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Gaps in public trust between scientists and climate scientists: a 68 country study

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Abstract

This study compares public trust in climate scientists and scientists in general across 68 countries ($N = 69{,}534$). On average, participants reported moderately high levels of trust in climate scientists, with trust levels being slightly lower than trust in scientists in general. Overall, this trust gap was larger among participants who identified as politically conservative or right-leaning, but there was considerable variation across countries.

Trust in scientists forms an important basis for public support for science-based solutions to major societal challenges. Higher trust is associated with greater willingness to defer decision-making to experts [1] and to follow public health recommendations [2]. In the case of climate scientists, trust is associated with belief in and concern about climate change [3] and greater support for climate policies [4, 5]. Low trust in climate scientists may hinder effective climate science communication and reduce public engagement with climate solutions, particularly when lagging behind trust in scientists in general.

However, climate change countermovements have actively sought to undermine trust in climate scientists and their findings [6]. This may have contributed to lower trust in climate scientists compared to scientists from other fields, particularly among political conservatives [7, 8]. While some studies find climate scientists are generally perceived as trustworthy [9, 10], and as trustworthy as other scientists in five out of six European countries studied [11], other research reports climate scientists are less trusted than other scientists in several countries. For example, in the United States [12] and Norway [13], climate scientists are trusted less than scientists in general, with conservative political orientation predicting larger differences in trust between climate scientists and scientists in general. Moreover, in the United States, federal agencies that focus on general science are trusted more strongly than climate-focused agencies, with conservative political orientation being a significant predictor of larger differences in trust [14]. These

findings are consistent with the link between conservatism and distrust of climate science [15, 16], climate scientists [8, 17], and scientists in general [18]. However, while this trust gap has been documented in the United States and a few European countries, there remains a lack of cross-cultural research investigating whether this trust gap is cross-culturally robust and, if so, what demographic, psychological, and country-level variables are most predictive of this gap.

Hence, we analysed data from the Trust in Science and Science-Related Populism (TISP) Many labs study [19, 20], which provides the largest snapshot to date of public trust in scientists. Participants ($N = 69{,}534$) from 68 countries indicated their trust in scientists in their country and trust in scientists working on climate change in their country. Trust in scientists was indexed using a 12-item questionnaire assessing perceptions of scientists' expertise, integrity, benevolence, and openness, which theoretically contribute to trustworthiness perceptions [21], whereas participants rated the extent they trust climate scientists with a single item (see the supplementary materials for details). In each case, higher scores along 5-point scales reflected greater trust.

Figure 1(A) shows that trust in climate scientists was moderately strong, as it was above the midpoint of the 1–5 scale ($M_{\text{weighted}} = 3.50$, $SD = 1.18$). However, it was slightly, but significantly lower than trust in scientists in general ($M_{\text{weighted}} = 3.62$, $SD = .70$), t (69,463) $= 19.68$, $p < .001$, $d = .12$. There was a notable variation between countries. Out of 68 countries, 43 showed lower trust in climate scientists compared to scientists in general, 19 showed no significant difference in trust ratings, and six showed higher trust. Figure 1(B) displays the variation in trust ratings across the world. While participants in some countries in South Asia, Central Europe, and North Africa rated trust in climate scientists higher than trust in scientists, the majority of participants—particularly those in Europe, North and Latin America, and Africa—trusted scientists more than climate scientists. Those countries that show the two strongest differences are instructive: in China, remarkably high trust in climate scientists compared to scientists in general conforms with high public support for national climate policies [22] and the perceived role of climate scientists in advancing those policies. In Democratic Republic of the Congo, unusually low trust in climate scientists compared to scientists in general could result from concerns that international climate initiatives, often promoted by climate scientists, may prioritize global renewable energy demands over local interests, leading to resource exploitation without equitable benefits for local communities [23].

What factors predict trust in scientists and trust in climate scientists? To address this question, we conducted multilevel regression analyses. As these analyses were not preregistered, we closely followed previous approaches [19], incorporating the same predictors with the addition of country-level emissions and corruption indices (see supplementary materials for details). As figure 2 shows, age, right-leaning and conservative political orientation, social dominance orientation, as well as science-related populist attitudes predicted lower trust in climate scientists when controlling for other variables. Each of these variables predicted a stronger negative relationship with trust in climate scientists than with trust in scientists in general. By contrast, living in an urban area, religiosity, and positive attitudes towards science predicted higher trust in climate scientists, with science-related attitudes being the strongest positive predictor of trust in climate scientists. Being male was associated with lower trust in scientists but was not significantly associated with trust in climate scientists. Across genders, trust in scientists was higher than trust in climate scientists ($M_{\text{weighted}} = 3.63$ vs. 3.50 for women; $M_{\text{weighted}} = 3.61$ vs. 3.51 for men). At the country level, only the Gini index significantly predicted trust in scientists in general, whereas no country-level variables were significant predictors of trust in climate scientists. To ensure that these findings are not driven by a few extreme cases, we reran our models after excluding the top three countries with the highest and lowest trust gaps. The findings remained largely unchanged, indicating that the observed patterns are not driven by these outliers (see supplementary materials for details).

To further investigate the relationship between political orientation and trust in scientists and climate scientists, we conducted a series of multilevel regression analyses (see supplementary materials for analyses on other predictors). First, we examined left-right and liberal-conservative political ideologies as predictors in separate models. Figure 3 indicates that political ideology is a stronger positive predictor of trust in climate scientists than in scientists in some countries, while it predicts lower trust in other countries. These observed patterns were supported by further multilevel linear models. We fitted models which combined trust measures as a single outcome, with trust target (scientists vs. climate scientists) entered as a categorical within-subjects predictor and including an interaction between trust target and political orientation. The trust target variable significantly interacted with right-leaning ideology both overall ($B = -.035$, $p = .028$) and in 44 countries. Similarly, conservatism interacted with trust target both overall ($B = -.041$, $p = .004$) and in 40 countries. In most countries, right-leaning ideology and conservatism were stronger negative predictors of trust in climate scientists than trust in scientists ($N = 28$ and 29 countries, respectively). Conversely, in a subset of countries, right-leaning and conservative political orientations were stronger positive predictors of trust in climate scientists than in scientists ($N = 16$ and 11 countries, respectively). Finally, multilevel models using

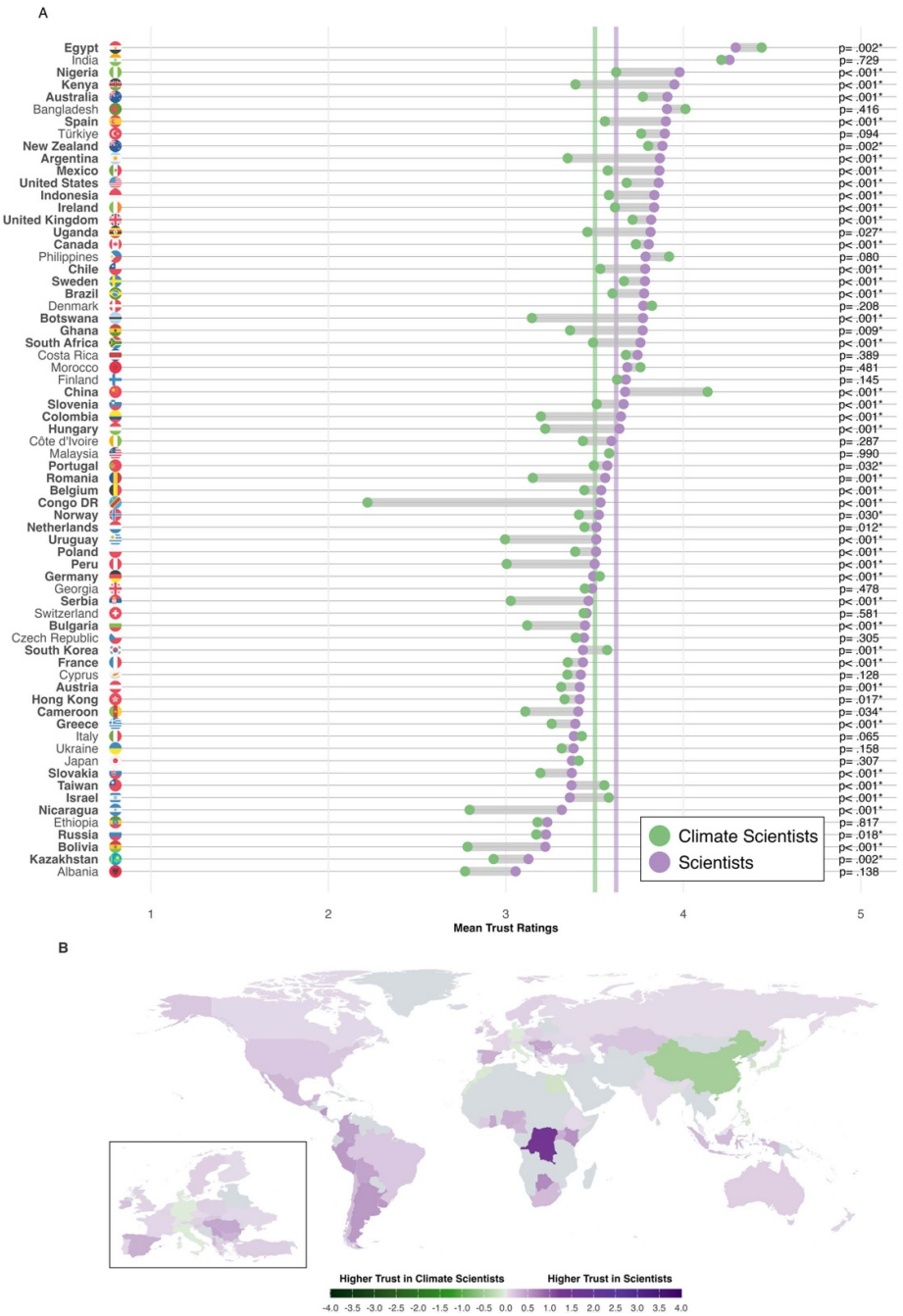

Figure 1. Trust in climate scientists versus scientists in general across 68 countries. Panel (A) shows the mean trust in climate scientists (green) and scientists in general (purple) across countries. The vertical lines show the overall mean trust in climate scientists (green), and scientists (purple). Weighted *t*-tests were conducted for each country, and countries with significant differences ($p < .05$) are shown in bold and with an asterisk. Panel (B) presents a global map depicting the difference in trust between climate scientists and scientists in general. The scores were calculated by subtracting trust in climate scientists from trust in scientists. Positive scores (purple) indicate greater trust in scientists, while negative scores (green) reflect higher trust in climate scientists. Countries without data are shaded in light grey. A zoomed-in map of Europe is shown to the left for clarity. Panel (B) illustrates the direction and size of trust differences, with significance testing shown in Panel (A).

the trust difference score (i.e. the trust gap between scientists and climate scientists)—calculated by subtracting each individual's trust ratings for climate scientists from their trust ratings for scientists—showed that right-leaning ($B = .046$, $p = .005$) and conservative ($B = .044$, $p = .002$) political orientations predicted a larger trust gap. This indicates that higher levels of right-leaning ideology and conservatism were associated with a larger trust gap in favour of scientists over climate scientists.

There are several potential explanations for these findings. In some countries such as the United States, Canada, the United Kingdom, and Australia, certain political leaders have contributed to fostering distrust in climate scientists [16]. These efforts, combined with misinformation campaigns from vested

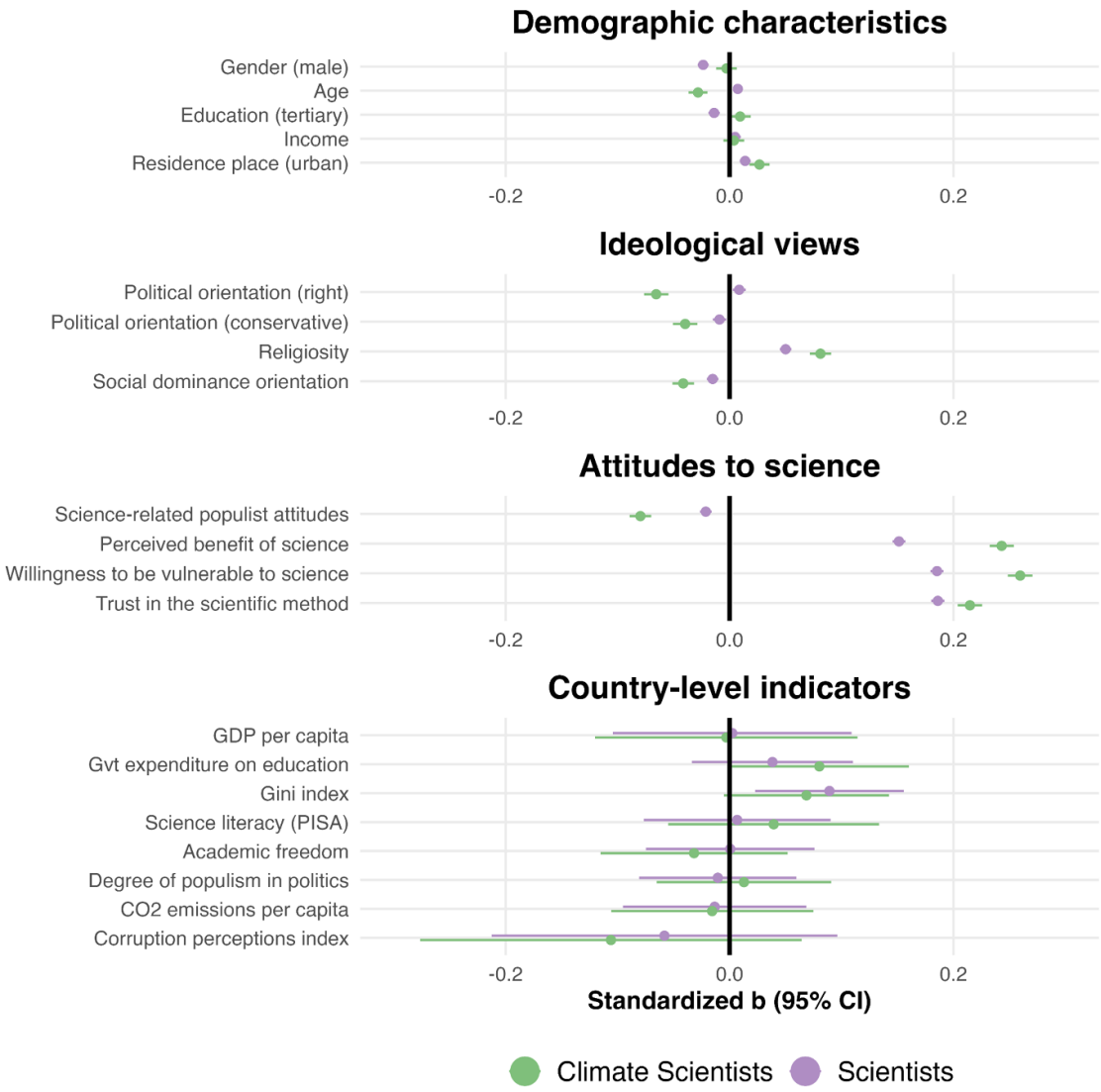

Figure 2. Predictors of trust in scientists and climate scientists. The estimates are derived from multilevel models with a by-country random intercept with all predictors entered simultaneously. Country-level variables were scaled by the overall sample means, while other variables were scaled individually for each country using that country's mean. Due to certain variables not being measured in all countries, these analyses are based on 51 countries (trust in scientists $N = 41{,}629$; trust in climate scientists $N = 41{,}623$). Error bars indicate 95% CI.

interests in the fossil fuel industries, aim to question the reality of human-caused climate change and the scientific consensus around this issue [24–26] potentially contributing to lower trust in climate scientists. Furthermore, given the policy implications and political relevance of climate science, it is perhaps expected that trust levels in certain countries align with political orientation [13]. Previous research has identified that conservatism is associated with greater trust in scientists in disciplines that foster economic production (e.g. materials and agricultural science) and lower trust in scientists in disciplines that study the impact of economic production on the environment (e.g. climatology and oceanography) [27]. Additionally, trust in scientists appears to be associated with public perception of scientists' political leanings. In countries such as the United States, climate scientists are often perceived as more politically liberal (i.e. left-leaning) than scientists in other fields [28]. Since trust is often based on perceived value similarity, left-leaning individuals may be more inclined to trust climate scientists if they perceive their values as aligned, whereas right-leaning individuals may exhibit greater scepticism if they perceive climate scientists as advocating for values that are in tension with their own [29].

One limitation of our research is the difference in how trust is measured: trust in scientists was averaged across ratings on four dimensions, while we used a simplified single-item measure for trust in climate scientists. Although we may assume that a single-item measure approximates trust as informed by these four dimensions [10], our data cannot verify this assumption. A comparison between trust in climate scientists and each individual item of the trust in scientists scale (see supplementary materials) showed

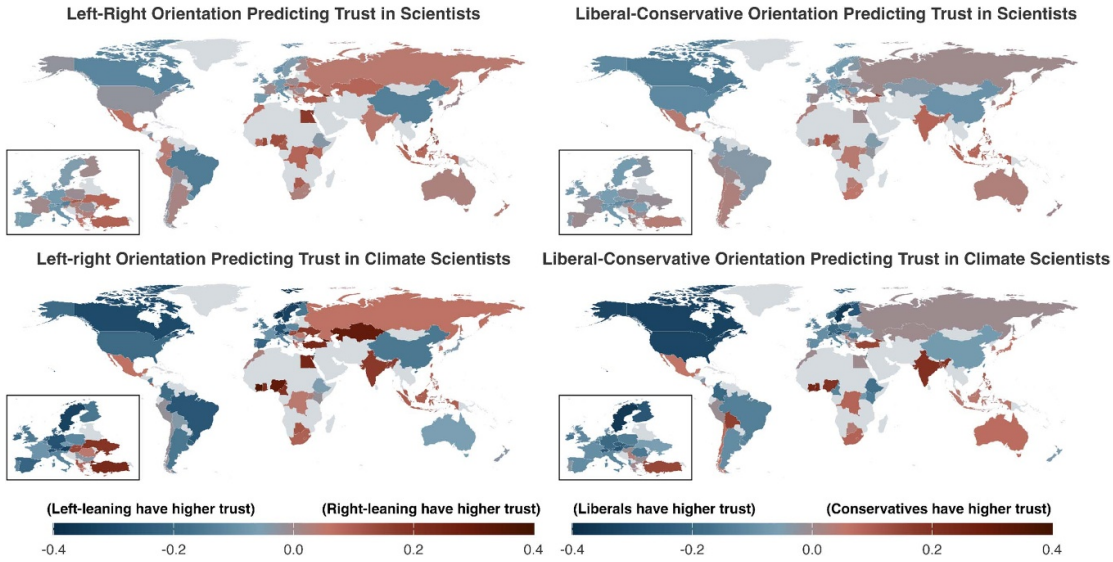

Figure 3. The relationship between right-leaning (1: left-leaning—5: right-leaning) and conservative (1: liberal—5: conservative) political orientation and trust in scientists and climate scientists (1: very low—5: very high) across countries. These estimates come from four weighted multilevel linear regression models with one political orientation variable as a predictor and random slopes predicting trust. The predicted coefficients (global fixed effect plus random slopes) for each country are shown here, while the random effects across countries are presented in the supplementary materials. Countries with a positive association between right-leaning or conservative ideologies and trust scores are coloured red, while those with negative associations are coloured blue. Countries without data are shaded light grey.

that participants rated their trust in climate scientists significantly lower than their perceptions of scientists' expertise, intelligence, qualifications, honesty, ethics, sincerity, concern for others' well-being, and eagerness to improve lives. Conversely, participants rated their trust in climate scientists significantly higher than their perceptions of scientists' openness to feedback, consideration of others' interests, willingness to be transparent, and attentiveness to different perspectives. In contrast to prior findings, which highlighted scientists' morality as a stronger predictor of trust than competence [10], our study found the largest trust gap in the competence dimension. Therefore, caution is necessary when directly comparing levels of trust due to the differing measurement methods and the greater potential for measurement error with a single-item approach.

In conclusion, while trust in climate scientists is moderately high, it tends to be slightly lower than trust in scientists overall. Such lower trust may reflect the successful efforts of the conservative countermovement to sow doubt about the integrity of climate scientists and their conclusions [6], and consistent with this idea, there was relatively greater consensus across the political spectrum in terms of the trustworthiness of scientists as compared to the trustworthiness of climate scientists. As trust in scientists is important for accepting recommendations grounded in scientists' findings [2], this trust gap may help explain why there has been insufficient action on climate change. In order to close this trust gap, future studies could test interventions to increase trust in climate scientists to levels comparable with other scientists especially in those countries with the largest trust gaps. While promoting trust in climate scientists is valuable, uncritical trust is not necessarily beneficial [30]. Increasing trust alone does not suffice to address climate change or other societal challenges. Trust is shaped by broader political, media, and institutional contexts [31], and increasing trust should go hand in hand with transparency in the scientific process, policy making, and communication of uncertainty, as well as public engagement rather than blind acceptance.

Data availability statement

The data that support the findings of this study are openly available at the following URL/DOI: https://osf.io/bkvpa/.

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Conflict of interest

Authors declare no conflicts of interest.

Ethics statement

This study uses data from the TISP project, which received ethical approval from Harvard University (protocol #IRB22-1046) and was exempt from full IRB review. All participants provided informed consent, and ethical approvals or exemptions were obtained by TISP collaborators at their respective institutions, adhering to local regulations.

CRediT statement

Conceptualisation, Investigation, Writing—Review & editing: All. Methodology, Supervision: VC, NGM. Data curation: NGM, VC, OG. Formal analysis: OG, NS, JK, NGM. Visualisation: OG, NS. Validation: MA. Project administration: OG, VC, NGM. Writing—Original draft: OG, SKS, VC.

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