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Individualism, universalism and climate change

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Abstract
Is 'individualism' pure selfishness? The climate change literature often assumes so. However, individualism can be seen as capturing values aligned with self-determination and self-achievement but also universalism. Indeed, cultural psychology recognises individualism as reflecting both personal agency and one's embeddedness, not in narrowly defined in-groups, but in society broadly. Through this lens, individualism can be consistent with adopting pro-social behaviours, including climate-friendly behaviours. But the under-exploration of the concept means empirical evidence is limited. Using cross-country, cross-sectional data we find that individualistic values are associated with an increased willingness to take individual-level actions against climate change. Individualism is also not associated with less support for additional taxes levied to fight climate change, and those willing to take more individual level actions against climate change are also more supportive of additional climate change taxes. Overall, our results confirm that individualism can be associated with taking actions for the greater good.

Keywords: climate change actions; individualism/collectivism; taxation; willingness to pay

Introduction

Climate change is a prominent societal challenge, that generates much debate, and disagreement, in particular around appropriate measures to address it. Understanding who supports taking specific actions towards mitigating, or adapting to, climate change, and why, is thus a central focus of research, as this can help target interventions around communication and propose policy options compatible with citizens' views and preferences. In this paper, we will focus principally on policies and actions that are aimed at reducing man-made CO_2 emissions and in particular understand the role individualism plays in driving support for these policies and actions. In recent years, researchers have pointed at issues with the definition and operationalisation of the concept of individualism/collectivism. While most people attach an intuitive meaning to these well-known terms, in practice, differences in interpretations exist, leading to issues in generalising key findings on their relevance and implication.

Individualism-collectivism is a key value which focuses on an individual's understanding of the self and its place in society. The concept has been popularised as one of Hofstede's cultural traits (Hofstede, 2001) and a broad body of work emphasises it as a concept meaningfully distinguishing social groups (Heine, 2020) with large variation in this dimension documented at the country or regional level, and a large number of studies illustrating its association with critical macro-outcomes (e.g. Gorodnichenko and Roland, 2017 and 2021). Individual values are undoubtedly shaped by these cultural values through the process of socialisation, as people form beliefs through repeated social interactions (Spong, 2019 and Hodgson, 2007). However, individuals' personal circumstances and experiences also further tint these values (Schwartz, 1992). As a result, individualism has also been

shown to explain important aspects of people's decision making around the world (e.g. Taras *et al.*, 2010). Here, we argue that accordingly, individualistic values might be particularly relevant to how individuals will take personal decisions regarding large societal challenges characterised by some degree of uncertainty over the impact of these personal efforts.

The relationship between individualism and personal decisions to act against climate change has attracted the interest of a number of researchers already (e.g. Kahan *et al.*, 2012; Stern *et al.*, 1999). However, the notion of individualism is complex and its different facets are not always recognised in the empirical literature. Indeed, while the notion of individualism clearly implies a focus on individual needs and wants independently of societal constraints, it can also be associated with pro-social behaviour. Going beyond a narrow conceptualisation of individualism as selfishness, individualism in the cultural studies tradition is also marked by a low level of embeddedness in local networks, but also greater levels of impersonal trust and reliance on weaker social ties (Maleki and de Jong, 2014; Triandis, 2001). This second dimensionality of individualism is important because it can spur individual actions contributing to the common good and support altruistic behaviour (e.g. Amini *et al.*, 2022; Pitlik and Rode, 2017).

Essentially, this means that some interpret individualism as selfishness, while others see it as associated with personal agency and universalism. While the latter definition of individualism is often explicitly emphasised in the broader empirical literature, the literature focusing on climate change to date seems to have disproportionately focused on selfishness only. As a result, research seems to have repeatedly concluded that (selfish) individualistic citizens[1] would not act, or act less than more collectivist individuals, against climate change (Joireman *et al.*, 2001; Kahan *et al.*, 2012). The type of selfish individualism emphasised in these papers is associated with homo-economicus and the pursuit of one's own self-interest, as well as a dislike for government interference into personal choices. Here we thus argue that an operationalisation more closely reflecting individualism both as self-orientation, and universalism could lead to different results. We thus emphasise the need for a careful reading of the literature, focusing not only on the concepts analysed, but also the way they are defined and operationalised.

In this paper, we thus propose to test how individual-level individualism relates to one's support for a number of climate change-mitigating actions and for climate-specific policies. That is to say that we look into the drivers of both individual-level actions against climate change and individual-level support for climate-friendly policies (i.e. collective action). We use a cross-country dataset that contains a detailed module on knowledge and understanding of climate change, perceived self-efficacy and support for different actions or policy responses meant to tackle climate change. Rather than focusing on selfishness, we use a measure of individualism which is also compatible with universalism, where universalism is understood as a preference for equal treatment across society and opposed to in-group favouritism. Based on this measure, we find evidence that individualistic people are more likely to report taking individual actions against climate change, and this remains true when controlling for their understanding of climate change or their perceived ability to effectively act against it. We also find that individualistic values are neither positively nor negatively associated with a willingness to pay (WTP) more in taxes to combat climate change.

The paper is structured as follows: Section 'Literature Review' discusses the definition of individualism and gives an overview of the existing research linking individualism and environmentalism or climate change. Section 'Data and Specification' explains the data and methodology used. Section 'Results' reports the results on individual-level individualism and support for climate change action and policies. In section 'Discussion and conclusions', we discuss the results further and conclude.

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[1]We note that Kahan *et al.* (2012) emphasises individualism as a world view that rejects collective interference with individual decisions and they thus posit (and empirically confirm) that individualistic values are associated with a degree of scepticism towards climate change risks. Joireman *et al.* (2001) emphasises a contrast between pro-sociality and pro-self, and thus does not recognise the importance of social embeddedness as possibly reflecting embeddedness in a narrow group or society as a whole.

Literature review

Selfishness and climate change

Much of the work on what explains people's attitudes towards climate change and their concerns for the natural environment has focussed on the 'cognitive hierarchies' literature (Fulton *et al.*, 1996; Homer and Kahle, 1988). Within this literature, values are seen as fundamental beginnings, based on which, ultimately, action will be taken. Values are assumed to be stable over time (Sauer and Fischer, 2010, 2). Following values, there are layers of beliefs, attitudes and intentions, which all finally lead to actions. As stated by Sauer and Fischer (ibid), social psychological theories and models of human behaviour such as Ajzen and Fishbein, (1980), Schwartz (1977, 1992) and Stern *et al.* (1999) can all be conceptualised as cognitive hierarchies. Importantly, many studies have reported that specific knowledge about the causes of climate change and the actions that could mitigate it are necessary, but in no way sufficient conditions to explain who will end up acting against climate change, or supporting policy change to address the issue (Bamberg and Möser, 2007). Instead, values appear as key drivers of the willingness to engage in behaviours to mitigate or limit climate-change, even above knowledge, thus emphasising the merit of models recognising the strong link between values and actions (Boto-Garcia and Buccio, 2020; Schultz and Zelezny, 2003).

Focusing on values as drivers of climate-change action, individualism has been extensively researched. However, the focus so far has been mostly on selfish individualism. Indeed, researchers have extended much effort in contrasting the selfish motives assumed in neo-classical economics (and by extension environmental economics) to more altruistic motives as typically posited in ecological economics for example (e.g. Lehtonen, 2004). Consistently, most of the theoretical and empirical literature investigating the relationship between climate change action (or pro-environmental behaviour more broadly) and individualism has focused on a definition of individualism contrasting selfish motives with more pro-social concerns. Dake (1991, 1992), for example, developed scales that measure four orientating dispositions in relation to perception of risk at the individual and societal level – egalitarianism, hierarchy, individualism, and fatalism. Theory suggests that egalitarian orientated people will be most concerned with the environment and that individualist orientated people will be the least concerned, and this is then supported by empirical evidence (Dake, 1991; Hornsey *et al.*, 2016; Peters and Slovic, 1996). Similarly, the norm activation model of altruism proposed by Schwartz (1973, 1977) includes fundamental values with a focus on social-altruistic aspects. These values are connected to pro-environmental behaviour or climate change mitigation. Stern *et al.* (1999) extend this and other social psychological models to develop the value-belief-norms (VBN) theory. Within these models and theories, one of the underlying hypotheses is always that individualism is associated with anti-social environmental behaviour compared to holding collectivist values which is seen as better aligned with altruism as it supports in-group collaboration. For example, Joireman, *et al.* (2001) and Van Vugt and Samuelson, (1998) find greater evidence of environmental concern among individuals with 'prosocial' rather than individualistic or competitive social value orientations.

That individualism can be prosocial (e.g. have concerns over inter-generational justice and be willing to act against climate change) is thus not widely considered possible in that literature. The consensus instead can be summarised as follows: 'In fact, there is a potential conflict between the unfolding of the self-interest of homo economicus and sustainability; since it is hardly possible to imagine a sustainable development which does not require any restriction on today's generation and its self-interests.' (Becker, 2006, 18).

Universalistic individualism and the literature on climate change action

Individualism is thus frequently referred to in the literature on personal values that can drive individuals to act against climate change, or to hold beliefs supporting more climate change action and activism. However, it is not a simple concept, and in the broader literature, different definitions and conceptualisations can be identified. Accordingly, a close look at how it is operationalised reveals wide differences in what the concept is meant to capture.

In this paper, we will focus on individualism, as opposed to collectivism, using a definition aligned with Hofstede's (1980) ground-breaking investigation of cultural values across the world, and which is now very widely used in institutional and cultural studies (e.g. Taras *et al.*, 2010 for a review). We refer to this value as 'universalistic individualism', because beyond a focus on personal needs and wants, it also includes preferences towards forms of social organisation which are more universalistic and less embedded in narrow, in-group networks (i.e. 'collectivistic social organisation' in Nardon and Steers, 2009). In this definition, universalism is about valuing impersonal relations, rather than always favouring in-groups.

Discussions around this specific interpretation of individualism have gained prominence in recent years, as social psychologists, and cultural psychologists, in particular, have worked towards pinpointing more precisely defined and broadly comparable measures of individualism. In Hofstede's seminal work, individualism is presented as a greater focus on one's own needs and wants and a preference for loose-knit social fabric (Hofstede, 1980). In individualistic societies, success is individual and individuals are expected to take charge and responsibility over their life (Oyserman *et al.*, 2002). On the contrary, in collectivist societies, individuals are expected to give more importance to their narrow in-group rather than their own needs and wants (Triandis, 1990). Unquestioning loyalty is required within the group, as well as strong adherence to social norms (Triandis, 2001). Importantly, in this definition, the dichotomy individualism/collectivism is however not strictly synonymous to selfishness/collective-mindedness. Indeed, collectivism is understood as potentially constraining personal freedom and limiting the scope for adapting and changing behaviour, as one favours in-groups and abides by constraining rules regulating this narrow group (Hofstede, 2001).

Accordingly, researchers, especially in the field of cultural psychology, have increasingly pointed at differences and disagreement in attempts to measure individualism/collectivism at the individual level and across culture (e.g. Peng *et al.*, 1997). An enlightening study by Heine *et al.* (2002) demonstrated that researchers often failed to measure collectivism across culture effectively, because they focused on contrasting selfishness and cooperation, without emphasising the group within which cooperation was expected, and the group used implicitly by respondents differed across culture. If collectivism is about in-group favouritism, the in-group needs to be defined, and can be contrasted to the type of impersonal relationships that will prevail in (universalistic) individualist contexts (Heine *et al.*, 2002; Pelham *et al.*, 2022). Concretely, this means that contrasting (universalistic) individualism and (ingroup-focused) collectivism may be more meaningful and lead to a better understanding of individual behaviour across social contexts, while contrasting selfishness to pro-sociality may be too simplistic, and may lead to intuitive but potentially misleading findings.

Putting more structure to this discussion, in a recent contribution, Kaasa (2021) reviewed the conceptualisation behind diverse sets of cultural dimensions to propose a unified framework from a theoretical or conceptual perspective. Her concluding overview firmly aligned individualism with intellectual autonomy in contrast to collectivism, which is embedded in narrow in-group networks. She also mentions the proximity that exists between individualism/collectivism and power distance, noting that they were initially created as a unique dimension by Hofstede thus reinforcing the constraining social structure implied in the notion of collectivism. Complementary investigations reviewing the empirical literature to identify correspondences between different sets of values have reached similar conclusions, with autonomy/embeddedness often found to positively correlate with individualism/collectivism, while it correlates negatively with power distance (Maleki and De Jong, 2014; Schwartz, 2004).

Accordingly, and moving away from the literature on cultural dimension to focus more specifically on personal values, individualism is conceptualised by most as capturing both an aspect of selfishness, and a degree of universalism. And when understood in that light, individualism has been shown to facilitate change, is associated with stronger support for egalitarian institutions and democratic processes (Davis and Abdurazokzoda, 2016; Licht *et al.*, 2007) and can also be associated with greater support for redistribution (Binder, 2019), government intervention, especially in a high institutional trust setting (Pitlik and Rode, 2017) or charitable giving (Cai *et al.*, 2022). This universalistic

individualism has also been linked to greater support for gender equality and womens' economic rights (Davis and Williamson, 2019, 2022). It can also be associated with greater support for acting against deleterious but traditional social practices such as corruption (Amini *et al.*, 2022) and more generally it can be associated with greater levels of pro-sociality (Irwin, 2009 and Andriani and Sabatini, 2015).This definition of individualism has been criticised, notably for its complexity as it bundles together different notions of self-determination and rejection of hierarchy or willingness to challenge the status quo (Beugelsdijk and Welzel, 2018; Singelis *et al.*, 1995). However, it is a definition that has an established pedigree and the volume of empirical work using that definition, as well as the coherent narrative emerging from it, means that it cannot be ignored. As already stated however, this conceptualisation of individualism is rarely the concept called upon in the environmental literature.

In addition to this, it is worth noting that the literature on WTP taxes (tax morale) or support for government policies, has often emphasised the importance of individual values and their interplay with institutional trust. For example, Mickiewicz *et al.* (2019) evidenced the relevance of both individual level cultural values and legitimacy of the government in explaining the tax morale of business owners. Consistent findings were reported in Andriani *et al.* (2022) using household surveys and focusing on values measured at the individual level but aligned with Hofstede's cultural dimensions. Interestingly they evidenced that individualism and institutional trust were both associated with greater tax morale. As already noted, Pitlik and Rode (2017) have also evidenced how individualism is associated with more support for government intervention especially in high institutional trust contexts. Overall, these findings all suggest that, especially when focusing on the government response to climate change, individualism can translate into effective support for taking action when individualism motivates citizens to choose their own course of action, while favouring universalistic values. We note that this interpretation of individualism underscores the importance of embeddedness. In Banfield's work (1958), familism is embeddedness in extremely narrow social groups and hostility towards outgroup members (or selfishness towards a broader social group), and it prevents any form of collective action. Nikolaev and Salahodjaev (2017), Grief and Tabellini (2017) and Davis and Williamson (2020) accordingly support the notion that individualism is linked to reduced familism, tribalism and insider-outsider distinctions.[2]

Research hypotheses

Our aim here is thus to fill an important gap in the literature, and to complement the studies already investigating the importance of values for our understanding of beliefs and actions to limit or mitigate climate change at the individual level, but focusing specifically on the value of individualism, while recognising it as more than selfishness.

We note that this investigation is of particular interest because it is difficult to assert *a priori* how individualism will impact on these beliefs and activities. Indeed, if selfishness is contrasted with pro-sociality, it is quite reasonable to expect pro-sociality to drive climate change beliefs and actions and thus selfishness would be expected to be negatively correlated with taking actions against climate change. The impact of individualism is however less clear if we use a definition and operationalisation which recognises the importance of embeddedness in broad social groups rather than narrow in-groups. On the one hand, individualism could be associated with less support for climate change mitigation and policies, if these are seen as constraining individual freedom or forcing people to conform. Conversely, individualism as facilitating self-orientation and self-determination could increase adoption of climate change prevention or mitigation individually and could support government climate change policies. Notably, there is evidence already that feelings of 'personal responsibility' are important to convert climate change worry into personal actions and support for policies (Bouman *et al.*, 2020).[3]

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[2]We are grateful for the suggestions of two of our reviewers who helped us formulate this point.

[3]As suggested by one of our reviewers, we note that the trade-offs would possibly be different if instead of Climate Change, we were focusing on environmental issues pertaining to common property resources. In this case, and as exemplified by the seminal work of Elinor Ostrom on the Tragedy of the Commons (1990), solutions might be found within the narrowly

Thus, here we propose to test these relationships, and we posit that universalistic individualism may be positively related to individual climate change actions.

Hypothesis 1: Individualism is positively associated with the likelihood that one will take up individual climate change actions.

Regarding more structural responses to climate change, such as being willing to pay more in tax if this is used to combat climate change, (universalistic) individualistic respondents may also be more supportive of government intervention.

Hypothesis 2: Individualism is positively correlated with support for climate change policy.

Data and specification
Data

To conduct our research, we use secondary data from the 'Life in Transition Survey - wave 2' (aka LITS2). This data was collected jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank in autumn 2010. The survey contains nationally representative samples of either 1,000 or 1,500 respondents in 29 post-communist countries in Central and Eastern Europe and Central Asia, plus Turkey and five Western European countries.[4]

The principal reason for using this data is that it contains a detailed module on climate change that makes it a particularly rich source of information for this paper. As well as asking people their attitudes towards climate change and how important climate change is to themselves, there are questions asking what people themselves have done to combat climate change, how educated people are about the causes of climate change and WTP to combat climate change. Climate change is not explicitly defined in the questionnaire, but the policy options offered are around changing behaviour to limit CO_2 emissions.

The geographical coverage of the survey is also interesting, since it includes countries at different levels of economic development, with distinctive historical backgrounds and different levels of reliance on natural resources that may influence attitudes towards climate change, thus offering a broad and diverse sample to test our hypotheses. While the sample is essentially dictated by our data source and a large coverage of countries can suggest greater external validity, one can also be concerned that the heterogeneity of the sample in fact hides important differences across countries. To mitigate this, we present some robustness tests, based on eliminating specific countries at the end of section 'Results'.

Variables of interests
Climate change

In order to capture what Stern (2000, 411) refers to as environmental citizenship we firstly generate a dummy variable that takes a value of 1 if the respondent has '…personally taken actions aimed at helping to fight climate change'. A follow up question identifies ten possible actions the person has done to reduce climate change: (1) purchased a car that consumes less fuel, or is more environmentally friendly (2) reduced the use of your car, for example, by car-sharing or using your car more efficiently (3) chosen an environmentally friendly way of transportation (by foot, bicycle, public transport) (4) reduced energy consumption at home (5) reduced consumption of water at home (6) where

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defined community jointly owning the resource, thus implying a possible positive role of collectivism. While this is an interesting context to keep in mind, our data does not include any question which could credibly be seen to refer to common goods and as such it is a proposition, we are unable to test empirically.

[4]For more details on survey design and the implementation of the methodology see Steves (2011).

possible, avoid short-haul flights (7) started separating most of your waste for recycling (8) reduced consumption of disposable items (e.g. plastic bags) (9) buy seasonal and local products to avoid products that come from far away, and thus contribute to CO_2 emissions (10) installed equipment in my own home that generates renewable energy (e.g. solar panels). Multiple responses to the possible actions are allowed from which we calculate a count variable that takes values from 0 to 10.[5]

Willingness to pay

To test hypothesis 2, we compute a dummy variable based on yes (= 1) and no (= 0) responses to the question 'Would you be willing to give part of your income or pay more taxes, if you were sure that the extra money was used to combat climate change'.

Individualism

Building on our literature review, we first identified a number of questions in the LITS2 survey capturing the values and beliefs of the respondents, in ways that were potentially relevant to the concept of individualism/collectivism aligned with the original cultural dimension proposed by Hofstede (1980). We ran a principal component analysis to identify coherent underlying concepts by grouping together the different survey questions we had selected. Following an iterative process, we were able to create a unique composite variable capturing individualism in our sample, as a weighted sum of the respondent's view on three issues using principal component analysis. More specifically, the three following values charge positively in our indicator of individualism: (i) preferences for private over public ownership, (ii) that competition is good since it encourages hard work and the development of new ideas and (iii) that people should be more active in questioning the actions of authorities. The first item is often used in composite index of individualism (see for example Beugelsdijk and Welzel, 2018) and as argued by Beugelsdijk *et al.* (2015), is consistent with the belief that everyone should look after him/ herself, rather than rely on the state (Hofstede, 2001). The second item is also consistent with this notion, but adds to it, as it reinforces the idea that individualism is closely associated with maximising individual efforts and promoting competition, thus implying universalism (Beugelsdijk *et al.*, 2015; Hofstede, 2001). Finally, our third variable is aligned with individualism as emphasising low obedience and conformity (Triandis, 2001).

Following Beugelsdijk *et al.* (2015) and Davis and Williamson (2019), we proceeded to check whether our measure of individualism was in line with existing indexes reflecting definitions of individualism aligned with our conceptualisation. Hofstede's own indexes of cultural values have little coverage in our region of interest, we thus used the Global Collectivism Index (or GCI) developed by Pelham *et al.* (2022). We find that the correlation between our measure of individualism, averaged at the country-level, and GCI is 0.63 if we remove 4 outliers (specifically France, Hungary, Georgia, and Mongolia) and we can reject the hypothesis that the 2 measures are independent at less than 1% level. This provides a degree of external validation for our own index and a confirmation that it measures individualism as self-determination and universalism.

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[5]There is no information in the data set on whether there have been government schemes to incentivise people to adopt climate-friendly behaviours, e.g. subsidising solar panels, cycle to work schemes. Evidence is mixed as to whether such schemes have made a lasting difference to people's attitudes towards the environment or climate change, or to further related changes in behaviour. Reviewing some of the evidence, Steg and Vlek (2009, 334) conclude that '…policies are more acceptable when they are believed to be fairer, and when they do not seriously affect individual freedom. Moreover, policies are more acceptable to people who are highly aware of the problem, and who feel a strong moral obligation to reduce the problems'. All models include country-level fixed-effects, which allows us to factor out national differences in such policies in explaining differences in behaviours. Our estimates are 'within country', thus focusing on differences in behaviours among individuals experiencing the same national-level policies. Similarly, cross-country differences in response can reflect differences in environmental quality and exposure to climate threat, among other factors. While this could have made a multi-level investigation interesting, empirical tests suggest that these models would not improve our understanding of the preferences investigated here.

Education and climate change knowledge

Previous work finds that specific education and information about climate change can result in changes in attitudes towards this issue (e.g. Dobson, 2003, 2007; Vicente-Molina *et al.*, 2013). While there is mixed evidence that more education *correlates* with climate mitigating behaviour (e.g. Ayalon *et al.*, 2013) and attitudes (e.g. Rowlands *et al.*, 2003), a recent study has concluded that more education *caused* people to behave in a more climate-friendly way (Meyer, 2015). We thus control for the level of education of people by creating three categorical variables for primary education, secondary education and tertiary education and expect to find that tertiary educated people are more likely to have taken action to combat climate change compared to secondary and primary educated people. We also hypothesise that the more educated would be willing to pay more in taxes to combat climate change.

   In addition to general education, access to information which is specifically about climate change and its origins could potentially impact on people's behaviour. With this in mind, we also control for the degree to which people believe they are well informed about climate change and whether our respondents have an actual understanding of the causes of climate change. Indeed, while CO_2 is the main contributor to climate change there are a number of ways that CO_2 can be reduced by individuals and indeed by nations and the international community. People who are more knowledgeable and more informed about the true causes of climate change might however be more supportive of any form of actions to reduce CO_2 emissions. In the frame of our analysis, we would expect these people to be more likely to act against climate change individually and to be more willing to pay for climate change policies that ultimately reduce CO_2. We capture whether people are informed about the causes of climate change by creating a group of dummy variables that capture whether people think they are not at all informed, not very well informed, fairly well informed or very well informed about climate change. In addition, we use information on the objective question 'Emission of CO_2 has a major impact on climate change', with respondents choosing one of five categories between strongly disagree with this statement (= 1) to strongly agree with this statement (= 5). We create what is a climate change knowledge dummy variable that takes a value of 1 if they agree or strongly agree with the statement and 0 otherwise.

Other controls

Demographic controls are included in the form of age categories and a female dummy variable. Evidence regarding how younger and older people behave and view green issues is mixed with Gifford and Nilsson (2014) finding evidence that older people are greener in their behaviours, but that younger people show more concern for the climate (Klineberg *et al.*, 1998; Jianguang, 1994). Regarding gender, Gifford and Nilsson (ibid) argue that the majority of empirical works finds women have more climate change-friendly views and behaviours than men possibly because they are more altruistic. There is mixed evidence on whether people with higher income or who are wealthier or who are in a higher social class are more likely to hold pro-climate beliefs and undertake climate change actions (e.g. Uyeki and Holland, 2000). In this paper we expect that people with higher income or who are wealthier are more likely to be able to act against climate change (e.g. can afford to buy more expensive local produce, can afford to purchase solar panels or take advantage of government schemes that incentivise their purchase). In LITS2 there is no credible measure of household income, we thus rely on an income ladder measure, whereby people report where they believe they are on a ten-step ladder ranging from lowest (rung 1) to highest (rung 10). Wealth is captured by a variable created using an asset index using principle components analysis on whether the household owned a car, a second residence, a bank account, debit card, credit card, mobile phone, computer, and had internet access. Including simultaneously in our regressions, education, income and wealth could be problematic as these variables are often highly correlated[6]. Pairwise correlations and stepwise

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[6]Our result tables include the income variable since Linder et al. (2020) suggest that multicollinearity is often less of an issue than expected and that omitted variable bias might be a greater concern.

estimations suggested that removing our measure of income reduced correlation concerns without damaging the goodness of fit of our models. The results presented in the paper do include income, but we note that for specifications excluding income (available upon request and seen by the reviewers) the results were unchanged for our main variables of interest.

To consider whether location is important in attitudes towards climate change we include controls for the type of settlement the household is in. To do so, we create three categorical variables for urban, rural, and metropolitan. To control for all unobserved country-wide influences on individual beliefs and actions towards climate change, all regressions include country-fixed effects. Our standard errors are also clustered at the country level.

As an introduction to the data, Table 1 provides the means of all the variables used in the forthcoming econometric work. For the dependent variables we note that 29.7 per cent of people undertake at least one climate change with the average number of such activities being closest to one. Just over a third of our sample (35.6%) state that they would be willing to pay (e.g. through paying more in taxes) if they were sure the extra money was used to combat climate change. The four most common forms of climate change action in the sample are reducing energy consumption at home (18.8%), separating waste disposal (18.7%), reducing water usage at home (16.4%), and reduced consumption of disposable items (13.4%). The actions that require some monetary outlay on behalf of people have lower take up rates, e.g. Installation of equipment in my own home that generates renewable energy (1.5%) or purchased a car that consumes less fuel, or is more environmentally friendly (5.3%). Three quarters of our sample realise that carbon dioxide causes climate change but over half say they are not informed or not very well informed about climate change.

Results

The first hypothesis we wish to test is whether individualism increases the likelihood of undertaking personal actions to combat climate change. Models 1 and 2 in Table 2 confirm this hypothesis for a dummy and continuous measure of personal actions respectively[7]. This is consistent with the broader empirical literature that individualistic people are more likely to act in pro-social ways (e.g. Irwin, 2009). In Models 3 and 4, additional controls are added to the basic specification presented in Model 2. As we expected, Model 3 shows that people who know CO_2 causes climate change are significantly more likely to have taken actions against climate change. Individualism remains positive and significant in Model 3 indicating that a direct correlation remains between this, and actions taken against climate change. In Model 4 we include whether people think they are well informed about climate change. The results indicate that the better-informed people think they are, the more likely they are to act against climate change. Individualism and our objective measure of CO_2 causing climate change both remain positive and significant.

As expected, we report that general education, the degree to which respondents are informed about climate change, and their understanding of its main cause are all linked to a greater likelihood to act individually against climate change. In our case, information and knowledge are thus linked to greater climate change actions. However, the likelihood of acting is also greater for more individualistic respondents: individualism thus matters over and above knowledge and encourages more individual-level actions against climate change.

Overall, Table 2 demonstrates a positive association between individualistic values and acting against climate change by engaging in a number of specific individual actions, such as purchasing fuel-efficient cars, choosing public transport, avoiding short-haul flights, buying seasonal or local produces, etc. Using the coefficient estimated in Model 4, this suggests that a one standard deviation

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[7]All models are estimated using linear regressions. This is to facilitate comparison across models, and in particular with the multi-level estimations discussed at the end of section 'Results'. Note that for all dichotomous variables, logit models were also estimated and results were consistent with the findings presented in this paper. This is also true for the models reported in Table 3.

Table 1. Descriptive statistics

Variable name	Observations	Mean	Std. Dev.
Different possible climate change actions			
Action 1: Purchased a car that consumes less fuel, or is more environmentally friendly	30,089	0.053	0.224
Action 2: Reduced the use of my car, for example by car-sharing or using my car more efficiently	30,089	0.066	0.248
Action 3: Chosen an environmentally friendly way of transportation (by foot, bicycle, public transport)	30,089	0.106	0.307
Action 4: Reduced energy consumption at home (e.g. turning down air-conditioning or heating, not leaving appliances on standby, buying energy efficient products, such as low-energy light bulbs or appliances)	30,089	0.184	0.387
Action 5: Reduced consumption of water at home (e.g. not leaving water running when washing dishes, etc)	30,089	0.157	0.364
Action 6: Where possible, avoid taking short-haul flights	30,089	0.029	0.168
Action 7: Started separating most of my waste for recycling	30,089	0.179	0.384
Action 8: Reduced consumption of disposable items (e.g. plastic bags, certain kind of packaging, etc)	30,089	0.129	0.335
Action 9: Buy seasonal and local products to avoid products that come from far away, and thus contribute to CO_2 emissions (because of the transport)	30,089	0.087	0.282
Action 10: Installed equipment in my own home that generates renewable energy (e.g. wind turbine, solar panels)	30,089	0.013	0.112
Dependent variables			
Climate change action (1 = at least one action, 0 = no action)	30,089	0.291	0.454
Number of climate change actions (range from 0–9)	30,089	0.989	1.846
Willingness to pay for action to tackle climate change	27,128	0.346	0.476
Independent variables			
Knowledge about climate change			
Emission of CO_2 has a major impact on climate change (agree = 1, disagree = 0)	30,089	0.744	0.436
Not at all informed about the causes of climate change	30,089	0.122	0.327
Not very well informed about the causes of climate change	30,089	0.419	0.493
Fairly well informed about the causes of climate change	30,089	0.384	0.486
Very well informed about the causes of climate change	30,089	0.075	0.263
Individualism	30,089	0.031	1.201
Socio-economic variables			
Female	30,089	0.599	0.490
Age 18–24	30,089	0.118	0.323
Age 25–34	30,089	0.199	0.399
Age 35–44	30,089	0.193	0.395
Age 45–54	30,089	0.178	0.383
Age 55–64	30,089	0.153	0.360

(*Continued*)

Table 1. (*Continued.*)

Variable name	Observations	Mean	Std. Dev.
Age 65 +	30,089	0.158	0.365
Income ladder	30,089	4.513	1.672
Wealth	30,089	0.123	1.787
Primary education	30,089	0.295	0.456
Secondary education	30,089	0.501	0.500
Tertiary education	30,089	0.204	0.403
Rural	30,089	0.392	0.488
Metropolitan	30,089	0.129	0.336
Urban	30,089	0.479	0.500

increase in individualism would result in a 3.8 percentage-point increase in climate change action – while this may seem small, one would need to increase the average wealth in the population by a ¼ of a standard deviation to achieve an equivalent change in behaviour, or to nearly double the number of respondents being 'very well informed' about climate change.

In order to test whether the results in Table 2 are over sensitive to how individualism is defined we regress combinations of the three terms that make up our individualism term in Table 3. Model 1 illustrates that those who have a preference for private over public ownership of business and industry are less likely to undertake climate change actions, while those who think competition is good since it instils a work ethic and can result in new ideas or who think citizens should be more active in questioning the actions of authorities are more likely to undertaken climate change actions. The different combinations of the three terms in the remaining model specifications indicates some degree of correlation between those who think competition is good and those who are more questioning of authorities but both remain significant at least at the 10 per cent level in Model 1 and Model 4.

To test hypothesis 2, we regress the person's WTP more in taxes if it was spent on climate change policies onto individualism. Model 1 in Table 4 shows that individualism is positively related to WTP to combat climate change although the coefficient is insignificant. As we have established in the previous section individualism and personal actions to tackle climate change are positively related to each other, but we wish to test whether those who have undertaken these personal actions are more or less likely to agree with governmental climate change policies. Model 2 shows that those who have undertaken more personal actions to combat climate change are more likely to be willing to financially support government climate change policies but that this positive association progressively diminishes as the number of individual actions undertaken increases (number of climate change actions squared < 0).

The findings suggest a possible indirect relationship between individualism and WTP through the number of actions personally taken to combat climate change. This is consistent with the results from Table 2, where we highlighted a positive association between individualism and individual actions against climate change. Individualistic individuals are very weakly more likely to support government actions against climate change, but this positive association is mostly mediated through their greater willingness to take personal actions.

In Models 3 and 4 we do not control for the number of actions variables, but instead include whether people know CO_2 causes climate change or not and whether people think they are informed about the causes of climate change. Individualism again is insignificant in both models. People who are more informed and people who know that CO_2 causes climate change are more willing to pay. Models 5 and 6 include two combinations of the action's terms and the CO_2 dummy and informed terms. Firstly, WTP has a direct and significant association with taking actions, having climate

Table 2. Climate change actions and multifaceted individualism

Variables	(1) CC action dummy	(2) Number of actions	(3) Number of actions	(4) Number of actions
Individualism	0.015*** (0.005)	0.053*** (0.019)	0.046** (0.018)	0.038** (0.016)
Emission of CO_2 has a major impact on climate change			0.367*** (0.063)	0.317*** (0.058)
Not at all informed about the causes of CC				*Reference group*
Not very well informed about the causes of CC				0.192*** (0.046)
Fairly well informed about the causes of CC				0.654*** (0.089)
Very well informed about the causes of CC				1.119*** (0.138)
Female	0.015** (0.007)	0.111*** (0.033)	0.104*** (0.032)	0.128*** (0.034)
Age 18–24	−0.029** (0.011)	−0.169** (0.063)	−0.163** (0.062)	−0.184*** (0.061)
Age 25–34	−0.012 (0.008)	−0.087** (0.042)	−0.087** (0.041)	−0.082** (0.038)
Age 45–54	0.017* (0.008)	0.067** (0.025)	0.068*** (0.025)	0.056** (0.023)
Age 55–64	0.031*** (0.011)	0.155*** (0.035)	0.157*** (0.035)	0.145*** (0.033)
Age 65 plus	0.010 (0.010)	0.041 (0.044)	0.041 (0.043)	0.036 (0.044)
Income ladder now	−0.001 (0.003)	−0.005 (0.011)	−0.001 (0.011)	−0.011 (0.010)
Wealth index	0.028*** (0.004)	0.142*** (0.022)	0.140*** (0.022)	0.117*** (0.020)
Primary educated	−0.054*** (0.009)	−0.210*** (0.052)	−0.207*** (0.051)	−0.132** (0.048)
Tertiary educated	0.067*** (0.012)	0.326*** (0.060)	0.324*** (0.060)	0.243*** (0.053)
Rural	−0.022* (0.012)	−0.069 (0.047)	−0.068 (0.047)	−0.055 (0.047)
Metropolitan	−0.049* (0.029)	−0.188** (0.090)	−0.183** (0.089)	−0.183** (0.080)
Constant	0.364*** (0.022)	0.916*** (0.067)	0.627*** (0.090)	0.310** (0.116)
Country fixed effects	Yes	Yes	Yes	Yes
Observations	30,089	30,089	30,089	30,089
R^2	0.222	0.276	0.283	0.309

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions clustered at country-level. Reference groups are Age 35–44, Secondary educated, residing in an urban area and Poland. France, Hungary, Mongolia & Georgia are dropped from the analysis since the individualism term is not empirically linked enough to Hofstede.

Table 3. Climate change actions and individual components of individualism

Variables	(1) Number of actions	(2) Number of actions	(3) Number of actions	(4) Number of actions
Private ownership of business and industry should be increased (1 = public ownership of business should increase, 10 = private ownership of business should increase)	−0.010** (0.005)	−0.009* (0.005)	−0.007 (0.005)	
Competition is good. It stimulates people to work hard and develop new ideas (10–1 Scale)	0.015** (0.007)	0.021*** (0.007)		0.013* (0.007)
As citizens, we should be more active in questioning the actions of our authorities (10–1 Scale)	0.019** (0.009)		0.023** (0.009)	0.018** (0.009)
Emission of CO_2 has a major impact on climate change	0.310*** (0.058)	0.314*** (0.058)	0.315*** (0.057)	0.312*** (0.058)
Not at all informed about the causes of CC	Reference group	Reference group	Reference group	Reference group
Not very well informed about the causes of CC	0.192*** (0.046)	0.191*** (0.046)	0.195*** (0.047)	0.192*** (0.046)
Fairly well informed about the causes of CC	0.654*** (0.089)	0.655*** (0.089)	0.659*** (0.090)	0.653*** (0.089)
Very well informed about the causes of CC	1.119*** (0.138)	1.117*** (0.139)	1.122*** (0.139)	1.119*** (0.138)
Demographic and socio-economic controls	Yes	Yes	Yes	Yes
Constant	0.118 (0.148)	0.211 (0.132)	0.170 (0.143)	0.087 (0.147)
Observations	30,089	30,089	30,089	30,089
R^2	0.310	0.309	0.309	0.309

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions clustered at country-level. Demographic and socio-economics controls are age, gender, education level, income ladder, wealth index, and where reside. Reference groups are Age 35–44, Secondary educated, residing in an urban area and Poland. France, Hungary, Mongolia & Georgia are dropped from the analysis since the individualism term is not empirically linked enough to Hofstede.

Table 4. Willingness to pay (WTP) for action to tackle climate change

Variables	(1) WTP	(2) WTP	(3) WTP	(4) WTP	(5) WTP	(6) WTP
Individualism	0.006 (0.005)	0.004 (0.006)	0.004 (0.005)	0.003 (0.006)	0.003 (0.006)	0.002 (0.006)
Number of climate change (CC) actions		0.049*** (0.009)			0.071*** (0.016)	0.037*** (0.008)
Number of climate change (CC) actions squared		−0.002 (0.001)			0.046*** (0.009)	0.038*** (0.009)
Emission of CO_2 has a major impact on climate change			0.084*** (0.017)	0.078*** (0.016)	−0.002 (0.001)	0.067*** (0.015)
Not at all informed about the causes of CC				Reference group		Reference group
Not very well informed about the causes of CC				0.065*** (0.018)		0.058*** (0.017)
Fairly well informed about the causes of CC				0.128*** (0.019)		0.106*** (0.017)
Very well informed about the causes of CC				0.160*** (0.027)		0.124*** (0.024)
Female	0.006 (0.007)	0.002 (0.007)	0.005 (0.007)	0.008 (0.007)	0.001 (0.007)	0.004 (0.007)
Age 18–24	−0.002 (0.012)	0.005 (0.013)	−0.001 (0.012)	−0.003 (0.012)	0.005 (0.013)	0.003 (0.012)
Age 25–34	−0.011 (0.011)	−0.007 (0.010)	−0.011 (0.010)	−0.010 (0.010)	−0.007 (0.010)	−0.007 (0.010)
Age 45–54	−0.000 (0.012)	−0.003 (0.011)	0.000 (0.012)	−0.002 (0.012)	−0.002 (0.011)	−0.004 (0.012)
Age 55–64	−0.019 (0.014)	−0.025* (0.013)	−0.019 (0.014)	−0.021 (0.014)	−0.024* (0.013)	−0.025* (0.013)
Age 65 plus	−0.026 (0.017)	−0.027 (0.016)	−0.026 (0.017)	−0.026 (0.017)	−0.027 (0.016)	−0.027 (0.016)
Income ladder now	0.017*** (0.003)	0.018*** (0.003)	0.018*** (0.003)	0.017*** (0.003)	0.018*** (0.003)	0.017*** (0.003)
Wealth index	0.020*** (0.006)	0.015** (0.006)	0.020*** (0.006)	0.016*** (0.006)	0.015** (0.006)	0.013** (0.006)
Primary educated	−0.039*** (0.010)	−0.031*** (0.010)	−0.038*** (0.010)	−0.026** (0.010)	−0.031*** (0.010)	−0.022** (0.010)
Tertiary educated	0.036*** (0.012)	0.024** (0.011)	0.035*** (0.012)	0.024** (0.012)	0.024** (0.011)	0.017 (0.011)
Rural	−0.007 (0.016)	−0.004 (0.015)	−0.006 (0.016)	−0.004 (0.016)	−0.004 (0.015)	−0.002 (0.016)
Metropolitan	−0.001 (0.019)	0.006 (0.019)	−0.000 (0.019)	0.001 (0.019)	0.007 (0.018)	0.007 (0.019)

Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.124*** (0.024)	0.084*** (0.023)	0.057** (0.026)	−0.021 (0.027)	0.030 (0.025)	−0.033 (0.026)
Observations	27,128	27,128	27,128	27,128	27,128	27,128
R^2	0.113	0.128	0.118	0.126	0.132	0.137

Notes: Reference groups are males, age 35–44, secondary education level, urban and Poland. Standard errors are clustered by country to capture differences in country-level characteristics. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
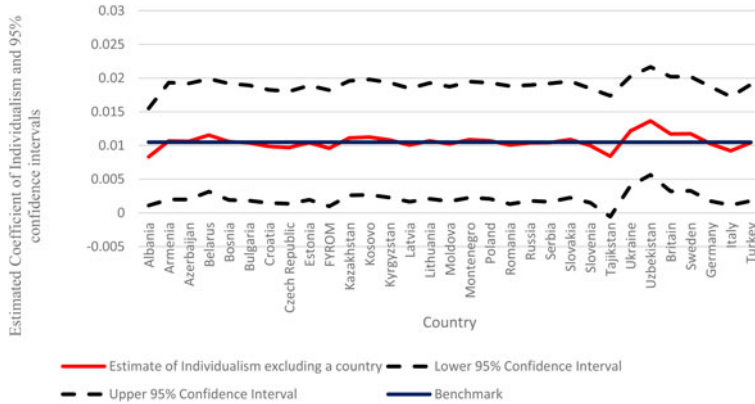
Figure 1. Climate change action dummy.

knowledge and being informed about the causes of climate change. When the action terms and informed about climate change dummies are included, we observe the size of the estimated coefficients declining. This reflects the fact that these two sets of variables are correlated, as we saw in Table 2.

Overall, while these results only evidence a weak positive correlation between individualism and WTP more taxes, and while this correlation is probably mostly translating the fact that individualistic respondents are also better informed and more willing to take personal actions against climate change, we should not get distracted from the fact that our results *do not* suggest in any way that individualistic respondents are less likely to contribute to climate change mitigation through increases in tax paying, or equivalently they *do not* suggest that more collectivist individuals would be more supportive of an increase in taxes. By conceptualising individualism as a concept that is more than selfishness, we reach more nuanced conclusions on its link with support for a public climate change response.[8]

Given possible heterogeneity across the countries in the sample, we tested whether the results for universalistic individualism being associated with greater action against climate change could be masking a specific country effect. To investigate this, we re-estimated Model 4 from Table 2 when the dependent variable was the action dummy and when the dependent variable was the number of actions, by removing one country at a time. Figures 1 and 2 illustrate that individualism remained positive and was significant at the 95% level meaning that no one country was driving the positive results reported in Table 2. That being said, the estimated coefficient on individualism increases substantially when Uzbekistan is excluded from both figures meaning this country is weakening the effect of individualism in the full sample estimates[9]. While for Figure 2 this is also the case when Britain or Sweden are dropped, we also see that excluding Germany and Croatia dampens the effect of individualism on climate change action.

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[8]We note that we are careful to interpret our results as correlations or associations between individualism and individual-level actions taken against climate change or willingness to pay more taxes. In line with recommendations by one of the referees we instrumented individualism to address endogeneity and measurement error by using pronoun drop (Licht *et al.*, 2007; Davis and Abdurazokzoda, 2016) and the historical prevalence of infectious disease (Nikolaev and Salahodjaev, 2017). These were linked to individual level data on which language is spoken at home following Davis and Williamson (2019). In both cases the instruments did not produce an F-Stat excluded instrument term that was greater than 10, although when using the infectious disease instrument to predict individualism this resulted in a positive and significant estimate of individualism on both measures of climate change action by the individual.

[9]As pointed out by one of our reviewers, Uzbekistan and Tajikistan were arguably the two most oppressive regimes at the time of the study and people answering surveys under such oppressive regimes are more likely to think about what the expected answer is rather than what their own views are. For this reason, we estimated our models but removed both these countries. There was no qualitative difference in the results, which are available upon request from the authors.
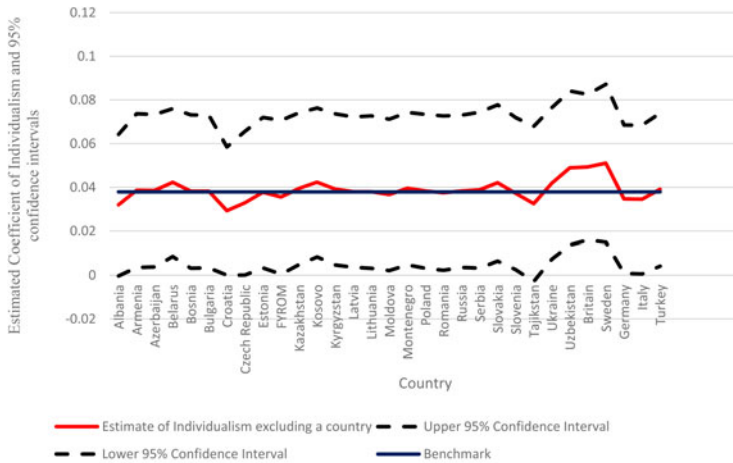
Figure 2. All climate change actions.

While our models are clustered at the country level, as individuals are nested in specific countries, a multi-level analysis, controlling for country-level variables, could be informative, in particular as it would allow to differentiate how much of the variance in taking climate change action(s) or being willing to pay for climate change policies is due to country-level and individual-level factors. However, both specification tests and variance decomposition analyses suggest that multi-level analysis is not appropriate in this context, when undertaking the initial Hausman test the multi-level (random effects) model was rejected for both the climate change action mode and WTP model meaning the fixed effects model is preferable.[10] Variance decomposition also shows that only 20% (climate change actions) and 10% (WTP) of the variance in responses is due to country-level differences.

Discussion and conclusions

Our results indicate that more individualistic individuals reports taking a greater number of personal actions to act against climate change, and this direct relationship remains when we consider how informed people feel about climate change and information about what causes climate change. In addition, we find some weak support for individualism being associated with a WTP more in taxes if this money was used to target climate change policies. Indeed, there is a positive but insignificant association between individualism and support for taxes aiming at tacking climate change, but a positive association between taking more individual actions and support for taxes, when individualistic respondents are more likely to take individual actions.

These findings may appear to contradict a literature that has pitted selfishness against pro-sociality when investigating values of relevance to our understanding of actions taken by individuals to combat climate change. But being self-centred and pro-social is in fact possible, as translated in the concept of individualism typically used in the cultural psychology literature. Indeed, focusing on individualism defined as self-determination and universalism, it has been argued to promote pro-sociality (e.g. Irwin, 2009), and to be associated with greater levels of generalised trust and a greater propensity for first-order cooperation, that is to say cooperation between individuals, without intermediation (Berigan and Irwin, 2011). With this in mind, it does make sense to find a positive association between

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[10]When comparing the difference in coefficients between fixed effects and random effects climate change action for Model 4, Table 2, we reject the random effects model since the Hausman test is 118.40. The equivalent test for willingness to pay for Model 6, Table 3 was 47.36, which again means rejection of the random effects model. These results are available upon request from the authors.

individualism and a willingness to take actions to tackle Climate Change, as we do. But while Berigan and Irwin (*ibid*) predict collectivism to be associated with greater levels of second-order cooperation (i.e. mediated via the state for example), we find no difference in the level of support for governments climate policies between collectivist and individualistic individuals, once personal actions are accounted for.

We also show that knowledge that CO_2 causes climate change and informed opinion about climate change are both correlated with supporting different measures to combat climate change, including both policy-change as well as individual actions. Finally, our findings indicate that the relationship between support for a government levy increases with individual actions against climate change, but at a decreasing rate.

In short, individualism is thus associated with taking individual actions against climate change in our sample of interests, and neutral to support for collective action (in the form of tax paying). Individualism can thus be compatible with pro-social actions that are for the greater good, if conceptualised as more than selfishness.

We link this to the work of Heine *et al.* (2002) which underscores that measures of collectivism/individualism should explicitly consider embeddedness in a narrow social group *in contrast to* values aligned with universalism to be meaningful across social contexts, and to recent work evidencing the importance of universalism to our understanding of differences in values held across social groups (Cappelen *et al.*, 2022).

These results are important for policy-making and for our understanding of the drivers of climate-change actions. Indeed, beyond the conclusion that individualistic values can be good for climate change mitigation, our results allow one to posit a possible micro-level channel through which economic development can lead to more environmental protection and climate change action (i.e. a mechanism explaining a potential climate change Kuznets' curve hypothesis), as economic development is usually associated with 'modernisation', which implies an increase in individualistic values: i.e. self-interest with universalism (Beugelsdijk and Welzel, 2018).

In addition, policy interventions are unlikely to affect citizens' values, and we do not want to suggest that interventions should be designed with this aim. Instead, it is important to be aware of the impact of values on actions and support for policies, and especially the way in which they interact with other factors, on which an intervention is possible. Our results in particular reveal a direct and independent impact of perceived self-efficacy on climate change action and a direct impact of knowledge about climate change on both climate change action and support for climate policies – this implies that an improvement in knowledge or perceived self-efficacy will lead to more climate friendly behaviour from citizens, independently of the values they hold. We believe this to be an important addition to the contribution of institutional economics to our understanding of the factors facilitating climate adaptation and policy formulation for climate change, complementing knowledge derived from the analysis of climate adaptation from the perspective of formal institutions and societal cooperation (e.g. Roggero *et al.*, 2018).[11]

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[11]Data limitations prevented more detailed investigations into country-level differences in culture, environment and policies, leaving space for future research.

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