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Tailoring climate change communication to female target groups – an experimental analysis of voting and consumer behavior in Switzerland

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Abstract

Climate change is a reality. Despite increasing materialization of this phenomenon and calls for immediate action to limit its underlying causes, only a limited uptake of pro-environmental behavior has been registered so far. One of its main reasons has been concluded to be the faulty pro-environmental communication, that is in most cases built ineffectively on erroneous assumptions about the nature of human behavior. The goal of the here presented research was thus to find out, what aspects communication strategy should be built on to motivate pro-environmental behavior, individual as well as collective. Considering the need to specialize communication strategies for higher impact and their potential swing voter role in Switzerland, a female target group was selected. To answer the research question, an experiment was conducted, exposing the participants to three variations of a communication strategy, preceded and followed by an online questionnaire. The results showed that shorter and, namely, peer effects-based strategies are the most effective to motivate pro-environmental action in general and among women in particular. The conclusions of this experiment thus importantly contribute to the on-going discussion on how to effectively communicate to motivate pro-environmental action, with insightful findings for both practice and further research.

1. Introduction

Climate change represents one of the major issues of today. This phenomenon of a long-term change of climate patterns has been scientifically proven to be anthropogenic, mainly caused by the extraction and burning of fossil fuels and the conversion of land for forestry and agriculture (IPCC, 2013). The increasing materialization of its negative consequences on both social and environmental systems has led the scientific community and the general public alike to realize the urgent need to act to limit its underlying causes (CRED, 2014). Contrary to the technological optimism of some, especially the first accounts, sustaining the idea that this trend can be fully reversed by technological advances (i.e. increased energy efficiency) (Lovins, 1976; Carson, 2010), authors such as Christian Klöckner (2015) state that deeper changes in human behavior and life-styles such as the limitation of personal consumption are needed. From the most part knowing what is necessary to be done to mitigate climate change (i.e. to use only renewable sources of energy and limit emissions caused by transport), the question how to achieve such a change has proven to pose a bigger problem. Climate scientists, ecologists and pro-environmental campaigners have been increasingly trying to persuade policy makers and general public to implement changes that would lead to pro-environmental behavior, so far mostly unsuccessfully.

While the role of communication to achieve this task is undeniable (Moser, & Dilling, 2004; Pelletier, & Sharp, 2008; CRED, 2014; Jarreau, Altinay, & Reynolds, 2017), the question how to set up the strategies and convey messages is still debated. Should they be based on the revelations of the scope and scale of the problem or rather focus on its impacts in the localities where people live and feature positive messages about the progress achieved so far (Stern, 2012; Collings, 2014; Holthaus, 2017; Wallace-Wells, 2017)? Should they be aiming to increase public's knowledge and understanding of climate change or should they focus on different cornerstones, such as emotions and belonging (Moser, & Dilling, 2004; Pelletier, & Sharp, 2008; CRED, 2014)? The research presented here aims to answer these, namely what concrete aspects the communication strategy should be built on to motivate pro-environmental action, namely among female target groups.

In order to answer this question, a theoretical understanding of pro-environmental communication has to be achieved. As a result, an analysis of climate change communication supported by theories of human behavior was undertaken; the following part summarizes main observations of this study. Based on this theoretical background, a mixed-method empirical research was conducted, which method and overall design are discussed in the third part of this paper. While the fourth part consequently presents and discusses its main results, the fifth and final part concludes on the paper and outlines possible further research.

2. Theoretical background

The literature on human behavior and climate communication being very extensive with a large number of authors from many different fields analyzing the issue, it is not possible and within the scope of this paper to review all applicable theories. Consequently, only the most important and relevant ones to the research question at hand were analyzed, which main observations are presented in the summary below.

2.1. Theories of human behavior

Contrary to the common understanding of human behavior as fully rational and thus seeing the lacking pro-environmental action as a result of inadequate knowledge about the extent of the problem (Burgess, Harrison, & Filius, 1998), an increasing number of authors concludes that human behavior is neither fully rational, nor can be influenced only by providing information. Contributions already as early as in 1950s started to point out that people's decisions are influenced by a plurality of factors and are not coined fully rationally. The most famous of these early contributions is the concept of Bounded Rationality of Herbert Simon (Simon, 1957) who showed that people's cognition is limited by number of factors, namely time, cognitive limitations and available information. This concept was further elaborated by behavioral economists, namely Amos Tversky and Daniel Kahnemann, who in 1970s attracted the attention to heuristics, mental shortcuts that people use to make decisions (Tversky, & Kahneman, 1974). The idea of cognitive biases systematically leading to suboptimal decisions was fully popularized by the concept of Nudge coined by Richard Thaler and Cass Sunstein in their seminal book "Nudge" (2008), in which the authors proposed ways how their knowledge can be harnessed for more effective policy making.

Besides the cognitive mechanisms, an increasing number of authors points out that human decision making is influenced by many other aspects, such as values (Stern, Dietz, &

Guagano, 1995; Stern, 1999), norms (Schwartz, 1977), worldviews (Weber, & Stern, 2011; CRED, 2014), culture and identity (Kahan, 2007; Kahan, 2015), all interacting together to form the final behavior. One of the most famous and robust theories in this regard is the Theory of Planned Behavior (TPB) of Icek Ajzen (1991) that asserts that human behavior is a product of personal attitudes, subjective norm and perceived behavioral control, that jointly influence the resulting behavior. As such, the theory critically contributes to the discussion on human behavior by showing that people oftentimes act against their volition due to internal and external barriers. This mismatch between personal attitudes and action is especially relevant for pro-environmental behavior, where the so called “Value-Action Gap” of limited action despite strong pro-environmental values has been regularly observed (Blake, 1999; Litvine, & Wüstenhagen, 2011; AXA, & Ipsos, 2012; Jarreau, Altinay, & Reynolds, 2017). The reason for the mismatch between intentions and actions can be also explained by “behavioral lock-ins”. Prominent especially in the work of many sociologists, these authors see human behavior as determined by societal habits (Giddens, 1984), routines (Triandis, 1977) and practices (Shove, 2003; Shove, 2009) that oftentimes inhibit pro-environmental action even if desired by an individual. Similarly, personal behavior is also directly and indirectly influenced by the society in which one operates, namely the closest peers and their behavior (CRED, 2014; Liao, Ho, & Yeang, 2016).

To summarize, human behavior is neither fully rational, nor can be influenced by information provision only. Decision making of any individual is a product of complex interactions between internal and external factors (such as norms, values, worldviews, habits, practices and other societal influences), played out on the platform of cognitive processes.

2.2. Pro-environmental communication

The above findings confirm the increasing realization that informing people about climate change by focusing on its global implications and revealing “shocking” facts about its extent does not motivate people to act pro-environmentally; it rather freezes them to inaction (Moser, & Dilling, 2004; Lowe, Brown, Dessai, de Franca Doria, Haynes, & Vincent, 2006; Holthaus, 2017). On the contrary, communication strategies should be “actionable”, relate the implications of climate change to daily lives and people close to the target group (their peers), show how concretely they impact the localities where people live (Moser, & Dilling, 2004; CRED, 2014) and propose actions that people can undertake to prevent these from happening. These actions should be understandable, presented clearly, refraining from the use of jargon and specific methodology (Jarreau, Altinay, & Reynolds, 2017) and highlight the concrete benefits the action would bring to people in question (besides the contribution to climate change mitigation) (Pelletier, & Sharp, 2008; CRED, 2014). Finally, the messages communicated, rather than overwhelming people with the numerous reasons why pro-environmental action is beneficial, should be concise, focus on couple of most important messages that should be moreover repeated to increase their effectiveness (Nielsen, & Morkes, 1997; Cook, & Lewandowsky, 2011). Finally, the carrier of the information should be trusted, this being achieved either by selecting a messenger close to the target group (social peer) (CRED, 2014) or a messenger with an authority (be it a professor, scientist or a politician) (O’Neill, Boykoff, Niemeyer, Day, 2013). The trust of the carrier chosen can be improved by the quality of presented information, such as by the use of high-quality visuals and the communication via known and trusted media and sources (Gehrke, & Turban, 1999; Sutcliffe, 2002; Ibrahim, Shiratuddin, & Wong, 2013; Stelzer, 2014).

Besides the quality of the information and the carrier, communicators also need to think how to structure and present their messages. Due to the current dominance of online environment under which any major strategy or campaign communicates their messages online, this research has decided to focus solely on the online environment and present its information in the form of a website. The research of Jakob Nielsen brings particular insights into the question how to successfully set up online environment to communicate its content effectively (Nielsen, & Morkes, 1997; Nielsen, 1997; Nielsen, 2000). Firstly, since people do not read the text of any online environment in its entirety, it should be easily scannable (enabled by its structuration into smaller paragraphs, introduced by headings and sub-headings and each expressing only one main information) and accompanied by visuals illustrating its main points (Sutcliffe, 2002; Ibrahim, Shiratuddin, & Wong, 2013; O'Neill, Boykoff, Niemeyer, & Day, 2013; Stelzer, 2014). These visuals should be of a good quality and be accompanied by short descriptions, clarifying the reasons for their employment. Visuals also represent a good opportunity to integrate interactive elements to the website, which increase attention and involvement of readers in the information provided (Ibrahim, Shiratuddin, & Wong, 2013).

Finally, considering all the above-mentioned points, namely the relation of communication strategies to the localities where people live, their peers and the worldviews, norms and values as determinants of individual decision making, communication strategies have to be specialized in regard to the target group in question and specific context they operate in (Pelletier, & Sharp, 2008; CRED, 2014; Jarreau, Altinay, & Reynolds, 2017).

3. Research design

3.1. Research question

The analysis of the aspects of a successful communication strategy hints to a potential conflict between the amount of aspects to be included and the call for its conciseness, expressed by authors such as Nielsen, & Morkes (1997) and Cook, & Lewandowsky (2011). Analyzing the aspects to mention deeper however shows us that they all revolve around two main building blocks - the localities where people live and one's peers, people with whom the target group in question identifies (Moser, & Dilling, 2004; CRED, 2014; Jarreau, Altinay, & Reynolds, 2017). Their partial overlap (people mostly relate to peers who share their geographical spaces (Proshansky, Fabian, & Kaminoff, 1983)) however opens up a space for potential inquiry. Would a focus on only one of them contribute to a better conciseness and thus increase the overall effectiveness of the strategy? Or are all the aspects so critical that an omission of one of them would hinder the communication strategy's effectiveness?

3.2. Case selection

As mentioned above, "one size fits all" strategies are not effective; communication strategies have to be specialized in relation to any target group and situation in which they want to operate to be successful (Pelletier, & Sharp, 2008; CRED, 2014; Jarreau, Altinay, & Reynolds, 2017). Consequently, the presented research has decided to focus on a female target group and a referendum on Swiss Energy Strategy 2050, held on 21 May, 2017; these for number of reasons.

Firstly, the focus on Switzerland was taken since most of the research on climate change communication to date is conducted in the USA (Weber, & Stern, 2011; CRED, 2014, Kahan, 2015). Characterized by a strong political polarization stretching to climate change issues as well (Kahan, 2007; Fisher, Waggle, & Leifeld, 2013), it is necessary to expand the countries studied so that the findings can be implemented within a broader range of cases and environments.

Secondly, the female target group was selected mainly for their potential swing voter role in issues related to sustainability. The study of Rinscheid and Wüstenhagen (2016) of two sustainability related referenda (namely on circular economy and nuclear phase-out) show that while women were initially supportive of both issues, a significant share at the time of vote changed their mind and voted against the initiatives (Ibid.). Communicating effectively to keep female attitudes pro-environmental thus represents a significant opportunity to swing the upcoming votes in relation to pro-environmental action, in Switzerland and potentially abroad as well.

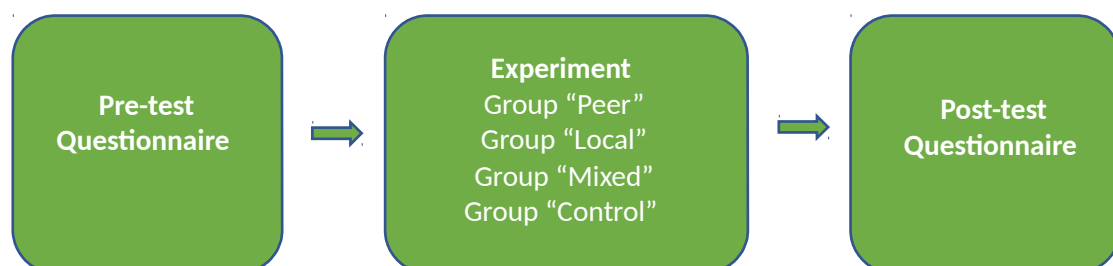
Thirdly, the referendum on Energy Strategy 2050 was chosen for its relevance to the topic. Tackling the main causes of climate change (by attempting to increase the share of renewable energy sources in Swiss energy mix, increase energy efficiency and put the cap on nuclear power plants) (SFOE, 2018), it represented a great match for the research question. Moreover, thanks to the frequency of referenda in Switzerland and the similarity of arguments of the anti-environmental camp (Rinscheid, & Wüstenhagen, 2016), the results of this study could be implementable in practice for one of the future sustainability-related referenda.

Finally, the study decided to focus on both, decisions leading to individual as well as collective behavior, mostly to cover an existing gap since most of the studies to date focus solely on individual behavior (Litvine, & Wüstenhagen, 2011; Chassot, Wüstenhagen, Fahr, & Graf, 2016). While necessary, the author of this research believes that individual behavior cannot generate a change quick enough and on a sufficiently large scale. For that, policy has to change to guide systemic sustainable transition.

3.3. Method

To answer its question, the present research decided to conduct a three-step, mixed-method, experimental study, composed of the testing of three version of communication strategy (revolving either around peer effects - <https://kksm9.webnode.com>, local aspects - <https://kksm10.webnode.com> or a combination of both <https://kksm8.webnode.com>, this conducted by selective choice of pictures, statements and frames employed), preceded and followed by a questionnaire, as illustrated in the Figure 1 below.

Figure 1: Data collection method



This set up was chosen for number of reasons, most importantly since it allows to control the evolution of behavior across time as well as among experimental groups (with a control group not exposed to any experimental strategy and only responding to both tested questionnaires in the same time frame as participants exposed to experimental strategies). The questionnaires were set up in the Unipark software (thus all responded online) and were controlling participants' evolution of transport and energy domain decisions (individual behavior) and voting within the referendum on Energy Strategy 2050 (collective behavior) as a result of the exposure to either of the three versions of experimental communication strategy. These particular dependent variables were chosen since they represent the sectors with the highest share of Swiss CO₂ emissions (FOEN, 2018a). Consequently, they were also major areas tackled by the Energy Strategy 2050 (SFOE, 2018) and thus the correlation between individual and collective behavior could have been tested.

To complement its methods, the experiment employed an eye tracking device. By generating data on the perception of experimental strategies such as scan path (how people proceeded through the website), frequency and number of fixations on given objects, the eye tracker allowed to see what aspects of the strategies attracted the most attention of the participants. Consequently, most influential aspects and reasons for the potential evolution of the behavior tested could have been distilled (built on the premise that what people directly perceive informs their decision making) (Strandvall, 2009). Due to the extent of the data generated by any measurement and the availability of one eye tracking device in the laboratory used for the experiment, only 13 participants (23,6%) of the participants; this number is however deemed fully sufficient by the author of this research.

3.4. Sample

The experiment was held in spring 2017 (to precede the Referendum on Energy Strategy 2050, held on 21 May 2017). As such, the pre-experimental questionnaire was held from 19 April to 7 May, 2017 while the post-experimental one was held from 8 to 20 May, 2017. The total number of participants was 55, distributed proportionately according to their gender among the experimental groups and the use of eye tracking device, as seen in the Table 1 below.

Table 1: Distribution of participants

	PC/Male	PC/Female	ET/Male	ET/Female	Total
Peer	6	6	4	1	17
Local	4	4	3	2	13
Mixed	4	5	2	1	12
Control	9	4			13
Total					55

4. Results

The results of the experiment overall show that both of the more concise strategies. i.e. the strategies based solely on peer or local aspects, were more effective to motivate people's willingness to act pro-environmentally than the mixed strategy combining both, peer effects and local aspects. The control group moreover scored the worst across all measured categories, with the overall lowest intention to act pro-environmentally and the highest

“undecided” responses. Secondly and even more importantly, from the two concise strategies, peer effects-based strategy was more effective in general and among female participants in particular to motivate pro-environmental intentions. To illustrate, the intention to change the household energy mix for the most renewable one increased the most among participants exposed to the peer effects-based strategy, with “strong support” of this change increasing from 5,9% in the pre-test questionnaire to 23,7% in the second one and “relative support” from 23,5% to 41,2%. On the contrary, while the “relative support” of participants exposed to the local aspects-based strategy increased from 38,5% to 46,2% across the measurements, their “strong support” remained the same (7,7%). Among the participants exposed to the mixed strategy, no one recorded a “strong support” and the “relative support” increased only from 8,3% to 18,3%. This group was also the only one that recorded participants actually increasing their willingness against the shift, with “strongly against” being recorded in 25% of responses in the second questionnaire while in only 8,3% in the first one. In line with the results observed in general, the control group recorded the most undecided participants (46,0% in the second measurement). Looking in particular at female participants, the role of peer effects-based strategy is even more pronounced. Comparing responses in the post-experimental questionnaire, strong support of a given pro-environmental action was the highest among women who were exposed to peer effects-based strategy nine times (for statements such as intention to start going to work by bicycle in the coming three months, support of the construction of wind turbines in the proximity (300m) to one’s house, support of a further development of renewable energy in one’s city and Switzerland as well as intention to participate in the Referendum against Energy Strategy 2050 and vote in favor of the Energy Strategy 2050 (against the referendum)); similar domination was recorded (for different statements) by local aspects-based only three times and mixed strategy only once.

4.1. Discussion of the results

More detailed analysis of the data generated by the two consecutive questionnaires and the eye tracker reveal the reasons for the dominance of the peer effects-based strategy across experimental groups and female target group in particular.

Firstly, the peer effects-based strategy was the most concise of the strategies tested. To illustrate, the participants took on average 5,84 minutes to go through the peer effects-based strategy, while the local one took participants 7,90 minutes and mixed 8,75 minutes on average. These results confirm the conclusions of Nielsen, & Morkes (1997) and Cook, & Lewandowsky (2011) on the principle of “less is more”, an increased effectiveness of concise strategies over the more complex ones.

Secondly, the peer effects-based strategy scored the best among women since it mirrored their internal values and worldviews. Tested in the pre-test questionnaire by allocating values to the statements “Protection of environment is important because” and “It is important for me”, female participants ranked as the most appealing values expressing care and prevention of harm (such as “By that nature and animal species are protected” as one of the top responses to the former statement and “Live a meaningful live” and “Have a good work-life balance” as two dominant responses to the latter one). On the contrary, male participants’ responses were dominated by statements expressing frugality and responsibility, such as “It saves and assures resources for future generations” and “It delivers clean air and fruitful soil that assures higher quality of food” as top responses to the former statement and “To assure economic stability and a high quality of life” as a top response to the latter one. The eye-tracking data support these conclusions on the differentiated values of male and female participants. As illustrated

by the heat maps on the Picture 1 below, showing the frequency of gaze on selected advantages of the Energy Strategy 2050 as featured in the local aspects-based strategy, the female participant (left heatmap) focused predominantly on the picture featuring kids and expressing the advantage “The health of our kids will be strengthened” contrary to a male participant (right heatmap) who predominantly focused on the picture of money expressing the patriotic feeling “Money stays in Switzerland and generates growth of the local economy”.

Picture 1: Heat maps, Advantages of Energy Strategy 2050, Local aspects-based strategy; Female participant (left) and Male participant (right)



Building on the findings summarized previously, communication strategies are the most effective if specialized in relation to the target group and context in question (Pelletier, & Sharp, 2008; CRED, 2014; Jarreau, Altinay, & Reynolds, 2017). Consequently, the peer effects-based strategy, by predominantly featuring pictures of people (kids in particular) and being framed alongside the effects of climate change and its mitigation on participants’ peers (by for example providing citations of students on the reasons why they have subscribed to the most renewable electricity mix, not mentioned in the local aspects-based strategy), directly corresponded to the underlying values and worldviews of women and thus had a particular effect on them.

4.2. Limitations

One of the major limitations of the experiment was the dominantly student sample of respondents (in the final sample, only 7 participants were non-students). This firstly caused a large drop-out between the first and the second measurement (caused most likely by the overlap of the timing of the experiment with the exam period at the University where the experiment was held), resulting in a relatively small final sample. Secondly, it also caused very specific answers, such as only one participant commuting to their daily occupation by car, not representative compared to the Swiss average (FOEN, 2018b). While this high level of specificity increases the effectiveness of the strategy (which was designed with students in mind, featuring students’ statements why they were motivated to switch to renewable energy mix etc.), further iterations of the strategy should target different population groups to generate insights on how to communicate to different groups as well.

5. Conclusions and further outlook

Climate change is a reality. More effective communication strategies are critically needed to motivate pro-environmental action on the scale and with the speed needed. The research presented in this paper attempts to help tackle this key issue of today by contributing to the ongoing scientific debate on how to set up communication strategies so that they successfully

motivate pro-environmental action. The results of the experimental analysis presented above show that concise, namely peer effects-based strategies, are the most effective to motivate intentions to act pro-environmentally and vote in favor of a pro-environmental policy. The peer effects-based strategies are the most effective in general and even more so towards women, who reacted even stronger to their exposure than male participants of the experiment. This finding further strengthens the increasing critique of the currently dominant set up of pro-environmental communication strategies and brings additional data on how to deliver them to increase their effectiveness, especially in regard to female student group.

The nature of the findings open-up for a potential further research. Firstly, differentiated framing could be tested within the peer effects-based strategy to indicate which ones would be effective among different target groups, such as men or non-student body. Secondly, the results generated could and should be used to set up communication strategies in practice, for example for one of the upcoming pro-environmentally oriented referenda held in Switzerland or elsewhere. Such an application in practice would be, besides bringing additional insights from new contexts, the ultimate proof of the relevance of the results generated by the here presented experiment.

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