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**Climate Adaptation and Climate Mitigation Do Not Undermine Each Other: A Cross
Cultural Test in Four Countries**

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Highlights

Prior expression of support for climate adaptation has either no or a small positive effect on subsequent intention to engage in mitigation.

This effect is mediated by heightened worry about the impacts of climate change.

Prior expression of intention to engage in climate mitigation has no effect on subsequent support for climate adaptation in cities.

Climate mitigation and adaptation do not undermine each other at the level of individual decision making.

Abstract

Adaptation and mitigation are both essential components of strategies that aim to decrease risks associated with climate change. A number of existing studies, however, suggest that the two might be negatively affecting each other – climate adaptation might decrease mitigation efforts and vice versa. We have examined these effects in five experimental studies carried out in four countries (total $N = 4,800$) and have used Bayesian analysis to evaluate the strength of empirical support for such effects. We did not find any evidence that compensation between climate mitigation and adaptation takes place. On the contrary, we found some evidence, albeit rather weak, that prior focus on adaptation measures increases the subsequent tendency to engage in mitigation behavior; this effect is likely to be driven by an increase in worry about the impacts of climate change that results from a prior focus on climate adaptation. If anything, offering adaptation options may increase the tendency to mitigate climate change.

Keywords: climate adaptation, climate mitigation, compensatory effect, moral licensing, attitude, global climate change, risk perception, Bayesian analysis, risk compensation

Climate Adaptation and Climate Mitigation Do Not Undermine Each Other: A Cross Cultural Test in Four Countries¹

Climate adaptation has become an indispensable part of climate policies, reflecting the fact that climate mitigation alone is no longer sufficient to protect humanity against the serious threats posed by climate change (Hoegh-Guldberg et al., 2019; IPCC, 2018). At the same time, climate change mitigation still has an indispensable role to play in reducing carbon emissions and thus reducing the rate of anthropogenic climate change (Peters et al. 2020). And yet, there has been some concern among climate scientists and policymakers that too much focus on climate adaptation could undermine mitigation policies (Giddens, 2009; Pielke et al., 2007). This was in part because climate adaptation and mitigation are substitutes in the sense that they both reduce the impacts of climate change (either by reducing global climate forcing or by reducing vulnerability) and compete for the same resources (Tol, 2005). Therefore a tradeoff between the adaptation and mitigation approaches can be expected both at the level of policy making (Felgenhauer & Webster, 2013) as well as at the individual level of decisionmakers (Hasson et al., 2010).

The evidence of such tradeoffs at the individual level of decision making remains, however, mixed. On the one hand, several studies on different types of risks, including the risk of HIV transmission and the risk of car accidents demonstrate that after an introduction of measures that decrease the impacts of a particular risk, people tend to perceive these risks as less severe and tend to slacken their risk mitigating behavior (e.g., Bolton et al., 2006; Dilley et al., 1997;

¹ All measures, manipulations, and exclusions are disclosed. No data analysis was undertaken before the end of data collection. Pre-registration of this study, as well as materials, data, analysis scripts and tests of all pre-registered hypotheses, can be found at the following anonymized link: https://osf.io/f3hwa/?view_only=ef6b8945f5aa42869ec16953cb83fcb5. Ethical standards of this study have been reviewed by the Scientific Board of the Global Change Research Institute CAS.

Peltzman, 1975). On the other hand, there is some evidence that individual support for climate mitigation is not diminished by prior information on climate adaptation and can be even increased by such information (e.g., Carrico et al., 2015; Evans et al., 2014; Greenhill et al., 2018). As far as we are aware, no study has explored the effect of prior mitigation engagement on subsequent support for adaptation policies, and no study has replicated the potential cross effects of mitigation and adaptation across several studies (viz. Carrico et al., 2015) and across cultures; this study aims to bridge these gaps in the literature. Finding robust evidence that climate mitigation and adaptation mutually influence each other would be important not only as a contribution to the literature on climate related behavior but would also have important practical ramifications by showing that policies targeting climate mitigation or adaptation have unintended consequences for other climate related policies.

1. Compensatory Cross Effects of Risk Mitigation and Risk Adaptation

Risk mitigation and risk adaptation are two general strategies leading to the reduction of impacts of prospective climate related risks. In the context of climate change, the two strategies to risk management often compete for the same resources, resulting in a very complex trade off situations between the two strategies (e.g., Felgenhauer & Webster, 2013).

Several studies found evidence that individuals implicitly make such tradeoffs when faced with risk adaptation and mitigation options in different areas of risk exposure. Using panel data on traffic related injuries and fatalities, a study by Peltzman (1975) found that the mandating of safety regulations and technical safety features throughout the 1960s did not lead to the expected reduction of traffic related injuries and fatalities. Peltzman (1975) argued that safety measures reduced impacts of risky driving and thus, somewhat paradoxically, increased its prevalence by making it relatively less costly. A similar tradeoff mechanism in the climatic domain was

supported by the recent findings of Greenhill et al. (2018) who found that information about the cost of climate adaptation increases the willingness of individuals to support climate mitigation policy (gasoline tax).

The notion of tradeoffs involved in the relationship between risk mitigation and risk adaptation is not restricted to monetary tradeoffs as evidenced by Dilley et al. (1997) who found that informing people about new HIV treatment makes them less concerned about becoming HIV positive and more willing to engage in risky sexual encounters. Correspondingly, Bolton et al. (2006) found across different types of risks (risk of personal bankruptcy, health risks of smoking) that information about risk adaptation measures (i.e., loans consolidation, smoking cessation aids) not only reduced perceived risks but also increased the intention of people to engage in risky behaviors.

One psychological explanation for such a compensatory relationship between risk mitigation and adaptation would be the moral licensing process whereby initial moral behavior licenses and thus facilitates subsequent immoral behavior (Mullen & Monin, 2016); moral licensing seems to provide a plausible theoretical explanation for compensatory effects related to proenvironmental behaviors (Noblet & McCoy, 2018) because such behaviors are typically prosocial and hence are perceived as moral (e.g., Urban et al., 2019). Another theoretical explanation for the tradeoff between risk mitigation and adaptation would be the notion of the single action bias, whereby the prior focus on a specific proenvironmental action makes people more likely to neglect other proenvironmental actions (Weber, 1997).

Even though the tradeoffs between risk adaptation and risk mitigation are highly plausible on a general level, there is little evidence that such compensatory effects take place in individual decision making on climate adaptation and mitigation as we will see in the next section.

2. Cross Effects of Climate Change Mitigation and Adaptation

A study by Evans et al. (2014) was probably the first study that examined the potential compensatory effect of climate adaptation on climate mitigation; this study found that providing information about potential local adaptation measures protecting coastal areas in New Zealand against climate related risks (sea level rise, coastal hazards, and storms) has increased subsequent intention to engage in personal mitigation behavior but had only a marginally significant effect on support for humanity wide climate mitigation. However, given the relatively small sample size of this study ($N = 174$), and the somewhat large dropout leading to a potential failure of randomization (i.e., judged by unequal group sizes, i.e., 109 vs. 65 participants), the results of this study should be taken cautiously. Another study by Carrico et al. (2015) found in one of its experiments that after learning about adaptation or mitigation options available to farmers, participants from the general population were more likely to support general mitigation policies and (marginally significantly) more likely to support agricultural adaptation policies (see also Howell et al., 2016, who failed to find any differences between the effects of mitigation and adaptation framing on the intention to engage in mitigation action and support mitigation policies). Carrico et al. (2015) also found, in the same experiment, that learning about adaptations and mitigations increased the perceived risk of climate change; such an increase in perceived risk of climate change observed after exposure to information about climate adaptation led Carrico and colleagues (2015) to hypothesize that such a consistency effect is driven by increased salience of risks related to climate change. However, Carrico et al. (2015) were unable to replicate these results in another experiment from the same study.

Other studies provided less direct evidence on the possible cross effects of climate adaptation and mitigation availability because they experimentally manipulated other aspects of

mitigation and adaptation options, rather than their availability. For instance, a study by Greenhill et al. (2018) manipulated information about adaptation costs (but not the availability of adaptation measures), only to find that increasing adaptation costs generally increased support for mitigation options. Likewise, a study by Howell et al. (2016), did not find a difference between the effects of providing information about climate mitigation and adaptation options and how these options were framed (i.e., individual vs. collective action) on subsequent intention to support and engage in climate mitigation. However, since this study (Howell et al., 2016) did not evaluate control condition with no information provision, it could not say how provision of information about adaptation or mitigation options (as opposed to no information provision) affects subsequent climate mitigation.

The extant literature on the cross effects of climate change mitigation and adaptation thus offers little support for the expected *compensatory effect* that we see in other areas of risk mitigation and adaptation (i.e., one strategy is preferred at the expense of another). Support for the opposite effect (i.e. one strategy is reinforcing the other), henceforth referred to as *consistency effect*, is also relatively weak, coming only from two studies, neither of which was replicated and neither of which explored the possible underlying mechanism of such cross effects.

3. Research Goals

This study focuses on whether highlighting risk adaptation or mitigation strategies affects subsequent decision making about personal engagement in climate mitigation and support for climate adaptation. Specifically, across five highly powered and preregistered experimental studies, we tested whether prior expression of support for climate adaptation in cities affects subsequent tendency to engage in climate mitigation and, vice versa, whether prior expression of intention to engage in climate mitigation affects tendency to support climate adaptation in cities;

such behavioral tendencies are conceptualized in this study as attitudinal constructs (e.g., Kaiser et al., 2010; Kaiser & Wilson, 2019). Given the inconclusive evidence in the existing literature, we test as plausible a hypothesis of a *consistency effect* (i.e., a *positive* effect of highlighting prior mitigation or adaptation actions on subsequent attitude to adaptation or mitigation) and an alternative hypothesis of a *compensatory effect* (i.e., a *negative* effect of highlighting prior mitigation or adaptation actions on subsequent attitude to adaptation or mitigation). Taking advantage of the Bayesian inference framework, we also test a third hypothesis, namely that there is practically no cross effect between climate mitigation and adaptation in individual decision making.

4. Study 1: Prague population

In Study 1 we looked at whether the mere expression of support for climate adaptation measures or expression of intention to engage in climate mitigation have cross effects on subsequent intention to engage in mitigation or support climate adaptation measures, respectively.

4.1 Method

4.1.1 Participants

A sample of 1,236 residents of Prague, selected from a participant panel (with more than 40,000 individuals) of an opinion poll company based on quota sampling (with quotas for age, education, and gender) entered the study on line. Based on preregistered exclusion criteria, we excluded 234 (18.9%) participants who did not finish the questionnaire, 14 (1.4%) participants who indicated repeated access to the questionnaire, and 2 (0.2%) participants for whom attitude levels could not be estimated due to insufficient variability in their responses; exclusion rates were similar in the two experimental groups $\chi^2(1, N = 1,236) = 0.8, p = .37$. The remaining

sample, $N = 986$, of which 459 (46.6%) participants were in the mitigation first condition, was fairly variable in terms of the demographic characteristics of participants (52.5% were females; 27.9%, 30.7%, 20.9%, and 20.5 % of participants were in age groups 18–29, 30–39, 40–49, and 50–60 respectively; 14.6%, 46.3%, and 39.0% of participants had primary, secondary, and tertiary education respectively).

4.1.2 Materials

Manipulation of climate adaptation and climate mitigation salience. The salience of climate mitigation strategy was manipulated by having participants indicate whether they intended to engage in 58 mitigation actions (the same format as the measure of the dependent variable); participants then read a short text which explained the role of climate mitigation and how it related to climate adaptation, after which they proceeded to the attitude to climate adaptation measure. The salience of climate adaptation strategy was manipulated similarly: after the rating of their support for 58 urban adaptation measures (the same format as the measure of the dependent variable), participants read a short text linking climate adaptation and mitigation, and then they proceeded to the attitude to climate adaptation measure.

Dependent variables.

Attitude to climate adaptation. We assessed attitude to climate adaptation in cities with a measure that was theoretically based on the attitude theory known as the Campbell paradigm (e.g., Kaiser et al., 2010; Kaiser & Wilson, 2019), which was previously used as a theoretical framework for measurement of attitudes to climate change (e.g., Urban, 2016).

The measurement instrument consisted of 58 items featuring urban adaptation measures (see Appendix for details of items); an example of an item: “Installation of roofs designed to capture and reuse rainwater on public buildings.” The majority of these items were adopted from

recent inventories of urban adaptation measures (Pötz, 2016; RESIN consortium, 2018). Ten items were developed based on suggestions of climate adaptation experts who commented on an earlier version of the scale. The scale was pretested in three consecutive rounds of pilots using non representative samples of the general Czech population aged 18–60 (total $N = 687$; for details see https://osf.io/3rx46/?view_only=7a8c8b830d874138a8db26426d38b62d).

Participants indicated acceptance of each adaptation measure on a five point Likert scale (1 = *strongly not support*, 2 = *rather not support*, 3 = *rather support*, 4 = *strongly support*, 5 = *do not know*). The attitude scale, calibrated as Rasch scale (for details of the measurement model, see Bond & Fox, 2012), had an excellent person separation reliability, $rel. = .93$, and internal consistency, $\alpha = .92$, in this study.

Attitude to climate mitigation. Attitude to mitigation was assessed with 58 items eliciting individual intention to engage in climate mitigation action over the next year (see Appendix for details). Thirty eight items were adopted from the GEB scale of proenvironmental attitude (e.g., Byrka et al., 2017) and the remaining eight items were suggested by experts who checked the face validity of the scale during scale development. The scale was pretested on a sample of the Czech adult population ($N = 200$, $\alpha = .78$, $rel. = 0.75$). An example of an item: “I will be eating only vegetarian meals.” For each item, participants indicated the probability of such behavior using five point Likert scales (1 = *very unlikely*, 2 = *rather unlikely*, 3 = *rather likely*, 4 = *very likely*, 5 = *I do not know/ not relevant*). Twenty two items with negative valence were reverse coded and all items were dichotomized by collapsing the categories “very unlikely” and “rather unlikely” and the categories “rather likely” and “very likely” before analysis; such dichotomization is known to reduce measurement error in similar scales (e.g., Kaiser & Wilson, 2004). The response category “do not know” was treated as a missing value. The scale, calibrated

as binary Rasch scale, had a sufficient person separation reliability, $rel. = .79$, and internal consistency, $\alpha = .82$, in the present study. Attitude to mitigation was positively associated with attitude to adaptation, $r(984) = .21$, $r < .001$.

4.1.3 Design

The study was a randomized experiment with two experimental groups. Participants in the *mitigation first* group expressed their intention to engage in mitigation behavior before proceeding to the adaptation items, while participants in the *adaptation first* group expressed their support for climate adaptation measures first and then proceeded to the mitigation items. To make our results easier to understand, we refer to *control* conditions (i.e., mitigation first group when we study the effect of adaptation on mitigation attitude, and adaptation first group when we study the effect of mitigation on adaptation) and *treatment* conditions, that is adaptation treatment condition (i.e., adaptation first group when we study the effect of adaptation on mitigation attitude) and mitigation treatment condition (i.e., the mitigation first group when we study the effect of mitigation on adaptation attitude).

4.1.4 Procedure

Invited participants were given personalized access to the study. After accessing the study, participants provided their informed consent and answered demographic questions which served also as quota sampling criteria. Only participants eligible for the study, based on their demographic characteristics, could enter the study. Participants who entered the study were randomly assigned to either the mitigation first or the adaptation first group. Participants in the mitigation first group answered mitigation attitude items first, then read some short information introducing adaptation measures and explaining how they relate to mitigation, after which they answered adaptation attitude items. Participants in the adaptation first group answered adaptation

attitude items first, then read some short information introducing mitigation measures and explaining how they relate to adaptation, after which they answered the adaptation attitude items. Both groups then proceeded to sections of the questionnaire which were not analyzed in this study (section on perceived benefits of greenery in cities, willingness to pay for adaptation measures, and beliefs about climate change). All participants were then thanked for their participation and were redirected to the web page of the opinion poll company to receive their reward for participation in the study (20 CZK, equivalent of €0.8).

4.1.5 Analyses

We used a Bayesian equivalent of a robust t test for independent samples (see analytical R script for details) to test our hypotheses. The advantages of the Bayesian analysis are numerous: it provides more refined insight into the credibility of hypothesized effects through the study of their posterior distributions, it allows for the evaluation of the credibility of the null hypothesis (i.e., practically no effect), and its results are not affected by repeated testing (Gelman et al., 2014; Kruschke, 2015).

Our model assumed that attitude levels in each experimental group could be described as coming from a t distribution with the following parameters: an unknown group specific location parameter, an unknown scale parameter (same across experimental groups), and unknown degrees of freedom (same across experimental groups). We used weakly informative priors to facilitate the convergence of the model. We estimated the posterior distribution of the effect size of treatment (i.e., the difference between the location parameter in the control group and treatment group) and expressed it as standardized effect size (Cohen's d). We were interested in whether the 95% credible interval on the estimated effect size was larger or smaller than zero

(i.e., the credibility of a negative or a positive effect), and whether it fell in the interval of practically negligible effect size ($-0.2 < d < 0.2$).

4.2 Results

4.2.1 Adaptation Treatment Effect on Mitigation Attitude

After expressing support for adaptation measures, participants had a higher tendency to engage in mitigation action, $M = 0.06$, 95% CI $[-0.10, 0.12]$, than participants in the control condition, $M = -0.12$, 95% CI $[-0.18, -0.05]$, resulting in a small effect size, $d = 0.23$, 95% CI $[0.11, 0.36]$, which was highly credible, $P(d > 0) > .999$ (see Appendix for details). Our results thus rejected the compensation effect and supported the consistency effect.

4.2.2 Mitigation Treatment Effect on Adaptation Attitude

After expressing their intention to engage in mitigation action, participants manifested somewhat higher support for adaptation measures, $M = -0.02$, 95% CI $[-0.12, 0.08]$, than participants in the control group, $M = -0.11$, 95% CI $[-0.21, -0.02]$, but this effect was very small, (and not different from zero by preregistered testing criteria), $d = 0.07$, 95% CI $[-0.03, 0.18]$, and falling in the region of practical equivalence to a zero effect size $P(-0.2 < d < 0.2) = .99$ (see Appendix for details). However, further exploration of posterior for the effect reveals that there is some evidence of this effect being positive, $P(d > 0) = .90$. These results reject the compensation effect and provide very weak support for the consistency effect; if there is such an effect, it must be almost negligible.

4.3 Discussion

In Study 1, we found support for the consistency effect of prior support for climate adaptation on subsequent intention to engage in climate mitigation. We found only very weak support for the consistency effect of prior engagement in mitigation behavior on subsequent

support for adaptation policies; this effect seems to be credible statistically, but practically negligible.

5. Study 2: Large Czech Cities

Study 2 aimed to replicate and generalize the results of Study 1 by focusing on the adult population of all large cities in the Czech Republic and by exploring the potential mediating role of climatic beliefs. In addition, in Study 2 we framed the set of measures used to highlight mitigation or adaptation options (i.e., experimental manipulation) as such prior to eliciting intention to engage in mitigation behavior or support for adaptation measures (our dependent variables); this was in contrast to Study 1 where we used such framing only after the experimental manipulation.

5.1 Method

5.1.1 Participants

A sample of adult residents (aged 18–60) of the large cities in the Czech Republic (10 cities with a population of over 80,000 inhabitants) participated in this study. Sampling was similar as in Study 1 and quotas were set to reflect the known demographics structure of the target population.

Of 1,204 participants who entered the study and were randomly assigned to experimental groups, we excluded, based on preregistered exclusion criteria, 197 (16.4%) participants who did not finish the questionnaire, 153 (12.7%) participants who indicated repeated access to the questionnaire, and 10 (0.8%) participants for whom attitude estimates could not be estimated due to insufficient variability in their responses; exclusion rates were similar in the two experimental groups $\chi^2(1, N = 1,204) = 0.14, p = .71$. The remaining sample, $N = 844$, of which 422 (50%) participants were in the mitigation first condition, was fairly variable in terms of the demographic

characteristics of participants (53.4% were females; 27.9%, 30.7%, 20.9%, and 20.5% of participants were in age groups 18–29, 30–39, 40–49, and 50–60 respectively; 36.5%, 41.0% and 22.5% of participants had primary, secondary, and tertiary education, respectively).

5.1.2 Materials

Dependent Variables.

Attitude to adaptation. The same measure of adaptation attitude was used as in Study 1, except that we used slightly different labels for the five point Likert scale (1 = *strongly oppose*, 2 = *somewhat oppose*, 3 = *somewhat support*, 4 = *strongly support*, 5 = *I do not know*). The scale had an excellent person separation reliability, $rel. = .93$, and internal consistency, $\alpha = .92$.

Attitude to mitigation. The same measure of mitigation attitude was used as in Study 1. The scale had sufficient person separation reliability, $rel. = .77$, and internal consistency, $\alpha = .81$. Attitude to mitigation was positively associated with attitude to adaptation, $r(842) = .19$, $r < .001$.

Mediators. Mediators were presented in random order.

Worry about climate change. Worry about climate change was measured with one item adopted from Van der Linden et al., (2015): “On a scale from 1 to 7, how worried are you about climate change?” Participants indicated their answers on a seven point Likert scale (1 = *I am not at all worried*; 7 = *I am very worried*).

Belief in climate change. Belief in climate change is measured with one item adopted from Van der Linden et al., (2015): “How strongly do you believe that climate change is or is not happening? Please, indicate your answer using a scale.” Participants indicated their answers on a seven point Likert scale (1 = *I strongly believe that climate change is NOT happening*, 4 = *I am unsure whether or not climate change is happening*, 7 = *I strongly believe climate change IS happening*).

Belief in human causation. Belief in human causation is measured with one item adopted from Van der Linden et al., (2015): “Assuming climate change IS happening: How much of it do you believe is caused by human activities, natural changes in the environment, or a combination of both? Please, indicate your answer using a scale.” Participants indicated their answers on a seven point Likert scale (1 = *I believe that climate change is caused mostly by natural changes in the environment*, 4 = *I believe that climate change is caused equally by natural changes and human activities*, 7 = *I believe that climate change is caused mostly by human activities*).

5.1.3 Design

Study 2 had a 2 (order of measures: mitigation first vs. adaptation first as in Study 1) x 2 (mediator position: before vs. after the first attitude measure) design.

5.1.4 Procedure

The same procedure as in Study 1 was used to select eligible participants who entered the study. After entering the study, participants were randomly assigned to one of the four experimental conditions. Participants assigned to groups with mediator position before the first attitude measure answered the three items measuring climatic beliefs first and then proceeded to the two sets of attitude items as in Study 1. Participants assigned to groups with mediator positions after the first attitude measure answered the first attitude measure, then the three items measuring climatic beliefs, and then proceeded to the second attitude measure. Unlike in Study 1, participants read a short introduction also for the first attitude measure (i.e., experimental manipulation) that identified it as climate mitigation or climate adaptation strategy.

All participants then proceeded to sections of the questionnaire which were not analyzed in this study (a section on perceived benefits of greenery in cities, value orientations, and consideration of future consequences). All participants were then thanked for their participation

and were redirected to the web page of the opinion poll company to receive their reward for participation in the study (20 CZK, equivalent of €0.8).

5.1.5 Analysis

The same analysis of treatment effects was conducted as in Study 1. In addition, we also conducted a (nonregistered) Bayesian mediation analysis of the treatment effects on attitude, separately for each of the three climatic beliefs as mediators (see analytical *R* scripts for details). Given the design of the study, mediation analyses for each of the two treatment effects could only be conducted on subsets from the total sample. Mediation for the adaptation treatment effect could only be studied on a subsample comprising of a group combining *adaptation first* and *mediator after the attitude measure* factors (treatment condition) and a group combining *mitigation first* and *mediator before the attitude measure* factors (control condition). Analogically, mediation for the mitigation treatment could be studied in the two remaining groups. For mediation analyses, we report standardized regression weights and posterior probabilities of these weights being positive.

5.2 Results

5.2.1 Adaptation Treatment Effect on Mitigation Attitude

After expressing support for adaptation measures, participants had similar level of mitigation attitude, $M = 0.00$, 95% CI $[-0.07, 0.07]$, as participants in the control group, $M = -0.01$, 95% CI $[-0.08, 0.06]$, resulting in practically no treatment effect, $d = 0.01$, 95% CI $[-0.13, 0.14]$, $P(d > 0) = .541$, $P(-0.2 < d < 0.2) = .996$.

5.2.2 Mitigation Treatment Effect on Adaptation Attitude

After expressing intention to engage in mitigation, participants had a similar level of adaptation attitude, $M = -0.06$, 95% CI $[-0.17, 0.04]$, as participants in the control group, $M =$

–0.09, 95% CI [–0.20, 0.01], resulting in practically no treatment effect, $d = 0.05$, 95% CI [–0.09, 0.14], $P(d > 0) = .644$, $P(-0.2 < d < 0.2) = .998$.

5.2.3 Mediation of Cross Effects by Climatic Beliefs

Even though we found no evidence of direct mitigation or adaptation treatment effects on attitudes, it is still possible that there might be indirect effects through mediators (e.g., Hayes, 2018). To shed more light on the role of climatic beliefs as potential mediators, we conducted exploratory (not registered) mediation analyses (see Appendix for details). Besides corroborating the lack of direct treatment effects on attitudes, $\beta < 0.047$, $P(\beta > 0) < .828$, we found a positive mitigation treatment effect on all three beliefs, $\beta = 0.071$ – 0.163 , $P(\beta > 0) > .931$, and a positive adaptation treatment effect on participants' worry about climate change, $\beta = 0.125$, $P(\beta > 0) = .992$. Most importantly, we found some evidence of a positive indirect mitigation treatment effect on adaptation attitude mediated by worry, $\beta = 0.017$, $P(\beta > 0) = .992$, and by the belief in anthropogenic causation, $\beta = 0.009$, $P(\beta > 0) = .970$. Likewise, we also found an indirect adaptation treatment effect on mitigation attitude mediated by worry, $\beta = 0.042$, $P(\beta > 0) = .992$.

5.3 Discussion

We did not replicate the direct mitigation and adaptation treatment effects observed in Study 1. However, we found some evidence that these mitigation and adaptation treatments have positive effects on subsequent adaptation and mitigation attitude indirectly, mainly through heightened worry about climate change impacts. Thus, these results give some support to the consistency hypothesis; this support is rather weak given that we did not corroborate the consistency hypothesis by preregistered criteria.

6. Study 3: Large Slovak Cities

Study 3 aimed to replicate and generalize results from Study 2 on a population of residents of large cities in Slovakia.

6.1 Method

6.1.1 Participants

A sample of adult residents (aged 18–60) of the large cities in the Slovak Republic (three cities with a population of over 80,000 inhabitants) participated in this study. Participants were recruited from a participant panel curated by an opinion poll company using quota sampling with quotas for age groups, education, and gender. The quotas were set to reflect the known demographics structure of the target population.

From 1,145 participants who entered the study, we excluded, based on preregistered exclusion criteria, 145 (12.7%) participants who did not finish the questionnaire, 30 (2.6%) participants who indicated repeated access to the questionnaire, and 13 (1.1%) participants for whom attitude estimates could not be estimated due to insufficient variability in their responses; exclusion rates for those participants who were assigned to experimental groups were statistically different in the two experimental groups, $\chi^2(1, N = 1,145) = 5.82, p = 0.016$. The remaining sample, $N = 957$, of which 475 (49.6%) participants were in the mitigation first condition was fairly variable in terms of demographic characteristics of participants (50.9% were females; 20.1%, 30.4%, 26.5%, and 23.0% of participants were in age groups 18–29, 30–39, 40–49, and 50–60 respectively; 20.5%, 41.1% and 38.5% of participants had primary, secondary, and tertiary education respectively).

6.1.2 Materials, Design, Procedure, and Analysis

The same materials, design, procedure, and analysis were used as in Study 2, except that the materials were in Slovak and the study was run in Slovak. The scale of adaptation attitude had an excellent person separation reliability, $rel. = .84$, and internal consistency, $\alpha = .94$. The scale of mitigation attitude also had an excellent person separation reliability, $rel. = .80$, and internal consistency, $\alpha = .81$. Attitude to mitigation was positively associated with attitude to adaptation, $r(955) = .20, r < .001$.

6.2 Results

6.2.1 Adaptation Treatment Effect on Mitigation Attitude

After expressing support for adaptation measures, people had a somewhat higher tendency to engage in mitigation actions, $M = 0.03$, 95% CI $[-0.03, 0.10]$ than people in the control group, $M = -0.03$, 95% CI $[-0.09, 0.04]$, resulting in a very small effect size, $d = 0.08$, 95% CI $[-0.05, 0.21]$, which was not different from zero by preregistered criteria. The negligible size of this effect is evident also in the high probability that the posterior of this effect falls in the interval of practically a zero effect size, $P(-0.2 < d < 0.2) = 0.97$.

6.2.2 Mitigation Treatment Effect on Adaptation Attitude

After expressing intention to engage in mitigation behavior, people had a similar level of adaptation attitude, $M = -0.10$, 95% CI $[-0.20, 0.00]$, as participants in the control group, $M = -0.08$, 95% CI $[-0.19, 0.02]$, resulting in practically no treatment effect, $d = -0.01$. 95% CI $[-0.11, 0.08]$, $P(-0.2 < d < 0.2) > .999$.

6.2.3 Mediation of Cross Effects by Climatic Beliefs

Nonregistered mediation analysis corroborated the lack of mitigation treatment effect, $\beta = -0.026$ — 0.021 , $P(\beta > 0) = .240$ – $.280$, and no adaptation treatment effect, $\beta = -0.050$ — 0.32 ,

$P = 0.135\text{--}0.248$, on attitude to adaptation and mitigation, respectively. Furthermore, we found no mitigation treatment effect on climatic beliefs, $\beta = 0.002\text{--}0.044$, $P(\beta > 0) < .839$, but we found a highly credible adaptation treatment effect on worry about climate change, $\beta = 0.076$, $P(\beta > 0) = .949$, but not on the beliefs about existence of climate change and its anthropogenic causation, $\beta = 0.006\text{--}0.038$, $P(\beta > 0) < .788$. Most importantly, we found no evidence of an indirect mitigation treatment effect on attitude to climate adaptation mediated by climatic beliefs, $\beta < 0.003$, $P(\beta > 0) < .822$, but we found credible evidence that adaptation treatment has a positive indirect effect on mitigation attitude through increased worry about impacts of climate change, $\beta = 0.24$, $P(\beta > 0) = .949$.

6.3 Discussion

Similar to Study 2, we did not find that direct mitigation or adaptation treatment effects attitudes. In fact, we found credible evidence that these effects are practically zero. However, we replicated the finding of Study 2 of an indirect adaptation treatment effect on attitude to mitigation via heightened worry about impacts of climate change; a similar effect was not replicated for the mitigation treatment.

7. Study 4: Large Polish Cities

The aim of Study 4 was to provide further evidence on potential effects of climate mitigation and adaptation treatments on subsequent attitude to climate adaptation and mitigation, respectively, and generalize these results using a sample of residents of large towns in Poland. To avoid potential confounding of the treatment effects due to climatic belief measurement, we assessed climatic beliefs after attitude measurement was taken to gain further insight into the expected association between mitigation and adaptation attitudes and climatic beliefs.

7.1 Method

7.1.1 Participants

A sample of adult residents (aged 18–60) of the large cities in Poland (42 cities with a population of over 80,000 inhabitants) participated in this study. Participants were recruited from participant panel curated by an opinion poll company, using quota sampling with quotas for age groups, education, and gender. The quotas were set to reflect the known demographics structure of the target population.

From 1,294 participants who entered the study, we excluded, based on preregistered exclusion criteria, 294 (22.7%) participants who did not finish the questionnaire, 40 (3.1%) participants who indicated repeated access to the questionnaire, and 17 (1.3%) participants for whom attitude estimates could not be estimated due to insufficient variability in their responses; the exclusion rates for those participants who were assigned to experimental groups were similar in the two experimental groups, $\chi^2(1, N = 1,294) = 0.001, p = .96$. The remaining sample, $N = 943$, of which 500 (53.0%) participants were in the mitigation–first condition, was fairly variable in terms of demographic characteristics of participants (53.1% were females; 20.9%, 30.5%, 26.6%, and 22.0% of participants were in age groups 18–29, 30–39, 40–49, and 50–60 respectively; 19.4%, 40.7%, and 39.9% of participants had primary, secondary, and tertiary education respectively).

7.1.2 Materials

Experimental manipulation and dependent variables. We used the same manipulation of mitigation and adaptation salience and same measures of adaptation and mitigation attitudes as in Studies 2 and 3, except they were translated into Polish. Adaptation attitude measure had an excellent person separation reliability, $rel. = .80$, and internal consistency, $\alpha = .94$. The

mitigation attitude measure had sufficient person separation reliability, $rel. = .75$, and internal consistency, $\alpha = .79$. Attitude to mitigation was positively associated with attitude to adaptation, $r(941) = .19, r < .001$.

Covariates. We used the same measures of climatic beliefs as in Studies 2 and 3, except they were translated into Polish.

Design. This study used the same design as Study 1.

7.1.3 Procedure

The same procedure was used as in Studies 2 and 3 except that climatic beliefs were assessed at the end of the study and the study was administered in Polish.

7.1.4 Analysis

We conducted the same analyses as in Study 1. In addition, we also conducted a nonregistered analysis of statistical associations between adaptation and mitigation attitudes and climatic beliefs using Bayesian robust correlation analysis. Analogically to robust regression analysis, this analysis assumes t distribution—rather than normal distribution—of residuals, and thus relaxes the stringent requirement of residual normality (see analytical R script for details).

7.2 Results

7.2.1 Adaptation Treatment Effect on Attitude to Mitigation

After expressing their support for adaptation measures, participants had a higher level of mitigation attitude, $M = 0.14$, 95% CI [0.07, 0.21], than participants in the control condition, $M = -0.12$, 95% CI [-0.18, -0.05], resulting in a small effect size, $d = 0.35$, 95% CI [0.23, 0.48], that was, nevertheless, highly credible, $P(d > 0) < .999$. This result supported the consistency hypothesis and rejected the compensation hypothesis.

7.2.2 Mitigation Treatment Effect on Attitude to Adaptation

After expressing intention to engage in mitigation action, participants had a similar level of adaptation attitude, $M = -0.20$, 95% CI $[-0.34, -0.06]$, as participants in the control condition, $M = -0.12$, 95% CI $[-0.26, 0.01]$, resulting in practically a zero effect size, $d = 0.05$, 95% CI $[-0.06, 0.17]$, $P(d > 0) < .812$, $P(-0.2 < d < 0.2) = .993$. This result rejected both the consistency and the compensation hypotheses.

7.2.3 Exploratory Analysis of the Associations Between Attitudes and Climatic Beliefs

Nonregistered correlation analysis revealed a small positive and highly credible association between mitigation and adaptation attitudes, $r = .19$, $P(r > 0) > .999$. Associations between climatic attitudes and climatic beliefs were all positive, $r_s = .07-.32$, $P(r > 0) > .984$, with the exception of belief in the reality of climate change and adaptation attitude that seemed to be essentially unrelated, $r = -0.01$, $P(r > 0) = .374$. Finally, the associations between the three climatic beliefs were all positive and rather strong, $r_s > .56-.67$, $P(r_s > 0) > .999$.

7.3 Discussion

We found support for the consistency effect of adaptation treatment on mitigation attitude, similar to Study 1, and no evidence of mitigation treatment effect on adaptation attitude. Adaptation and mitigation attitudes were positively but rather weakly associated with climatic beliefs. Given the relatively strong associations between belief constructs, it would not be possible to distinguish their unique associations with mitigation and adaptation attitudes.

8. Study 5: Large Hungarian Cities

Study 5 aimed to replicate and generalize results from Study 4 on a population of residents of large cities in Hungary.

8.1 Method

8.1.1 Participants

A sample of adult residents (aged 18–60) of large cities in Hungary (nine cities with a population of over 80,000 inhabitants) participated in this study. Participants were recruited from a participant panel curated by an opinion poll company using quota sampling with quotas for age groups, education, and gender. The quotas were set to reflect the known demographics structure of the target population.

From 1,308 participants who entered the study, we excluded, based on preregistered exclusion criteria, 307 (23.5%) participants who did not finish the questionnaire, 26 (2.0%) participants who indicated repeated access to the questionnaire, and 9 (0.7%) participants for whom attitude estimates could not be estimated due to insufficient variability in their responses; exclusion rates for those participants who were assigned to experimental groups were not different in the two experimental groups, $\chi^2(1, N = 1,308) < 0.001, p > .99$. The remaining sample, $N = 966$, of which 474 (49.3%) participants were in the mitigation first condition, was fairly variable in terms of the demographic characteristics of participants (52.5% were females; 24.5%, 27.7%, 27.1%, and 20.8% of participants were in age groups 18–29, 30–39, 40–49, and 50–60 respectively; 13.1%, 45.6%, and 41.3% of participants had primary, secondary, and tertiary education respectively).

8.1.2 Materials, Design, Procedure, and Analysis

The same materials, design, procedure, and analyses were used as in Study 2, except that the materials were in Hungarian and the study was run in Hungarian. The scale of adaptation attitude had an excellent person separation reliability, $rel. = .81$, and internal consistency, $\alpha = .92$. The scale of mitigation attitude had sufficient person separation reliability, $rel. = .75$, and

internal consistency, $\alpha = .80$. Attitude to mitigation was positively associated with attitude to adaptation, $r(959) = .18, r < .001$.

8.2 Results

8.2.1 Adaptation Treatment Effect on Attitude to Mitigation

After expressing their support for adaptation measures, participants in the experimental group expressed similar level of intention to engage in mitigation action, $M = -0.01$, 95% CI $[-0.05, 0.08]$, as participants in the control group, $M = -0.01$, 95% CI $[-0.07, 0.05]$, resulting in practically a zero effect size, $d = 0.04$, 95% CI $[-0.09, 0.16]$, $P(d > 0) = .720$, $P(-0.2 < d < 0.2) = .994$.

8.2.2 Mitigation Treatment Effect on Attitude to Adaptation

After expressing their intention to engage in mitigation behavior, participants in the experimental group expressed a similar level of support for adaptation measures, $M = -0.13$, 95% CI $[-0.25, -0.01]$, as participants in the control group, $M = -0.13$, 95% CI $[-0.25, 0.00]$, resulting in practically a zero effect size, $0 < d < 0.01$, 95% CI $[-0.12, 0.11]$, $P(d > 0) = .483$, $P(-0.2 < d < 0.2) > .999$.

8.2.3 Exploratory Analysis of the Associations Between Climatic Attitudes and Beliefs

Non registered correlation analysis revealed a positive but rather small association between mitigation and adaptation attitudes, $r = .17, P(r > 0) > .999$, and also a positive association between climatic attitudes and climatic beliefs, $r = .10-.26, P(r > 0) > .998$; in fact, only mitigation attitude and belief about anthropogenic causation were essentially unrelated, $r = .03, P(r > 0) = .830$. Associations between the three climatic beliefs were comparatively high, $r = .48-.61, P(r > 0) > .999$.

8.3 Discussion

We found credible evidence that the adaptation treatment effect on mitigation attitude, and the mitigation treatment effect on adaptation attitude, were both practically zero, thus rejecting both the consistency and compensation hypotheses. Like Study 4, we found positive but rather small associations between climate beliefs and attitudes.

9. Aggregating Evidence From the Five Studies

Evidence from the five studies regarding the effect of adaptation and mitigation treatments on attitudes to mitigation and adaptation can be aggregated by pooling posteriors from the five studies. Such analysis suggests that there was some, albeit very weak, evidence of a negligible positive effect of adaptation treatment on mitigation attitude, $d = 0.14$, 95% CI $[-0.08, 0.43]$, $P(d > 0) = .829$ (see Figure 1 for details), providing rather limited support for the consistency hypothesis. On the other hand, we found no evidence of the mitigation treatment effect on adaptation attitude, $d = 0.03$, 95% CI $[-0.10, 0.15]$, $P(d > 0) = .647$.

10. General Discussion

The aim of this study was to examine potential cross effects between climate mitigation and adaptation at the level of individual decision making. Specifically, we tested whether prior support for climate adaptation affects subsequent attitude to climate mitigation and, vice versa, whether expressing an intention to engage in mitigation actions affects subsequent attitude to climate adaptation. Previous literature provided inconclusive answers to these questions. While some studies found a *compensatory relationship* between various risk adaptation and mitigation strategies, whereby highlighting one of these strategies undermined the other (e.g., Bolton et al., 2006; Dilley et al., 1997; Peltzman, 1975), other studies found a *consistency effect*, whereby

highlighting one strategy increased also support for the other (e.g., Carrico et al., 2015; Evans et al., 2014).

Across five highly powered and preregistered experimental studies run in four Central European countries, we found no evidence of the compensatory effect. We found some—albeit rather limited—evidence (in two of the five studies) of the consistency effect, namely that expressing initial support for adaptation increased subsequent intention to mitigate climate change (for similar results, see Carrico et al., 2015; Evans et al., 2014). Our finding of the small effect size of the consistency effect could explain why we did not replicate it in all studies and why some previous studies also failed to replicate it (e.g., Carrico et al., 2015).

We also found that the consistency effect is likely to be driven by heightened worry about the impacts of climate change but only after evaluation of adaptation options. This mediation mechanism seems to be consistent with the salience hypothesis (Carrico et al., 2015), namely that initial information about ways to tackle climate change increases the salience of climate change and related problems and, hence, increases motivation for further actions aimed at reducing climate risks.

We did not find any evidence that prior commitment to climate mitigation would produce a consistency effect on subsequent adaptation support. One possible reason why we could not find the consistency effect in this case could be a ceiling effect due to adaptation measures receiving very high support to start with (average support for adaptation measures was 69%–89% across countries).

10.1 Implications

Our results show that compensatory effects in risk reducing strategies might be less prevalent than once thought (e.g., Bolton et al., 2006). It is not possible to generalize from our

results to other areas of risk mitigation and risk adaptation, but it is already apparent that introducing climate adaptation measures is unlikely to undermine climate mitigation (for similar evidence, see Carrico et al., 2015; Evans et al., 2014). On the contrary, providing information about adaptation options may increase the salience of climate risks and increase mitigation engagement in individuals; such an effect is likely to be very small though, and more of a side benefit than a feasible strategy to promote climate mitigation. In any case, the lack of compensatory effects in climate adaptation and mitigation is reassuring in the current situation when only a mix of adaptation and mitigation measures can help humanity to deal with the impacts of climate change (e.g., IPCC, 2018). Such a result is particularly important for city planning as climate change is expected to enhance warming in cities and their surroundings with likely negative impacts on urban quality of life (IPCC, 2019). Our results also suggest that nature based climatic solutions in the urban environment, some of which can support mitigation, or adaptation, or both (see, e.g., Keeler et al., 2019), will likely not undermine each other.

More broadly, our results are also relevant for the discussion of the psychological processes hypothesized to be responsible for compensatory effects in the environmental domain, such as single action bias (e.g., Weber, 1997) and moral licensing in the environmental domain (e.g., Noblet & McCoy, 2018). Our study that did not find any evidence of compensatory effects and thus adds to recent literature demonstrating that any such effects in the environmental domain might be relatively rare and small in magnitude (e.g., Blanken et al., 2014; Kuper & Bott, 2019; Urban et al., *in press*, 2019). More importantly, our finding of increased risk salience after exposure to risk adaptation strategy (see Carrico et al., 2015 for similar results) reveals one of the mechanisms that probably attenuates such compensatory processes.

10.2 Limitations

The first limitation of the present study is that we focused on attitudes to adaptation and mitigation rather than on observed mitigation and adaptation behavior. Even though intention based attitudinal measures are known to be a less than perfect approximation of observed behavior (e.g., Sheeran & Webb, 2016), they are still relatively good proxies for behavior, comparable to behavioral self reports (cf. Kormos & Gifford, 2014). Nonetheless, future studies should extend our knowledge of adaptation mitigation cross effects by focusing on observed mitigation and adaptation behavior.

Another potential limitation of the present study is that it was administered online to participants selected with quota sampling from participant pools. Our samples are similar in key demographic variables to target populations of large cities but we cannot claim representativity, which only can be achieved through random sampling from target populations. Arguably though, representativeness is less important in theoretically grounded experimental studies as is ours (e.g., Zelditch, 2007). Moreover, online administration is superior to mail administration used in some previous studies on adaptation and mitigation cross effects (e.g., Evans et al., 2014) in that it provides good control over the administration and experimental randomization. Such control seems to be crucial because post hoc analyses, including conventional balance checks, are not very indicative regarding whether randomization was successful (Mutz et al., 2019). Given that dropout rates were similar across experimental conditions in each of our studies (except for Study 3), there is nothing to indicate a failure of randomization in our studies.

Another limitation of the present study concerns the fact that we focused on city wide adaptation measures and individual mitigation actions, similar to previous studies, which have focused on collective adaptation and individual or collective mitigation (e.g., Carrico et al., 2015;

Evans et al., 2014). Future studies should focus on how the collective vs. individual level of risk reducing strategy affect cross effects between mitigation and adaptation.

11. Conclusions

We found no evidence that prior support for climate adaptation undermines subsequent engagement in climate mitigation. On the contrary, we found some evidence that highlighting adaptation options increases worry about impacts of climate change, which makes people more likely to engage in climate mitigation. Even though the synergic effect of climate adaptation and mitigation seems to be rather small, it is certainly reassuring to find such a synergic effect as both adaptation and mitigation strategies need to be combined to effectively address risks associated with climate change.

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Figure 1

Standardized effect sizes of adaptation and mitigation treatments and their 95% CIs

Note. Panel A. displays standardized effects of adaptation treatment on mitigation attitude; panel B. displays the effect of mitigation treatment on adaptation attitude. Dots represent means of posterior distributions of standardized effect sizes (Cohen's d); error bars represent 95% credible intervals (percentile-based) of these standardized effects. Vertical broken line represents zero effect ($d = 0$).

Appendix

Table A1

List of cities with more than 80,000 inhabitants in each country and their respective population share within the population of such cities

	Czech Republic		Hungary		Poland		Slovak Republic	
#	City	Pop. share [%]	City	Pop. share [%]	City	Pop. share [%]	City	Pop. share [%]
1	Praha	48	Budapest	60	Warszawa	16	Bratislava	56
2	Brno	14	Debrecen	7	Kraków	7	Košice	32
3	Ostrava	11	Szeged	6	Łód	6.2	Prešov	13
4	Plze	6	Miskolc	6	Wrocław	5.8		
5	Olomouc	4	Pécs	5	Pozna	4.8		
6	Liberec	4	Gy r	5	Gda sk	4.2		
7	Pardubice	3	Nyíregyháza	5	Szczecin	3.6		
8	Hradec Králové	3	Kecskemét	4	Bydgoszcz	3.1		
9	Ústín nad	3	Székesfehérvár	3	Lublin	3.1		

	Labem							
10	eské Bud jovice	3			Białystok	2.7		
11					Katowice	2.6		
12					Gdynia	2.2		
13					Cz stochowa	2		
14					Radom	1.9		
15					Toru	1.8		
16					Sosnowiec	1.8		
17					Kielce	1.8		
18					Rzeszów	1.7		
19					Gliwice	1.6		
20					Zabrze	1.6		
21					Olsztyn	1.6		
22					Bielsko-Biała	1.5		
23					Bytom	1.5		
24					Zielona Góra	1.3		

25					Rybnik	1.3		
26					Ruda ńska	1.2		
27					Opole	1.2		
28					Tychy	1.2		
29					Gorzów Wielkopolski	1.1		
30					D ąbrowa Górnicza	1.1		
31					Elbl ąg	1.1		
32					Płock	1.1		
33					Wałbrzych	1		
34					Włocławek	1		
35					Tarnów	1		
36					Chorzów	1		
37					Koszalin	1		
38					Kalisz	0.9		
39					Legnica	0.9		

40					Grudzi dz	0.9		
41					Jaworzno	0.8		
42					Słupsk	0.8		

Table A2*Adaptation attitude scale*

#	Item
1	Building so-called green facades on public buildings (vertical vegetation on buildings).
2	Installation of roofs designed to capture and reuse rainwater in public buildings.
3	Installation of night ventilation systems in public buildings
4	Installation of shading features in public buildings (e.g. outdoor blinds and awnings)
5	Conversion of impermeable concrete and asphalt surfaces of public spaces, pavements and streets to semi-permeable areas with greenery.
6	Conversion of impermeable concrete surfaces of car parks and pedestrian paths to permeable gravel surfaces.
7	Implementation of regular awareness campaigns on the health risks of high temperatures in cities for the homeless and socially excluded groups.
8	Implementation of regular awareness campaigns on the health risks of increased temperatures in cities for elderly and other vulnerable groups.
9	Creation of a heatwave early warning system for providing information for different groups of residents and reporting on a crisis management plan.
10	Creation of an early warning system to alert residents about extreme weather events via text messages (SMS).
11	Fitting children's playgrounds with shading features (e.g. shelters, awnings)
12	Creation of new nature-based water retention areas to compensate for seasonal fluctuations in urban watercourses.

13	Increasing the retention capacity of existing water bodies (e.g. by mud excavation) to compensate for seasonal fluctuations in urban watercourses.
14	Installation of water mist sprayers in public spaces.
15	Installation of automatic rainwater irrigation systems for watering urban greenery.
16	Planting new trees on streets and along roads.
17	Replacement of existing public building roofs with so-called green roofs with vegetation.
18	Construction of classical roofs on public buildings with removal of rainwater and seepage on site of building.
19	The use of materials which reflect heat and sunlight on the facades of public buildings.
20	Installation of white roofs on public buildings which reflect excessive sunlight.
21	Replacing asphalt and concrete surfaces of public spaces with semi-permeable surfaces (e.g. retention paving with distance joints, grass blocks)
22	Conversion of impermeable concrete and asphalt surfaces of car parks, streets and pavements to semi-permeable concrete and asphalt surfaces.
23	Limiting electricity supply to households in the event of an increased risk of power outages during periods of extreme heat.
24	Limiting the air conditioning of public buildings in the event of an increased risk of power outages during periods of extreme heat.
25	Reducing public access to urban greenery during periods of heat to reduce the risk of fires.
26	Modification of facades and roofs of historic buildings to absorb less heat (use of light

	reflective materials).
27	More frequent sprinkling of pavements during heat waves using drinking water from the water mains.
28	Change and optimization of street orientation to increase wind cooling and reduce overheating.
29	Creation of publicly inaccessible concrete retention tanks for rainwater and its drainage into the sewer system.
30	Creation of underground retention tanks using to capture water for urban vegetation watering.
31	Increasing the retention capacity of existing water bodies by their area expansion.
32	Construction of chargeable automatic drinking fountains with chilled water in public spaces.
33	Installation of irrigation systems using drinking water from the mains for irrigation of urban vegetation
34	Building new suburban woods, wooded parks and parks.
35	Replacing greenery, which dries, with the same types of greenery with the same risk of drying.
36	Greening existing public spaces (squares and streets, etc.) by introducing off limits grass and herbal strips.
37	Planting new flower beds on the streets and alongside roads.
38	Introducing concrete boxes with flowers into streets without greenery.
39	Placing synthetic retention absorbers without vegetation on flat roofs to collect

	rainwater.
40	Construction of high-rise buildings providing shade in the city center.
41	Capturing rainwater from the roofs of public buildings and its saturation into the ground on the site of the building.
42	Replacement of concrete banks of watercourses in towns with nature-based river beds.
43	Improved systems for rapid rainwater drainage into sewers.
44	Limitations on water supply for watering private gardens.
45	Restrictions on the operation of public buildings and reduction of office during periods of extreme heat.
46	Restrictions on water supply to households during periods of drought.
47	Building publicly inaccessible green corridors to improve urban ventilation.
48	Building nature-based water areas in the city (e.g. wetlands, streams)
49	Creation of underground retention tanks for rainwater capture and drainage.
50	Creation of artificial water retention bodies, inaccessible to the public, to compensate for seasonal fluctuations in urban watercourse.
51	Increasing retention capacity by countersinking existing water bodies.
52	Installation of irrigation systems exploiting deep groundwater wells for watering of urban greenery.
53	Adoption of a law establishing an obligation to provide free water in restaurants, bistros and cafés.
54	Replacement of urban wild and unkempt vegetation with flower beds.

55	Replacing concrete noise barriers with green noise barriers.
56	Conversion of urban public car parks to areas of urban greenery.
57	Introducing concrete boxes with bushes and trees into streets without greenery.
58	Introducing concrete boxes with flowers into streets with trees.

Notes: Participants indicated acceptance of each adaptation measure on a five-point Likert scale. The questionnaire used on Prague sample had a slightly different response categories (1 = strongly not support, 2 = rather not support, 3 = rather support, 4 = strongly support, 5 = do not know) than questionnaires used in the remaining four samples (1 = strongly oppose, 2 = rather oppose, 3 = rather support, 4 = strongly support, 5 = do not know).

Table A3*Mitigation attitude scale*

#	Item
1	<i>I will be keeping the engine running at red traffic lights.*</i>
2	<i>I will be driving at speeds under 100 kph (= 62.5 mph) on freeways.</i>
3	<i>I will be having chemical air freshener in my bathroom.*</i>
4	I will be eating only vegetarian meals.*
5	I will be trying to minimize the waste I produce.
6	<i>I will be taking a plastic bag in a store, when offered one.*</i>
7	I will be showering, rather than taking a bath.*
8	In winter, I will be turning down the heat when I leave my apartment for more than 4 hours.*
9	<i>I will be keeping the lights on in rooms that are not used by anybody.</i>
10	I will be saving money in a bank which invests in ecological products and technologies (e.g. renewables).
11	I will be buying food from local producers.*
12	I will be using only LED lighting at home.
13	<i>In hotels, I will be having the towels changed daily.*</i>
14	I will be buying domestically grown wooden furniture.*
15	I will be collecting and recycling used paper.*
16	<i>In the winter, I will be keeping the heat on, so that I do not have to wear a sweater.*</i>
17	I will be using a fuel-efficient automobile (less than 6 liters per 100 kilometers).*

18	<i>I will be buying coffee and other drinks in disposable cups.</i>
19	<i>I will be driving to where I want to start my hikes.*</i>
20	I will prefer going on domestic holidays before going on holidays abroad.
21	In nearby areas (around 30 kilometres; around 20 miles), I will be using public transportation or riding a bike.*
22	I will be reducing my consumption of dairy products.
23	I will be disconnecting the TV or computer from the wall, when I do not use it.
24	<i>I will be buying only new clothes.</i>
25	I will be waiting until I have a full load before doing my laundry.*
26	<i>In the winter, I will be airing rooms while keeping on the heat and leaving windows open, simultaneously.*</i>
27	<i>I will be keeping the engine running while waiting in front of a railroad crossing or in a traffic jam.*</i>
28	<i>I will be driving my car in or into the city.*</i>
29	I will be riding a bicycle or taking public transportation to work or school.*
30	<i>I will be throwing away the leftovers of fruits and vegetables into the mixed waste.</i>
31	I will be buying products in refillable packages.*
32	<i>I will be buying bottled water.*</i>
33	<i>I will be buying more food than I actually consume.</i>
34	I will be looking into the pros and cons of having a private source of solar power.*
35	<i>I will be buying beverages in cans.*</i>

36	I will buy groceries and other products in unpackaged stores.
37	I will be offering a car for carpooling into work or school.*
38	I will be using a hybrid or fully electric car.
39	I will be washing dirty clothes without prewashing.*
40	<i>I will be using an oven cleaning spray to clean my oven.*</i>
41	I will be having a contract for renewable energy with my energy provider.*
42	I will be reusing my shopping bags.*
43	I will be refraining from owning a car.*
44	At home, I will be using an energy saving fridge (class A+++).*
45	I will be cleaning up rubbish after myself in the countryside.*
46	I will be buying seasonal fruit and vegetables.*
47	I will be driving in such a way as to keep my fuel consumption as low as possible.
48	<i>At home, I will be using air conditioning when it is hot outside.</i>
49	I will be repairing broken stuff, instead of buying new things.
50	I will be buying only products which can be recycled.
51	<i>I will be using fabric softener with my laundry.*</i>
52	I will purchase solar panels.*
53	<i>I will be ordering home delivery of pre-cooked food.</i>
54	<i>I will be using a clothes dryer.*</i>
55	<i>For longer journeys (more than 6 hours of travel time by car), I take an airplane.*</i>
56	I will be finding out the carbon footprint of products which I buy.*

57	At home, I will have high-capacity batteries, charged from solar panels.
58	I will be bringing empty bottles to a recycling bin.*

Notes: Asterisk denotes 38 items that were adopted from the GEB scale (e.g., Byrka et al., 2016); remaining items were new. For each item, participants indicated the probability of such behavior over the next year using five-point Likert scale (1 = very unlikely, 2 = rather unlikely, 3 = rather likely, 4 = very likely, 5 = I do not know/ not relevant). Twenty two items in italics had negative valence and were reverse-coded prior to data analysis. Items were translated from English to national languages.

Figure A1

Posterior distribution of effect sizes (effect of adaptation on mitigation, Study 1)

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A2*Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 1)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A3*Posterior distribution of effect sizes (effect of adaptation on mitigation, Study 2)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A4*Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 2)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Table A4

Effects of the type of treatment, position of the mediator, and their interaction on the climatic beliefs (regression coefficients and their 95% CIs, Bayesian robust linear regression, Study 2).

Independent variables	Worry		Climate Change		Antropogenic causation	
	b	95% CI	b	95% CI	b	95% CI
<i>Treatment type:</i>						
<i>adaptation-first</i>	-0.1	[-0.4, 0.19]	0.03	[-0.24, 0.3]	0.08	[-0.21, 0.37]
<i>Mediator position:</i>						
<i>after treatment</i>	0.43	[0.14, 0.73]	0.23	[-0.04, 0.52]	0.39	[0.08, 0.69]
<i>Treatment type:</i>						
<i>adaptation-first</i> ×						
<i>mediator position:</i>					-	
<i>after treatment</i>	0.06	[-0.36, 0.5]	-0.3	[-0.71, 0.09]	0.42	[-0.86, 0]

Note. *Treatment type:* *adaptation-first* is a dummy-coded indicator taking value of 1 for adaptation-first treatment condition, and 0 for mitigation-first treatment condition; *mediator position:* *after treatment* is a dummy-coded indicator taking value of 1 if the mediator variable has been measured after the treatment, and value of 0 if the mediator has been measured before the treatment; *treatment type: adaptation-first* × *mediator position: after treatment* is a mean-centered interaction of the two dummy variables; mean-centering is used here to facilitate interpretation of the interactive effect.

Table A5

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = worry about climate change; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.013	[-0.070, 0.096]	.616
Treatment -> belief	0.163	[0.068, 0.258]	> .999
Belief -> attitude	0.103	[0.022, 0.184]	.992
Indirect treatment effect -> attitude	0.017	[0.003, 0.037]	.992

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A6

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = belief in the existence of climate change; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.028	[-0.050, 0.105]	.758
Treatment -> belief	0.071	[-0.021, 0.163]	.931
Belief -> attitude	0.002	[-0.084, 0.091]	.509
Indirect treatment effect -> attitude	0.00	[-0.008, 0.008]	.505

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A7

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = belief in anthropogenic causation; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.019	[-0.059, 0.094]	.689
Treatment -> belief	0.100	[0.006, 0.192]	.981
Belief -> attitude	0.093	[0.013, 0.172]	.988
Indirect treatment effect -> attitude	0.009	[0.000, 0.024]	.970

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A8

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = worry about climate change; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.000	[-0.091, 0.093]	.498
Treatment -> belief	0.125	[0.03, 0.221]	.992
Belief -> attitude	0.341	[0.247, 0.434]	> .999
Indirect treatment effect -> attitude	0.042	[0.01, 0.08]	.992

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A9

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = belief in the existence of climate change; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.047	[-0.054, 0.144]	.828
Treatment -> belief	-0.012	[-0.103, 0.082]	.404
Belief -> attitude	0.220	[0.124, 0.319]	> .999
Indirect treatment effect -> attitude	-0.002	[-0.024, 0.019]	.404

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A10

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = belief in anthropogenic causation; Bayesian mediation analysis, Study 2)

		95% CI	P(> 0)
Treatment -> attitude	0.040	[-0.053, 0.135]	.794
Treatment -> belief	0.014	[-0.089, 0.112]	.609
Belief -> attitude	0.244	[0.152, 0.339]	> .999
Indirect treatment effect -> attitude	0.003	[-0.022, 0.029]	.609

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Figure A5*Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 3)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A6*Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 3)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Table A11

Effects of the type of treatment, position of the mediator, and their interaction on the climatic beliefs (regression effect estimates and their 95% CIs, Bayesian robust linear regression, Study 3)

	Anthropogenic					
	Worry		Climate change		causation	
Treatment: adapt. first	0.10	[-0.19, 0.39]	-0.10	[-0.35, 0.16]	-0.13	[-0.42, 0.15]
Mediator position:						
after treatment	0.24	[-0.05, 0.53]	-0.11	[-0.35, 0.14]	-0.08	[-0.37, 0.2]
Treatment x mediator						
position	-0.09	[-0.51, 0.32]	0.26	[-0.09, 0.6]	0.33	[-0.07, 0.72]

Note. *Treatment type: adaptation-first* is a dummy-coded indicator taking value of 1 for adaptation-first treatment condition, and 0 for mitigation-first treatment condition; *mediator position: after treatment* is a dummy-coded indicator taking value of 1 if the mediator variable has been measured after the treatment, and value of 0 if the mediator has been measured before the treatment; *treatment type: adaptation-first* × *mediator position: after treatment* is a mean-centered interaction of the two dummy variables; mean-centering is used here to facilitate interpretation of the interactive effect.

Table A12

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = worry about climate change; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.026	[-0.098, 0.045]	0.240
Treatment -> belief	0.044	[-0.038, 0.131]	0.839
Belief -> attitude	0.075	[0.002, 0.148]	0.978
Indirect treatment effect -> attitude	0.003	[-0.003, 0.012]	0.822

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(\beta > 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A13

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = belief in the existence of climate change; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.023	[-0.093, 0.046]	0.265
Treatment -> belief	0.002	[-0.080, 0.086]	0.520
Belief -> attitude	0.018	[-0.053, 0.092]	0.682
Indirect treatment effect -> attitude	0.000	[-0.004, 0.004]	0.510

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A14

Mediation analysis (DV = adaptation attitude, treatment = expressing an intention to engage in mitigation, mediating belief = belief in anthropogenic causation; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.021	[-0.090, 0.049]	0.280
Treatment -> belief	0.015	[-0.074, 0.107]	0.630
Belief -> attitude	0.067	[-0.004, 0.140]	0.963
Indirect treatment effect -> attitude	0.001	[-0.006, 0.009]	0.616

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(> 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A15

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = worry about climate change; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.050	[-0.140, 0.035]	0.135
Treatment -> belief	0.076	[-0.015, 0.169]	0.949
Belief -> attitude	0.312	[0.222, 0.399]	1.000
Indirect treatment effect -> attitude	0.024	[-0.005, 0.055]	0.949

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(\beta > 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A16

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = belief in the existence of climate change; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.037	[-0.126, 0.051]	0.211
Treatment -> belief	0.006	[-0.072, 0.088]	0.550
Belief -> attitude	0.216	[0.126, 0.305]	1.000
Indirect treatment effect -> attitude	0.001	[-0.016, 0.020]	0.550

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(\beta > 0)$ is the posterior probability that the estimated coefficients β is positive.

Table A17

Mediation analysis (DV = mitigation attitude, treatment = expressing support for adaptation measures, mediating belief = belief in anthropogenic causation; Bayesian mediation analysis, Study 3)

		95% CI	P(> 0)
Treatment -> attitude	-0.032	[-0.123, 0.062]	0.248
Treatment -> belief	0.038	[-0.055, 0.132]	0.788
Belief -> attitude	0.212	[0.122, 0.303]	1.000
Indirect treatment effect -> attitude	0.008	[-0.011, 0.031]	0.788

Note. Standardized regression coefficients, β s, are mean values of the posterior distribution of standardized regression coefficients; 95% CIs are percentile-based credible intervals for β s; $P(\beta > 0)$ is the posterior probability that the estimated coefficients β is positive.

Figure A7*Posterior distribution of effect sizes (effect of adaptation on mitigation, Study 4)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A8

Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 4)

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Table A18

Statistical effect of climatic beliefs on adaptation attitude (Bayesian robust regression, Study 4)

Independent variables	b	95% CI
Intercept	-0.04	[-24.41, 24.19]
Worry about CC	-0.12	[-58.73, 59.8]
Belief in CC	-0.06	[-56.29, 55.43]
Belief in anthrop. causation	-0.39	[-57.23, 56.05]

Note. The Bayesian equivalent of the regression coefficient, b , is the mean value of the posterior distribution of coefficient estimates; 95% credible intervals are based on percentiles. The three climatic belief variables had seven response categories, which were recoded using orthogonal polynomial coding for linear effect (see preregistered script for details).

Table A19

Statistical effect of climatic beliefs on mitigation attitude (Bayesian robust regression, Study 4)

Independent variables	b	95% CI
Intercept	-0.1	[-24.34, 23.84]
Worry about CC	1.56	[-54.81, 59.56]
Belief in CC	-0.5	[-55.47, 53.04]
Belief in anthrop. causation	-0.01	[-59.35, 58.81]

Note. The Bayesian equivalent of the regression coefficient, b , is the mean value of the posterior distribution of coefficient estimates; 95% credible intervals are based on percentiles. The three climatic belief variables had seven response categories, which were recoded using orthogonal polynomial coding for linear effect (see preregistered script for details).

Table A20

Association between adaptation and mitigation attitudes and climatic beliefs. (Bayesian robust correlations and their posterior probability of being positive, Study 4)

	1	2	3	4	5
1. Adapt. attitude		< .999	< .999	0.374	0.984
	0.19				
2. Mitig. attitude	[0.12 0.25]		< .999	< .999	< .999
	0.14	0.32			
3. Worry about CC	[0.07 0.21]	[0.26 0.38]		< .999	< .999
	-0.01	0.2	0.67		
4. Belief in CC	[-0.08 0.06]	[0.14 0.27]	[0.63 0.71]		< .999
	0.07	0.21	0.56	0.56	
5. Belief in anthrop. causation	[0.01 0.14]	[0.15 0.27]	[0.51 0.6]	[0.51 0.61]	

Note. The lower triangle displays estimates of robust correlation coefficients and their 95% credible intervals; the upper triangle displays posterior probabilities that correlation coefficients are positive.

Figure A9*Posterior distribution of effect sizes (effect of adaptation on mitigation, Study 5)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Figure A10*Posterior distribution of effect sizes (effect of mitigation on adaptation, Study 5)*

Note. Panel A displays the posterior distribution of the raw treatment effect; panel B displays the posterior distribution of the standardized treatment effect (Cohen's d). Treatment effects were computed by subtracting posterior estimates of the location parameter for the control condition from those of the treatment condition. Vertical broken lines denote 95% credible intervals (percentile-based) on posterior distributions.

Table A21

Statistical effect of climatic beliefs on adaptation attitude (Bayesian robust regression, Study 5)

Independent variables	b	95% CI
Intercept	-0.29	[-36.79, 35.89]
Worry about CC	0.14	[-51.63, 54.15]
Belief in CC	0.14	[-52.79, 52.45]
Belief in anthrop. causation	0.4	[-61.57, 60.82]

Note. The Bayesian equivalent of the regression coefficient, b , is the mean value of the posterior distribution of coefficient estimates; 95% credible intervals are based on percentiles. The three climatic belief variables had seven response categories, which were recoded using orthogonal polynomial coding for linear effect (see the preregistered script for details).

Table A22

Statistical effect of climatic beliefs on mitigation attitude (Bayesian robust regression, Study 5)

Independent variables	b	95% CI
Intercept	-0.12	[-24.78, 23.73]
Worry about CC	0.33	[-58.04, 56.05]
Belief in CC	-0.09	[-54.46, 51.75]
Belief in anthrop. causation	-0.36	[-59.27, 58.57]

Note. The Bayesian equivalent of the regression coefficient, b , is the mean value of the posterior distribution of coefficient estimates; 95% credible intervals are based on percentiles. The three climatic belief variables had seven response categories, which were recoded using orthogonal polynomial coding for linear effect (see the preregistered script for details).

Table A23

Association between adaptation and mitigation attitudes and climatic beliefs (Bayesian robust correlations and their posterior probabilities of being positive, Study 5)

	1.	2.	3.	4.	5.
1. Adapt. attitude		< .999	0.999	0.999	0.83
	0.17				
2. Mitig. attitude	[0.1 0.23]		< .999	< .999	0.999
	0.11	0.26			
3. Worry about CC	[0.04 0.18]	[0.19 0.31]		< .999	< .999
	0.1	0.17	0.61		
4. Belief in CC	[0.04 0.17]	[0.1 0.23]	[0.56 0.65]		< .999
5. Belief in anthrop. causation	0.03	0.11	0.48	0.47	
	[-0.04 0.1]	[0.05 0.18]	[0.43 0.53]	[0.41 0.52]	

Note. The lower triangle displays estimates of robust correlation coefficients and their 95% credible intervals, the upper triangle display posterior probability that correlation coefficients are positive.