climate

MDPI

Article

Between Individual Belief and National Context: Relative Positioning and Expectations of Collective Climate Action in Europe

João Carlos de Sousa [1,2,*] and Luísa Schmidt [3]

[1] CIES-Iscte, Centre for Research and Studies in Sociology, Iscte—University Institute of Lisbon, Av. das Forças Armadas, 40, 1649-026 Lisbon, Portugal
[2] School of Agriculture, Santarém Polytechnic University, Quinta do Galinheiro, S. Pedro, 2001-904 Santarém, Portugal
[3] Institute of Social Sciences, University of Lisbon (ICS-ULisboa), 1600-189 Lisbon, Portugal; mlschmidt@ics.ulisboa.pt
* Correspondence: joao.carlos.sousa@iscte-iul.pt

Highlights

What are the main findings?

- Higher country-level average belief in the anthropogenic origin of climate change is associated with higher expectations of collective climate action.
- Positive individual deviation from the country-level average is associated with lower expectations of collective climate action, especially at higher levels of climate worry.

What are the implications of the main findings?

- Expectations of collective climate action are associated not only with individual climate beliefs, but also with individuals' relative positioning within their national belief context.
- Communication and public intervention strategies may benefit from reinforcing visible signals of shared commitment, reciprocity, and collective efficacy, alongside scientific information about climate change.

Abstract

Expectations regarding collective climate action are multidimensional and should be understood in relation to the social contexts in which they are embedded. This study examines whether these expectations are associated with the country-level average belief in the anthropogenic origin of climate change and with individuals' deviation from that average. Drawing on Round 10 of the European Social Survey, the analysis utilizes 24,014 valid cases from 29 European countries. It estimates Complex Samples General Linear Models (CSGLM) to account for the complex sampling design. The results show that the country-level average belief in the anthropogenic origin of climate change is positively associated with expectations of collective climate action; that is, countries with a higher average belief exhibit higher expectations of collective climate action. Conversely, individuals whose belief in the anthropogenic origin of climate change exceeds the respective country-level average tend to express lower expectations of collective climate action. This negative association becomes stronger at higher levels of climate worry and is attenuated as ideological positioning moves towards the right; in contrast, trust in scientists does not have a significant moderating effect. Overall, the findings support a socially contextualized understanding of expectations of collective climate action, in which both national belief contexts and individuals' relative positioning within those contexts are relevant.

Check for updates

Academic Editor: Nir Y. Krakauer

Received: 20 July 2026
Revised: 13 August 2026
Accepted: 18 August 2026
Published: 18 August 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

Keywords: climate change; collective climate action; national belief context; relative contextual positioning; anthropogenic climate belief; climate worry; political ideology

1. Introduction

Climate change poses an existential challenge to contemporary societies, encompassing impacts that extend far beyond the environmental and ecological spheres. In this sense, it requires the collective mobilization of individual, institutional, and political actors. Organizing a strategy to address climate change is not confined to informed individual choice; rather, it entails cooperation, coordination, and reciprocity to confront collective dilemmas and politically coordinated choices [1–3]. Consequently, individuals' disposition to regard climate action as plausible is associated not only with information or individual belief, but also with expectations about others, including institutions and fellow citizens, being equally willing to mobilize. To understand collective climate action, it is therefore necessary to move away from individualistic perspectives and shift the analytical focus towards how social expectations of perceived reciprocity and collective coordination are structured [4,5].

In general terms, the literature linking public opinion and climate change has shown that support for collective climate action is associated with individual-level factors, such as belief in the anthropogenic origin of climate change [6], climate concern, trust in scientists, and political-ideological positioning [7–11]. These studies are important because they help explain why some individuals acknowledge the gravity and urgency of climate change, accept scientific authority as a source of knowledge and diagnosis, and support, or do not support, policy measures aimed at mitigation and adaptation. However, when the focus shifts from individual attitudes to collective action on climate change, the available knowledge remains more limited. At this point, it becomes important to examine what individuals think about the surrounding social and political context of climate change; that is, the extent to which they consider that others share beliefs, concerns, and dispositions compatible with the possibility of coordinated climate action.

Substantive advances in understanding this phenomenon require mobilizing the concept of second-order beliefs, that is, what individuals think others believe. The collective coordination required by climate change can be better understood by considering whether a given belief is collectively shared, since the perception of shared belief may function as a source of legitimation, reciprocity, and mobilization viability [4,5]. In the climate domain, citizens may underestimate the degree of agreement or disagreement among their fellow citizens within their political and social community [12,13]. In short, collective action should be understood as a relational assessment, one that depends not only on each individual's own evaluation, but also on the interpretation of the degree of consensus or disagreement between their position and the context in which they are embedded [14].

Accordingly, individual belief in the anthropogenic origin of climate change should be understood as a position socially anchored in its national context. This anchoring may be expressed through each individual's relative position within the national context in which they are situated. Thus, an individual's belief may be positioned above, below, or close to the average level of belief observed within the respective national context. The literature suggests that perceived correspondence between one's own position and the beliefs attributed to others may be associated with greater expectations of recognition, reciprocity, and the plausibility of collective action [12–15]. By contrast, stronger individual beliefs in the anthropogenic origin of climate change may coexist with lower expectations of collective action when individuals are positioned above the average level of belief observed

in their national context. It is therefore crucial to distinguish between the country-level average belief and each individual's relative position within that national context, while recognizing that this observed positioning does not directly measure perceived consensus or second-order beliefs [12–14].

Theoretical reflection and empirical analysis concerning the articulation between individual beliefs and national contexts of belief remain insufficiently developed, despite recent advances on consensus perception [16–18], social normativity [14,19], and second-order beliefs in the climate domain [12,13]. More specifically, it is important to understand whether expectations of collective climate action depend only on individuals' attribution of the origin of climate change or whether, alternatively, they are also associated with the relative positioning of that belief within the respective national context. The contribution of this research is to decompose belief in the anthropogenic origin of climate change into two analytically distinct components: a country-level component, represented by the national mean, and an individual within-country component, represented by each respondent's deviation from that mean. This decomposition makes it possible to assess how national belief contexts and individuals' relative positioning within those contexts are associated with expectations of collective climate action. The deviation score is an observed measure of relative contextual positioning and does not directly capture perceived consensus or second-order beliefs. In this way, the article incorporates not only individual factors into the analytical equation, but also relational and contextual dimensions, allowing for a more detailed examination of expectations regarding the plausibility of collective climate action.

The research question guiding this study can be formulated as follows: to what extent are expectations of collective climate action associated with the country-level average belief in the anthropogenic origin of climate change and with individuals' relative positioning within the respective national context? To operationalize the research, the study draws on Round 10 of the European Social Survey [20], particularly its climate change module, which enables a comparative European perspective on the relationship between climate beliefs [6], national contexts, and expectations of collective climate action. Complex Samples General Linear Models (CSGLM) are used, distinguishing the country-level average belief in the anthropogenic origin of climate change from individuals' deviation from that average. This strategy makes it possible to assess how the country-level average belief and individuals' relative positioning within the respective national context are associated with expectations of collective climate action.

However, the relationship between individual relative positioning and the national belief context is embedded in a multidimensional structure and may vary according to ideological positioning, as well as motivational and epistemic dimensions. Recent empirical evidence [7,21,22] suggests that ideological positioning may interfere with the relevance attributed to climate change and, consequently, with public intervention and the very legitimacy of collective action. At the same time, recent evidence [10,23] indicates that trust in scientists may operate as a resource of epistemic validation, reducing dependence on dominant beliefs in the surrounding social context and reinforcing the credibility of the climate diagnosis. Finally, the level of climate worry may be associated with how the distance between the individual position and the national context is interpreted, intensifying the perception that collective mobilization is insufficient when individual belief is situated above the national average pattern [11]. Accordingly, this study tests whether the association between individual deviation from the country-level average belief and expectations of collective climate action varies according to these three dimensions.

This article aims to contribute to the literature on climate public opinion and collective action by proposing that expectations of collective climate action are associated not only with belief in the anthropogenic origin of climate change, but also with the national context

in which that belief is interpreted. By distinguishing between the country-level average belief and individuals' relative positioning within that national context, the research seeks to show that the transition from recognition of the climate problem to expectations of collective climate action is associated with the social conditions in which that belief is embedded. The article is structured as follows: the theoretical framework discusses collective climate action, second-order beliefs, perceived consensus, and relative positioning within the national context; the methods and analytical strategy are then presented; the results follow; the main contributions, limitations, and theoretical implications are then discussed; finally, the conclusions summarize the main findings.

2. Theoretical Framework

2.1. Climate Change and Collective Action as a Coordination Problem

Addressing climate change is far from being an individual or geographically bounded problem; rather, it should be understood first and foremost as a collective problem requiring collective responses capable of producing effective solutions. This is because adaptation and mitigation measures generate collectively shared benefits, including for those who do not directly contribute to their production, thereby embodying what is often described as a public good [1,24]. Moreover, climate change is a multiscalar process involving not only individual actors, but also institutional actors that extend far beyond political and geographical boundaries. Any strategy aimed at achieving substantive climate goals must therefore, to a large extent, involve the action of as many actors as possible [2,25,26].

Accordingly, it is important to consider that the effectiveness of individual action depends, to a significant degree, on the actions of others, and that the costs of action tend to be immediate, geographically anchored and/or individually experienced, in contrast to benefits that emerge only in the medium and long term and often in diffuse ways, even though they collectively benefit communities [1,27]. This interdependence generates cooperation dilemmas and may foster free riding, that is, the possibility of benefiting from the actions or resources of others without contributing proportionally to their production [1,24]. Collective action to address climate change therefore entails much more than individual recognition of the problem; it depends, above all, on the conditions of coordination and on expectations regarding the behavior of fellow citizens [4,26,28].

However, even when there is individual recognition of the problem of climate change, this is not sufficient to trigger collective action. More than that, it is important to consider that individuals tend to adopt behaviors when they anticipate that others will also do so, that is, when they perceive that their adherence to the cause will be reciprocated [4,26,28]. It is within this framework that a socially grounded expectation of collective action is constituted [25]. Consequently, collective action aimed at addressing climate change becomes socially plausible [4,5]. Ultimately, it becomes crucial to understand how individuals interpret the surrounding social context and, through that interpretation, the possibility of coordinated action in response to the climate problem [5].

2.2. Second-Order Beliefs, Perceived Consensus, and Relative Contextual Positioning

Expectations of collective action do not depend solely on individual beliefs, particularly in relation to highly politicized issues such as climate change. In this process, individuals' assessments of the plausibility of collective mobilization are based on signals that other members of their community recognize the same problem and are willing to cooperate [4,5]. In this context, second-order beliefs—understood as what individuals think others believe—are particularly relevant to collective action [12]. In relation to climate change, these psychosocial processes may influence whether collective mobilisation is perceived as socially supported and politically feasible.

Perceived consensus emerges when individuals assess their own beliefs in relation to those they understand to prevail within their community [12,18]. Consequently, the fact that a particular position is perceived as the dominant one in the national context allows it to gain greater legitimacy among the population and be viewed as more plausible [13]. Conversely, when a position is perceived as a minority view, it is also considered less likely to be shared by fellow citizens [29]. Concerning the specific topic of climate change, the literature suggests that the perception of social consensus may diverge from the actual distribution, leading to a distorted perception of the population's actual support, a pattern consistent with pluralistic ignorance [12,13,30,31].

Nevertheless, subjective perceptions of consensus and the observed distribution of beliefs constitute related but empirically distinct dimensions [12,13,32,33]. As an indicator of the belief context, this study uses the country-level mean of belief in the anthropogenic origin of climate change, within which each participant is situated. Thus, we consider each participant's deviation from their respective country's mean as an indicator of their relative position within the broader national context of belief [34]. Consequently, this indicator is conceived as a measure of contextual positioning, rather than as a direct measure of either perceived consensus or second-order beliefs.

In conceptual terms, conditional cooperation is understood as the willingness to participate in a collective action if one's fellow citizens are also willing to cooperate [31,35,36]. National contexts with higher average levels of belief in the anthropogenic origin of climate change may therefore provide more favorable contextual signals for expectations of reciprocity and coordinated climate action [36,37]. Conversely, a positive individual deviation from the respective national average implies that the participant holds a belief that is higher than the national average. The absence of this correspondence may imply a lower assessment of the plausibility of collective climate action [35–37].

2.3. Belief in the Human Origin of Climate Change and Expectations of Collective Climate Action

The sociopolitical debate on climate change revolves, to a large extent, around the acceptance or rejection of its anthropogenic origin [7,9,34]. The belief in anthropogenic origin is based on the understanding that climate change results primarily from human action, and not solely from natural processes. By identifying human activity as the cause of the problem, this belief also introduces a dimension of social and political responsibility [8,23]. In this sense, if human action is recognized as the cause of the problem, human and collective intervention can also be conceived as part of the solution.

Attributing climate change to human activity frames the problem as one requiring debate, political deliberation, policy intervention, and, consequently, collective mobilization. Policy measures may be aimed at either adaptation or mitigation, as well as regulatory mechanisms and behavioral changes. Consequently, attributing climate change to human activity serves as an initial impetus for building collective responsibility and, ultimately, for coordinated action. In contrast, attributing climate change to natural causes can hinder the recognition of human responsibility and foster attitudes of inevitability or fatalism [37,38].

Even so, the anthropogenic attribution of climate change is not the sole determinant of whether collective mobilization becomes plausible. This role depends in part on the level of belief in human-caused climate change within the respective national context. Thus, shared recognition, reciprocity, and the possibility of coordination are also partially influenced by the average levels of belief in human-caused climate change in each national context [4,5,12–14,19]. Consequently, it is expected that high national average levels of anthropogenic belief regarding climate change will be associated with higher expectations of collective climate action.

H1. *Higher country-level average belief in the anthropogenic origin of climate change is associated with higher expectations of collective climate action.*

In addition to the national average level of belief in the anthropogenic origin of climate change, it is important to consider each individual's relative position within their respective national context. A positive deviation occurs when an individual's belief in the anthropogenic origin of climate change exceeds the average observed in their country. A positive deviation may thus represent a situation in which the intensity of an individual's belief is not matched by a national pattern of equal intensity. In light of the logic of reciprocity and conditional cooperation, this lack of correspondence suggests a negative association between positive individual deviation and expectations of collective climate action [12,13,35–37]. Thus, the second hypothesis is formulated:

H2. *The greater the positive individual deviation from the country-level average belief in the anthropogenic origin of climate change, the lower the expectation of collective climate action.*

2.4. Factors Conditioning the Association Between Relative Positioning and Expectations of Collective Climate Action

The literature has shown that higher levels of climate worry are associated with greater perceived severity and urgency regarding climate change [11]. In turn, higher levels of climate worry may be associated with greater importance being attached to a national context conducive to mobilization [5,13]. This may mean that the lack of alignment between intense individual beliefs and a national context of similar intensity takes on greater significance. Consequently, it is expected that the negative association between positive individual deviation and expectations of collective action will be more pronounced among participants with higher levels of climate worry.

H3. *The negative association between positive individual deviation from the country-level average belief in the anthropogenic origin of climate change and expectations of collective climate action will be stronger among individuals with higher levels of climate worry.*

Trust in scientists is understood as an expression of recognition of epistemic authority, providing individuals not only with an interpretive reference but also with a basis for validating their beliefs about climate change. Generally speaking, the literature has shown that high levels of trust in scientists are associated with greater acceptance of scientific knowledge regarding the origin and severity of climate change [10,23,39,40]. Thus, when an individual's belief is underpinned by trust in scientific authorities, the lack of alignment with the national belief context may assume less interpretive significance. Consequently, the negative association between positive individual deviation and expectations of collective action is expected to be weaker among individuals with high levels of trust in scientists.

H4. *The negative association between positive individual deviation from the country-level average belief in the anthropogenic origin of climate change and expectations of collective climate action will be weaker among individuals with higher levels of trust in scientists.*

On a topic as heavily politicized as climate change, each individual's ideological orientation plays a significant role in how both the nature and severity of the phenomenon are interpreted. The literature has consistently linked ideological stance to how individuals process scientific knowledge, as well as to how they assess the severity of climate change and recognize the plausibility of collective action [7,9,21,41]. Consequently, the significance of each individual's relative position within the national belief context may vary according

to the ideological framework through which climate change is interpreted. Thus, it is to be expected that the anticipated negative association with positive individual deviation will not manifest uniformly among individuals with diverse ideological positions.

H5. *The negative association between positive individual deviation from the country-level average belief in the anthropogenic origin of climate change and expectations of collective climate action will vary according to individuals' ideological positioning.*

From an analytical perspective, the analysis is based on two dimensions: on the one hand, the national average intensity of belief in the anthropogenic origin of climate change; on the other hand, the individual deviation from the respective national average. In practical terms, it is expected that national contexts with high average levels of belief in anthropogenic causes will be associated with high expectations of collective action, whereas positive individual deviations will be associated with lower expectations of collective action. At the same time, the association between individual deviation and expectations of collective action is expected to be moderated by climate worry, trust in scientists, and ideological positioning. In this way, it is possible to test whether expectations of collective action are associated with individuals' relative position within their respective national context, considering the conditions under which this association becomes pronounced. These hypothesized relationships are summarized in Figure 1.

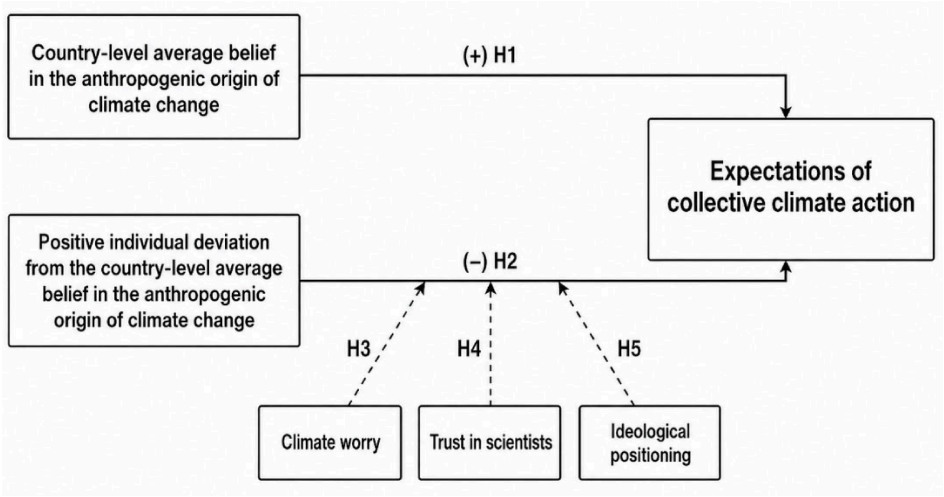


Figure 1. Conceptual model and hypothesized relationships. *Note:* The model distinguishes between a contextual component, represented by the country-level average belief in the anthropogenic origin of climate change, and an individual component, represented by positive individual deviation from that country-level average. A positive association is expected between the country-level average belief and expectations of collective climate action (H1), whereas a negative association is expected between positive individual deviation and expectations of collective climate action (H2). Climate worry (H3), trust in scientists (H4), and ideological positioning (H5) are hypothesized to moderate the latter association.

3. Materials and Methods

The empirical evidence for this study was drawn from Round 10 of the European Social Survey (ESS), a cross-national survey coordinated by the European Social Survey European Research Infrastructure Consortium (ESS ERIC), based on standardized criteria for sampling, translation, data collection, and data processing. Fieldwork was conducted between 2020 and 2022, targeting individuals aged 15 or older who were residents in private households, regardless of nationality or language. The ESS requires the use of

probability sampling in all participating countries. Of the 31 countries participating in Round 10, 29 form the empirical basis for this study.

3.1. Data, Analytic Sample, and Study Design

The analytical sample consists of 24,014 participants from the 29 countries included in the study. To ensure a common analytical basis across the different analytical sequences, only participants with valid information on all variables included in the larger model were considered. The use of the same analytical sample (Models 1–3) ensured that the differences observed in the processes of generating empirical evidence did not result from changes in the sample composition. It was also assumed that the unit of analysis consists of each participant, who, in turn, is considered within their respective country.

In light of the constraints imposed by the COVID-19 pandemic, data collection procedures were adapted to each specific national situation. Despite differences in national sampling frames and sampling designs and the specific methods used to select participants across countries, all countries participating in the ESS share the common requirement of using probability sampling methods. Consequently, 22 countries implemented the standard strategy of in-person interviews; the remaining nine opted for self-administered surveys. Although these national variations existed, the ESS methodological quality protocol was implemented in all countries.

Using the CSPLAN procedure, the sampling plan was defined incorporating the following design elements: "anweight" as the analytical weight, "stratum" as the stratification variable, and "psu" as the primary sampling unit. The plan was estimated using a with-replacement (WR) estimator. This option allowed for the incorporation of the weighting, stratification, and clustering of the original sampling plan into the parameter estimates. Thus, it was possible to subsequently apply the same sampling plan to all specifications of Models 1–3. All procedures were performed using the "Complex Samples" module in IBM SPSS Statistics 29.

It is important to emphasize that selecting CSGLM does not correspond to estimating a multilevel model with random effects at the country level. The aim was to ensure the production of estimates adjusted for the complex design, incorporating both the individual and contextual components. On the one hand, the contextual component is operationalized through the national mean of belief in the anthropogenic origin of climate change; on the other hand, the individual component is measured by each participant's deviation from the respective national mean. Finally, the use of the CSGLM was intended to ensure that the parameter estimates and statistical uncertainty accounted for the stratification, weighting, and clustering inherent in the ESS's complex sampling design.

3.2. Measures

The variables included in the analysis have different measurement scales, which required harmonization. Whenever necessary, the indicators used were recoded from their original scales into a common 0–10 scale in order to standardize constructs measured on different scales and to strengthen the interpretive coherence of the empirical evidence produced. These scale transformations followed the criteria of substantive ordering and proportional distances between the original scales (see Table 1).

Table 1. Summary of measures, coding procedures, and analytical scales.

Variable	Original Scale	Recoding/Harmonization	Final Scale
Panel A—Main dependent variable			
Expected collective climate action	0–10/1–4/0–6	Harmonized by admrclc; the 1–4 and 0–6 versions were linearly rescaled to 0–10	0–10
Panel B—Core predictor and contextual decomposition			
Human-causation belief	1–5	Single-item variable linearly rescaled to 0–10	0–10
Country-level average belief in the anthropogenic origin of climate change	Country mean of a 0–10 variable	Derived indicator; country-level mean of cause_human_010	0–10
Individual deviation from country-level average belief	Derived score	Derived indicator; individual score minus country mean: cause_human_010 − cause_human_010_ctrymean	Continuous, centered around 0
Panel C—Motivational, institutional, ideological, and sociodemographic variables			
Climate worry	1–5	Single-item variable linearly rescaled to 0–10	0–10
Personal responsibility	0–10	No recoding beyond missing-data handling	0–10
Trust in scientists	0–10	No recoding beyond missing-data handling	0–10
Trust in politicians	0–10	No recoding beyond missing-data handling	0–10
Left–right ideology	0–10	No recoding beyond missing-data handling	0–10
Gender	Binary	Recoded to 0 = man; 1 = woman	0–1
Age	Years	No recoding beyond missing-data handling	Continuous
Years of education	Years	No recoding beyond missing-data handling	Continuous
Panel D—Centered variables and interaction terms (Model 3)			
Centered climate worry	0–10 before centering	Derived indicator; grand-mean centering	Continuous, centered at 0
Centered trust in scientists	0–10 before centering	Derived indicator; grand-mean centering	Continuous, centered at 0
Centered ideology	0–10 before centering	Derived indicator; grand-mean centering	Continuous, centered at 0
Individual deviation × climate worry	Product term	Derived indicator; multiplication of cause_gap by c_risk	Continuous
Individual deviation × trust in scientists	Product term	Derived indicator; multiplication of cause_gap by c_trstsci	Continuous
Individual deviation × ideology	Product term	Derived indicator; multiplication of cause_gap by c_lr	Continuous

The main dependent variable in this study is the expectation of collective climate action; to this end, we sought to assess the likelihood that many people around the world would reduce their energy consumption in order to try to reduce climate change. The ESS conducted an automated CAPI randomization procedure, in which participants were divided into three groups of similar size and presented with the same substantive item but with different response formats, using the following scales: 0–10, 1–4, and 0–6, respectively. To obtain a comparative analytical metric, the 1–4 and 0–6 response scales were linearly transformed, bringing the entire sample onto a 0–10 scale. Thus, on the harmonized 0–10 scale, higher values indicate a greater likelihood that many people will effectively reduce their energy consumption to lower climate change, while lower values indicate a lower likelihood of a reduction in energy consumption.

In order to measure the attribution of the causes of climate change, belief in the anthropogenic origin of climate change was considered. This indicator consisted of a single item that asked participants whether they believed climate change is caused by human action, natural factors, or a combination of both. The item was measured on a five-point ordinal scale: 1—exclusively by natural factors, 2—mainly by natural factors, 3—both by natural factors and human action, 4—mainly by human action, and 5—exclusively by human action. The responses were recoded to a 0–10 scale to ensure a metric similar to that of the other indicators in the model. In its recoded version, higher values on the 0–10 scale correspond to the attribution of human action to climate change, in contrast to lower values, which indicate attribution to natural processes.

The individual component was operationalized by measuring individual deviation, which consisted of the participant's relative position within their respective national belief context. The contextual component, in turn, was operationalized by calculating the respective national average level of belief in the anthropogenic origin of climate change. Individual deviation was calculated by subtracting the respective national average from each participant's individual score. Specifically, a value of zero corresponds to the national average, with positive values indicating a level of belief in anthropogenic causes that is higher than the respective national average and negative values indicating levels of belief that are lower than the average. Finally, each participant's difference from the national average represents their observed relative position within the respective national context and should not be interpreted as a direct measure of perceived consensus or second-order beliefs.

The model also includes a motivational dimension that was operationalized, on the one hand, by the degree of perceived personal responsibility for attempting to reduce climate change, which was measured by a single item on a 0–10 scale, allowing us to capture the extent to which each participant considers themselves individually responsible for trying to reduce climate change. On the other hand, it was operationalized by the level of climate worry, which was measured by a single item on an ordinal scale ranging from 1 (not at all worried) to 5 (extremely worried), and was linearly recoded to a 0–10 scale while maintaining the original substantive ordering. In both cases, in the final variables, higher values indicate, respectively, greater personal responsibility for attempting to reduce climate change and greater climate worry.

In addition to motivational indicators, the analytical model includes indicators of ideological orientation, political-institutional trust, and epistemic authority. Epistemic authority was operationalized using an item measuring trust in scientists, on a scale from 0 to 10, where higher values correspond to higher levels of trust. Trust in politicians was measured using a single item on a scale from 0 to 10, with higher values indicating higher levels of trust. Participants were asked to position themselves on a left–right scale from 0 to 10, where lower values correspond to positions on the left and higher values

to positions on the right. The inclusion of these indicators made it possible to estimate potential associations with expectations of collective climate action.

Finally, sociodemographic variables were included to account for sociodemographic differences that might be associated with the dependent variable. Thus, the models included gender, age, and years of schooling as covariates. Gender was coded binarily (0 = male; 1 = female), while age, expressed in years, and education, measured by the number of years of education completed, were treated as continuous variables. To facilitate the interpretation of lower-order coefficients in models with interactions, climate worry, trust in scientists, and ideological positioning were grand-mean centered before constructing the respective interaction terms. Subsequently, three interaction terms were constructed between the individual deviation from the national mean of anthropogenic belief and each of the moderator variables: climate worry, trust in scientists, and ideological positioning. The inclusion of these interaction terms made it possible to test whether the association between participants' relative positioning within their respective national contexts and expectations of collective climate action varies as a function of levels of climate worry, trust in scientists, and ideological positioning, as predicted in H3–H5.

3.3. Analytical Strategy

The analytical strategy was based on the Complex Samples General Linear Models procedure (CSGLM), which made it possible to account for the complex sampling design of the ESS and to produce design-adjusted estimates. Three sequential model specifications were estimated using CSGLM. In all models, unstandardized coefficients and their respective standard errors are reported, with statistical significance determined using Wald tests. In addition to interpreting the coefficients, the R^2 values of each of the three models were considered, together with the respective increments in explained variance (ΔR^2), in order to quantify the additional variance explained by each set of variables.

Model 1 (M1) was designed to assess the contextual and sociodemographic components. More specifically, gender, age, and education were included. The contextual component was represented by the country-level average belief in the anthropogenic origin of climate change, while the individual component was represented by each participant's deviation from the respective country-level average belief. This distinction made it possible to estimate, on the one hand, the association with the country-level component and, on the other, the association between each participant's relative position within their respective national context and expectations of collective climate action.

In a second step, Model 2 (M2) added motivational, epistemic, ideological, and political-institutional variables to the analytical model, namely climate worry, perceived personal responsibility, trust in scientists, trust in politicians, and ideological positioning. This approach made it possible to assess how the associations identified in M1 changed when framed by attitudinal, institutional, and sociopolitical dimensions.

Model 3 (M3) introduced interaction terms between individual deviation from the country-level average belief and three moderating variables: climate worry, trust in scientists, and ideological positioning. These variables were previously grand-mean centered to facilitate the interpretation of lower-order coefficients in models containing interaction terms. This specification made it possible to assess whether the association between individual deviation from the country-level average belief and expectations of collective climate action varies according to levels of climate worry, trust in scientists, and ideological positioning. The statistically significant conditional associations estimated in the final model were graphically represented to facilitate their interpretation.

In order to verify the robustness of the M3 results—and given that expectations of collective climate action were measured using three randomized response formats: 1–4, 0–6, and 0–10—with the 1–4 and 0–6 formats linearly harmonized to 0–10—M3 was re-estimated separately within each response-format group. This robustness test retained the same predictors, control variables, and interaction terms, using the same weights and the same complex sampling design.

4. Results

Empirical evidence was produced in three complementary stages. The analysis begins by presenting descriptive results and identifying bivariate associations. It then estimates the associations of the country-level average belief in the anthropogenic origin of climate change and of individuals' positioning in relation to the respective country-level average. The models also include motivational, epistemic, political-institutional, and ideological indicators in order to assess the robustness of these associations. Finally, interaction terms are estimated to assess whether the association between individual deviation from the country-level average belief and expectations of collective climate action varies according to levels of climate worry, trust in scientists, and ideological positioning.

4.1. Participants, Descriptive Statistics, and Associations

The analysis included a total sample of 24,014 valid participants from the 29 countries included in the study. Of these participants, 52.2% are women, with a mean age of approximately 51 years (SD = 18.04). The average level of education is approximately 14 years.

Considering the results presented in the following table (see Table 2), statistically significant associations are generally observed, particularly regarding expectations of collective climate action, as well as country-level average belief in the anthropogenic origin of climate change, climate worry, personal responsibility, trust in scientists, trust in politicians, and ideological positioning. The dispersion observed in the central variables confirms that there is sufficient variability in the dispositions analyzed, justifying the estimation of multivariate models capable of distinguishing individual, contextual, and relational associations.

Table 2. Descriptive statistics and correlations of the analytical variables.

	Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1	Gender	0.52	0.50	—	—	—	—	—	—	—	—	—	—
2	Age	51.02	18.04	0.035 ***	—	—	—	—	—	—	—	—	—
3	Years of education	13.55	4.14	−0.002	−0.221 ***	—	—	—	—	—	—	—	—
4	Country-level average belief in the anthropogenic origin of climate change	6.36	0.20	0.002	0.024 **	−0.083 ***	—	—	—	—	—	—	—
5	Individual deviation from country-level average belief	0.07	1.98	−0.014	−0.110 ***	0.119 ***	0.006	—	—	—	—	—	—
6	Climate worry	5.80	2.28	0.113 ***	−0.020 *	0.151 ***	0.001	0.361 ***	—	—	—	—	—
7	Left–right ideology	5.07	2.24	−0.065 ***	0.097 ***	−0.113 ***	−0.009	−0.138 ***	−0.168 ***	—	—	—	—
8	Personal responsibility	6.54	2.34	0.082 ***	−0.023 **	0.181 ***	−0.005	0.243 ***	0.479 ***	−0.098 ***	—	—	—
9	Trust in scientists	7.28	2.01	−0.041 ***	−0.067 ***	0.156 ***	0.055 ***	0.143 ***	0.170 ***	−0.046 ***	0.205 ***	—	—
10	Trust in politicians	3.75	2.38	−0.011	−0.010	0.094 ***	0.075 ***	0.009	0.030 ***	0.097 ***	0.144 ***	0.310 ***	—
11	Expected collective climate action	4.39	2.35	0.027 ***	0.081 ***	−0.074 ***	0.094 ***	−0.013	0.082 ***	0.042 ***	0.165 ***	0.056 ***	0.159 ***

Source: Authors' own calculations based on ESS Round 10. **Note:** Pearson correlations weighted by *anweight*; unweighted N = 24,014 valid cases. Descriptive statistics are reported on the analytical scales used in the models. In Model 3, climate worry, trust in scientists, and left–right ideology were grand-mean centered and used to construct interaction terms with individual deviation from the country-level average belief. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

4.2. Sequential CSGLMs

The associations between the different predictors and expectations of collective climate action were estimated through three sequential models (M1–M3), as shown in Table 3. The three models were estimated using complex sample procedures, incorporating strata, primary sampling units, and analytical weights, in accordance with the ESS sampling design. The table and models should be read cumulatively: M1 includes sociodemographic variables, country-level average belief in the anthropogenic origin of climate change, and individual deviation from the respective country-level average belief; M2 adds climate worry, personal responsibility, trust in scientists, trust in politicians, and ideological positioning; finally, M3 estimates the interaction terms between individual deviation from the country-level average belief and climate worry, trust in scientists, and ideological positioning.

Table 3. Predictors and moderators of expected collective climate action: Models 1–3.

Predictors	Model 1	Model 2	Model 3
Gender	0.113 (0.061)	0.046 (0.061)	0.030 (0.061)
Age	0.008 *** (0.002)	0.007 *** (0.002)	0.007 *** (0.002)
Years of education	−0.030 *** (0.007)	−0.053 *** (0.007)	−0.049 *** (0.007)
Country-level average belief in the anthropogenic origin of climate change	1.023 *** (0.125)	0.884 *** (0.118)	0.884 *** (0.117)
Individual deviation from country-level average belief	0.000 (0.017)	−0.053 ** (0.017)	−0.062 *** (0.017)
Climate worry	—	0.038 * (0.015)	0.038 * (0.015)
Left–right ideology	—	0.031 * (0.015)	0.027 (0.015)
Personal responsibility	—	0.160 *** (0.015)	0.156 *** (0.014)
Trust in scientists	—	−0.003 (0.017)	−0.004 (0.017)
Trust in politicians	—	0.135 *** (0.013)	0.133 *** (0.013)
Individual deviation × climate worry	—	—	−0.024 *** (0.006)
Individual deviation × trust in scientists	—	—	0.000 (0.007)
Individual deviation × left–right ideology	—	—	0.023 *** (0.007)
N	24,014	24,014	24,014
R^2	0.018	0.072	0.077
ΔR^2	—	0.054	0.005

Source: Authors' own calculations based on ESS Round 10. **Note:** Models were estimated using Complex Samples General Linear Models (CSGLM), incorporating strata, primary sampling units, and analytical weights, in accordance with the ESS sampling design. Unstandardized coefficients are reported, with standard errors in parentheses. Gender is coded as 0 = man and 1 = woman. In Model 3, climate worry, trust in scientists, and left–right ideology were grand-mean centered before estimating interaction terms with individual deviation from the country-level average belief. The three models are estimated on the same analytical sample, defined by valid responses on all variables included in Model 3. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

To ensure comparability across the three models, they were estimated using the same sample (N = 24,014), defined on the basis of valid responses for all variables included in the full model. An increase in explained variance is observed from M1 to M2 (R^2 = 0.018 to R^2 = 0.072; ΔR^2 = 0.054). The interpretation of the results focuses on the country-level and individual components, as well as on the conditions under which the association between individual deviation and expectations of collective climate action varies.

M1 makes it possible to distinguish the country-level and individual components of expectations of collective climate action, distinguishing the country-level average belief

in the anthropogenic origin of climate change from the individual position in relation to the respective country-level average. The explained variance in expectations of collective climate action is modest ($R^2 = 0.018$), corresponding to 1.8%. The country-level average belief in the anthropogenic origin of climate change is statistically significantly associated in M1 with expectations of collective climate action ($p < 0.001$). More specifically, a one-point increase in the country-level average belief in the anthropogenic origin of climate change is associated with an increase of approximately 1.02 points in expectations of collective climate action, holding sociodemographic variables constant.

By contrast, individual deviation from the country-level average belief is not statistically significant ($p = 0.978$). This result suggests that individual deviation is not statistically significantly associated with expectations of collective climate action in M1. Among the sociodemographic variables, age shows a statistically significant and positive association ($p < 0.001$), indicating that older participants tend to report higher expectations of collective climate action. Education, in turn, shows a negative association ($p < 0.001$), meaning that higher levels of education are associated with lower expectations of collective climate action, controlling for the remaining variables in the model. In summary, M1 suggests that expectations of collective climate action are positively associated with the country-level average belief in the anthropogenic origin of climate change, whereas individual deviation from the respective country-level average does not show a statistically significant association in M1.

M2 adds a set of factors that enable a motivational, epistemic, political-institutional, and ideological reading of expectations of collective climate action. This model includes climate worry, personal responsibility, trust in scientists, trust in politicians, and ideological positioning. In this second model, an increase in explained variance is observed ($\Delta R^2 = 0.054$), bringing the total to $R^2 = 0.072$, suggesting that these additional individual-level dimensions contribute to the model's explanatory capacity.

More specifically, the country-level average belief in the anthropogenic origin of climate change remains positively and significantly associated with expectations of collective climate action ($p < 0.001$). The persistence of this association, although with reduced magnitude, indicates that national contexts of belief remain relevant to expectations of collective action. Crucially, individual deviation from the country-level average belief becomes negative and statistically significant ($p = 0.002$), suggesting that being above the national average in belief in the anthropogenic origin of climate change is associated with lower expectations of collective climate action. Among the strongest associations, personal responsibility ($p < 0.001$) and trust in politicians ($p < 0.001$) stand out, indicating that expectations of collective climate action are associated with both personal responsibility and trust in politicians. To a lesser extent, climate worry ($p = 0.013$) and ideological positioning ($p = 0.042$) also contribute to the model's explanatory capacity. Trust in scientists, by contrast, is not statistically significantly associated with expectations of collective climate action ($p = 0.853$). The sociodemographic trends observed in M1 are reproduced in M2.

Taken together, the evidence produced in M2 shows that expectations of collective climate action are positively associated with the country-level average belief in the anthropogenic origin of climate change, personal responsibility, and trust in politicians, while individual deviation from the country-level average belief shows a smaller negative association. In other words, holding a belief above the national average does not necessarily translate into higher expectations of collective climate action.

Finally, M3 introduces the interaction terms between individual deviation from the country-level average belief and the three moderating variables. The three moderators—climate worry, trust in scientists, and ideological positioning—were grand-mean centered and used to construct interaction terms with individual deviation from the country-level

average belief, while retaining the remaining variables included in M2, namely personal responsibility and trust in politicians, in order to facilitate the interpretation of the lower-order coefficients. M3 presents $R^2 = 0.077$, with an increase in $\Delta R^2 = 0.005$ compared with M2, making it possible to assess whether the association between individual deviation from the country-level average belief and expectations of collective climate action varies according to the three moderating variables.

Overall, the main effects observed in M2 remain stable in M3. The interaction between individual deviation from the country-level average belief and climate worry is negative ($p < 0.001$) (see Table 3). Substantively, this means that among individuals with higher levels of climate worry, being above the country-level average belief is associated with even lower expectations of collective climate action. The negative association between individual deviation and expectations of collective climate action is therefore stronger at higher levels of climate worry.

The interaction between the individual deviation from the country-level average belief and ideology is positive and significant ($p < 0.001$), suggesting that this negative association tends to be mitigated as ideological positioning moves from left to right. Thus, individual deviation from the country-level average belief shows a weaker negative association among individuals positioned further to the right. Ideology emerges, therefore, as a factor according to which the association between individual deviation and expectations of collective climate action varies. By contrast, the interaction with trust in scientists is not statistically significant ($p = 0.968$). In short, M3 shows that the negative association between individual deviation from the country-level average belief and expectations of collective climate action is conditional, becoming stronger at higher levels of climate worry and weaker among more right-wing ideological positions. The statistically significant conditional associations are illustrated in Figure 2.

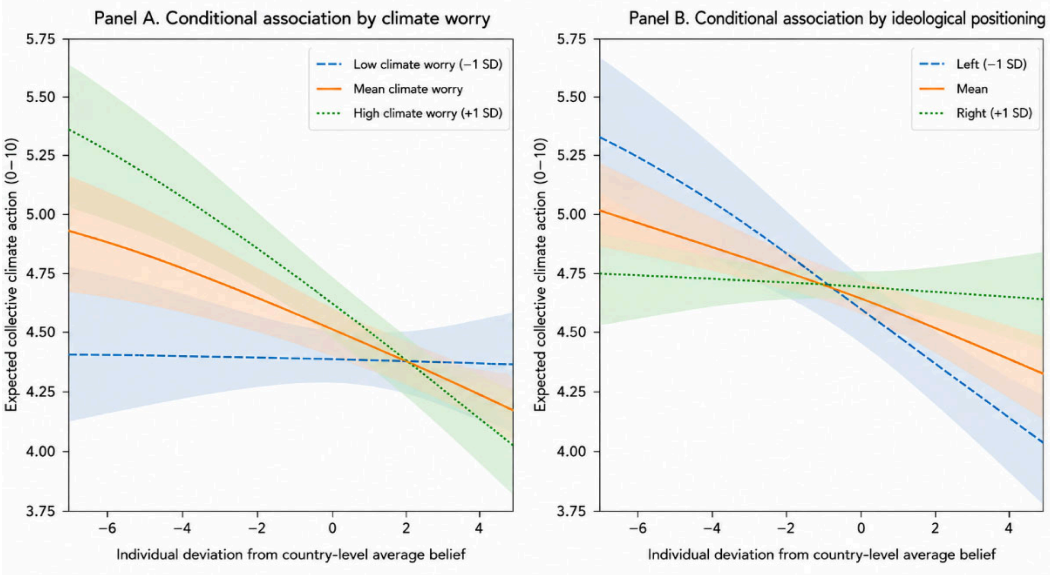


Figure 2. Conditional associations between individual deviation from the country-level average belief and expected collective climate action. **Source:** Authors' own calculations based on ESS Round 10. **Note:** Predicted values are based on Model 3 estimated with Complex Samples General Linear Models. Low, mean, and high levels of climate worry and left–right ideology correspond to −1 standard deviation, the mean, and +1 standard deviation, respectively. Shaded areas represent 95% confidence intervals. All remaining covariates are held at their sample means, and gender is fixed at the reference category. Individual deviation is defined as the difference between each participant's belief in the anthropogenic origin of climate change and the corresponding country-level average belief.

Panel A shows that the negative association between individual deviation and expectations of collective climate action is stronger at higher levels of climate worry; that is, the slope is steeper when climate worry is high. In Panel B, ideological positioning moderates this association: the negative slope of individual deviation tends to weaken at higher levels of ideological positioning, that is, among those positioned further to the right.

In summary, the results provide empirical support for H1, H2, H3, and H5. Higher country-level average belief in the anthropogenic origin of climate change is associated with higher expectations of collective climate action (H1). Individual deviation from the respective country-level average is negatively associated with expectations of collective climate action in Models 2 and 3, providing support for H2. This negative association becomes stronger at higher levels of climate worry (H3) and varies according to ideological positioning (H5). H4 is not supported, since the interaction between individual deviation and trust in scientists is not statistically significant.

4.3. Robustness Check Across Randomized Response Formats

To test the robustness of the results, the randomized administration of three response formats for the dependent variable was used: 1–4, 0–6, and 0–10. The 1–4 and 0–6 formats were linearly converted to the common 0–10 scale. M3 was re-estimated in each randomized group. To ensure comparability, all other predictors, control variables, and interaction terms were held constant, as were the weighting and treatment of the complex sampling design (Table 4).

Table 4. Robustness check for Model 3 across randomized response formats of the dependent variable.

Predictor	Full Sample (M3)	0–10 Format	1–4 Format	0–6 Format
Country-level average belief	0.884 *** (0.117)	1.028 *** (0.146)	0.770 *** (0.171)	0.824 *** (0.177)
Individual deviation	−0.062 *** (0.017)	−0.017 (0.025)	−0.097 ** (0.031)	−0.070 * (0.028)
Individual deviation × climate worry	−0.024 *** (0.006)	−0.030 *** (0.008)	−0.014 (0.012)	−0.025 * (0.011)
Individual deviation × trust in scientists	0.000 (0.007)	−0.011 (0.010)	−0.003 (0.014)	0.014 (0.012)
Individual deviation × left–right ideology	0.023 *** (0.007)	0.024 * (0.010)	0.028 * (0.013)	0.019 (0.013)
N	24,014	8002	8098	7914
R^2	0.077	0.131	0.050	0.076

Source: Authors' own calculations based on ESS Round 10. **Note:** Entries are unstandardized coefficients, with standard errors in parentheses. The response-format columns refer to the original randomized ESS response formats. The 1–4 and 0–6 formats were linearly rescaled to 0–10, whereas the original 0–10 format required no rescaling. All models retain the Model 3 specification, including sociodemographic controls, personal responsibility, trust in scientists, trust in politicians, and left–right ideology, and incorporate strata, primary sampling units, and analytical weights in accordance with the ESS complex sampling design. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Across the three response formats, the country-level average belief in the anthropogenic origin of climate change remained positively and significantly associated with expectations of collective climate action. The association between individual deviation and expectations of collective climate action remained negative across all response formats, but was statistically significant only for the 1–4 and 0–6 groups. Importantly, the positive country-level association and the negative direction of individual deviation were also

observed in the original 0–10 group, for which no transformation of the dependent variable was required.

Considering the interaction between individual deviation and climate worry across the three response formats, it was found that the interaction term maintained a negative direction and was significant in the 0–10 and 0–6 formats. Regarding the interaction with ideological positioning, it was positive in all three formats and significant in both the 0–10 and 1–4 formats. Consistent with the previously observed trend, the interaction with trust in scientists remained nonsignificant across all three response formats. In summary, the trends observed in the initially estimated model were broadly consistent across the different response formats.

5. Discussion

Expectations of collective climate action cannot be understood merely as a direct consequence of belief in the anthropogenic origin of climate change. Rather, they should be understood as a socially mediated assessment of the possibility of coordination among actors within a given community or country [2,4,5]. The empirical evidence produced in this study indicates the relevance of national contexts of belief: higher country-level average belief in the anthropogenic origin of climate change is associated with higher expectations of collective climate action.

According to the results, the positive and statistically significant association of the country-level average belief in the anthropogenic origin of climate change suggests that expectations of collective climate action are associated with the national contexts within which climate policy debates unfold. More concretely, in national contexts where the average belief in the anthropogenic origin of climate change is higher, expectations of collective climate action also tend to be higher. This finding is consistent with literature [4,5,19] suggesting that individuals may orient their expectations of action partly on the basis of what they infer about dominant beliefs and behaviours among their fellow citizens, which may contribute to perceptions of the social and political legitimacy of collective action [42]. Although these perceptions are not directly measured in the present study, this literature provides a plausible theoretical framework for interpreting the observed country-level association. In this sense, the study seeks to move the debate on collective climate action away from a focus centred exclusively on individual factors and towards greater consideration of the political and social circumstances and specificities of national contexts.

Individual deviation from the country-level average belief helps account for why individuals with more intense anthropogenic beliefs may simultaneously express lower expectations of collective climate action. In other words, when individuals are positioned relatively above the country-level average belief, expectations of collective climate action tend to be lower. Ultimately, when an individual expresses a stronger belief in the anthropogenic origin of climate change compared with the respective country-level average, this positive deviation is associated with lower expectations of collective climate action. This pattern is compatible with theoretical interpretations based on perceived consensus, reciprocity, and conditional cooperation [4,12,13], although the present study does not directly measure these underlying perceptions.

The association between climate worry and expectations of collective climate action is positive, although modest. Climate worry therefore not only has a positive association with expectations of collective climate action; it is also associated with how the relationship between individual deviation from the country-level average belief and expectations of collective climate action varies. According to the literature on climate risk and concern, higher levels of worry tend to foster pro-climate attitudes and dispositions [11,35]. In other words, when climate worry is combined with a position above the country-level average belief, the

negative association between individual deviation and expectations of collective climate action becomes stronger. Individuals with higher levels of concern may be more sensitive to the distance between the gravity they attribute to climate change and the national pattern of belief in which they are embedded. Therefore, the greater the climate worry and the greater the positive individual deviation from the country-level average belief, the lower expectations tend to be regarding coordinated collective climate action. Climate worry thus assumes an ambivalent role: it may reinforce the political and collective relevance of climate change, but it may also intensify a pessimistic reading of the viability of collective action, a pattern that may be compatible with lower expectations of social reciprocity.

In line with climate worry, political ideology also moderates the association between individual deviation from the country-level average belief and expectations of collective climate action. More specifically, the results show that the negative association between individual deviation and expectations of collective climate action is attenuated as ideological positioning moves towards the right. This does not mean that individuals positioned further to the right have higher expectations of collective climate action, but rather that the individual deviation from the country-level average belief is differently associated with expectations depending on each individual's ideological positioning [15]. Given the strong politicization of climate change, ideology may function as a filter through which individuals interpret the issue, the legitimacy of public intervention, and the plausibility of collective mobilization [7,9,21]. We therefore observe a dual tendency: among individuals positioned further to the left, positive individual deviation is associated with a stronger reduction in expectations of collective climate action; among individuals positioned further to the right, the same positive individual deviation appears to have a less detrimental association with expectations of collective action.

Although the literature associates trust in scientists and science with acceptance of the anthropogenic origin of climate change [10,23,39,40], the results obtained indicate that trust in scientists is not significantly associated with expectations of collective climate action, nor does it significantly moderate the negative association between individual deviation from the country-level average belief and those expectations. This finding can be interpreted in light of the Gateway Belief Model, which emphasizes perceived scientific consensus as a pathway through which scientific agreement may be associated with climate beliefs, concern, and support for action [18,23]. Importantly, the present study measures trust in scientists rather than perceived scientific consensus, and therefore the absence of a significant moderation effect does not necessarily contradict this theoretical framework. In other words, trust in scientists may reinforce the credibility of the climate diagnosis without necessarily being associated with expectations regarding coordinated collective action, thereby reinforcing the distinction between epistemic authority and sociopolitical action. By contrast, the positive associations of personal responsibility and trust in politicians indicate that expectations of collective action are also related to individual responsibility and trust in the political-institutional environment within which collective mobilization may occur. Expectations of collective climate action therefore appear to be associated not only with epistemic dimensions, but also with confidence in the social and institutional capacity for coordinated action.

In a context marked by strong politicization and polarization around climate change, the results of this study have implications for understanding collective climate action. This implies the need to develop communication and public intervention strategies aimed at constructing a shared sociopolitical horizon centred on consensus, reciprocity, and the efficacy of collective action, rather than focusing only on the gravity of climate change or exclusively on the authority of scientific knowledge. In this sense, communication and public intervention strategies centred solely on the severity of climate change or on the

authority of scientific knowledge may prove insufficient if they are not accompanied by the public construction of signals of consensus, reciprocity, and collective efficacy. This interpretation is consistent with literature suggesting that expectations concerning collective action may be related to what individuals believe about the positions and willingness to cooperate of their fellow citizens [5,12–14], although such second-order beliefs are not directly measured in the present study.

Despite the valuable contributions of this research to the study of collective climate action, some limitations should be acknowledged. The first concerns the cross-sectional nature of the study, which does not allow causal relationships to be established between climate beliefs, national contexts, individual deviation from the country-level average belief, and expectations of collective climate action. A second limitation is that the study measures expectations rather than actual and observable behaviours of mobilization and participation around climate and environmental causes. A third limitation concerns the nature of the individual deviation measure, which, by relying on observed relative positioning within the national context of beliefs, does not directly measure participants' subjective perceptions of what their fellow citizens think or are willing to do in support of climate action. Finally, a fourth limitation concerns the proportion of variance explained by the estimated models. Despite the increase in explained variance from $R^2 = 0.018$ in M1 to $R^2 = 0.077$ in M3, with the incorporation of the motivational, epistemic, politico-institutional, and ideological positioning dimensions, a still considerable proportion of the variance in expectations of collective climate action remains unexplained. Nevertheless, associations were identified that should be interpreted as contributions to our understanding of expectations regarding collective climate action.

Future approaches to this issue should therefore consider the articulation between institutional trust, media exposure, perceived consensus, and collective efficacy through methodological designs that include longitudinal and experimental perspectives, making it possible to test more precisely mechanisms that remain outside the scope of the present approach. It should be clarified that this study did not aim to systematically estimate or compare specific patterns for individual countries. In this regard, future research should take into account the magnitude and direction of the identified associations across different countries. The possible existence of differences between countries should also serve as a basis for analysis across various regions of Europe, considering certain national idiosyncrasies, specifically institutional, political, and media dimensions.

6. Conclusions

By distinguishing between the national average level of belief in the anthropogenic origin of climate change and individual deviation from that average, this study sought to capture two distinct dimensions of the relationship between climate beliefs and expectations of collective action. At the contextual level, a higher national average level of belief in the anthropogenic origin of climate change is associated with higher expectations of collective climate action. At the individual level, however, a positive deviation from the national average is associated with lower expectations of collective climate action when the other dimensions included in the models are taken into account. The coexistence of these two associations thus suggests that understanding expectations of collective climate action requires distinguishing between the national context of belief and the relative positioning of individuals within that same context.

Climate worry introduces an additional dimension to this relationship, as the negative association between positive individual deviation and expectations of collective action is stronger at higher levels of climate worry. Ideological positioning is also a relevant factor, as the negative association between individual deviation and expectations of collective

action is attenuated among more right-leaning individuals. Unlike climate worry and ideological positioning, trust in scientists did not moderate the association between individual deviation and expectations of collective action as expected. Taken together, the results reinforce the need to distinguish between the credibility attributed to scientific knowledge and the motivational and ideological conditions associated with how individuals assess the possibility of coordinated collective action.

Overall, the results support the argument that climate action requires a socially contextualized approach, one that includes individual beliefs in the anthropogenic origin of climate change, but also the relational, normative, and institutional circumstances that make coordinated collective climate action plausible within public opinion.

Author Contributions: Conceptualization, J.C.d.S.; methodology, J.C.d.S.; formal analysis, J.C.d.S.; investigation, J.C.d.S.; data curation, J.C.d.S.; writing—original draft preparation, J.C.d.S.; writing—review and editing, J.C.d.S. and L.S.; supervision, L.S. All authors have read and agreed to the published version of the manuscript.

Funding: This work was carried out within the scope of the Agenda "Descentralizar Portugal com Blockchain"—Blockchain.PT, funded by the European Union through NextGenerationEU, under the Portuguese Recovery and Resilience Plan (PRR), project code C05-i11/2024.PC644918095-00000033.

Institutional Review Board Statement: Ethical review and approval were waived for this study because it uses anonymized secondary data from the European Social Survey.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the original European Social Survey.

Data Availability Statement: The data used in this study are publicly available from the European Social Survey Data Portal, Round 10: European Social Survey Round 10 Data (2020), DOI: 10.21338/NSD-ESS10-2020.

Acknowledgments: During the preparation of this manuscript, the authors used ChatGPT (OpenAI; GPT-5 series, accessed in 2025 and 2026) for language editing, formatting support, and manuscript-structuring assistance. The authors reviewed and edited all outputs and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. Olson, M. *The Logic of Collective Action: Public Goods and the Theory of Groups*; Harvard University Press: Cambridge, MA, USA, 1965.
2. Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action*; Cambridge University Press: Cambridge, UK, 1990.
3. IPCC. *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*; Core Writing Team, Lee, H., Romero, J., Eds.; IPCC: Geneva, Switzerland, 2023; pp. 35–115. [CrossRef]
4. Bicchieri, C. *The Grammar of Society: The Nature and Dynamics of Social Norms*; Cambridge University Press: Cambridge, UK, 2006.
5. Tankard, M.E.; Paluck, E.L. Norm perception as a vehicle for social change. *Soc. Issues Policy Rev.* **2016**, *10*, 181–211. [CrossRef]
6. Krkoška Lorencová, E.; Loučková, B.; Vačkářů, D. Perception of Climate Change Risk and Adaptation in the Czech Republic. *Climate* **2019**, *7*, 61. [CrossRef]
7. McCright, A.M.; Dunlap, R.E. The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *Sociol. Q.* **2011**, *52*, 155–194. [CrossRef]
8. Lee, T.M.; Markowitz, E.M.; Howe, P.D.; Ko, C.-Y.; Leiserowitz, A.A. Predictors of public climate change awareness and risk perception around the world. *Nat. Clim. Change* **2015**, *5*, 1014–1020. [CrossRef]
9. Hornsey, M.J.; Harris, E.A.; Bain, P.G.; Fielding, K.S. Meta-analyses of the determinants and outcomes of belief in climate change. *Nat. Clim. Change* **2016**, *6*, 622–626. [CrossRef]

10. Cologna, V.; Siegrist, M. The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis. *J. Environ. Psychol.* **2020**, *69*, 101428. [CrossRef]
11. Brosch, T. Affect and emotions as drivers of climate change perception and action: A review. *Curr. Opin. Behav. Sci.* **2021**, *42*, 15–21. [CrossRef]
12. Mildenberger, M.; Tingley, D. Beliefs about climate beliefs: The importance of second-order opinions for climate politics. *Br. J. Political Sci.* **2019**, *49*, 1279–1307. [CrossRef]
13. Sparkman, G.; Geiger, N.; Weber, E.U. Americans experience a false social reality by underestimating popular climate policy support by nearly half. *Nat. Commun.* **2022**, *13*, 4779. [CrossRef] [PubMed]
14. Schneider, C.R.; van der Linden, S. Social norms as a powerful lever for motivating pro-climate actions. *One Earth* **2023**, *6*, 346–351. [CrossRef]
15. Shin, Y.A.; Constantino, S.M.; Gross, L.J.; Kinzig, A.; Lacasse, K.; Beckage, B. Culture Mediates Climate Opinion Change: A System Dynamics Model of Risk Perception, Polarization, and Policy Effectiveness. *Climate* **2025**, *13*, 194. [CrossRef]
16. Ding, D.; Maibach, E.W.; Zhao, X.; Roser-Renouf, C.; Leiserowitz, A. Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nat. Clim. Change* **2011**, *1*, 462–466. [CrossRef]
17. Lewandowsky, S.; Gignac, G.E.; Vaughan, S. The pivotal role of perceived scientific consensus in acceptance of science. *Nat. Clim. Change* **2013**, *3*, 399–404. [CrossRef]
18. van der Linden, S.L.; Leiserowitz, A.A.; Feinberg, G.D.; Maibach, E.W. The scientific consensus on climate change as a gateway belief: Experimental evidence. *PLoS ONE* **2015**, *10*, e0118489. [CrossRef] [PubMed]
19. Nolan, J.M. Social norm interventions as a tool for pro-climate change. *Curr. Opin. Psychol.* **2021**, *42*, 120–125. [CrossRef] [PubMed]
20. European Social Survey European Research Infrastructure (ESS ERIC). *ESS Round 10—2020: Democracy, Digital Social Contacts*; Sikt—Norwegian Agency for Shared Services in Education and Research: Bergen, Norway, 2023. [CrossRef]
21. Egan, P.J.; Mullin, M. Climate change: US public opinion. *Annu. Rev. Political Sci.* **2017**, *20*, 209–227. [CrossRef]
22. Wang, J.; Kim, S. Analysis of the Impact of Values and Perception on Climate Change Skepticism and Its Implication for Public Policy. *Climate* **2018**, *6*, 99. [CrossRef]
23. van der Linden, S. The Gateway Belief Model (GBM): A review and research agenda for communicating the scientific consensus on climate change. *Curr. Opin. Psychol.* **2021**, *42*, 7–12. [CrossRef] [PubMed]
24. Hardin, R. *Collective Action*; Johns Hopkins University Press: Baltimore, MD, USA, 1982.
25. Marwell, G.; Oliver, P. *The Critical Mass in Collective Action: A Micro-Social Theory*; Cambridge University Press: Cambridge, UK, 1993.
26. Coleman, J.S. *Foundations of Social Theory*; Belknap Press of Harvard University Press: Cambridge, MA, USA, 1990.
27. Ostrom, E. Polycentric systems for coping with collective action and global environmental change. *Glob. Environ. Change* **2010**, *20*, 550–557. [CrossRef]
28. Chong, D. *Collective Action and the Civil Rights Movement*; University of Chicago Press: Chicago, IL, USA, 1991.
29. Noelle-Neumann, E. The spiral of silence: A theory of public opinion. *J. Commun.* **1974**, *24*, 43–51. [CrossRef]
30. Geiger, N.; Swim, J.K. Climate of silence: Pluralistic ignorance as a barrier to climate change discussion. *J. Environ. Psychol.* **2016**, *47*, 79–90. [CrossRef]
31. Andre, P.; Boneva, T.; Chopra, F.; Falk, A. Globally representative evidence on the actual and perceived support for climate action. *Nat. Clim. Change* **2024**, *14*, 253–259. [CrossRef]
32. Goerg, S.J.; Pondorfer, A.; Stöhr, V. Regional variation in social norm nudges. *Sci. Rep.* **2024**, *14*, 16773. [CrossRef] [PubMed]
33. Sousa, J.C. Anatomia de uma catástrofe mediática: Pedrogão Grande e a política da invisibilidade. *Estud. Comun.* **2024**, *39*, 44–59. [CrossRef]
34. Sousa, J.C. Climate Leviathan. A Political Theory of Our Planetary Future. *Estud. Ibero-Am.* **2023**, *49*, e40980. [CrossRef]
35. Leiserowitz, A. Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values. *Clim. Change* **2006**, *77*, 45–72. [CrossRef]
36. Bamberg, S.; Rees, J.; Seebauer, S. Collective climate action: Determinants of participation intention in community-based pro-environmental initiatives. *J. Environ. Psychol.* **2015**, *43*, 155–165. [CrossRef]
37. Mead, E.; Roser-Renouf, C.; Rimal, R.N.; Flora, J.A.; Maibach, E.W.; Leiserowitz, A. Information seeking about global climate change among adolescents: The role of risk perceptions, efficacy beliefs, and parental influences. *Atl. J. Commun.* **2012**, *20*, 31–52. [CrossRef] [PubMed]
38. Mayer, A.; Smith, E.K. Unstoppable climate change? The influence of fatalistic beliefs about climate change on behavioural change and willingness to pay cross-nationally. *Clim. Policy* **2019**, *19*, 511–523. [CrossRef]
39. Hmielowski, J.D.; Feldman, L.; Myers, T.A.; Leiserowitz, A.; Maibach, E. An attack on science? Media use, trust in scientists, and perceptions of global warming. *Public Underst. Sci.* **2014**, *23*, 866–883. [CrossRef] [PubMed]

40. Bogert, J.M.; Buczny, J.; Harvey, J.A.; Ellers, J. The effect of trust in science and media use on public belief in anthropogenic climate change: A meta-analysis. *Environ. Commun.* **2024**, *18*, 484–509. [CrossRef]
41. Kahan, D.M. Climate-science communication and the measurement problem. *Political Psychol.* **2015**, *36*, 1–43. [CrossRef]
42. Dayton, L.; Parker, K.; Ross, J.; Tharmarajah, S.; Latkin, C. "Taking Action in Community Is Much, Much Preferable to Doing It Alone": An Examination of Multi-Level Facilitators of and Barriers to Sustained Collective Climate Change Activism Among US Residents. *Climate* **2024**, *12*, 222. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.