Word count: 5,936

Effects of Social, Biospheric and Temporal Dilemma Preferences on Climate Change Adaptation and Mitigation

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This work was supported by the EU LIFE program (project LIFE TreeCheck: Green Infrastructure Minimising the Urban Heat Island Effect, grant No. LIFE17 GIC/CZ/000107).

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Highlights

- Focus on immediate consequences (CFC-I) has a positive effect on climate adaptation but a negative effect on climate mitigation
- Egoistic value has a positive effect on climate adaptation but a negative effect on climate mitigation
- Biospheric and altruistic values and focus on future consequences (CFC-F) have positive effects on mitigation and adaptation

Abstract

Social, biospheric, and temporal dilemma preferences are known to affect people's decision making regarding engagement in proenvironmental behavior and, more specifically, also their engagement with climate change. In this study, we focus on the role of three social dilemma preferences (biospheric, egoistic and altruistic values) and two temporal preferences (consideration of future and immediate consequences) as factors of adaptation support and mitigation intention. We found, across four independent preregistered studies (total N = 3,710) conducted in four different countries, that some dilemma preferences affect climate mitigation intention and adaptation support similarly, whereas others have a differential effect on the types of actions. Those with an eye on the immediate consequences of their actions and who are concerned about direct personal benefits are likely to support climate adaptation but not climate mitigation. Generally, though, people who consider future events and their implications in their decision making and those who consider benefits for the biosphere and other people are likely to engage both in climate mitigation and climate adaptation.

Keywords: global climate change, adaptation, mitigation, values, consideration of future consequences

Effects of Social, Biospheric and Temporal Dilemma Preferences on Climate Change Adaptation and Mitigation[1]

Since human activities are an important factor of climate change (Girod et al., 2014; Jorgenson et al., 2019), any attempts to reduce the risks associated with global climate change should exploit the mitigation potential of changing individual behavior (van de Ven et al., 2018) in addition to the adoption of necessary adaptation policies (Intergovernmental Panel on Climate Change, 2018). Many factors of individual climate mitigation behavior and adaptation support have been identified (e.g., S. van der Linden, 2014; van Valkengoed & Steg, 2019) but social, biospheric, and temporal dilemma preferences seem to stand out due to their trans-situational character, temporal stability, and relatively consistent effect on climate-related behavior (e.g., Corner et al., 2014; Milfont et al., 2012).

Climate-related behavior seems to be influenced by social dilemma preference (whether to prioritize narrow self-interest or a broader social interest, see, e.g., Karp, 1996; Van Vugt et al., 1995), biospheric dilemma preference (whether to prioritize the needs of humankind or the needs of the biosphere; see, e.g., Stern & Dietz, 1994), and temporal dilemma preference (whether to prioritize short-term needs or long-term needs; see, e.g., Milfont & Gouveia, 2006). Besides guiding one's decision making by setting general trans-situational goals, such dilemma preferences also shape the perception of novel phenomena (Stern et al., 1995).

The role of dilemma preferences as factors of climate attitude and mitigation behavior has been amply documented (for an overview, see, e.g., Corner et al., 2014; Milfont et al., 2012). Even though dilemma preferences are conceptually and logically related (e.g., Joireman et al., 2004), they have been rarely studied jointly (but see Joireman et al., 2001;

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[1] All measures, manipulations, and exclusions are disclosed. No data analysis was undertaken before the end of data collection. Pre-registration of this study can be found here: https://osf.io/wmxut/?view_only=c4586bd64c854ace87eae4f08e1b9c3c Materials, data, analysis scripts and tests of all pre-registered hypotheses, can be found at the following anonymized link: https://osf.io/zc8xq/?view_only=08b97f83c37a46e19fa5f7364de9cae5 Ethical standards of this study have been reviewed by the Scientific Board of the Global Change Research Institute CAS.

Khachatryan et al., 2013; Milfont & Gouveia, 2006). Also, no studies have explored the role of general dilemma preferences in climate adaptation.

The purpose of this study is to bridge some of these gaps in the literature by looking at the role of social, biospheric, and temporal dilemma preferences in climate adaptation and mitigation. Across four preregistered studies conducted in four European countries on samples of the urban population, we aimed to investigate how general dilemma preferences affect the intention to engage in mitigation action and support adaptation measures.

Given that climate adaptation and mitigation are related yet distinct phenomena from a motivational point of view (e.g., Brügger et al., 2015), and that both are needed in sound climate change policies (IPCC, 2014), our study contributes to the theoretical understanding of how general preferences shape engagement with climate change and offers some guidance on how pre-existing preferences can be used to motivate climate engagement.

Biospheric and Social Dilemma Preferences

Biospheric, egoistic, and altruistic dilemma preferences refer to the general tendencies of people to consider, in their decision-making, the needs of the biosphere, their own needs, and the needs of humanity, respectively (De Groot & Steg, 2007). These general preferences are relatively stable personality traits that are predictive of decision-making in situations where the benefits for the biosphere, self, and humanity are at stake (De Groot & Steg, 2007). They sometimes even cast one against the others (hence the term dilemma preferences; see Khachatryan et al., 2013). Besides guiding one's decision making by setting general trans-situational goals, such dilemma preferences also shape the perception of novel phenomena by highlighting the implications of these novel phenomena for the biosphere, self, and humanity(Stern et al., 1995).

The relevance of biospheric, egoistic and altruistic dilemma preferences for decision making in the area of environmental conservation has been abundantly demonstrated by three research traditions that run somewhat in parallel but overlap substantially (Gärling, 1999; Stern & Dietz, 1994; for a discussion of the conceptual differences of value theories, see Hanel et al., 2018)and that include literature on social value orientations (e.g., Cameron et al., 1998; Van Vugt et al., 1995), literature drawing directly from Schwartz's (1992) value theory (e.g., Corner et al., 2014; Nilsson et al., 2004), and literature that has refined Schwartz's (1992) value theory for use in the environmental domain (e.g., de Groot & Steg, 2008; Joireman et al., 2001; Stern et al., 1993).

The general picture that has emerged is that biospheric preferences are consistently related to proenvironmental attitude and behavior (e.g., de Groot & Steg, 2008; Dietz et al., 2007; Fontaine et al., 2008; Stern, 2000). Proenvironmental behavior and attitude tend to be positively associated also with prosocial value orientations (e.g., Cameron et al., 1998; Gärling et al., 2003; Joireman et al., 2001; Van Vugt et al., 1995; but see Joireman et al., 2004 for the lack of such an effect) and altruistic values (e.g., De Groot & Steg, 2007; Poortinga et al., 2004; Stern, 2000), even though these associations tend to be rather weak and specific only to certain decision situations (de Groot & Steg, 2008). Positive effects of biospheric and altruistic values on proenvironmental behavior are also in line with the literature grounded in Schwartz's (1992) concept of self-transcendence (as opposed to self-enhancement) which has been repeatedly found to be positively associated with proenvironmental attitude and behavior (Milfont et al., 2010; Nordlund & Garvill, 2002; Schultz et al., 2005; Stern, 2000; Stern et al., 1998; Thøgersen & Ölander, 2002).

The pattern seems to be less clear when it comes to pro-self or egoistic orientations. On the one hand, there is some evidence that environmental behavior and attitude tend to be negatively associated with pro-self value orientation (Cameron et al., 1998; Gärling et al., 2003; Joireman et al., 1997, 2001; Van Vugt et al., 1995), self-enhancement values (Nordlund & Garvill, 2002; Stern, 2000; Stern et al., 1998; Thøgersen & Ölander, 2002), and with egoistic values (e.g., de Groot & Steg, 2008; Poortinga et al., 2004). On the other hand, there is also some evidence that self-interest can motivate proenvironmental behavior (e.g., Braun Kohlová & Urban, 2020; De Dominicis et al., 2017; Gifford & Nilsson, 2014; Griskevicius et al., 2010). The way egoistic preferences affect proenvironmental behavior appears to be contingent on what personal benefits one can draw from proenvironmental conservation (De Dominicis et al., 2017).

Engagement with Global Climate Change

Biospheric preferences are positively associated with belief in climate change (see the meta-analysis by Hornsey et al., 2016), knowledge of the impacts of and responses to GCC (Xie et al., 2019), concern about the impacts of GCC that are either general (Shi et al., 2016) or specific (Marshall et al., 2019), risk perception associated with GCC (Sander van der Linden, 2015), and intention to engage in mitigation behavior and support mitigation policies (Marshall et al., 2019; Xie et al., 2019). Also, altruistic preferences tend to be positively associated with knowledge of the impacts of and responses to GCC (Xie et al., 2019), concern about the impacts of GCC that are either general (Shi et al., 2016) or specific (Marshall et al., 2019), risk perception associated with GCC (Sander van der Linden, 2015), and intention to engage in mitigation behavior and support mitigation policies (Marshall et al., 2019; Xie et al., 2019). However, altruistic preferences tend to be weaker predictors of engagement with climate change than biospheric preferences (Shi et al., 2016). The generally positive associations between biospheric and altruistic preferences and climate change beliefs, attitudes, and behavior are also consistent with the evidence of a positive association between more general self-transcendent preferences (that should include also altruistic and biospheric values; see de Groot & Steg, 2008) and pro-climatic beliefs (Milfont et al., 2015; Poortinga et al., 2019), pro-climatic attitude (Brown & Kasser, 2005; De Groot & Steg, 2007;

Poortinga et al., 2004, 2019), and climate mitigation behavior and policy support (Corner et al., 2014; Dietz et al., 2007; Nilsson et al., 2004).

The picture is less clear when it comes to egoistic preferences. As mentioned earlier, there is ample evidence that self-enhancement (as opposed to self-transcendence) is negatively related to pro-climatic beliefs, attitudes, and behavior (e.g., Corner et al., 2014; Poortinga et al., 2019). There is also some evidence that egoistic values are negatively associated with certain types of climate-related knowledge and perceived inefficacy of mitigation response (Xie et al., 2019), and with the intention to mitigate climate change (Khachatryan et al., 2013). However, several studies did not find any association between egoistic value and worry about the impacts of GCC (Marshall et al., 2019; Shi et al., 2016), or individual mitigation behavior and policy support (Dietz et al., 2007; Xie et al., 2019). Moreover, there is evidence that egoistic value is associated with precursors of pro-climatic attitude and behavior, such as climatic risk perception and concern (positive associations; e.g., Sander van der Linden, 2015; Xie et al., 2019), and negative emotions related to impacts of GCC (negative association; e.g., Marshall et al., 2019).

Temporal Dilemma Preferences

Many environmental problems—notably global climate change (Zickfeld & Herrington, 2015)—involve important inter-temporal tradeoffs between the necessity to address these problems in the present time and the fact that such actions will have benefits in the relatively distant future (e.g., Luderer et al., 2013). Accordingly, temporal preferences are important factors of proenvironmental attitude and behavior (for meta-analysis, see Milfont et al., 2012). There are several traditions of measurement of temporal preferences, such as those using consideration of future consequences scales (CFC; Strathman et al., 1994) or the Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 1999), but their results seem to overlap in many contexts (Pozolotina & Olsen, 2019).

Previous studies have found that orientation on immediate consequences is negatively associated with environmental concern and motivation (Arnocky et al., 2014) and proenvironmental behavior (see a meta-analysis by Milfont et al., 2012), whereas orientation on the future is positively associated with environmental concern and motivation (Arnocky et al., 2014) and proenvironmental intention and behavior (Bruderer Enzler, 2015; Joireman et al., 2001, 2004; see also a meta-analysis by Milfont et al., 2012). Essentially, same patterns have been observed regarding climate change mitigation: future orientation is positively associated with support for mitigation policies and individual mitigation behavior (Corral-Verdugo et al., 2017; Dietz et al., 2007; Khachatryan et al., 2013), whereas immediate-orientation is negatively associated with mitigation behavior and policy support (e.g., Khachatryan et al., 2013; but see Corral-Verdugo et al., 2017, who failed to find such an effect). No research has focused on the effect of temporal preferences on adaptation attitude and behavior.

The obliqueness of Dilemma Preference Space

Social and temporal dilemma preferences are not independent but, rather, form an oblique space whereby holding one type of preference makes the person more likely to hold certain preferences of other types (e.g., Khachatryan et al., 2013; but see Milfont & Gouveia, 2006). The obliqueness of the social preference space was noted early on in the circumplex structure of human values (Schwartz, 1992) whereby certain types of preferences (e.g., altruistic and biospheric values) belong to a more general value cluster (i.e., the universalism value cluster) characterized by a common guiding principle (i.e., appreciation and protection of all people and nature de Groot & Steg, 2008; Schwartz, 1992); differences between such preferences become obvious only in situations that contrast them directly (i.e., the situation when people have to choose between an altruistic act and an act that benefits the biosphere; de Groot & Steg, 2008). Social dilemma preferences are also tied to temporal preferences because individual self-interest is necessarily bound by a much short time horizon than preferences regarding collective benefits and benefits for the biosphere (e.g., Joireman et al., 2004). Given the considerable overlap between social and temporal preferences, the question remain to what degree do individual social and temporal preferences contribute a unique piece of information for the prediction of mitigation and adaptation behavior.

Hypotheses

Based on the results of previous studies, we expect that mitigation intention will be positively affected by biospheric and altruistic values, and by a focus on future consequences, and negatively affected by egoistic value and a focus on immediate consequences. We expect the same patterns to hold for adaptation policy support.

Research Objectives

This study aimed to investigate the relationship between general preferences in social and temporal dilemmas and engagement with climate change. Specifically, across four preregistered studies conducted on samples of the urban population of four European countries, we tested for general patterns of relationships between three social preferences (i.e., biospheric, egoistic and altruistic) and two temporal preferences (i.e., focus on the future and immediate consequences), and intention to engage in individual mitigation behavior and support urban adaptation policies. Given the known empirical overlaps between dilemma preferences, we also aimed to explore the potential redundancy of dilemma preferences in explanation of mitigation intention and adaptation support. Also, we explored differences in the effects of dilemma preferences on mitigation intention and adaptation support and the degree to which such differences can be generalized across countries.

Method

Details of the method, including materials, data collection, and analyses can be found at the following anonymized link:

https://osf.io/zc8xq/?view_only=08b97f83c37a46e19fa5f7364de9cae5

Participants

Participants for each national study were recruited from participant pools run by opinion poll companies in Czechia, Hungary, Poland, and Slovakia using country-specific quotas (age groups, gender, education, and city of residence) to approximate the adult population aged 18-60 of large cities (over 80,000 inhabitants) in each country. Between 1,000 and 1,007 participants completed the study in each country; based on preregistered criteria, we excluded between 2.6% and 15.2% of participants who reported repeated access to the questionnaire and between 0.9% and 1.7% participants for whom we could not estimate Rasch-calibrated measures of mitigation intention and adaptation support (see Appendix for details). The remaining national samples (N = 844-966) were variable in terms of gender (50.9%-53.1% were females), education (13.1%-36.5% had primary education, 40.7%-45.6% had secondary education, and 22.5%-41.3% had tertiary education), age (the relative frequencies of age groups 18-29, 30-39, 40-49 and 50-60 were 20.1%-27.9%, 27.7%-30.7%, 20.9%-27.1%, and 20.5%-23.0%, respectively). The regional coverage for the large cities was also good in each country (see Appendix for details). Given that the sample was drawn using non-probabilistic sampling, we cannot claim representatives of national samples.

Materials

Support for Climate Adaptation

Support of climate adaptation in cities was assessed with 58 items eliciting support for specific 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. Items were developed in English and translated into the four national languages using the translation and back-translation procedure (Brislin, 1970). Participants indicated acceptance of each 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 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). Before being calibrated as a Rasch scale (for technical details of the Rasch measurement model, see Bond & Fox, 2012), items were dichotomized by collapsing the categories “strongly not support” and “rather not support” and the categories “rather support” and “strongly support” before analysis to reduce the measurement error (e.g., Kaiser & Wilson, 2004), and to simplify the Rasch model; “do not know” responses were recorded as missing values. The measure had excellent internal consistency reliability, α =.92-.94, and separation reliability, rel. = .80-.93. Note that this measure and the measure of mitigation intention are grounded in a theoretical framework of attitude measurement knowns as the Campbell paradigm (Byrka et al., 2010; Kaiser & Wilson, 2019); both latent constructs could be alternatively referred to as attitudes because they capture behavioral tendency that is a defining feature of attitude (e.g., Kaiser et al., 2010).

Intention to Engage in Climate Mitigation Behavior

Intention to engage in climate mitigation behavior was assessed with 58 items eliciting individual intention to engage in specific climate mitigation actions over the next year. Forty-eight mitigation actions were adopted from the recent version of the General Environmental Behavior scale (Byrka et al., 2017). The remaining 10 items were developed by authors and their face validity was checked independently by four environmental scientists (see Appendix for details of items). Items were developed in English and translated into the four national languages using the translation and back-translation procedure (Brislin, 1970). An example of an item: "I will be eating only vegetarian meals." For each item, participants indicated how likely it was that they would engage in each behavior in the next year 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 items with negative valence were reverse-coded. Responses to all items were dichotomized by collapsing the categories "very unlikely" and "rather unlikely" and the categories "rather likely" and "very likely" to reduce potential measurement error (e.g., Kaiser & Wilson, 2004) and simplify the model estimation. The response category "do not know" was treated as missing information. The measure had sufficient internal consistency reliability, α =.79-.81, and separation reliability, rel. = .75-.80.

Social Dilemma Preferences

Social dilemma preferences were assessed using biospheric (four items), egoistic (five items), and altruistic (five items) subscales from the Environmental Portrait Value Questionnaire (E-PVQ, Bouman et al., 2018). Items were translated from English into the four national languages using the translation and back-translation procedure (Brislin, 1970). An example of an item measuring biospheric values: "It is important to [him/her] to prevent environmental pollution." An example of an item measuring egoistic values: "It is important to [him/her] to have control over others' actions." An example of an item measuring altruistic values: "It is important to [him/her] that every person has equal opportunities." Participants indicated whether the person described in each item is like him or her on a seven-point scale (1 = *the person is totally not like you*, 7 = *the person is totally like you*). Three items of the hedonic subscale from E-PVQ were not used in this study. Before analysis, some items were reverse-coded so that higher scores reflected higher intensity of a particular preference. For each subscale of interest, a standardized summed score was computed. Internal consistency reliability was high for biospheric (α = .90-.91), egoistic (α = .74-.79), and altruistic subscale (α = 79-84).

Temporal Dilemma Preferences

Temporal dilemma preferences were assessed with the Consideration of Future Consequences scale (CFC, Strathman et al., 1994). Five items from this scale captured focus on future consequences (CFC-F); an example of an item: "I consider how things might be in the future." Another seven items captured focus on immediate consequences (CFC-I); an example of an item: "I mainly act to satisfy my immediate concerns, figuring the future will take care of itself." Participants indicated how characteristic was each description of themselves on a five-point Likert scale (1 = *extremely uncharacteristic*, 5 = *extremely characteristic*). Items were translated from English into the four national languages using the translation and back-translation procedure (Brislin, 1970).

Due to a technical error, the Slovak study had one item missing in CFC-F and one in CFS-I subscales (items "My convenience is a big factor in the decisions I make or the actions I take," and „Since my day-to-day work has specific outcomes, it is more important to me than behavior that has distant outcomes", respectively). To make the results comparable across countries, we excluded the two items from the scales in each of the countries. Note, however, that removing the two items had practically no effects on reliability of scales or on substantive results within or across the countries (see Appendix for details of analyses conducted with the full set of items).

In the preregistration, we defined the scale a priori as a two-dimensional scale (for supporting evidence, see Adams, 2012; Bruderer Enzler, 2015; Khachatryan et al., 2013; Rappange et al., 2009; Toepoel, 2010) and decided to derive distinct scores for the CFC-F and CFC-I dimensions through confirmatory factor analysis (see the analytical *R* script for details) and standardize these scores before analysis. Estimates of latent scores capturing focus on future and immediate consequences were standardized prior to analysis. CFC-F had a sufficient reliability, α = .67-.74, CFC-I had excellent reliability, α = 80-.84.

Analysis

To analyze the statistical effects of dilemma preferences on support for adaptation measures and climate mitigation intention, we ran mixed logistic models with either response to mitigation or adaptation items as dependent variables and dilemma preferences (measured at the levels of individuals) as independent variables included as fixed effects. Also, this model included a random intercept over individuals that captured the average tendency of each individual to express a certain level of policy acceptance or mitigation intention, and also a random intercept over items that captured the average level of acceptability of each measure or average intention to engage in specific mitigation action. Note that this approach is conceptually similar to formulating an explanatory Rasch model, specifically the latent regression Rasch model (LRRM, for details, see De Boeck & Wilson, 2011). As in LRRM, people's characteristics, such as dilemma preferences, are directly included in the measurement model for the dependent variables (i.e., adaptation support and mitigation intention) at the item rather than a personal level. As such, this model uses the full information provided by each individual when repeatedly expressing policy support or mitigation intention; this model also takes into account uncertainty of policy support or mitigation intention that exists at the individual level and that would be ignored if we had used just point estimates of adaptation support or mitigation intention for each individual.

To test for the redundancy of dilemma preferences in explanation of climate mitigation intention and adaptation support, we considered the 95% CI on the improvement of Bayesian information criterion (BIC, Schwarz, 1978) between the models derived through non-parametric bootstrap. To compare the role of dilemma preferences as factors of adaptation support and mitigation intention, we estimated 95% CIs on the difference between standardized effects of the dilemma preferences on the two dependent variables using non-parametric bootstrap.

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 and answered the mitigation and adaptation items (the order of items in each measure was randomized; the order of mitigation and adaptation measures was also randomized). Participants then answered three batteries presented in random order: a battery on perceived benefits of greenery in cities (not analyzed in this study), E-PVQ scale, and CFC scale. Participants were then thanked for their participation and were redirected to the web page of the respective national opinion poll companies to receive their reward for participation in the study (an equivalent of € 0.8 in national currencies).

Results

Average support for adaptation measures ranged between 32.14% (restrictions on water supply in periods of drought) and 97.18% (building of new suburban woods and parks; see Appendix for details). Intention to engage in mitigation actions over the next year ranged between 16.42% (adhering to strictly vegetarian diet) and 95.63% (cleaning up rubbish after oneself in the countryside; see Appendix for details). Measures of adaptation support and mitigation intention were positively correlated across the studies, r = .18-.20, ps < .05 (see Appendix for details).

Support for adaptation measures

As shown in Table 1, biospheric value and future orientation had the expected positive effect on support for adaptation measures but these effects were rather small and statistically significant in only two of the national samples. Contrary to our expectations, egoistic value and immediate orientation had both positive effects on adaptation support; these effects were somewhat stronger and statistically significant in all countries. Altruistic value did not have a significant effect on adaptation support in this model in either of the countries. However, examination of zero-order correlations (see Appendix for details) revealed that altruistic value was positively associated with adaptation support (r = .02-.13, ps < .05 in three of the four studies).

Analysis of incremental validity of dilemma preferences (for details, see Table 2) revealed that information about egoistic preferences was rather redundant in the model once the biospheric value was included. In the same vein, the preference for immediate outcomes (CFC-I) was redundant once the preference for future outcomes (CFC-F) was included in the model. On the other hand, altruistic preference seemed to carry a piece of unique information over and above other social preferences.

Intention to engage in mitigation actions

As shown in Table 3, biospheric value and future orientation had the expected positive effect and immediate orientation the expected negative effect on the intention to mitigate climate change. The egoistic value had the expected negative effect on mitigation intention that was statistically significant in three of the four studies. Again, the altruistic value had mostly no statistically significant effect on mitigation intention (three of the four studies) and only a weak negative effect in one study. Examination of zero-order correlations (see Appendix for details) revealed, again, that altruistic value was positively associated with mitigation intention (r = .26-.29, ps < .05).

Analysis of the incremental validity of dilemma preferences (for details, see Table 4) revealed that none of the preferences was consistently redundant as a factor of climate mitigation across the four studies. In other words, each of the dilemma preferences seemed to carry unique information relevant for explanation of mitigation intention, even though some of these preferences had lower importance as factors of mitigation intention as we had noted earlier.

Comparing the Role of Dilemma Preferences in Adaptation Support and Mitigation Intention

A comparison of standardized effects reveals that the effects of social and temporal preferences on mitigation support and adaptation intention differed for most of the dilemma preferences and that such differences were rather consistent across studies (see Table 5 for details). Biospheric value had a positive effect both on mitigation intention and adaptation support but its effect on climate mitigation was stronger. Egoistic value and focus on immediate consequences had positive effects on adaptation support but negative effects on mitigation intention. The focus on future consequences had a similar positive effect both on mitigation intention and adaptation support. Likewise, the effect of altruistic value on adaptation support and mitigation intention was similar but usually small and statistically insignificant.

Discussion

This study aimed to analyze how social, biospheric and temporal dilemma preferences affect support for adaptation support and mitigation intention across four independent studies conducted in four European countries. Specifically, we focused on the role of biospheric, egoistic and altruistic values, and consideration of future and immediate consequences, as factors of adaptation support and mitigation intention. Also, we wanted to explore the potential redundancy of dilemma preferences due to their logical and empirical overlaps. Finally, we compared the role that dilemma preferences play as factors of adaptation support and mitigation intention.

The Role of Biospheric Motivation and Concern with Future Consequences

In line with our expectations, we found that biospheric value and concern with future consequences (CFC-F) have both positive effects on adaptation policy support and mitigation intention (for similar results, see Corral-Verdugo et al., 2017; Dietz et al., 2007; Khachatryan et al., 2013; Marshall et al., 2019; Xie et al., 2019). Interestingly, biospheric preference has a stronger effect on mitigation intention than support for adaptation policy. The effect of concern with future consequences on adaptation support and mitigation intention is similar in magnitude.

The Role of Egoistic Motivation and Concern with Immediate Consequences

Contrary to our expectations, we found that egoistic value and concern with immediate consequences had unexpected positive effects on adaptation support and expected negative effects on mitigation intention. The somewhat ambivalent role of egoistic motivation as a factor of proenvironmental behavior has been noted previously (e.g., Sander van der Linden, 2015; Xie et al., 2019; for a discussion of the egoistic motivation for proenvironmental behavior, see De Dominicis et al., 2017). As far as we know, no previous study has examined the effect of concern with immediate consequences on climate adaptation; however, CFC-I has had a negative effect on climate change mitigation in previous studies (Khachatryan et al., 2013; see Milfont et al., 2012 for a meta-analysis in the context of proenvironmental behavior).

The urban adaptation measures that we focused on in this study bring urban residents many immediate and direct benefits not just in terms of alleviation of climate impacts but also in terms of co-benefits (e.g., energy and water cost reduction, presence of natural elements in the urban environment etc.). As such, adaptation measures can be—as our study shows—attractive even for people who put emphasis on their self-interest and who tend to think in shorter time horizons. This contrasts with climate mitigation that can only bring benefits in the future but delivers little in the way of immediate personal benefits.

Consequently, mitigation actions are likely to be enacted by people who are not motivated by self-interest but by concerns for the biosphere and concern for others and who are focused on the future rather than immediate consequences.

Role of Altruistic Motivation

Our study has revealed that altruistic value has relatively small effects on either adaptation support or mitigation intention once other dilemma preferences are accounted for. When taken alone though, altruistic value is positively associated with mitigation intention and, somewhat weakly, also with adaptation support. These results are in line with existing literature showing that the role of altruistic value as a factor of proenvironmental behavior is less important than the role of biospheric motivation (e.g., de Groot & Steg, 2008). The conceptual overlap of the altruistic and biospheric values due to their being rooted in the same value cluster of self-transcendent values (de Groot & Steg, 2008) then means that altruistic motivation may appear like an unimportant factor in comparison to other social dilemma preferences when studied jointly. However, our results reveal that—despite its lower importance—altruistic motivation is a factor of adaptation support and especially of mitigation intention that is quite distinct from other social dilemma preferences.

Practical Implications

Our study suggests, in line with previous studies, that people who mitigate climate change are—to a large degree—the same people who support adaptation measures. However, these two groups do not overlap completely: those with an eye on the immediate consequences of their actions who are concerned about direct personal benefits are likely to support climate adaptation but not climate mitigation. Generally, though, people who consider future events and their implications in their decision-making and those who consider benefits for the biosphere and other people are likely to engage both in climate mitigation and climate adaptation.

These patterns may be exploited in targeting and framing of climate campaigns. For instance, it would be desirable to highlight direct short-term benefits that ensue from climate mitigation actions whenever possible. Another way to exploit these patterns would be by activating certain values that people hold. For instance, it is possible to use priming to make people more sensitive to future consequences of their actions (e.g., Arnocky et al., 2014; Rabinovich et al., 2010); such intervention should make people more likely to engage both in climate mitigation and adaptation. Another option to manipulate dilemma preferences and thus to affect climate mitigation and adaptation would be through a perspective-taking exercise (e.g., Pahl & Bauer, 2013; see Schultz, 2000 for an example of perspective-taking manipulation of social and biospheric dilemma preferences) where people try to imagine being a person who is affected by climate impacts in the future. These and similar approaches could be implemented within climatic campaigns or even within specific climatic policies and measures (e.g., by providing or framing certain information).

Limitations

One of the limitations of the present study is that it uses an ad hoc measure of climate adaptation support. Unfortunately, we are not aware of any similar measures that would be sufficiently representative of existing urban adaptation options. However, we think that our results are not compromised by the low validity of this measure given the fact that our measure has good psychometric properties and that we were able to corroborate some of the associations between this measure, dilemma preferences (e.g., biospheric value, CFC-F, altruistic value), and mitigation intention found in previous studies.

Another limitation of the current study lies in the fact that it focuses on urban adaptations only. Arguably, urban adaptations are important given the share of urban populations worldwide and the vulnerability of urban populations to climate change (De Sherbinin et al., 2007). However, future studies should explore other aspects of climate adaptation and demonstrate whether our results generalize also to other types of adaptation measures.

Finally, evidence provided by our study was correlational only and therefore a causal interpretation of the statistical effects of dilemma preferences on mitigation intention and adaptation support should be taken cautiously. Future studies should extend the results of the present study by manipulating dilemma preferences experimentally (for examples of such manipulations, see, e.g., Pahl & Bauer, 2013; Rabinovich et al., 2010; Schultz, 2000).

Conclusions

We have found, across four independent studies conducted in four European countries that some dilemma preferences affect similarly climate mitigation intention and adaptation support, whereas others have a differential effect on the two types of actions. Those with an eye on the immediate consequences of their actions who are concerned about direct personal benefits are likely to support climate adaptation but not climate mitigation. People who consider future events and their implications in their decision-making and those who consider benefits for the biosphere and other people are likely to engage both in climate mitigation and climate adaptation.

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Table 1

Effect of dilemma preferences on adaptation support (standardized regression coefficients and their 95% CIs, mixed logit model)

	Czechia		Hungary		Poland		Slovakia	
	β	*p*	β	*p*	β	*p*	β	*p*
Intercept	1.54	.000	2.30	.000	2.40	.000	1.97	<.001
	[1.21, 1.87]		[1.97, 2.63]		[2.07, 2.73]		[1.64, 2.3]	
Biospheric	0.10	.106	0.14	.017	0.11	.164	0.19	.003
	[-0.02, 0.22]		[0.02, 0.26]		[-0.05, 0.27]		[0.07, 0.31]	
Egoistic	0.14	.002	0.13	.006	0.12	.026	0.11	.011
	[0.06, 0.22]		[0.03, 0.23]		[0.02, 0.22]		[0.03, 0.19]	
Altruistic	0.10	.079	0.05	.363	-0.04	.592	-0.03	.584
	[-0.02, 0.22]		[-0.07, 0.17]		[-0.18, 0.1]		[-0.15, 0.09]	
Future	0.10	.081	0.08	.147	0.12	.034	0.1	.063
	[-0.02, 0.22]		[-0.02, 0.18]		[0, 0.24]		[0, 0.2]	
Immediate	0.22	.000	0.40	.000	0.37	.000	0.32	<.001
	[0.1, 0.34]		[0.3, 0.5]		[0.27, 0.47]		[0.22, 0.42]	
BIC	36997.3		35890.6		32486.4		36917.7	
N	42707		51784		48651		49310	

Note. Biospheric, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. BIC is a point estimate of the Bayesian information criterion and captures the relative predictive quality of the model. *N* is the number of observations at the item level (i.e., 58 items × respective national sample size). Random parameters omitted. CFC10 was used in this analysis.

Table 2

Incremental validity of dilemma preferences in explanation of adaptation support (change in Bayesian information criterion and its 95% CI, mixed logit model)

	ΔBIC [95% CI]			
	Czechia	Hungary	Poland	Slovakia
(0. Biospheric)	—	—	—	—
1. Egoistic	13.43	12.46	7.7	13.97
	[10.39, 21.43]	[9.25, 19.91]	[4.44, 13.77]	[10.23, 22.18]
2. Altruistic	-7.22	-10.65	-10.17	-10.65
	[-9.13, -4.78]	[-11.31, -10.17]	[-11.04, -9.33]	[-11.25, -10.25]
3. Future	-10.30	-5.88	-9.86	-10.62
	[-11.2, -9.56]	[-8.39, -2.78]	[-10.98, -8.76]	[-11.33, -10.13]
4. Immediate	5.56	44.13	36.41	29.13
	[2.13, 11.99]	[39.61, 58.1]	[32.03, 48.9]	[24.71, 40.48]

Note. ΔBIC is the incremental change in BIC associated with the inclusion of the variable in the model. The 95% CIs were derived through non-parametric bootstrap. *Biospheric, egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Biospheric value included in the baseline model. Negative values of ΔBIC (negative increment) indicate a non-redundant variable improving the fit of the model. CFC10 was used in this analysis.

Table 3

Effect of dilemma preferences on mitigation intention (standardized regression coefficients and their 95% CIs, mixed logit model)

	Czechia		Hungary		Poland		Slovakia	
	β	*p*	β	*p*	β	*p*	β	*p*
Intercept	0.49	.003	0.40	.009	0.69	.000	0.66	.000
	[0.18, 0.8]		[0.11, 0.69]		[0.38, 1.00]		[0.35, 0.97]	
Biospheric	0.28	.000	0.20	.000	0.31	.000	0.34	.000
	[0.22, 0.34]		[0.14, 0.26]		[0.25, 0.37]		[0.28, 0.4]	
Egoistic	-0.04	.099	-0.08	.000	-0.06	.013	-0.05	.018
	[-0.08, 0]		[-0.12, -0.04]		[-0.1, -0.02]		[-0.09, -0.01]	
Altruistic	-0.02	.490	0.05	.095	-0.06	.097	-0.07	.032
	[-0.08, 0.04]		[-0.01, 0.11]		[-0.12, 0.00]		[-0.13, -0.01]	
Future	0.10	.002	0.05	.044	0.06	.015	0.07	.009
	[0.04, 0.16]		[-0.01, 0.11]		[0.02, 0.10]		[0.01, 0.13]	
Immediate	-0.07	.023	-0.06	.015	-0.10	.000	-0.06	.018
	[-0.13, -0.01]		[-0.1, -0.02]		[-0.14, -0.06]		[-0.12, 0.00]	
BIC	47680.9		56270.8		52003.3		53631.68	
N	44393		50772		48939		50483	

Note. Biospheric, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. *BIC* is a point estimate of the Bayesian information criterion and captures the relative predictive quality of the model. *N* is the number of observations at the item level (i.e., 58 items x respective national sample size). Random parameters omitted. CFC10 was used in this analysis.

Table 4

Incremental validity of dilemma preferences in explanation of mitigation intention (change in Bayesian information criterion and its 95% CI, mixed logit model)

	ΔBIC [95% CI]			
	Czechia	Hungary	Poland	Slovakia
(Biospheric)	--	--	--	--
1. Egoistic	-3.05	3.95	3.29	5.02
	[-6.1, 2.88]	[0.44, 13.18]	[-0.16, 11.56]	[1.46, 14.1]
2. Altruistic	-10.62	-6.16	-9.46	-8.12
	[-11.43, -10.14]	[-8.89, -1.94]	[-11.36, -7.41]	[-10.42, -5.2]
3. Future	16.09	0.95	-1.49	2.25
	[13.4, 29.54]	[-2.19, 8.83]	[-4.76, 4.91]	[-1.53, 10.52]
4. Immediate	-5.57	-4.9	9.59	-5.22
	[-8.48, -1.11]	[-7.92, 0.17]	[6.37, 21]	[-8.33, -0.38]

Note. ΔBIC is the incremental change in BIC associated with the inclusion of the variable in the model. The 95% CIs were derived through non-parametric bootstrap. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Biospheric value included in the baseline model. Negative values of ΔBIC (negative increment) indicate a non-redundant variable improving the fit of the model. CFC10 was used in this analysis.

Table 5

Differences between effects of dilemma preferences on mitigation intention and adaptation support (differences of standardized regression coefficients and their 95% CIs)

	β_{mitig} - β_{adapt}			
	Czechia	Hungary	Poland	Slovakia
Biospheric	0.19	0.06	0.2	0.14
	[0.13, 0.24]	[0.01, 0.11]	[0.14, 0.26]	[0.09, 0.2]
Egoistic	-0.18	-0.21	-0.18	-0.17
	[-0.21, -0.13]	[-0.24, -0.16]	[-0.22, -0.13]	[-0.2, -0.12]
Altruistic	-0.12	-0.01	-0.02	-0.04
	[-0.16, -0.06]	[-0.05, 0.04]	[-0.08, 0.04]	[-0.09, 0.02]
Future	0.00	-0.03	-0.06	-0.03
	[-0.05, 0.05]	[-0.07, 0.02]	[-0.1, -0.01]	[-0.07, 0.02]
Immediate	-0.29	-0.45	-0.47	-0.38
	[-0.33, -0.23]	[-0.48, -0.39]	[-0.5, -0.41]	[-0.4, -0.31]

Note. The difference between parameters was derived by subtracting standardized effects on adaptation support from respective standardized effects on mitigation intention. The 95% CIs were derived through non-parametric bootstrap. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Larger values of the difference indicate a more positive effect (smaller negative effect) on mitigation intention as compared to adaptation support. CFC10 was used in this analysis.

Appendix

In the first part of this Appendix, we provide supplementary information on the selection of cities for quota sampling of participants, details of scales, reliabilities of latent variables, and zero-order correlations between latent variables. All these analyses were conducted with CFC10 scale (two items removed from CFC scale). In the second part of the appendix, we provide results obtained with the CFC12 scale (full CFC scale) used in Czechia, Hingary and Poland.

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

	Czechia		Hungary		Poland		Slovakia	
#	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	Łódź	6.2	Prešov	13
4	Plzeň	6	Miskolc	6	Wrocław	5.8		
5	Olomouc	4	Pécs	5	Poznań	4.8		
6	Liberec	4	Győr	5	Gdańsk	4.2		
7	Pardubice	3	Nyíregyháza	5	Szczecin	3.6		
8	Hradec Králové	3	Kecskemét	4	Bydgoszcz	3.1		
9	Ústín nad Labem	3	Székesfehérvár	3	Lublin	3.1		
10	České Budějovice	3			Białystok	2.7		
11					Katowice	2.6		
12					Gdynia	2.2		
13					Częstochowa	2		
14					Radom	1.9		
15					Toruń	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 Śląska	1.2
27	Opole	1.2
28	Tychy	1.2
29	Gorzów Wielkopolski	1.1
30	Dąbrowa Górnicza	1.1
31	Elbląg	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	Grudziądz	0.9
41	Jaworzno	0.8
42	Słupsk	0.8

Table A2

Adaptation support scale

		Average support for adaptation measures (%)[1]				
#	Item	CR	HU	PL	SK	All
1	Building so-called green facades on public buildings (vertical vegetation on buildings).	86.90	89.40	88.62	91.33	89.16
2	Installation of roofs designed to capture and reuse rainwater in public buildings.	94.72	96.60	96.63	97.24	96.35
3	Installation of night ventilation systems in public buildings	84.30	88.98	85.28	90.55	87.47
4	Installation of shading features in public buildings (e.g. outdoor blinds and awnings)	88.01	93.44	92.82	90.42	91.32
5	Conversion of impermeable concrete and asphalt surfaces of public spaces, pavements, and streets to semi-permeable areas with greenery.	89.97	92.15	91.46	92.68	91.63
6	Conversion of impermeable concrete surfaces of car parks and pedestrian paths to permeable gravel surfaces.	78.96	81.29	84.58	83.07	82.06
7	Implementation of regular awareness campaigns on the health risks of high temperatures in cities for the homeless and socially excluded groups.	65.23	83.50	89.94	80.00	80.44
8	Implementation of regular awareness campaigns on the health risks of increased temperatures in cities for elderly and other vulnerable groups.	82.57	88.34	93.66	88.39	88.51
9	Creation of a heatwave early warning system for providing information for different groups of residents and reporting on a crisis management plan.	79.14	89.87	94.57	89.49	88.67
10	Creation of an early warning system to alert residents about extreme weather events via text messages (SMS).	73.17	77.10	94.82	83.76	82.66
11	Fitting children’s playgrounds with shading features (e.g. shelters, awnings)	90.43	95.09	94.15	92.27	93.08
12	Creation of new nature-based water retention areas to compensate for seasonal fluctuations in urban watercourses.	92.91	95.24	95.81	93.99	94.55
13	Increasing the retention capacity of existing water bodies (e.g. by mud excavation) to	93.28	95.90	95.17	93.69	94.58

	compensate for seasonal fluctuations in urban watercourses.					
14	Installation of water mist sprayers in public spaces.	79.44	87.98	89.91	88.58	86.76
15	Installation of automatic rainwater irrigation systems for watering urban greenery.	94.37	96.20	97.02	97.00	96.21
16	Planting new trees on streets and along roads.	95.68	98.63	92.16	96.78	95.85
17	Replacement of existing public building roofs with so-called green roofs with vegetation.	89.21	93.72	90.24	91.85	91.35
18	Construction of classical roofs on public buildings with removal of rainwater and seepage on the site of the building.	69.59	91.62	76.93	75.85	79.55
19	The use of materials which reflect heat and sunlight on the facades of public buildings.	86.52	87.63	89.54	88.33	88.05
20	Installation of white roofs on public buildings which reflect excessive sunlight.	80.99	86.14	86.85	86.36	85.26
21	Replacing asphalt and concrete surfaces of public spaces with semi-permeable surfaces (e.g. retention paving with distance joints, grass blocks)	88.84	91.63	85.17	91.73	89.42
22	Conversion of impermeable concrete and asphalt surfaces of car parks, streets and pavements to semi-permeable concrete and asphalt surfaces.	84.95	89.35	90.01	88.71	88.36
23	Limiting electricity supply to households in the event of an increased risk of power outages during periods of extreme heat.	32.39	55.22	46.83	36.06	42.95
24	Limiting the air conditioning of public buildings in the event of an increased risk of power outages during periods of extreme heat.	67.13	68.90	74.76	67.59	69.66
25	Reducing public access to urban greenery during periods of heat to reduce the risk of fires.	38.87	44.49	57.51	46.61	46.97
26	Modification of facades and roofs of historic buildings to absorb less heat (use of light reflective materials).	74.17	60.67	86.93	81.56	75.58
27	More frequent sprinkling of pavements during heat waves using drinking water from the water mains.	31.33	54.77	43.39	42.63	43.47
28	Change and optimization of street orientation to increase wind cooling and reduce overheating.	78.81	82.47	90.60	84.79	84.27
29	Creation of publicly inaccessible concrete retention tanks for rainwater and its drainage	61.44	84.01	72.97	67.23	72.06

	into the sewer system.					
30	Creation of underground retention tanks using to capture water for urban vegetation watering.	93.90	97.54	96.44	95.08	95.82
31	Increasing the retention capacity of existing water bodies by their area expansion.	86.35	93.16	92.92	89.31	90.70
32	Construction of chargeable automatic drinking fountains with chilled water in public spaces.	48.36	63.26	64.63	51.15	57.10
33	Installation of irrigation systems using drinking water from the mains for irrigation of urban vegetation	37.00	57.44	53.76	40.09	47.34
34	Building new suburban woods, wooded parks, and parks.	96.23	98.10	97.48	96.81	97.18
35	Replacing greenery, which has dried, with the same types of greenery with the same risk of drying.	30.27	61.97	47.19	39.16	45.10
36	Greening existing public spaces (squares and streets, etc.) by introducing off-limits grass and herbal strips.	82.54	88.62	85.56	89.27	86.68
37	Planting new flower beds on the streets and alongside roads.	87.56	94.60	92.71	94.38	92.49
38	Introducing concrete boxes with flowers into streets without greenery.	67.66	76.43	85.00	79.86	77.54
39	Placing synthetic retention absorbers without vegetation on flat roofs to collect rainwater.	83.70	91.77	87.58	82.20	86.66
40	Construction of high-rise buildings providing shade in the city center.	49.19	50.98	45.73	39.80	46.43
41	Capturing rainwater from the roofs of public buildings and its saturation into the ground on the site of the building.	88.46	92.96	89.75	87.30	89.75
42	Replacement of concrete banks of watercourses in towns with nature-based riverbeds.	85.47	86.61	87.25	86.03	86.36
43	Improved systems for rapid rainwater drainage into sewers.	67.32	89.72	87.38	79.88	81.77
44	Limitations on water supply for watering private gardens.	63.83	52.15	63.94	59.31	59.59
45	Restrictions on the operation of public buildings and reduction of office hours during periods of extreme heat.	63.40	77.19	79.71	77.64	74.84
46	Restrictions on water supply to households during periods of drought.	26.76	34.47	42.09	25.33	32.14
47	Building publicly inaccessible green corridors to improve urban ventilation.	78.58	86.35	85.94	84.74	84.09

48	Building nature-based water areas in the city (e.g. wetlands, streams).	90.20	92.65	91.13	86.54	90.17
49	Creation of underground retention tanks for rainwater capture and drainage.	71.45	91.68	95.78	76.77	84.70
50	Creation of artificial water retention bodies, inaccessible to the public, to compensate for seasonal fluctuations in urban watercourse.	81.86	88.93	88.17	86.31	86.47
51	Increasing retention capacity by countersinking existing water bodies.	88.57	94.25	94.78	89.43	92.02
52	Installation of irrigation systems exploiting deep groundwater wells for watering of urban greenery.	71.29	89.61	87.60	78.21	82.28
53	Adoption of a law establishing an obligation to provide free water in restaurants, bistros, and cafés.	76.32	90.80	87.17	87.31	85.74
54	Replacement of urban wild and unkempt vegetation with flower beds.	62.72	83.94	72.82	74.63	74.06
55	Replacing concrete noise barriers with green noise barriers.	89.18	95.57	95.24	92.96	93.40
56	Conversion of urban public car parks to areas of urban greenery.	51.56	64.73	60.05	63.09	60.22
57	Introducing concrete boxes with bushes and trees into streets without greenery.	72.58	77.85	87.90	81.61	80.18
58	Introducing concrete boxes with flowers into streets with trees.	58.76	61.46	78.30	73.63	68.15

Note. 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 do not support, 2 = rather do 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).

[1] Average support for adaptation measures was computed from dichotomized items (by collapsing response categories „strongly do not support“ and „rather do not support“, and response categories „rather support“ and „strongly support“).

Table A3

Mitigation intention scale

		Average engagement in mitigation actions (%)[1]				
#	Item	CR	HU	PL	SK	All
1	I will be keeping the engine running at red traffic lights.[2, 3]	26.11	35.40	26.23	32.02	30.07
2	I will be driving at speeds under 100 kph (= 62.5 mph) on freeways.[3]	26.23	30.08	32.95	26.73	29.01
3	I will be having chemical air freshener in my bathroom.[2, 3]	49.88	54.09	51.79	55.52	52.92
4	I will be eating only vegetarian meals.[2]	15.56	14.51	19.33	16.33	16.42
5	I will be trying to minimize the waste I produce.	85.51	90.11	88.99	88.94	88.47
6	I will be taking a plastic bag in a store when offered one.[2, 3]	65.93	55.45	65.67	74.03	65.27
7	I will be showering rather than taking a bath.[2]	85.68	85.03	84.56	89.88	86.31
8	In winter I will be turning down the heat when I leave my apartment for more than 4 hours.[2]	80.12	77.66	80.64	82.93	80.34
9	I will be keeping the lights on in rooms that are not used by anybody.[3]	89.70	90.23	88.24	89.15	89.33
10	I will be saving money in a bank which invests in ecological products and technologies (e.g. renewables).	35.40	45.38	53.23	44.92	45.23
11	I will be buying food from local producers.[2]	76.77	67.41	83.60	80.93	77.15
12	I will be using only LED lighting at home.	73.38	78.77	82.43	82.75	79.54
13	In hotels I will be having the towels changed daily.[2, 3]	75.07	77.64	61.62	75.63	72.60
14	I will be buying domestically grown wooden furniture.[2]	32.15	31.34	56.85	40.68	40.22
15	I will be collecting and recycling used paper.[2]	80.12	85.32	84.06	82.33	83.04
16	In the winter I will be keeping the heat on so that I do not have to wear a sweater.[2, 3]	63.25	51.58	63.14	60.52	59.50
17	I will be using a fuel-efficient automobile (less than 6 liters per 100 kilometers).[2]	58.00	54.50	70.01	65.83	62.16
18	I will be buying coffee and other drinks in disposable cups.[3]	65.37	70.49	65.53	72.34	68.56
19	I will be driving to where I want to start my hikes.[2, 3]	28.44	43.78	27.13	22.49	30.48
20	I will prefer going on domestic holidays before going on holidays abroad.	59.01	69.05	69.11	61.07	64.78

21	I will be using public transportation or riding a bike in nearby areas (around 30 kilometers; around 20 miles).[2]	68.72	64.66	68.62	66.78	67.13
22	I will be reducing my consumption of dairy products.	28.25	35.88	35.27	29.12	32.25
23	I will be disconnecting the TV or computer from the wall socket, when I do not use it.	38.21	48.30	61.96	44.13	48.46
24	I will be buying only new clothes.[3]	37.34	56.31	42.41	35.29	43.04
25	I will be waiting until I have a full load before doing my laundry.[2]	89.24	84.08	94.08	89.47	89.21
26	In the winter, I will be airing rooms while keeping on the heat and leaving windows open, simultaneously.[2, 3]	76.18	68.52	75.57	74.41	73.58
27	I will be keeping the engine running while waiting in front of a railroad crossing or in a traffic jam.[2, 3]	51.87	58.36	53.20	48.63	53.01
28	I will be driving my car in or into the city.[2, 3]	60.51	48.24	32.56	51.01	48.04
29	I will be riding a bicycle or taking public transportation to work or school.[2]	74.24	69.67	77.05	68.94	72.39
30	I will be throwing away the leftovers of fruits and vegetables into the mixed waste.[3]	38.74	44.46	32.43	40.07	38.94
31	I will be buying products in refillable packages.[2]	65.34	72.13	85.65	69.14	73.38
32	I will be buying bottled water.[2, 3]	61.27	41.36	29.01	52.65	45.67
33	I will be buying more food than I really consume.[3]	80.27	80.32	81.34	84.44	81.63
34	I will be looking into the pros and cons of having a private source of solar power.[2]	37.48	43.03	56.63	46.87	45.88
35	I will be buying beverages in cans.[2, 3]	54.27	52.17	52.89	60.00	54.87
36	I will buy groceries and other products in unpackaged stores.	42.03	37.98	72.43	54.37	52.13
37	I will be offering a car for carpooling into work or school.[2]	31.58	14.67	32.99	42.49	30.26
38	I will be using a hybrid or fully electric car.	16.64	17.96	28.07	24.25	21.69
39	I will be washing dirty clothes without prewashing.[2]	67.19	69.30	70.01	70.21	69.24
40	I will be using an oven cleaning spray to clean my oven.[2, 3]	45.99	45.72	41.96	52.40	46.54
41	I will be having a contract for renewable energy with my energy provider.[2]	42.17	21.00	65.49	46.13	43.46
42	I will be reusing my shopping bags.[2]	94.48	84.63	95.15	95.55	92.45
43	I will be refraining from owning a car.[2]	59.81	53.94	62.19	61.60	59.46
44	At home, I will be using an energy-saving fridge (class A+++).[2]	79.69	72.74	87.90	85.95	81.65

45	I will be cleaning up rubbish after myself in the countryside.[2]	96.50	94.49	94.64	97.01	95.63
46	I will be buying seasonal fruit and vegetables.[2]	89.83	90.89	96.14	92.60	92.44
47	I will be driving in such a way as to keep my fuel consumption as low as possible.	83.02	81.41	86.55	84.76	83.96
48	At home, I will be using air conditioning when it is hot outside.[3]	73.20	55.88	68.38	67.66	65.87
49	I will be repairing broken stuff, instead of buying new things.	72.83	76.75	85.95	75.94	78.04
50	I will be buying only products which can be recycled.	52.86	39.51	65.99	64.16	55.68
51	I will be using fabric softener with my laundry.[2, 3]	72.19	84.53	66.17	74.32	74.50
52	I will purchase solar panels.[2]	15.46	20.35	27.47	25.28	22.13
53	I will be ordering home delivery of pre-cooked food.[3]	74.26	71.20	51.89	78.09	68.78
54	I will be using a clothes dryer.[2, 3]	72.21	36.36	52.74	73.76	58.27
55	For longer journeys (more than 6 hours of travel time by car), I will take an airplane.[2, 3]	67.73	59.90	64.31	71.06	65.78
56	I will be finding out the carbon footprint of products which I buy.[2]	18.88	19.48	34.94	23.91	24.22
57	At home, I will have high-capacity batteries, charged from solar panels.	14.36	16.43	26.26	19.44	18.93
58	I will be bringing empty bottles to a recycling bin.[2]	87.68	83.03	87.62	87.34	86.38

Note. 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).

[1] Average engagement was computed from dichotomized items by (by collapsing response categories „very unlikely“ and „rather unlikely“ and response categories „rather likely and very likely“. Some items were reverse-coded so that higher percentage indicated higher intention to engage in mitigation action.

[2] Items were adopted from the GEB scale (e.g., Byrka et al., 2016); remaining items were new.

[3] Items with negative valence were reverse-coded prior to analysis.

Table A4

Exclusion rates in the four studies

		Excluded participants				
		Repeated access		Cannot estimate mitig. intention or adapt. support		
	Finished questionnaires	Abs.	Rel. (%)	Abs.	Rel. (%)	Valid sample
Czech sample	1007	153	15.2	10	1	844
Hungarian sample	1001	26	2.6	9	0.9	966
Polish sample	1000	40	4.0	17	1.7	943
Slovak sample	1000	30	3.0	13	1.3	957

Table A5

Sociodemographic characteristics of samples

	Gender	Age groups				Education		
	Females	18-29	30-39	40-49	50-60	Primary	Secondary	Tertiary
Czech sample	53.4	27.9	30.7	20.9	20.5	36.5	41.0	22.5
Hungarian sample	52.5	24.5	27.7	27.1	20.8	13.1	45.6	41.3
Polish sample	53.1	20.9	30.5	26.6	22.0	19.4	40.7	39.9
Slovak sample	50.9	20.1	30.4	26.5	23.0	20.5	41.1	38.5

Table A6

Reliability of measures

	Czech sample	Hungarian sample	Polish sample	Slovak sample
Adaptation support	.92 (.93)	.92 (.81)	.94 (.80)	.94 (.84)
Mitigation intention	.81 (.77)	.80 (.75)	.79 (.75)	.81 (80)
Biospheric	.91	.90	.91	.91
Egoistic	.77	.74	.77	.79
Altruistic	.81	.79	.88	.84
Future	.74	.67	.72	.72
Immediate	.80	.82	.84	.84

Note. Internal consistency reliability is listed for all constructs; person separation reliabilities (in brackets) are additionally listed for the two measures that were calibrated as Rasch scales. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC10 was used in this analysis.

Table A7

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Czech sample)

Variable	*M*	*SD*	1	2	3	4	5	6
1. Mitigation intention	0.00	0.76						
2. Adaptation support	0.00	1.29	.19**					
			[.13, .26]					
3. Biospheric	0.00	1.00	.45**	.12**				
			[.40, .50]	[.05, .18]				
4. Egoistic	0.00	1.00	-.01	.18**	.15**			
			[-.08, .05]	[.11, .24]	[.09, .22]			
5. Altruistic	0.00	1.00	.29**	.13**	.67**	.17**		
			[.23, .35]	[.06, .20]	[.64, .71]	[.10, .23]		
6. Future	0.00	1.00	.37**	.04	.53**	.06	.41**	
			[.31, .42]	[-.02, .11]	[.48, .58]	[-.01, .13]	[.36, .47]	
7. Immediate	0.00	1.00	-.31**	.11**	-.35**	.24**	-.23**	-.61**
			[-.37, -.25]	[.04, .17]	[-.41, -.29]	[.18, .30]	[-.29, -.17]	[-.65, -.56]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC10 was used in this analysis.

Table A8

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Hungarian sample)

Variable	*M*	*SD*	1	2	3	4	5	6
1. Mitigation intention	0.01	0.70						
2. Adaptation support	-0.01	1.46	.18**					
			[.12, .24]					
3. Biospheric	0.00	1.00	.35**	.07*				
			[.30, .41]	[.01, .14]				
4. Egoistic	0.00	1.00	-.01	.16**	.30**			
			[-.07, .06]	[.10, .22]	[.24, .35]			
5. Altruistic	-0.00	1.00	.26**	.08**	.67**	.39**		
			[.20, .31]	[.02, .15]	[.63, .70]	[.34, .44]		
6. Future	-0.00	1.00	.24**	-.02	.43**	.16**	.38**	
			[.18, .30]	[-.09, .04]	[.38, .48]	[.10, .22]	[.33, .44]	
7. Immediate	0.00	1.00	-.24**	.22**	-.30**	.11**	-.21**	-.50**
			[-.30, -.18]	[.16, .28]	[-.36, -.24]	[.05, .17]	[-.27, -.15]	[-.54, -.45]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC10 was used in this analysis.

Table A9

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Polish sample)

Variable	*M*	*SD*	1	2	3	4	5	6
1. Mitigation intention	0.00	0.74						
2. Adaptation support	-0.03	1.57	.19**					
			[.13, .25]					
3. Biospheric	-0.00	1.00	.40**	.04				
			[.35, .46]	[-.03, .10]				
4. Egoistic	-0.00	1.00	.03	.14**	.35**			
			[-.03, .10]	[.08, .20]	[.29, .40]			
5. Altruistic	-0.00	1.00	.27**	.02	.76**	.36**		
			[.21, .33]	[-.04, .09]	[.73, .78]	[.31, .42]		
6. Future	0.00	1.00	.24**	.06	.43**	.27**	.39**	
			[.18, .30]	[-.01, .12]	[.37, .48]	[.21, .33]	[.33, .44]	
7. Immediate	-0.00	1.00	-.25**	.23**	-.23**	.16**	-.19**	-.18**
			[-.31, -.19]	[.16, .29]	[-.29, -.17]	[.09, .22]	[-.25, -.12]	[-.25, -.12]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC10 was used in this analysis.

Table A10

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Slovak sample)

Variable	M	SD	1	2	3	4	5	6
1. Mitigation intention	0.01	0.75						
2. Adaptation support	0.00	1.42	.20**					
			[.14, .26]					
3. Biospheric	0.00	1.00	.44**	.09**				
			[.39, .49]	[.02, .15]				
4. Egoistic	0.00	1.00	-.06	.16**	.13**			
			[-.12, .01]	[.10, .23]	[.07, .19]			
5. Altruistic	0.00	1.00	.29**	.07*	.75**	.19**		
			[.23, .35]	[.00, .13]	[.72, .78]	[.13, .25]		
6. Future	0.00	1.00	.32**	.03	.53**	.00	.48**	
			[.27, .38]	[-.04, .09]	[.48, .57]	[-.06, .07]	[.43, .52]	
7. Immediate	0.00	1.00	-.25**	.20**	-.29**	.30**	-.20**	-.43**
			[-.31, -.19]	[.14, .26]	[-.35, -.23]	[.25, .36]	[-.26, -.14]	[-.48, -.38]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC10 was used in this analysis.

In the reminder of the Appendix, we present results estimated with CFC scales with two items removed in all countries.

Table A11

Reliability of CFC12 measures

CFC12 subscales	Czech sample	Hungarian sample	Polish sample
Future	0.74	.69	.72
Immediate	0.80	.82	.84

Note. Internal consistency reliability is listed for all constructs; person separation reliabilities (in brackets) are additionally listed for the two measures that were calibrated as Rasch scales. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC12 was used in this analysis.

Table A12

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Czech sample)

Variable	*M*	*SD*	1	2	3	4	5	6
1. Mitigation intention	0.00	0.76						
2. Adaptation support	0.00	1.29	.19**					
			[.13, .26]					
3. Biospheric	0.00	1.00	.45**	.12**				
			[.40, .50]	[.05, .18]				
4. Egoistic	-0.00	1.00	-.01	.18**	.15**			
			[-.08, .05]	[.11, .24]	[.09, .22]			
5. Altruistic	-0.00	1.00	.29**	.13**	.67**	.17**		
			[.23, .35]	[.06, .20]	[.64, .71]	[.10, .23]		
6. Future	0.00	1.00	.37**	.06	.54**	.07*	.43**	
			[.32, .43]	[-.01, .13]	[.49, .58]	[.00, .13]	[.37, .48]	
7. Immediate	0.00	1.00	-.31**	.11**	-.35**	.25**	-.23**	-.57**
			[-.37, -.25]	[.04, .17]	[-.41, -.29]	[.18, .31]	[-.29, -.16]	[-.62, -.53]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC12 was used in this analysis.

Table A13

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Hungarian sample)

Variable	*M*	*SD*	1	2	3	4	5	6
1. Mitigation intention	0.01	0.70						
2. Adaptation support	-0.01	1.46	.18**					
			[.12, .24]					
3. Biospheric	0.00	1.00	.35**	.07*				
			[.30, .41]	[.01, .14]				
4. Egoistic	0.00	1.00	-.01	.16**	.30**			
			[-.07, .06]	[.10, .22]	[.24, .35]			
5. Altruistic	0.00	1.00	.26**	.08**	.67**	.39**		
			[.20, .31]	[.02, .15]	[.63, .70]	[.34, .44]		
6. Future	0.00	1.00	.24**	.00	.42**	.18**	.38**	
			[.18, .30]	[-.06, .07]	[.37, .47]	[.12, .24]	[.32, .43]	
7. Immediate	0.00	1.00	-.24**	.22**	-.30**	.12**	-.20**	-.42**
			[-.30, -.18]	[.16, .28]	[-.35, -.24]	[.06, .19]	[-.26, -.14]	[-.47, -.36]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC12 was used in this analysis.

Table A14

Descriptive statistics (means, standard deviations, and zero-order correlation with 95% CIs, Polish sample)

Variable	M	SD	1	2	3	4	5	6
1. Mitigation intention	0.00	0.74						
2. Adaptation support	-0.03	1.57	.19**					
			[.13, .25]					
3. Biospheric	0.00	1.00	.40**	.04				
			[.35, .46]	[-.03, .10]				
4. Egoistic	0.00	1.00	.03	.14**	.35**			
			[-.03, .10]	[.08, .20]	[.29, .40]			
5. Altruistic	0.00	1.00	.27**	.02	.76**	.36**		
			[.21, .33]	[-.04, .09]	[.73, .78]	[.31, .42]		
6. Future	0.00	1.00	.24**	.08*	.43**	.27**	.38**	
			[.18, .30]	[.01, .14]	[.38, .49]	[.21, .33]	[.33, .44]	
7. Immediate	0.00	1.00	-.26**	.22**	-.22**	.17**	-.18**	-.13**
			[-.32, -.20]	[.16, .28]	[-.28, -.16]	[.11, .24]	[-.24, -.12]	[-.19, -.07]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). * indicates $p < .05$. ** indicates $p < .01$. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Future* and *immediate* denote CFC-F and CFC-I subscales, respectively. CFC12 was used in this analysis.

Table A15

Effect of dilemma preferences on adaptation support (standardized regression coefficients and their 95% CIs, mixed logit model)

	Czechia		Hungary		Poland	
	β	*p*	β	*p*	β	*p*
Intercept	1.54	<.001	2.3	<.001	2.4	<.001
	[1.21, 1.87]		[1.97, 2.63]		[2.07, 2.73]	
Biospheric	0.09	.129	0.14	.021	0.09	.234
	[-0.03, 0.21]		[0.02, 0.26]		[-0.07, 0.25]	
Egoistic	0.13	.002	0.13	.009	0.12	.033
	[0.05, 0.21]		[0.03, 0.23]		[0, 0.24]	
Altruistic	0.09	.092	0.05	.371	-0.04	.608
	[-0.03, 0.21]		[-0.07, 0.17]		[-0.18, 0.1]	
Future	0.11	.046	0.09	.099	0.13	.016
	[-0.01, 0.23]		[-0.01, 0.19]		[0.03, 0.23]	
Immediate	0.22	<.001	0.38	<.001	0.35	<.001
	[0.12, 0.32]		[0.28, 0.48]		[0.25, 0.45]	
BIC	36997.1		35892.8		32488	
N	42707		51784		48651	

Note. Biospheric, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. BIC is a point estimate of the Bayesian information criterion and captures the relative predictive quality of the model. *N* is the number of observations at the item level (i.e., 58 items × respective national sample size). Random parameters omitted. CFC12 was used in this analysis.

Table A16

Incremental validity of dilemma preferences in explanation of adaptation support (change in Bayesian information criterion and its 95% CI, mixed logit model)

	ΔBIC [95% CI]		
	Czechia	Hungary	Poland
(0. Biospheric)	—	—	—
1. Egoistic	13.43 [10.26, 21.15]	12.46 [9.25, 19.91]	7.7 [4.44, 13.77]
2. Altruistic	-7.22 [-9.03, -4.8]	-10.65 [-11.31, -10.17]	-10.17 [-11.04, -9.33]
3. Future	-10.63 [-11.13, -10.37]	-9.15 [-10.78, -7.48]	-8.03 [-9.78, -5.97]
4. Immediate	6.17 [2.99, 12.67]	45.25 [40.75, 59.34]	32.95 [28.63, 44.82]

Note. ΔBIC is the incremental change in BIC associated with the inclusion of the variable in the model. The 95% CIs were derived through non-parametric bootstrap. *Biospheric, egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Biospheric value included in the baseline model. Negative values of ΔBIC (negative increment) indicate a non-redundant variable improving the fit of the model. CFC12 was used in this analysis.

Table A17

Effect of dilemma preferences on mitigation intention (standardized regression coefficients and their 95% CIs, mixed logit model)

	Czechia		Hungary		Poland	
	β	*p*	β	*p*	β	*p*
Intercept	0.49	.003	0.4	.009	0.69	.000
	[0.18, 0.8]		[0.11, 0.69]		[0.38, 1]	
Biospheric	0.28	.000	0.2	.000	0.3	.000
	[0.22, 0.34]		[0.14, 0.26]		[0.24, 0.36]	
Egoistic	-0.04	.125	-0.08	.000	-0.06	.020
	[-0.08, 0]		[-0.12, -0.04]		[-0.1, -0.02]	
Altruistic	-0.02	.454	0.04	.112	-0.06	.087
	[-0.08, 0.04]		[-0.02, 0.1]		[-0.12, 0]	
Future	0.1	.001	0.06	.012	0.07	.005
	[0.04, 0.16]		[0.02, 0.1]		[0.03, 0.11]	
Immediate	-0.08	.008	-0.07	.005	-0.12	.000
	[-0.14, -0.02]		[-0.11, -0.03]		[-0.16, -0.08]	
BIC	47676.89		56266.51		51997.36	
N	44393		50772		48939	

Note. Biospheric, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. *BIC* is a point estimate of the Bayesian information criterion and captures the relative predictive quality of the model. *N* is the number of observations at the item level (i.e., 58 items x respective national sample size). Random parameters omitted. CFC12 was used in this analysis.

Table A18

Incremental validity of dilemma preferences in explanation of mitigation intention (change in Bayesian information criterion and its 95% CI, mixed logit model)

	ΔBIC [95% CI]		
	Czechia	Hungary	Poland
(Biospheric)	--	--	--
1. Egoistic	-3.05	3.95	3.29
	[-6.1, 2.88]	[0.44, 13.18]	[-0.16, 11.56]
2. Altruistic	-10.62	-6.16	-9.46
	[-11.43, -10.14]	[-8.89, -1.94]	[-11.36, -7.41]
3. Future	18.25	3.16	-0.65
	[15.66, 32.45]	[0.04, 12.02]	[-4.06, 6.18]
4. Immediate	-3.74	-2.85	14.7
	[-6.86, 1.71]	[-6.05, 3.27]	[11.68, 28.07]

Note. ΔBIC is the incremental change in BIC associated with the inclusion of the variable in the model. The 95% CIs were derived through non-parametric bootstrap. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Biospheric value included in the baseline model. Negative values of ΔBIC (negative increment) indicate a non-redundant variable improving the fit of the model. CFC12 was used in this analysis.

Table A19

Differences between effects of dilemma preferences on mitigation intention and adaptation support (differences of standardized regression coefficients and their 95% CIs)

	$\beta_{mitig} - \beta_{adapt}$		
	Czechia	Hungary	Poland
Biospheric	0.19	0.06	0.21
	[0.13, 0.24]	[0.01, 0.11]	[0.15, 0.27]
Egoistic	-0.17	-0.21	-0.17
	[-0.2, -0.13]	[-0.24, -0.16]	[-0.21, -0.12]
Altruistic	-0.12	-0.01	-0.02
	[-0.16, -0.06]	[-0.06, 0.04]	[-0.08, 0.04]
Future	-0.01	-0.03	-0.06
	[-0.06, 0.04]	[-0.07, 0.02]	[-0.11, -0.01]
Immediate	-0.3	-0.45	-0.47
	[-0.34, -0.24]	[-0.47, -0.38]	[-0.49, -0.4]

Note. The difference between parameters was derived by subtracting standardized effects on adaptation support from respective standardized effects on mitigation intention. The 95% CIs were derived through non-parametric bootstrap. *Biospheric*, *egoistic* and *altruistic* denote subscales of E-VPQ. *Immediate* and *future* denote CFC-I and CFC-F subscales, respectively. Larger values of the difference indicate a more positive effect (smaller negative effect) on mitigation intention as compared to adaptation support. CFC12 was used in this analysis.