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Lights out alert: Evidence-based communication strategies to prepare for energy shortages

Nicolás Curotto [a,*], Marianne Moreira [b,c], Rodrigo Moreno [c,d], Daniel Schwartz [c,e]

[a] Faculty of Physical and Mathematical Sciences, University of Chile, Santiago, Chile
[b] Department of Economics, Norwegian School of Economics, Bergen, Norway
[c] Instituto Sistemas Complejos de Ingeniería (ISCI), Santiago, Chile
[d] Department of Electrical Engineering, University of Chile, Santiago, Chile
[e] Department of Industrial Engineering, University of Chile, Santiago, Chile

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ABSTRACT

Amid escalating risks of energy shortages driven by climate change and sociopolitical instability, effective risk communication strategies are essential for fostering public cooperation in energy-saving initiatives. This study investigates how the design of energy risk communication campaigns can influence public response. Drawing on a behavioral decision framework, we conducted large-scale, randomized online experiments in the UK (N = 3,836) and Chile (N = 2,607) during periods of potential energy shortages. We tested four key factors influencing the impact of energy risk communication campaigns: the framing of the crisis's cause (local vs. global), the credibility and role of the message source, the emphasis on specific energy-saving actions, and the underlying motivations driving household actions (economic, environmental, or social). Our findings indicate that messages emphasizing locally controllable causes, such as domestic energy policies, can enhance willingness to save energy. In the UK, which is geographically closer to the Ukraine–Russia war, framing the cause of the crisis around the conflict also proves particularly effective. Government-sourced messages that highlight specific industry efforts to mitigate the crisis improve public perceptions of institutions. Campaigns focusing on high-impact energy-saving recommendations are more effective in encouraging commitment to saving energy than a mixed approach. Prosocial messages that frame energy saving as preventing blackouts increase risk awareness but do not outperform messages framed around saving money in terms of energy-saving intentions. These insights underscore the need for targeted, contextually relevant risk communication strategies and offer policymakers valuable guidance for improving public response and engagement in preparation for energy crises.

1. Introduction

In recent years, electricity security has escalated in importance for many countries [3–5], with the risk of widespread power outages increasingly recognized as a critical threat [6–11]. These security challenges stem from a combination of factors, including inadequate supply infrastructure—encompassing generation and distribution networks—compounded by growing demand, climate change, and sociopolitical conflicts. These challenges, coupled with the gradual phasing out of conventional fossil-fuel-based generation, present significant difficulties in maintaining electricity security.[1]

Power outages can severely disrupt production processes and economic activities [12]; public safety and health services [13]; and everyday life [14]. In this regard, preparing the public for potential power outages or blackouts through effective risk communication is critical to managing a possible crisis [13,15,16].

Effective risk communication of energy policies is essential to inform and prepare the public, particularly as these policies might involve complex technical and behavioral considerations [13,17]. Moreover, recent evidence from several countries indicates that public opinion of Governments and public officials is highly susceptible to how potential energy shortages are communicated and managed [18–21].

* Corresponding author.
E-mail address: ncurottoe@gmail.com (N. Curotto).

[1] This may also be partially driven by the decline of various energy sources. For example, in the UK, some analysts have warned that as existing nuclear power plants retire, and the construction of new ones is delayed, the upcoming winters may see a significant risk of blackouts and outages [1,2].

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Poorly designed communication strategies can lead to risk misperception and public backlash, as seen in the case of smart meter rollouts in several countries, which have complicated broader energy policy goals [22–27]. These negative consequences extend beyond individual technologies, impacting energy policy initiatives [28], and require not only addressing risk misperceptions but also fostering public acceptance and encouraging energy-saving behaviors [29–32].

To achieve these goals—addressing risk perceptions, increasing willingness to act, and fostering public acceptance—risk communication research focuses on developing effective strategies to inform and engage stakeholders about risks [33]. In the context of a potential energy shortage, this involves preparing the public for possible power outages. This requires a nuanced understanding of how individuals perceive and respond to different message strategies, as highlighted by the Organization for Economic Co-operation and Development (OECD) [34].

Although effective communication design is crucial in light of an energy shortage, there is limited empirical research on key elements: clearly explaining the drivers or main causes of the risk of energy shortage [35], the rationale behind proposed actions, and the role of stakeholder engagement [32]. This gap hinders the development of communication strategies that leverage these elements to enhance public understanding, trust, and proactive risk management, especially when designing a comprehensive risk communication campaign.

To address this gap, we conducted large-scale online randomized experiments in the United Kingdom and Chile, two countries that were preparing for potential energy shortages at the time of the study [36,37]. Using common media formats (e.g., online news, flyers, and social media), the experiments tested key risk communication strategies: (1) explaining the causes of the energy crisis, (2) highlighting the role of other stakeholders, (3) informing the public about specific energy-saving actions they can adopt at home, and (4) presenting motivations to save energy, such as reducing the possibility of blackouts. Our findings provide insights for researchers and policymakers on how energy crisis campaigns influence public acceptance and energy-saving intentions, both before and during scheduled outages [32].

2. Literature review

The risk communication literature indicates that effective messaging must account for how individuals perceive, interpret, and act on risks. Prior research has recognized that risk communication is closely linked to behavioral decision-making research, as risk perception and the effectiveness of risk communication are shaped by cognitive biases, motivational factors, and contextual influences [38–40]. In particular, this research highlights two key areas: first, it emphasizes the role of risk-related decision-making frameworks in message design [40], and second, it stresses the need for systematic message testing to ensure that risk communications are clear and aligned with public decision-making processes [41,42]. Without such testing, messages may be ineffective or misunderstood, placing the burden on the audience rather than improving communication strategies.

In the context of energy shortages, risk communication must not only raise awareness but also prepare the public for imminent challenges, foster acceptance of emergency policies, and promote mitigation behaviors [43,44]. As introduced in the previous section, we examine four key domains of energy risk communication—referred to from now on as causes of the crisis, industry efforts, energy-saving actions, and motivations to save energy—each of which presents distinct challenges for public engagement and policy acceptance [32,35].

Because each domain involves different decision-making processes, we apply specific theoretical frameworks from behavioral decision research to systematically test the effects of communication strategies on public responses. By doing so, our study builds upon existing theories and frameworks (construal level theory, information overload, and crowding out) while also contributing to risk communication more broadly by advancing and testing these theories in the context of energy crisis campaigns. By conducting comparative experiments in two countries, we examine how these frameworks apply across different social and cultural contexts, which may shape public acceptance of policies [45,46], such as differences in climate change concern or geopolitical causes of an energy shortage.

2.1. Causes of the energy crisis

As discussed in the International Energy Agency's (IEA) 2011 update of the *Saving Electricity in a Hurry* report, identifying the cause of an electricity shortfall is essential for determining the appropriate course of action [35]. This applies to both policymakers and consumers, as effective risk communication in energy crisis campaigns requires that the public recognize the urgency of the situation, increasing their willingness to adopt energy-saving measures and comply with Government directives (e.g., scheduled power outages and reduced lighting in public buildings). Public receptiveness to the underlying causes of the crisis heightens perceived urgency and risk awareness, both key drivers of personal preparedness and risk mitigation behaviors [47,48]. For example, during the 1973 oil embargo, the geopolitical framing of the crisis led to increased public awareness of energy dependence, whereas the California 2001 energy crisis, perceived as resulting from market manipulation, generated public skepticism [49,50].

From a behavioral decision research perspective, psychological distance plays a significant role in shaping the risk perception of an energy crisis. Psychological distance encompasses an event that is, for example, far in the future or geographically remote, influencing how individuals perceive and respond to risks [51,52]. For example, proximity to natural disasters can enhance climate change beliefs by reducing psychological distance [53]. Similarly, an energy shortage caused by the war in Ukraine is likely to have a more pronounced impact in countries with closer geographical and economic ties to the conflict, such as the UK, compared to more distant countries like Chile. In contrast, decommissioning of coal-fired power plants may have a more uniform effect as it involves locally controllable actions.

2.2. Industry efforts

As the risk of energy outages increases, involving key industry players becomes essential for leveraging resources, reducing energy consumption in production processes, and communicating relevant information. In particular, the Government might not necessarily be the best messenger for an energy crisis campaign [32]. Previous research in different contexts has shown that public receptivity can vary based on the source's credibility or the attitudes toward a specific industry or Government [54–56].

Companies communicating their efforts toward a public good can influence consumers' decisions [57]. However, while consumers often appreciate corporate social responsibility, such as energy efficiency in production processes, they may also question the company's underlying motives. Research indicates that backlash may occur against perceived corporate motives when these motives are perceived as incongruent with consumer values [58] or when there is a low fit between the company's product line and the supported cause [59]. This raises the question of who should lead the communication on collective energy efforts, underscoring the importance of a credible and relatable messenger.

Credibility also hinges on the specificity and depth of the communicated information, serving as a measure to discern substantive commitments from superficial assurances. Accordingly, based on construal level theory,[2] concrete and detailed information (i.e., low construal)

[2] Construal level theory is a broader framework that encompasses psychological distance, explaining how greater perceived distance leads to higher levels of abstraction in mental representations.

allows people to better approximate a problem and evaluate the source of information, while abstract or high construal messages (e.g., communicating a general concern about energy efficiency) motivate a broader consideration but may distance the audience from the source [60]. Even though no previous research has examined the role of specificity of mitigation action for different sources of information (e.g., industry vs. Government) under a potential risk, research in technology adoption shows that the effectiveness of communication campaigns varies for different construal levels and the credibility of the information [61]. Likewise, in the energy sector, in the context of renewable energy technologies, high construal messaging has been found to trigger reactance when consumers become aware of the drawbacks of the technology, potentially altering their initial positive reception [62].

2.3. Energy-saving actions

A common tool used in energy-saving campaigns is to provide households with recommended energy-saving actions. However, the literature has shown paradoxical results on how many and what actions to promote. For example, a 2020 meta-analysis found that providing general energy-saving tips increased energy consumption from 3.2 to 5.2%, while personalized advice reduced it by 5.2% [63]. These mixed effects align with research on information overload, which suggests that excessive information can lead to difficulties in decision-making and attention allocation [64]. Furthermore, consumers may already possess motivation and knowledge about some energy-saving options, and additional *tips* could lead to information overload [65]. Campaign managers should consider the possibility that in energy-saving communications efforts, a more focused approach may be more effective [66].

Energy-saving campaigns often feature a mix of high-impact actions and less significant ones, which may attract more attention if they are simple to implement. In this regard, some energy-saving actions, such as unplugging unused appliances, may offer minimal savings or are already commonly practiced, while the benefits of other higher-impact actions, such as replacing old light bulbs, might not be immediately apparent to consumers [67].

Because multiple studies provide evidence of the importance of recommending specific energy-saving actions (e.g., [68,69]), most campaigns provide a large comprehensive list of actions (e.g., [70–72]). However, existing research remains unclear on whether energy-saving campaigns should prioritize and emphasize higher-impact actions to maximize effectiveness.

2.4. Motivations to save energy

Effective communication campaigns can shape consumer behavior by leveraging motivations framed as benefits or costs associated with their decisions. In this regard, behavioral decision research as applied to energy and sustainable behavior reveals a complex interplay between altruistic, social, and financial motives in actions ranging from recycling to transportation [73–78]. While individuals may be driven to act out of concern for their community or environment [79], financial incentives—such as reducing electricity bills—can sometimes undermine intrinsic motivations [80,81], a phenomenon explained by theories such as overjustification [82] and crowding-out [83]. These frameworks suggest that when individuals are intrinsically motivated, introducing extrinsic rewards may reduce their autonomous motivation to act.

During energy crises, understanding how these motivations affect risk perception and willingness to act is critical, both in shaping individual decisions and in influencing others. In particular, when widespread social impacts of blackouts are more salient, altruistic messages could appeal to pro-social and pro-environmental motives [32]. Pro-social motivation focuses on preventing potential impacts from blackouts—such as rationing on low-income communities and electricity-dependent individuals—and pro-environmental motivation relates to climate change mitigation and resource conservation. Although energy-saving campaigns typically emphasize environmental aspects of climate change (e.g., [84,85]) or financial incentives like cost savings (e.g., [86]), it is essential to assess their effectiveness in the context of an energy crisis, particularly when compared to the immediate threat of blackouts and their impacts on communities. While previous research has shown how monetary-saving motives, which people are already aware of, compare to environmental motivations in energy policies (e.g., [80]), to our knowledge, there is a lack of research testing these motivations in an energy crisis setting. This context provides a unique opportunity to examine how overjustification and crowding-out theories apply when framed based on a pro-social motive (impact of blackouts on vulnerable groups, such as electro-dependent individuals).

To better resonate with the public, energy crisis communication campaigns should increase households' likelihood of accepting rationing policies such as scheduled blackouts while promoting energy-saving behavior. Communication should address the main cause of the crisis and the institutional responses while providing clear motivations and actionable recommendations. Understanding or knowledge is a crucial precursor to behavioral intentions in various behavior change models [87–90], as individuals inherently seek consistency between their actions and decisions, and what they know [91]—although declared intentions do not always lead to actual behavior due to various moderating factors, a phenomenon known as the intention-behavior gap [92]. Thus, beyond providing information, effective risk communication requires empirical testing to ensure clarity and alignment with public decision-making processes.

By applying and testing these theoretical frameworks in energy crisis communication, this study advances risk communication and behavioral decision research by examining how different message strategies influence public responses. Furthermore, we enhance ecological validity by using realistic stimuli, such as news articles and social media posts, designed to mirror actual crisis communication efforts. This approach allows us to assess not only behavioral intentions in realistic campaign contexts but also the likelihood of message engagement, such as information sharing and attention allocation. Previous research on societal public emergencies underscores the importance of these indicators in understanding public preparedness and compliance with governmental communications and directives during emergencies [55,56].

3. Method

3.1. Setting

We conducted a series of randomized experiments in Chile and the UK. All experiments were pre-registered at the Penn Wharton Credibility Lab on AsPredicted.org.[3] These experiments were conducted in May–June 2022 in Chile and January 2023 in the UK, corresponding to the fall/winter season in each country, when energy demand is typically higher. At the time of the experiments, the countries were facing threats of imminent energy shortages and blackouts [36,37], and their Governments were actively involved in developing emergency plans in collaboration with stakeholders such as industry and the scientific community [93,94]. While both countries faced potential energy shortages, their geopolitical and cultural differences offer insights for designing effective risk communication campaigns in similar global contexts.

First, people in Chile show higher concern for climate change than people in the UK; according to a recent survey, 65% of Chileans would be willing to contribute 1% of their income to act against climate

[3] Experimental pair 1 UK: #119268; Experimental pair 2 UK: #119269; Experimental pair 1 Chile: #98054; Experimental pair 2 Chile: #98049.

change compared to 48% of people from the UK [95]. Similarly, in Chile, there is more demand for political action to address the climate crisis: 98% to 83% in the UK [95]. Secondly, in the UK, concerns over electricity security were driven by rising global energy prices, the Russian invasion of Ukraine, and the failure of several domestic energy suppliers. These factors led to warnings of possible winter blackouts and emergency rationing measures. In response, the UK Government introduced the British Energy Security Strategy in April 2022 to strengthen the resilience of the electricity sector and reduce dependence on imported energy [93]. The strategy prioritized the expansion of low-carbon electricity generation, including nuclear power, offshore wind, and carbon capture technologies, while also addressing electricity market reforms. On the other hand, Chile faced an energy crisis driven by severe drought, which limited hydroelectric generation, and rising international fuel prices, increasing operational uncertainty. In April 2022, the Chilean Government formed the Grupo de Seguridad Eléctrica (Electric Security Group), bringing together public agencies and industry representatives to coordinate emergency plans for 2022–2023 [94]. The initiative aimed to strengthen energy security through preventive actions, including potential electricity rationing, encouraging reduced demand from industry and households, and continuous monitoring of supply risks. Finally, both countries were decommissioning coal-fired power plants, limiting energy capacity, to move toward cleaner energy sources; Chile committed to phasing out coal-fired generation by 2040 or sooner [96] and the UK had plans to end coal power by 2024, a goal reached last October [97].[4]

3.2. Experimental design

The randomized experiments cover the four key elements of an energy crisis communication campaign indicated in the Introduction and Literature Review: the causes or reasons to explain an impending energy crisis, how and by whom industry efforts should be communicated, how and what energy-saving actions should be recommended, and the motivations that drive households to save energy. Each experiment randomly displays one variation of an infographic or news article used in a realistic communication campaign. In the UK experiments, participants were recruited from the Prolific Academic panel, while the experiments in Chile used the panel from an international market research firm (Netquest). For both panels, only adult residents of each country were eligible to participate. Table 1 presents both samples' sample sizes and characteristics.[5]

Participants were randomly assigned using experimental pairs: *causes-motivations* and *industry-actions*. Each person was assigned to one of the experimental pairs, meaning all participants took part in two experiments. Participants were recruited in each country by the respective platform until meeting the required sample size and demographic quotas. They were randomly assigned to one experimental pair and then again to one experimental condition for each experiment. To prevent any carry-over effects from the first experiment into the second experiment for each pair, in addition to random assignment participants were exposed to information from all conditions of the first experiment once they finished it (e.g., all treatments from the causes of the crisis were presented after finishing the causes experiment and before beginning the motivations experiment).[6] After participants viewed the conditions' stimuli, they answered the outcome measures, which are detailed for each experiment in the following subsections.

[4] Based on the OECD Survey on Drivers of Trust in Public Institutions [98], trust in the national Government was slightly higher in Chile (30%) than in the UK (27%), both below the OECD average (39%).

[5] As pre-registered, observations without answers in at least one of the primary dependent variables were excluded from the analysis.

[6] Consistently, we found no interaction effects between the two experiments of each pair (see Appendix D).

Table 1
Descriptive statistics for the UK and Chile.

	UK Mean (SD)	Chile Mean (SD)
Age	41.04 (13.34)	45.03 (16.11)
	Proportion	Proportion
Gender		
Men	0.50	0.52
Women	0.50	0.48
Income		
Low income	0.05	0.31
Middle low income	0.22	0.31
Middle high income	0.40	0.26
High income	0.33	0.12
Education		
Primary	0.20	0.23
Secondary	0.19	0.18
Tech. Certificate	0.42	0.52
University	0.19	0.08
N	3836	2607

Figs. C.1, C.2, C.3, and C.4, in Appendix C, detail the structure of the experimental design. Demographic data were collected at the end of the experiments. All materials presented to participants from the UK and Chile (infographics, instructions, and questions) can be found in Appendix C.

3.2.1. Causes of the energy crisis experiment

Participants were randomly assigned to read one of four news covers, each offering a different explanation for why electricity shortages were expected in the upcoming winter. These reasons were: (1) the Ukraine–Russia war—a distant cause in the case of Chile and near for the UK, (2) climate change—a factor beyond the control of local authorities, (3) the decommissioning of coal-fired plants—which are Government-led in both countries, or (4) a control condition—that described the energy grid without specifying a cause for the potential energy crisis. All covers reflected the front page of renowned news portals from each country and were written in the same way, with a headline, an image, and the story's lead.

The key outcome variables are the intention to adopt energy-saving actions ("I'll make great efforts to save energy"), willingness to share information ("I'll share information about the energy crisis with friends and family"), and risk perception of the energy crisis. Risk perception is represented by an index that uses the average response to four questions about the perceived severity and mitigation of the risk of an energy crisis: the perceived likelihood of energy rationing or blackouts, the acceptance of potential scheduled blackouts, the perceived relevance of the energy crisis, and the perceived need for public investment to reduce the likelihood of blackouts. In addition, participants were asked whether the communication piece caught their attention and whether it was understandable. All variables were measured using 5-point Likert scale (from 1: "I strongly disagree" to 5: "I strongly agree").

3.2.2. Industry efforts experiment

This experiment examined whether the source and the specificity of the industry efforts toward the energy crisis changed people's intentions and perceptions of different stakeholders. Participants were shown a Facebook post styled as an infographic, stating that "this winter, less energy will be available" and emphasizing that "saving energy is everyone's responsibility". They were randomly assigned to one of the following conditions: (a) the No specific actions (source: Government) or control condition, featuring a post from the governmental energy agency of each country with a general message about working with the industry to promote reduced energy consumption, (b) the Specific actions from the industry (source: Government) was identical to the control but included specific energy-saving efforts by the industry, such as installing modern smelters, and (c) the Specific actions from the industry (source: the industry) was the same as the previous condition, except the post was attributed to the industry (specifically, a mining company).[7]

The dependent variables include the intention to save energy and willingness to share information, using the same items from the previous experiment, opinions about the Government's and industry's efforts to tackle the energy crisis ("I have a good opinion about the efforts of the government [industry] to tackle the energy crisis".), and attention and understanding.[8] These are assessed using 5-point Likert scale questions, using the same agreement scales from the previous experiment. In this experiment, we also measured how much responsibility for the energy crisis (from 0%–100%) participants attributed to households, industry, and the Government.

3.2.3. Energy-saving actions experiment

This experiment investigates the content and method of communicating recommended energy-saving actions to households. It is prompted by the need for households to contribute to tackling the energy crisis, complementing private and public sector efforts. Participants were invited to sign a commitment to adopt energy-saving actions at home, entering their initials as a commitment device [99] before selecting actions from a list. The actions were culturally adapted for each country—the specific actions recommended for each country can be found in Table E.2 of Appendix E—and detailed specific household appliances and rooms. These, along with the commitment device, act as situational cues [100] enhancing the predictive validity of declared intentions on actual behavior. The configurations of actions on this list constitute the experimental conditions.

Participants were randomly assigned to one of four experimental conditions: (i) the control condition, which lists a set of 10 energy-saving actions commonly suggested in each country, (ii) the "low-impact only" condition, listing only the five low-impact actions from the control condition (e.g., unplug electrical appliances and chargers when not in use), (iii) the "high-impact only" treatment condition, which presents the five high-impact actions (e.g., change all my old light bulbs to LED or other energy-efficient light bulbs) from the control condition (i.e., this and the previous condition are mutually exclusive), and (iv) the "high-impact labeled" condition, that uses the same list as the control but adds a label ("High-Impact") next to the five high-impact actions (the low-impact actions do not include any label).

Low-impact and high-impact actions were classified based on their yearly energy-saving potential (in [kWh/year]) [101], but only participants in the "high-impact-labeled" condition saw only a "High-Impact" label next to the high-impact actions.[9] Dependent variables are whether the specific actions are selected or not, plus the total number of low-impact, high-impact, and total actions selected.

3.2.4. Motivations to save energy experiment

The previous experiments explore different aspects of energy crisis communications: explaining to the population why the country might face a crisis and what different stakeholders could do. This final experiment focuses on the motivational drivers for households in an energy-saving campaign.

Participants were presented with an infographic from an energy-saving campaign sponsored by the country's energy agency. They were randomly assigned to one of three conditions: (A) the "Saving Money" condition, which states "Save energy and reduce your bill"; (B) the "Avoiding Blackouts" condition, with the message "Save energy and avoid blackouts"; and (C) the "Helping the Environment" condition, indicating "Save energy and reduce the impacts of climate change". All conditions feature pictures related to their main messages (e.g., for the avoiding blackouts motivations, it showed an electricity-dependent person and a child using a candle to read), emulating a standard infographic in a communication campaign.[10]

The outcome variables measured are the intention to save energy ("The campaign encourages me to contribute by saving energy at home"), willingness to share information ("I'll share the campaign with friends and family"), and risk perception. Risk perception is represented by an index that uses the simple average of responses to two questions: the perceived vulnerability to the energy crisis and the perceived likelihood of blackouts. Participants were also asked to commit to specific actions (selected from the same list used in the energy-saving actions experiment), in addition to reporting attention and understanding.[11]

3.3. Statistical analysis

All experiments were analyzed using linear regression models with robust standard errors to account for heteroscedasticity. For 5-point Likert scale dependent variables, we dichotomized responses by coding "I strongly agree" or "I agree" as 1, otherwise ("I neither agree nor disagree", "I disagree" or "I strongly disagree") as 0. Therefore, treatment effects can be interpreted as changes in the proportion of agreement in percentage points. This is a standard approach in policymaking communication and market research due to its ease in interpretability. However, it has the limitation of potentially discarding nuanced information. Hence, we also provide results using linear regressions with robust standard errors using the entire scale of the Likert scales (these results are shown in Appendix B, and conclusions remain robust across analyses) and note any relevant difference in results—mainly due to the increase in estimator efficiency using the entire scale. As specified in the pre-registrations, the regression models control for gender, age, education, and household income.[12] *P*-values for pairwise comparisons of treatment coefficients were estimated using Wald tests.

4. Results and discussion

This section presents the results and discussion of each experiment. As a reference, Tables E.1 and E.2 in Appendix E show a summary of the dependent variables of the experiments and in which tables they are presented.

[7] The experiment in Chile used an additional treatment: the same as the control condition but without the general message about the energy agency working with the industry. There were no significant differences with the control condition (see Appendix B for regressions for including the fourth treatment), so it was omitted from the UK experiment for simplicity.

[8] There is a question about their opinion on the specific mining company, but it was only included in the Source: Industry condition because it mentioned a mining company.

[9] Low-impact and high-impact actions are based on [101] and were adapted to each country's context, using relevant campaigns as Ref. [102–105]. Low-impact actions save up to 25 [kWh/year], and high-impact actions save upwards of 251 [kWh/year]. This categorization allows for a rough estimate of the relative potential savings per person of a specific treatment.

[10] In Chile, due to the collaboration with the Ministry of Energy, a fourth treatment was included to test specific and proprietary images referencing potential cartoons and idiosyncratic language aimed at smart energy usage (see Appendix B for regressions including the fourth treatment). This image was not publicly available and is not included in the Appendixes.

[11] In the pre-registration, the main and secondary outcome variables differed slightly depending on the country in which the experiment was conducted. In the main text, we report the outcomes that are common and more relevant, and in the Appendix, we present all collected outcomes.

[12] For consistency, analyses in both countries used the same control variables. In the UK, we also recorded whether the respondents were primarily responsible for paying the electricity bill. Controlling for this variable in the UK did not significantly change the outcomes.

4.1. Causes of the energy crisis

Table 2 shows the results on the proportion of people who agree to make efforts to conserve energy ("Intention"), to share the article with family and friends ("Sharing"), and to perceive risk ("Risk Perception"). Average treatment effects are compared to the control condition, which did not indicate any specific cause for the energy crisis.

When the cause of the energy crisis is the Ukraine–Russia war, there is an increase in energy-saving intention agreement in the UK—6.0 percentage points (pp.) ($p = 0.017$) from 77.8% (when no specific cause is given). In Chile, there are no significant effects for this treatment from the control condition (79%). On the other hand, the decommissioning of the country's coal-fired plants increases the intention to save energy in both countries, but these effects are only marginally significant, 4.7 pp. ($p = 0.065$) in the UK and 5.3 pp. ($p = 0.072$) in Chile.[13] Attributing the energy shortage to climate change does not result in a significant change in people's intentions to save energy in the UK ($p = 0.516$) or in Chile ($p = 0.375$). These results suggest that causes related to domestic policies, such as the decommissioning of coal-fired plants, might be well-received in both countries or at least not be detrimental. Sociopolitical events such as wars may have a substantial impact only when there is a direct connection to the country's energy supply, consistent with the psychological distance.

The agreement of sharing information about the energy crisis is approximately 63.7% in the UK and 81.2% in Chile when no specific cause is provided, while risk perception is also high but more even for both countries at around 67.5% and 69%, respectively. In the UK, all three reasons tend to decrease sharing intentions: climate change and the Ukraine–Russia conflict reduce agreement by 5.5 pp. (marginally significant at $p = 0.079$), while the decommissioning of coal-fired plants reduces it by 7.5 pp. ($p = 0.017$). None of the causes significantly modified the risk perception index in the UK. In Chile, consistent with the result on energy-saving intentions, the war is the only cause that decreases the baseline high agreement on the intention of sharing, by 7.4 pp. ($p = 0.022$), and risk perception index, by 9.4 pp. ($p < 0.001$). The high baseline level of risk perception in the UK remains stable across all treatments, possibly reflecting existing high public concern, as in Chile, about energy shortages.

A more detailed breakdown of the risk perception index, as presented in Table A.2 in Appendix A, shows that climate change is the only cause that significantly increases the belief in a real possibility of blackouts in Chile—by 7.2 pp. ($p = 0.035$) from a base of 69%. On the other hand, the lower aggregated risk perception in Chile in the case of the Russia–Ukraine war is due to a lower perceived risk of blackouts (14.3 pp. ($p < 0.001$) from a baseline of 69%) and the perception that the energy crisis is one of the most important issues for the country (decreased by 11.6 pp. ($p = 0.001$) from a baseline of 75%).

Overall, the previous results suggest that in both countries, there are high levels of agreement in behavioral intentions and risk perception toward an energy crisis. Changing the reason to explain potential energy outages in risk communication campaigns is more a matter of not reducing those high levels of agreement, like using distant causes, such as geopolitical conflicts with limited perceived local relevance, even if they actually affect the energy shortage.[14] From a communication perspective, sharing news related to distressing causes, such as wars or climate change, may be less likely due to potential avoidance behaviors [107,108].

We also examine other outcome variables—see Table A.1 in Appendix A—regarding the understanding and attention levels toward the article. In both countries, all the causes significantly increase understanding; in the UK, by 19.7 pp. for climate change ($p < 0.001$), 40.3 pp. for the decommissioning of coal-fired plants ($p < 0.001$), and 39.1 pp. for the war ($p < 0.001$)—from 43.8% in the control condition. In Chile, understanding increases by 21.4 pp. for climate change ($p < 0.001$) and 12.8 pp. for decommissioning ($p < 0.001$)—from 66% in the control condition. Furthermore, the article's content captures the participants' attention in both countries regardless of the cause (approximately 77% for the control condition in both countries) and only is significantly different for the climate change condition, decreasing in the UK and increasing in Chile—by 6.0 pp. ($p = 0.030$) and 7.3 pp. ($p = 0.015$) respectively.

4.2. Industry efforts

Table 3 presents the results of the people who agree to make efforts to conserve energy ("Intention") and to share the campaign with family and friends ("Sharing"). It also presents participants' agreement on having a good opinion about the industry and Government's efforts to tackle the energy crisis ("Industry Opinion" and "Govt. Opinion") in each country.[15] The average treatment effects of each condition are compared to the control condition, which did not specify any industry efforts and used a governmental agency as the source of the post.

In the control condition, 65.6% of the people in the UK and 75.7% in Chile agree to make efforts to save energy. None of the treatments significantly affects the intention to save energy in either country. The proportion of people agreeing to share the campaign in the control condition is relatively low in the UK, around 25%, and much higher in Chile, 51%. In the UK, adding specific industry measures, regardless of the source, further decreases the likelihood of sharing the post by 5.8 pp.–6.5 pp. ($ps < 0.02$). In Chile, when specific actions are communicated by the industry, the agreement with sharing the campaign decreases, with only marginal significance, by 6.9 pp. ($p = 0.076$).

Communicating specific industry actions significantly improves public opinion about key stakeholders in the energy system, particularly the industry itself. In both countries, the positive opinion toward the Industry increases when specific efforts are communicated, both when a private company or the Government is the main source: by 4.8 pp. (marginally: $p = 0.062$) and 15.5 pp. ($p < 0.001$) respectively in the UK, and by 12.8 pp. ($p = 0.001$) and 10.3 pp. ($p = 0.008$) in Chile. Positive opinions toward the Industry's efforts are relatively low in the baseline control condition, around 28% in the UK and 36% in Chile. These results suggest that communicating specific measures taken by the industry to save energy positively impacts public perception of the industry's handling of the crisis, regardless of the campaign's source. The UK results suggest an even larger benefit when the industry leads the campaign through a private company. In Chile, the higher positive opinion of the industry for Government-led posts may also reflect the general perception of Government leadership during energy discussions, particularly as the Government had initiated stakeholder collaborations in preparation for potential shortages [94],[16] though differences may also be explained by other factors.

[13] In Chile the effect for intention to save Energy for the "Decommissioning" treatment is not marginally significant when using the entire Likert scale ($p = 0.166$, suggesting the result in the dichotomized model should be interpreted with caution), as shown in Table B.1, Appendix B. However, pairwise comparisons' difference for the "Climate Change" and "War" treatments is significant at the 5% level ($p = 0.019$) in this case.

[14] In Chile, see: [106].

[15] The Chile sample originally had 1298 observations but included a fourth treatment that was removed for the UK experiment (see footnote 7). The observations for the fourth treatment were not included in the analysis for this experiment, which is why the number of observations reported is 976 and not 1298.

[16] As detailed in the previous section, the Government in the UK was also leading efforts to enhance the resilience of the energy sector. However, to our knowledge, there were no initiatives to involve other stakeholders in collaboratively addressing an energy risk campaign. On the other hand, the Government in Chile invited industry representatives and academic experts, including the authors of this study, to collaborate in such initiatives.

Table 2
Causes of the crisis experiment - Proportion of "I agree" and "I strongly agree" answers.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Climate change	0.017	0.027	−0.055*	−0.008	0.000	0.018
	(0.026)	(0.031)	(0.031)	(0.031)	(0.016)	(0.023)
Decommissioning	0.047*	0.053*	−0.075**	−0.044	−0.021	−0.025
	(0.025)	(0.030)	(0.031)	(0.031)	(0.016)	(0.023)
War	0.060**	−0.009	−0.055*	−0.074**	−0.010	−0.094***
	(0.025)	(0.031)	(0.031)	(0.032)	(0.016)	(0.023)
Pairwise comparisons (p-values)						
CC vs. Decommissioning	0.234	0.367	0.527	0.254	0.211	0.061
CC vs. War	0.084	0.231	1	0.042	0.533	<0.001
Decommissioning vs. War	0.585	0.032	0.529	0.364	0.530	0.004
Mean "No cause for crisis"	0.778	0.790	0.637	0.812	0.675	0.690
N	1918	1309	1918	1309	1918	1309

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

Table 3
Industry efforts experiment - Proportion of "I agree" and "I strongly agree" answers.

	Intention		Sharing		Industry opinion		Govt. opinion	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile
Specific actions, source: Gov	−0.025	0.044	−0.065***	0.055	0.048*	0.128***	0.012	0.131***
	(0.027)	(0.031)	(0.023)	(0.038)	(0.026)	(0.038)	(0.023)	(0.038)
Specific actions, source: Ind	−0.013	0.029	−0.058**	−0.069*	0.155***	0.103***	−0.042*	0.070*
	(0.027)	(0.033)	(0.023)	(0.039)	(0.026)	(0.038)	(0.022)	(0.038)
Pairwise comparisons (p-values)								
Specific actions Gov vs. Ind	0.664	0.618	0.738	0.001	<0.001	0.516	0.017	0.123
Mean "No specific actions"	0.656	0.757	0.249	0.506	0.276	0.364	0.217	0.367
N	1918	976	1918	976	1918	976	1918	976

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

Regarding the positive opinion toward the Government's handling of the crisis in the UK, adding specific actions does not change public opinion when the Government is the source of the post (22% of agreement of a good opinion in the control condition). When the source is a private company, positive opinion toward the Government decreases by 4.2 pp., though the effect is marginally significant ($p = 0.060$). Conversely, in Chile, there is a significant increase in positive Government perception (37% in the control condition), especially under the Government-led campaign (13.1 pp., $p = 0.001$). This indicates that in both countries, Government-led campaigns are a good choice to boost positive perceptions—for both Government and industry—, which could be crucial during an energy crisis that involves many stakeholders and requires collaboration among them.[17] These findings are consistent with the literature on responsibility attribution, which suggests that individuals assign more responsibility to actors perceived to have greater control or agency in managing risks [47].

Additional outcome variables were examined, including understanding and attention levels toward the campaign and the perceptions of responsibility for the crisis—see Tables A.3 and A.4 in Appendix A. These measures indicate that, in Chile, 33% of the responsibility to tackle the energy crisis is attributed to the Government, 46% to the industry, and 21% to households. In the UK, responsibility is more evenly distributed, with 25% attributed to households, 38% to the Government, and 37% to the industry. Attention and understanding decrease in the UK when specific industry efforts are communicated, regardless of the source (by 5.6–7.5 pp., $ps < 0.05$, for attention and by 5.3–21.6 pp., $ps < 0.02$, for understanding). In Chile, no treatment changes attention, but adding specific actions and keeping the Government as the source results in a marginal increase of 6.1 pp. ($p = 0.061$) in understanding. Overall, these additional outcomes strengthen the idea that in the UK there is sort of a punishment, especially toward the information provided by the Government.

4.3. Energy-saving actions

Table 4 shows the results on the total number of actions selected, the number of low-impact actions selected, and the number of high-impact actions selected for the treatments for each country—note that, except for the "high-impact labeled" condition, participants are not prompted through an explicit label which actions had a high saving-energy impact.[18] Average treatment effects are shown compared to the control condition, which presented all ten actions (five low-impact and five high-impact) without identifying which ones were the high-impact actions.

In the control condition, UK participants commit to an average of 2.1 high-impact and 2.8 low-impact actions, totaling 4.9. Conversely, participants in Chile commit to approximately 2.5 high-impact and 3.7 low-impact actions, amounting to 6.2 actions. Adding labels to high-impact actions generates a positive, significant effect of 0.30 additional high-impact actions in the UK ($p = 0.008$), but that is not the case in Chile (0.21, $p = 0.119$). Overall, the total number of actions increases by 0.42 on average in the UK (though the effect is marginally significant, $p = 0.060$), while the effect is not statistically significant in Chile ($p =$

[17] When using the whole scale, there are a few differences, as shown in Table B.2, Appendix B. Mainly, in Chile, for the "Specific actions (source: Government)" treatment, the effect of intention to save energy is positively significant at the 5% level ($p = 0.022$), while for the "Specific actions (source:Industry)" treatment, the Government opinion is not significant for any country.

[18] The "Low-impact actions" and "High-impact actions" variables have fewer observations in total. This is because the "Low-impact only" and "High-impact only" treatments do not have high-impact and low-impact actions, respectively. Therefore, those observations are not included in the variables' regressions.

Table 4
Energy-saving actions experiment - Number of actions selected.

	Total actions		Low-impact actions		High-impact actions	
	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.424*	0.245	0.130	0.047	0.301***	0.208
	(0.225)	(0.249)	(0.125)	(0.138)	(0.114)	(0.133)
Low-impact only			0.234*	0.338***		
			(0.125)	(0.128)		
High-impact only					0.410***	0.378***
					(0.114)	(0.125)
Pairwise comparisons (p-values)						
Labeled vs. Low-Impact			0.412	0.029		
Labeled vs. High-Impact					0.344	0.205
Mean "All actions-No labels"	4.888	6.153	2.832	3.653	2.055	2.500
N	1918	1298	1435	964	1442	975

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

0.324)—which might be explained by a ceiling effect due to the already high baseline. Notably, the potential positive effects do not come at the expense of the commitment to lower-impact actions in either country.

When only high-impact actions are available in the set of energy-saving actions, in both countries, the number of high-impact actions increases by 0.41 ($p < 0.001$) in the UK and 0.38 ($p = 0.003$) in Chile. A potential downside is removing the possibility for participants to commit to any low-impact action (none were available). However, as detailed in Table 5 and discussed below, much larger gains in total energy savings are observed even if those low-impact actions were not performed. Table 4 also shows the results when only low-impact energy-saving actions were available, showing a marginally significant increase for the UK and a significant increase for Chile in the commitment to these actions (0.22, $p = 0.061$, and 0.34, $p = 0.009$, respectively). Nevertheless, this scenario offers limited additional benefits for overall energy savings, as many low-impact actions may already be routine practices for participants.

Regarding the commitment to each specific energy-saving action, Table A.5 in Appendix A showcases that, in the UK, the largest effect of labeling high-impact actions is due to increased commitment to replacing old appliances with energy-efficient A-labeled models (11.5 pp. from 22.5% commitment in the control condition, $p < 0.01$), followed by lowering the thermostat by at least 2 °C (7.4 pp. from 44.4%, $p = 0.021$), and changing old light bulbs to LED or other energy-efficient light bulbs (6.3 pp. from 55.6%, $p = 0.043$). In Chile, the increase in the number of high-impact actions of the labeling is due to more commitment to installing insulation strips in doors and windows, although these are marginally significant (6.7 pp. from 35.6% commitment in the control condition, $p = 0.078$) and replacing old appliances (6.7 pp. from 37.4%, $p = 0.087$). For the high-impact-only treatment, the increase in high-impact actions selected in the UK is driven by an increased commitment to all 5 actions: installing wall insulation (6.5 pp. from 26.4%, $p = 0.026$), avoiding the use of clothes dryer (5.6 pp. from 56.6%, $p = 0.074$), changing old light bulbs (5.6 pp. from 55.6%, $p = 0.074$), replacing old appliances (11.6 pp. from 22.5%, $p < 0.01$), and lowering the thermostat (11.6 pp. from 44.4%, $p < 0.01$). In Chile, the increase in commitment to high-impact actions in the same treatment is due to changing old light bulbs (5.8 pp. from 68.5%, $p = 0.082$), replacing old appliances (11.3 pp. from 37.4%, $p = 0.003$), and reducing the use of electricity and heat between 8 PM and 10 PM (12.9 pp. from 43.2%, $p = 0.001$).

Overall, the high-impact-only and low-impact-only treatments work by limiting the pool of options and focusing potential commitments on a subset of actions. Limiting options increases the commitment to high-impact or low-impact actions, respectively, in both countries. This might be explained by the information overload effect, where a larger number of alternatives can dilute attention and reduce commitment to specific, impactful actions [65]. On the other hand, a larger increase in commitment to high-impact actions in the high-impact-only treatment, when compared to the increase in commitment to low-impact actions for the low-impact-only treatment, is consistent with Buckley's meta-analysis results where it was found that interventions focused on general tips fared worse than those that recommend specific and personalized advice [63]. The low-impact actions list comprises generic actions that people might already perform at home.

Table 5
Energy-saving actions experiment - Potential of electricity savings per person treated.

Treatment	Potential savings [kWh/yr]	
	UK	Chile
All actions-No Labels	1461	1813
Low-impact only	34	50
High-impact only	1708	2018
High-impact labeled	1669	1958

In terms of overall energy-saving impacts, performing high-impact actions would result in savings of at least 250 [kWh/year] per action. Conversely, low-impact actions translate to savings of 1 to 25 [kWh/year] per action [101].[19] As shown in Table 5, presenting all ten actions with no labeling would result in potential savings of 1461 [kWh/yr] in the UK and 1813 [kWh/yr] in Chile. Despite offering fewer actions, reducing the pool of actions to only the high-impact ones increases the potential savings by 16.9% (to 1708 [kWh/yr]) and 11.3% (to 2018 [kWh/yr]) in the UK and Chile, respectively. Labeling the high-impact actions without removing the low-impact ones provides a middle ground, resulting in additional savings of 14.2% in the UK and 8.0% in Chile, although it is more likely that some of the low-impact actions are already performed by households. The condition that shows only the low-impact energy-saving actions offers little savings (less than 34 [kWh/yr]) despite being commonly the most emphasized in many energy-saving campaigns.[20] These results reinforce that campaign designers should avoid suggesting as many general energy-saving actions as possible and instead focus on asking for commitment to specific higher-impact actions.

4.4. *Motivations to save energy*

Table 6 shows the results of people who agree to make efforts to conserve energy ("Intention"), to share the campaign with family and

[19] This information directly comes from the UK energy-saving action clusters. Savings for the Chile experiment were estimated to fit into similar energy-saving action clusters.

[20] This estimation uses a conservative estimate for the highest impact energy-saving actions, and the median value for the rest of actions, based on [101].

Table 6
Motivations to save experiment - Proportion of "I agree" and "I strongly agree" answers.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Blackouts	−0.026	0.035	0.002	0.069**	0.107***	0.014
	(0.025)	(0.031)	(0.027)	(0.034)	(0.021)	(0.027)
Environmental impacts	−0.078***	0.005	0.021	0.031	0.009	0.014
	(0.025)	(0.032)	(0.027)	(0.035)	(0.022)	(0.027)
Pairwise comparisons (p-values)						
Blackouts vs. Env. Impacts	0.045	0.332	0.498	0.259	<0.001	0.997
Mean "Saving Money"	0.753	0.769	0.368	0.690	0.636	0.798
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

friends ("Sharing"), and to perceive risk ("Risk Perception") for each country.[21] Average treatment effects are compared to the motivation to save money. At this baseline, 75% of people in the UK and 77% in Chile already agree to make efforts to save energy. This level decreases only in the UK when the campaign is framed by "helping the Environment" by 7.8 pp. ($p = 0.002$). When this campaign is framed by "avoiding blackouts", there is no change in intention to save energy in either country.

The proportion of people agreeing to share the campaign with family and friends is much lower in the UK (37%) than in Chile (69%) when the campaign is motivated by saving money—consistent with previous results. Only in Chile does the motivation to avoid blackouts increase the agreement of sharing the campaign with family and friends by 6.9 pp. ($p = 0.042$). Lastly, risk perception was high in both countries (64% in the UK and 80% in Chile) when the energy-saving campaign was framed by saving money. In this case, using the prevention of blackouts as motivation increases risk perception by 10.7 pp. ($p < 0.001$) in the UK but not in Chile. These results highlight how different motivations might work better in different places. Overall, "avoiding blackouts" emerges as a particularly effective motivational framing, showing no significant drawbacks across measured outcomes and even enhancing some perceptions. This does not imply that people are indifferent to saving money—an outcome they likely already anticipate—but rather that highlighting a tangible and immediate benefit does not crowd out other motivations.

Other outcome variables, such as understanding and attention levels toward the campaign, are detailed in Table A.7, Appendix A. Attention is very high in the UK and Chile at the baseline level for "saving money", 61% and 69% respectively, and increases even more when the campaign is framed to avoid blackouts—by 10 pp. ($p = 0.013$) and 8.3 pp. ($p < 0.001$). Understanding is also high at the base level, 86% in the UK and 84% in Chile, and the only treatment to have an observable effect is the motivation to mitigate environmental impacts—a 6.9 pp. ($p = 0.001$) decrease. We also asked participants to commit to energy-saving actions. However, no significant differences were observed across motivations in participants' actual commitment to specific actions, highlighting the complexity of translating motivational framing into behavioral commitment—details in Table A.8.

5. Conclusions and policy implications

5.1. Conclusions

Effective risk communication is key for Governments at times of potential energy shortages and outages. It shapes the risk perception and public opinion of different stakeholders and may promote energy-saving behaviors during energy crises. This study provides a nuanced understanding of how various messaging elements in an energy crisis communication campaign can resonate with the public and influence their energy-saving intentions and perceptions. The use of a series of randomized online experiments conducted in the UK and Chile during months leading to potential energy shortages, grounded in a risk communication framework and behavioral decision research, allows the examination of common constructs generally used in energy emergency campaigns.

The experiments conducted in two countries aimed to determine whether campaigns could be tailored to specific audiences. In particular, we found differences in providing causes for potential shortages related to the Ukraine–Russia war. This suggests that a country's geographical and political proximity to a sociopolitical conflict can significantly amplify the impact of such events on public response to campaigns, although other factors may also contribute—in the UK, people reported being less concerned about climate change than in Chile [109] and have a higher income per capita [110]. In Chile, messaging focusing on the phase-out of coal-fired power plants appears a reasonable cause in fostering energy-saving intentions—actually, in both countries—, aligning with internal constraint-based causes [35].

Furthermore, our research indicates that detailed communication (low construal) about industry efforts to address energy crises (particularly when led by the Government) can enhance public trust and perception toward the industry and even the Government in the case of Chile. For the UK, no message increased the public opinion of their Government. However, it is important to note that baseline public support for the UK Government was significantly lower than in Chile in the experiment. Future studies may tease apart whether the general level of Government approval interacts with the need for details in communication strategies.

Another critical insight of the study is the recommendation of high-impact energy-saving actions—adjusted for each country. We found that presenting a mix of low-impact and high-impact actions can dilute commitment to the latter, suggesting that policymakers should focus on a smaller set of high-impact recommendations. This approach may prevent campaigns from overwhelming the public and provide clearer guidance toward achieving significant energy savings.

Finally, the study shows that framing energy-saving actions around the prosocial impact of preventing blackouts increases risk perception, compared to financial or environmental motivations. This could be due to climate change being perceived as a long-term threat [111–113] while blackouts are more immediate threats. Despite the heightened risk perception, none of the motivations translated into a stronger intention to save energy in either country. This may be due to participants already considering energy shortages as a serious risk, limiting the detectable impact of additional risk framing. This is consistent with prior research in a health context suggesting that once perceived risk is high, further increases may not directly influence behavioral intentions unless accompanied by actionable, efficacy-focused recommendations, as in the energy-saving actions experiment [114].

[21] The Chile sample originally had 1309 observations but included a fourth treatment that was removed for the UK experiment (see footnote 10). The observations for the fourth treatment were not included in the analysis for this experiment, which is why the number of observations reported is 981 and not 1309.

5.2. Limitations and future research

Interventions that increase conservation intentions might translate into actual behavior, but it is not a guarantee [92,115]. These experiments address this issue through the use of actual media outlets and infographics, which help increase their ecological validity and bridge the intention-behavior gaps [100]. Furthermore, behavioral intentions have been shown to correlate with emergency preparedness and public acceptance of policy measures [55,56]. An increased intention to save energy, coupled with positive perceptions of institutional responses, can help authorities prepare the public for shortages and measures such as scheduled blackouts, thereby enhancing the effectiveness of communication campaigns.

We focus on four factors that can be included in communication campaigns, though other specific causes, motivations, and actions warrant further testing. We considered the most common strategies in each context, which can provide a guideline for creating effective energy crisis communication campaigns. Future studies should explore other national-specific components and their interactions (e.g., highlighting high-impact energy actions may prove more effective when aligned with altruistic motivation). Despite these limitations, our main takeaways are consistent with the literature and relevant reports from international institutions [32,35].

5.3. Policy implications

Communication campaigns must be contextually tailored, focusing on local or national energy issues to increase relevance and public response. This means strategically leveraging sociopolitical events, especially in countries where these events directly impact energy supply. Government officials should collaborate with industry players to convey detailed, transparent information about their role and efforts in addressing the energy crisis. This approach builds public trust and fosters cooperation.

Energy-saving campaigns must prioritize and communicate high-impact actions, providing actionable steps for households to adopt. This approach shifts away from generalized tips toward a focused set of targeted high-impact actions. When deciding recommendations, it is important, in addition to impact, to consider the degree to which individuals can modify their actions in response to interventions. Dietz et al. [116] highlight that by focusing on actions that are more likely to be adopted, households can achieve significant energy savings without compromising well-being. Future research could further refine energy crisis campaigns by incorporating subgroup characteristics, such as prior energy-efficient behaviors and available household modifications.

As discussed in the previous section, a cause of the crisis related to local constraints could drive individual willingness to save energy, but it does not significantly influence societal actions, such as information-sharing or heightened risk perceptions. Conversely, emphasizing the widespread societal benefits of saving energy—such as preventing blackouts—can enhance social engagement. For example, this approach increased risk perception in the UK and information-sharing intentions in Chile. Campaign designers should consider that messages highlighting personal, actionable benefits may better motivate individual actions while emphasizing shared social outcomes—like reducing the risk of blackouts—can encourage broader community engagement. Additionally, tailoring campaigns to cultural norms and values—such as communication styles and trust in institutions—can further enhance public engagement and response.

Governments should develop energy crisis campaigns whenever potential shortages are projected. Our study provides experimental evidence on how specific components of these campaigns can influence public responses, helping Governments prepare for potential shortages—either by encouraging action or fostering acceptance of measures that might impact their daily life. We also emphasize the role of industry and how its involvement can enhance customer perceptions and foster a more positive image. Finally, continuous investment in behavioral research is crucial in the energy sector. Understanding evolving public perceptions and behaviors will enable the adaptation of campaigns to maintain their effectiveness over time.

CRediT authorship contribution statement

Nicolás Curotto: Writing – original draft, Visualization, Software, Project administration, Formal analysis, Data curation, Conceptualization. **Marianne Moreira:** Writing – original draft, Visualization, Software, Formal analysis, Data curation, Conceptualization. **Rodrigo Moreno:** Writing – review & editing, Funding acquisition. **Daniel Schwartz:** Writing – review & editing, Visualization, Supervision, Software, Funding acquisition, Formal analysis, Conceptualization.

Disclosure of the use of generative AI and AI-assisted technologies

During the preparation of this work, the authors used Grammarly, ChatGPT-4, and Writefull to improve the readability and language of the text. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Secondary dependent variables

This section presents results for secondary dependent variables for the *Causes of the crisis*, *Industry efforts*, *Energy-saving actions*, and *Motivations to save* experiments. Table A.1 presents the results on attention and understanding, while Table A.2 presents the results on disaggregated risk perception dimensions of the *Causes of the crisis* experiment. Average treatment effects are compared to the control condition, which did not indicate any specific cause for the energy crisis.

Table A.3 presents the results on attention and understanding, while Table A.4 presents the results for the relative perceived responsibilities of the Government, the industry, and households for the crisis of the *Industry efforts* experiment. Average treatment effects are compared to the control condition, which did not specify any industry efforts and used a governmental agency as the source of the post.

Table A.5 presents the results on the commitment to specific high-impact actions, while Table A.6 presents the results for the commitment to specific low-impact actions of the *Energy-saving actions* experiment. Average treatment effects are shown compared to the control condition, which presented all ten actions (five low-impact and five high-impact) with- out identifying which ones were the high-impact actions.

Finally, Table A.7 presents the results on attention, understanding, and the disaggregated risk perception dimensions, while Table A.8 presents the results for the number of total actions, high-impact actions, and low-impact actions committed for the *Motivations to save* experiment. Average treatment effects are compared to the motivation to save money.

Table A.1
Causes of the crisis experiment - Secondary variables - Proportion of "I agree" and "I strongly agree" answers.

	Attention		Understanding	
	UK	Chile	UK	Chile
Climate change	−0.060**	0.073**	0.197***	0.214***
	(0.028)	(0.030)	(0.032)	(0.032)
Decommissioning	−0.027	−0.007	0.403***	0.128***
	(0.027)	(0.032)	(0.028)	(0.035)
War	−0.040	−0.035	0.391***	0.058
	(0.028)	(0.033)	(0.028)	(0.036)
Pairwise comparisons (p-values)				
CC vs. Decommissioning	0.249	0.007	<0.001	0.003
CC vs. War	0.480	<0.001	<0.001	<0.001
Decommissioning vs. War	0.657	0.386	0.629	0.035
Mean "No cause for crisis"	0.776	0.772	0.438	0.660
N	1918	1309	1918	1309

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Appendix B. Robustness checks for the main results

This section presents the main results using a linear model with controls and robust standard errors considering all the levels of the Likert (i.e, from 1 to 5) for the *Causes of the crisis*, *Industry efforts*, and *Motivations to save* experiments. Table B.1 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the risk perception index for the *Causes of the crisis* experiment. Average treatment effects are compared to the control condition, which did not indicate any specific cause for the energy crisis.

Table B.2 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the positive opinions of the industry and Government's efforts to tackle the crisis for the *Industry efforts* experiment. Average treatment effects of each condition are compared to the control condition, which did not specify any industry efforts and used a governmental agency as the source of the post.

Table B.3 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the risk perception for the *Motivations to save* experiment. Average treatment effects are compared to the motivation to save money.

Included in this section also are Tables B.4 and B.5. The first one presents the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the positive opinions of the industry and Government's efforts to tackle the crisis of all original treatments for the *Industry efforts* experiment in Chile, including the Original Control treatment, which was ultimately not considered for analysis and not included in the UK experiment.

Table B.5 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the risk perception of all original four treatments for the *Motivations to save* experiment in Chile, including the Campaign Mascot treatment which was ultimately not considered for analysis and not included in the UK experiment.

Table B.6 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the risk perception without covariates for the *Causes of the crisis* experiment. Table B.7 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the positive opinions of the industry and Government's efforts to tackle the crisis without covariates for the *Industry efforts* experiment.

Table B.8 shows the results on the number of total actions, high-impact actions, and low-impact actions committed without covariates for the *Energy-saving actions* experiment. Table B.9 shows the results on the intention to conserve energy, the likelihood of sharing the campaign with family and friends, and the risk perception index without covariates for the *Motivations to save* experiment.

Appendix C. Materials

Figs. C.1 and C.3 present the structure of the Causes-Motivations experimental pairing for the UK and Chile samples, respectively. Figs. C.2 and C.4 present the structure of the Industry-Actions experimental pairing for the UK and Chile samples, respectively. All figures include the number of observations for each specific treatment, and treatment pairings, alongside attrition numbers.

Fig. C.5 presents all four treatments used for the *Causes of the crisis* experiment in Chile. All four treatments were translated into English, language was adapted to fit the population and put on a mock-up of a local UK news outlet. They are presented in Fig. C.6.

Fig. C.7 presents all four treatments used for the *Industry efforts* experiment in Chile. The "no collaboration" treatment (top-left in the figure) was dropped for the UK experiment, as it was not different enough from the "No specific efforts" treatment in all relevant dependent variables. The "No specific efforts" became the new control treatment for the analysis in both countries and, alongside the "Specific actions, source: Gov" and "Specific actions, source: Ind" was translated into English for the UK experiment, the language and institutions were adapted to fit the population, and can be found in Fig. C.8.

Fig. C.9 presents three of the four treatments used for the *Motivations to save* experiment in Chile. The "campaign mascot" treatment is not included in this Appendix A as it tested specific content for a prospective Government-sanctioned campaign in Chile. The other three treatments were translated into English and the language and institution were adapted to fit the population for the UK experiment, as shown in Fig. C.10.

After presenting the treatment images, we conducted a survey that started with the dependent variables and ended with demographic module questions. The questions included for the experiment *Causes of the crisis* are below:

Now that you have read the article, we would like to know what you will do given the energy crisis. Please indicate how much you agree with the statements below:

- *I'll make great efforts to save energy.*
- *I'll share information about the energy crisis with friends and family.*

We would like to know your reaction to the article. Please, indicate how much you agree with the statements below:

- *There is a real possibility of energy rationing or blackouts.*
- *I'm in favour of scheduled blackouts if they are necessary.*
- *The energy crisis is one of the most important issues for the country.*
- *The government should invest significant resources to reduce the likelihood of blackouts.*

About the article, please indicate how much you agree with the statements below:

- *The content of the article caught my attention.*
- *I clearly understood from the article why less energy will be available.*

Before continuing with the *Motivations to save* experiment, we displayed a paragraph intended to reset the effect of the treatment of the previous experiment.

In this second part, please consider that the following energy-saving campaign is posted on the Internet. Note that there will be less energy available this winter due to climate change, fuel scarcity, and less generation of electricity from non-sustainable sources.

The randomly assigned *Motivations to save* treatment is shown, and afterward, a list of questions is presented (seen below).

Now that you have seen the campaign, please indicate how much you agree with the statements below:

- *The campaign encourages me to contribute by saving energy at home.*

Table A.2
Causes of the crisis experiment - Secondary variables - Proportion of "I agree" and "I strongly agree" answers.

	Risk 1		Risk 2		Risk 3		Risk 4	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile
Climate change	0.015	0.072**	−0.011	0.045	0.002	−0.027	−0.003	−0.017
	(0.031)	(0.034)	(0.032)	(0.038)	(0.027)	(0.034)	(0.023)	(0.034)
Decommissioning	−0.013	−0.049	−0.070**	−0.014	0.003	−0.032	−0.005	−0.005
	(0.031)	(0.036)	(0.032)	(0.039)	(0.027)	(0.034)	(0.023)	(0.034)
War	−0.025	−0.143***	0.004	−0.061	−0.014	−0.116***	−0.006	−0.054
	(0.031)	(0.037)	(0.032)	(0.038)	(0.027)	(0.035)	(0.023)	(0.035)
Pairwise comparisons (p-values)								
CC vs. Decommissioning	0.384	<0.001	0.067	0.122	0.959	0.887	0.953	0.741
CC vs. War	0.213	<0.001	0.631	0.005	0.559	0.013	0.917	0.294
Decommissioning vs. War	0.708	0.011	0.020	0.214	0.524	0.018	0.964	0.165
Mean "No cause for crisis"	0.597	0.694	0.483	0.568	0.770	0.750	0.849	0.747
N	1918	1309	1918	1309	1918	1309	1918	1309

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.
Risk 1: There is a real possibility of energy rationing or blackouts.
Risk 2: I'm in favour of scheduled blackouts if they are necessary.
Risk 3: The energy crisis is one of the most important issues for the country.
Risk 4: The government should invest significant resources to reduce the likelihood of blackouts.

Table A.3
Industry efforts experiment - Secondary variables - Proportion of "I agree" and "I strongly agree" answers.

	Attention		Understanding	
	UK	Chile	UK	Chile
Specific actions, source: Gov	−0.075***	0.040	−0.216***	0.061*
	(0.028)	(0.036)	(0.023)	(0.032)
Specific actions, source: Ind	−0.056**	−0.030	−0.053**	0.021
	((0.028)	(0.038)	(0.021)	(0.034)
Pairwise comparisons (p-values)				
Specific actions Gov vs. Ind	0.505	0.058	<0.001	0.215
Mean "No specific actions"	0.554	0.675	0.859	0.751
N	1918	976	1918	976

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

- *I'll share the campaign with friends and family.*
- *The campaign makes me feel that the crisis will have consequences that might affect us all.*
- *The campaign makes me feel that there is a real possibility of rationing and blackouts.*
- *The information on the campaign caught my attention.*
- *The information on the campaign is easy to understand.*

For the final part of this experiment, we asked participants to commit to specific energy-saving actions. The instructions, the question, and the list of actions are the same as the energy-saving actions experiment from the second pairing and are shown alongside the material for that experiment further below.

Now that you have seen the campaign, we invite you to commit to adopting energy-saving actions. Here is the campaign again, and below it, you'll find the commitment and a list of suggested actions:

Participants assigned to the second pairing being with the experiment *Industry efforts*. The instructions and questions asked were:

Based on the publication you just saw, please indicate how much you agree with the statements below:

- *I'll make great efforts to save energy.*
- *I'll share the campaign with friends and family.*
- *The information in the campaign caught my attention.*
- *The information in the campaign was easy to understand.*

We would like to know your reaction to the publication (available again below). Please indicate how much you agree with the statements below:

- *I have a good opinion about the efforts of the industry to tackle the energy crisis.*
- *I have a good opinion about the efforts of the government to tackle the energy crisis.*
- *I have a good opinion about the efforts of [Private company name] to tackle the energy crisis.*

Suppose the country must make a 100% effort to avoid blackouts by either saving energy or investing in efficient technology. How would you distribute the effort among industry, the government, and households? All three options must total 100, where 0 represents "no effort at all" and 100 "should make all the effort".

Similar to the first pairing, before continuing with the *Energy-saving actions* experiment, we displayed a paragraph intended to reset the effect of the *Industry efforts* treatment

Both the private and public sectors are making efforts to tackle the energy crisis. However, saving energy is everyone's responsibility, and households play a crucial role. We invite you to sign a commitment to adopt energy-saving behaviour at home.

Below is the *Energy-saving actions* commitment and list of all low-impact and high-impact actions.

We invite you to sign a commitment to adopt energy-saving behaviour at home. Please place your initials in the box (for example, "JS" for John Smith) and then,for each behaviour listed, mark whether you will commit to it. You can select as many actions as you like, but if you are unwilling to commit to a specific action, leave it blank.

If you prefer not committing to any action, enter an "X" in the initials box and do not mark any behaviour. After you finish, continue to the next page.

"I, initials ..., commit to adopt the following energy-saving behaviour:"

The following list of actions was displayed for participants of the Chile experiment (note that the HIGH IMPACT label was seen only by participants assigned to the *High-impact Labeled* treatment):

- I will take out all necessary food items from the fridge at once
- I will unplug electrical appliances and chargers when not in use
- I will turn off the lights when leaving a room
- I will unplug my cellphone once charged
- I will wash full loads of clothes
- I will install insulation strips in doors and windows (HIGH IMPACT)
- I will avoid using the dryer and prefer hanging and air-drying laundry (HIGH IMPACT)
- I will change all my old light bulbs to LED or other energy-efficient light bulbs (HIGH IMPACT)

Table A.4
Industry efforts experiment - Secondary variables - Proportion of "I agree" and "I strongly agree" answers.

	Ind. Responsibility		Govt. Responsibility		Households responsibility	
	UK	Chile	UK	Chile	UK	Chile
Specific actions, source: Gov	0.359	−0.759	−0.062	−0.406	−0.297	1.166
	(0.850)	(1.506)	(0.930)	(1.204)	(0.985)	(1.438)
Specific actions, source: Ind	−0.733	0.234	0.682	1.641	0.051	−1.875
	(0.795)	(1.512)	(0.907)	(1.192)	(0.936)	(1.275)
Pairwise comparisons (p-values)						
Specific actions Gov vs. Ind	0.186	0.519	0.427	0.114	0.714	0.026
Mean "No specific actions"	36.97	46.12	38.06	32.88	24.97	21.00
N	1918	976	1918	976	1918	976

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Table A.5
Energy-saving actions experiment - Secondary variables - Proportion of selections - High-impact actions.

	Action H1		Action H2		Action H3		Action H4		Action H5	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.014	0.067*	0.034	0.047	0.063**	−0.018	0.115***	0.067*	0.074**	0.044
	(0.028)	(0.038)	(0.032)	(0.037)	(0.031)	(0.036)	(0.029)	(0.039)	(0.032)	(0.039)
High-impact only	0.065**	0.057	0.056*	0.021	0.056*	0.058*	0.116***	0.113***	0.116***	0.129***
	(0.029)	(0.037)	(0.031)	(0.036)	(0.031)	(0.033)	(0.029)	(0.038)	(0.032)	(0.038)
Pairwise comparisons (p-values)										
Labeled vs. High-Impact	0.084	0.779	0.487	0.480	0.820	0.029	0.964	0.240	0.189	0.029
Mean "All actions-No labels"	0.264	0.356	0.566	0.653	0.556	0.685	0.225	0.374	0.444	0.432
N	1442	975	1442	975	1442	975	1442	975	1442	975

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.
H1: "I will install insulation in walls and roofs" (UK); "I will install insulation strips in doors and windows" (Chile).
H2: "I will avoid using the dryer and prefer hanging and air-drying laundry" (UK and Chile).
H3: "I will change all my old light bulbs to LED or other energy-efficient light bulbs" (UK and Chile).
H4: "I will replace my old appliances by energy-efficient A-labelled models" (UK and Chile).
H5: "I will lower my thermostat by at least 2 ºC" (UK); "I will reduce my consumption of electricity between 8–10PM" (Chile).

Table A.6
Energy-saving actions experiment - Secondary variables - Proportion of selections - Low-impact actions.

	Action L1		Action L2		Action L3		Action L4		Action L5	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.020	0.032	0.020	−0.038	0.061*	0.038	0.020	−0.005	0.020	0.020
	(0.032)	(0.036)	(0.031)	(0.036)	(0.032)	(0.030)	(0.032)	(0.033)	(0.032)	(0.035)
Low-impact only	0.065**	0.077**	0.024	0.046	0.039	0.067**	0.065**	0.066**	0.065**	0.082**
	(0.032)	(0.034)	(0.031)	(0.034)	(0.032)	(0.027)	(0.032)	(0.030)	(0.032)	(0.033)
Pairwise comparisons (p-values)										
Labeled vs. Low-Impact	0.164	0.193	0.909	0.018	0.499	0.285	0.164	0.024	0.164	0.074
Mean "All actions-No labels"	0.450	0.685	0.603	0.700	0.481	0.803	0.450	0.768	0.450	0.697
N	1435	964	1435	964	1435	964	1435	964	1435	964

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.
L1: "I will take out all necessary food items from the fridge at once. (UK and Chile).
L2: "I will unplug electrical appliances and chargers when not in use" (UK and Chile).
L3: "I will clean my windows to allow more sunlight in (UK); "I will turn off the lights when leaving a room" (Chile).
L4: "I will allow hot food to cool before putting it in the fridge" (UK); "I will unplug my cellphone once charged" (Chile).
L5: "I will thaw food in a refrigerator or sink instead of using a microwave". (UK); "I will wash full loads of clothes" (Chile).

- I will replace my old appliances by energy-efficient A-labelled models (HIGH IMPACT)
- I will reduce my consumption of electricity between 8-10PM (HIGH IMPACT)

The following list of actions was displayed for participants of the UK experiment (note that the HIGH IMPACT label was seen only by participants assigned to the *High-impact Labeled* treatment):

- I will take out all necessary food items from the fridge at once
- I will unplug electrical appliances and chargers when not in use
- I will clean my windows to allow more sunlight in
- I will allow hot food to cool before putting it in the fridge
- I will thaw food in a refrigerator or sink instead of using a microwave
- I will install insulation in walls and roofs (HIGH IMPACT)
- I will avoid using the dryer and prefer hanging and air-drying laundry (HIGH IMPACT)
- I will change all my old light bulbs to LED or other energy-efficient light bulbs (HIGH IMPACT)
- I will replace my old appliances by energy-efficient A-labelled models (HIGH IMPACT)
- I will lower my thermostat by at least 2 °C (HIGH IMPACT)

Table A.7
Motivations to save experiment - Secondary variables - Proportion of "I agree" and "I strongly agree" answers.

	Attention		Understanding		Risk 1		Risk 2	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile
Blackouts	0.100***	0.083**	−0.026	−0.005	0.045*	0.019	0.169***	0.010
	(0.026)	(0.033)	(0.020)	(0.029)	(0.023)	(0.030)	(0.027)	(0.030)
Environmental impacts	0.006	0.061*	−0.069***	−0.007	0.003	0.025	0.015	0.004
	(0.028)	(0.034)	(0.021)	(0.029)	(0.024)	(0.030)	(0.028)	(0.031)
Pairwise comparisons (p-values)								
Blackouts vs. Env. Impacts	<0.001	0.497	0.0520	0.939	0.0730	0.842	<0.001	0.842
Mean "Saving Money"	0.611	0.693	0.859	0.836	0.751	0.799	0.523	0.796
N	1900	981	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.
Risk 1: The campaign makes me feel that the crisis will have consequences that might affect us all.
Risk 2: The campaign makes me feel that there is a real possibility of rationing and blackouts.

Table A.8
Motivations to save experiment - Secondary variables - Number of actions selected.

	Total actions		Low-impact actions		High-impact actions	
	UK	Chile	UK	Chile	UK	Chile
LBlackouts	0.050	0.414	0.036	0.238*	0.014	0.176
	(0.181)	(0.257)	(0.102)	(0.139)	(0.093)	(0.139)
Environmental impacts	−0.126	−0.039	−0.105	0.006	−0.021	−0.045
	(0.182)	(0.269)	(0.103)	(0.142)	(0.094)	(0.147)
Pairwise comparisons (p-values)						
Blackouts vs. Env. Impacts	0.336	0.088	0.170	0.101	0.707	0.127
Mean "Saving Money"	5.025	5.906	2.913	2.353	2.112	3.553
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Table B.1
Causes of the crisis experiment - 1: I strongly disagree, 2: I disagree, 3: I neither agree nor disagree, 4: I agree, 5: I strongly agree.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Climate change	0.065	0.118	−0.144**	0.033	−0.009	0.077
	(0.056)	(0.079)	(0.069)	(0.081)	(0.040)	(0.062)
Decommissioning	0.104*	0.107	−0.129*	−0.087	−0.048	−0.087
	(0.054)	(0.077)	(0.068)	(0.082)	(0.038)	(0.064)
War	0.131**	−0.066	−0.149**	−0.190**	−0.035	−0.286***
	(0.054)	(0.081)	(0.068)	(0.084)	(0.038)	(0.064)
Pairwise comparisons (p-values)						
CC vs. Decommissioning	0.458	0.884	0.831	0.125	0.345	0.009
CC vs. War	0.211	0.019	0.941	0.006	0.532	<0.001
Decommissioning vs. War	0.596	0.022	0.770	0.214	0.743	0.002
Mean "No cause for crisis"	3.864	4.216	3.576	4.235	3.690	3.834
N	1918	1309	1918	1309	1918	1309

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Controlled for age, gender, education and household income.

Table B.2
Industry efforts experiment - 1: I strongly disagree, 2: I disagree, 3: I neither agree nor disagree, 4: I agree, 5: I strongly agree.

	Intention		Sharing		Industry opinion		Govt. opinion	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile
Specific actions, source: Gov	−0.037	0.187**	−0.146**	0.198*	0.139**	0.314***	0.025	0.296***
	(0.052)	(0.082)	(0.063)	(0.103)	(0.061)	(0.110)	(0.064)	(0.100)
Specific actions, source: Ind	0.026	0.030	−0.110*	−0.167	0.455***	0.374***	−0.082	0.099
	(0.051)	(0.088)	(0.063)	(0.105)	(0.059)	(0.112)	(0.063)	(0.104)
Pairwise comparisons (p-values)								
Specific actions Gov vs. Ind	0.193	0.063	0.565	<0.001	<0.001	0.588	0.089	0.055
Mean "No specific actions"	3.628	4.095	2.553	3.379	2.695	2.825	2.401	2.962
N	1918	976	1918	976	1918	976	1918	976

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Controlled for age, gender, education and household income.

Table B.3
Motivations to save experiment - 1: I strongly disagree, 2: I disagree, 3: I neither agree nor disagree, 4: I agree, 5: I strongly agree.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Blackouts	−0.049	0.117	−0.006	0.165*	0.259***	0.092
	(0.054)	(0.081)	(0.064)	(0.085)	(0.049)	(0.074)
Environmental impacts	−0.125**	0.061	0.026	0.048	0.057	0.060
	(0.054)	(0.085)	(0.065)	(0.092)	(0.049)	(0.076)
Pairwise comparisons (p-values)						
Blackouts vs. Env. Impacts	0.167	0.494	0.628	0.190	<0.001	0.665
Mean "Saving Money"	3.796	4.109	2.970	3.930	3.583	4.161
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Controlled for age, gender, education and household income.

Table B.4
Industry efforts experiment - Regressions including removed fourth treatment in Chile - Proportion of "I agree" and "I strongly agree" answers.

	Intention Chile	Sharing Chile	Industry opinion Chile	Govt. opinion Chile
Specific actions, source: Gov	0.045	0.056	0.126***	0.133***
	(0.031)	(0.038)	(0.037)	(0.038)
Specific actions, source: Ind	0.029	−0.069*	0.102***	0.072*
	(0.033)	(0.039)	(0.038)	(0.038)
Original control	0.020	−0.002	0.032	0.053
	(0.032)	(0.039)	(0.037)	(0.037)
Pairwise comparisons (p-values)				
Specific actions Gov vs. Ind	0.608	0.001	0.529	0.122
Gov vs. Original control	0.420	0.135	0.013	0.037
Ind vs. Original	0.784	0.085	0.074	0.621
Mean "No specific actions"	0.757	0.506	0.364	0.367
N	1298	1298	1298	1298

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Controlled for age, gender, education and household income.

Table B.5
Motivations to save experiment - Regressions including removed fourth treatment in Chile - Proportion of "I agree" and "I strongly agree" answers.

	Intention Chile	Sharing Chile	Risk perception Chile
Blackouts	0.036	0.070**	0.015
	(0.031)	(0.034)	(0.027)
Environmental impacts	0.06	0.032	0.015
	(0.032)	(0.035)	(0.027)
Campaign Mascot	−0.011	0.021	−0.057*
	(0.032)	(0.035)	(0.029)
Pairwise comparisons (p-values)			
Blackouts vs. Env. Impacts	0.331	0.254	0.993
Blackouts vs. Campaign Mascot	0.139	0.150	0.012
Env. impacts vs. Campaign Mascot	0.610	0.762	0.012
Mean "Saving Money"	0.769	0.690	0.798
N	1309	1309	1309

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Controlled for age, gender, education and household income.

After finishing answering the questions of the second experiment, participants are presented with a demographic questionnaire. We asked about age, gender, employment, income, educational background, and, only for the UK, whether the respondent is primarily responsible for paying the energy bill. For Chile, we also asked one question intended for the Ministry of Energy (social media platforms regularly used) and 10 additional 5-point Likert scale questions of agreement. These questions were intended for potential follow-up surveys in case a campaign was launched.

- *I feel informed about the energy crisis in Chile*
- *I will make great efforts to conserve electricity*
- *Private companies are making great efforts to conserve electricity to help avoid blackouts in households*
- *If I realize that private companies are making investments to save electricity, it encourages me to conserve electricity at home*
- *The energy crisis is one the biggest issues the country is facing*
- *My energy-saving behaviours have an impact in reducing the likelihood of blackouts*
- *We have to learn to live with the possibility of energy shortages in the next years*
- *I am in favour of scheduled blackouts if they are announced in advance*
- *The Government is doing a good job in facing the energy crisis*
- *It is very likely there will be blackouts this winter in my county/neighborhood*

Table B.6
Causes of the crisis experiment - Proportion of "I agree" and "I strongly agree" answers - No covariates.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Climate change	0.019	0.029	−0.054*	−0.008	0.001	0.024
	(0.026)	(0.031)	(0.031)	(0.031)	(0.016)	(0.024)
Decommissioning	0.050*	0.060**	−0.075**	−0.041	−0.020	−0.016
	(0.026)	(0.030)	(0.031)	(0.032)	(0.016)	(0.024)
War	0.063**	0.000	−0.059*	−0.072**	−0.008	−0.083***
	(0.025)	(0.032)	(0.031)	(0.032)	(0.016)	(0.024)
Pairwise comparisons (p-values)						
CC vs. Decommissioning	0.226	0.282	0.524	0.310	0.223	0.097
CC vs. War	0.076	0.346	0.870	0.048	0.602	<0.001
Decommissioning vs. War	0.572	0.042	0.635	0.339	0.484	0.005
Mean "No cause for crisis"	0.778	0.790	0.637	0.812	0.675	0.690
N	1918	1309	1918	1309	1918	1309

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Table B.7
Industry efforts experiment - Proportion of "I agree" and "I strongly agree" answers - No covariates.

	Intention		Sharing		Industry opinion		Govt. opinion	
	UK	Chile	UK	Chile	UK	Chile	UK	Chile
Specific actions, source: Gov	−0.028	0.054*	−0.067***	0.054	0.047*	0.123***	0.016	0.129***
	(0.027)	(0.032)	(0.023)	(0.039)	(0.026)	(0.038)	(0.023)	(0.038)
Specific actions, source: Ind	−0.015	0.037	−0.058**	−0.069*	0.154***	0.098**	−0.041*	0.069*
	(0.027)	(0.033)	(0.023)	(0.039)	(0.027)	(0.039)	(0.022)	(0.039)
Pairwise comparisons (p-values)								
Specific actions Gov vs. Ind	0.647	0.586	0.687	0.001	<0.001	0.519	0.012	0.126
Mean "No specific actions"	0.656	0.757	0.249	0.506	0.276	0.364	0.217	0.367
N	1918	976	1918	976	1918	976	1918	976

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Table B.8
Energy-saving actions experiment - Number of actions selected - No covariates.

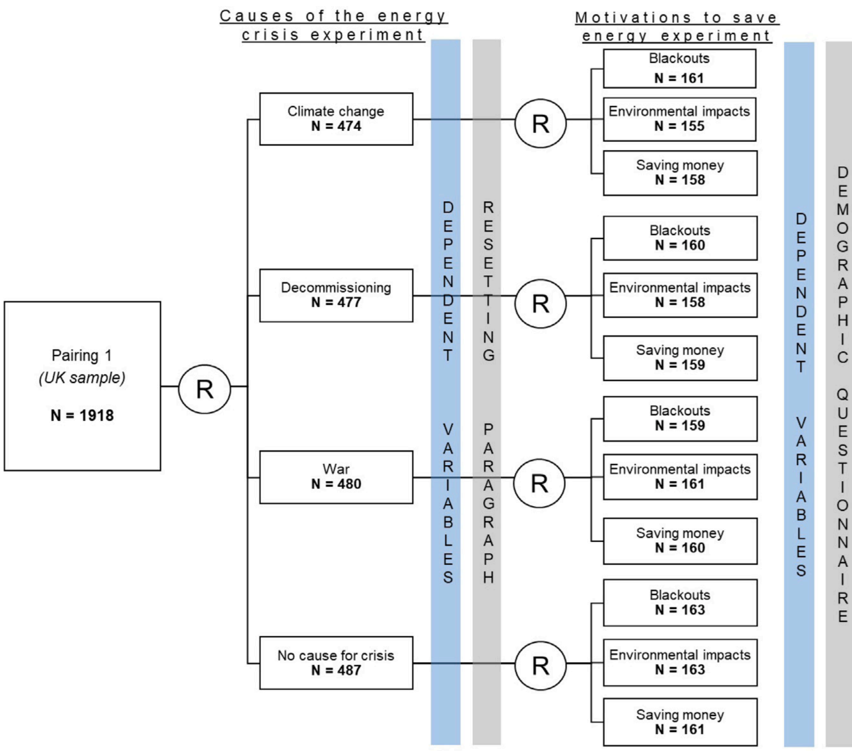
	Total actions		Low-impact actions		High-impact actions	
	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.402*	0.205	0.119	0.017	0.283**	0.188
	(0.227)	(0.255)	(0.126)	(0.140)	(0.114)	(0.137)
Low-impact only			0.212*	0.321**		
			(0.126)	(0.131)		
High-impact only					0.387***	0.368***
					(0.115)	(0.130)
Pairwise comparisons (p-values)						
Labeled vs. Low-Impact			0.468	0.023		
Labeled vs. High-Impact					0.371	0.191
Mean "All actions-No labels"	4.888	6.153	2.832	3.653	2.055	2.500
N	1918	1298	1435	964	1442	975

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

Table B.9
Motivations to save experiment - Proportion of "I agree" and "I strongly agree" answers - No covariates.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Blackouts	−0.028	0.045	0.005	0.082**	0.112***	0.023
	(0.024)	(0.032)	(0.027)	(0.034)	(0.021)	(0.028)
Environmental impacts	−0.079***	0.012	0.018	0.040	0.009	0.022
	(0.025)	(0.033)	(0.027)	(0.036)	(0.022)	(0.028)
Pairwise comparisons (p-values)						
Blackouts vs. Env. Impacts	0.044	0.292	0.626	0.223	<0.001	0.954
Mean "Saving Money"	0.753	0.769	0.368	0.690	0.636	0.798
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Linear probability models controlling for age, gender, education and household income.

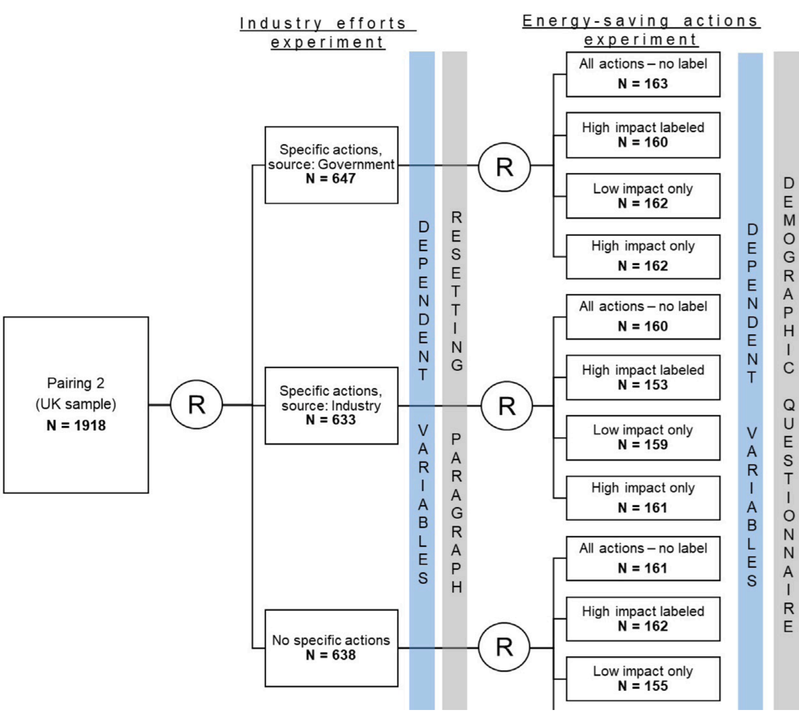


Experimental pairing 1
Causes of the energy crisis – Motivations to save energy
(UK sample)

Causes of the energy crisis experiment	N
Climate change	474
Decommissioning	477
War	480
No cause for crisis (control)	487
Total	**1918**

Motivations to save energy experiment	N
Blackouts	638
Environmental impacts	637
Saving money (control)	638
Total	**1900**

Fig. C.1. Flow diagram for *Causes of the crisis* and *Motivations to Save* pairing in the UK.

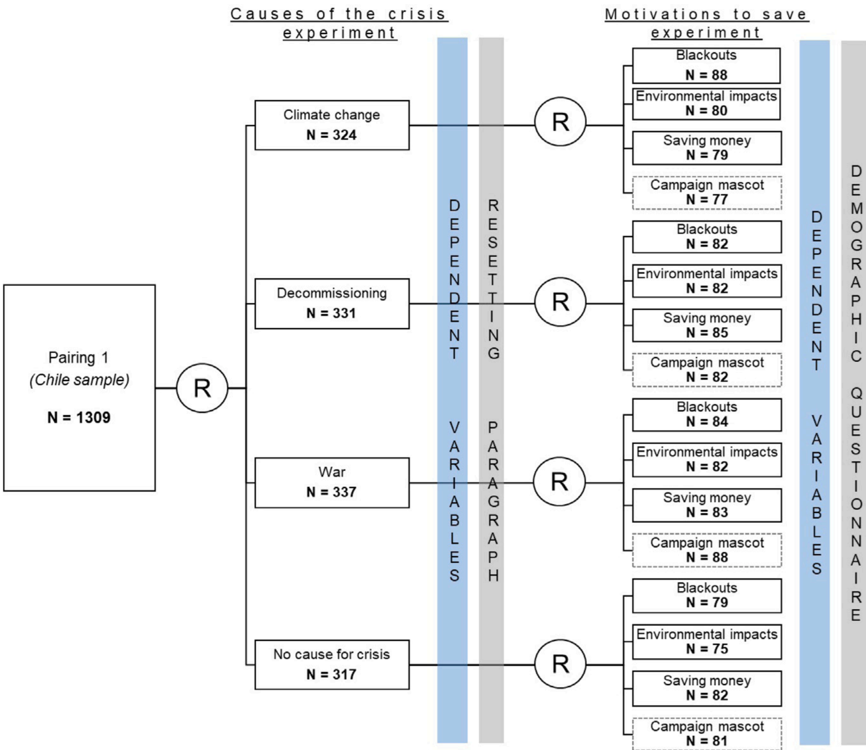


Experimental pairing 2
Industry efforts – Energy-saving actions
(UK sample)

Industry efforts experiment	N
Specific actions, source: Government	647
Specific actions, source: Industry	633
No specific actions (control)	638
Total	**1918**

Energy saving actions experiment	N
High-impact labeled	475
Low-impact only	476
High impact only	483
All actions – no label (control)	484
Total	**1918**

Fig. C.2. Flow diagram for *Industry efforts* and *Energy-saving actions* pairing in the UK.

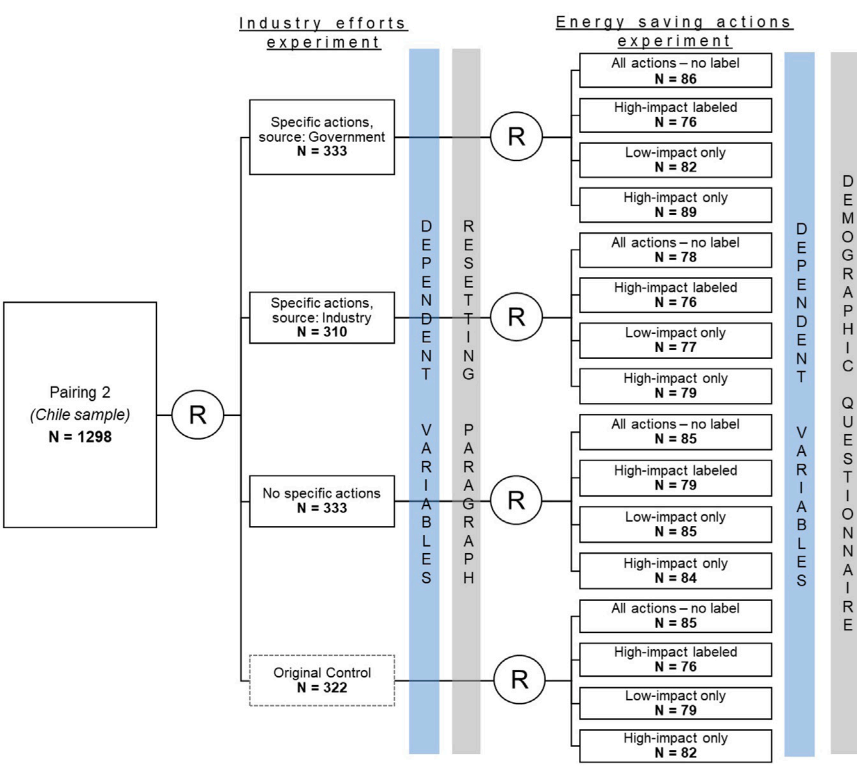


Experimental pairing 1
Causes of the energy crisis – Motivations to save energy
(Chile sample)

Causes of the energy crisis experiment	N
Climate change	324
Decommissioning	331
War	249
No cause for crisis (control)	317
Total	**1309**

Motivations to save energy experiment	N
Blackouts	333
Environmental impacts	319
Saving money (control)	329
Campaign mascot	*328*
Total	*1309* **(981)**

Fig. C.3. Flow diagram for *Causes of the crisis* and *Motivations to Save* pairing in Chile. Observations for the "Campaign mascot" treatment were not included in the analysis.



Experimental pairing 2
Industry efforts-energy saving actions
(Chile sample)

Industry efforts experiment	N
Specific actions, source: Government	333
Specific actions, source: Industry	310
No specific actions (control)	333
Original Control	*322*
Total	*1298* **(976)**

Energy saving actions experiment	N
All actions – no label	334
High-impact labeled	307
Low-impact only	323
High-impact only	334
Total	**1298**

Fig. C.4. Flow diagram for *Industry efforts* and *Energy-saving actions* pairing in Chile. Observations for the "Original Control" treatment were not included in the analysis.

Newspaper logo

Este invierno habrá menos electricidad disponible

El mayor sistema de energía nacional entrega electricidad entre Arica y Quellón, también con dos sistemas medianos para la Patagonia. En Chile, si estos sistemas no tienen suficiente capacidad para la generación eléctrica, habrá una crisis energética y posibles cortes de luz.

Newspaper logo

Este invierno habrá menos electricidad disponible debido al cambio climático

El cambio climático no sólo tiene consecuencias catastróficas para el medioambiente, también ha provocado sequías y escasez de agua. En Chile, donde no hay suficiente agua para la generación eléctrica, habrá una crisis energética y posibles cortes de luz.

Newspaper logo

Este invierno habrá menos electricidad disponible debido al retiro de centrales a carbón

La carbono neutralidad reduce los impactos del cambio climático, pero requiere de retirar centrales de carbón, para reemplazarlas por energía renovable. En Chile, donde no se cuenta con suficiente energía renovable, habrá una crisis energética y posibles cortes de luz.

Newspaper logo

Este invierno habrá menos electricidad disponible debido a la guerra en Ucrania

La guerra entre Rusia y Ucrania no sólo tiene consecuencias humanitarias catastróficas, también ha provocado escasez de combustibles. En Chile, donde no se puede importar suficiente combustible para la generación eléctrica, habrá una crisis energética y posibles cortes de luz.

Fig. C.5. *Causes of the crisis* treatments for Chile. From left to right, from top to bottom: No cause for crisis; Climate change; Decommissioning of coal-fired plants; and Ukraine–Russia War.

Newspaper logo

This winter, less electricity will be available

The National Grid supplies electricity to most of the UK, including England, Wales, Scotland, and surrounding islands. Countries like the UK, with a national grid, will face an energy crisis during the winter that might lead to blackouts.

Newspaper logo

This winter, less electricity will be available due to the impacts of climate change

Climate change has catastrophic consequences on the environment, causing droughts, temperature changes, and unpredictable wind patterns. Countries like the UK, where there are significant climate-related risks, will face an energy crisis during the winter that might lead to blackouts.

Newspaper logo

This winter, less electricity will be available because polluting power plants are being shut down

Achieving net zero emissions is essential to reducing the impacts of climate change, but it means decommissioning coal-fired power plants. Countries like the UK, which are making efforts in this direction, will face an energy crisis during the winter that might lead to blackouts.

Newspaper logo

This winter, less electricity will be available due to the Russia-Ukraine war

The Russia-Ukraine war is having catastrophic consequences for the people involved and has also caused a fuel shortage worldwide. Countries like the UK, where the local energy system is dependent on imported fuel, will face an energy crisis during the winter that might lead to blackouts.

Fig. C.6. *Causes of the crisis* treatments for the UK. From left to right, from top to bottom: No cause for crisis; Climate change; Decommissioning of coal-fired plants; and Ukraine–Russia War.

Fig. C.7. *Industry efforts* treatments for Chile. From left to right, from top to bottom: Original control (not considered for analysis); No specific actions; Specific actions, source: Government; Specific actions, source: Industry.

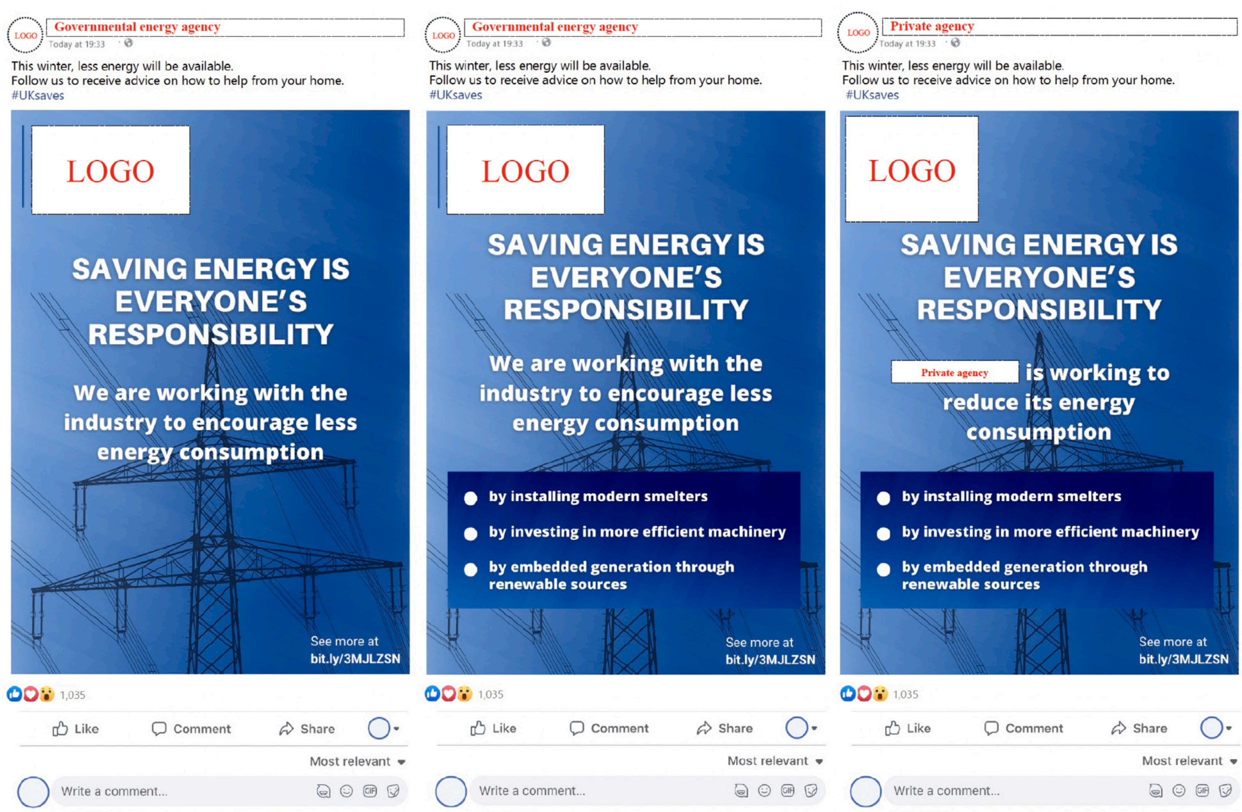


Fig. C.8. *Industry efforts* treatments for the UK. From left to right: No specific actions; Specific actions, source: Government; Specific actions, source: Industry.

Fig. C.9. *Motivations to save* treatments for Chile. From top to bottom: Saving money, Blackouts, Environmental impacts. The "campaign mascot" treatment is not included as it tested specific proprietary content for a prospective Government-sanctioned campaign in Chile.

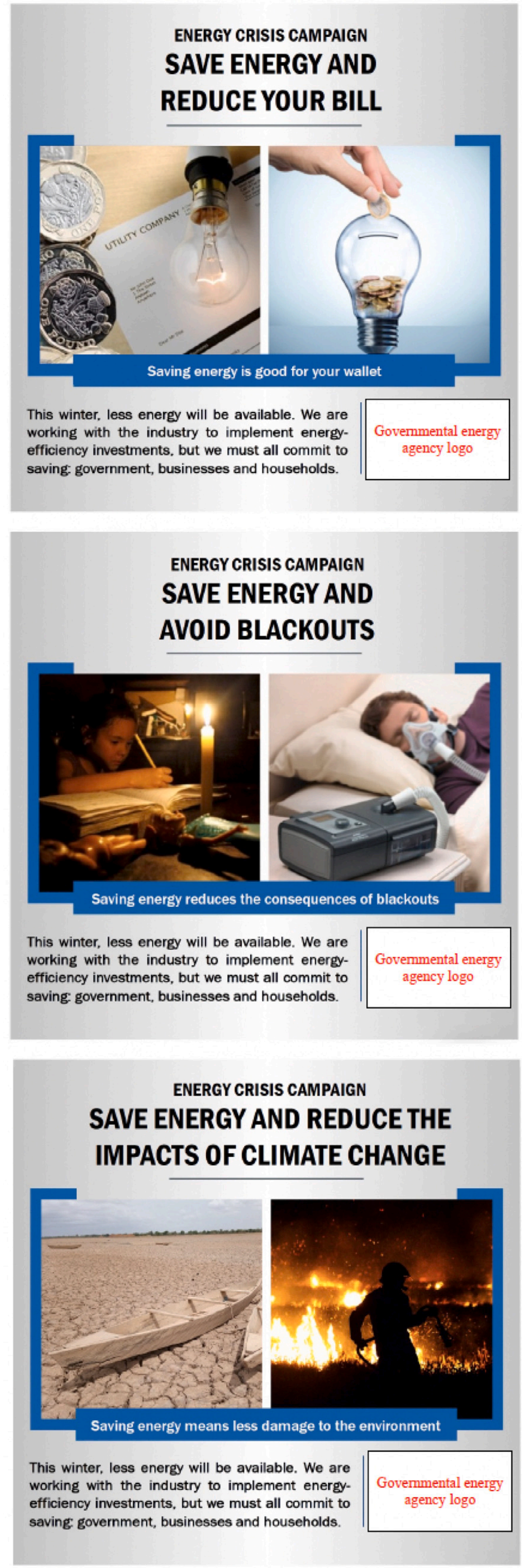


Fig. C.10. Motivations to save treatments for the UK. From top to bottom: Saving money, Blackouts, Environmental impacts.

Appendix D. Cross-experiment effects

This section explores the potential order and cross-experiment effects of the first experiment into the second experiment for each pairing: *Industry efforts* potential treatments effects on *Energy-saving actions* dependent variables and *Causes of the crisis* treatments potential effects on *Motivations to save* dependent variables.

Tables D.1 and D.2 present the results for the main dependent variables of the *Energy-saving actions* and *Motivations to save* experiments, when controlling for the *Industry efforts* and *Causes of the crisis* treatments, respectively. Table D.3 presents the results for the main dependent variables of the *Energy-saving actions* experiment interacting its treatments with the *Industry efforts* treatments. Table D.4 presents the results for the main dependent variables of the *Motivations to save* experiment interacting its treatments with the *Causes of the crisis* treatments.

Appendix E. Dependent variables summary

Tables E.1 and E.2 provide an overview of the dependent variables measured in the experiments. Table E.1 categorizes these variables by experiment, specifying their measurement scale, the specific construct they represent, and the corresponding results tables where they are analyzed. The dependent variables capture key dimensions, including behavioral intention to save energy, willingness to share information, risk perception, attention, understanding, and attitudes and perceived responsibility toward institutional actors. The primary outcomes, as defined in the study's pre-registration, are presented in the main text, while secondary outcomes are detailed in Appendix A. Table E.2 presents the low and high impact actions recommended to participants in the Energy-saving actions and Motivations to save experiments. Results for the likelihood of participants committing to a specific action for the Energy-saving actions experiment can be found in Tables A.5 and A.6.

The survey questions were developed specifically for this study but were informed by common themes and prior work in behavioral decision research. To ensure clarity and validity, qualitative interviews and pilot testing were conducted in Chile. The items were then translated from Spanish to English and optimized using artificial intelligence tools to enhance linguistic equivalence. Native English speakers reviewed the translated items to verify their clarity and accuracy. Cultural adaptations were made to account for differences in energy usage and conservation practices between Chile and the UK. Specifically, the research team incorporated energy-saving actions recommended by local Governments in both countries to ensure contextual relevance. This process enabled the development of culturally sensitive and contextually appropriate survey items, facilitating an accurate assessment of the dependent variables in both countries.

Table D.1
Energy-saving actions experiment controlling for *Industry efforts* treatments - Number of actions selected.

	Total actions		Low-impact actions		High-impact actions	
	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.436*	0.231	0.132	0.041	0.304***	0.203
	(0.226)	(0.248)	(0.125)	(0.137)	(0.113)	(0.133)
Low-impact only			0.233*	0.336***		
			(0.125)	(0.128)		
High-impact only					0.410***	0.378***
					(0.114)	(0.125)
Pairwise comparisons (p-values)						
Labeled vs. Low-Impact			0.423	0.026		
Labeled vs. High-Impact					0.356	0.194
Mean "All actions-No labels"	4.888	6.153	2.832	3.653	2.055	2.500
N	1918	1298	1435	964	1442	975

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education, household income, and *Industry efforts* treatments.

Table D.2
Motivations to save experiment controlling for *Causes of the crisis* treatments - Proportion of "I agree" and "I strongly agree" answers.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Blackouts	−0.026	0.036	0.002	0.069**	0.107***	0.015
	(0.025)	(0.031)	(0.027)	(0.034)	(0.021)	(0.027)
Environmental impacts	−0.078***	0.006	0.021	0.031	0.009	0.015
	(0.025)	(0.032)	(0.027)	(0.035)	(0.022)	(0.027)
Pairwise comparisons (p-values)						
Blackouts vs. Env. Impacts	0.044	0.328	0.494	0.260	<0.001	0.997
Mean "Saving Money"	0.753	0.769	0.368	0.690	0.636	0.798
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education, household income, and *Causes of the crisis* treatments.

Table D.3
Energy-saving actions experiment (Industry efforts interactions) - Number of actions selected.

	Total actions		Low-impact actions		High-impact actions	
	UK	Chile	UK	Chile	UK	Chile
High-impact labeled	0.733*	−0.075	0.279	−0.244	0.459**	0.161
	(0.382)	(0.522)	(0.216)	(0.290)	(0.192)	(0.265)
Low-impact only			0.351	0.350		
			(0.218)	(0.264)		
High-impact only					0.456**	0.360
					(0.190)	(0.249)
Specific actions, source: Gov	0.498	−0.383	0.249	−0.080	0.254	−0.314
	(0.386)	(0.479)	(0.218)	(0.273)	(0.193)	(0.244)
Specific actions, source: Ind	0.570	0.694	0.265	0.458*	0.316	0.204
	(0.385)	(0.453)	(0.214)	(0.252)	(0.194)	(0.249)
No specific actions		−0.169		−0.082		−0.067
		(0.483)		(0.277)		(0.242)
Labeled × SA (Gov)	−0.648	0.311	−0.307	0.231	−0.325	0.111
	(0.549)	(0.733)	(0.308)	(0.409)	(0.276)	(0.381)
Labeled × SA (Ind)	−0.265	0.402	−0.136	0.388	−0.139	0.083
	(0.549)	(0.685)	(0.305)	(0.375)	(0.278)	(0.375)
Labeled × No specific actions		0.521		0.524		−0.036
		(0.717)		(0.396)		(0.372)
LI × SA (Gov)			−0.380	0.104		
			(0.309)	(0.368)		
LI × SA (Ind)			0.031	−0.437		
			(0.303)	(0.365)		
LI × No specific actions				0.257		
				(0.368)		
HI × SA (Gov)					−0.146	0.399
					(0.277)	(0.346)
HI × SA (Ind)					0.008	−0.269
					(0.277)	(0.370)
HI × No specific actions						−0.097
						(0.347)
F	23.83	28.65	2.93	3.72	3.94	5.91
p-value (F-test)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
N	1918	1298	1435	964	1442	975

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

Table D.4
Motivations to save experiment (Causes of the crisis interactions) - Proportion of "I agree" and "I strongly agree" answers.

	Intention		Sharing		Risk perception	
	UK	Chile	UK	Chile	UK	Chile
Blackouts	−0.035	0.026	0.053	0.105	0.105**	−0.040
	(0.050)	(0.062)	(0.054)	(0.070)	(0.043)	(0.053)
Environmental impacts	−0.117**	0.041	0.028	0.052	−0.026	0.022
	(0.051)	(0.062)	(0.054)	(0.071)	(0.044)	(0.049)
Climate change	−0.016	−0.029	0.021	0.033	−0.016	−0.056
	(0.049)	(0.065)	(0.054)	(0.072)	(0.045)	(0.056)
Decommissioning	−0.001	−0.017	−0.002	0.006	−0.042	−0.047
	(0.049)	(0.064)	(0.054)	(0.072)	(0.044)	(0.053)
War	0.049	0.010	0.016	0.045	0.032	−0.033
	(0.047)	(0.063)	(0.054)	(0.071)	(0.042)	(0.053)
Blackouts × CC	0.057	0.001	−0.033	−0.049	0.021	0.101
	(0.070)	(0.090)	(0.077)	(0.098)	(0.061)	(0.076)
Blackouts × Decom	0.015	0.065	−0.108	−0.003	0.018	0.103
	(0.070)	(0.086)	(0.076)	(0.097)	(0.061)	(0.075)
Blackouts × War	−0.036	−0.024	−0.066	−0.091	−0.033	0.012
	(0.069)	(0.086)	(0.077)	(0.095)	(0.059)	(0.077)
Env Imp × CC	0.035	0.009	0.036	−0.011	0.081	0.024
	(0.073)	(0.089)	(0.078)	(0.099)	(0.062)	(0.074)
Env imp × Decom	0.083	−0.027	−0.026	0.017	0.074	0.024
	(0.072)	(0.088)	(0.077)	(0.098)	(0.063)	(0.071)
Env imp × War	0.038	−0.119	−0.039	−0.088	−0.010	−0.076
	(0.070)	(0.091)	(0.076)	(0.100)	(0.060)	(0.076)
F	1.62	4.08	1.39	3.73	4.06	3.94
p-value (F-test)	0.044	<0.001	0.120	<0.001	<0.001	<0.001
N	1900	981	1900	981	1900	981

Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.
Linear probability models controlling for age, gender, education and household income.

Table E.1
Summary of Dependent variables, Measurement scales, and Constructs across experiments.

Experiment	Dependent variable	Construct	Table
Causes of the crisis	I'll make great efforts to save energy.	Behavioral intention	Table 2
	I'll share information about the energy crisis with friends and family.	Information-sharing intention	Table 2
	Risk Index (simple average of the four risk perception items)	Risk perception	Table 2
	– There is a real possibility of energy rationing or blackouts.	Risk perception, Perceived likelihood of blackouts	Table A.2
	– I'm in favour of scheduled blackouts if they are necessary.	Risk perception, Perceived acceptability of mitigation measures (scheduled blackouts)	Table A.2
	– The energy crisis is one of the most important issues for the country.	Risk perception, Perceived severity of the energy crisis	Table A.2
	– The government should invest significant resources to reduce the likelihood of blackouts.	Risk perception, Perceived necessity of risk mitigation measures.	Table A.2
	The content of the article caught my attention.	Attention	Table A.1
	I clearly understood from the article why less energy will be available.	Understanding	Table A.1
Motivations to save	The campaign encourages me to contribute by saving energy at home.	Behavioral intention	Table 6
	I'll share the campaign with friends and family.	Information-sharing intention	Table 6
	Risk Index (simple average of the two risk perception items)	Risk perception	Table 6
	– The campaign makes me feel that the crisis will have consequences that might affect us all.	Risk perception, Perceived vulnerability to the crisis	Table A.7
	– The campaign makes me feel that there is a real possibility of rationing and blackouts.	Risk perception, Perceived likelihood of blackouts	Table A.7
	The information on the campaign caught my attention.	Attention	Table A.7
	The information on the campaign is easy to understand.	Understanding	Table A.7
Industry efforts	I'll make great efforts to save energy.	Behavioral intention	Table 3
	I'll share the campaign with friends and family.	Information-sharing intention	Table 3
	The information in the campaign caught my attention.	Attention	Table A.3
	The information in the campaign was easy to understand.	Understanding	Table A.3
	I have a good opinion about the efforts of the industry to tackle the energy crisis.	Attitude towards industry	Table 3
	I have a good opinion about the efforts of the government to tackle the energy crisis.	Attitude towards government	Table 3
	Suppose the country must make a 100% effort to avoid blackouts by either saving energy or investing in efficient technology. How would you distribute the effort among industry, the government, and households? All three options must total 100, where 0 represents "no effort at all" and 100 "should make all the effort".		
	– Industry (%)	Perceived responsibility of industry in addressing the crisis	Table A.4
	– Government (%)	Perceived responsibility of Government in addressing the crisis	Table A.4
	– Household (%)	Perceived responsibility of households in addressing the crisis	Table A.4
Energy-saving actions	Total number of energy-saving actions committed to.	Behavioral commitment	Table 4
	Number of high-impact energy-saving actions committed to.	Behavioral commitment	Table 4
	Number of low-impact energy-saving actions committed to.	Behavioral commitment	Table 4

Dependent variables were categorized as primary or secondary in the pre-registration, with primary outcomes reported in the main text and secondary outcomes in Appendix A.
Participants responded to the opinion statements using a 5-point Likert scale, with response options ranging from "Strongly Agree" to "Strongly Disagree".
The Risk Index was measured on a 0.0–1.0 scale. Responsibility distribution required participants to allocate 100% across three categories (industry, Government, and households).

Table E.2
Summary of energy-saving actions and constructs.

Country	Dependent variable (Energy saving action)	Construct	Table
Chile	I will take out all necessary food items from the fridge at once.	Low-impact action	Table A.6
	I will unplug electrical appliances and chargers when not in use.	Low-impact action	Table A.6
	I will turn off the lights when leaving a room.	Low-impact action	Table A.6
	I will unplug my cellphone once charged.	Low-impact action	Table A.6
	I will wash full loads of clothes.	Low-impact action	Table A.6
	I will install insulation strips in doors and windows.	High-impact action	Table A.5
	I will avoid using the dryer and prefer hanging and air-drying laundry.	High-impact action	Table A.5
	I will change all my old light bulbs to LED or other energy-efficient light bulbs.	High-impact action	Table A.5
	I will replace my old appliances by energy-efficient A-labelled models.	High-impact action	Table A.5
	I will reduce my consumption of electricity between 8-10PM.	High-impact action	Table A.5
UK	I will take out all necessary food items from the fridge at once.	Low-impact action	Table A.6
	I will unplug electrical appliances and chargers when not in use.	Low-impact action	Table A.6
	I will clean my windows to allow more sunlight in.	Low-impact action	Table A.6
	I will allow hot food to cool before putting it in the fridge.	Low-impact action	Table A.6
	I will thaw food in a refrigerator or sink instead of using a microwave.	Low-impact action	Table A.6
	I will install insulation in walls and roofs.	High-impact action	Table A.5
	I will avoid using the dryer and prefer hanging and air-drying laundry.	High-impact action	Table A.5
	I will change all my old light bulbs to LED or other energy-efficient light bulbs.	High-impact action	Table A.5
	I will replace my old appliances by energy-efficient A-labelled models.	High-impact action	Table A.5
	I will lower my thermostat by at least 2 °C.	High-impact action	Table A.5

Energy-saving actions were recorded as binary variables (1 = selected, 0 = not selected) in a select-all-that-apply format, allowing participants to choose from none to all options.

Data availability

Data will be made available on request.

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