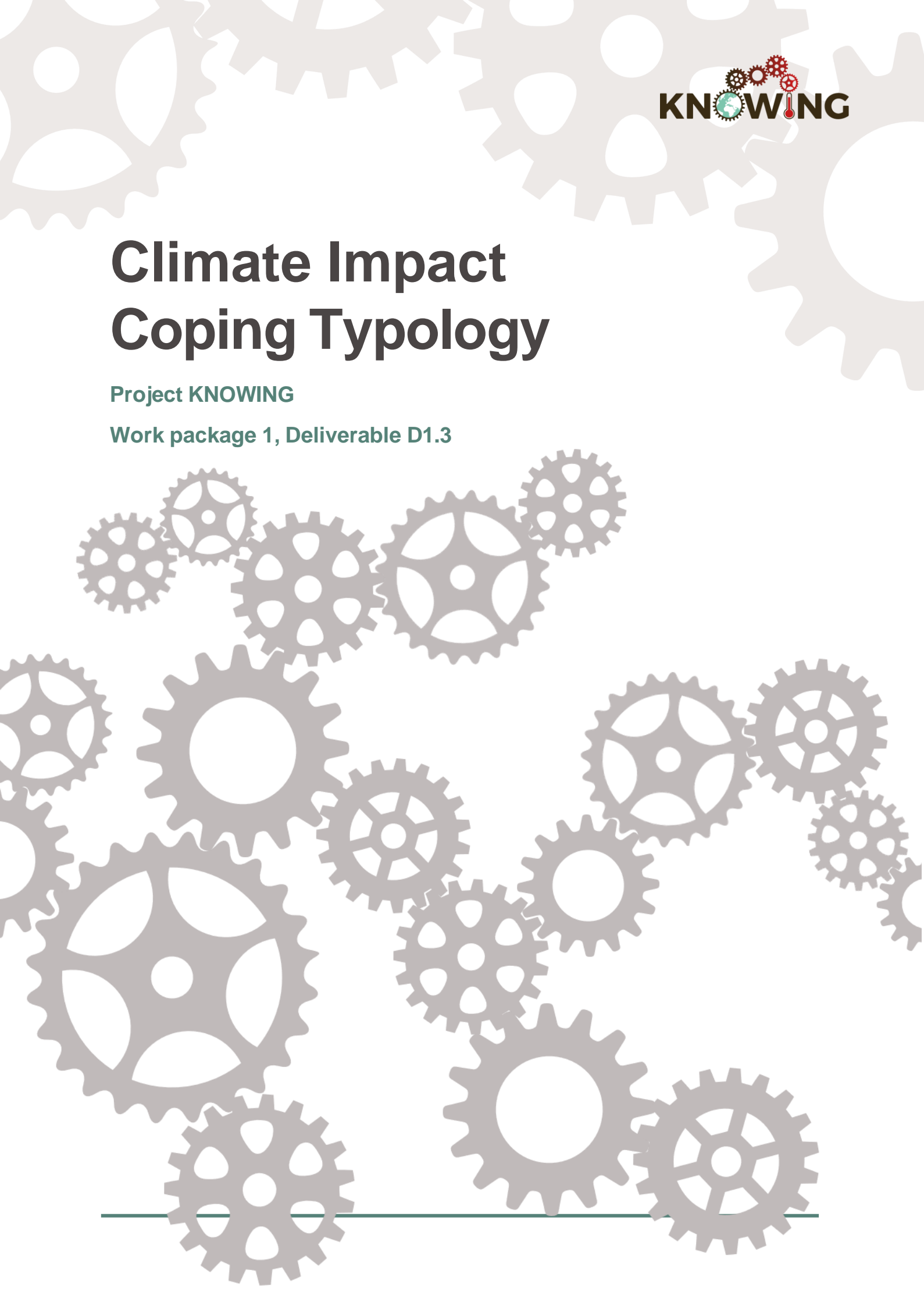


Climate Impact Coping Typology

Project KNOWING

Work package 1, Deliverable D1.3




Climate Impact Coping Typology

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Author(s):	Rudloff, C., Millonig, A., Fessler, F., Markvica, K. (AIT), Austria

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List of Acronyms

CIC	Climate interaction context
EC	European Commission
EU	European Union
IPCC	Intergovernmental Panel on Climate Change
KER	Key Exploitable Result
UNFCCC	United Nations Framework Convention on Climate Change

Glossary

Adaptation	The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2014). This can be specific for climate change (United Nations Framework Convention on Climate Change, UNFCCC), but also apply for other challenges such as soil erosion, migration and structural economic changes. Adaptation can occur in autonomous fashion, for example through market changes, or as a result of intentional adaptation policies and plans at International, National or local scale (UNISDR, 2009).
Adaptation measures	Adaptation measures are technologies, processes, and activities directed at enhancing our capacity to adapt (building adaptive capacity) and at minimizing, adjusting to and taking advantage of the consequences of climatic change (delivering adaptation) (Climate-ADAPT). Can be separated in: Hard and source-oriented measures, Hard and receptor-oriented measures and Soft measures (Glossary of the Clarity Proposal). In the context of EU-GL, the term generally refers to the Actions reducing vulnerability to climate change and climate variability by preventing negative effects or by enhancing resilience to climate change (ClimWatAdapt, 2012) (EU-GL, 2011).
Climate	Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization (WMO). The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the climate system (IPCC AR6).
Climate change	Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes (IPCC, 2014).
Climate impacts	The consequences of realized risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure, and vulnerability. Impacts generally refer to effects on lives; livelihoods; health and well-being; ecosystems and species; economic, social and cultural assets; services (including ecosystem services); and infrastructure (based on IPCC, 2018).
Coping	The use of available skills, resources and opportunities to address, manage and overcome adverse conditions, with the aim of achieving basic functioning of people, institutions, organisations and systems in the short to medium term (UNISDR, 2009; IPCC, 2012).
Climate Mitigation Pathways	Timeline (or Pathways) that depict the timing of mitigation and possible adaptation measures, with respect to specific climate impacts, that need to be implemented to reach climate neutrality by a certain point in time (e.g. 2050).
Human behaviour	The responses of persons or groups to a particular situation, here likely to relate to climate change. Human behaviour covers the range of actions by individuals, communities, organisations, governments and at the international level (IPCC, AR6). Note: This is a broad definition of human behaviour including actions of organisations and governments.
Impact	The probable spatial/temporal damage distribution according to a predefined scale of damage expected on the element at risk under consideration.

	<p>The impact scenario therefore represents the probabilistic distribution, in a given geographical area, of the damage caused by a single hazardous event with an assigned probability of occurrence (assumed as the reference hazard scenario) (Zuccaro et al. 2018).</p> <p>The impact can be measured in several ways: physical, economic, social, functional etc. and it can be evaluated as direct and/or indirect consequence of the event at a given time (snapshot) or projected in the future.</p> <p>In literature impact is defined as "consequences of a hazardous event, on natural and human systems, once it materializes, i.e. actually affects a societal system. The term impacts is used primarily to refer to the effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events occurring within a specific time period and the vulnerability of an exposed society or system. The impacts of climate change on geophysical systems, including floods, droughts, and sea level rise, are a subset of impacts called physical impacts (IPCC, 2014).</p>
Mitigation	<p>In the context of climate change, and in this document, the term is used to indicate "a human intervention to reduce the sources or enhance the sinks of greenhouse gases (GHGs)" (IPCC, 2014), that are the source of climate change.</p> <p>It is also used to indicate the lessening or minimizing of the adverse impacts of a hazardous event (UNISDR, 2017), through actions that reduce hazard, exposure, and vulnerability (IPCC, 2014). However, this is not the meaning that is used in this document.</p> <p>Annotation: The adverse impacts of hazards, especially natural hazards, cannot be completely prevented, but their scale or severity can be substantially reduced by various strategies and actions. Mitigation measures include engineering techniques as well as improved environmental and social policies and public awareness.</p>
Mitigation measures	<p>In climate policy, mitigation measures are technologies, processes or practices that contribute to mitigation, for example renewable energy technologies, waste minimisation processes and public transport commuting practices (IPCC, AR6).</p>
Response risk	<p>Potential for trade-offs or negative side-effects from responses. This can be on the sector associated with the response, or in other sectors, or on other societal objectives, such as the Sustainable Development Goals (SDGs) (IPCC, AR6). Note: response risks may occur in the same sector or in other sectors.</p>
Sinus-Meta-Milieus®	<p>Market-research based target group model, multi-national everyday life segments comprising groups of like-minded people sharing the same basic orientations, values and lifestyles: ten distinctive milieus for established markets as well as emerging markets positioned in a framework of social status and basic values (https://www.sinus-institut.de/en/sinus-milieus/sinus-milieus-international).</p>
Coping strategies	<p>Reactions to measures affecting the personal life from different categories of adaptation and mitigation policies: information measures (e.g., awareness campaign), incentivisation measures (e.g., financial support of desired behaviours, financial disadvantage of undesired behaviours), infrastructure measures, and regulatory measures (legal obligations and bans).</p>

Executive summary

The development of effective Climate Mitigation Pathways (KNOWING Key Exploitable Result KER3) must also consider the citizens' perspective on climate impact and policies to identify potential response risks and develop measures to mitigate rebound effects. To this end, KNOWING aims to establish a widely applicable Climate Impact Coping Typology (Figure 1) and a related Coping Behaviour Model for the international research community and expert audience.

This Deliverable reports on underlying theoretical concepts, the methodology for the segmentation of types and the main results of the analysis. More profound information and technical details will be published open access in an established academic journal.

The model will be integrated in the KNOWING Impact Interaction Modelling Framework (KER2) and will inform target-group oriented communication within the Climate Activation and Empowerment Services (KER4). The typology will be made available for identifying type representations in future surveys and for developing accompanying measures such as communication strategies to mitigate response risks and rebound effects of policies and will be made available as part of the Impact Interaction Knowledge Base (KER1).

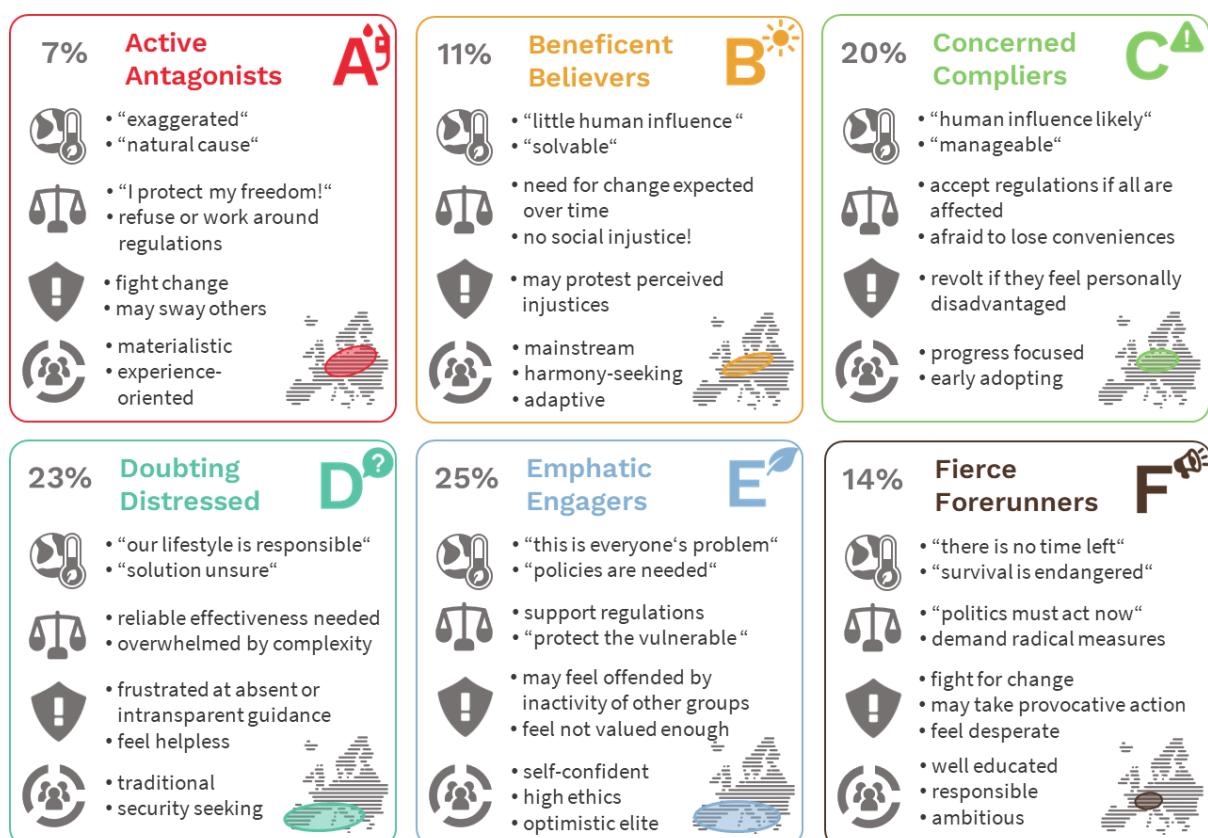


Figure 1: Profiles of KNOWING Climate Impact Coping Types summarising opinions regarding climate change, views on climate action, response risks, societal milieu characteristics, and regions of above-average presence.

1 KNOWING summary

Climate change has been globally recognised as an existential threat requiring urgent action to avoid catastrophic consequences. Hence, the EU's Green Deal has been proposed “to make Europe the first climate neutral continent in the world”. This includes not only the elimination of net emissions of greenhouse gases by 2050; this is to be achieved while decoupling economic growth from resource use and striving for a fair implementation, leaving no person and no place behind. This ambitious goal is additionally challenged by the need to adapt to unavoidable impacts.

According to the EU's Climate Adaptation Strategy (COM(2021) 82), “improving knowledge and managing uncertainty” is key for realising the vision of a climate neutral and climate-resilient Union, as “Climate change is having such a pervasive impact that our response to it must be systemic”. Thus, there is an **urgent need for an integrated approach for enhanced understanding of the interaction, complementarity and trade-offs** between adaptation and mitigation measures, especially regarding the expected increase in regional mean temperature, changing precipitation pattern and soil moisture (IPCC AR6 WG I). Furthermore, this **understanding and knowledge needs to be provided to a broad audience to support local authorities** in EU countries for developing regional programmes.

KNOWING aims to develop a **modelling framework to help understand and quantify the interactions** between impacts and risks of climate change, mitigation pathways and adaptation strategies. The framework will be used to assess the **interrelations between public and private adaptation and mitigation strategies** in order to **identify mitigation pathways along optimised combinations of interventions** in different sectors (e.g. energy, mobility, land use, construction, agriculture). The framework will focus on **three main Climate Impact Contexts (CICs)**: (1) Heat waves & health, (2) Soil fertility & agriculture, and (3) Flooding & infrastructure (including river and coastal flooding). It be applied **in four Demonstrator and five Follower Regions by involving authorities, stakeholders and citizens** to develop **enhanced activation and empowerment services, providing target-group-specific awareness, education and decision support tools** to improve the comprehensibility of complex interrelations and support strategic planning of combined adaptation and mitigation measures.

To achieve this goal, KNOWING will produce the following **key exploitable results (KERs)**:

- KER1 an **Impact Interaction Knowledge Base** comprising causal relations of climate and intervention impacts, rebound effects, coping strategies, etc. to inform Climate-ADAPT and IPCC Working Groups I, II & III
- KER2 an **Impact Interaction Model Framework** consisting of a system dynamics model, climate and sector models for integrated assessment of impacts (direct and indirect) of climate change and countermeasures
- KER3 a Typology of transferable **Climate Mitigation Pathways** including optimised bundles of adaptation and mitigation measures for different typical Climate Impact Contexts (heat waves, soil fertility, flooding)
- KER4 **Climate Activation and Empowerment Services** addressing different target groups (citizens, businesses, authorities) to enhance climate literacy, provide playful trainings and support decision making

These results, developed with the support of an External Expert Advisory Board (EEAB) and a Stakeholder Reference Group (SRG), will **accelerate the transition to a climate-neutral and resilient society and economy** enabled through advanced climate science, mitigation and adaptation pathways and behavioural transformations.

This Deliverable is part of WP1 “Identify climate influences and interrelations” and describes the development of typical profiles of citizen coping strategies in the form of six Coping Types and the open-source Behaviour Model that has been created based on this research to be implemented in the KNOWING Expandable Impact Interaction Model Framework (D2.4).

2 Object of the Deliverable

This Deliverable reports on the development and resulting behaviour typology of behaviour reactions (coping strategies) in relations to CIC measures.

The report describes the methodology for clustering Coping Behaviour Types based on a survey involving more than 6,000 respondents from the countries of the Demonstrator and Follower Regions. The report also includes descriptions of the resulting Coping Types and the Behaviour Model. The Coping Behaviour Model source code will be included in the Climate Interaction Knowledge Base (KER1, D1.4).

The data, the typology and the model will be made open access for academic and educational use; terms of use and conditions for commercial use will be defined as part of the KNOWING exploitation strategy and the innovation plan.

3 Introduction

Policy measures are often not as effective as expected, which is partly rooted in unknown, unanticipated, or underestimated interrelations with other systems, which is commonly known as “rebound effects”. One major source of such effects are human reactions, as they are still insufficiently understood and are also subject to constant change due to influences such as social or economic changes. As societies are increasingly shaped by globalisation and individualisation trends, conventional characteristics such as socio-economic backgrounds and living environments are progressively less meaningful for identifying behavioural groups (Reckwitz, 2017) (Reckwitz, 2019), which makes it even harder to assess the reaction of different population segments to climate measures. In a situation where time is of the essence to avoid missing the temperature target, it is all the more important to be able to assess possible response risks in order to increase the effectiveness of measures and prevent social tipping points.

Currently, there already exist several even longitudinal studies exploring public opinion regarding climate change and related concerns and expectations (e.g., the EU’s Eurobarometer on Climate Change (European Commission, 2023), OECD survey or several international academic surveys (Ritchie, 2024)), which, by the way, all confirm that most people are convinced and concerned about climate change and want to see strong and urgent action. However, there is little knowledge about group-specific positions on the type of political action that needs to be taken. This is even more crucial regarding the tendency of forming opinion echo chambers supported by social media, which can lead to increasingly polarising debates. More insight into communities of opinions and attitudes is therefore needed, which requires a transnational exploration and segmentation of perceptions and expectations. Typologies provide a valuable tool in this respect, and with “Global Warming’s Six Americas” there is a good example for classifying attitudinal and behavioural communities. However, a comparable typology for the European context has not been developed so far.

For the development of the modelling framework in the KNOWING project, this requirement was addressed by using qualitative and quantitative methods which have already been successfully applied to develop typologies for the transport sector (Markvica, Millonig, Haufe, & Leodolter, 2020). The initial interpretative step was qualitative and aimed at developing a set of literature-based, plausible hypothetical types and related assumptions concerning their climate responses. In the second quantitative-statistical step a large-scale survey was conducted in the following countries: Austria, Germany, Italy, Spain, Croatia, Estonia and Vietnam to test and verify the typology.

For this purpose, the generated hypotheses were integrated into the online survey based on general statements. Thought experiments within the survey provide insight regarding the coping patterns of the different behaviour types, for example their willingness to support policy decisions and tendencies to go in opposition against climate measures. Furthermore, the thought experiments from the survey served as basis for the behavioural choice model.

The following sections further detail the approach and the results after a brief introduction to the Coping Typology and the most prevalent characteristics of the six Climate Impact Coping Types.

4 Outline of Climate Impact Coping Typology

The Climate Impact Coping Typology (short: Coping Typology) describes six evidence-based behavioural groups showing distinguishable perceptions of the overall topic of climate change and specific response reactions to climate mitigation and adaptation measures. The types are based on response patterns to twelve statements related to climate action, their composition of specific social milieu groups, and their responses to exemplary decision experiments related to the KNOWING CICs. The typology has been developed based on representative surveys in six European countries. In addition, a survey has been conducted in Southeast Asia for the purpose of testing the typology’s applicability to non-European regions, which will be used at a later point in the project in the course of activities to maximise the transferability of the project results.

The underlying concepts, the methodology and more detailed results obtained from the analysis will be briefly described in the following sections, a more profound description will be published open access in “Environment and Behavior”. The following subsections of Section 4 provide an introduction and brief outline of the principal characteristics of the Coping Types.

4.1 Coping Typology Profiles

The typology resulted from the statistical analysis of responses to 33 questions and statements within a questionnaire which has been used during a transnational, multilingual survey in countries of the KNOWING Demonstrator and Follower Regions Austria, Croatia, Estonia, Germany, Italy, Spain and Vietnam. Twelve questions and statements showed particular explanation power during the clustering process and can be used for identifying types in future surveys.

The six identified Climate Impact Coping Types are:

- Type A “*Active Antagonists*” denying Climate Change and opposing and distrusting any measures,
- Type B “*Beneficent Believers*” trusting in climate change being a minor problem not concerning them,
- Type C “*Concerned Compliers*” who are starting to get worried and open for certain change,
- Type D “*Doubting Distressed*” wanting to change but being frustrated by the lack of clear guidance,
- Type E “*Emphatic Engagers*” acting to the best of their knowledge and trusting in their contribution,
- Type F “*Fierce Forerunners*” who are desperate and fear for the future of coming generations.

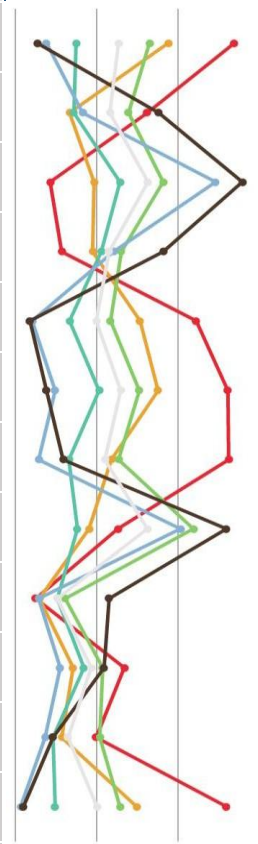
Table 1 provides a short description of the attitudes and behavioural characteristics of each Coping Type as well as potential response risks to climate mitigation and adaptation measures. The types are mainly defined by their attitudes and behaviours and cannot be recognised by salient socio-demographic characteristics or living environments. Merely Type A shows slight overrepresentation of male persons in the gender distribution.

Table 2 lists the twelve questions and statements defining the type classification as well as the average response values of each Coping Type. These questions and statements have been selected during the clustering process from a more extensive list (see the full list in Table 4) and have the most influential ones for defining the types. The responses span from rather extreme opposite positions between Types A and F over more moderate responses by Types B, C and D which differ in specific aspects and the distinctness of their respective positions. Type-specific responses which differ significantly from the overall average response are highlighted in colour.

Table 1: Behaviour characteristics and response risks of identified Coping Types.

<p>A</p> <p>Active Antagonists</p>	<p>Characteristics: They consider the discussion about climate change to be exaggerated and pointless. They are highly critical of any measures and are prepared to defend themselves against restrictions on their habits and freedoms if they cannot bypass regulations or at least gain personal advantage.</p> <p>Response risks: Although the group is small, they can manage to attract a lot of attention. If they feel that decisions are being made above their heads that they do not have any control, they protest strongly against any perceived unfairness and can sway less opposed groups to their side.</p>
<p>B</p> <p>Beneficent Believers</p>	<p>Characteristics: They recognise that there are consequences of climate change, even if they do not necessarily see the reasons for this in human activities. In general, however, the topic hardly plays a role in their lives. They trust in technical solutions and that the problems will be solved. Measures are however rejected if they are perceived as unfair or discriminatory for some groups.</p> <p>Response risks: They can easily be upset and influenced by protests from opponents of the measures and migrate into Type A. As few people are generally concerned about the issue, it is also difficult to reach them in order to dispel any potential fears in advance.</p>
<p>C</p> <p>Concerned Compliers</p>	<p>Characteristics: They are noticing the changes caused by climate change, which is beginning to raise their concerns. However, this does not mean that they currently see a need for actively changing their behaviour. However, the growing awareness is fuelling concerns about the future, and they fear they will have to accept giving up some of their conveniences.</p> <p>Response risks: The increased awareness of the topic also means that more information is being sought. There is a risk that they will trust insecure or incorrect sources and thus manifest exaggerated fears and either completely avoid any discussion (→ Type B) or increasingly oppose measures (→ Type A). If measures are not plausible to them, there is a risk that they will work around them or oppose them.</p>
<p>D</p> <p>Doubting Distressed</p>	<p>Characteristics: They are aware that their lifestyle has an impact on climate change. They expect the need to change their habits but are undecided about what they can do and what measures make sense. They are therefore very critical of some measures, although they are generally prepared to make changes.</p> <p>Response risks: They feel stressed by the complexity and intransparency of the effects of measures and seek clarification in order to make decisions. Conflicting information further frustrates them, which might result in them losing interest (→ Type C) or protest (→ Type F).</p>
<p>E</p> <p>Emphatic Engagers</p>	<p>Characteristics: They are actively involved in climate protection and adaptation in their communities. They have adapted their lifestyle accordingly and consciously try to adopt climate-friendly behaviour. They are optimistic and trust in planned measures and technological developments, but it is important to them that measures are socially balanced.</p> <p>Response risks: Their optimism can make them overestimate the impact of their activities and prevent them from informing themselves sufficiently about effective changes. If, in the absence of significant mitigation, they come to the realisation that their contribution is insignificant, they may turn emotionally against less active groups or ineffective policies.</p>
<p>F</p> <p>Fierce Forerunners</p>	<p>Characteristics: They are acutely aware of the urgency to act and are deeply worried that measures will not be sufficient or too late. They are energetically demanding more effective measures and voluntarily abandon creature comforts. They even support radical measures. However, the deadlock in implementation is increasingly wearing them down and frustrating them.</p> <p>Response risks: They are increasingly desperate in view of the hesitant progress in climate protection and are willing to take provocative action to make their voices heard for the future of themselves and the coming generations. If there is the impression that measures taken are only half-hearted because other interests dominate, the emotional strain and perceived hopelessness can lead to radical action or to complete resignation.</p>

Table 2: Response profiles of identified Coping Types. (ID = code in questionnaire; response options for “How important is...” questions: 1 = Very important, 2 = Rather important, 3 = Less important, 4 = Not important at all; for statements: 1 = I fully agree, 2 = I agree for the most part, 3 = I disagree for the most part, 4 = I disagree completely).

ID	Questions and Statements	Active Antagonists	Beneficent Believers	Concerned Compilers	Doubting Distressed	Emphatic Engagers	Fierce Forerunners	average	Response Profiles
									1 2 3 4
F5A1	How important is...? - The discussion around climate change	3,69	2,88	2,65	1,75	1,38	1,27	2,27	
F7A3	When it comes to products, I do pay attention to the ecological balance, but in the end it's still the price that decides.	2,62	1,67	2,39	1,72	1,83	2,76	2,17	
F7A16	I think restricting myself for climate protection is completely pointless - it has no effect at all if I change.	1,43	1,97	2,82	2,29	3,46	3,79	2,63	
F1A12	I don't trust all the different green quality labels - it's just a marketing strategy anyway.	1,57	1,95	2,3	2,06	2,21	2,82	2,15	
F5A3	How important is...? - That we humans change our habits	3,22	2,53	2,17	1,67	1,21	1,18	2,00	
F7A13	I am very interested in topics such as sustainability, climate protection and adaptation measures.	3,61	2,75	2,52	2,03	1,49	1,38	2,30	
F5A4	How important is...? - That there are reward systems (incentives) for climate-friendly behaviour	3,62	2,18	2,27	1,66	1,29	1,59	2,10	
F7A4	I can't do without my favourite foods, unfortunately, so I'm worried that they might become much more expensive or even banned because they're not organic or healthy enough	2,26	1,91	3,19	1,76	3,03	3,59	2,62	
F1A4	It annoys me when some people try to tell me how to live.	1,25	1,3	1,61	1,52	1,29	2,15	1,52	
F1A10	I'm fascinated by technical progress - we can't even imagine today what will be possible in 10 years' time.	2,34	1,71	2,07	1,84	1,55	2,09	1,93	
F1A3	Policies need to address broader social inequalities (e.g. support for poorer households, protection from disadvantaged).	1,99	1,57	2,04	1,46	1,37	1,46	1,65	
F5A2	How important is...? - That policy makers take swift action against climate change	3,59	2,49	2,29	1,49	1,07	1,1	2,01	

above average response plus standard deviation
 below average response minus standard deviation

The range of positions regarding climate change is clearly showing the full spectrum of possible attitudes along the Coping types, as in e.g. response profiles regarding the importance of the climate change topic (Figure 2) and the actions needed to mitigate and adapt to climate change impacts (Figure 3, Figure 4).

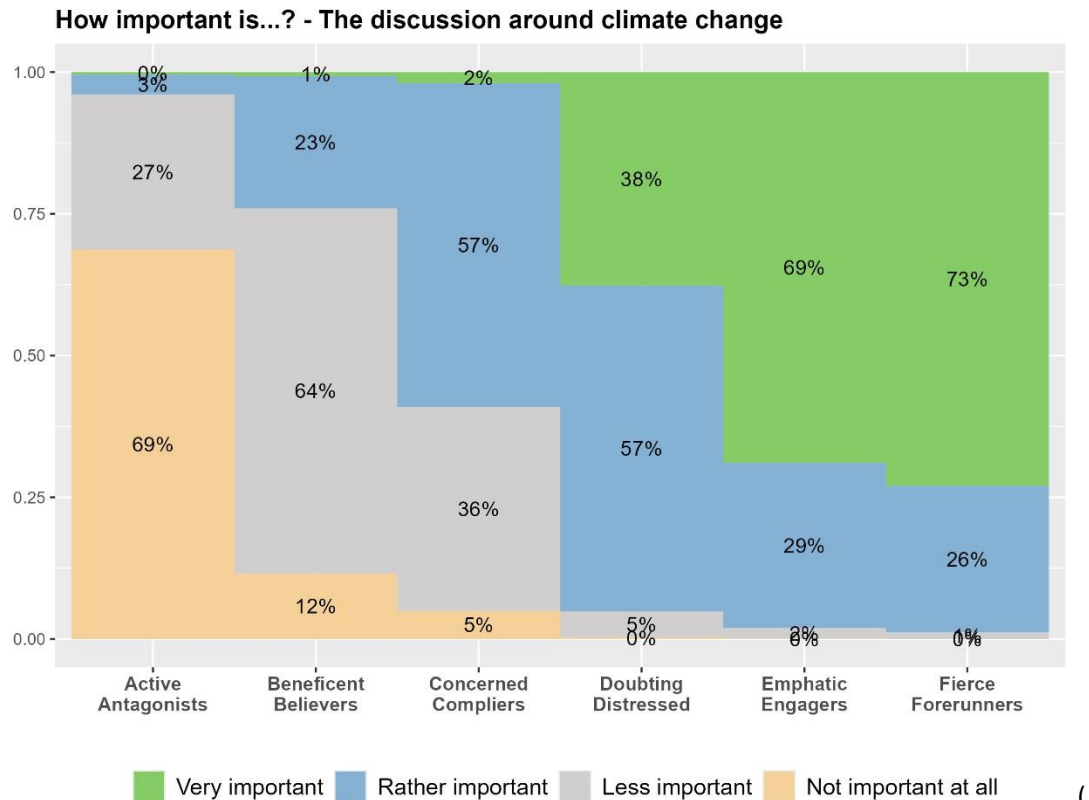


Figure 2: Type-specific responses to F5A1.

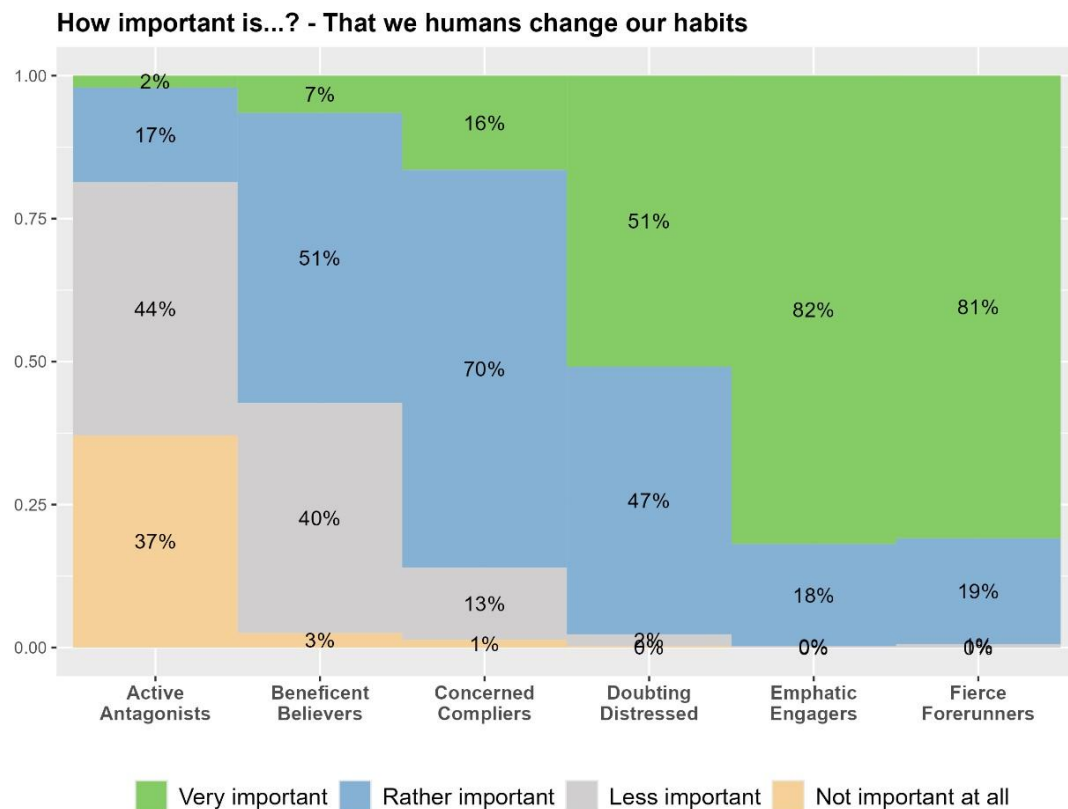


Figure 3: Type-specific responses to question F5A3.

Opinions differ on how radical and how quickly measures are necessary. What do you think? Which of the statements corresponds most closely to your opinion?

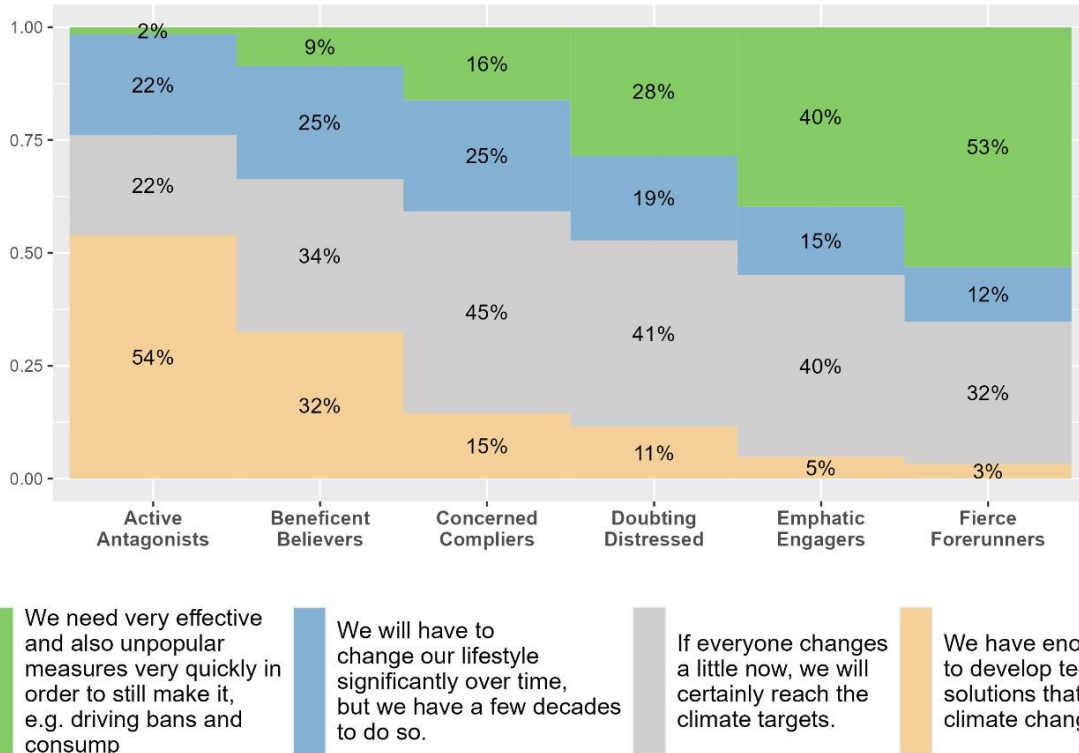


Figure 4: Type-specific responses to question F6.

In other questions, the Coping Types' responses hint to specific other priorities influencing the perception of climate action, e.g., regarding sustainability vs. costs (Figure 5) or social implications (Figure 6).

When it comes to products, I do pay attention to the ecological balance, but in the end it's still the price that decides.

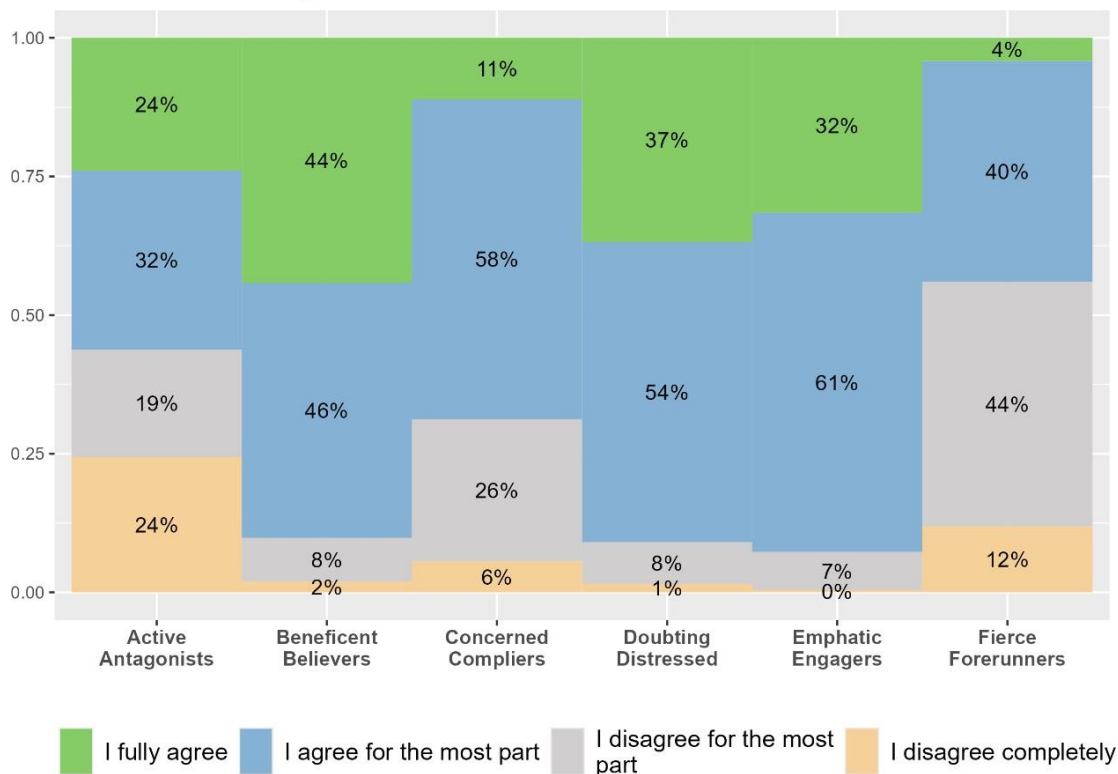


Figure 5: Type-specific responses to statement F7A3.

To begin with, here are a few general statements that can be heard frequently. To what extent do you agree with the following statements? - Policies need to address broader social inequalities (e.g. support for poorer households, protection from disadvantage).

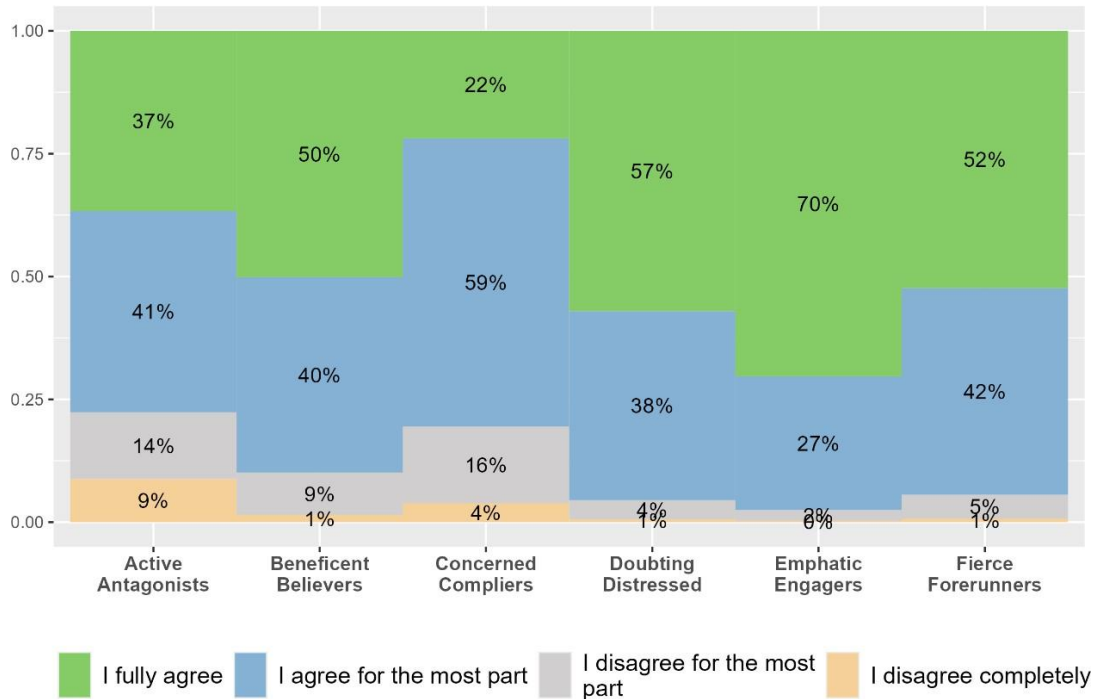


Figure 6: Type-specific responses to statement F1A3.

4.2 Distribution of Coping Types

Nowadays, the importance of climate change is clearly recognised by the general public. With the exception of Type A and Type B, the importance of the issue is acknowledged by the majority of types, especially by types D, E and F. This indicates that the majority of the population is aware that climate action is necessary, and they support climate discussion, as Types D, E and F already account for 62% of respondents (Figure 7). The realisation that people will have to change their behaviour is even more widespread.

Coping Types - all countries

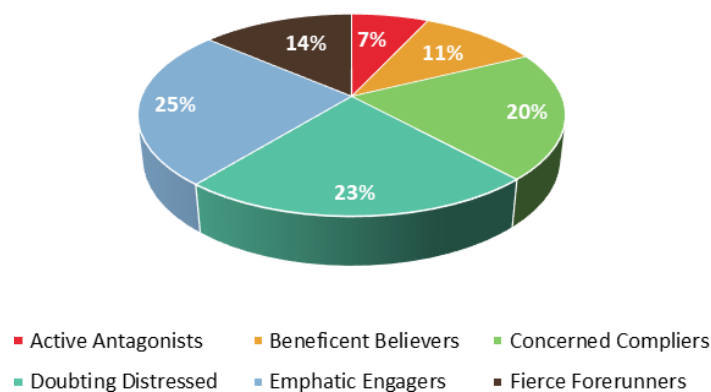


Figure 7: Distribution of Coping Behaviour Types in all countries.

The more extreme types on the edges of the spectrum (Type A and Type F) are in general comparatively small in size with 7% and 14%, respectively, but receive a lot of attention due to their outspokenness. Type B, which is relatively indifferent to the climate issue, also represents a rather small group with only 11%. The greater share of the population is made up of types C, D and E, who deal with the issue in different ways. Type C (20%) is not fully involved in the topic, but they try to take sustainable decisions when this is possible without major inconveniences. Type D (23%) is willing to act more responsively but struggles with finding the best way to adapt. For Type E (25%) climate-aware decisions are part of everyday life and believe they have found their way to actively participate in Climate Action.

A comparison of the distribution of types across countries (Figure 8: Distribution of Coping Behaviour Types across countries (Clusters per country)Figure 8) reveals that the "Emphatic Engagers" (accounting for about one third of the citizens) are particularly prevalent in Italy, Spain, and Croatia. This suggests that awareness of climate change and willingness to engage is most pronounced in countries where the effects of climate change are already apparent, e.g., through extreme temperatures. Also, the "Doubting Distressed" type is strongly represented in the same countries (Italy, Spain, Croatia). In contrast to that, Type F plays a less important role than in more northern countries, perhaps because awareness is already widely given. Type A does not play any significant role in countries in the European South, as Climate Change is hardly deniable.

In Estonia, climate change impacts have not yet become as severe as to boost the awareness of necessary climate action. The most dominant Type are "Concerned Compliers", which suggests that there is currently still a fairly widespread lack of clarity on the subject. In Austria and Germany show more balanced distributions of the types in the population. Interestingly, the group of the "Fierce Frontrunners" is larger in these two countries than in the rest. At the same time, also the "Active Antagonists" are considerably large, as they are in Estonia. The distribution indicates more conflicting positions in these countries, which harbours the risk of open conflict in public debates on necessary measures, even though the population largely supports distinct measures.

The results show that – although the types can be found in all countries – the distribution of the Coping Types within the population gives some indication of geographical, societal and other aspects influencing the perception of Climate Change and the potential response risks. However, the closer exploration of the composition of types in the society also hint to potential approaches to avoid response risks and increase active engagement. In Section 31, additional country-specific analysis results will be discussed to highlight national characteristics.

Distribution of Coping Types across countries

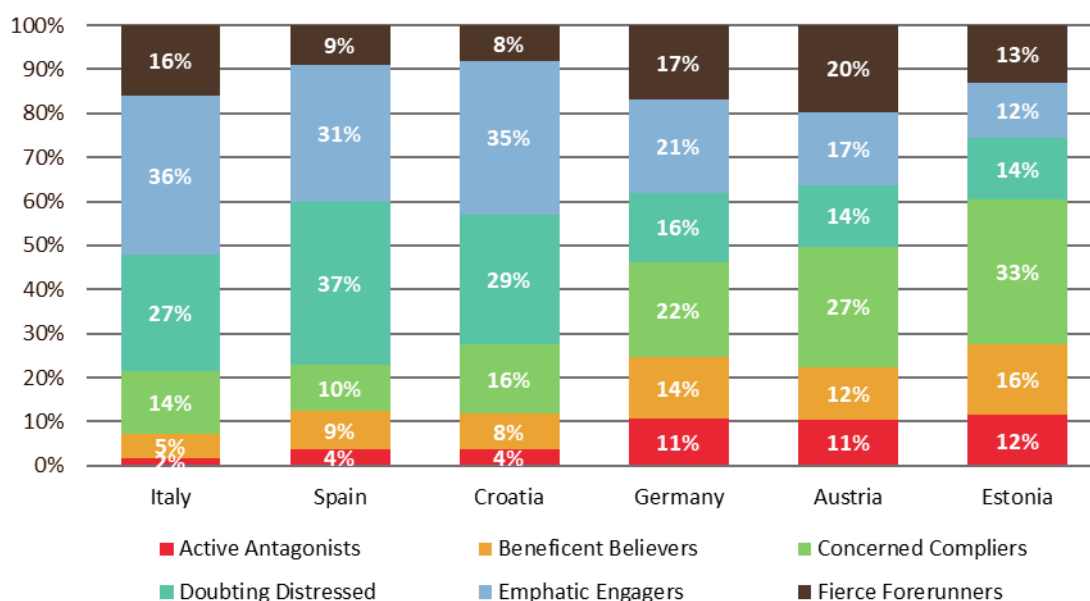


Figure 8: Distribution of Coping Behaviour Types across countries (Clusters per country).

5 Underlying Concepts and Hypotheses

One of the goals of the KNOWING project is the informed systematic consideration of behavioural response risks in the development of CIC-specific pathways. To this aim, a typology of characteristic behaviour patterns and a respective behaviour model was to be developed for the European context to be implemented in the Impact Interaction Model Framework.

The existing literature provides a broad range of insights into behavioural responses to Climate Change and Climate Action, but a systematic classification of attitudes and behaviours is lacking for the European population. Therefore, two approaches have been combined to achieve evidence-based and representative Coping Types which explain response patterns and related risks and provide deeper insights into societal and communicational influences:

- 1) An established cross-national classification of groups sharing the same value orientations, lifestyles, and consumer preferences in the form of market-research based social milieus (Sinus-Meta-Milieus® (Sinus, 2024)),
- 2) Related literature on climate responses and climate behaviour group segmentation.

The approaches were used to develop a hypothetical typology including assumed values, living preferences, and probable reactions to measures affecting their habits.

5.1 Social Milieus and Climate Change Perception

In the social sciences, there is a long tradition of segmentation approaches for researching and explaining different character profiles and unconscious behaviours, such as in psychology or anthropology, and behavioural patterns and attitudes towards everyday practices, such as in sociology and market research. As behaviour is the result of an extremely complex interplay of internal and external influencing factors such as innate and acquired personality traits, social and regional influences, and past experiences, no two people in the world behave in exactly the same way. The social sciences therefore attempt to describe and classify this range of behavioural patterns on the basis of a number of individual characteristics in order to reduce complexity and determine the influence of factors.

Socio-economic characteristics, especially gender and age, are most frequently used in studies to distinguish between groups. However, it was generally recognised that simply focusing on one type of characteristic (usually those that are easy to measure) is an inadequate simplification, as it assumes that, for example, people of a certain age, gender or location generally have the same (McDonald & Dunbar, 2012).

In recent years, there has been a trend to replace segmentations along salient attributes by more complex concepts which are more complex to measure but provide much higher explanatory power, such as lifestyles, behaviour types or market segments. One of the most recognised commercial segmentation models is the Sinus-Milieu® Model¹, which has been developed in the 1980s and is regularly updated and available for a large number of different countries worldwide. The model is also provided in the form of Sinus-Meta-Milieus®² for established and emerging markets.

A “milieu” describes a group of “like-minded people” that not only share specific views and show similar behaviour but are also positioned along the social status (i.e., low, middle, high) and basic values (i.e., traditional, modernisation, re-orientation). The milieus are profoundly described in terms of their attitudes

¹ <https://www.sinus-institut.de/en/sinus-milieu>

² <https://www.sinus-institut.de/en/sinus-milieu/sinus-milieu-international>

and behaviours towards different aspects of everyday life, e.g., work, family, leisure, politics, or consumption (Risius & Aydingül, 2018). Figure 9 illustrates the importance of the subject of sustainability for the ten different meta-milieus of established markets such as in the EU.

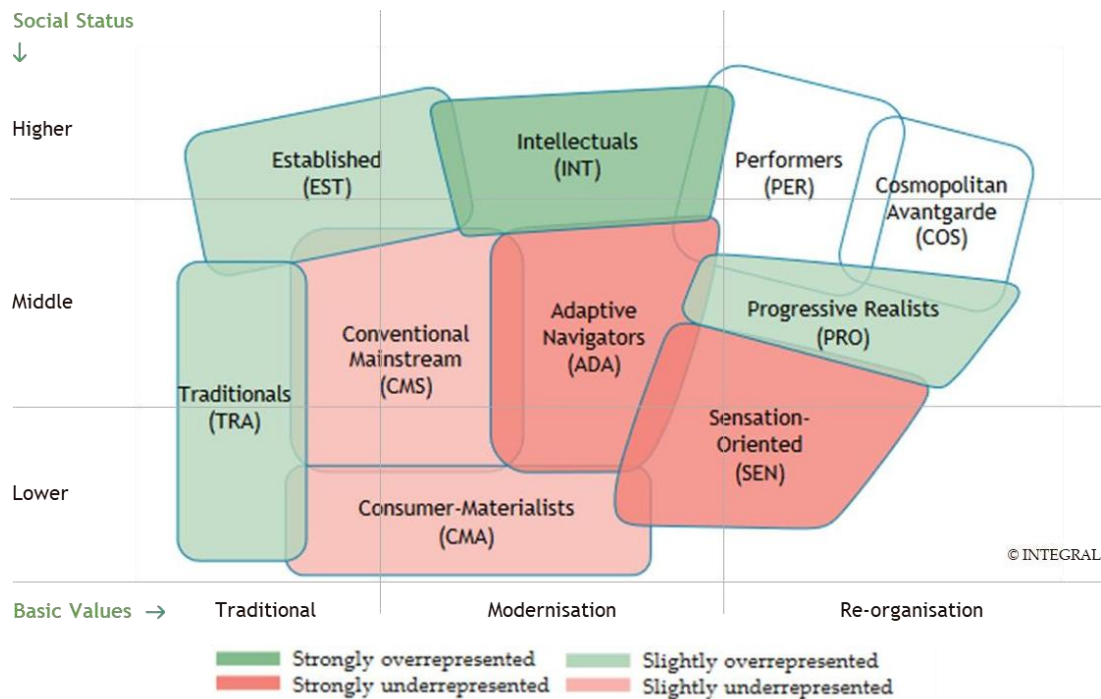


Figure 9: Importance of “sustainability” from the perspective of the milieus. © Copyright Sinus-Institute, Heidelberg

The ten meta-milieus are briefly characterised as follows:

- Established (EST)*: self-confident, status-driven, conservative elite with high responsibility and ethics
- Intellectuals (INT)*: academic elite with post-material roots, responsible, creative and globalisation-critical
- Performers (PER)*: efficiency & progress-oriented modern elite, global economic thinking, technology savvy
- Cosmopolitan Avantgarde (COS)*: postmodern lifestyle elite, urban, ambitious and flexible anti-mainstream
- Progressive Realists (PRO)*: drivers of global and social transformation, responsibility, party and protest
- Adaptive Navigators (ADA)*: flexible modern pragmatists, willingness to adapt and perform, digital savvy
- Sensation-oriented (SEN)*: materialistic and entertainment-oriented, focused on the present, unconcerned
- Conventional Mainstream (CMS)*: harmony seeking, community-oriented, desire for security, fear of loss
- Traditionals (TRA)*: simple lifestyle, desire for order, security, harmony and consistency, digital illiteracy
- Consumer Materialists (CMA)*: precariat, desire for social and material advancement, fear to be left behind

The meta-milieu attributes were also collected in the course of the transnational survey and included in the segmentation process to allow for a more profound understanding and richer background knowledge of the resulting typology as well as to increase the transferability of the Coping Types, as the meta-milieus are already well established and constantly adapted to societal changes. Hence, each Coping Type is also characterised by the meta-milieus most represented in this group.

5.2 Related Literature and Segmentation Approaches

There is a vast amount of literature related to behavioural aspects in relation to climate impacts and policy measures, which usually is highlighting a specific behavioural phenomenon in a concrete context. As a first step in the effort to develop CiC-specific response hypotheses, it was important to develop a

³ <https://climatecommunication.yale.edu/about/projects/global-warmings-six-americas/>

5.3 Hypotheses Generation

The development of hypothetical types to be tested during the planned transnational survey was based on the established typology of the Six Americas. This typology was based on beliefs and knowledge about climate change but could also serve as a base for the development of behaviour types for a broader climate change related behaviour typology. The six types ranging from the Alarmed to the Dismissive and spanning the spectrum from the people with the highest belief in global warming, most concerned and most motivated to the least concerned and motivated with the lowest belief in global warming. The type designations and updated group sizes are shown in Figure 11.

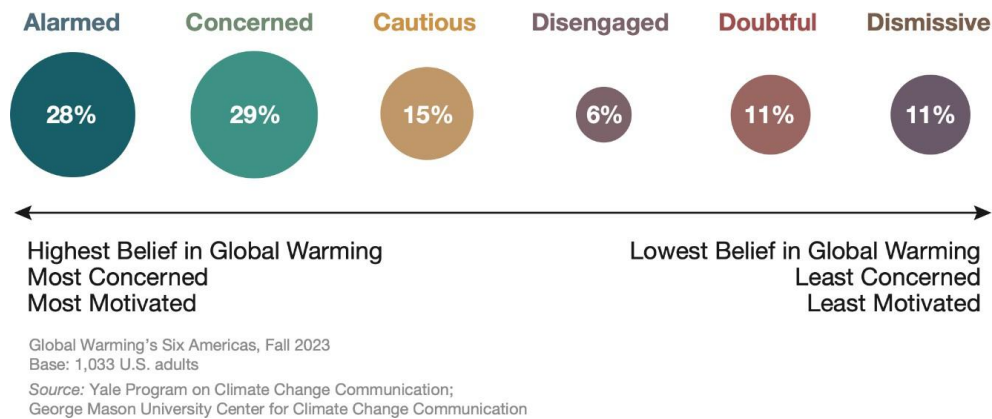


Figure 11: Six Americas types ranging from people with a strong believe in climate change to those with the lowest belief in climate change and their distribution in the US in 2023.

To account for growing fears that climate targets may not be met anymore, a seventh type, the “Re-signed” were added as a hypothetical type for the people with highest believe in global warming who have given up engagement to activate others to support global reduction of greenhouse gases due to emotional stress. In the following step, the collected hypotheses were mapped to the six plus one hypothetical types to describe assumed type-specific characteristics regarding different everyday habits, i.e., living, working, education (knowledge acquisition), providing, recreation, social interaction, mobility. In addition, example cases of different concrete measures of different types (information measures, incentive measures, infrastructure measures, regulatory measures) were selected in the context of the KNOWING CICs to create choice situations as a basis for the development of a type-based behaviour model and added to the mapping. The collected descriptions and response hypotheses formed the basis for the development of the questionnaire for the subsequent transnational survey.

	DESCRIPTION	LIVING	WORKING	EDUCATION	PROVIDING	RECREATION	SOCIAL INTERACTION	MOBILITY
	This group is fully aware of the dangers of climate change and proactively supports measures to combat it. They are usually well informed and engaged on both a personal and political level.	often urban, smaller apartments or old farm house, second hand furniture, responsible and circular economy oriented, renewable energy use wherever possible	often working in meaningful occupations, try to contribute to change, salary must be sufficient, but money is no main motivation, volunteering for non-profit activities	highly interested in topics related to climate, environment, society, try to be up to date and to increase their possibilities to change something	high awareness for environmental and social "footprint" of products, self-sustained if possible (food coops),	local recreation, hiking, active, nature, "do no harm" principle, if they travel long distance, e.g. flying, they do it for a good reason and try otherwise to avoid it	seek like-minded to remotivate themselves and get mutual support, moral courage, find it difficult to understand or accept other opinions	try to avoid motorised transport as much as possible (also digitally), seek living and work locations with short distances to activities,
	They recognise climate change as a real problem and are concerned about it, but often feel overwhelmed or unsure of how best to act.	try to adapt if it is easy to do and if they are fairly convinced about the positive impact, e.g. stay in large house but install solar panels, organic gardening, furniture from sustainable production, but not necessarily second hand.	promoting sustainability at work place, support and start climate-aware initiatives	actively seek information, but do not necessarily know which information to use in what way or how to deal with the information	buy organic products if they trust the producer, try to live self-sustained if possible	try to avoid flying and do it less frequently than before, like to spend time with family and friends, like to spend time in nature.	use their family and friends to discuss topics related to climate change, try to learn from others about solutions, open-minded towards different approaches (risk of maladaptation)	use "sustainable" alternatives of all modes, use different strategies to be sustainable because they do not really know what is better (e.g. either drive to smaller grocery store nearby or to larger supermarket offering organic products)
	This group has some concerns about climate change but is not sure about the causes or the urgency of action. They need more information to form a clear opinion.	Has not thought about changing home setting because of climate change. Try to save energy and recycles but has not yet made investments into renewable energy or into energy-saving appliances for their home. Energy costs makes them review some of their choices.	Work setting remains unchanged, but there are worries if climate change and higher energy costs will be a danger for job. Wait for clear policies and strategies regarding climate change by employer. Wonders if they could or should do more to work sustainably.	Occasionally seeks out information on climate change (e.g. during major events like natural disasters). Not a daily follower of climate news, but try to keep themselves updated whenever the topic becomes particularly relevant or appears in their circles.	Might buy organic and is interested in the footprint of products, but price/other properties of products are still at least as important.	Starts to notice changes in environment and adapts accordingly (changes in snow in winter, water levels and weather patterns in summer). Hence climate change has a part in changing behaviour, but is not the main driver.	Discusses topic with friends and family. Might seek out events or groups to gain more information but is also vulnerable to wrong information due to limited knowledge.	Tries to use public transport and other sustainable forms of transport where it does not interfere with her activities, tries to drive efficiently and might use telework if possible. Might also reduce flying and will use carbon offset programs.

Figure 12: Extract from the mapping of hypothetical type characteristics.

6 Data Collection: Transnational Survey

The transnational survey was conducted by a market research institute licenced to allocate Sinus-Meta-Milieus ®⁴ as an online survey in seven countries: Austria, Germany, Italy, Spain, Croatia, Estonia, and Vietnam. Data collection was done during November 2023. For all countries, apart from Vietnam, a representative sample was collected, but as online access is significantly less well distributed among the population in Vietnam, the Vietnamese sample is not representative but is composed of younger and better educated persons than average. The sample size for each county is given in Table 3.

Table 3: Sample size N per country.

Country	Sample Size N
Germany	1047
Austria	998
Italy	1011
Spain	1077
Croatia	1029
Estonia	1083
Vietnam (only online active people)	1048

The content of the survey consisted of four parts designed to cluster the respondents into behavioural homogeneous types, develop a simple model of behavioural responses and to collect general information about the respondents. The full questionnaire is added in Appendix C. The four parts are:

1. **Awareness and behavioural status:** This section contains statements about lifestyle issues, general questions about climate change issues in the life of the respondents as well as statements about issues related to climate change. The statements in this section were used in the clustering algorithm to form the Climate Coping Typology. (See Table 4). The responses to the statements were given in a four step Likert scale. For F7AX_1 and F1AX_1 the answers ranged from 1="I fully agree" to 4="I disagree completely" and for F5AX_i, the answers ranged from 1="Very Important" to 4="Not important at all".
2. **Thought experiment:** This section contains four thought experiments about the behavioural response to climate mitigation measures and climate change impact. In each of the thought experiments first a climate mitigation or adaptation measure was presented together with five behavioural responses. The respondents were asked to first state the likelihood that they would react to the described measure by each of the responses and then asked to choose the most likely of the five responses. The thought experiments are listed in Table 5.
3. **Living environment:** Living conditions and available mobility modes.
4. **Socio-demographic information.**

Table 4: Statements and questions used in the typology algorithm.

Code	Statement / question
F1A1	Social and digital media are daily sources of information for me to form my opinion.
F1A2	My life follows familiar and well-rehearsed routines, so I am hardly interested in other life alternatives.
F1A3	Policies need to address broader social inequalities (e.g., support for poorer households, protection from disadvantage).
F1A4	It annoys me when some people try to tell me how to live.



⁴ <https://www.integral.co.at/en/integral>

F1A5	Measures that restrict people's freedom are not acceptable in a democracy.
F1A6	The well-being of the people here and now is more important than that of future generations.
F1A7	I love travelling to faraway countries to get to know other cultures and leave my everyday life behind for a while.
F1A8	I try not to get too stressed by the numerous global crises - there are already enough challenges in my life.
F1A9	I'm very interested in trendy products and like to buy the latest things, because I want to keep up with the times and like to be at the forefront.
F1A10	I'm fascinated by technical progress - we can't even imagine today what will be possible in 10 years' time.
F1A11	It is important to me that I can contribute to solving the big problems of the world - that is why I strive to make a positive contribution in my work and other activities.
F1A12	I don't trust all the different "green" quality labels - it's just a marketing strategy anyway.
F1A13	I would like to make my purchasing decisions much more consciously but find it far too difficult and confusing to find trustworthy bases for the decision.
F1A14	I don't have to have new things all the time and I'm happy to buy something second-hand once in a while; the consumerism craze tends to repulse me anyway.
F5A1	We need very effective and also unpopular measures very quickly in order to still make it, e.g., driving bans and consumption restrictions.
F5A2	We will have to change our lifestyle significantly over time, but we have a few decades to do so.
F5A3	If everyone changes a little now, we will certainly reach the climate targets.
F5A4	We have enough time to develop technical solutions that stop climate change.
F7A1	I rarely inform myself about sustainable alternatives in my areas of life, at most when a major purchase is pending (e.g., home renovation, car).
F7A3	When it comes to products, I do pay attention to the ecological balance, but in the end it's still the price that decides.
F7A4	I can't do without my favourite foods, unfortunately, so I'm worried that they might become much more expensive or even banned because they're not organic or healthy enough
F7A5	I can't imagine that drastic measures can be enforced - in my circle of acquaintances, no one wants to give up their habits.
F7A6	I think that far too little is being done for climate protection, which is why I am actively involved in it.
F7A7	I believe that climate change is a massive challenge, but what can really be done no one knows for sure.
F7A8	The consequences of climate change are already evident, so we need to adapt.
F7A9	In my opinion, the data on the causes and consequences of climate change is very contradictory - you have to listen to all the arguments before you can form an opinion.
F7A10	I am very sceptical about the arguments and demands regarding climate protection and fear that they are often a pretext for other interests.
F7A11	I fear that there is hardly any chance left to curb climate change - people do not want to give up anything and too many other interests hinder real climate protection.
F7A12	It annoys me that there is so much different information on climate change. It is far too complicated to find out what is really true.
F7A13	I am very interested in topics such as sustainability, climate protection and adaptation measures.
F7A14	I feel a great personal responsibility to mitigate climate change.
F7A15	I avoid discussions about climate change, I think they are far too emotional and lead to no result anyway.
F7A16	I think restricting myself for climate protection is completely pointless - it has no effect at all if I change.

Besides the statements and questions listed above, the choice experiments were used to identify types with consistent response patterns. The experiments were drawn from the mapping of hypothetical type characteristics. First, four specific measures and related implementation actions were selected from the resulting catalogue of measures from Task 1.2. The first selected measure was related to climate mitigation (incentivisation of renewable energy), the others were related to measures in the context of the KNOWING Climate Impact Contexts (CICs) flooding, heat, and agriculture.

Respondents were asked to imagine experiencing the situations described, regardless of how likely it was that the situation would actually ever happen to them. Within the five potential responses they could choose from per thought experiment, variables were used to increase the variance of the resulting choice data and create comparability across different countries. These values were basis for the development of the type-specific Coping Behaviour Model.

Table 5: Hypothetical choice situations in the form of thought experiments and potential responses.

<p>Thought Experiment 1: In the next few years, renewable energies, such as photovoltaics or wind power, will not yet be sufficiently available at peak times of electricity consumption. Imagine your electricity provider has a new pricing model: at times when there is a surplus of renewable energy, the price of electricity is lower and can even become negative (i.e., the costs incurred to date are reduced); when availability is scarce, electricity becomes more expensive because additional fossil fuels, such as gas or oil, have to be used.</p>	
<p>Response 1: I am changing my lifestyle habits (e.g., washing laundry at different times) to optimise my annual electricity savings by up to 2x percent of the current costs with this tariff and recommend the pricing model to my acquaintances.</p>	
<p>Response 2: I accept the pricing model, but do not change my habits significantly and hope to achieve at least an annual saving of up to x percent.</p>	
<p>Response 3: I don't accept the pricing model because it's too complicated for me to always think about when I do what. In exchange, I also accept that I might have to pay up to x percent more for electricity per year.</p>	
<p>Response 4: I will definitely not accept the pricing model - I have the feeling that they want to manipulate me, and I will definitely not let that happen, even if I have to pay up to 2x percent more.</p>	
<p>Response 5: I don't like either the old or the new pricing model, because it either puts me at risk of using fossil energy or tempts me to use even more energy to save money. I use as little electricity as possible anyway, generate my own energy as much as possible and aim to become independent of energy suppliers.</p>	
<p>Thought Experiment 2: Due to the increasing risk of flooding, dams need to be extended and further flood protection measures taken. Imagine you own a house that has to make way for the newly defined flood zone. You receive a letter from the city announcing the planned relocation. The city can only pay you x% of the market value of your house as compensation.</p>	
<p>Response 1: I understand that this measure has to be set and that I have to accept a disadvantage in view of the higher threat to protect the general public, which I also try to explain to my neighbours, who are not enthusiastic. I will take the opportunity to look for a smaller and more sustainable home with the money, in order to contribute to climate protection in this way as well.</p>	
<p>Response 2: It is understandable to me that there must be such measures - but I do not see why I should be disadvantaged by this and am not prepared to accept this measure if I do not receive at least x+y% of the market value. I am trying to persuade my neighbours to join me in this effort.</p>	
<p>Response 3: I will not accept this under any circumstances and would only consider it, if at all, if I get the full market value plus z% of the value for the removal costs. I will also sue the city for this if necessary and invite my neighbours to join me.</p>	
<p>Response 4: That is out of the question for me at all. There are certainly other places where the dam and the flood plains can go than on my property of all places. I will fight this measure in the strongest possible terms until the city gives in and changes its plans.</p>	
<p>Response 5: I would first like to find out whether it is really the best way to enforce this measure in our country. I am organising a citizens' initiative at my own expense with like-minded people in order to better represent the concerns of those affected and especially to point out the social hardship that may result. In this way, we will try to find a compromise with the city on how flood protection can be achieved without causing social disadvantages.</p>	

Thought Experiment 3: In the future, there will be more and more prolonged periods of heat. However, the massive use of air conditioning systems would place a heavy burden on the energy supplier network. It is therefore stipulated that the room temperature in public buildings may no longer be lowered below x degrees, except in rooms where vulnerable people (e.g., pregnant women, people with health problems) are present. Imagine you work in an office for a public service provider - how would you behave?



Response 1: I know that the increased use of air conditioning leads to further problems and endangers climate protection, so I think this measure is reasonable. I even try to convince my roommates to only lower the temperature to $x+y$ degrees and help ourselves in other ways, e.g., with lighter clothes or cool cloths.

Response 2: I think it is unfair because it puts me and my colleagues at a disadvantage compared to people in the private sector. I am therefore trying to fight this regulation and mobilise the union, if necessary, we threaten to strike and protest in the streets.

Response 3: It is impossible for me to work under such conditions. I can only stand a maximum room temperature of $x-z$ degrees, above that it is an imposition. If necessary, I would look for another job

Response 4: I try to get a doctor's certificate stating that such a temperature is dangerous to my health and that I am entitled to a lower temperature of at most $x-y$ degrees. If that doesn't work, I at least try to be moved to a room with a vulnerable person.

Response 5: I'll get a portable air conditioner and bring it to the workplace; I certainly won't let anyone tell me what to do. Maybe colleagues will even chip in with me for the cost.

Thought Experiment 4: Food production in the future will be increasingly affected by crop failures. As a result, many familiar foods such as wheat products, various types of fruit and vegetables and meat will become much more expensive. Just a few years ago, an average weekly shop cost up to $x\%$ less than it does now. However, the government is supporting the agricultural sector in switching to other food sources and is promoting a balanced, healthy and ecologically conscious diet with alternative foods, e.g., from African or oriental cuisine.



Response 1: I am happy because now I have more certainty that my diet not only be healthier, but also more ecological. And while I'm changing my diet, I'm also looking to see if I can't find even more tastes in cheaper alternatives that aren't so popular with others - that might even bring me back to the cost of what I used to buy.

Response 2: I think about which favourite foods I don't want to give up and otherwise try to change. However, I would like to achieve at least a saving of $y\%$ with this change, even if I might not like everything so much at first.

Response 3: I find it unacceptable that we can no longer maintain our food culture and I don't see why everyone who wants to should have to pay higher costs. Instead, I demand that measures be taken to preserve our food culture and that the farmers be supported in this. If necessary, the government will have to make savings in other areas.

Response 4: I am massively concerned about the food situation and try to make provisions as far as possible in case my preferred foods are no longer available. I am therefore investing in larger food stocks for the future and am prepared to spend the equivalent of up to x weeks' shopping.

Response 5: I cannot imagine that climate change should have such a big impact. I doubt very much that the changes have anything to do with it but suspect that there are other interests behind it. I am trying to find out more and motivate others not to allow these serious interventions.

The survey was designed to take around 20 minutes to complete. In addition to the questionnaire, respondents were asked to answer a list of questions to allocate the respondent to the meta-milieu. These questionnaire items are not available via open access, as they are subject to the trade secrets of the market research company.

7 Statistical Analysis of survey data

To develop the Climate Coping Typology, a methodology was created that was adapted from the one used to develop the pro:motion Typology, a typology of behaviour patterns related to information retrieval habits, attitudes toward different modes of transport, and mobility behaviour (Millonig, Markvica, & Haufe, 2016; Markvica, Haufe, & Millonig, 2016; Markvica, Millonig, Haufe, & Leodolter, 2020). For KNOWING, in a first step, the data was used to decide on a set of statements and the number of optimal types in the typology before sharpening the typology along the separation of the meta-milieus. In the following, a short overview over the methodology is given. A detailed methodology will be published in the open-source paper mentioned earlier.

7.1 Clustering for Climate Coping Typology

The goal of the algorithm is to extract a typology of behavioural homogeneous types. To achieve that an algorithm was designed that takes the fit of the resulting type-specific input into consideration when evaluating the fit of the Typology. As a basic cluster algorithm, K-means clustering was chosen. The methodology described below decides simultaneously on the optimal number of clusters and the optimal statements to use for the clustering.

The steps of the algorithm are as follows:

Step 1 Creation of an initial typology:

The initial number of clusters chosen was seven, according to the number of hypothesised types. To select the initial statements, first the covariance matrix was used to remove the statements that had very similar responses to other statements in the set. Once no similar statements remained, the number of initial statements was reduced to eight by running a K-means clustering with seven clusters. The statement which had the smallest difference in the cluster centres was then removed. This was repeated until only eight statements were left.

Step 2 Optimising number of clusters and chosen statements:

In this step, the number of clusters and the chosen statements were optimised taking the fit of the behavioural model described below, the number of chosen statements and the number of clusters into consideration. To do that, the following was repeated until the fit could not be improved further: For each of the possible actions (adding a cluster, removing a cluster, combining two clusters, splitting a cluster, adding a statement, removing a statement, or exchanging a statement) a behavioural choice model was estimated. The resulting fits were compared, and the number of clusters and statements were taken as the starting point for the next optimisation step.

Step 3 Adjusting the clusters to better fit Sinus-Meta-Milieus @:

The initial cluster centres were adjusted by taking only the cluster centres of respondents in the relevant meta-milieus as starting values in a new round of K-means. The result of the clustering algorithm was then taken as the final Climate Impact Coping Typology and interpreted accordingly. In addition, the final cluster-dependent behaviour model was estimated based on this final typology.

The full list of statements used in the clustering algorithm are given in Table 4. Initially the statement “As I know that air travel is particularly harmful to the environment, I try to avoid flying as much as possible, even if the alternatives are sometimes more complicated and exhausting.” was also used in the algorithm but it turned out that the statement, while separating the population well made it hard to assign meta-milieus and an explanation to the different types, so the statement was discarded from the process.

7.2 Climate Adaptation and Mitigation Behavioural Modelling

As part of the clustering algorithm a climate adaptation and mitigation behaviour model was used. To develop a behavioural choice model, the thought experiments from the survey were analysed. The four thought experiments included can be seen in Table 5.

F7A16 I think restricting myself for climate protection is completely pointless - it has no effect at all if I change.

The thought experiments refer to the three Climate Impact Contexts: (1) Heat waves & health, (2) Soil fertility & agriculture, and (3) Flooding & infrastructure. The respondents are presented with various action scenarios for selection. In combination with the general statements, it can be determined to what extent the inner attitude of the coping types is reflected in their actions.

Since no clear enumeration of the choices can be taken from the questions and due to the very broad range of different possible behavioural responses to climate change events and climate mitigation measures, a general enumeration system was developed for the possible responses.

The variables defined can be seen in Table 6. For the benefit variables the range of possible enumerations goes from -2 to 2. The negative numbers indicate negative outcomes for the respondent, e.g., for monetary benefits, negative numbers indicate increased costs, for other benefits like societal benefits, negative numbers indicate that the respondents see a burden for society if they choose the reaction. If the variable is not relevant for the reaction, it is enumerated as 0. For adaptation effort, the scale only goes from 0 to 2 indicating no effort for the adaptation to the new situation to 2 a lot of effort for the adaptation to the new situation.

When enumerating a new situation, the numbers should be assigned from the perspective of a person who would choose the respective answer. So, if someone who does not believe in climate change chooses a variant that they see as benefiting society in getting over the manipulation by the climate change community the societal benefits would be high from their perspective.

Table 6: Enumeration variables and guidelines for the enumeration for new behavioural responses to climate mitigation and adaptation measures.

Variable	Guidelines for enumeration of response
Short Term Monetary Benefits	How much costs/savings can be expected in the short run?
Long Term Monetary Benefits	How much costs/savings can be expected in the long run?
Adaptation Effort	How difficult is it for the respondent to adapt to the new situation for the given reaction?
Societal Benefits	In the view of the respondent who would choose the answer, does society benefit from choosing the response.
Individual emotional Benefits	How much does the choice of the response help the person in their own emotional well-being?
Perceived Fairness	How fair is the measure in the view of a person who would choose that response?

In the enumeration of the thought experiment is given. These values serve as the basic variables for the estimation of the type specific Logit models.

Table 7: Enumeration of thought experiments from the survey.

Thought experiment	Response	Short Term Monetary Benefits	Long Term Monetary Benefits	Adaptation Effort	Societal Benefits	Individual emotional Benefits	Perceived Fairness
Renewable energy	1a	1	2	2	2	2	2
	1b	0	1	0	0	1	0
	1c	0	-1	0	0	-1	-1
	1d	0	-2	1	-2	1	-2
	1e	0	1	0	2	-1	-1
Flooding	2a	-2	1	1	2	2	2
	2b	-1	-1	2	2	1	1
	2c	0	0	2	1	-1	-1
	2d	0	-1	1	-2	-1	-2
	2e	0	-1	2	2	2	2
Heat	3a	0	0	1	2	2	2
	3b	0	0	2	-1	-1	-2
	3c	0	0	2	-1	-1	-1
	3d	0	0	1	-1	1	-1
	3e	-1	0	1	-2	2	-2
Agriculture	4a	1	2	1	2	2	2
	4b	1	0	1	1	1	0
	4c	-1	-2	1	-2	1	-2
	4d	-2	1	2	-1	-2	-2
	4e	-1	-2	2	-2	1	-2

A type-specific logit model was estimated on the data. The model parameters of the final behavioural model belonging to the final Climate Coping Typology are given in Table 8. The model parameters are multiplied with the variable values of the different behavioural responses to get to the utilities and the shares per type described in Section 8. Multiplying the shares per type with the shares of the types in the population gives the final shares of behavioural responses for a region.

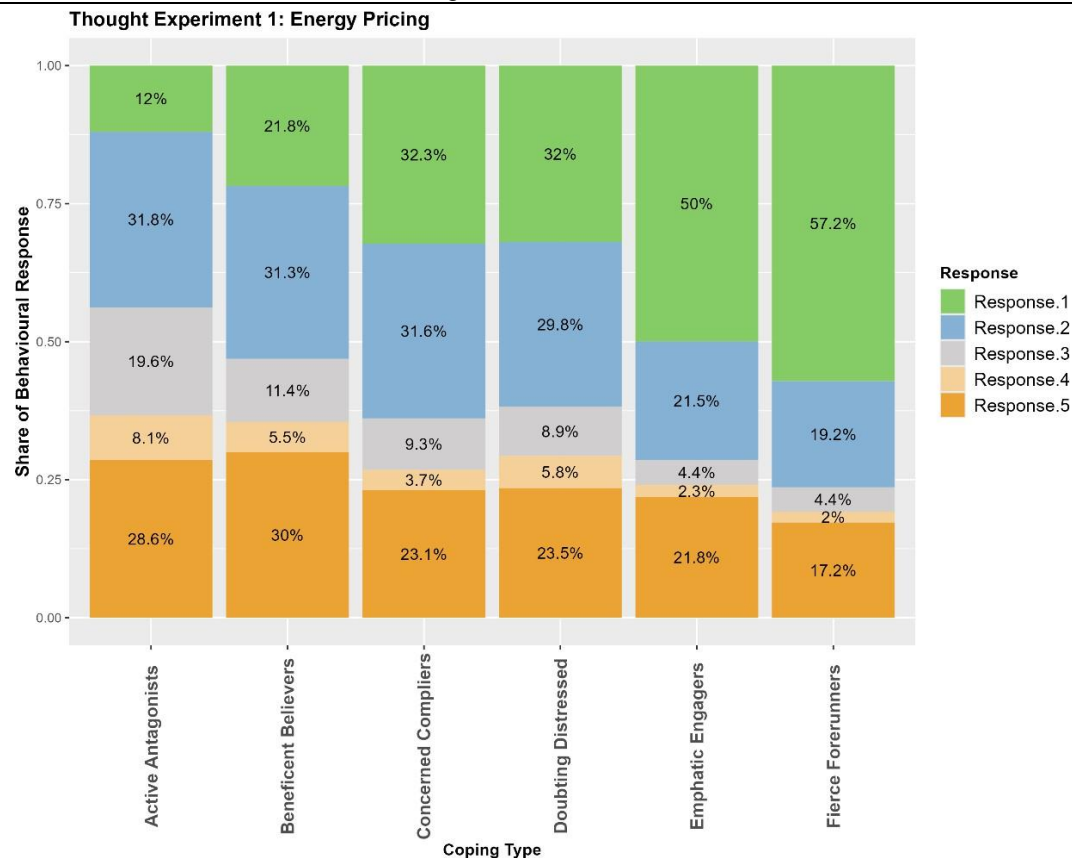
Table 8: Model parameters of the behaviour model.

Behaviour	Active Antagonists	Beneficent Believers	Concerned Compliers	Doubting Distressed	Emphatic Engagers	Fierce Forerunners
Short Term Monetary Benefits	0.123	0.071	0.126	0.109	0.116	0.124
Long Term Monetary Benefits	-0.162	-0.083	-0.79	-0.064	-0.015	-0.037
Adaptation Effort	-0.288	-0.102	-0.015	-0.005	0.159	0.130
Societal Benefits	0.207	0.327	0.325	0.248	0.399	0.391
Individual emotional Benefits	0.070	0.134	0.162	0.113	0.162	0.138
Perceived Fairness	-0.356	-0.290	-0.145	-0.064	-0.061	0.115

The following table and included figures show the response patterns of each type in the choice experiments, which show type-specific coping strategies to the different measures from the energy, land use and food sector which were selected for the choice experiments.

Table 9: Thought experiment included in the transnational survey. For the x, y and z values different options were included randomly to increase the variance of the resulting choice data.

Thought Experiment 1: In the next few years, renewable energies, such as photovoltaics or wind power, will not yet be sufficiently available at peak times of electricity consumption. Imagine your electricity provider has a new pricing model: at times when there is a surplus of renewable energy, the price of electricity is lower and can even become negative (i.e., the costs incurred to date are reduced); when availability is scarce, electricity becomes more expensive because additional fossil fuels, such as gas or oil, have to be used



Response 1: I am changing my lifestyle habits (e.g., washing laundry at different times) to optimise my annual electricity savings by up to 2x percent of the current costs with this tariff and recommend the pricing model to my acquaintances.

Response 2: I accept the pricing model, but do not change my habits significantly and hope to achieve at least an annual saving of up to x percent.

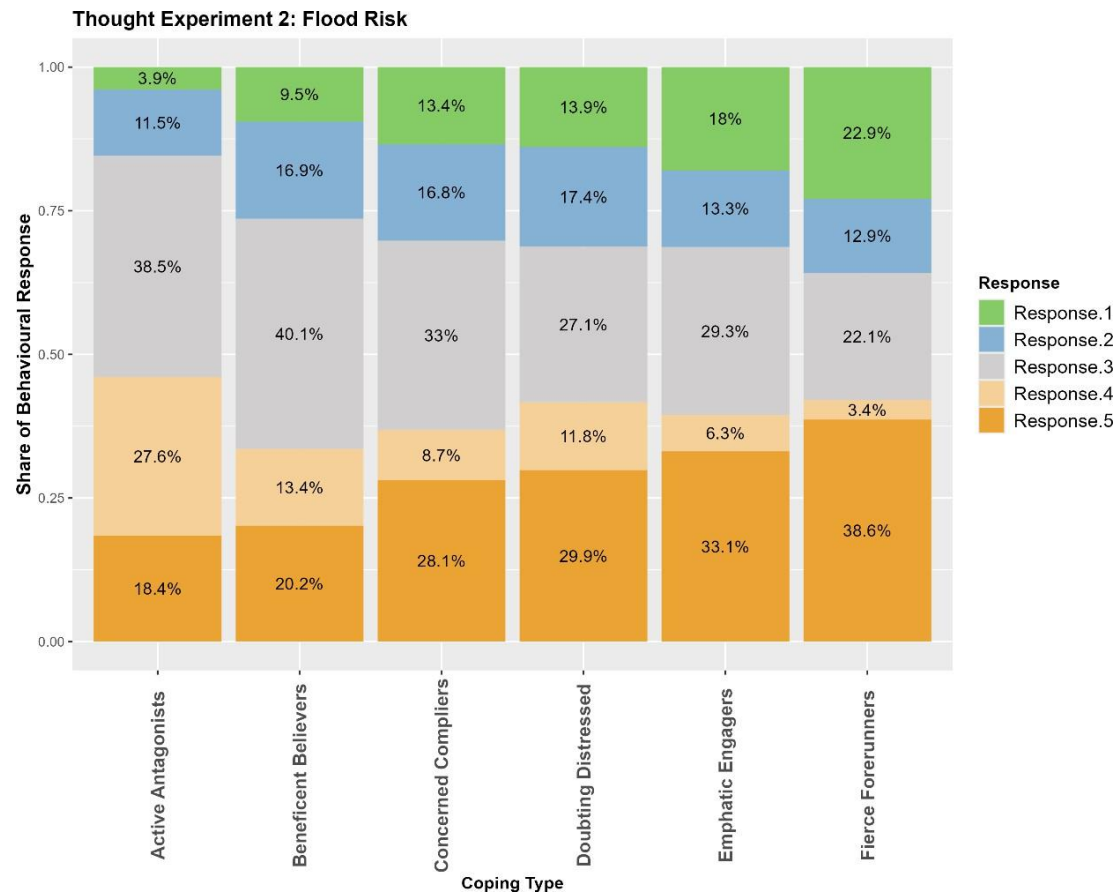
Response 3: I don't accept the pricing model because it's too complicated for me to always think about when I do what. In exchange, I also accept that I might have to pay up to x percent more for electricity per year.

Response 4: I will definitely not accept the pricing model - I have the feeling that they want to manipulate me, and I will definitely not let that happen, even if I have to pay up to 2x percent more.

Response 5: I don't like either the old or the new pricing model, because it either puts me at risk of using fossil energy or tempts me to use even more energy to save money. I use as little electricity as possible anyway, generate my own energy as much as possible and aim to become independent of energy suppliers.

Figure 13: Type responses to Thought Experiment 1: Energy Pricing.

Thought Experiment 2: Due to the increasing risk of flooding, dams need to be extended and further flood protection measures taken. Imagine you own a house that has to make way for the newly defined flood zone. You receive a letter from the city announcing the planned relocation. The city can only pay you x% of the market value of your house as compensation.



Response 1: Understand that this measure has to be set and that I have to accept a disadvantage in view of the higher threat to protect the general public, which I also try to explain to my neighbours, who are not enthusiastic. I will take the opportunity to look for a smaller and more sustainable home with the money, in order to contribute to climate protection in this way as well.

Response 2: It is understandable to me that there must be such measures - but I do not see why I should be disadvantaged by this and am not prepared to accept this measure if I do not receive at least x+y% of the market value. I am trying to persuade my neighbours to join me in this effort.

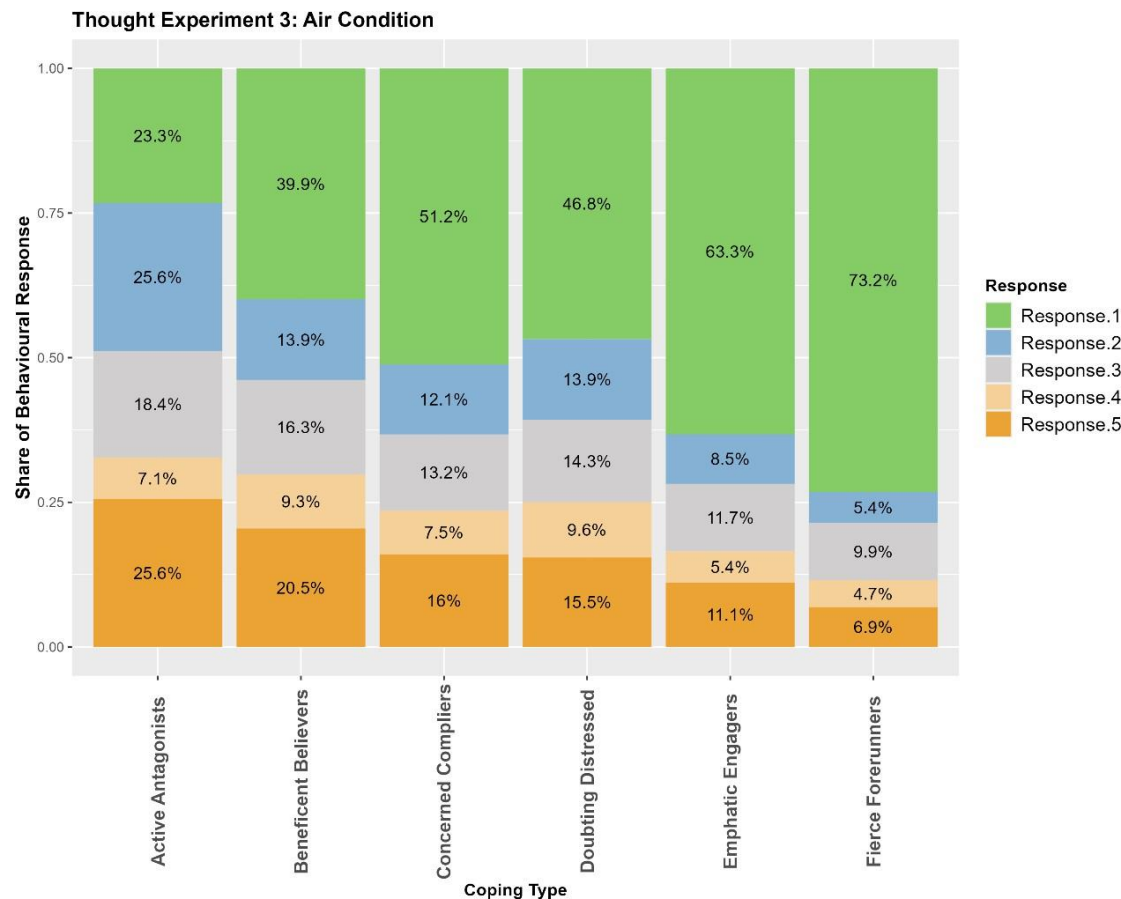
Response 3: I will not accept this under any circumstances and would only consider it, if at all, if I get the full market value plus z% of the value for the removal costs. I will also sue the city for this if necessary and invite my neighbours to join me.

Response 4: That is out of the question for me at all. There are certainly other places where the dam and the flood plains can go than on my property of all places. I will fight this measure in the strongest possible terms until the city gives in and changes its plans.

Response 5: I would first like to find out whether it is really the best way to enforce this measure in our country. I am organising a citizens' initiative at my own expense with like-minded people in order to better represent the concerns of those affected and especially to point out the social hardship that may result. In this way, we will try to find a compromise with the city on how flood protection can be achieved without causing social disadvantages.

Figure 14: Type responses to Thought Experiment 2: Flood Risk.

Thought Experiment 3: In the future, there will be more and more prolonged periods of heat. However, the massive use of air conditioning systems would place a heavy burden on the energy supplier network. It is therefore stipulated that the room temperature in public buildings may no longer be lowered below x degrees, except in rooms where vulnerable people (e.g. pregnant women, people with health problems) are present. Imagine you work in an office for a public service provider - how would you behave?



Response 1: I know that the increased use of air conditioning leads to further problems and endangers climate protection, so I think this measure is reasonable. I even try to convince my roommates to only lower the temperature to x+y degrees and help ourselves in other ways, e.g. with lighter clothes or cool cloths.

Response 2: I think it is unfair because it puts me and my colleagues at a disadvantage compared to people in the private sector. I am therefore trying to fight this regulation and mobilise the union, if necessary we threaten to strike and protest in the streets.

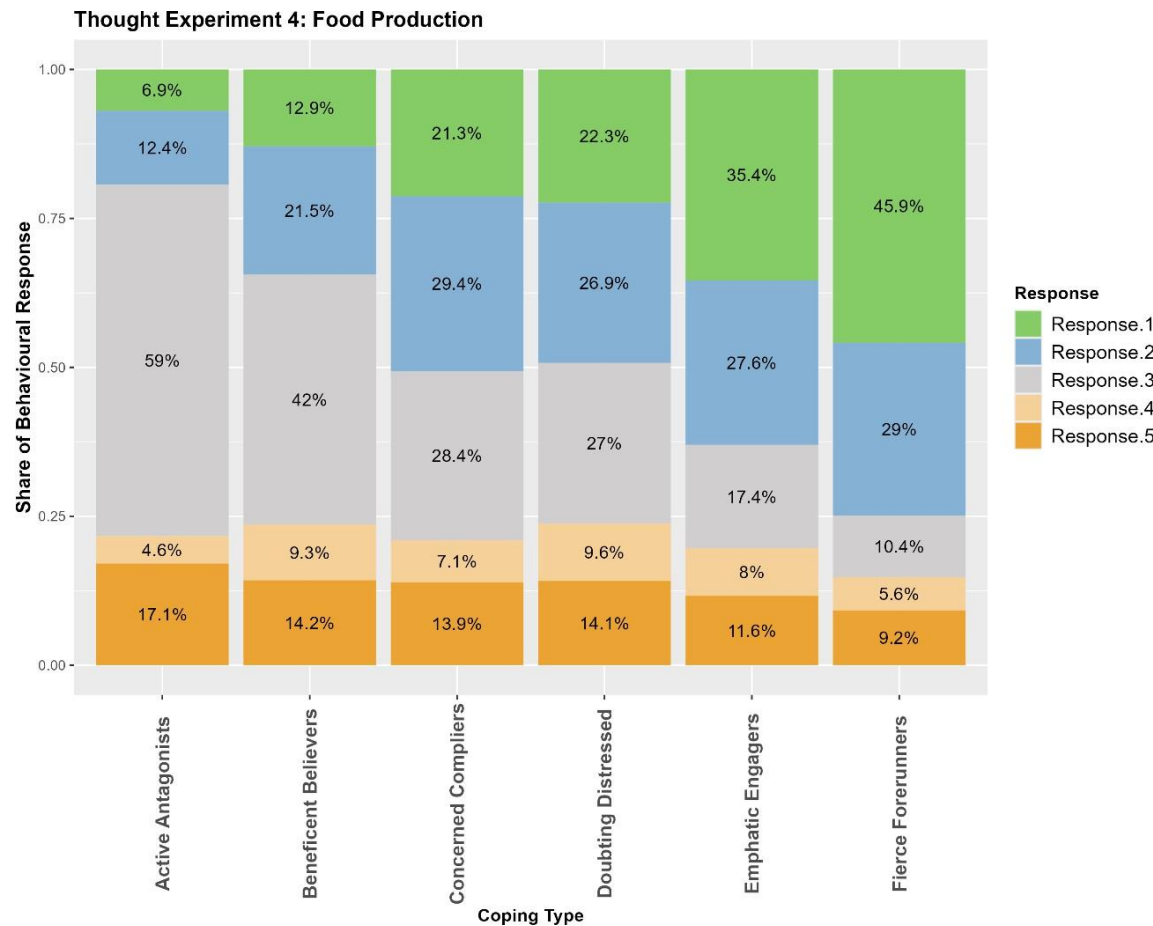
Response 3: It is impossible for me to work under such conditions. I can only stand a maximum room temperature of x-z degrees, above that it is an imposition. If necessary, I would look for another job.

Response 4: I try to get a doctor's certificate stating that such a temperature is dangerous to my health and that I am entitled to a lower temperature of at most x-y degrees. If that doesn't work, I at least try to be moved to a room with a vulnerable person.

Response 5: I'll get a portable air conditioner and bring it to the workplace, I certainly won't let anyone tell me what to do. Maybe colleagues will even chip in with me for the cost.

Figure 15: Type responses to Thought Experiment 3: Air Condition.

Thought Experiment 4: Food production in the future will be increasingly affected by crop failures. As a result, many familiar foods such as wheat products, various types of fruit and vegetables and meat will become much more expensive. Just a few years ago, an average weekly shop cost up to x% less than it does now. However, the government is supporting the agricultural sector in switching to other food sources and is promoting a balanced, healthy and ecologically conscious diet with alternative foods, e.g. from African or oriental cuisine.



Response 1: I am happy because now I have more certainty that my diet not only be healthier, but also more ecological. And while I'm changing my diet, I'm also looking to see if I can't find even more tastes in cheaper alternatives that aren't so popular with others - that might even bring me back to the cost of what I used to buy.

Response 2: I think about which favourite foods I don't want to give up and otherwise try to change. However, I would like to achieve at least a saving of y% with this change, even if I might not like everything so much at first.

Response 3: I find it unacceptable that we can no longer maintain our food culture and I don't see why everyone who wants to should have to pay higher costs. Instead, I demand that measures be taken to preserve our food culture and that the farmers be supported in this. If necessary, the government will have to make savings in other areas.

Response 4: I am massively concerned about the food situation and try to make provisions as far as possible in case my preferred foods are no longer available. I am therefore investing in larger food stocks for the future and am prepared to spend the equivalent of up to x weeks' shopping.

Response 5: I cannot imagine that climate change should have such a big impact. I doubt very much that the changes have anything to do with it but suspect that there are other interests behind it. I am trying to find out more and motivate others not to allow these serious interventions.

Figure 16: Type responses to Thought Experiment 4: Food Production.

7.3 Response Differences per Country

Some general information of the respondents, like the place of living (see Figure 17). The results show that there is a smaller part of the population living in smaller towns and rural areas in Spain, Croatia and Estonia, with Austria being the country with the most rural population. In Italy and Germany, about half of the respondents live in urban areas (larger city and suburbs, medium-sized city).

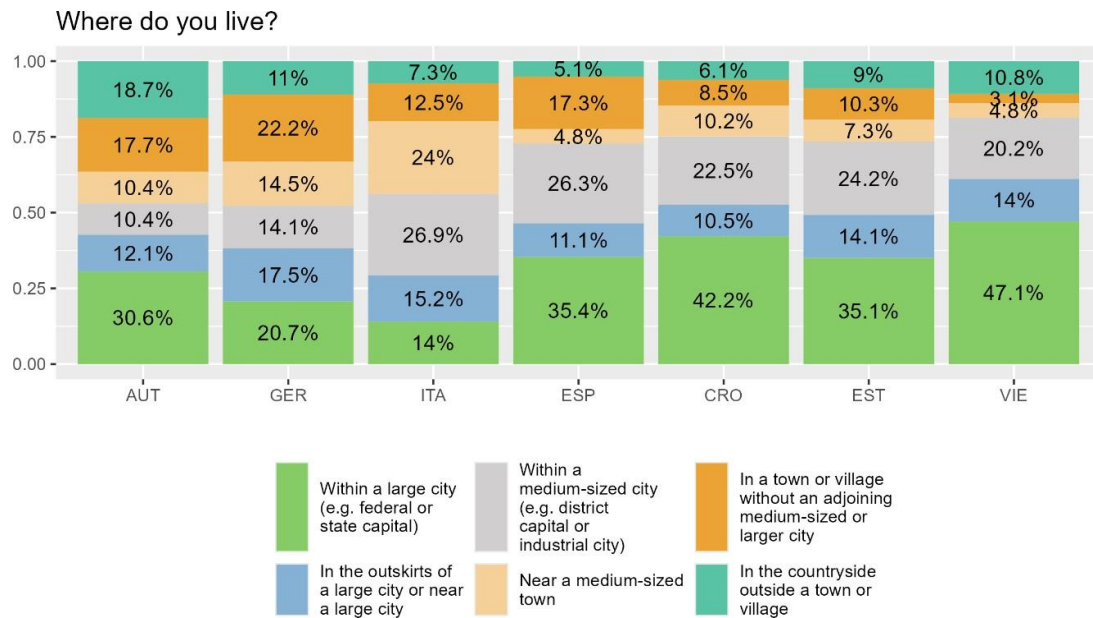


Figure 17: Places of residence amongst respondents to the transnational survey.

In the following section, the answers of the respondents to the general statements are filtered and presented by country. It is important to identify the similarities and differences in the perception of climate issues. Furthermore, the general statements provide insights into how much intervention by politics is desired and how important it is to involve the population in shaping measures or preserving personal freedom.

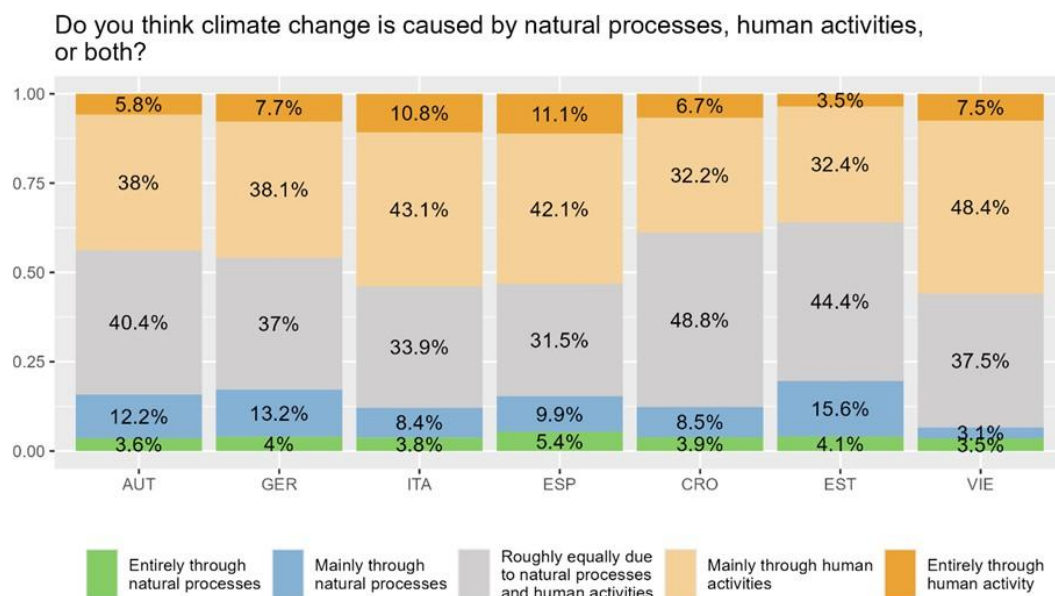


Figure 18: Believe of respondents in what part climate change is caused by humans and by natural processes.

Regarding the cause of climate change, a rather small proportion of respondents assume a purely human cause or a purely natural process (Figure 18). About one third see human activity as the main cause, and about one third identifies both human and natural factors as the trigger. The highest percentage of respondents stating human activities as main factor live in Italy, Spain and Vietnam. A particularly large number of respondents in Estonia believe that climate change has a mainly natural origin, followed by Germany and Austria. In Croatia, about half of the people state that it is roughly equally due to natural processes and human activities.

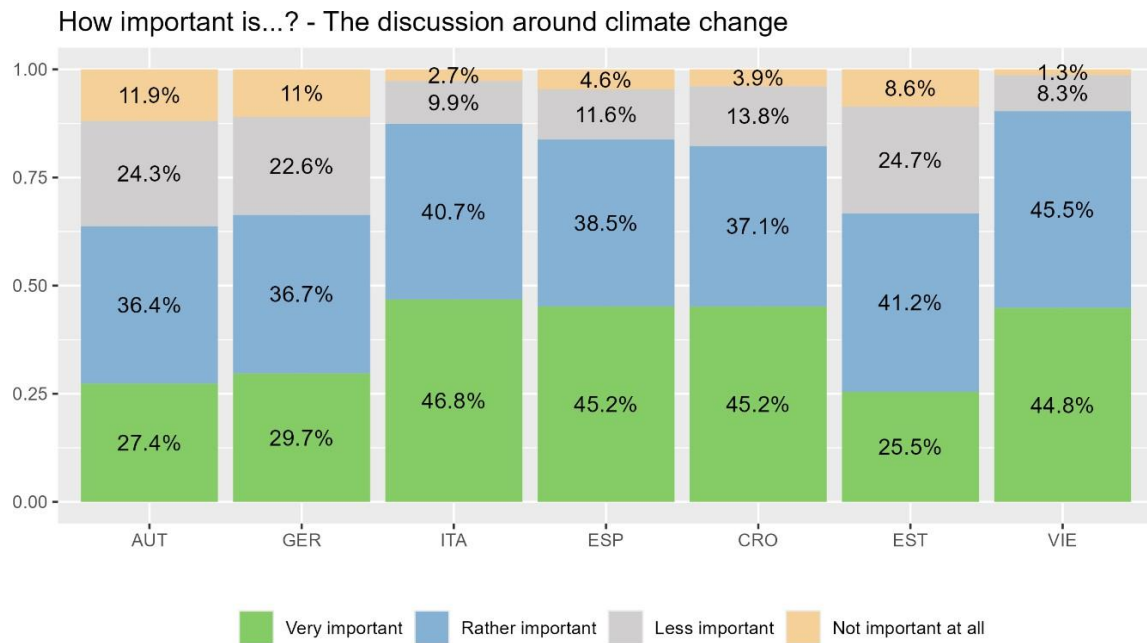


Figure 19: Importance of discussions around climate change in the participating countries.

The discussion around climate change is perceived very differently in the countries participating in the survey (see Figure 19). There is more interest in it in Italy, Spain, Croatia and Vietnam than in the other countries. More than two thirds of the respondents think of the discussion as very important or rather important. In Austria, Germany and Estonia, on the other hand, around one third perceives it as less important or not important at all.

To begin with, here are a few general statements that can be heard frequently. To what extent do you agree with the following statements? - The well-being of the people here and now is more important than that of future generations.

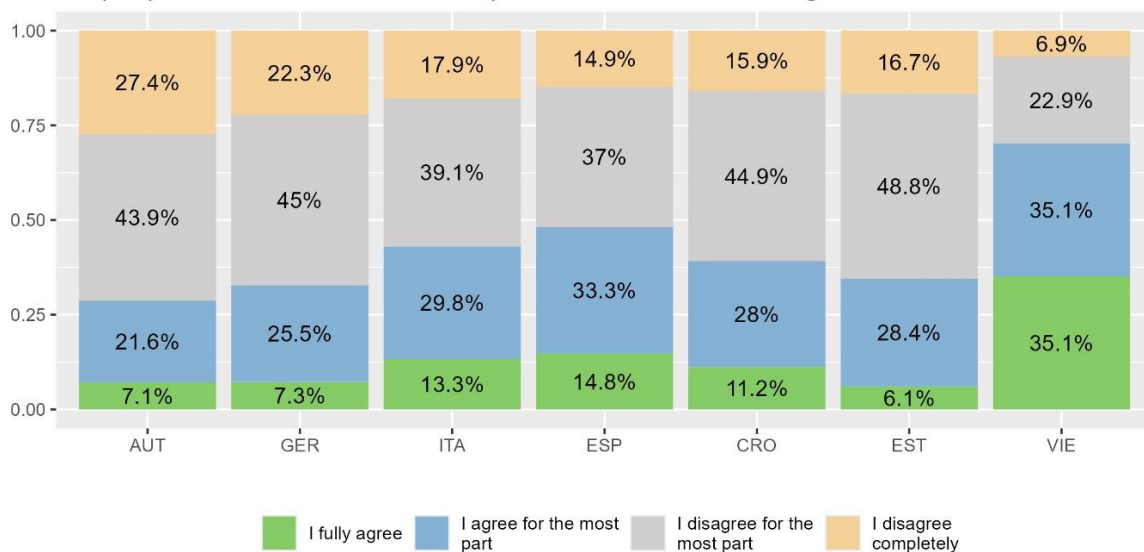


Figure 20: How much do people worry about future generations compared with people in the present.

Worry about the effects of climate change on future generations seems to be less of an issue in Vietnam (Figure 20). Almost three-quarters of the Vietnamese surveyed believe that the effects on well-being are more important in the here and now. In Spain, the opinion is split across the participants of the survey. Interestingly, most people in Austria are very concerned about future generations, followed by Germany.

When people talk about climate change, how stressful do you find it most of the time?

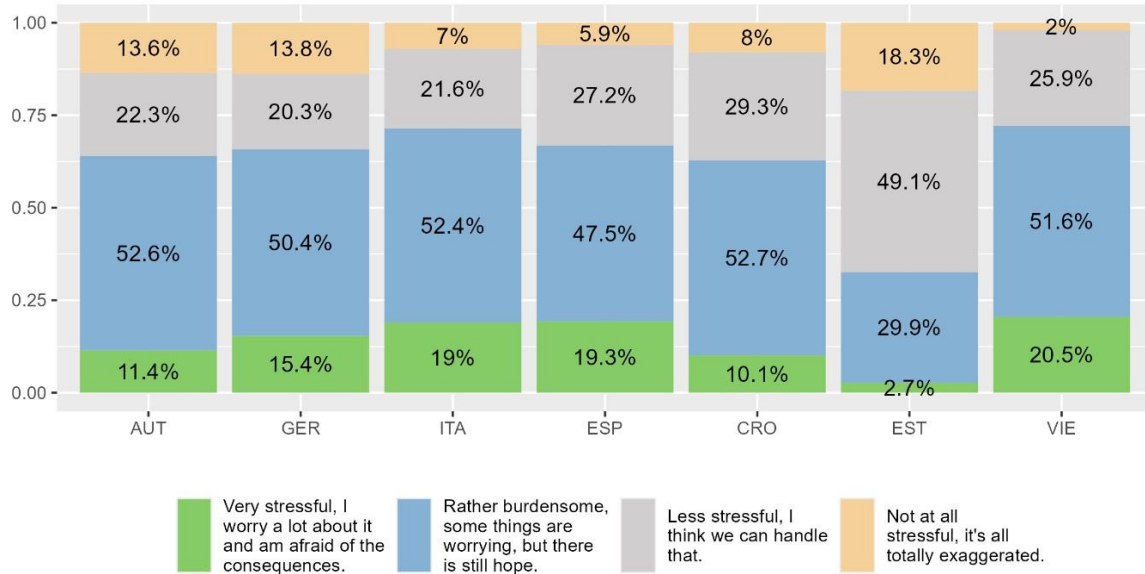


Figure 21: Stress level caused by discussions in different countries.

Less stressed in the discussions on climate change are the Estonian respondents (Figure 21). Only a very small percentage perceives talking about the issue as very stressful or rather burdensome. In all other countries, about half of the respondents state it as rather burdensome in addition to those that experience it as a very stressful topic.

Opinions differ on how radical and how quickly measures are necessary. What do you think? Which of the statements corresponds most closely to your opinion?

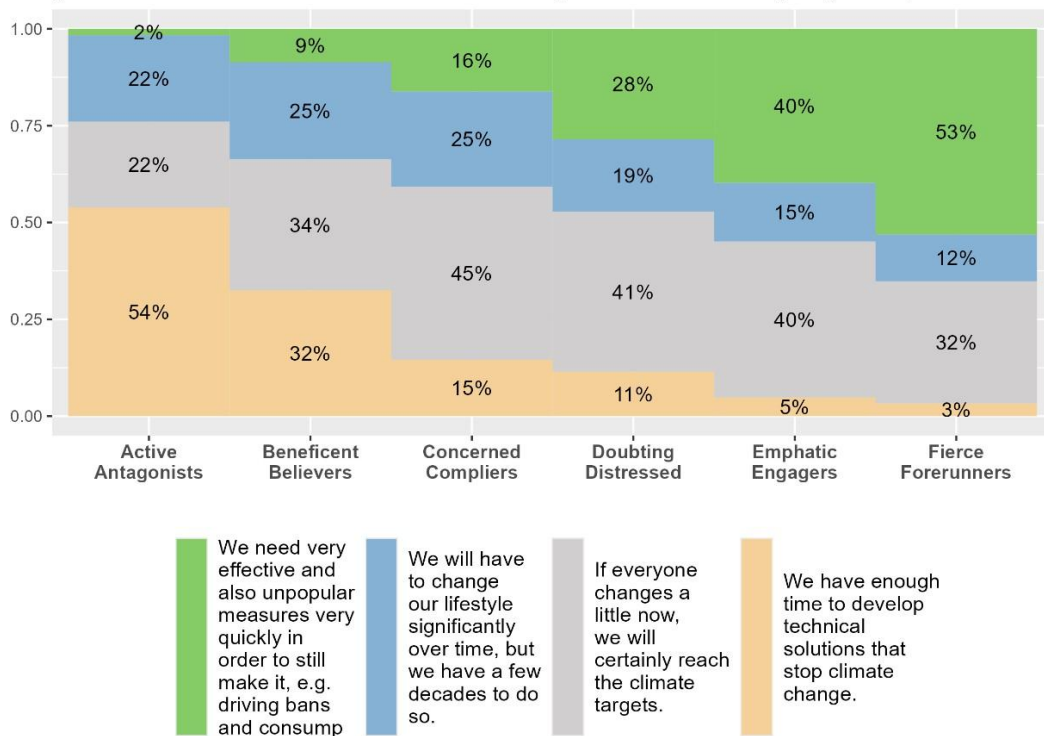


Figure 22: Desire for drastic measures amongst different types.

Even among the “Active Antagonists” (2%) and “Beneficent Believers” (9%) types are people that would support unpopular measures (Figure 22). However, more than half of the survey participants in the “Active Antagonists” category (54%) agree that there is enough time to develop them, followed by the “Beneficent Believers” Type (32%). The statement about everyone contributing to the change to reach the climate targets is most popular among the “Concerned Compliers” (45%), “Doubting Distressed” (41%) and “Empathic Engagers” (40%) Type.

Incidentally, if this question is analysed by age group, it becomes clear that socio-demographic characteristics no longer have much significant explanatory power. This underlines all the more the importance of attitude and behavioural typologies in order to better understand response risks and develop appropriate measures.

Opinions differ on how radical and how quickly measures are necessary. What do you think? Which of the statements corresponds most closely to your opinion?

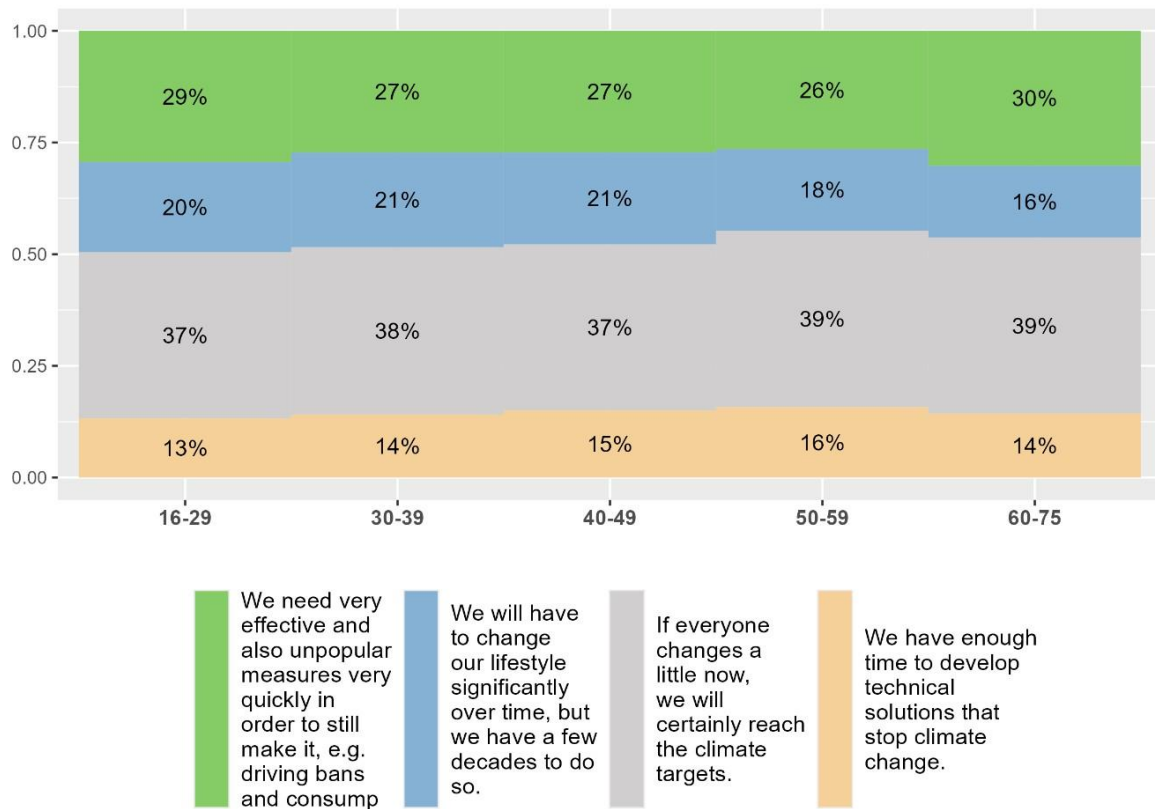


Figure 23: Desire for drastic measures amongst different age groups.

8 Description of Climate Coping Types Attributes

In general, the Climate Coping Typology shows a weak correlation with sociodemographic characteristics. Only individual aspects stand out for specific types. This is not surprising, since the explanatory content of sociodemographic factors is very weak among a broad middle class. Common behaviour typologies therefore primarily refer to values and attitudes. However, socio-demographics are included as they allow for nuances in the individual types.

8.1 Socio-Demographics

As far as **gender** is concerned, the "Active Antagonists" type with 63% men (followed by the "Beneficent Believers" with 55% men) tends to be more clearly male dominated compared to the "Empathic Engagers" type, which is 55% female at the other end of the spectrum. The country-specific analysis of the gender component also reveals that the "Active Antagonists" type has a male predominance, with the highest prevalence observed in Croatia (73%) and Estonia (74%).

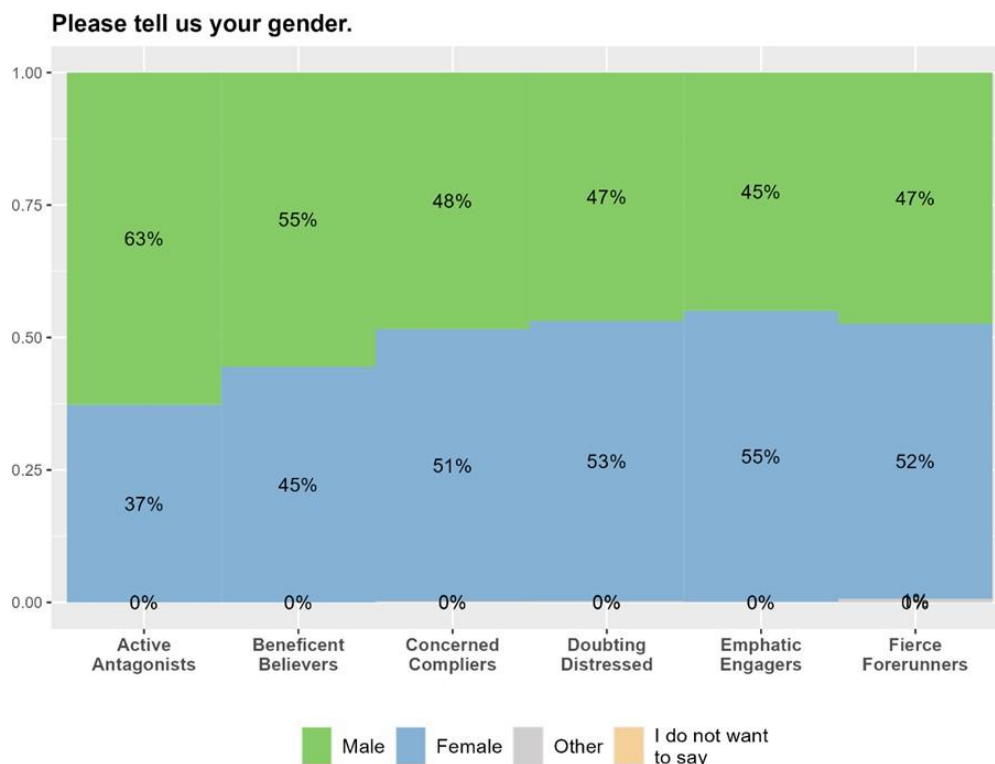


Figure 24: Gender distribution of Climate Impact Coping Types.

In terms of **age group distribution**, the younger age group of 16–29-year-olds is most represented in the "Doubtful Distressed" Type, with 24% of respondents falling into this category. This is followed by "Fierce Forerunners" (20%) and "Concerned Compliers" (19%). If the 30-39 age group is included, the "Doubting Distressed" Type remains in the lead. Those above the age of 60 (up to 75) were found to be most represented in the "Active Antagonists" and "Fierce Forerunners" Types, with respective percentages of 28% and 27%. There are no special features that stand out when comparing countries.

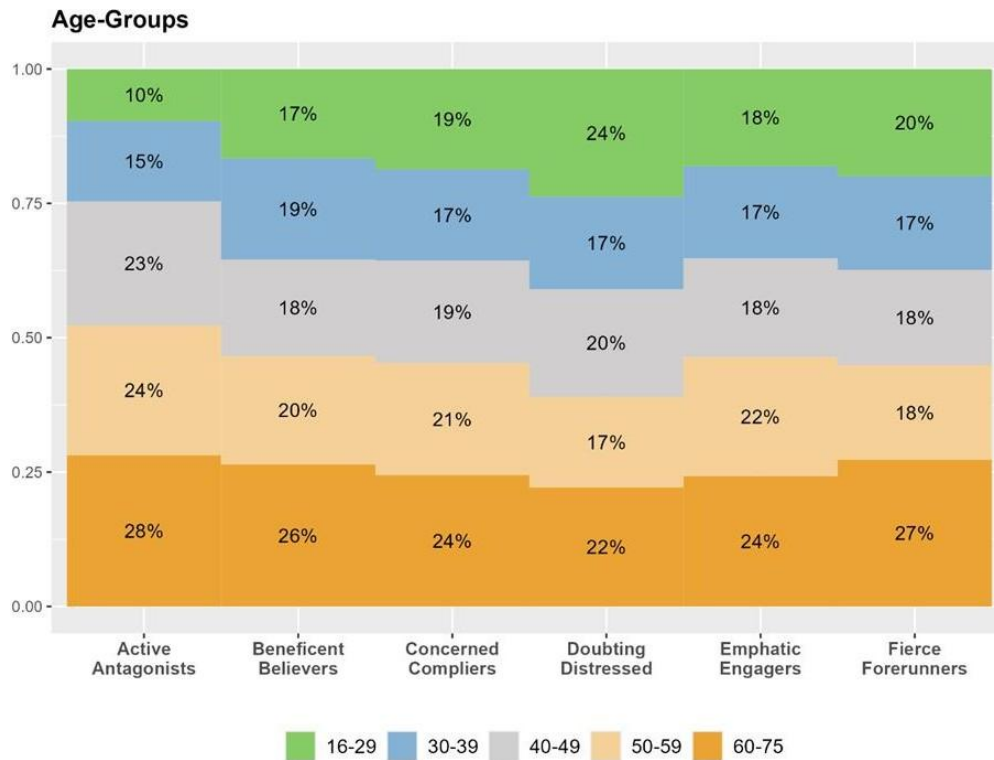


Figure 25: Age distribution of Climate Impact Coping Types.

If we take a closer look at the **place of residence**, the "Fierce Forerunners" Type (with 33% living within a large city) is most likely to be a metropolitan type, closely followed by the "Emphatic Engagers" (31%) and "Doubting Distressed" (30%). In contrast, more than a quarter of the "Active Antagonists", "Beneficent Believers" and "Concerned Compliers" Types live in the countryside outside or in a town or village without an adjoining medium-sized or larger city. In Italy, the lowest proportion of respondents (across all types) reside in a large city. In Croatia, however, this figure is almost half. In comparison to other countries, Austrians tend to live more in rural areas.

Where do you live?

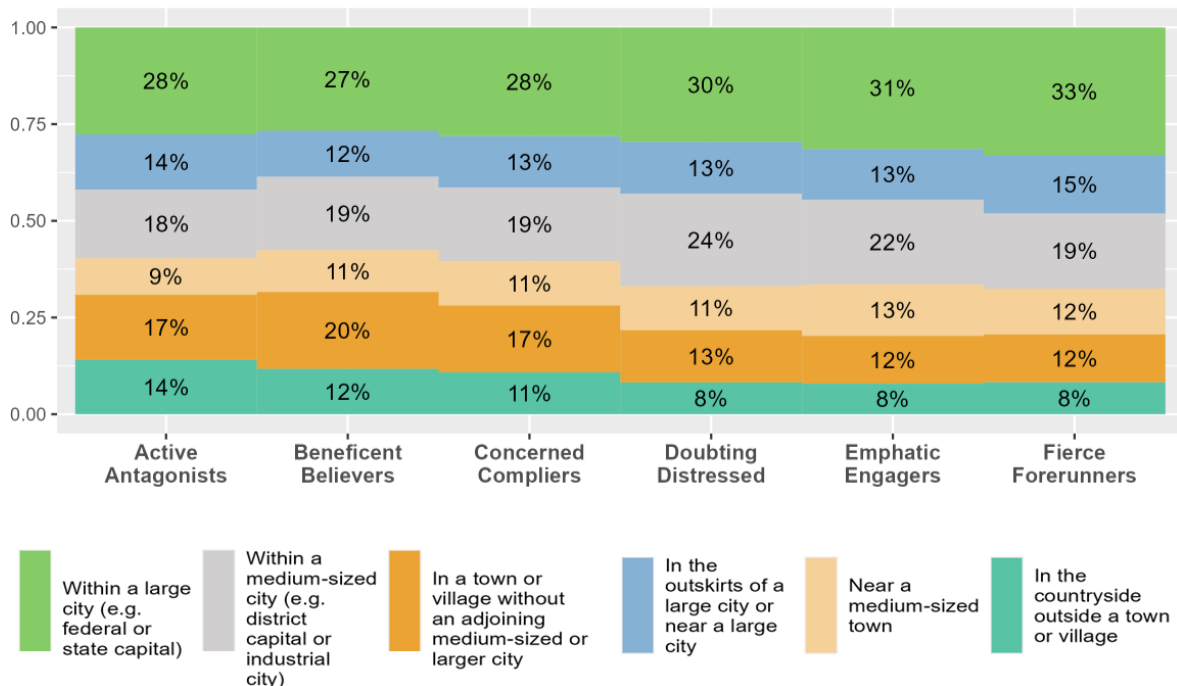


Figure 26: Living environments of Climate Impact Coping Types.

In terms of the **current occupation** of all respondents, hardly any type stands out in a significant way. A country-specific breakdown reveals that the number of full-time employees is slightly lower in Germany, Italy, and Austria than in Estonia, Croatia, or Spain. Italy stands out for its higher proportion of housewives/househusbands.

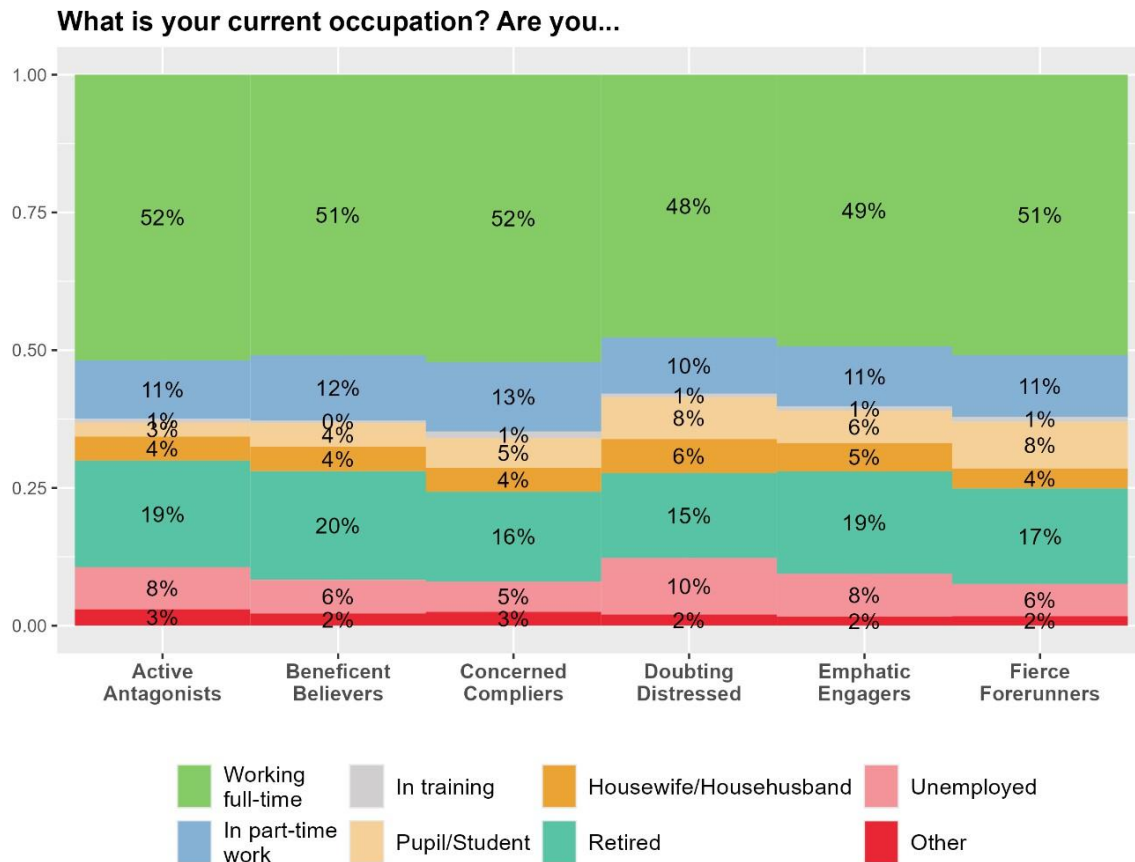


Figure 27: Occupations of Climate Impact Coping Types.

In terms of **household size**, the "Doubting Distressed" Type, followed by "Empathic Engagers", stands out as the one that contains the most households larger than 2 people (3-7 people or more). Persons within the household who are **in need of care** are, however, fairly evenly distributed across all types (only slightly more care-giving persons are found in the "Doubting Distressed" type). The country-specific analysis shows no major anomalies in terms of household size, except that Spain has the lowest number of single-person households. According to the representative sample, Germany and Austria have more 1-2 person households than the other countries.

The monthly **household income** surveyed shows that half of all types earn at least € 2,000 with the "Fierce Forerunners" being slightly ahead of the other types in terms of the upper income segments. However, it must be noted that this attribute is difficult to compare, as income levels differ significantly between the countries. The country breakdown shows that Croatia in particular has a slightly lower average household income.

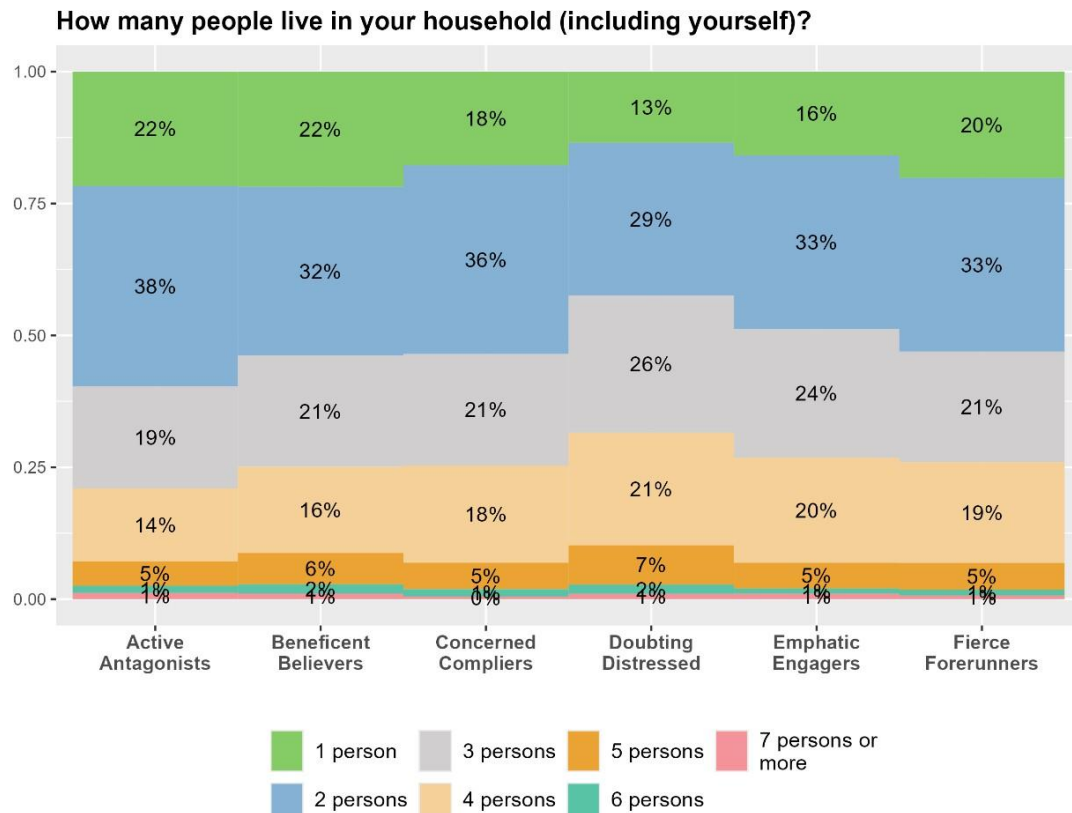


Figure 28: Occupations of Climate Impact Coping Types.

8.2 Correlation of Coping Types with Meta-Milieus

The meta-milieus have been used during the clustering process for refining the typology according to milieu-specific lifestyle groups. The meta-milieus provide rich background information about the opinion and social status of different groups and support the transferability of the typology. Table 10 shows the composition of Coping Types from meta-milieus.

Table 10: Over- or under-representation of meta-milieus in Coping Types.

	Active Antagonists	Beneficent Believers	Concerned Compliers	Doubting Distressed	Emphatic Engagers	Fierce Forerunners	average
Sinus-Meta-Milieus®	A	B	C	D	E	F	
EST-Established	6%	9%	10%	11%	15%	14%	11%
INT-Intellectuals	0%	2%	8%	4%	15%	29%	10%
PER-Performer	8%	9%	14%	9%	9%	14%	10%
COS-Cosmopolitan Avantgarde	4%	7%	7%	8%	9%	10%	7%
PRO-Progressive Realists	1%	4%	5%	9%	11%	10%	7%
ADA-Adaptive Navigators	13%	18%	15%	14%	8%	6%	12%
SEN-Sensation-oriented	23%	14%	10%	13%	7%	2%	12%
CMS-Conventional Mainstream	18%	19%	15%	15%	11%	8%	15%
TRA-Traditionals	6%	8%	8%	9%	8%	5%	7%
CMA-Consumer Materialists	22%	11%	7%	8%	6%	2%	9%

■ above average response plus standard deviation
■ below average response minus standard deviation

The types at the “extreme” edges of the typology spectrum, Type A and Type F, show very distinct over- and under-representations of meta-milieus. Towards the middle of the spectrum, the types are more evenly distributed among the meta milieus and only show one or two dominant meta-milieus. These are in line with the types’ response characteristics and provide more details for interpretation of their respective beliefs and responses. The following illustrations and descriptions provide the specific milieu-based background information for each Coping Type.

The “**Active Antagonists**” are mostly found in the meta-milieus of the Sensation-oriented and the Consumer-Materialists. Elite milieus of higher social status are underrepresented. This indicates that Type A represents materialistic and entertainment focused groups of lower social status, often also precariat, with desires for a better life in terms of financial security and consumption power. They do not want to lose any of their hard-earned conveniences and fear of being disadvantaged (again) in comparison to groups of better social status.

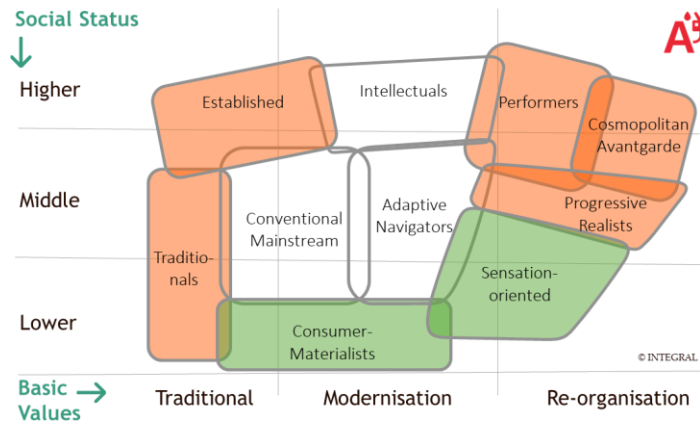
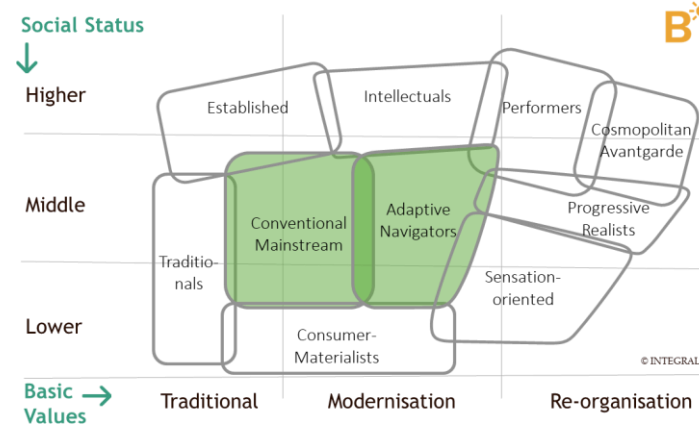


Figure 29: Main meta-milieus of „Active Antagonists“.



“**Beneficent Believers**” do not show significant under-representations of any meta-milieus and contain higher shares of the Conventional Mainstream and Adaptive Navigators. This means that they represent the pragmatic and modern middle of society. They are community-oriented and harmony seeking, but also willing to adapt to new situations and largely familiar with digital media. However, they also are concerned about losing their prosperity and wish for security.

Figure 30: Main meta-milieus of „Beneficent Believers“.

“**Concerned Compliers**” show an over-representation of Performers – the efficiency and progress-oriented modern elite with higher education and a strong trust in technological progress. Despite this optimistic view, it does not escape their notice that climate change is an increasing threat not only to other parts of the world, but also to their own future. They interpret this challenge like a project and are willing to adapt and trust global economy to adapt to the changing realities. They are positive that – with the right developments and innovative ideas – it is possible to stop global warming.

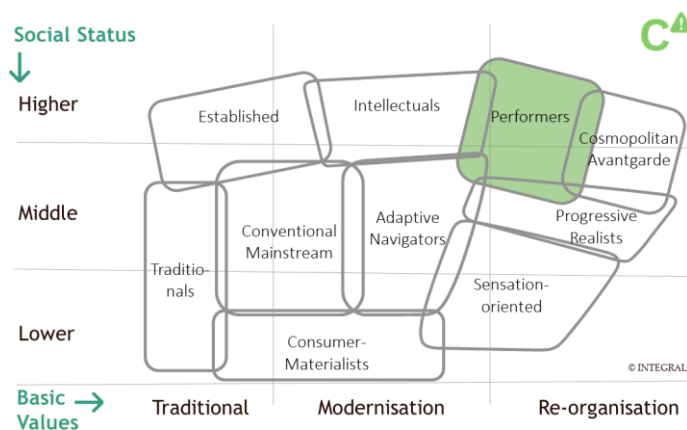


Figure 31: Main meta-milieus of „Concerned Compliers“.

In the group of the **“Doubting Distressed”**, only the Traditionals are over-represented in comparison to other types. Traditionals are persons of lower or middle social status who prefer a simple lifestyle. They have a strong desire for order, security, harmony, and consistency. Innovative technologies are rather foreign to them. This goes in line with the type’s feeling of insecurity and being overwhelmed by the complexity of climate impacts and interactions between measures. Even though they are aware of the rapid changes, they are lost when it comes to decide what is right.

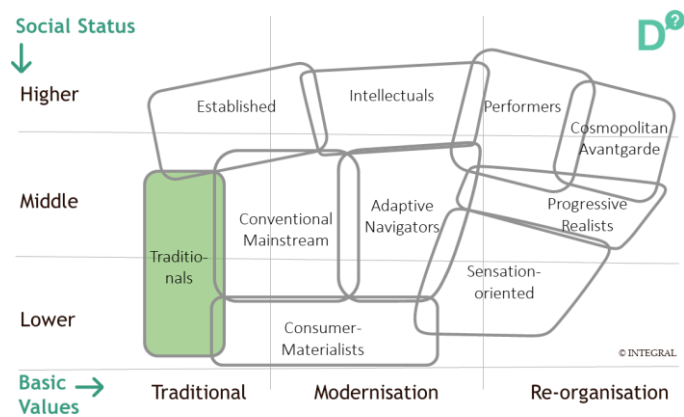


Figure 32: Main meta-milieus of „Doubting Distressed“.

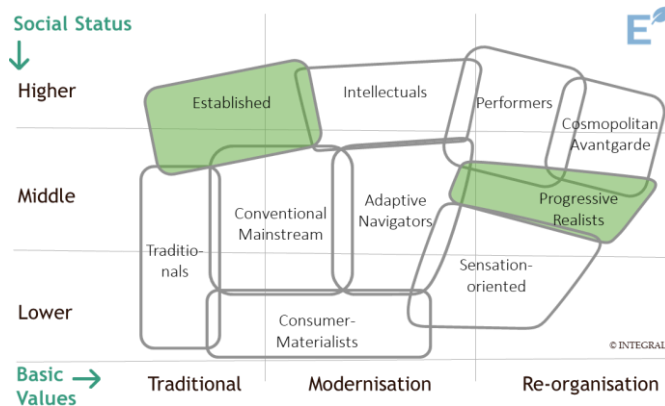


Figure 33: Main meta-milieus of „Empathic Engagers“.

The **“Empathic Engagers”** show over-representations of two different meta-milieus: the Established and the Progressive Realists. While the Established represent the self-confident and status-driven conservative elite, the Progressive Realists are more actively driving transformation. Both milieus have a high standard of ethics and social responsibility in common, which accounts for their willingness to act as role models and behave in a visibly sustainable manner. They expect others to follow their example.

The **“Fierce Forerunners”** combine the milieus of the progressive, intellectual, and post-modern elite, while middle- and lower-class milieus are significantly under-represented. They are highly ambitious and see it as their responsibility not only to act in the most climate-neutral way possible, but also to demand a massive shift away from capitalist, consumption-intensive lifestyles. They are extremely well informed and frustrated by the perceived inactivity of politicians and the influence of powerful global institutions lobbying against climate protection. This can lead them to take provocative actions.

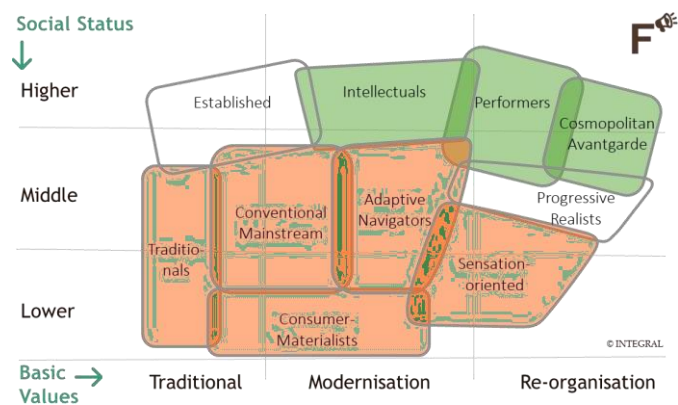


Figure 34: Main meta-milieus of „Fierce Forerunners“.

8.3 Climate Impact Coping Type Attributes

In this part, the Climat Impact Coping Types are presented in more detail regarding their attitudes and behaviours and their main socio-demographic attributes.

8.3.1 Type A - “Active Antagonists” (7%)

The „Active Antagonists“ Type thinks the climate debate is exaggerated and pointless. It is therefore rather reluctant to change its behaviour. It is sometimes assumed that with enough time and technological development, everything can be solved – if necessary, at all as a natural cause is assumed.

The general statements suggest that the “Active Antagonists” Type is easily annoyed by suggestions on how to live. People in this category do not support the discussion on climate change and are not interested in the topic itself. Reward systems and actions from policy makers are not encouraged by them as they do not want to change their behaviour anyways. More than half of them state that contributing to solving the big problems of the world is rather not important to them. They tend to think of green quality labels as a marketing scam and don't want to be patronised.

According to the thought experiments, Type A is highly critical of any measures and brings little willingness to support measures that serve society more than themselves. These people tend to refuse or work against these measures and regulations, or at least to gain personal advantage. They fight against change to defend themselves against restrictions on their habits and personal freedom and encourage other people to do the same, which can sway people from other types to their position. But not all people belonging to this behaviour type are in complete opposition. Some people would stick to their routines and accept changed circumstances and a few would even slightly alter their behaviour. However, they are more sensitive to measures taken that affect their own lives. They are fundamentally materialistic and experience-oriented.

Compared to the other behaviour types, the “Active Antagonists” Type is more male-dominated (63% male, 37% female) and car oriented. 62% use the car with combustion engine for most of the everyday journeys. This behaviour type is the most rural, with 14% living in the countryside outside a town or village. Otherwise, the spatial distribution hardly differs from that of the other types.

52% work full-time, 11% part-time and 19% are retired. A high percentage of one-person households (22%) and two-person households (38%) can be found within the “Active Antagonists” type. 17% state to have one person in need of care in their household, 12% have two persons and 3% three persons to take care of.

The monthly household income is comparably high to the other behaviour types. Nearly half of the respondents state to have a monthly household income of € 3,000 or more. Of these, 5% even have more than 6,000 euros per month at their disposal. This could be related to the fact that they are comparatively older people. After all, about half of the people are 50 years or older (24% in age group 50-59, 28% in age group 60-75). Another 23% are between 40 and 49 years old.

8.3.2 Type B - “Beneficent Believers” (11%)

The "Beneficent Believers" Type consciously withdraws from the climate debate and concentrates on himself/herself. Although they recognise the consequences of climate change, they do not necessarily see the reasons for this in human activities. In general, the topic plays only a minor role in their lives and is seen as solvable. This type is hardly open to change and prefers to maintain the status quo, even if a certain need for change is to be expected over time. Unpleasant things are ignored or avoided as they are harmony-seeking individuals. This type is generally considered mainstream and adaptable.

The general statements suggest that the “Beneficent Believers” Type does not want suggestions on how to live and does not support the discussion on climate change. Regarding the other statements, this type has more moderate views than the “Active Antagonists” Type.

For many representatives of this type, the common good is not a decisive argument for supporting climate measures. Nevertheless, measures are rejected or protested against if they are perceived as socially unjust or discriminatory for certain groups. They generally rely on technical solutions and that the problems will be solved. But as soon as it becomes unpleasant (habits) or too costly for these people, they mobilise against the measure taken. It is interesting to note that, depending on the scenario, around a third of this type tends to act moderately. Thus, there are also individuals who are obedient to authority, unless others manage to convince them to question authorities.

The “Beneficent Believers” type is male dominated (55% are male). Their spatial distribution is average. Only the high percentage of 20% living in a town or village without an adjoining medium-sized or larger city combined with 12% living in the countryside outside a town or village stands out in comparison.

The highest percentage of retirees (20%) can be found among this type. The number of unemployed people is rather low (6%), 51% work full-time and 12% part-time. The percentage of pupils or students is only 4%.

The household size is very similar to the type “Active Antagonists” in terms of people living in single-person (22%), three-person (21%) or four-person (16%) households. Only the number of two-person households is lower (32% vs. 38% within the “Active Antagonists” type). In 34% of the households are minors or persons in need of care.

The average income is quite similar to the “Doubting Distressed” Type and comparatively low. Less than a quarter has a monthly household income of more than 3,000 euro. Nearly half of them live on less than € 2,000 per month, 14% have a budget of less than € 1,000.

The division by age groups does not significantly differ from the other types. Slightly half of them are younger than 49 years with 17% between 16 and 29 years and 19% between 30 and 39 years old. It is the type with the highest percentage of people between 30 and 39 years.

8.3.3 Type C - “Concerned Compliers” (20%)

The “Concerned Compliers” Type is interested in climate issues and is noticing the changes caused by it but feels inadequately informed. These individuals are cautious in their conclusions, as they like to understand the big picture. They are concerned about the implications and believe that they can help slow down the process to some extent and that climate change is manageable, as human influence is considered likely. Nevertheless, this does not imply that they currently perceive a necessity for actively modifying their behaviour. However, the increasing awareness is giving rise to concerns about the future, which they anticipate will require them to accept the necessity of giving up certain conveniences. In general, Type C is progress-orientated and focused on early adaptation.

This type is concerned about future generations and tends to think that measures should not restrict people’s freedom. These people are more open to other life alternatives than other behaviour types, according to their responses to the general statements within the survey.

In thought experiments, they operate in the middle ground. About half are willing to accept change and regulations or even actively support it if all are affected. Other members of the type see themselves more in the role of victims and are afraid to lose conveniences. This is influenced by the fact that personal freedom is important to this type, and measures can be met with rejection solely for that reason. In some cases, people even revolt if they feel personally disadvantaged, This fear can create a bias when they seek information by overemphasising potential threats. The gender ratio for the behaviour type “Concerned Compliers” is approximately balanced (51% are female). The spatial distribution is more rural than average with 28% living in a large city versus 11% in the countryside outside a town or village, 17% in a town or village without an adjoining medium-sized or larger city and 11% near a medium-sized town.

The share of people working part-time is a little bit higher than within the other types (13%) and the share of people unemployed is the lowest among the types (5%). Around half of the respondents live in single- (18%) or two-person households (36%). A total of 32% of the households include minors or persons in need of care.

The monthly income per household is rather high. Less than a quarter lives on a budget below € 1,500 per month. More than a quarter of them has a monthly income above € 3,500. This is surprising as it is a comparatively young group of people with 19% between 16 and 29 years old followed by 17% in the age group 30-39 years.

8.3.4 Type D -“Doubting Distressed” (23%)

The „Doubting Distressed“ Type tends towards criticism of science and is overwhelmed by complexity. This behaviour type blames our lifestyle for climate change. However, the urgency is not necessarily

recognized, and the impact of their own actions is considered rather low. People who belong to this type D assume that they need to change their habits but are undecided about what they can do and what measures make sense. They are therefore unsure about a solution.

According to the general statements, this type likes trendy products as well as travelling to faraway countries and is more concerned with solving the challenges in their lives than stressed by global crises.

Type E reacts very similarly to Type D in thought experiments. However, the background may be different, as it is more about general scepticism that change can be achieved through their actions. As they are very undecided about which measures are effective, they are usually critical of many of the proposed measures. They are generally prepared to make changes, but the overabundance of partly contradicting information overwhelms them, causing them to rather not change anything at all.

The gender ratio for the “Doubting Distressed” Type is slightly female dominated (53% are female). This type tends to live in more urban environments with 30% living within a large city, 13% in the outskirts of a large city or near a large city and 24% within a medium-sized city.

This behaviour type has the lowest percentage of people working full-time (48%) or part-time (10%) or retirees (15%) among all types. On the other hand, it has the highest percentage of housewives or househusbands (6%) and the highest percentage of unemployed people (10%). The number of students and pupils is rather high with 8% (same as “Fierce Forerunners” Type).

The household size is significantly higher than among the other behaviour types. 58% live in a household with three persons or more. The percentage of persons in need of care in the household is especially high (37%) and the monthly household income comparably low with 51% living on a budget of less than € 2,000. The monthly budget of 14% is below € 1,000 and of 20% below € 1,500.

The “Doubting Distressed” type stands out for having a particularly large number of young people. Nearly a quarter are less than 29 years old (24%), 17% are between 30 and 39 years old and 20% between 40 and 49 years old.

8.3.5 Type E - “Empathic Engagers” (25%)

The “Empathic Engagers” Type perceives climate change as a threat for everyone but is relatively unsure about the action options. It is a rather reactive type. As a result, these people are still relatively easily influenced and can be motivated to change their behaviour and support preventing measures and the necessary policies. They are actively involved in climate protection and adaptation in their communities, are self-confident and belong to the optimistic elite with their high ethical values.

The “Empathic Engagers” Type is very sensitive to being told how to live and likes to travel to faraway countries. This type supports the discussion on climate change and believes in rewards systems. These people are willing to restrict themselves and change habits and demand swift actions from policy makers. They are optimistic and trust in planned measures and technological developments. But at the same time, they are concerned about social inequalities that might be tied to measures taken. Therefore, it is important to them that measures are socially balanced and also protect the most vulnerable groups.

Type E (in the thought experiments) has the most understanding of change of all types. These people tend to adapt their lifestyle accordingly and consciously adopt climate-friendly behaviour and sometimes even see advantages from the changed situation. They may feel that their point of view is not sufficiently valued and feel offended by the inactivity of other groups. Only comparatively few respondents go completely into opposition and try to change the situation in their favour. Of course, the reaction varies depending on how severe the cut in habits is.

Given the results of the thought experiments, one can see that they do accept minor changes in their daily life more easily but are nonetheless sensitive to major ones. They want to find out whether measures set are the best ones before giving in to doing the greater good. This bears the risk, that the effect of some measures is overestimated if positive information is perceived more strongly out of a desire to make a positive contribution and more complex side effects tend to be ignored

Among all types, the “Empathic Engagers” Type is the most female dominated (55% are female). Together with the “Doubting Distressed” and “Fierce Forerunners” type, it is the most urban type with 31% living within a large city, 13% in the outskirts of a large city or near a large city and 22% within a medium-sized city.

This type has the second highest share of housewives/househusbands (5%) among all types and a rather high share of pupils/students (6%) and retirees (19%). Among the survey participants, 49% state to work full-time, 11% work part-time and 8% are unemployed. The second lowest share of single households (16%) can be found within the “Empathic Engagers” type. Apart from that, the number of people living in each household is quite average and 32% have minors or persons in need of care living with them.

The monthly household income is average with not too many high earners among them. Slightly above a quarter of them has a budget of € 3,000 or more per month. On the other end of the spectrum, 28% have a monthly household income below € 1,500.

It is a rather young type with all age cohorts equally represented and nearly half of them below 49 years (53%) and the other half 50 years old or above.

8.3.6 Type F - “Fierce Forerunners” (14%)

The “Fierce Forerunners” Type feels most threatened by climate change. Depending on the cultural context, they are more worried about implications during their lifespan or the life of the next generation. This type is most prone to activism and drastic behaviour changes in their lives. However, there is a wide range of fluctuations, and many are (still) optimistic and not very reactive. The acceptance of unpopular measures is most likely to be expected in this type, which is considered well-educated, responsible and ambitious.

The responses of the “Fierce Forerunners” Type to the general statements give the impression that they do support the discussion on climate change and are curious about the topic itself. They assume that there is hardly any time left and that our survival is endangered. Therefore, the willingness to restrict themselves and change habits is high and swift actions from policy makers are demanded.

Type F reacts most moderately next to Type E in the thought experiments. Here, too, there are some representatives who interpret measures as an encroachment on their personal freedom and therefore try to fight them fiercely. However, many people are sympathetic to changes for the benefit of the common good and may demand or support more effective, or even radical, measures, even if this means voluntarily sacrificing personal comfort. Due to their acute awareness of the urgency to act and out of a feeling of desperation, they may take provocative action and fight for change. However, the deadlock in implementation is increasingly wearing them down and frustrating them.

The “Fierce Forerunners” Type consists of 52% female participants with a tendency to live in urbanised areas such as large-cities (33%) to medium-sized cities (19%) and their outskirts (27%). Only 8% live in the countryside outside a town or village and 12% in a town or village without an adjoining medium-sized or larger city.

There are comparatively many pupils and students among them (8%). More than half of the survey participants work full-time, 11% part-time and 6% are unemployed. The share of housewives and househusbands is as low as for the types “Active Antagonists”, “Beneficent Believers” and “Concerned Compilers” (4% for each type). The number of retirees is quite average with 17%.

More than half of the “Fierce Forerunners” respondents live in a single- or two-person household (53%). This type has the lowest share of people in need of care within their households. Only 30% have minors or persons in need of care living with them.

The monthly household income is rather high with the lowest share of people with a budget below € 2,000 (33%). As many as 42% have a budget of € 3,000 or more per month. The share of young persons is comparatively high with 37% below 39 years and 18% in the age group 40-49 years. At the same time, the number of persons in the age group 60-75 is the second highest among all types with 27%.

8.4 Country Specifics

Although all Climate Impact Coping Types can be found in each of the involved countries, the composition of the national population differs regarding the sizes of the groups. This is also an indicator of the national awareness and existing experiences with climate impacts as well as potential societal divisions regarding climate threats and urgency for action. The results of the survey in Vietnam will be discussed later in the project in the course of Pathway transferability activities.

8.4.1 Austria

Half of the respondents in Austria are female. 59% are currently working. A quarter of the participants live in single households, 37% in households with two persons and 38% in households with three or more persons. In 27% of the households are persons in need of care.

More than half of the Austrians use a car with combustion engine (53%) most of the time, followed by public transport (25%). Non-motorized transport is used by 27%. Only 4% use an electric car.

The 998 respondents in Austria fall into the following categories:

Active Antagonists	11%
Beneficent Believers	12%
Concerned Compliers	27%
Doubting Distressed	14%
Empathic Engagers	17%
Fierce Forerunners	20%

29% of the respondents in Austria state that they talk about climate change at least several times a week with 5% talking about it daily. Interestingly, 24% within the “Beneficent Believers” Type are involved in regular climate change discussions.

In Austria, the “Fierce Forerunners” Type is the best educated, followed by the “Concerned Compliers” Type and the “Empathic Engagers” Type. The “Active Antagonists” Type has a strong inclination towards practical training, with 50% apprentices.

8.4.2 Germany

In Germany, 50% of the survey respondents are female. 56% belong to the working population which is a low percentage compared to the other participating countries. 27% live alone, 37% live with another person and 37% in households with three persons or more. 32% of the survey participants live with a person in need of care.

Nearly half of the Germans mostly use the car with combustion engine for their day-to-day journeys (49%). 17% use public transport and 17% walk on a regular basis. The percentage of those cycling is 11% which is rather high compared to other countries participating in the survey. 4% use the electric car frequently and 1% uses micro vehicles.

The 1,047 respondents in Germany fall into the following categories:

Active Antagonists	11%
Beneficent Believers	14%
Concerned Compliers	22%
Doubting Distressed	16%
Empathic Engagers	21%
Fierce Forerunners	17%

31% of the respondents in Germany state that they talk about climate change at least several times a week with 6% talking about it daily. 13% of the “Active Antagonists” type and 15% of the “Beneficent Believers” type discuss it several times a week.

In Germany, the “Fierce Forerunners” Type is very academically oriented. After all, 37% indicate having studied at a university, college, or technical college. Meanwhile, 16% of the “Active Antagonists” Type

have also studied, which is in the middle range. “Active Antagonists” and “Beneficent Believers” individuals have the highest proportion of people with further secondary education without an Abitur (38% and 40%).

8.4.3 Italy

In Italy, 51% of the 1,011 respondents are female. While the distribution by age group is even, 51% are currently working. 59% live in a household with three or more persons and 28% have persons in the household in need of care.

The mostly used means of transport include car with combustion engine (42%), on foot (28%) and public transport (13%). Only 5% use an electric car, 9% cycle and 3% use micro vehicles.

The 1,011 respondents in Italy fall into the following categories:

Active Antagonists	2%
Beneficent Believers	5%
Concerned Compliers	14%
Doubting Distressed	27%
Empathic Engagers	36%
Fierce Forerunners	16%

49% of the respondents in Italy state that they talk about climate change at least several times a week with 10% talking about it daily. Interestingly, 21% within the “Beneficent Believers” Type have regular climate change talks.

University education is relatively equally represented in Italy across all types. Among other forms of education, higher education is more prevalent among the “Beneficent Believers”, “Empathic Engagers”, and “Fierce Forerunners” Types.

8.4.4 Spain

Half of the 1,077 respondents in Spain are female. 63% belong to the working population which is rather high compared to the other participating countries (except Estonia). 63% live in households with three persons or more, 26% live together with another person and 11% in single households. 39% of the survey participants have persons in need of care at home.

A very high percentage of the respondents walks on a regular basis for most of the everyday journeys (38%). Nearly one third uses a car with combustion engine regularly and 24% use public transport. 3% use an electric car, 2% a bicycle or e-bike and another 2% micro vehicles most often.

The 1,077 respondents in Spain fall into the following categories:

Active Antagonists	4%
Beneficent Believers	9%
Concerned Compliers	10%
Doubting Distressed	37%
Empathic Engagers	31%
Fierce Forerunners	9%

40% of the respondents in Spain state that they talk about climate change at least several times a week with 9% talking about it daily. Within the types “Fierce Forerunners” and “Empathic Engagers” more than 50% have frequent discussions on climate change, followed by the “Concerned Compliers” and “Doubting Distressed” Types with more than 30%.

The “Active Antagonists” Type in Spain has a high education level (same tendency as for Croatia). More people have a university education than in any other type. A third of the “Active Antagonists” have a higher education compared to 30% of the “Fierce Forerunners” Type, 31% of the “Concerned Compliers” Type and the other types with less than a quarter. Primary education is highest among the “Doubting Distressed” Type (12%). High school is most prominent among the “Fierce Forerunners” Type with 32%.

8.4.5 Croatia

In Croatia, 51% of the 1,029 respondents are female and 59% account to the working population. 60% live in households with three or more persons and 27% live together with another person. 40% of the participants have people in need of care in their household.

The most used means of transport is the car with combustion engine (44% use it regularly). 27% of the respondents walk on most of their everyday journeys, 16% use public transport and 9% cycle. Only 1% uses micro vehicles.

The 1,029 respondents in Croatia fall into the following categories:

Active Antagonists	4%
Beneficent Believers	8%
Concerned Compliers	16%
Doubting Distressed	29%
Empathic Engagers	35%
Fierce Forerunners	8%

28% of the respondents in Croatia state that they talk about climate change at least several times a week with 8% talking about it daily. Surprisingly, the “Empathic Engagers” Type (38%) discusses climate change more frequently than the “Fierce Forerunners” Type (30%). Furthermore, 23% of the “Active Antagonists” Type and 15% of “Beneficent Believers” seem to have conversations on a weekly basis.

The “Active Antagonists” Type in Croatia stands out in terms of education level, as they are extremely well-educated. This is not the case in the other countries examined (except for Spain). Approximately one-third have completed a master's degree (30%) or even hold a doctorate.

The "Fierce Forerunners" Type, on the other hand, which is usually one of the best educated types in the other countries studied, is comparatively only very moderately well educated. About half have completed secondary education, a quarter have a diploma, 8% have a bachelor's degree, and 14% have a master's degree. The educational level of the other types is comparable to their equivalent type in other countries.

8.4.6 Estonia

53% of the 1,083 survey participants in Estonia are female. 69% are currently working which is high given the slightly higher percentage of very young (16-29 years old) and rather old (60-75 years old) age groups. 19% live in single households, 37% in households with two persons and 44% in households with three persons or more. 38% have persons in the household that need care.

The means of transport mostly used is the car with combustion engine (54% use it on a regular basis). 21% use public transport frequently and 21% walk regularly. 3% use the bicycle or e-bike for most of their everyday journeys. Only 1% uses an electric car and 1% micro vehicles.

The 1,083 respondents in Estonia fall into the following categories:

Active Antagonists	17%
Beneficent Believers	21%
Concerned Compliers	36%
Doubting Distressed	14%
Empathic Engagers	12%
Fierce Forerunners	13%

15% of the respondents in Estonia state that they talk about climate change at least several times a week with 2% talking about it daily. Only 33% of the “Fierce Forerunners” type discuss climate change regularly, which is quite low compared to this type in other countries.

The most educated types in Estonia are the “Fierce Forerunners”, “Empathic Engagers” and “Concerned Compliers” Types. The “Fierce Forerunners” Type has the largest proportion of doctorates and 31% with master's degrees.

9 Implementation and Usage of Typology and Behaviour Model

To apply the Climate Impact Coping Typology for a new survey, the statements in Table 2. must be included in the survey. To assign respondents to the types, the Euclidean distance of their response to the cluster centres is calculated and the respondents are assigned the type of the closest cluster centre. R code is supplied in the knowledge data base.

In addition, if a representative sample is collected for a region or country, the distribution of types within this region can be deduced from the survey results.

To apply the behaviour model to a new measure, the following steps have to be taken:

1. **Create a list of behavioural responses to the climate measure or climate risk:** For a given adaptation or mitigation measure, a list of behavioural responses is defined. As an example of these responses, the list of responses from the thought experiments can be used.
2. **Enumerate the behavioural responses according to the variables given in table:** Each behavioural response has to be assigned a value between -2 and 2 for each of the variables in Table 6 except for adjustment effort, where the value should be between 0 and 2. The variable assignment should be taken from the perspective of a person choosing that behavioural response. For example, if a person would choose a behavioural response that clearly works against climate mitigation, that even includes an element of working against the intended goal of the measure, the person might feel, that that behavioural response might have a positive value for societal benefits, since it might swing the mood in the society towards their intended goal. Once all the behavioural responses are enumerated, the model can be applied to the measure.
3. **Applying the behavioural model to an intended measure:** For each of the possible behavioural response apply the the logit model described in Section 7.2 to the enumeration. This results in a share of the response for each of the responses and each type. Using the share of types in the region, this can be used to calculate the overall behaviour responses of a population to the measure.

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Annex A: Data Summary

Data accessibility:

Survey Data will be made available on Zenodo, once the results and the Climate Coping Typology have been published.

Data interoperability:

Data is available in csv format. The data contains the survey data for each country as well as a legend file.

In addition, the cluster centers are provided together with R-code to extract the types from survey data.

Data reuse:

Survey data can be reused but a request for usage together with the intended purpose of use needs to be submitted to the responsible person at AIT.

The Coping Typology together with the statements are free to be applied in other surveys and studies. A guideline on how to use the Typology is supplied with the data together with an R-script to extract the types of respondents from survey data.

Security and Ethics:

No personal information was collected of the survey respondents, hence the work performed in this deliverable is not considered sensitive in terms of ethics or security.

The work performed in this deliverable is not considered sensitive in terms of ethics or security.

The work performed for this Deliverable are not considered sensitive in terms of ethics or security.

Table 11: Data used in preparation of KNOWING Deliverable D1.3

Dataset name	Format	Size	Owner & re-use conditions	Potential utility within & outside of KNOWING	Unique ID ⁵
Transnational survey data	Csv	3.18MB	Data will be supplied on request with clear outline of research question planned to be answered with data.	Large scale information on climate behaviour and believes.	10.5281/zenodo.11368615

⁵ Unique ID in the tables is typically an URI or DOI, e.g. a Zenodo DOI for KNOWING output.

Annex B: Ethics Considerations

Several relevant ethical areas for KNOWING were touched in preparation of this deliverable.

Human Participation:

This research involves human participants, including potentially **vulnerable individuals** or groups. Contacting of the survey respondents was subcontracted to a well-established Austrian market research institute and their cooperation partners in the other countries, based on their contact database. To obtain the needs and constraints experienced by vulnerable groups, the survey sample was composed of different social milieu groups. However, the collected data is used only in anonymised form and results are only provided in aggregated form.

- The authors hereby conform that: The project does not involve **children under the age of 14**, and minors over the age of 14 only participate with parental consent. The participation of the surveys is fully voluntary and involves people aged between 15-65 years.
- No **persons in dependent positions** are involved in the project, so there is no relationship of dependency between participants and the research partners.
- Data is only processed in **anonymised or pseudonymised** form.

Personal Data:

Within this research personal data of respondents was collected through surveys in WP1, subcontracted to a market research institute using their contact database. Surveys were conducted in Austria, Germany, Croatia, Italy, Spain, Estonia and Vietnam. Exchange of information and data with the stakeholders in Vietnam does not include any personal data.

The market research institute is responsible for maintaining respondents' contact details and ensuring that they are not used for secondary purposes.

Collection of sensitive personal data such as health, sexual lifestyle or religious conviction, is not part of the surveys. No sensitive personal data such as genetic, biometric, or health data are processed as part of the project.

Further, our data protection officer continuously checks the correct use of the data.

Fair Benefit Sharing:

Research activities involve participants from Vietnam, for testing and adjusting project outcomes. The exchange of information and data focusses primarily on socio-economic and environmental impacts without including sensitive personal data, except contact data maintained by the market research institute as previously described. The exchange of information and data with Vietnam as a follower case aims to test and adapt the resulting pathways to the local context.

A detailed strategy for fair benefit sharing with local citizens and stakeholders in Demonstrator and Follower Regions from lower-middle income countries such as Vietnam is specified in the Stakeholder Involvement Plan (D4.1) and the DEC Plan (D5.1).

Annex C: Questionnaire

ID	Awareness and behavioural status
F1A	To begin with, here are a few general statements that can be heard frequently. To what extent do you agree with the following statements?
F1A_1	Social and digital media are daily sources of information for me to form my opinion.
F1A_2	My life follows familiar and well-rehearsed routines, so I am hardly interested in other life alternatives.
F1A_3	Policies need to address broader social inequalities (e.g. support for poorer households, protection from disadvantage).
F1A_4	It annoys me when some people try to tell me how to live.
F1A_5	Measures that restrict people's freedom are not acceptable in a democracy.
F1A_6	The well-being of the people here and now is more important than that of future generations.
F1A_7	I love travelling to faraway countries to get to know other cultures and leave my everyday life behind for a while.
F1A_8	I try not to get too stressed by the numerous global crises - there are already enough challenges in my life.
F1A_9	I'm very interested in trendy products and like to buy the latest things, because I want to keep up with the times and like to be at the forefront.
F1A_10	I'm fascinated by technical progress - we can't even imagine today what will be possible in 10 years' time.
F1A_11	It is important to me that I can contribute to solving the big problems of the world - that is why I strive to make a positive contribution in my work and other activities.
F1A_12	I don't trust all the different "green" quality labels - it's just a marketing strategy anyway.
F1A_13	I would like to make my purchasing decisions much more consciously, but find it far too difficult and confusing to find trustworthy bases for the decision.
F1A_14	I don't have to have new things all the time and I'm happy to buy something second-hand once in a while; the consumerism craze tends to repulse me anyway.
1	<i>I fully agree</i>
2	<i>I agree for the most part</i>
3	<i>I disagree for the most part</i>
4	<i>I disagree completely</i>
F2	How often is climate change talked about in your environment (family, friends, work/education)?
	Daily or almost daily
	Several times a week
	A few times a month
	Rarer
	Never
F3	Do you think climate change is caused by natural processes, human activities, or both?
	Entirely through natural processes
	Mainly through natural processes
	Roughly equally due to natural processes and human activities
	Mainly through human activities
	Entirely through human activity
F4a	When people talk about climate change, how stressful do you find it most of the time?
	Very stressful, I worry a lot about it and am afraid of the consequences.

Rather burdensome, some things are worrying, but there is still hope.

Less stressful, I think we can handle that.

Not at all stressful, it's all totally exaggerated.

F4bA What effects do you think you personally will be more affected by in your living environment in the future?

Health impairments due to extreme heat

Habitat loss due to rising sea levels

Floods and mudflows due to extreme weather events

Water scarcity

Rising food prices

Rising energy prices

Very likely

Rather likely

Less likely

Unlikely

F5A How important is...?

The discussion around climate change

That policy makers take swift action against climate change

That we humans change our habits

That there are reward systems (incentives) for climate-friendly behaviour

Very important

Rather important

Less important

Not important at all

F6 Opinions differ on how radical and how quickly measures are necessary. What do you think? Which of the statements corresponds most closely to your opinion?

We need very effective and also unpopular measures very quickly in order to still make it, e.g. driving bans and consumption restrictions.

We will have to change our lifestyle significantly over time, but we have a few decades to do so.

If everyone changes a little now, we will certainly reach the climate targets.

We have enough time to develop technical solutions that stop climate change.

F7A To what extent do you agree with the following statements?

I rarely inform myself about sustainable alternatives in my areas of life, at most when a major purchase is pending (e.g. home renovation, car).

As I know that air travel is particularly harmful to the environment, I try to avoid flying as much as possible, even if the alternatives are sometimes more complicated and exhausting.

When it comes to products, I do pay attention to the ecological balance, but in the end it's still the price that decides.

I can't do without my favourite foods, unfortunately, so I'm worried that they might become much more expensive or even banned because they're not organic or unhealthy enough

I can't imagine that drastic measures can be enforced - in my circle of acquaintances, no one wants to give up their habits.

I think that far too little is being done for climate protection, which is why I am actively involved in it.

I believe that climate change is a massive challenge, but what can really be done no one knows for sure.

The consequences of climate change are already evident, so we need to adapt.

In my opinion, the data on the causes and consequences of climate change is very contradictory - you have to listen to all the arguments before you can form an opinion.

I am very sceptical about the arguments and demands regarding climate protection and fear that they are often a pretext for other interests.

I fear that there is hardly any chance left to curb climate change - people do not want to give up anything and too many other interests hinder real climate protection.

It annoys me that there is so much different information on climate change. It is far too complicated to find out what is really true.

I am very interested in topics such as sustainability, climate protection and adaptation measures.

I feel a great personal responsibility to mitigate climate change.

I avoid discussions about climate change, I think they are far too emotional and lead to no result anyway.

I think restricting myself for climate protection is completely pointless - it has no effect at all if I change.

I fully agree

I agree for the most part

I disagree for the most part

I disagree completely

Thought experiments

We will now describe possible developments in the future and their impact on everyday life. We ask you to put yourself in each situation, even if it has little to do with your actual situation. For each development, we describe different ways in which you can respond to such a situation.

Background

In the next few years, renewable energies, such as photovoltaics or wind power, will not yet be sufficiently available at peak times of electricity consumption. Imagine your electricity provider has a new pricing model: at times when there is a surplus of renewable energy, the price of electricity is lower and can even become negative (i.e. the costs incurred to date are reduced); when availability is scarce, electricity becomes more expensive because additional fossil fuels, such as gas or oil, have to be used.

F8A You can now see some ways of dealing with this pricing model. How likely is it that you personally will react in this way?

I am changing my lifestyle habits (e.g. washing laundry at different times) to optimise my annual electricity savings by up to 2x percent of the current costs with this tariff and recommend the pricing model to my acquaintances.

I accept the pricing model, but do not change my habits significantly and hope to achieve at least an annual saving of up to x percent.

I don't accept the pricing model because it's too complicated for me to always think about when I do what. In exchange, I also accept that I might have to pay up to x percent more for electricity per year.

I will definitely not accept the pricing model - I have the feeling that they want to manipulate me and I will definitely not let that happen, even if I have to pay up to 2x percent more.

I don't like either the old or the new pricing model, because it either puts me at risk of using fossil energy or tempts me to use even more energy to save money. I use as little electricity as possible anyway, generate my own energy as much as possible and aim to become independent of energy suppliers.

Very likely

More likely

Less likely

Unlikely

F9 How would you most likely react to the pricing model? Please choose the variant that you would most likely consider!

I change my lifestyle, save up to 2x percent of current costs per year, recommend the price model to others

I accept the price model, do not change my habits significantly and hope to save up to x per cent per year

I do not accept the price model, accept that I will pay up to x percent more per year.

I won't accept the price model under any circumstances, even if I have to pay up to 2x percent more.

I don't like either the old or the new pricing model, I want to become independent of energy suppliers.

F9a Which factors were critical for your decision?

Climate protection

Health

Justice

Cost

Convenience

Social commitment

Scepticism

Concern

Pragmatism

Compassion

Other: _____

F10A Due to the increasing risk of flooding, dams need to be extended and further flood protection measures taken. Imagine you own a house that has to make way for the newly defined flood zone. You receive a letter from the city announcing the planned relocation. The city can only pay you x% of the market value of your house as compensation.

You can now see some ways of dealing with this situation. How likely is it that you personally will react in this way?

I understand that this measure has to be set and that I have to accept a disadvantage in view of the higher threat to protect the general public, which I also try to explain to my neighbours, who are not enthusiastic. I will take the opportunity to look for a smaller and more sustainable home with the money, in order to contribute to climate protection in this way as well.

It is understandable to me that there must be such measures - but I do not see why I should be disadvantaged by this and am not prepared to accept this measure if I do not receive at least x+y% of the market value. I am trying to persuade my neighbours to join me in this effort.

I will not accept this under any circumstances and would only consider it, if at all, if I get the full market value plus z% of the value for the removal costs. I will also sue the city for this if necessary and invite my neighbours to join me.

That is out of the question for me at all. There are certainly other places where the dam and the flood plains can go than on my property of all places. I will fight this measure in the strongest possible terms until the city gives in and changes its plans.

I would first like to find out whether it is really the best way to enforce this measure in our country. I am organising a citizens' initiative at my own expense with like-minded people in order to better represent the concerns of those affected and especially to point out the social hardship that may result. In this way, we will try to find a compromise with the city on how flood protection can be achieved without causing social disadvantages.

Very likely

More likely

Less likely

Unlikely

F11 How would you most likely react to this situation? Please choose the option that would be most likely for you!

I understand that this measure must be taken and will look for a smaller and more sustainable home

I am not prepared to accept this measure unless I receive at least x+y% of the market value

I would only consider this if I get the full market value plus z% of the value for the removal costs

I will fight this measure tooth and nail until the city relents and changes its plans.

I want to find out first whether this is really the best way to enforce this measure in our area and am organising a citizens' initiative

F11a Which factors were critical for your decision?

Climate protection

Health

Justice

Cost

Convenience

Social commitment

Scepticism

Concern

Pragmatism

Compassion

Other: _____

F12A In the future, there will be more and more prolonged periods of heat. However, the massive use of air conditioning systems would place a heavy burden on the energy supplier network. It is therefore stipulated that the room temperature in public buildings may no longer be lowered below x degrees, except in rooms where vulnerable people (e.g. pregnant women, people with health problems) are present. Imagine you work in an office for a public service provider - how would you behave?

You can now see some ways of dealing with this situation. How likely is it that you personally will react in this way?

I know that the increased use of air conditioning leads to further problems and endangers climate protection, so I think this measure is reasonable. I even try to convince my roommates to only lower the temperature to x+y degrees and help ourselves in other ways, e.g. with lighter clothes or cool cloths.

I think it is unfair because it puts me and my colleagues at a disadvantage compared to people in the private sector. I am therefore trying to fight this regulation and mobilise the union, if necessary we threaten to strike and protest in the streets.

It is impossible for me to work under such conditions. I can only stand a maximum room temperature of x-z degrees, above that it is an imposition. If necessary, I would look for another job.

I try to get a doctor's certificate stating that such a temperature is dangerous to my health and that I am entitled to a lower temperature of at most x-y degrees. If that doesn't work, I at least try to be moved to a room with a vulnerable person.

I'll get a portable air conditioner and bring it to the workplace, I certainly won't let anyone tell me what to do. Maybe colleagues will even chip in with me for the cost.

Very likely

More likely

Less likely

Unlikely

F13 How would you most likely react to this situation? Please choose the option that would be most probable for you!

I think this is a reasonable measure and I even try to convince my room mates to lower the temperature to x+y degrees only

I try to fight this regulation and mobilise the union

I can only stand a room temperature of x-z degrees, if necessary I would look for another job.

I'm trying to get a doctor's certificate stating that I'm entitled to a lower temperature of no more than x-y degrees

I get a portable air conditioner and bring it to the workplace

F13a Which factors were critical for your decision?

Climate protection

Health

Justice

Cost

Convenience

Social commitment

Scepticism

Concern

Pragmatism

Compassion

Other: _____

F14A Food production in the future will be increasingly affected by crop failures. As a result, many familiar foods such as wheat products, various types of fruit and vegetables and meat will become much more expensive. Just a few years ago, an average weekly shop cost up to x% less than it does now. However, the government is supporting the agricultural sector in switching to other food sources and is promoting a balanced, healthy and ecologically conscious diet with alternative foods, e.g. from African or oriental cuisine.

You can now see some ways of dealing with this situation. How likely is it that you personally will react in this way?

I am happy because now I have more certainty that my diet not only be healthier, but also more ecological. And while I'm changing my diet, I'm also looking to see if I can't find even more tastes in cheaper alternatives that aren't so popular with others - that might even bring me back to the cost of what I used to buy.

I think about which favourite foods I don't want to give up and otherwise try to change. However, I would like to achieve at least a saving of y% with this change, even if I might not like everything so much at first.

I find it unacceptable that we can no longer maintain our food culture and I don't see why everyone who wants to should have to pay higher costs. Instead, I demand that measures be taken to preserve our food culture and that the farmers be supported in this. If necessary, the government will have to make savings in other areas.

I am massively concerned about the food situation and try to make provisions as far as possible in case my preferred foods are no longer available. I am therefore investing in larger food stocks for the future and am prepared to spend the equivalent of up to x weeks' shopping.

I cannot imagine that climate change should have such a big impact. I doubt very much that the changes have anything to do with it, but suspect that there are other interests behind it. I am trying to find out more and motivate others not to allow these serious interventions.

Very likely

More likely

Less likely

Unlikely

F15 How would you most likely react to this situation? Please choose the option that would be most probable for you!

I am happy about the changeover and am looking around for even cheaper alternatives in order to get back to the previous shopping costs

I'm thinking about which of my favourite foods I don't want to do without, but would like to save at least y%.

I find it unacceptable that we can no longer maintain our food culture

I am investing in larger food stocks for the future for the equivalent of up to x weeks' shopping

I am trying to find out more and motivate others not to allow these serious interventions.

F15a Which factors were critical for your decision?

Climate protection

Health

Justice

Cost

Convenience

Social commitment

Scepticism

Concern

Pragmatism

Compassion

Other: _____

Living environment

F16 Which means of transport do you use for most of your everyday journeys?

Car with combustion engine

Electric car

Public transport

Bicycle or e-bike

Micro vehicles (e.g. scooters)

on foot

F17A How do you live? Please select all options that apply to your main residence! (multiple answer)

In a block of flats

In a detached house

In an old building

In a new building

In a renovated building

For rent

Ownership

With electricity/heating from (largely) renewable energies

Sociodemographic information

F18 Please tell us your gender.

Male

Female

Other

I do not want to say

F19 Where do you live?

- Within a large city (e.g. federal or state capital)
- In the outskirts of a large city or near a large city
- Within a medium-sized city (e.g. district capital or industrial city)
- Near a medium-sized town
- In a town or village without an adjoining medium-sized or larger city
- In the countryside outside a town or village

F20 Please tell us your year of birth.

F21 What is your highest completed education?
[country-specific education categories]

F22 In which region do you live
[country-specific categories]

- F23 What is your current occupation? Are you...**
- Working full-time
 - In part-time work
 - In training
 - Pupil/Student
 - Housewife/Househusband
 - Retired
 - Unemployed
 - Other

F24 How many people live in your household (including yourself)?

F25 How many of them are in need of care (e.g. minors or persons in need of care)?

F26 What is your monthly household income?
[country-specific income categories]