

## Article

# Ideology as Filter: Motivated Information Processing and Decision-Making in the Energy Domain

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**Abstract:** The transition towards more renewable energy will substantially increase voters' involvement in the political decision-making process in the energy domain. Decisions such as whether to approve or reject large-scale energy programs can be complex, especially when available information cues are numerous and conflicting. Here, we hypothesize that political ideology is a strong determinant in this process, serving as a filter that voters apply when evaluating the relevance of provided information cues. We tested this hypothesis in the context of the 2017 Public Vote on the Swiss Energy Act. A sample of  $n = 931$  Swiss voters were presented with arguments in favor or against the Energy Act, which were framed in terms of values found to be relevant for liberal and conservative ideologies, respectively. Political ideology strongly determined individual attitudes and voting preferences. Political ideology moreover moderated the influence of information provision on decisions, in that arguments congruent with voters' political ideology were more likely to be evaluated as personally relevant and integrated into their decisions. We discuss the implications of our findings for measures on how to address ideology-based decision-making in order to ensure a well-informed electorate.

**Keywords:** political ideology; voter preferences; information processing; real-world political events; argument framing; Swiss Energy Act; public acceptance; political decision-making; motivated reasoning

## 1. Introduction

On 21 May 2017 the Swiss electorate approved the Swiss Energy Act with a majority of 58.2% of votes, providing political authorities with the mandate to advance the energy transition in Switzerland. The Swiss Energy Act is built on multiple legislative components, which vary concerning uncertainties, benefits, and costs. Information sent out by the different political stakeholders on the consequences of the Energy Act was moreover largely contradictory, making it difficult for the voter to evaluate the relevance of the different information cues. In this contribution, we address the question how voters form and update their attitudes, judgments, and decisions concerning such complex political energy programs. We suggest that political ideology (on a spectrum from liberal to conservative) constitutes a major determinant of decision-making processes in complex political decision scenarios such as under the Swiss Energy Act.

We suggest that political ideology has two important functions for voters' decision-making process: It serves as a filter for information cues as well as a mental framework of shared beliefs and values [1]. That is, political ideology acts on judgment and decision-making by (i) allowing voters to evaluate and prioritize information, and (ii) by serving as a source of information in itself (see also: [2,3]). We investigated the pervasive influence of political ideology on information processing

and political judgment and decision-making in the context of the 2017 Public Vote on the Swiss Energy Act. We examined a large sample of Swiss voters about two weeks before the public vote and analyzed the impact of political ideology on their information evaluation and voting preferences. We expected political ideology (i) to have a substantial direct impact on voters' attitudes and voting preferences and (ii) to modulate the extent to which voters evaluate and integrate specific new information concerning the Energy Act. That is, we assumed that arguments about the Energy Act would be more likely to be evaluated as personally relevant and integrated into the decision process when they are in line with the values and pre-existing attitudes compatible with the underlying political ideology.

### *1.1. The Impact of Political Ideology on Judgments and Decisions*

Political ideology is classically represented on a continuum from left to right, representing the range from liberal to conservative ideology [1,2]. Liberal ideology emphasizes topics such as change, socialism, equality, and progressiveness, while conservative ideology emphasizes topics such as nationalism, maintenance, order/hierarchy, traditionalism, and individualism [1]. Research in political psychology and the political sciences has revealed substantial differences in perception, beliefs, judgments, and decisions as a function of an individual's positions along the political ideology spectrum [1].

Climate change beliefs have become a prototypical example of how political ideology may shape individual cognition and contribute to the polarization of societal groups [4–7]. Meta-analytic and cross-national research has illustrated that political ideology is among the most influential determinants of individual climate change beliefs, with effects most pronounced in the United States [8,9]. Of particular importance for the present research, the effects of political ideology are not restricted to individual beliefs, but translate into ideology-driven decision outcomes, for instance in the energy domain. Decisions to take part in innovative renewable energy communities were determined by political ideology, in that conservatives were less willing to take part in a renewable energy community scheme than liberals [10]. An ideology divide was also identified for energy mix choices, with liberals including a larger proportion of added renewable energy in energy portfolios than conservatives [11]. The share of liberals among early adopters of private solar panels was higher than the share of conservatives [12]. Liberal ideology and orientation to liberal parties was associated with elevated support for renewable energy projects and policies, as well as with stronger support for the Swiss Energy Act [3,13,14].

The significant influence of political ideology on energy decisions in general and renewable energy policy decisions in particular can be explained by the function of political ideology as an overarching mental framework of shared value and belief systems [1,15,16]. Research conducted across many countries has shown that conservatism is associated with values referring to conformity and tradition, whereas liberalism is associated with values referring to universalism (e.g., equality), benevolence (e.g., taking care of others), and openness to change [15,17–19]. Applying these systematic differences in core values to the domain of renewable energy policy acceptance, political ideology thus may serve as an internal benchmark indicating whether a project is line with one's principal values and goals [20,21]. Following this rationale, an observed higher approval of renewable energy projects by liberals can be explained by the forward-looking and status quo-changing nature of renewable energy projects that speak to liberal values such as openness to change. The lower approval by conservatives can be explained by the fact that the policies oppose conservative values such as tradition. Combined with the reluctance to support renewable energies due to an aversion to policy regulations associated with conservatism, these value differences across the liberal-conservative spectrum may help explain the observed differences in policy acceptance [22].

In parallel to the literature on the value basis of different ideologies, research based on moral foundation theory has demonstrated that liberal and conservative ideologies are grounded in different moral pillars [23,24]. According to this theory, moral concerns and judgments are shaped by five moral intuitions, i.e., harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity

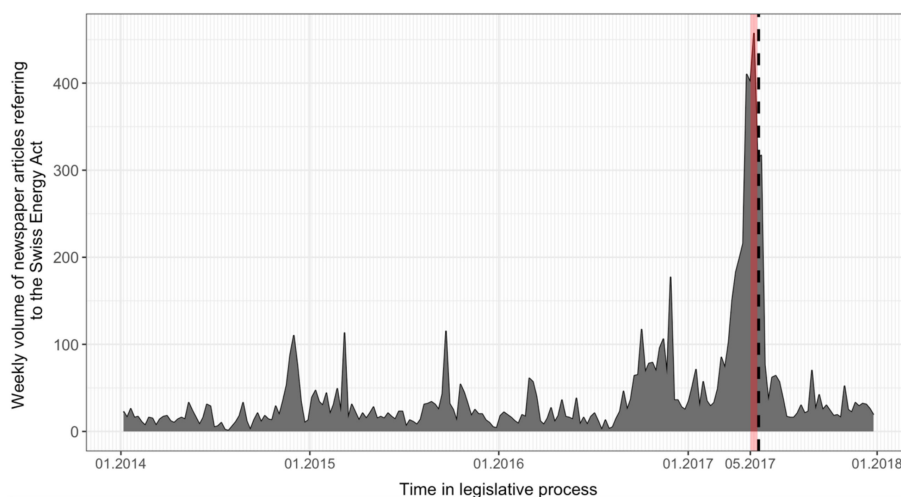
([25], for a breakdown of the five moral foundations see: [26]). Liberals tend to endorse the harm/care and fairness/reciprocity moral foundations, whereas conservatives tend to endorse the ingroup/loyalty, authority/respect, and purity/sanctity moral foundations [27]. Communications about environmental issues are primarily framed in terms of moral foundations which are more strongly endorsed by liberals (e.g., highlighting the harm inflicted to the environment), which may partly explain the lower environmental policy support by conservatives [28]. Indeed, reframing environmental messages in terms of conservative-oriented moral foundations (e.g., highlighting how the purity of nature is endangered) increased environmental policy support among conservatives, resulting in equal support ratings across partisans [28]. In the same line, framing messages in terms of authority and loyalty moral foundations increased conservatives' environmental attitudes, intentions, and behaviors compared to a framing based on harm/care moral foundations [29,30]. These fundamental differences in moral foundations thus provide a complementary explanation for the impact of political ideology on environmental judgments and decisions.

Taken together, the study of political ideology has illustrated that an individual's position along the ideological continuum largely influences their beliefs, judgments, and decisions in the climate and energy domain. This influence can to some extent be attributed to the different value and morality bases of liberal and conservative ideologies. In the present research, we aimed to investigate these impacts in the context of the 2017 Public Vote on the Swiss Energy Act. We provided voters with information on the Energy Act which was either framed in terms of liberal or conservative values and moral foundations, assuming that an ideology-congruent framing of supportive and opposing arguments would lead to more positive and negative attitudes and preferences with regards to the Energy Act, respectively.

### *1.2. The Impact of Political Ideology on Information Processing*

As reviewed above, political ideology has a direct influence on our beliefs, attitudes, and decisions. In addition to this direct effect, ideology exerts an indirect influence by determining how individuals select and process relevant information [11,21,31]. Political ideology may thus operate as a means to facilitate information processing, allowing individuals to evaluate information as relevant or irrelevant and prioritize relevant information in an efficient way [2,32]. In a charged political environment such as a pre-election period, the amount of information available to the voter can reach excessive levels (see Figure 1 for the example of the Swiss Energy Act). This may result in conflicting information cues from different stakeholders with opposing interests. For instance, conservative parties claimed that the Swiss energy transition would be two orders of magnitude more expensive compared to estimates by more liberal parties (see Section 1.3). Processing the large amount of available information is often impossible, forcing voters to base their attitudes and decisions on available information cues that are congruent with their values and pre-existing attitudes [2,33–35].

The differences in values and moral concerns underlying political ideology may result in the very same information being processed and prioritized differently, depending on one's position along the liberal-conservative continuum [2,35]. It has been argued that it is important to match an argument to the recipient's personal concerns and values, otherwise the argument is less likely to be judged as personally relevant, and less likely to be integrated into the consideration process [36]. Consistent with this notion, liberals evaluated arguments framed in terms of liberal moral foundations (i.e., fairness) as more persuasive than the same arguments framed in terms of more conservative moral foundations (i.e., loyalty). Perceiving the message as congruent with one's values was moreover related to stronger acceptance of the message [37]. Applying this principle to the energy domain, we tested whether the framing of new information on the Energy Act in terms of ideology-specific values and moral concerns influences how voters evaluate the information as personally relevant, depending on their ideology.



**Figure 1.** Newspaper coverage of the Swiss Energy Act in Switzerland from 1 January 2014, to 30 November 2017. The solid red line shows the period of data collection (i.e., the first two weeks of May 2017), the dotted line indicates the date of the public vote on the Energy Act. Data was retrieved from the Swiss newspaper database “Swissdox” by searching for the keywords “Energy law”, and “Energy strategy 2050” in German (i.e., “Energiegesetz” and “Energiesstrategie 2050”) and French (i.e., “loi sur l’énergie” and “stratégie énergétique 2050”). Search queries focused on 16 French-speaking newspapers and 63 German-speaking newspapers (see Appendix A for the complete list of newspapers included in the search query), resulting in a total of 8673 newspapers articles.

Information processing is moreover influenced by the extent to which a message is perceived to be compatible with one’s pre-existing attitudes toward the object. Arguments incompatible with one’s prior attitudes are judged to be weaker and interpreted in a way that allows decision makers to keep their prior position [33,34,38]. This process can render individuals insensitive to new information and even increase the belief divide among partisans [32,39]. For instance, experimentally inducing either positive or negative attitudes towards Carbon Capture and Sequestration (CCS) prior to detailed information provision affected how participants evaluated the subsequent information about the technology: participants with induced positive attitudes reported more confidence in supporting information than participants with induced negative attitudes. The induced motivated information processing resulted in stable preferences that were insensitive to detailed information provision [39]. In light of the significant influence of political ideology on attitude and preference formation (see Section 1.1), we suggest here that political ideology also serves as an underlying driver of biased assimilation of new information [35,40].

### 1.3. The 2017 Swiss Energy Act

Initiated in the wake of the Fukushima 2011 nuclear disaster, the Swiss Energy Act (Swiss EnA) was approved in September 2016 by the Swiss federal council [41]. Substituting for the federal energy law of 1998, the EnA outlined the Swiss Energy Strategy to reach national energy and environmental goals for 2050. Three major objectives were defined [41]: (1) The development of a secure supply and distribution of affordable and environmentally friendly energy (Art. 1). (2) The promotion of efficient and parsimonious energy use by decreasing energy consumption in 2035 by 43% compared to the 2000 level (Art. 45). (3) The provision of 480 million francs (491.2 million USD) per year in financial subsidies to incentivize the transition toward an energy supply based on locally generated renewable energy (e.g., by funding geothermal projects, Art. 33), fading out nuclear power (source of 38% of Swiss energy) [41,42].

The economic implications of the law ignited the political debate: the conservative Swiss People’s Party (Swiss People’s Party, SPP) publicly opposed the legislation and collected the signatures required

by the Swiss direct democratic system to trigger a national referendum [43]. The SPP claimed that the legislation would cost Swiss families 3200 francs more per year [44,45]. They further argued that the legislation would increase energy costs, increase bureaucracy, and that the energy supply would be more dependent on extranational imports due to the unreliability of renewables [44].

The new law was championed by its proponents, the Green Party (Les verts), and the other left-leaning Swiss parties. Their argument focused on renewable energies being locally sourced, with higher supply standards and lower environmental impacts [46], while rejecting the cost figures put forward by the SPP, arguing instead that the taxation increase would only amount to 40 francs [43]. Centrist parties also had a favorable position towards the new law, as it entailed the creation of new employment [46]. The Energy Act received public endorsements from the Swiss federal parliament and Doris Leuthard, then-president of the Swiss Confederation [47].

As illustrated in Figure 1, the information volume on the Swiss Energy Act peaked in the final weeks leading up to the referendum on 21 May 2017. Media analyses in different countries, including Switzerland, have shown that higher exposure to media information can heighten the public divide on political issues depending on prior attitudes to the issue at hand [48]. In addition to the uptake of media information, political and non-political stakeholders provided simplified information cues in this pre-referendum phase. The cues were highly diverse and conflicting as illustrated by the discussion on the economic consequences of the law (i.e., 40 versus 3200 Francs in annual costs for a Swiss family). This complex and uncertain information environment should make voters prone to rely on cognitive strategies aiming to reduce complexity (such as referring to their political ideology) when evaluating information cues about the Energy Act. We collected data within this information-intense period (see the red area in Figure 1).

#### 1.4. Hypotheses

We investigated the impact of political ideology and information provision on voters' attitudes and voting preferences concerning the Swiss Energy Act about two weeks before the 2017 Public Vote. Eligible voters willing to vote in the upcoming public vote received three arguments either in favor or against the Swiss Energy that were either framed in terms of liberal or conservative values and moral foundations (resulting in four experimental conditions: liberal/in favor, liberal/against, conservative/in favor, conservative/against). Participants were asked to evaluate the extent to which they perceive the presented arguments as personally relevant and to report their attitudes and voting preferences concerning the Energy Act (see Appendix B for a visualization of the experimental procedure).

Based on our review of the literature, we expected that political ideology would result in different attitudes and voting preferences concerning the Swiss Energy Act. Our assumptions were formalized in Hypothesis 1:

**Hypothesis 1a–b.** *Political ideology impacts attitudes (H1a) and voting preferences (H1b) toward the Energy Act, with more conservative [liberal] political ideology being associated with increasing disapproval [approval] of the Energy Act.*

We moreover expected that the influence of political ideology on attitudes and voting preferences towards the Energy Act is moderated by the framing of information on the Energy Act in terms of liberal versus conservative values and moral foundations [29,37,49,50]. Our assumption was formalized in Hypothesis 2:

**Hypothesis 2a–b.** *Political ideology interacts with information framing to influence attitudes (H2a) and voting preferences (H2b): Information framed in terms of conservative [liberal] values and moral foundations results in greater attitude and voting preference change in participants with conservative [liberal] ideology.*

We also expected that political ideology influences to what extent information is evaluated as personally relevant. Specifically, we expected the influence of political ideology to be moderated



by the framing of the information on the Energy Act (i.e., liberal vs. conservative) as well as the general direction of the information (in favor vs. against Energy Act). As data collection occurred close to the public vote, we assumed that voters already had formed pre-existing attitudes towards the Energy Act that were either compatible or incompatible with the experimentally provided information (see also Kammermann and Dermont [3] for the divide among voters on the Swiss Energy Act). Our assumptions were formalized in Hypotheses 3a and 3b:

**Hypothesis 3a.** *Political ideology interacts with information framing to influence information evaluation: Participants with conservative [liberal] ideology evaluate information framed in terms of conservative [liberal] values and moral foundations as more personally relevant.*

**Hypothesis 3b.** *Political ideology interacts with information direction to influence information evaluation: Participants with conservative [liberal] ideology evaluate information against [in favor of] the Energy Act as more personally relevant.*

We finally tested, by means of a mediation analysis, whether differences in the evaluation of arguments as a function of political ideology and information content translate into attitudes and voting preferences (i.e., mediated impact of political ideology on political attitudes and preferences via information evaluation). Our assumption was formalized in Hypothesis 4:

**Hypothesis 4a–b.** *Political ideology has an indirect influence on attitudes (H4a) and voting preferences (H4b) toward the Energy Act via evaluation differences concerning the relevance of information on the topic.*

## 2. Materials and Methods

Study data and R code for the statistical analyses are made publicly available on the Open Science Framework (OSF): [https://osf.io/x97wy/?view\\_only=1ff68842696f4497b1028f6cb333a4a2](https://osf.io/x97wy/?view_only=1ff68842696f4497b1028f6cb333a4a2)

### 2.1. Participants

The study was conducted in the German and French speaking parts of Switzerland between 4 May and 9 May 2017 (i.e., about two weeks before the public vote on the Swiss Energy Act on 21 May 2017). Participants were recruited via a panel provider and financially compensated for their participation. Only participants who were eligible to vote in Switzerland on the federal level and who did not already vote on the Energy Act by postal voting were eligible to take part in the study. All participants provided informed consent to take part in the study. In total, 1073 participants completed the study. We only included participants who intended to vote in the upcoming public vote on the Energy Act, leading to the exclusion of 139 participants. Three participants did not report their gender and thus were not included in the main analyses, resulting in a final sample of 931 participants (520 female) between 18 and 87 year ( $M_{\text{Age}} = 47.07$ ,  $SD_{\text{Age}} = 15.50$ ). Mean political ideology was close to the center 5.54 ( $SD = 1.75$ ) on a scale ranging from 1 (*extremely liberal*) to 11 (*extremely conservative*). The research was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of the Faculty of Psychology and Educational Sciences of the University of Geneva, Switzerland.

### 2.2. Design and Procedure

The study was based on a 2 (argument direction: in favor/against Energy Act)  $\times$  2 (argument framing: liberal/conservative) between-subjects experimental design, resulting in four experimental conditions.

Participants provided their consent to take part in the study and reported demographic information, their political ideology, and prior knowledge about the Energy Act (refer to Section 2.4 for more information on the assessment of the independent and dependent variables). After a short introduction

of the Swiss Energy Act, participants were presented with three arguments, either in favor or against the Energy Act. The arguments were framed in terms of values referring to either liberal or conservative ideology (i.e., fairness vs. tradition/ingroup; harm/care vs. purity; openness to change vs. authority/ingroup, respectively). After each argument, participants evaluated the respective argument in terms of its personal relevance for them. After the information section, participants reported their attitudes towards the Energy Act as well as their voting preferences. Finally, participants were debriefed and provided with additional information on the Energy Act as well as with official information sources. The complete experimental procedure is illustrated in Appendix B.

### 2.3. Arguments on the Energy Act

The arguments were between 20 and 50 words in length and based on the political discussion on the Energy Act in the months before the public vote. The arguments were framed in terms of values and moral foundations, referring to either liberal or conservative ideology. In the liberal framing condition, arguments were referring to harm/care, openness to change, or fairness values and moral foundations (one value per argument). In the conservative framing condition, arguments were referring to purity, tradition, or ingroup/authority values and moral foundations. Across framing conditions, the arguments were kept as identical as possible, only varying in the extent to which they emphasized liberal or conservative values and moral foundations, while keeping the same thematic information. As an example, the argument in favor of the Energy Act “The energy law will have positive impacts on nature. Energy from renewable sources will reduce pollution due to CO<sub>2</sub>-emissions and nuclear waste that currently cause harm to the fragile [contaminate the purity of the] Swiss nature” was either referring to harm/care (liberal framing) or purity values (conservative values). This type of manipulation has been successfully applied by previous research in the environmental domain [28,29,49]. See Appendix C for the complete list of arguments used in the present study.

### 2.4. Assessed Variables

Demographic questions and participants’ political ideology were assessed before the argument presentation section. Similar to previous research [28], political ideology was assessed using a range from 1 (*extremely liberal*) to 11 (*extremely conservative*). Note that each reported analysis is based on the continuous political ideology scale, whereas we refer to specific political ideology scores for visualizing the interactions of political ideology with the experimental conditions. Specifically, we will present predicted effects for participants with one standard deviation (SD) below and above the mean political ideology score, referring to “liberal ideology” and “conservative ideology”, respectively. In addition, we asked participants to rate their subjective knowledge about the Energy Act using a scale from 1 (*absolutely no knowledge*) to 8 (*very good knowledge*).

After the presentation of each argument, participants evaluated the extent to which they considered the argument to be personally relevant for them on a scale ranging from 1 (*absolutely not relevant*) to 8 (*extremely relevant*). The composite score reflecting the mean personal relevance evaluation across the three presented arguments served as dependent variable to test Hypothesis 3a–b (Model 3) and as mediator to test Hypothesis 4a–4b (Models 4–5).

After reading the arguments, participants reported the extent to which they evaluated the Energy Act as 1 (*negative*) or 8 (*positive*) as well as the extent to which they are 1 (*against*) or 8 (*in favor*) of the Energy Act. The composite score of both variables served as the first dependent variable to test Hypotheses 1a and 2a (Model 1) and Hypothesis 4a (Model 4). Internal consistency of the composite score was high, indicating that both variables are associated with one overarching factor ( $\alpha = 0.863$ , attitudes toward the Energy Act). Participants moreover reported whether they would vote in favor or against the Energy Act if the public vote had taken place on the day of data collection. To this end, we presented the official question of the public vote on May 21, 2017 (i.e., “do you accept the Energy Act from September 2016?”) and participants indicated *yes* or *no*. This variable served as the second

dependent variable to test Hypotheses 1b and 2b (Model 2) and Hypothesis 4b (Model 5). Please refer to Table 1 for a summary of the assessed variables.

**Table 1.** Independent and dependent variables assessed in the present study. Model refers to the statistical models in which the variables were included.

Variable	Type	Measurement	Model
Political ideology	Independent variable	Scale from 1 ( <i>extremely liberal</i> ) to 11 ( <i>extremely conservative</i> )	1–5
Prior knowledge	Covariate	Scale from 1 ( <i>absolutely no knowledge</i> ) to 8 ( <i>very good knowledge</i> )	1–5
Age	Covariate	<i>Year of birth</i>	1–5
Gender	Covariate	<i>Male/female</i>	1–5
Personal relevance of EnA arguments	Dependent variable (M3)/Mediator (M4–5)	Evaluation of presented arguments: Scale from 1 ( <i>absolutely not relevant</i> ) to 8 ( <i>extremely relevant</i> )	3–5
Attitudes towards EnA	Dependent variable	Composite score – evaluation of EnA: Scale from 1 ( <i>negative</i> ) or 8 ( <i>positive</i> ) Scale from 1 ( <i>against</i> ) or 8 ( <i>in favor</i> )	1 + 4
EnA voting preferences	Dependent variable	Acceptance of EnA: <i>yes/no</i>	2 + 5

## 2.5. Statistical Analyses

### 2.5.1. Hypotheses 1–3: Direct Effects of Political Ideology

As summarized in Table 2, we computed three (linear and generalized linear) models to test Hypotheses 1–3 (for more information on the hypotheses see Section 1.4). The independent variables were kept constant across the three models: Participants' political ideology score, the two experimental factors *argument direction* and *argument framing*, as well as the respective interaction terms were used as predictors. Participants' gender, age, and prior knowledge about the Energy Act served as covariates. Hypothesized effects did not transition from significant to non-significant when covariates were removed from the models. All variables were z-standardized before the main analyses reported in Section 3. As specified in Table 2, the dependent variables varied between models: attitudes towards the Energy Act (Models 1), voting preferences about the Energy Act (Models 2), and evaluation of arguments about the Energy Act (Model 3).

### 2.5.2. Hypothesis 4: Indirect Effects of Political Ideology

We computed two moderated mediation models to test Hypotheses 4a and 4b (for more information on hypotheses see Section 1.4). The independent variables were kept constant across the two models: Political ideology was added as an independent variable and argument evaluation as a mediator in the models. Participants' gender, age, and prior knowledge about the Energy Act served as covariates. Attitudes towards the Energy Act (Model 4) and voting preferences regarding the Energy Act (Model 5) served as dependent variables. Finally, the pathway from ideology to argument evaluation and the pathway from information evaluation to the dependent variables were defined to be moderated by *argument direction*. The moderation was based on our assumption that ideology modulates the evaluation of information (cf., Hypothesis 3) as well as the rationale that higher perceived relevance of positive arguments should result in increased attitudes and voting preferences, whereas higher perceived relevance of negative arguments should result in decreased attitudes and voting preferences. Based on results reported in Section 3.2.1 and to reduce complexity of the analysis, we did not additionally define paths to be moderated by *argument framing*. Tests of indirect effects were based on one overall test of the product of the path from the independent variable to the mediator and the path from



the mediator to the dependent variable (i.e., the index approach), using bootstrapping procedures (1000 bootstrap samples).

**Table 2.** Results of Models 1–3 testing Hypotheses 1–3 on the direct influences of political ideology on attitudes, voting preferences, and information evaluation. In this table, 95% Confidence intervals are displayed in brackets.

Independent variable	Model 1 Attitudes (H1a/H2a)			Model 2 Voting preferences (H1b/H2b)			Model 3 Argument evaluation (H3a/H3b)		
	Estimate (B)	t	p	Estimate (B)	z	p	Estimate (B)	t	p
Political ideology	−0.35 [−0.46, −0.25]	−6.58	<0.001	−0.45 [−0.61, −0.31]	−5.97	<0.001	0.10 [0.01, 0.19]	2.22	0.027
Argument direction	−0.24 [−0.35, −0.14]	−4.54	<0.001	−0.20 [−0.34, −0.05]	−2.75	0.006	−0.65 [−0.74, −0.57]	−14.85	<0.001
Argument framing	−0.07 [−0.17, 0.04]	−1.25	0.213	−0.03 [−0.17, 0.11]	−0.48	0.634	0.05 [−0.03, 0.14]	1.25	0.21
Argument direction X argument framing	−0.01 [−0.12, 0.09]	−0.24	0.809	−0.02 [−0.16, 0.12]	−0.26	0.797	−0.01 [−0.09, 0.08]	−0.15	0.88
Political ideology X argument direction	0.01 [−0.09, 0.12]	0.23	0.821	0.075 [−0.07, 0.22]	0.98	0.324	0.27 [0.19, 0.36]	6.12	<0.001
Political ideology X argument framing	0.03 [−0.08, 0.13]	0.49	0.627	−0.07 [−0.22, 0.08]	−0.93	0.355	−0.03 [−0.12, 0.06]	−0.61	0.54
Political ideology X argument direction X argument framing	0.11 [0.01, 0.22]	2.13	0.034	−0.02 [−0.17, 0.13]	−0.28	0.783	0.01 [−0.08, 0.09]	0.16	0.87
Age	−0.17 [−0.27, −0.06]	−3.00	0.003	−0.33 [−0.48, −0.19]	−4.45	<0.001	0.01 [−0.08, 0.10]	0.31	0.76
Gender	−0.11 [−0.22, −0.01]	−2.09	0.037	−0.01 [−0.24, 0.04]	−1.37	0.17	−0.15 [−0.23, −0.06]	−3.21	0.001
Prior knowledge	0.13 [0.02, 0.24]	2.28	0.023	0.12 [−0.03, 0.27]	1.57	0.12	0.02 [−0.07, 0.11]	0.50	0.62

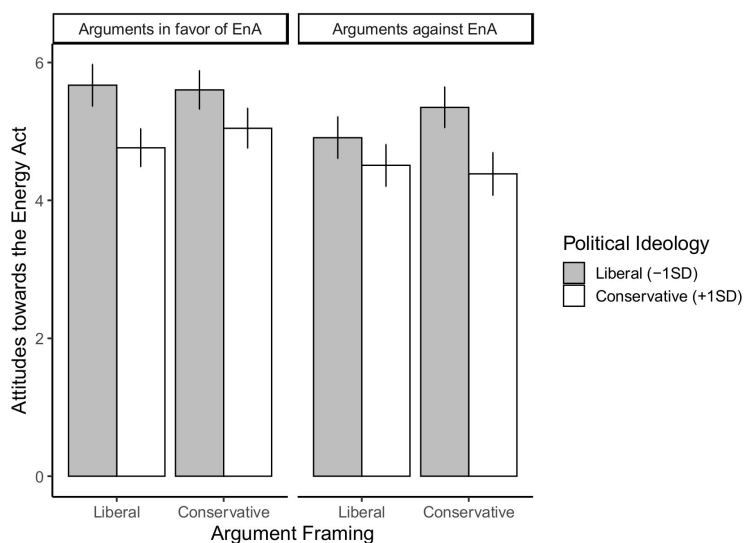
### 3. Results

#### 3.1. Voting Attitudes and Preferences

##### 3.1.1. Hypotheses 1a and 2a: Attitudes toward the Energy Act

Model 1 predicting attitudes toward the Energy Act was significant ( $F(10,920) = 9.05$ ,  $p < 0.001$ ,  $R^2_{adj} = 0.08$ ). Findings supported Hypothesis 1a on the direct impact of political ideology on voters' attitudes (see Table 2). As illustrated in Figure 2, across experimental conditions, individuals with a more pronounced conservative political ideology had less favorable attitudes toward the Energy Act than individuals with a more pronounced liberal ideology. Moreover, attitudes were influenced by the direction of the presented arguments on the Energy Act. The presentation of arguments against the Energy Act led to less positive attitudes toward the Energy Act as compared to the presentation of arguments in favor of the Energy Act.

In line with Hypothesis 2a, findings revealed a significant interaction of political ideology, argument direction, and argument framing. Whereas argument framing and political ideology did not interact with each other when presented arguments were in favor of the Energy Act ( $Est_B = -0.18$ ,  $t = -1.23$ , 95% CI  $[-0.46, 0.10]$ ,  $p = 0.218$ ), results pointed to an interaction trend of both variables when presented arguments were against the Energy Act ( $Est_B = 0.28$ ,  $t = 1.75$ , 95% CI  $[-0.03, 0.59]$ ,  $p = 0.08$ ). As shown in Figure 2, simple effect analysis revealed that the impact of political ideology was stronger when the arguments were framed in terms of conservative values ( $Est_B = -0.48$ ,  $t = -4.27$ , 95% CI  $[-0.70, -0.25]$ ,  $p < 0.001$ ) than in terms of liberal values ( $Est_B = -0.20$ ,  $t = -1.79$ , 95% CI  $[-0.42, 0.02]$ ,  $p = 0.07$ ) in this condition.



**Figure 2.** Attitudes toward the Energy Act as a function of argument direction (against/in favor of the Energy Act), argument framing (liberal/conservative) and participants' political ideology based on Model 1. Liberal and conservative ideology refer to  $-1$  SD and  $+1$  SD from the mean political ideology score, respectively (resulting political ideology scores = 3.79 and 7.29). Please refer to Supplementary Material for a visualization of the effects based on the entire political ideology scale range. Error bars refer to 95% Confidence intervals. EnA = Energy Act.

Finally, age, gender, and prior knowledge were associated with attitudes in that younger participants, females, and participants with higher knowledge about the Energy Act had more positive attitudes toward the Energy Act (see Table 2).

### 3.1.2. Hypotheses 1b and 2b: Voting Preferences vis-à-vis the Energy Act

Model 2 predicting attitudes toward the Energy Act was significant ( $\chi^2(10) = 75.12, p < 0.001, R^2_{\text{Nagelkerke}} = 0.11$ ). Findings supported Hypothesis 1b on the direct impact of political ideology on voting preferences (see Table 2). As illustrated in Figure 3, the likelihood to be willing to vote in favor of the Energy Act at time of data collection was strongly determined by participants' political ideology in that individuals with a more pronounced conservative political ideology were less likely to vote in favor of the Energy Act than individuals with a more pronounced liberal ideology. Moreover, voting preferences were influenced by the direction of the presented arguments on the Energy Act as the presentation of arguments against the Energy Act led to a lower preference to vote in favor of the Energy Act compared to the presentation of arguments in favor of the Energy Act.

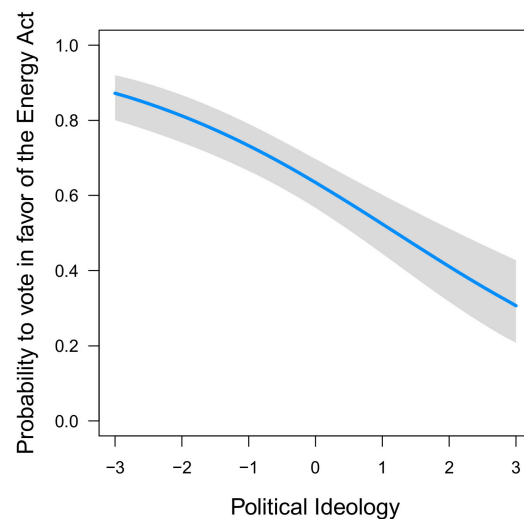
Finally, age was associated with voting preferences in that older participants were less likely to be willing to vote in favor of the Energy Act. Neither gender, prior knowledge, argument framing, nor the interaction of argument framing and political ideology affected voting preferences. Therefore, analysis of voting preferences did not support Hypothesis 2b on the interaction of political ideology and argument framing.

## 3.2. Argument Evaluation

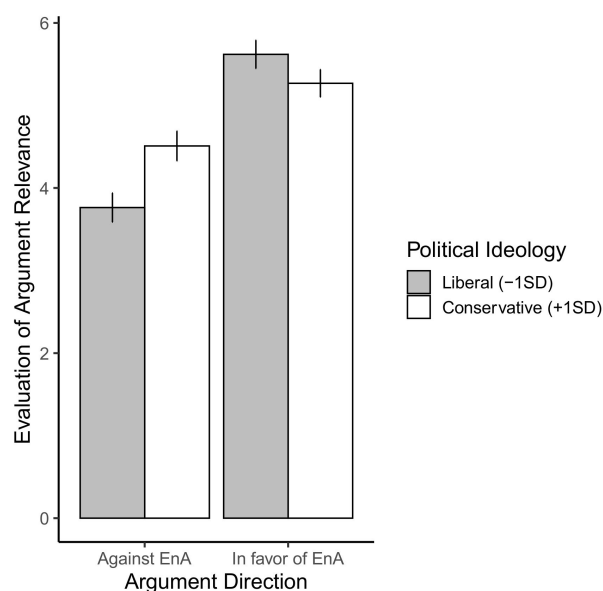
### 3.2.1. Hypotheses 3a and 3b: Evaluation of Arguments about the Energy Act

Model 3 predicting argument evaluation was significant ( $F(10,920) = 28.03, p < 0.001, R^2_{\text{adj}} = 0.23$ ). As illustrated in Figure 4, arguments in favor of the Energy Act were overall evaluated as more personally relevant. In line with Hypothesis 3b this effect was subject to participants' political ideology (i.e., interaction of argument direction and political ideology, cf., Table 2). Analysis of simple effects

revealed that participants with a more pronounced liberal political ideology were less likely to evaluate negative arguments as personally relevant than participants with a more pronounced conservative political ideology ( $Est_B = -0.17$ ,  $t = 2.99$ , 95% CI  $[-0.29, -0.06]$ ,  $p = 0.003$ ). This pattern reversed for positive arguments in that participants with a more pronounced conservative political ideology were less likely to evaluate those arguments as personally relevant than participants with a more pronounced liberal political ideology ( $Est_B = 0.37$ ,  $t = 5.63$ , 95% CI  $[0.24, 0.50]$ ,  $p < 0.001$ ).



**Figure 3.** Predicted probability to be willing to vote in favor of the Energy Act at the time of data collection as a function of participants' political ideology (from extremely liberal to extremely conservative, z-standardized) based on Model 2. The gray area reflects the 95% confidence interval band.

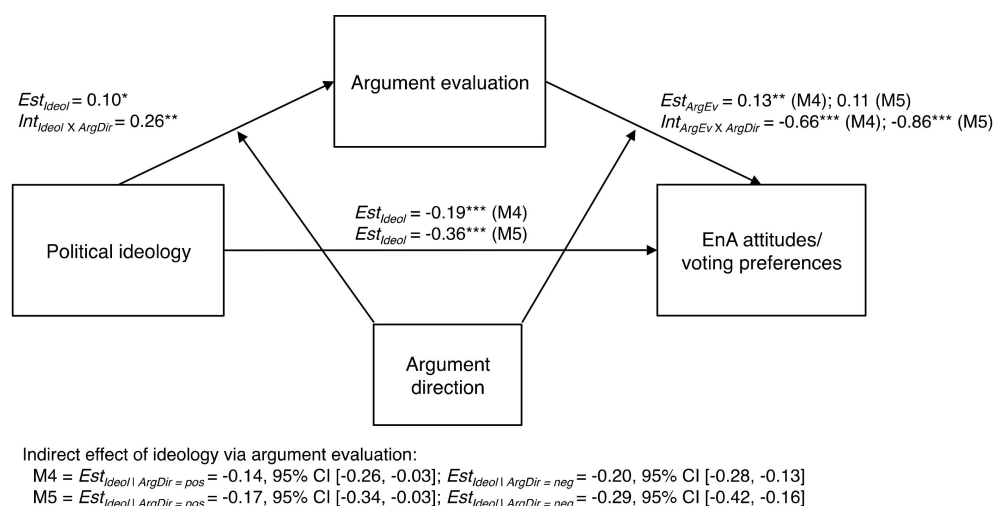


**Figure 4.** Evaluation of the personal relevance of the presented arguments on the Energy Act as a function of argument direction (against/in favor of the Energy Act) and participants' political ideology based on Model 3. Liberal and conservative ideology refer to  $-1$  SD and  $+1$  SD from the mean political ideology score, respectively (resulting political ideology scores = 3.79 and 7.29). Please refer to Supplementary Material for a visualization of the effects based on the entire political ideology scale range. Error bars refer to 95% Confidence intervals. EnA = Energy Act.

Finally, gender influenced relevance evaluations in that female participants were more likely to judge arguments overall as more relevant. Neither age, prior knowledge, nor argument framing affected the relevance rating. Also, argument framing and political ideology did not interact, thus not supporting Hypothesis 3a.

### 3.2.2. Hypotheses: 4a and 4b: Indirect Effects on Attitudes and Voting Preferences via Argument Evaluation

Model 4 predicting attitudes towards the Energy Act via argument evaluation supported Hypothesis 4a: As illustrated in Figure 5, political ideology influenced argument evaluation in that participants with a more pronounced liberal political ideology were more likely to evaluate positive arguments as personally relevant and negative arguments as personally irrelevant than participants with a more pronounced conservative political ideology (see also Section 3.2.1, Hypothesis 3b and Figure 4). This effect translated into differentiated voting preferences and attitudes toward the Energy Act, as more personal relevance assigned to positive arguments and less personal relevance assigned to negative arguments were associated with more favorable attitudes. This indirect effect partially mediated the influence of political ideology on attitudes (see Figure 5). Likewise, Model 5 predicting voting preferences towards the Energy supported Hypothesis 4b, revealing an indirect of political ideology on voting preferences via argument evaluation.



**Figure 5.** Effects of political ideology on attitudes towards the Energy Act (Model 4, M4) and on Energy Act voting preferences (Model 5, M5) partially mediated by the evaluation of information on the Energy Act. The pathway from ideology to argument evaluation and the pathway from information evaluation to the dependent variables were moderated by *argument direction* (against/in favor of the Energy Act). Age, gender, prior knowledge, and argument framing were added as covariates. Confidence intervals of indirect effects were based on 1000 bias-corrected bootstrap samples. EnA = Energy Act; M4/M5 = Model 4 and 5; Int. = Interaction effects; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

## 4. Discussion

The successful transition towards more renewable energies requires the involvement of the public, be it via active investments in small-scale renewable energy technologies or via the support of large-scale energy programs [20]. Making elaborated decisions in this realm requires the processing of complex information, often under conditions of limited time and cognitive resources. In the present contribution we investigate how political ideology influences this information processing as well as associated political judgment and decision-making. We hypothesized that voters' political ideology would serve as a direct antecedent of political judgment and decisions as well as an indirect antecedent influencing the evaluation of available information cues. We tested our hypothesis in the context of the

2017 Public Vote on the Swiss Energy Act. We collected data about two weeks before the public vote, when information cues from the media (see Figure 1) and political stakeholders peaked, potentially polarizing the positions of the electorate along the political ideology spectrum [48]. We found that political ideology was a strong determinant of voters' preferences to vote against or in favor of the Energy Act. In line with previous research [3], a more conservative political ideology was associated with a higher likelihood to reject the Energy Act: A conservative voter (1 SD above the mean ideology score) was about 2.5 times more likely to reject the Energy Act than a liberal voter (1 SD below the mean ideology score), whereas a strong conservative voter (2 SD above the mean ideology score) was around six times more likely to reject the Energy Act than a strong liberal voter (2 SD below the mean ideology score).

Our findings moreover showed that political ideology acted on how participants evaluated information on the Energy Act, consistent with previous research on motivated reasoning [31]. A more pronounced liberal ideology was associated with a stronger tendency to evaluate positive arguments as personally relevant and negative arguments as personally irrelevant. The evaluation pattern mirrored the positions of the respective political parties on the Energy Act at the time of data collection with stronger opposition to the Energy Act from conservative parties and stronger support from liberal-left parties (see Section 1.3 and [3]). In light of the extensive cues provided at the time of data collection (cf., Figure 1), it is likely that partisans had already formed pre-existing attitudes towards the Energy Act. That is, voters may have internalized the respective stances of their ideological counterparts on the party level and thus evaluated provided arguments through their ideology-colored lenses [34,35]. Analysis of indirect effects showed that ideology-motivated information processing led to more polarized voting preferences and attitudes, as stronger relevance assigned to supporting arguments was associated with higher preferences and attitudes. In contrast, stronger relevance assigned to opposing arguments was associated with lower preferences and attitudes (see Section 3.2.2 and Figure 5).

Argument framing in terms of liberal and conservative values and moral foundations did not influence the evaluation of Energy Act arguments, but did influence participants' attitudes as a function of political ideology. Our findings support previous research on argument framing [28,29,37,49,50], even though the framing effects observed here were relatively small in size. Small effect sizes may be due to the timing of data collection close to the public vote. As discussed above, it is likely that voters had already formed initial attitudes toward the Energy Act at the point of data collection and thus were strongly guided by their pre-existing attitudes specific to the policy and to a lesser extent by their underlying value and moral bases. Thus, our findings suggest that attitude strength towards the message object serves as an additional moderator of message reframing effects (for moderators of message framing effects see: [36]). Future research is needed to test this hypothesis.

#### 4.1. Limitations and Future Research

We collected data during an information-intense time period, allowing us to shed light on voters' attitude and preference updating in the context of an upcoming real-world political event. We have to acknowledge, however, that our data only represents a spotlight of the political decision-making process that can be expected to be highly dynamic in nature. We call for future research that applies longitudinal designs, allowing to track voter preferences and information processing strategies across pre-election and post-election periods in order to disentangle effects inherent to (i) the value and moral bases underlying political ideologies and (ii) initial attitudes originating from different ideologies. As an example illustrating the benefit of a longitudinal approach, Hahnel and colleagues investigated how attitudes and climate change beliefs of US voters changed and influenced each other across the 2016 US presidential election period. Illustrating how partisan and party ideology are intertwined, findings showed that shifts in climate change beliefs across the election period were subject to changes in partisans' attitudes towards the winning party [32].

In our study political ideology was measured on a continuum from liberal to conservative. Even though the liberal-conservative dimension is the most commonly applied dimension in the study



of political ideology, it may reflect the multi-party political landscape in Switzerland to a lesser extent than a left-right continuum [51]. Our operationalization may have resulted in a lower validity of the assessment of political ideology and thus in smaller effect sizes. Moreover, integrating voters' political affiliation in addition to their political ideology would have provided a more complete picture of participants' political identity. However, in order to reduce the complexity of the findings and to infer concrete hypotheses rather than applying an exploratory approach based on a large range of independent variables, we decided to focalize our research on the effects of political ideology, which in previous research has been shown to have effects over and above political affiliation (see, e.g., [52]).

Furthermore, we did not pretest whether participants perceived the reframed arguments as actually referring to their values and moral concerns. Thus, even though item development was based on previous research on moral framing by integrating language referring to the values and moral foundations underlying the different political ideologies (e.g., [28]), we cannot exclude that the reframing of arguments applied here was partially ineffective and thus resulted in smaller effect sizes. Previous research directly assessed subjective moral fit of reframed messages, which should be applied in future studies similar to the study reported here. In line with our call for future longitudinal research, it would be an interesting research avenue to examine the effectiveness of reframed messages across election periods in order to examine when reframing is most effective. Finally, we did not pretest the perceived quality and plausibility of the arguments, which might have resulted in additional (uncontrolled) influences beyond the intended argument differences.

#### *4.2. Implications for Political Communication*

What lessons can be drawn from these findings for political communication in the energy sector? First, our findings illustrate that polarized information environments with conflicting information cues from the media and the political elites may trigger a divide at the public level [48,53–55]. Opinion formation and updating at the levels of political elites and the electorate should not be seen as isolated processes but rather as being strongly intertwined with each other. Here we discussed cognitive strategies that voters may apply in complex political environments and underlined the relevance of political ideology in the evaluation of information cues provided by the involved stakeholders. Our findings indicate that issue polarization in public is driven by ideology-based motivated information processing (see mediation analyses, Section 3.2.2). This top-down process on information evaluation can be expected to intensify across time in that increasing attitudes result in an elevated motivation to evaluate new information in a manner that allows to confirm and exacerbate established positions [34,35]. For political communication, information campaigns should be implemented at an early stage before voters have established strong ideology-based attitudes. Timing is particularly pertinent, as already weak existing attitudes can trigger biased assimilation processes that result in rigid preferences [39].

Second, political communication can benefit from a more detailed look at partisan differences in cognitive strategies that are applied to reduce information processing needs. Although meta-analytic research has shown that both liberals and conservatives are prone to biased judgment and decisions, our findings point to differences in information evaluation and integration across the ideological continuum [40]. As illustrated in Figure 4, conservatives were relatively stable in their evaluation of argument relevance. Liberals, in contrast, showed stronger motivated information processing and evaluated positive arguments as substantially more relevant than negative arguments. These effects may be driven by the circumstances specific to the public vote on the Energy Act or the specific point of data collection. However, the findings highlight that openness to information cues varies across the political spectrum and that being aware of such differences can increase the effectiveness of political information campaigns. Moreover, political communication can be improved by actively addressing partisan biases. Making cognitive biases explicit to the decision makers has been shown to attenuate biased judgment and decision-making [56].

Our findings nevertheless provide good news for political programs targeting the energy transition. Across the political spectrum participants were sensitive to new information about the Energy Act, as the argument direction had a substantial impact on each of the analyzed dependent variables. This means that—despite ideology-motivated information processing—partisans were open to new information about the benefits and risks of the Energy Act, even though publicly available information cues were peaking at the time of data collection. For policy makers, this means that communicating energy program information can be an effective way to ensure a well-informed electorate. As outlined here, messages should address the values and moral concerns across the political spectrum to avoid that the underlying goals and concerns of individual political groups are addressed asymmetrically. Besides the advantages of balanced messages for persuasion, knowing about the underlying value and moral bases may help us to better understand and appreciate the opposing political positions, which may eventually improve the political debate and the overall political climate.

**Supplementary Materials:** The following are available online at <http://www.mdpi.com/2071-1050/12/20/8429/s1>.

**Author Contributions:** Conceptualization, U.J.J.H., C.M., T.S. and T.B.; Data curation, U.J.J.H.; Formal analysis, U.J.J.H.; Funding acquisition, T.B.; Methodology, U.J.J.H., C.M. and T.B.; Visualization, U.J.J.H., C.M.; Writing—original draft, U.J.J.H., T.S. (Section 1.3); Writing—review & editing, U.J.J.H., C.M., T.S. and T.B. All authors have read and agreed to the published version of the manuscript.

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## Appendix A. List of Newspapers Included in the Media Analysis (Figure A1)

Search queries for newspapers coverage of the Swiss Energy Act focused on:

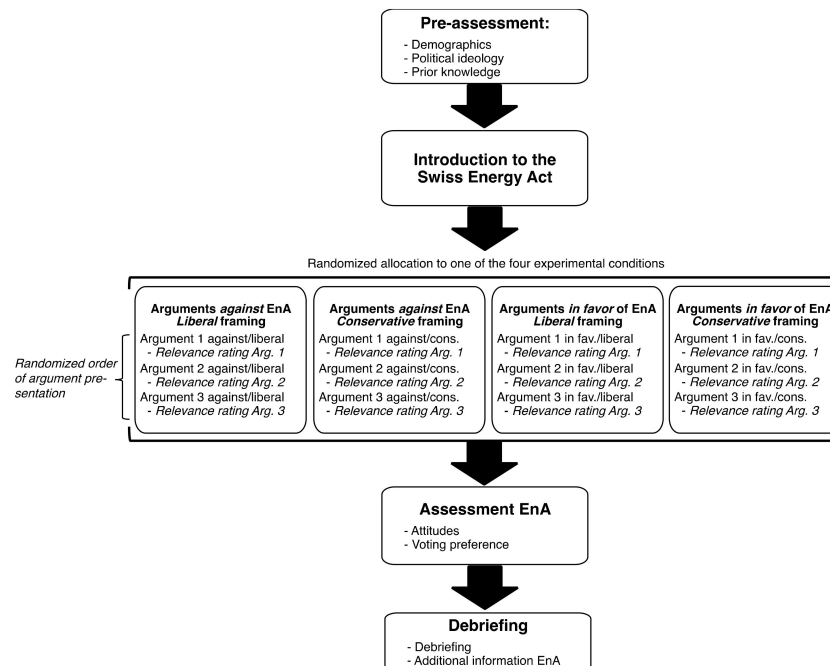
A total of 16 newspapers in French:

- Nine daily newspapers: 20 min, 24 heures, Agefi, Arcinfo, Le Journal du Jura, La Liberté, Le Nouvelliste, Le Temps, La Tribune de Genève
- One Sunday newspaper: Le Matin Dimanche
- Six weekly newspapers: La Broye, Coopération, GHI, L'Illustré, Lausanne Cités, Le Matin Dimanche, Migros Magazine

A total of 63 newspapers in German:

- Forty-five daily newspapers: 20 minuten, Aargauer Zeitung, Anzeiger von Uster, Appenzeller Zeitung, Badener Tagblatt, Basler Zeitung, Berner Oberländer, Berner Zeitung, Bieler Tagblatt, Blick, Blick am Abend, Bote der Urschweiz, Der Bund, Bündner Tagblatt, BZ - Zeitung für die Region Basel, BZ- Langenthaler Tagblatt, Freiburger Nachrichten, Landbote, Der, Limmattaler Zeitung, Linth-Zeitung, Luzerner Zeitung, Neue Zürcher Zeitung, Nidwaldner Zeitung, Obwaldner Zeitung, Oltnen Tagblatt, Der Rheintaler, Schaffhauser Nachrichten, Solothurner Zeitung/MLZ, St. Galler Tagblatt, Südostschweiz, Tages-Anzeiger, Thalwiler Anzeiger/Sihltaler, Thuner Tagblatt, Thurgauer Zeitung, Toggenburger Tagblatt, Urner Zeitung, Walliser Bote, Werdenberger & Obertoggenburger, Wiler Zeitung, Willisauer Bote, Zofinger Tagblatt, Zuger Zeitung, Zürcher Oberländer, Zürcher Unterländer, Zürichsee-Zeitung
- Four Sunday newspapers: NZZ am Sonntag, NZZ am Sonntag Magazin, Sonntagsblick, SonntagsZeitung
- Fourteen weekly newspapers: BauernZeitung, Coopzeitung, Furttaler, Glattaler, Migros-Magazin, Obersee Nachrichten, regio.ch, Rümmlinger, Seetaler Bote, Tagblatt der Stadt Zürich, Volketswiler, Die Weltwoche, Die Wochenzeitung, züritipp

## Appendix B. Visualization of the Experimental Procedure of the Study



**Figure A1.** Visualization of the experimental procedure of the present study including independent and dependent variable assessment as well as the randomized allocation to one of four experimental conditions.

## Appendix C. Arguments on the Energy Act Presented in the Study

**Table A1.** Arguments about the Energy Act presented in the present study, based on the between-subjects factors *argument direction* (against/in favor of EnA) and *argument framing* (liberal-oriented/conservative-oriented). Each participant was presented with three arguments from one of the four experimental conditions. The respective values/moral foundations used for argument reframing are listed below each argument.

Arguments Against EnA		Arguments in Favor of EnA	
	Liberal Framing	Conservative Framing	
Argument 1	The energy law will have negative effects on prosperity in the long run. Increasing energy costs and job loss will more negatively impact the poor social classes than others. This is an unfair development that fosters inequality in society. <i>Fairness</i>	The energy law will have negative effects on prosperity in the long run. Increasing energy costs and job loss will negatively impact traditional families in Switzerland. This endangers established societal structures. <i>Tradition/Ingroup</i>	The energy law will have positive effects on prosperity in the long run. Stable energy costs and job creation will benefit all social classes (including the poorest). This is a fair development that fosters equality in society. <i>Fairness</i>
			The energy law will have positive effects on prosperity in the long run. Stable energy costs and job creation will benefit traditional families in Switzerland. This strengthens established societal structures. <i>Tradition/Ingroup</i>
Argument 2	The energy law will have negative impacts on nature. The construction of giant wind engines and solar plants will cause harm to the fragile Swiss nature. <i>Harm/care</i>	The energy law will have negative impacts on nature. The construction of giant wind engines and solar plants will disfigure the purity of Swiss nature and landscape. <i>Purity</i>	The energy law will have positive impacts on nature. Energy from renewable sources will reduce pollution due to CO <sub>2</sub> -emissions and nuclear waste that currently cause harm to the fragile Swiss nature. <i>Harm/care</i>
			The energy law will have positive impacts on nature. Energy from renewable sources will reduce pollution due to CO <sub>2</sub> -emissions and nuclear waste that currently contaminate the purity of Swiss nature. <i>Purity</i>

Table A1. Cont.

	Arguments Against EnA		Arguments in Favor of EnA	
	Liberal Framing	Conservative Framing	Liberal Framing	Conservative Framing
Argument 3	A failed energy strategy will serve as a negative example. As a result, it will damage confidence in future innovative projects and thus will impair technological evolution and change beyond the energy sector. <i>Openness to change</i>	A failed energy strategy will serve as a negative example. As a result, it will damage the reputation of Switzerland including its status and its well-earned respect around the world. <i>Authority/Ingroup</i>	A successful energy strategy will serve as a positive example. As a result, it will increase confidence in future innovative projects and thus will stimulate technological evolution and change beyond the energy sector. <i>Openness to change</i>	A successful energy strategy will serve as a positive example. As a result, it will increase the reputation of Switzerland including its status and its well-earned respect around the world. <i>Authority/Ingroup</i>

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