern among

a significant, highly mobilized subset of the population, namely young people in Europe. In addition, analytically, our paper qualifies the association between variables as not just static but dynamic. While the reverse causality hypothesis between attitudinal variables cannot be entirely ruled out with such two-wave panel data, our results are substantiated theoretically and robust across many model specifications. These contributions also have significant implications for the literature on political engagement of young people, demonstrating the importance and complexity of politicization processes – especially the role of a *change* in political attitudes and values in influencing individual concerns even in a short period of time. Although worldviews and values are relatively static and slow to change, political identities are fluid and more easily subject to change. Therefore, if a shift does take place, it also influences concern for the climate and environmental issues.

Last, our results are driven by nine European countries, and further inquiry should extend the comparative scope of the analysis by including more countries within and beyond Europe. The trends might look different in the context of more polarized opinions about climate change. Future studies may also strengthen the causality proven in this study by covering a longer time period, and looking at the significance of the two sets of predictors in the long term. Finally, given the prominent role of young people in recent and current mass mobilization around climate change, more systematic work is required to understand the effects of engaging in climate activism on changing levels of concern across different levels of analysis. What this study has shown, however, is that individual-level political attitudes and value configurations are vital in understanding shifts in public concern for the environment and climate issues.

Appendix

Figure A1. Histogram of completion time (end date of survey) per country, wave I

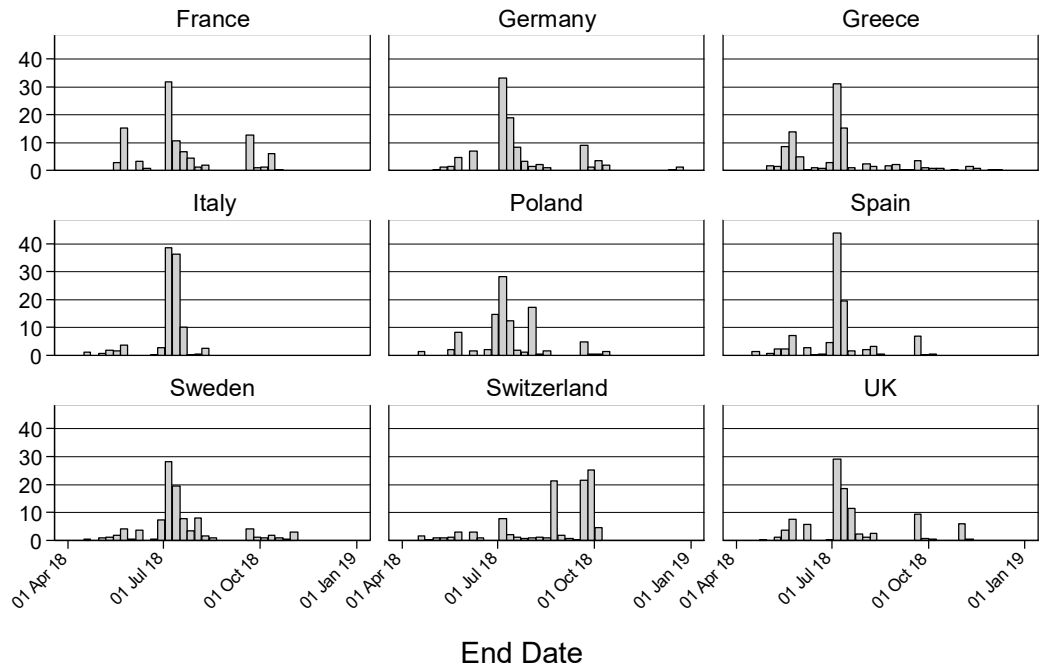


Figure A2. Histogram of completion time (end date of survey) per country, wave II

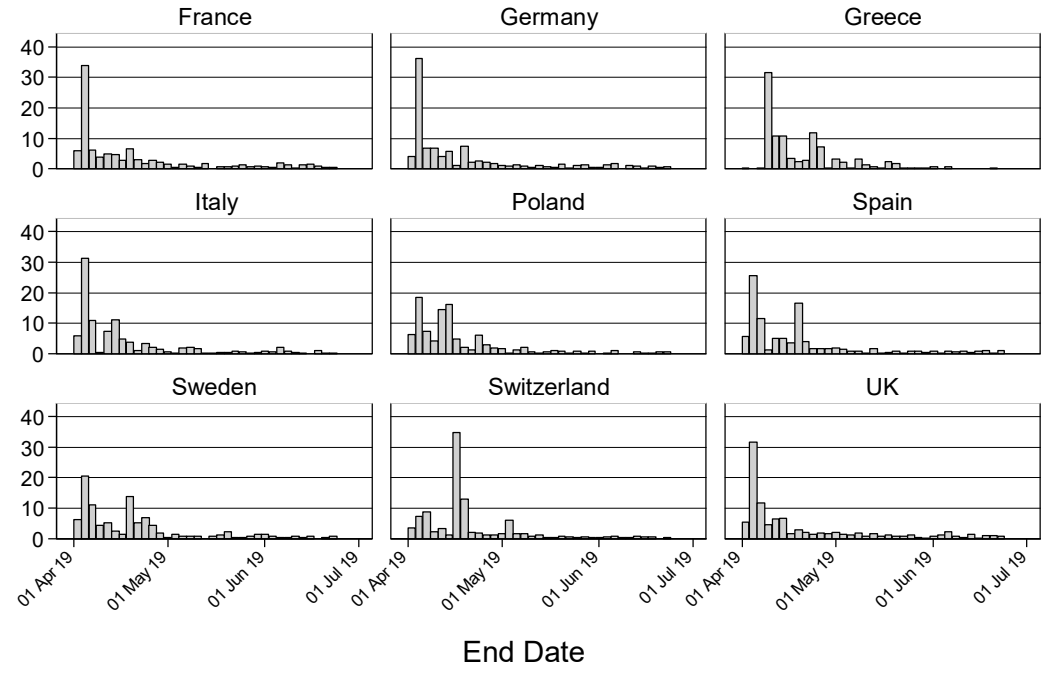


Figure A3. Distribution of national concern, waves I and II

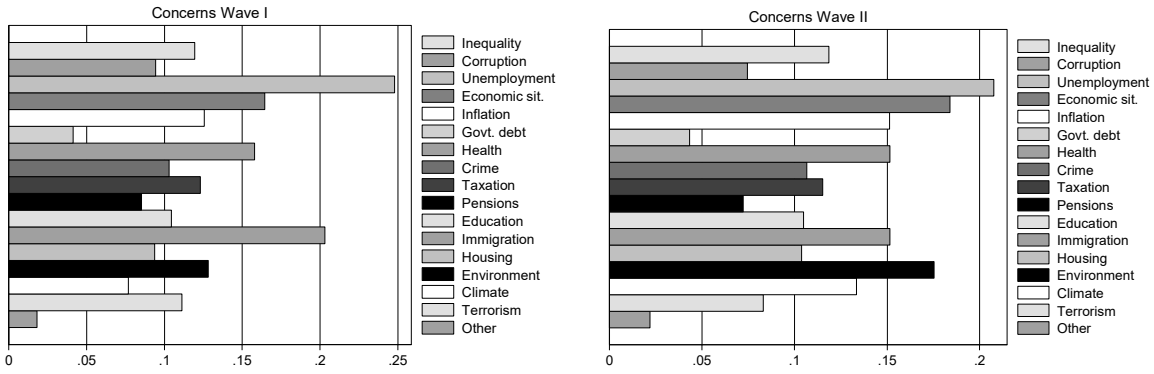


Table A1. Correlation matrix of predictors and control variables

	Relative deprivation	Pro-migrant attitudes	Govt. should spend less	Auth.-libertarian scale	Political info on social media	Meeting friends	Female	Age	Education	Urban-rural
Relative deprivation	1.00									
Pro-migrant attitudes	−0.10	1.00								
Govt. should spend less	0.05	−0.19	1.00							
Auth.-libertarian scale	−0.09	0.24	−0.35	1.00						
Political info on social media	0.08	0.08	−0.00	−0.07	1.00					
Meeting friends	0.00	0.08	0.03	0.01	0.23	1.00				
Female	0.05	0.00	0.00	0.17	−0.12	−0.05	1.00			
Age	0.01	−0.09	0.04	−0.11	−0.03	−0.15	−0.08	1.00		
Education	−0.13	0.12	−0.05	0.11	0.08	0.03	0.03	0.18	1.00	
Urban-rural	−0.04	−0.05	0.05	−0.05	−0.10	−0.07	0.01	−0.05	−0.13	1.00

Table A2. Panel logistic regression models with random effects

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Coeff	**S.E.**	**Coeff**	**S.E.**	**Coeff**	**S.E.**	**Coeff**	**S.E.**	**Coeff**	**S.E.**	**Coeff**	**S.E.**	**Coeff**	**S.E.**
Relative deprivation	−.49***	.12	−.54***	.11	−.48***	.11	−.47***	.12	−.45***	.12	−.56***	.12	−.27	.17
Govt should spend less			−.29***	.04	−.19***	.04	−.20***	.05	−.20***	.04	−.20***	.05	.07	.07
Auth.-libertarian scale	.74***	.08			.65***	.08	.65***	.09	.59***	.08	.57***	.08	.31*	.15
Political info on social media							.01	.04	.01	.04	−.07	.04	−.04	.07
Meeting friends							.15**	.05	.10	.05	.12*	.06	.02	.09
Female									.11	.11	−.03	.11		
Age									−.06***	.01	−.06***	.01		
Education							.13	.07	.21**	.07	.20**	.08	.68**	.21
Urban-rural							−.07	.05	−.08	.05	.01	.05	−.18	.10
Pro-migrant attitudes	.21***	.02	.22***	.02	.19***	.02	.18***	.02	.18***	.02	.20***	.02	.07	.04
Extreme weather events											−.03	.03		
Events FFF											.00**	.00		
Constant	−4.70***	.32	−1.42***	.24	−3.72***	.38	−4.15***	.45	−2.42***	.55	−3.60***	.58		
N	6582		6582		6582		6582		6582		6582		1366	
Country dummies	Yes		Yes		Yes		Yes		Yes		No		No	

Note: *p<0.05, **p<0.01, ***p<0.001. DV: composite index of environmental or climate concern.

Table A3. Multinomial regression with two kinds of independent variables and contextual effects (countries vs extreme weather protests). Baseline category: never concerned.

	Model 1 (IDV=wave II)			Model 2 (IDV=wave I)			Model 3 (IDV=wave II)			Model 4 (IDV=wave I)		
	Concerned both waves	Became concerned	Lost concern	Concerned both waves	Became concerned	Lost concern	Concerned both waves	Became concerned	Lost concern	Concerned both waves	Became concerned	Lost concern
Relative deprivation	-0.53**	-0.35*	-0.18	-0.48**	-0.01	-0.02	-0.56**	-0.36***	-0.16	-0.55**	-0.04	-0.04
	(0.17)	(0.14)	(0.21)	(0.18)	(0.13)	(0.19)	(0.17)	(0.14)	(0.21)	(0.17)	(0.13)	(0.18)
Pro-migrant attitudes	0.14***	0.14***	0.11**	0.14***	0.16***	0.17***	0.14***	0.14***	0.11***	0.14***	0.15***	0.17***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.04)	(0.03)	(0.02)	(0.04)
Gov. should spend less	-0.21**	-0.19**	-0.15	-0.25***	-0.23***	-0.01	-0.20**	-0.18***	-0.14*	-0.26***	-0.23***	-0.01
	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)
Auth.-libertarian scale	0.66***	0.20*	-0.07	0.81***	0.22*	0.09	0.67***	0.19*	-0.07	0.77***	0.20**	0.09
	(0.12)	(0.10)	(0.15)	(0.11)	(0.10)	(0.14)	(0.11)	(0.09)	(0.15)	(0.11)	(0.09)	(0.13)
Control variables												
Female	0.05	0.25*	-0.04	-0.01	0.17	-0.09	0.01	0.21*	-0.01	-0.06	0.12	-0.05
	(0.14)	(0.118)	(0.18)	(0.14)	(0.10)	(0.18)	(0.13)	(0.12)	(0.18)	(0.13)	(0.12)	(0.18)
Age	-0.04**	-0.06***	-0.03	-0.05***	-0.06***	-0.02	-0.04**	-0.06***	-0.03	-0.04**	-0.06***	-0.02
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Education	0.13	0.04	-0.6	0.18	0.07	-0.17	0.13	0.02	-0.05	0.13	0.03	-0.17
	(0.10)	(0.09)	(0.13)	(0.10)	(0.09)	(0.12)	(0.10)	(0.08)	(0.14)	(0.09)	(0.18)	(0.13)
Urban-rural	-0.09	-0.07	-0.05	-0.02	-0.07	-0.05	-0.02	-0.02	-0.02	0.05	-0.02	-0.03
	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)	(0.06)	(0.05)	(0.08)
Pol info social media	0.03	0.03	0.05	-0.02	0.01	0.00	-0.07	0.00	0.01	-0.14**	-0.03	-0.05
	(0.05)	(0.05)	(0.07)	(0.06)	(0.05)	(0.07)	(0.05)	(0.04)	(0.07)	(0.05)	(0.05)	(0.07)
Meeting friends	0.19*	0.06	0.06	0.09	0.04	0.08	0.24**	0.09	0.04	0.17**	0.09	0.10
	(0.08)	(0.07)	(0.09)	(0.08)	(0.06)	(0.10)	(0.08)	(0.07)	(0.09)	(0.07)	(0.06)	(0.10)
Climate strikes							0.00	0.00	-0.00	0.00	0.00	-0.00
							(0.00)	(0.00)	(0.00)	(0.000)	(0.00)	(0.00)
Extreme weather							-0.24***	-0.09*	-0.01	-0.23***	-0.10**	-0.02
							(0.05)	(0.04)	(0.05)	(0.05)	(0.03)	(0.05)
Constant	-2.89***	-0.94	-1.25	-2.99***	-0.88	-2.48**	-3.79***	-1.18	-1.40	-3.72***	-1.13	-2.70**
	(0.71)	(0.62)	(0.92)	(0.72)	(0.58)	(0.88)	(0.74)	(0.63)	(0.93)	(0.72)	(0.58)	(0.90)
Country dummies		Yes			Yes			No			No	
Observations		3,198			3,198			3,198			3,198	
Pseudo R2		0.0997			0.1058			0.0657			0.0727	

Note: In Model 1 and Model 3, we use the values of independent variables from wave II; in Model 2 and Model 4, these come from wave I.

Questionnaire:

- Relative deprivation: “You have experienced real financial difficulties (e.g. could not afford food, rent, electricity) in the past 12 months”. Yes/No.
- Pro-migrant attitudes: “Would you say that [country]’s cultural life is generally undermined or enriched by people coming to live here from other countries? Please state your answer on this scale where 0 means ‘undermined’ and 10 means ‘enriched’”.
- Govt. should spend less: “Government should decrease taxes a lot and spend much less on social benefits and services”, 5-point Likert scale, from “strongly disagree” to “strongly agree".
- Auth.-libertarian scale: “How much do you agree or disagree with the following statements?”, simple summated index based on 5-point Likert scales, from “strongly disagree” to “strongly agree":
    - A woman has to have children in order to be fulfilled
    - Abortion should not be allowed in any case
    - Children should be taught to obey authority
    - People who break the law should get stiffer sentences
    - Homosexual couples should not be allowed to adopt children under any circumstances.
- Female: “What sex were you assigned at birth, on your birth certificate?” Male/ female.
- Age: “Please state your date of birth”: 2018/9- year of birth.
- Education: “What is the highest level of education that you have completed?" Primary, secondary, tertiary.
- Urban-rural: “Which of the following best describes the area in which you live?” A big city, suburbs or outskirts of a big city, town or small city, country village, farm or home in the countryside.

- Political info on social media: “How often do you do each of the following? Look for political information on social media”. Never, less than once per week, 1-2 days per week, 3-4 days per week, every day.
- Meeting friends: “During the past month, how often have you met socially with friends not living in your household?” Never, once or twice per month, every week, almost every day.

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