Report on Survey Experiment

1. Introduction

A key activity of the ALMONDO project involves the design and implementation of an information provision experiment, aiming to understand and measure how contents shared on social media by different stakeholders affect individual beliefs on climate change. We achieve these objectives by assessing prior beliefs by means of questions collected from the relevant literature. Then, respondents are randomly assigned to one of three possible information provisions, consisting of real-life social media posts. After the information provision, we evaluate the posterior beliefs by means of questions related to prior ones. Finally, we add questions that invite the subject to perform real actions, to measure propensity to take an active stance on the relevant issue. Comparing how beliefs change from prior to posterior depending on the treatment, we can assess how beliefs change because of the information provision.

This report briefly summarizes the relevant literature and details the experimental protocol, the survey structure and its implementation, as well as the preliminary results from the first pilot study conducted

on a non-representative sample of respondents. This analysis is meant to shed light on the dynamics of climate-related opinions.

2. Literature Review

Survey experiments have been growing in popularity in the last years to investigate a wide range of topics in economics (Haaland et al., 2021), political science (Druckman et al., 2011) and in other domains. Climate change is no exception (McGrath, 2018). In particular information provision experiments, where researchers generate evidence by varying the subjects' information sets (Haaland et al., 2021), have shown to be an increasingly accepted tool to assess theories about the public's beliefs on climate change's existence and risk (Deryugina and Shurkov, 2016, Sanz-Menendez and Cruz-Castro 2019), scientific consensus (Van der Linden et al. 2015, Diamond et al. 2020), and related policy support (Douenne and Fabre, 2022, Tzamourani 2022), as well as in measuring the impact of misinformation (Benegal and Scruggs, 2018, Hardy and Jamieson, 2017, Van der Linden 2015).

Most studies find a significant effect of information provision on the targeted belief in the expected direction, but the size of the effect is highly heterogeneous both cross-sample within a single study and across studies. In what follows we review the main results in three specific areas of the literature: experiments that inform subjects about the scientific consensus on climate change, experiments that provide misinformation to respondents, and experiments that look at policy support.

Information provision about scientific consensus on climate change seems to be generally effective to shift the public's perception on the consensus itself and own personal beliefs on anthropogenic climate change, in line with the "Gateway Belief Model" (Lewandowsky et al, 2013, Deryugina and Shurkov, 2016, Cook and Lewandowski, 2016, Van der Linden et al. 2015, Kerr and Wilson 2018, Diamond et al. 2020). However, there is also evidence of no effects beyond the perception of consensus (Bolsen and Druckman, 2018, Bolsen et al. 2014, Dixon et al. 2017). Survey question structure and phrasing, source credibility, and communication style can have a significant impact on the size of the measured effect of the information (Sanz-Menendez and Cruz-Castro 2019, Schuldt et al 2015, Van der Linden et al 2014, Motta et al, 2019). Individual-specific factors such as ideologization and politicization can also affect the impact of the consensus statement across the population (Bolsen and Druckman, 2018). In contrast, Van der Linden et al 2018 find that a consensus statement induces convergence across the political spectrum by increasing perceived consensus for conservatives by a larger amount. Heterogeneity in impact can be driven also by subject characteristics other than ideology such as differences in education, media

exposure, or socio-demographics (Zhang et al. 2018). While a large part of information provision experiments focused on consensus statements and mainly textual information, Gustafson et al 2020 provided a treatment consisting in a real 90-second radio story on the effects of climate change, in order to capture the role of emotions in shifting beliefs. The study finds positive effects on global warming beliefs and risk perceptions.

Another important line of work studies the effects of climate misinformation and possible counters to those effects. Usually providing misinformation seems to lower significatively subjects' belief and commitment in fighting climate change (Benegal and Scruggs, 2018, Hardy and Jamieson, 2017, Van der Linden 2015). McCright et al. (2015) finds that the impact of misinformation on climate beliefs and climate policy support depends on political orientation, with conservatives more exposed than liberals. However, most of the studies find the effect of misinformation to be roughly equal among the populations of respondents. Regarding ways to counteract misinformation, "inoculation" techniques (where the misleading information is exposed as such by highlighting inconsistencies or political motivations) seem to be effective in neutralizing the impact of misinformation (Cook et al., 2017, Van der Linden et al., 2017). Benegal and Scruggs (2018) tested a misinformation-plus-correction statement design and found that correction statements from one's own political party are the most effective in balancing the effect of the misinformation treatment.

While most studies addressing beliefs over the reality of climate change find a significant treatment effect, albeit of varying size, the impact of information provision experiments on policy support and climate change mitigation behaviors seems much weaker. For example, Catner and Rolvering 2022 finds that providing information on carbon pricing and revenue recycling affects the beliefs and attitudes of the population on average over the policy but fails to change perceptions and policy support for climate skeptics and are in general heterogeneous across population subgroups. Conversely, Andre et al. 2021 find that providing information on the prevalence of climate-friendly behaviors among peers affects more strongly individuals who are skeptical about the existence and threat of global warming.

Deryugina and Shurkov, 2016 provide information on scientific consensus and find that the treatment affects beliefs on climate change but not policy stance or willingness to donate to climate change-related causes. Douenne and Fabre, 2022 find that an information treatment on a carbon tax and dividend policy scheme changes the subjects' support to the policy, but the shift is small.

Eliciting pre-treatment or prior beliefs together with posterior beliefs in information provision experiments can be advantageous to estimate heterogeneous treatment effects and can mitigate concerns about priming. However, they present the potential downside of generating stronger demand effects, consistency bias and can confuse the respondent (Haaland et al, 2021). In survey experiments about

Climate Beliefs, many scholars prefer not to elicit priors, thus relying solely on the difference between treatment and control group to measure treatment effects (Deryugina and Shurkov, 2016, Douenne and Fabre, 2022, Bolsen et al 2014, Bolsen and Druckman, 2018, McCright, 2015). Others instead propose pre-treatment questions that are identical to post-treatment ones (Van der Linden et al 2015, Van der Linden et al 2017, Diamond et al 2020, Zhang et al 2018, Kerr, Wilson 2018, Gustafson et al 2020). In this case, in order to mitigate the exposure of the respondents to researcher demand effects and consistency bias, most of these studies introduced neutral or unrelated information in the survey in order to increase the psychological distance of the subject between pre- and post- treatment belief assessment. However, no study surveyed on the subject tries to use a different elicitation mode for prior and posterior beliefs, an approach employed in survey experiments in economics (Coibion et al., 2019b, Haaland and Roth, 2021).

Studies vary as well in terms of questionnaire structure and how the outcome variables are measured. Studies focusing on scientific consensus information as treatment typically employ 0-100 scales (Van der Linden et al. 2015, Van der Linden et al. 2017, Kerr and Wilson, 2018), but Likert scales with five or seven outcomes are not uncommon in experiments that explore misinformation, framing or other research questions (Diamond et al. 2020, McCright et al, 2015, Bolsen et al. 2014, Bolsen and Druckman 2018). This heterogeneity can potentially have an impact on results comparability as it affects the measurement of beliefs (Schuldt et al. 2015, Motta et al., 2019).

Many information provision experiments involve presenting the treatment group with information about a topic, while a pure control group receives no information ("pure control" design). An alternative approach would involve providing both the treatment and control groups with different sets of information ("active control" design). In survey experiments on climate change, a large number of studies employ a pure control design (Douenne and Fabre, 2022, Bolsen and Druckman, 2018, Deryugina and Shurkov, 2016, Van der Linden et al 2015, Kerr, Wilson 2018), while just as many studies employ some sort of active control, either in the form of neutral or unrelated information (Diamond et al, 2020, McCright et al, 2015, Hardy and Jamieson 2017) or of performing a neutral cognitive task (Van der Linden et al 2017, Gustafson 2020, Zhang et al, 2018).

Studies also differ in terms of the specific treatment design. Most studies have opted for a text-only statement that is supposed to be simple to read and easy to understand (Van der Linden et al 2018, Zhang et al 2018, Bolsen and Druckman 2018). This is true in particular for studies focusing on scientific consensus-based information treatments: a typical example is a phrase similar to: "97% of climate scientists have concluded that human-caused climate change is happening". Occasionally, multiple treatment conditions are provided to distinguish between statements that are similar in content but

different in form. For example, Deryugina and Shurkov (2016) distinguish between an "hard" and a "soft" treatment (depending on how specific/general the provided information is), while Van der Linden et al. (2014) couple a consensus statement with a "metaphor" statement to test the effectiveness of metaphors to enhance the impact of the statement (for example: "If 97% of engineers concluded that a particular bridge is unsafe to cross, would you believe them? 97% of climate scientists have concluded that human-caused climate change is happening"). Other studies couples short text information with various kinds of infographics (Van der Linden et al. 2017, Cook and Lewandowski, 2016). A minority of the studies reviewed departed from this practice by providing information in different formats like real world newspaper articles (Hardy and Jamieson, 2017), videos (Van der Linden, 2015), or radio stories (Gustafson et al 2020).

In general, studies do not try to assess to what extent the information provided and its source are perceived as credible (with the exception of Deryugina and Shurkov, 2016), even though there is evidence of the fact that source credibility affects treatment effect (Sanz-Menendez and Cruz-Castro 2019).

The literature on survey experiments on climate change beliefs is rich and quickly expanding. It displays a high degree of heterogeneity both in terms of design choices (belief elicitation strategy, questionnaire structure, control and treatment design) and results. Generally, studies find a significant treatment effect on climate beliefs in the expected direction, but the effect size varies across studies and across population subgroups. Moreover, it is unclear whether a shift in beliefs about the reality of anthropogenic climate change has a direct link with climate policy support and commitment to fight climate change, which seems relatively unaffected by the information treatment.

3. Experimental protocol, survey structure and survey implementation

Our survey experiment on climate change beliefs is structured as an information provision experiment, with the objective of understanding and measuring how content shared on social media by different stakeholders affects individual beliefs on climate change.

First, the questionnaire administers three questions with the aim to assess the respondent's socio-demographic background. Next, the subject's beliefs on the existence and relevance of Anthropogenic Climate Change are elicited, both before and after an information provision treatment. In order to avoid researcher-demand effects, priming or other sources of bias, the questions posed after the treatment are worded differently than before treatment. The treatment consists in social media posts dealing with Climate Change. Respondents are randomized into three different treatment groups. One group is

exposed to content stressing the impact of climate change and the role played by humans. A second group is shown content that is dismissive of the climate crisis and minimizes the role of human activities. The third group is exposed to non-climate related material and acts as an active control. In order to avoid researcher-demand biases in those assigned to control, some additional questions on a non-related topic are assigned, both pre- and post- treatment.

More in detail, the survey consists of seven blocks. The first block introduces the survey, presents the consent form for personal data usage, provides data protection and privacy details, asks three demographic questions, and defines the concepts of climate change and gender pay gap. The second block consists of seven questions regarding the respondent's opinion on a given statement. Five of those items focus on climate change, while two on an unrelated topic (gender roles and gender equality). The purpose of those two questions is to mask possible researcher demand effects for the subjects assigned to the active control group, which will be exposed to social media content related to the same gender related themes. The main purpose of this survey block is to assess the prior beliefs of respondents on the reality, anthropogenic nature and urgency of climate change. After answering the questions of the second block, the respondent is randomly assigned to one among the three groups for the information provision (labeled "IPCC", "CO2", "EIGE").

The third, fourth, and fifth block introduce and present the information treatments. These blocks have the same structure: a first introductory page describing the organization and three posts shared on social media via their official accounts. Each post is on a different page with a few explanatory points.

The IPCC treatment shows content posted on social media by the Intergovernmental Panel on Climate Change (IPCC), a United Nations body for assessing the science related to climate change. This information treatment is expected to shift opinions towards the current scientific consensus (i.e., that climate change is real, related to human activities) and increase support for green policies.

The CO2 treatment displays content posted on social media by the CO2 Coalition, a non-profit organization dismissing the climate crisis and arguing that the increase of carbon dioxide in the atmosphere has positive effects. This second information treatment is expected to shift opinions in the direction of larger skepticism in the current scientific consensus and decrease support for climate-related policies.

Finally, the EIGE treatment shows content posted from the European Institute for Gender Equality (EIGE) on the issue of the Gender Pay Gap, a topic unrelated to climate change. This third assignment is expected to work as an active control, with no significant effect on climate-related opinions.

After the information treatment is administered, posterior beliefs are collected. The sixth block of the questionnaire contains four questions on climate related topics aimed at assessing in an indirect way climate change opinions as well as two questions related to gender roles. The final block contains two questions (one on the reality of climate change and one on its human-induced nature) that are rephrased versions of those asked before the information provision, in order to measure the shift in beliefs induced by the treatment, two questions that involve real actions, and three standard questions on the quality of the survey. The two questions involving real actions concern choosing a post to be shared and a petition to sign and to donate to.

At the moment of the writing, the survey has been administered to a smaller fraction of the representative panel in order to test for possible sources of bias, confusion or distortion among respondents. Preliminary results are therefore not robust and will be updated in the next steps of the implementation phase.
By the end of the implementation phase, the survey will be administered to a representative sample of the general Italian population between 18 and 64 years of age, stratified by age, gender, geographical macro-area, educational qualification (graduates vs. non-graduates) and employment status (employed vs. not employed). Given the nature of the survey experiment of the study, the only available technique to reach respondents is by means of Computer Assisted Web Interviewing (CAWI). The panel of respondents is estimated to be around 2000 units and it is being provided by a private company (SWG).

4. Descriptive statistics

a. Demographics

In the pilot study, the survey was administered to a total of 607 individuals, constituting about 30% of the target sample size. Out of these, 574 (94.5%) carried on the survey until the end, while the rest were screened out, or failed to complete it. Questionnaires were carried out on average in less than 6.6 minutes. Of the subjects who finished the questionnaire, 248 (43.7%) were males, while 323 (56.3%) females, while 3 individuals identified themselves as non-binary (Figure 1). Our sample presents a median age of 48 years, slightly older than the Italian general population.
The reported household income distribution is depicted in Figure 2. The modal outcome for this item is the bracket 25.000-49.999€, more or less in line with the income distribution for households in Italy (the median income for Italian households is around 30.000€).

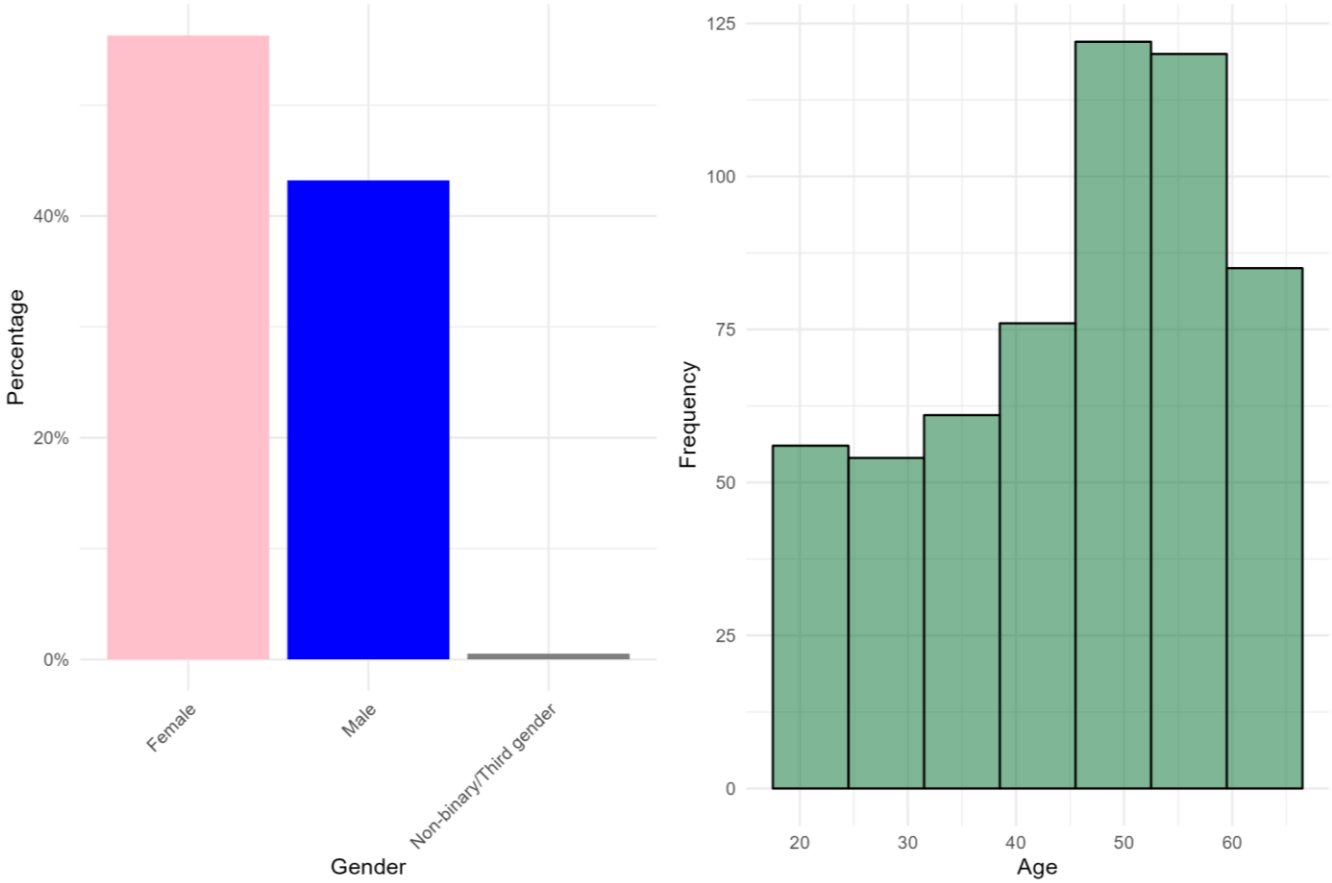

Figure 1: Sample distribution by Gender (left) and Age (right).

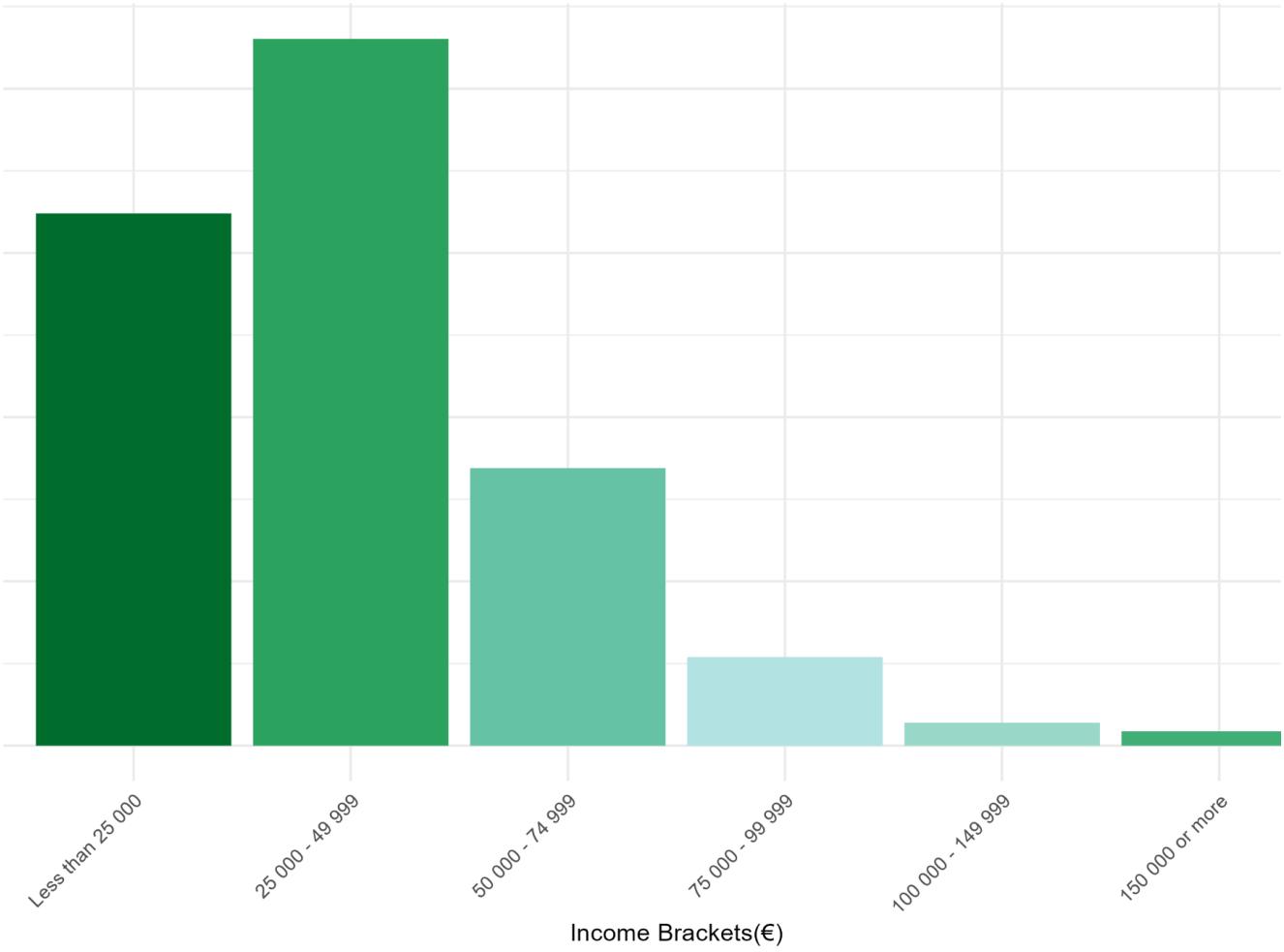

Figure 2: Sample distribution by household income brackets

b. Prior beliefs

In terms of prior beliefs, the overwhelming majority of the sample seems to be sensitive to the issue of climate change and aware of the impact of climate change on their lives. On average, respondents strongly believe that climate change is real, are convinced that climate change will bring mostly negative consequences, and that it brings short term consequences (Figure 3). Moreover, they are on average convinced that human activities are a major cause of climate change, and that their local area will be influenced to some degree by climate change (Figure 4). Between-group differences across treatment groups are small. Nevertheless, it is important to note that there is a small minority of respondents (around 10%) that is skeptical about the existence, relevance and human-relatedness of Climate Change.

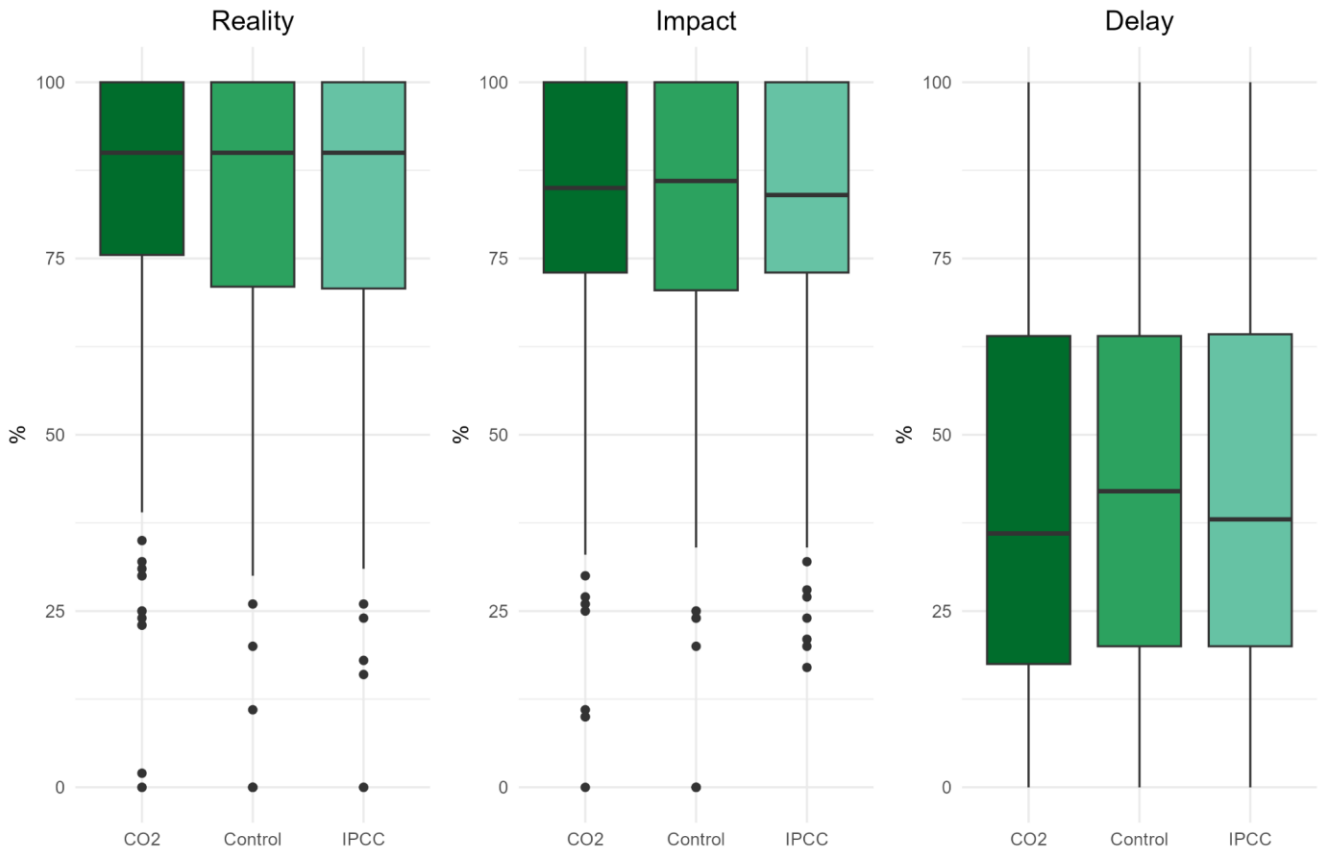

Figure 3: Agreement on a 0-100 scale to the statements: "I believe that climate change is real" (left), "Overall, climate change will bring more negative than positive consequences to the world" (center), and "The consequences of climate change will only be experienced in the far future" (right). The box covers the middle 50% (IQR) with the median as a horizontal line, whiskers span typical values (within 1.5 times the IQR), and dots represent outliers.

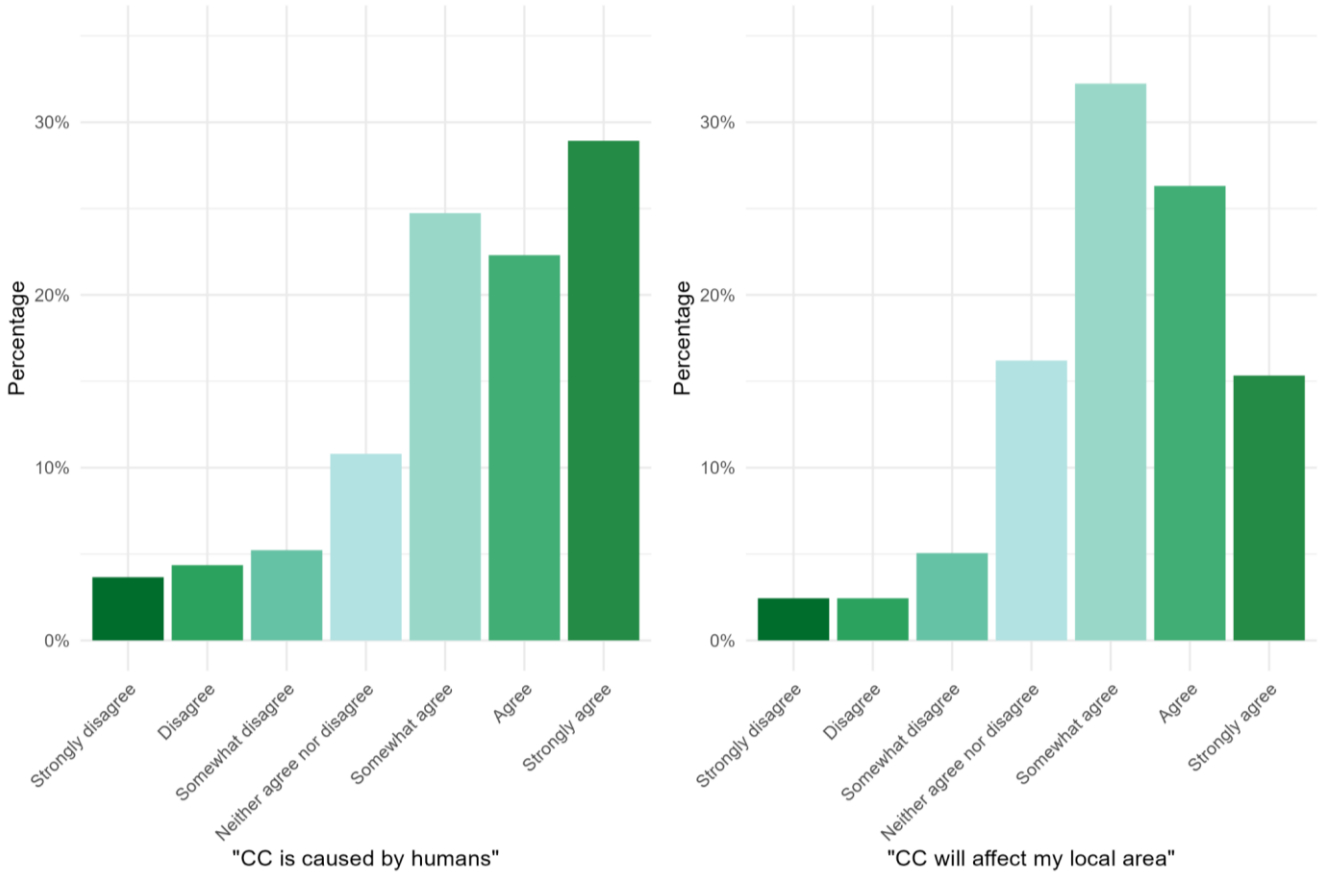

Figure 4: Opinions on a 7-item likert scale on the statements: "Human activities are a major cause of climate change" (left) and "My local area will be influenced by climate change" (right)

c. Posterior beliefs

Despite the general widespread belief that anthropogenic climate change is a real, important and urgent problem, policy support for climate policy measures such as the carbon tax is relatively mild, with a median support of 50/100 across the all treatment groups (Figure 5), and no significant differences across treatment groups. This suggests that policy support may not be strictly related to climate beliefs, a result that is found also in the existing literature. Median support for improving vital infrastructure resilience is higher, but still homogeneous over all three groups.

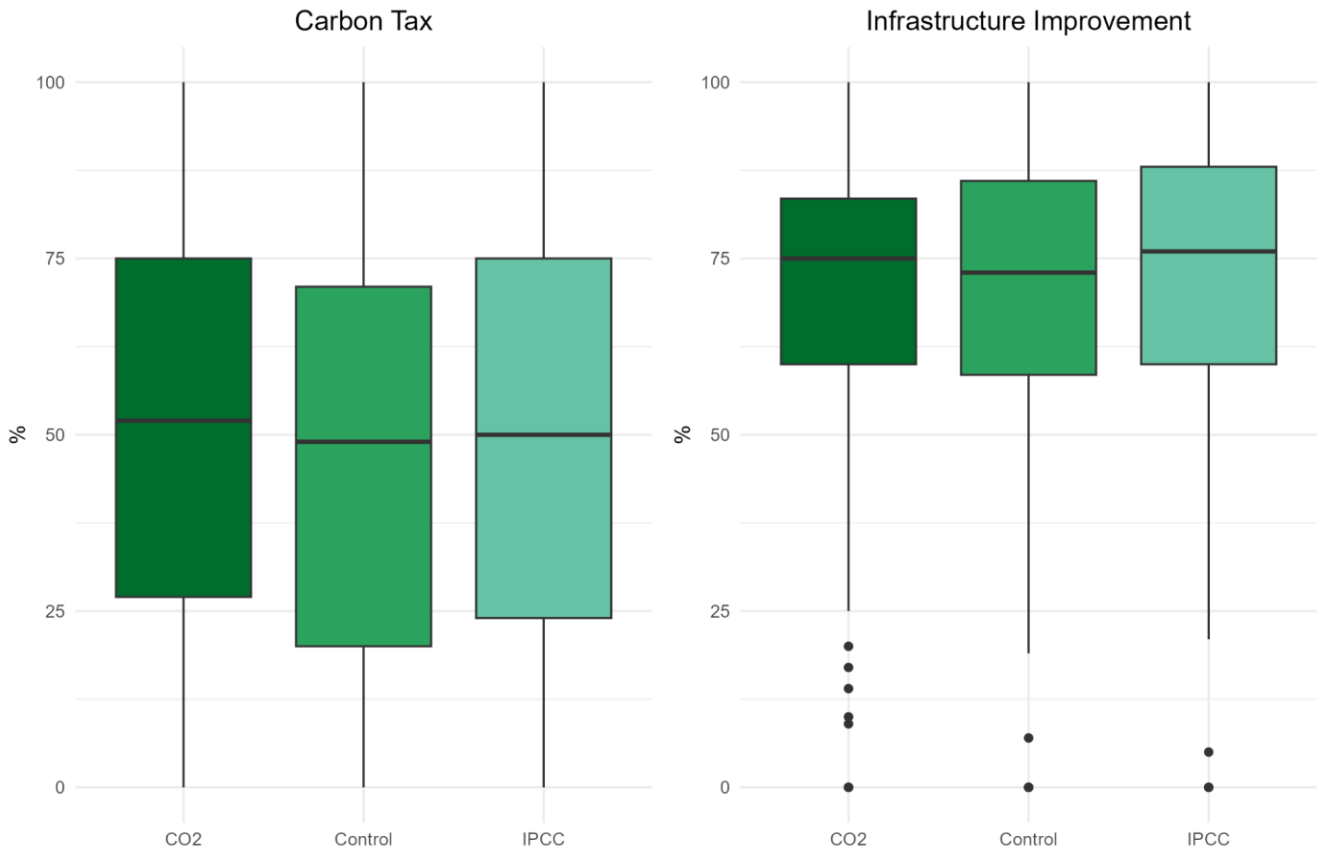

Figure 5: Support on a 0-100 scale to the policies: “"Increasing taxes on fossil fuels, such as oil, gas, and coal"”(left), and “ "Investing public money to make vital infrastructure (for example, energy utilities, power lines, cell towers) more resistant to climate change risks” (right).

As is shown in Figure 6, posterior beliefs on the existence of climate change, elicited by question Q14 (Climate change is NOT occurring), are somewhat different between the three groups. The IPCC treatment group exhibits the lowest mean support to the statement (16.6 %) versus a mean support of 21.4% for the control group and 25.2% for the CO2 group. The three groups express similar beliefs that climate change is a human-caused activity (Figure 6, right panel) with no clear difference across groups. However, people that belong to the CO2 treatment group seem to express less sharp opinions with respect to the other two groups, with the share of “Strongly Agree” about 5% smaller than the overall average.

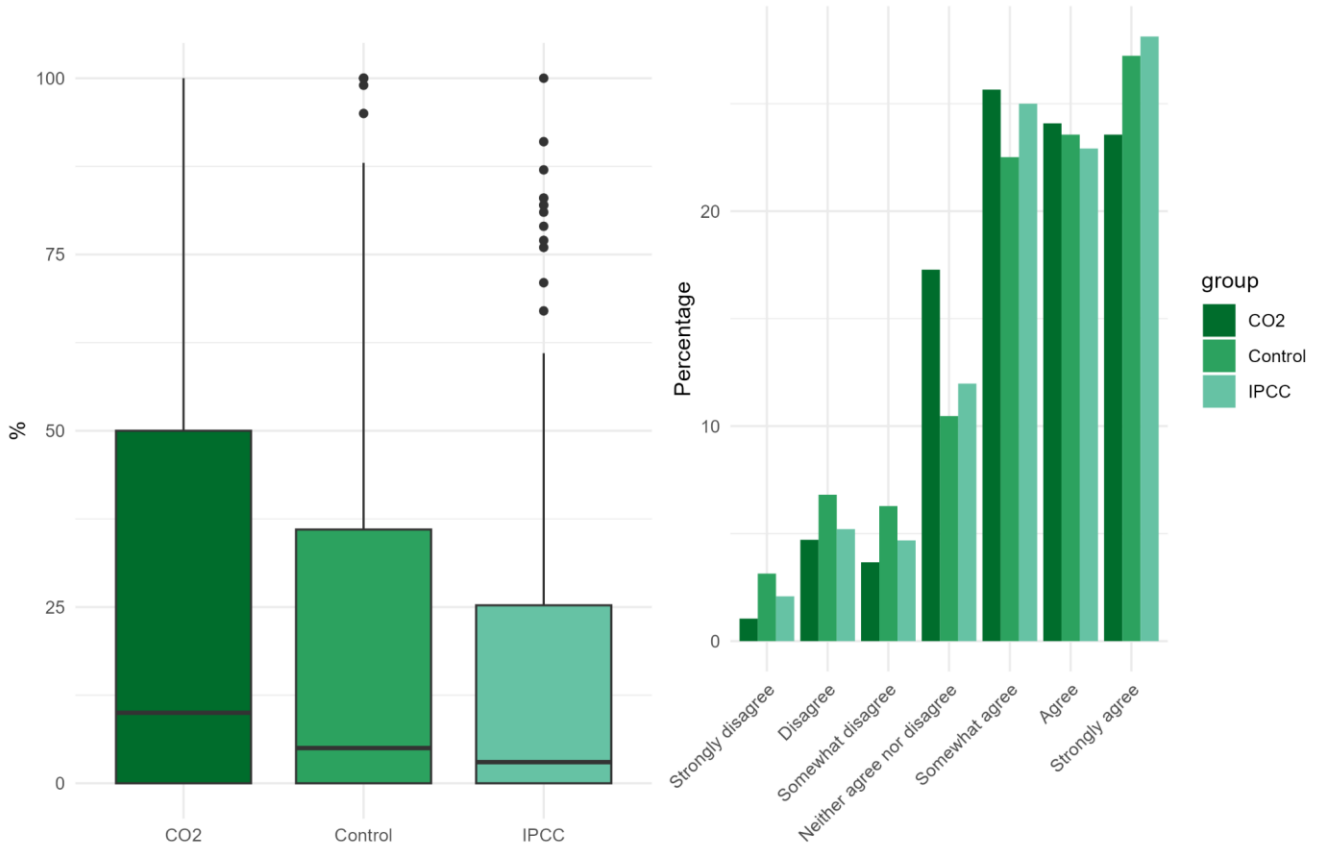

Figure 6: Agreement on a 0-100 scale to the statements: "Climate Change is NOT occurring" (left), opinions on a 7-item likert scale on the statements: "The main causes of Climate Change are Human activities" (right).

d. Action engagement

Finally, we investigate whether respondents would be ready to engage in a concrete action to support the fight against climate change. Results are reported in Figure 7. The first action is to share social media content on their profiles between EIGE, IPCC or CO2 coalition posts. Here there seems to be a trend by participants to share the same type of content that they were exposed to, even though the distributions conditional on treatment assignment are still too similar to claim statistical significance.

Similarly, we ask respondents whether they would be willing to sign a petition. Three alternatives are provided: a climate change-related petition (calling governments to take steps to tackle the climate change challenge), labeled "COP26", a gender gap-related petition, labeled "Gender Gap", or None. In this case, values are very similar across all three groups.

Finally, we ask respondents whether they would be willing to donate a sum up to 50€ to the petition they signed for. The distributions are very similar across treatment groups.

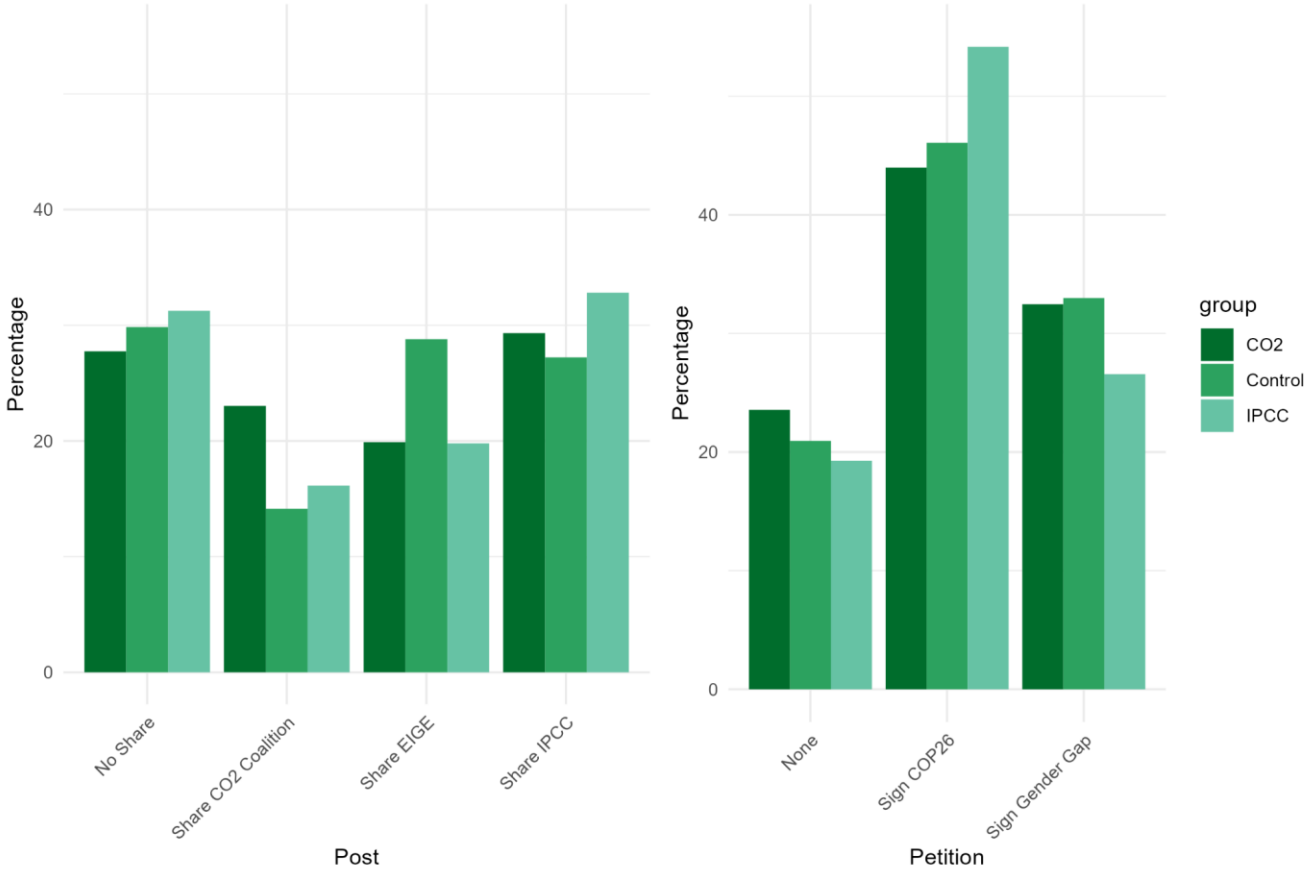

Figure 7: Willingness to share social media content (left) and sign petition (right) by treatment group

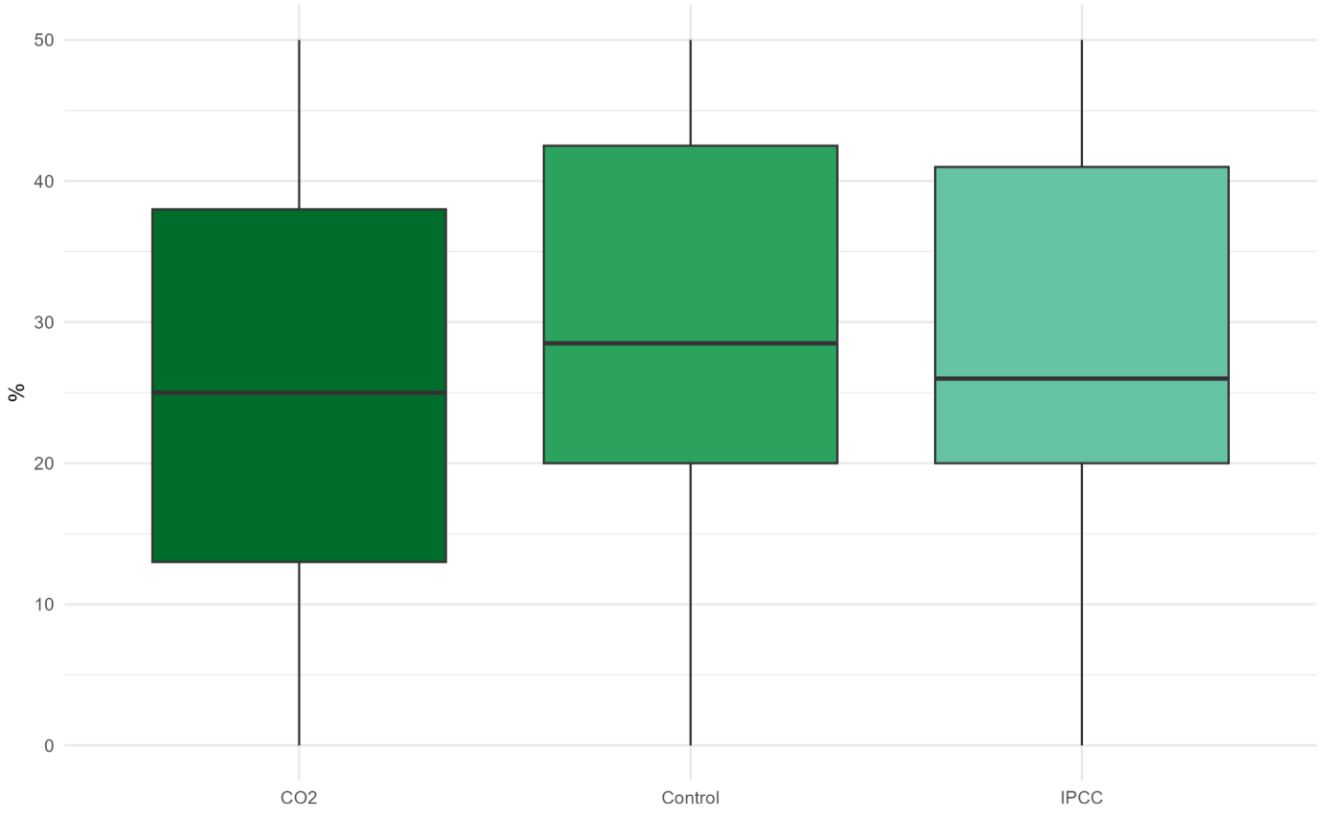

Figure 8: Willingness to donate to the signed petition

5. Concluding remarks

The ALMONDO project aims to provide valuable insights into the mechanisms by which social media content influences individual beliefs about climate change. Through the experimental protocol outlined in this report, we have established a robust framework for assessing the impact of different types of information provision on prior beliefs, as well as the propensity to take action on climate issues.

The preliminary results from the pilot study, while based on a small sample, offer promising suggestions for further analysis as the project progresses and more comprehensive data is collected. At the current stage, some differences emerge between treatment groups with respect to their beliefs on climate change, but no clear effect is registered in terms of policy support or behaviour, in line with existing literature.

Future work will aim to expand the sample size through the help of a private panel provider, and examine the effects of social media exposure on climate-related beliefs and behaviors. By understanding these

dynamics more deeply, the ALMONDO project will contribute to a better understanding of how information provision can influence public engagement with climate change issues, ultimately guiding more effective communication strategies for climate action.

Bibliography

Andre, Peter, Teodora Boneva, Felix Chopra, and Armin Falk. 2021. “Fighting Climate Change: The Role of Norms, Preferences, and Moral Values.”

Beiser-McGrath, Liam F., and Thomas Bernauer. 2021. “Current Surveys May Underestimate Climate Change Skepticism Evidence from List Experiments in Germany and the USA.” Edited by Bidhubhusan Mahapatra. *PLOS ONE* 16 (7): e0251034. https://doi.org/10.1371/journal.pone.0251034.

Benegal, Salil D., and Lyle A. Scruggs. 2018. “Correcting Misinformation about Climate Change: The Impact of Partisanship in an Experimental Setting.” *Climatic Change* 148 (1–2): 61–80. https://doi.org/10.1007/s10584-018-2192-4.

Bolsen, Toby, and James N. Druckman. 2018. “Do Partisanship and Politicization Undermine the Impact of a Scientific Consensus Message about Climate Change?” *Group Processes & Intergroup Relations* 21 (3): 389–402. https://doi.org/10.1177/1368430217737855.

Bolsen, Toby, Thomas J. Leeper, and Matthew A. Shapiro. 2014. “Doing What Others Do: Norms, Science, and Collective Action on Global Warming.” *American Politics Research* 42 (1): 65–89. https://doi.org/10.1177/1532673X13484173.

Cantner, Fabienne, and Geske Rolvering. n.d. “Does Information Help to Overcome Public Resistance to Carbon Prices? Evidence from an Information Provision Experiment.”

Cook, John, and Stephan Lewandowsky. 2016. “Rational Irrationality: Modeling Climate Change Belief Polarization Using Bayesian Networks.” *Topics in Cognitive Science* 8 (1): 160–79. https://doi.org/10.1111/tops.12186.

Cook, John, Stephan Lewandowsky, and Ullrich K. H. Ecker. 2017. “Neutralizing Misinformation through Inoculation: Exposing Misleading Argumentation Techniques Reduces Their Influence.” Edited by Emmanuel Manalo. *PLOS ONE* 12 (5): e0175799. https://doi.org/10.1371/journal.pone.0175799.

Cook, John, Naomi Oreskes, Peter T Doran, William R L Anderegg, Bart Verheggen, Ed W Maibach, J Stuart Carlton, et al. 2016. “Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming.” *Environmental Research Letters* 11 (4): 048002. https://doi.org/10.1088/1748-9326/11/4/048002.

Deryugina, Tatyana, and Olga Shurchkov. 2016. “The Effect of Information Provision on Public Consensus about Climate Change.” Edited by Judi Hewitt. *PLOS ONE* 11 (4): e0151469. https://doi.org/10.1371/journal.pone.0151469.

Diamond, Emily, Thomas Bernauer, and Frederick Mayer. 2020. “Does Providing Scientific Information Affect Climate Change and GMO Policy Preferences of the Mass Public? Insights from Survey Experiments in Germany and the United States.” *Environmental Politics* 29 (7): 1199–1218. https://doi.org/10.1080/09644016.2020.1740547.

Dixon, Graham, Jay Hmielowski, and Yanni Ma. 2017. “Improving Climate Change Acceptance Among U.S. Conservatives Through Value-Based Message Targeting.” *Science Communication* 39 (4): 520–34. https://doi.org/10.1177/1075547017715473.

Douenne, Thomas, and Adrien Fabre. 2022. “Yellow Vests, Pessimistic Beliefs, and Carbon Tax Aversion.” *American Economic Journal: Economic Policy* 14 (1): 81–110. https://doi.org/10.1257/pol.20200092.

Drews, Stefan, and Jeroen C.J.M. Van Den Bergh. 2016. “What Explains Public Support for Climate Policies? A Review of Empirical and Experimental Studies.” *Climate Policy* 16 (7): 855–76. https://doi.org/10.1080/14693062.2015.1058240.

Gustafson, Abel. n.d. “Personal Stories Can Change Climate Change Beliefs and Attitudes: The Mediating Role of Emotion.”

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart. n.d. “Designing Information Provision Experiments.”

Hardy, Bruce W., and Kathleen Hall Jamieson. 2017. “Overcoming Endpoint Bias in Climate Change Communication: The Case of Arctic Sea Ice Trends.” *Environmental Communication* 11 (2): 205–17. https://doi.org/10.1080/17524032.2016.1241814.

Kerr, John R., and Marc Stewart Wilson. 2018. “Changes in Perceived Scientific Consensus Shift Beliefs about Climate Change and GM Food Safety.” Edited by Jonathan Jong. *PLOS ONE* 13 (7): e0200295. https://doi.org/10.1371/journal.pone.0200295.

Lewandowsky, Stephan, Gilles E. Gignac, and Samuel Vaughan. 2013. “The Pivotal Role of Perceived Scientific Consensus in Acceptance of Science.” *Nature Climate Change* 3 (4): 399–404. https://doi.org/10.1038/nclimate1720.

Linden, Sander Van Der, Anthony Leiserowitz, and Edward Maibach. 2017. “Scientific Agreement Can Neutralize Politicization of Facts.” *Nature Human Behaviour* 2 (1): 2–3. https://doi.org/10.1038/s41562-017-0259-2.

McCright, Aaron M., Meghan Charters, Katherine Dentzman, and Thomas Dietz. 2016. “Examining the Effectiveness of Climate Change Frames in the Face of a Climate Change Denial Counter-Frame.” *Topics in Cognitive Science* 8 (1): 76–97. https://doi.org/10.1111/tops.12171.

McGrath, Mary C. 2021. “Experiments on Problems of Climate Change.” In *Advances in Experimental Political Science*, edited by James Druckman and Donald P. Green, 1st ed., 592–615. Cambridge University Press. https://doi.org/10.1017/9781108777919.039.

Motta, Matthew, Daniel Chapman, Dominik Stecula, and Kathryn Haglin. 2019. “An Experimental Examination of Measurement Disparities in Public Climate Change Beliefs.” *Climatic Change* 154 (1–2): 37–47. https://doi.org/10.1007/s10584-019-02406-9.

Nai, Alessandro, Yves Schemeil, and Jean-Louis Marie. 2017. “Anxiety, Sophistication, and Resistance to Persuasion: Evidence from a Quasi-Experimental Survey on Global Climate Change.” *Political Psychology* 38 (1): 137–56. https://doi.org/10.1111/pops.12331.

Peterson, Erik, and Shanto Iyengar. 2020. “Replication Data for: Partisan Gaps in Political Information and Information-Seeking Behavior: Motivated Reasoning or Cheerleading?” Harvard Dataverse. https://doi.org/10.7910/DVN/6SRI9K.

Sanz-Menéndez, Luis, and Laura Cruz-Castro. 2019. “The Credibility of Scientific Communication Sources Regarding Climate Change: A Population-Based Survey Experiment.” *Public Understanding of Science* 28 (5): 534–53. https://doi.org/10.1177/0963662519840946.

Schuldt, Jonathon P., Sungjong Roh, and Norbert Schwarz. 2015. “Questionnaire Design Effects in Climate Change Surveys: Implications for the Partisan Divide.” *The ANNALS of the American Academy of Political and Social Science* 658 (1): 67–85. https://doi.org/10.1177/0002716214555066.

Tvinnereim, Endre, Ole Martin Lægreid, Xiaozi Liu, Daigee Shaw, Christopher Borick, and Erick Lachapelle. 2020. "Climate Change Risk Perceptions and the Problem of Scale: Evidence from Cross-National Survey Experiments." *Environmental Politics* 29 (7): 1178–98. https://doi.org/10.1080/09644016.2019.1708538.

Tzamourani, Panagiota. 2022. "Climate Change Concerns and Actions – Can Provision of Information Motivate People to Fight Climate Change?"

Van Der Linden, Sander. 2015. "The Conspiracy-Effect: Exposure to Conspiracy Theories (about Global Warming) Decreases pro-Social Behavior and Science Acceptance." *Personality and Individual Differences* 87 (December):171–73. https://doi.org/10.1016/j.paid.2015.07.045.

Van Der Linden, Sander L., Anthony A. Leiserowitz, Geoffrey D. Feinberg, and Edward W. Maibach. 2014. "How to Communicate the Scientific Consensus on Climate Change: Plain Facts, Pie Charts or Metaphors?" *Climatic Change* 126 (1–2): 255–62. https://doi.org/10.1007/s10584-014-1190-4.

———. 2015. "The Scientific Consensus on Climate Change as a Gateway Belief: Experimental Evidence." Edited by Kristie L Ebi. *PLOS ONE* 10 (2): e0118489. https://doi.org/10.1371/journal.pone.0118489.

Van Der Linden, Sander, Anthony Leiserowitz, Seth Rosenthal, and Edward Maibach. 2017. "Inoculating the Public against Misinformation about Climate Change." *Global Challenges* 1 (2): 1600008. https://doi.org/10.1002/gch2.201600008.

Van Valkengoed, A. M., Steg, L., & Perlaviciute, G. (2021). Development and validation of a climate change perceptions scale. Journal of Environmental Psychology, 76, 101652.

Zhang, Baobao, Sander Van Der Linden, Matto Mildenberger, Jennifer R. Marlon, Peter D. Howe, and Anthony Leiserowitz. 2018. "Experimental Effects of Climate Messages Vary Geographically." *Nature Climate Change* 8 (5): 370–74. https://doi.org/10.1038/s41558-018-0122-0.