Supplementary information C of the publication Public opinion about solar radiation management: A cross-cultural study in 20 countries around the world

Additional information on the data analysis approach

Content of Supplementary information C:

Supplementary note C1: ANCOVAS to examine the public opinion about SRM within countries and across country clusters

To examine the public opinion about SRM within and across all countries, we ran for both the student and the general public sample eight ANCOVAs, one on belief in global warming, one on each of the six perceptions about SRM we investigated, and one on acceptability of SRM. A key interest was whether the mean values of belief in global warming, perceptions about SRM and acceptability of SRM differed across countries. For this purpose, we assessed differences between countries through pairwise comparisons using Bonferroni corrected p-levels of $p \leq .00278$ for the student samples (18 comparisons) and of $p \leq .0045$ for the general public samples (eleven comparisons). Further, we assessed for each country whether its mean values were significantly different from the average across all countries (i.e. the grand means) by comparing the respective Bonferroni corrected confidence intervals (CIs). These were 99.737% for the student samples (19 comparisons) and 99.583% for the general public samples (12 comparisons).

To investigate potential differences in belief in global warming, perceptions about SRM, and acceptability of SRM between country clusters, namely the Global South, the 'non-WEIRD' Global North, and the 'WEIRD' Global North, we ran for each of these three samples eight additional ANCOVAs, separately for students and the general public. We compared for belief in global warming, each perception about SRM and acceptability of SRM the Bonferroni corrected 99.667% CIs (three comparisons) of the grand means of each sample with the other two samples.

In all the above analyses, time of data collection (spring versus autumn) was included as a covariate for both the student and general public samples and education level for the general public sample, first, because the subsamples differed on these variables, and second, because both factors were substantially related with some of the variables we studied (i.e. medium to large effects; Cohen, 1992). While the remaining demographics (i.e. age, gender, and students' field of study) also differed between subsamples, they were not substantially related with any of the variables we studied (i.e. mostly small effects; Cohen, 1992) and were thus not controlled for.

To investigate potential differences in belief in global warming, perceptions about SRM, and acceptability of SRM between students and the general public, we ran for both the student and the general public sample eight additional ANCOVAs using only the data of the eleven countries for which data from both samples were available (see Fig. 1 and Table 1). We compared for belief in global warming, each perception about SRM and for acceptability of SRM the 95% CIs of the grand mean of the student sample with that of the general public sample. Per country, we compared for belief in global warming, each perception and for acceptability the Bonferroni corrected 99.545% CIs (eleven tests) of the mean of the student sample with that of the general public sample. For both samples, time of data collection was included as a covariate. In this case, we did not control for level of education in the general public sample so as to apply exactly the same analysis for the two samples.

Supplementary note C2: Simple and multiple regression analyses and GEEs to investigate associations between belief in global warming and perceptions about SRM with acceptability

Next, we investigated for belief in global warming and each perception about SRM whether it was significantly associated with acceptability of SRM. For this purpose, we ran per country and separately for students and the general public seven simple regression analyses. For both full samples, we ran seven Generalised Estimating Equations (GEEs; Zeger & Liang, 1986) that accounted for the clustered structure of the data within the 19 and 12 countries, respectively.

Finally, we tested to what extent belief in global warming and the six perceptions about SRM *uniquely* explained acceptability of SRM, that is, when controlling for all other explanatory factors. Per country and separately for students and the general public, we ran a multiple regression analysis. For both full samples, we ran a GEE that accounted again for the clustered structure of the data.

A key interest regarding the simple and multiple regression analyses, respectively, and the corresponding GEEs was (a) whether the associations between belief in global warming and each perception about SRM with acceptability and (b) whether the explanatory factors of acceptability differed across countries. Therefore, we assessed for each country (and separately for students and the general public) whether the regression coefficients of the specific country sample were significantly different from the regression coefficients of the respective full sample (student or general public sample) by comparing the respective Bonferroni corrected CIs. These were again 99.737% for the student samples and 99.583% for the general public samples.

To investigate for potential differences between country clusters in (a) associations between belief in global warming and each perception about SRM with acceptability of SRM and (b) in the explanatory factors of acceptability, we re-ran all of the above-outlined GEEs for the Global South, the non-WEIRD Global North, and the WEIRD Global North, separately for students and the general public. We assessed whether the regression coefficients of the GEEs of each of these three samples differed from those of the other two samples by comparing the respective Bonferroni corrected 99.667% CIs (three comparisons).

To investigate for potential differences between students and the general public in (a) associations between belief in global warming and each perception about SRM with acceptability of SRM and (b) in the explanatory factors of acceptability, we re-ran all of the above-outlined GEEs (as well as the simple and multiple regression analyses) for both the student and the general public samples using only the data of the eleven countries for which data from both samples were available (see Fig. 1 and Table 1). For the full samples, we assessed whether the regression coefficients of the GEEs among students differed from those among the general public by comparing the respective 95% CIs. Per country, we assessed whether the regression coefficients of the regression analyses among students differed from those among the general public by comparing the respective Bonferroni corrected 99.545% CIs (eleven tests).

Further information on the GEEs

For all GEEs, we used the following specifications to fit the model (Ballinger, 2004). First, as our cluster numbers were 19 countries and less, we chose model-based estimators because they have better properties when cluster numbers are smaller than 20 (Ballinger, 2004; Horton & Lipsitz, 1999; Prentice, 1988). Second, an identity link function was used, which is recommended when

the outcome variable (here acceptability of SRM) is, as in our case, measured (Horton & Lipsitz, 1999) and normally distributed (Ballinger, 2004). Finally, we chose an exchangeable correlation structure, which should be used when observations within a cluster do *not* follow a logic order (Ballinger, 2004; Horton & Lipsitz, 1999), which was the case for the responses of the different participants clustered in a country (logic orders are mainly found in longitudinal studies with repeated measurements per participant).

As GEEs do not provide standardised regression coefficients, which would enhance the comparability of effects (Bouman et al., 2020), we ran all GEEs twice, once with unstandardised and once with standardised predictor and outcome variables. To maximise the comparability of effects between the results of the two full samples (GEEs) and the results per subsample (regressions) and to consider the clustered structure of the data, we standardised the variables at country level (Bouman et al., 2020).

All analyses were performed using IBM SPSS Statistics 27 and 29 for Windows. With exception of the GEEs, for which bootstrapping is not available, all CIs were estimated with bias-corrected and accelerated (BCa) bootstrapping based on 5,000 resamples.

Reference list of Supplementary information C

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