Framing Climate Change Messages on Instagram: The Effects of Goal Framing and Spatial Distance on Pro-Environmental Behavior

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Abstract

The increasingly detrimental consequences of climate change demand sustainable changes in human behavior. An effective approach to motivate such pro-environmental behavior lies in the stimulation of awareness by communicating climate change information. Therefore, this study aims to investigate how to optimize messages about climate change on Instagram based on Prospect Theory and Construal Level Theory. For this means, an online experiment with $N = 331$ and $N = 210$ was conducted, testing the influence of goal framing, spatial distance framing, and their interaction on information-seeking, intended, and actual pro-environmental behavior. The combinations gain / distant and loss / proximate were hypothesized to have the largest effect on the outcome variables. However, the results displayed no significant effects, suggesting that neither goal framing nor spatial distance framing influenced information-seeking, intended, or actual pro-environmental behavior. Further, the frames could not potentiate each other's effectiveness when combined. Explanations for this, implications, and directions for future research are discussed. Advocating the consideration of individual factors when framing climate change information, this research is indicative for the design of climate change messages and provides an exploratory base for the application of Instagram in this context.

Keywords: climate change, goal framing, spatial distance, Instagram

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„Human-induced climate change […] has caused widespread adverse impacts and related losses and damages to nature and people […].“ (Intergovernmental Panel on Climate Change, 2022, p. 11). Starting their latest summary for policymakers with this statement, the Intergovernmental Panel on Climate Change (IPCC) leaves no doubt that climate change mainly results from human activity. Consequently, one effective solution to the climate crisis lies in sustainable behavior change. However, making the according adaptations in daily life is oftentimes effortful and costly for the individual (Steg & Vlek, 2009). Therefore, calls for studying factors that motivate pro-environmental behavior have risen (Li et al., 2019; van Valkengoed & Steg, 2019). Ultimately, such insights form the base for promoting sustainable behavior change.

Pro-environmental behavior is generally defined as any action which reduces harm or increases benefits to the environment (Stern, 2000). Following the Value-Belief-Norm Theory of Environmentalism, problem awareness is a crucial element for pro-environmental behavior to arise as it increases pro-environmental intentions, motivating pro-environmental behavior (Blok et al., 2014; Spence et al., 2012; Stern, 2000). An approach believed to bridge the gap between scientific findings about climate change and public pro-environmental behavior is climate change communication, which works by increasing awareness about the consequences of climate change (Moser, 2016). Hence, effective climate change communication is highly important for stimulating pro-environmental behavior.

The communication of climate change information naturally involves some context that frames the message (Spence & Pidgeon, 2010). Framing information means emphasizing certain aspects of messages that objectively convey the same information. However, the different emphasis allows the communication of a specific perspective to the receiver (Nabi, 2003). Thereby, frames can make the message content more relevant or accessible,

influencing the receiver's attitudes, subsequent decisions, and behavior (Moser, 2010; Nabi, 2003; Nisbet & Mooney, 2007). Due to this property, message framing is an important way to stimulate pro-environmental behavior.

Goal Framing in Climate Change Communication

Climate change messages are commonly framed in terms of the gains or losses ("goal framing") of environmental behaviors. More precisely, gain frames highlight the benefits of engaging in a target behavior (e.g. "By switching off the lights, you benefit the environment."), whereas loss frames present the information in a way that emphasizes the disadvantages of not engaging in the target behavior (e.g. "If you don't switch off the lights, you deplete natural resources."; Cheng et al., 2011; Tversky & Kahneman, 1981). Ultimately, the aim is to guide individuals toward sustainable behaviors (Spence & Pidgeon, 2010).

The theoretical basis for the influence of goal framing on subsequent behavior lies in Prospect Theory. According to Prospect Theory, humans are more opposed to losses than eager toward gains, a tendency that is referred to as "loss aversion" (Tversky & Kahneman, 1981). The behavioral implication thereof is that, in situations characterized by high uncertainty, humans are more willing to take risks in order to prevent losses than to obtain gains (Spence & Pidgeon, 2010). Importantly, climate change is a highly uncertain phenomenon: Its exact consequences, extent, location, and time frame remain unclear (Morton et al., 2011). Following the predictions of Prospect Theory, climate change messages framed in terms of losses should stimulate pro-environmental behavior more powerfully than gain-framed messages, given the uncertainty that accompanies climate change. However, past studies have not confirmed the pattern predicted by Prospect Theory unequivocally (Spence & Pidgeon, 2010; van der Linden, 2014; Woltin et al., 2022). Rather, the effectiveness of goal framing seems to depend on further factors along which they are implemented, such as environmental attitudes or emotions (Spence & Pidgeon, 2010; Tanford et al., 2020).

Consequently, factors determining the effectiveness of goal framing need to be studied in a more differentiated manner in order to arrive at more comprehensive insights.

Spatial Distance to Climate Change

Besides goal framing, another frame that is often implemented in climate change messages is psychological distance, i.e. the degree to which people feel distant to phenomena that are not part of their present experience (Bilandzic et al., 2017; Liberman et al., 2007; Segev et al., 2015). Commonly, four variants of psychological distance are distinguished: Temporal, spatial, hypothetical, and social distance (Liberman et al., 2007). The effects of psychological distance are explained by Construal Level Theory, which implies that humans form mental representations ("construals") of events depending on how distant they feel from their present situation (Liberman & Trope, 1998; Trope & Liberman, 2003). Naturally, psychologically distant phenomena are more difficult to visualize, which means that more abstract and high-level mental construals are used to represent these phenomena (Trope & Liberman, 2003). With increasing construal abstractness, more generalized and decontextualized considerations are made (Trope & Liberman, 2003), which weakens perceived personal relevance and distorts individuals' subsequent evaluations and considerations (Brügger et al., 2015; Wang et al., 2019). In contrast, low-level construals make people focus on more detailed, concrete information (Trope & Liberman, 2003).

According to this, it becomes apparent that populations in industrialized countries perceive climate change as more abstract and intangible because they experience its consequences less directly than many people in developing countries (Füssel, 2010; Intergovernmental Panel on Climate Change, 2022). As a result, difficulties arise in visualizing climate change concretely enough for it to induce personal relevance or willingness to engage in pro-environmental behavior (Roeser, 2012; Spence et al., 2012; van Boven et al., 2010; Wang et al., 2019). This is detrimental as it is industrialized countries that hold the most powerful influence in tackling climate change (Füssel, 2010). Since they hold

most financial resources, yet are spatially most distant from manifestations of climate change, it becomes apparent that the variant spatial distance is of great importance in this context. Despite this, much research has focused on temporal distance, creating gaps in the literature on spatial distance.

Spatial Distance as a Moderator for Goal Framing Effects

Importantly, Construal Level Theory predicts that differences in spatial distance merely determine which considerations are made or which information is attended to, rather than directly influencing behaviors. Accordingly, the construal level which is used is proposed to moderate the effects of other factors, such as values or level of information (Ledgerwood et al., 2010; Wang et al., 2019). Here, the influence of climate change messages may be increased by ensuring that its construal levels match, i.e. that all factors are mentally represented on the same level of abstractness (Ledgerwood et al., 2010). This effect can be led back to processing fluency: Construally matching messages are easier to process, which makes them more influential (Lee & Aaker, 2004). Hence, the strength of the effect of spatial distance on pro-environmental behavior might depend on the construal level of other factors.

Correspondingly, it has been suggested that combining Construal Level and Prospect Theory, the effects of goal framing are strengthened when a congruent level of psychological distance is used (Chen, 2016; Lee & Oh, 2014; White et al., 2011). In line with this, research on construal levels of climate change messages has shown that gain frames enhance processing fluency when combined with abstract, temporally distant information, increasing their effectiveness. Likewise, the influence of loss frames was augmented by concrete construals (Chen, 2016; Orten Tugrul & Lee, 2018). Since the effects of climate change communication on pro-environmental behaviors may be increased by implementing frames with matching construal levels (Woltin et al., 2022), it is important to investigate whether this pattern can be translated to a combination of goal framing and levels of spatial distance.

Climate Change Communication via Instagram

Due to the pervasiveness and ease of use of social media, they are a more potent medium in affecting pro-environmental behavior than traditional, text-based media, such as newspapers or magazines (Tanford et al., 2020; Xu & Han, 2019). Instagram has been shown to be an especially effective channel because it makes use of visual stimuli (Tao et al., 2021). Compared to written messages, these visualizing properties have the potential to make the diffuse phenomenon of climate change more concrete and personally relevant, and are more likely to arouse attention and activate emotions (Ballew et al., 2015; Duan et al., 2021; Spence & Pidgeon, 2010). As a result, visual messages can enhance intentions to increase pro-environmental behavior (Duan et al., 2021). Despite such promising effects, research on applying visual stimuli in climate change communication is limited (Chapman et al., 2016). Given the potential of Instagram to communicate climate change information in a way that stimulates pro-environmental behavior, filling this gap in research can yield valuable insights in order to potentiate the effectiveness of climate change messages. By making use of visual messages that combine goal framing and spatial distance, governments, agencies, and environmental organizations can design more effective climate change communication, that makes the abstract phenomenon of climate change more concrete and tangible. In this way, pro-environmental behavior can be stimulated more powerfully.

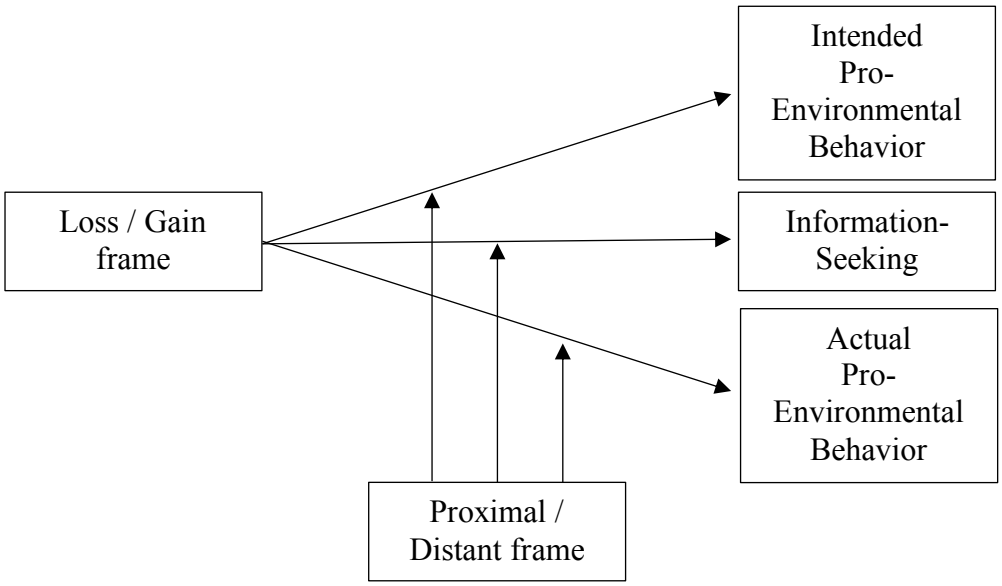
The Present Research

Following this, the study at hand investigates whether goal framing and spatial distance frames affect pro-environmental behavior in visual messages on Instagram. Building on the demonstrated interaction between goal framing and construal levels (Chen, 2016; Orten Tugrul & Lee, 2018), moderation effects of different levels of spatial distance on goal frames will also be tested (see Figure 1 for an overview). In order to investigate the effects systematically and allow for precise conclusions, the outcome variable pro-environmental will be subdivided: First, information-seeking behavior will be investigated as it serves as an

important, problem-focused base for subsequent pro-environmental behavior (Huang, 2016). Moreover, intended pro-environmental behavior and actual pro-environmental behavior will be differentiated because pro-environmental intentions are an important yet not always a necessary antecedent of pro-environmental behavior (Stern, 2000). This differentiation is also to counteract effects that are due to social desirability bias, the tendency to give insincere answers which are believed to be seen as favorable by others, and hypothetical bias, i.e. incongruities between intentions and behavior (Ropret Homar & Knezevic Cvelbar, 2021).

Figure 1

Proposed Moderation Model



Derived from the literature elaborated on above, messages framed in terms of losses, affect subsequent behavior more strongly due to the human tendency of loss aversion (Tversky & Kahneman, 1981). Consequently, compared to gain frames, loss-framed messages are hypothesized to be more effective in increasing information-seeking, intended pro-environmental behavior, and actual pro-environmental behavior (H1). Additionally, following Construal Level Theory, proximizing climate change should make its consequences more concrete and tangible, increasing personal relevance and pro-environmental behavioral

intentions (Spence et al., 2012; Wang et al., 2019). Accordingly, it is hypothesized that framing messages about climate change in terms of its proximal consequences increases information-seeking, intended pro-environmental behavior, and actual pro-environmental behavior more strongly than spatially distant frames (H2). Lastly, combining gain with spatially distant frames and loss with spatially proximal frames is hypothesized to yield the strongest effects on information-seeking, intended pro-environmental behavior, and actual pro-environmental behavior (H3). This hypothesis is based on results from various studies, showing the superior effectiveness of implementing gain frames along with high psychological distance and of matching loss frames with psychological proximity (Chang et al., 2015; Nan, 2007; Orten Tugrul & Lee, 2018; Segev et al., 2015).

Methods

Design

An online study with a 2 (goal frame: gain / loss) X 2 (spatial distance frame: proximal / distant) between-subjects design was conducted. The influence on the dependent variables intended pro-environmental behavior (quantitative, range: 1 - 5), information-seeking (binary, levels: 0 / 1), and actual pro-environmental behavior (binary, levels: 0 / 1) was measured.

Participants

To achieve a power of $1\text{-}\beta \geq .80$ (80%) with a small effect size ($f^2 \geq .02$) and an alpha of .05, an a-priori power analysis in G*power indicated a minimal sample size of 395 (Faul et al., 2009), indicating 99 participants per condition. Participants were approached by means of advertisements posted on the researcher's social media channels WhatsApp and Instagram, via the Instagram page of the environmental foundation Daniel Schlegel Umweltstiftung, and on the recruitment platforms SurveyCircle and SurveySwap. This ensured a demographically

diverse sample. Interested individuals could access the study via a link. They did not receive any reimbursement for their participation.

The general inclusion criteria for taking part in this study specified that participants had to be at least 18 years old and they had to be proficient in the English or German language as the study was available in English and German.

From the 452 recorded responses, 17 had to be excluded because they did not agree to participate after reading the informed consent, 17 participants withdrew their participation after the debriefing, and 51 were excluded because they failed the attention check. Furthermore, 36 cases with missing data for intended pro-environmental behavior were identified. Upon closer inspection of these cases' other data, no pattern could be determined, which is why they were deemed missing completely at random. Therefore, these cases were simply excluded from the analysis. This resulted in a sample of $N = 331$, with $n = 81$ in condition 1 (gain / proximal), $n = 82$ in condition 2 (gain / distant), $n = 90$ in condition 3 (loss / proximal), and $n = 78$ in condition 4 (loss / distant) for analysis 1.

In this sample, 214 participants identified as female, 110 as male, one as non-binary, and one participant preferred not to answer. The sample's average age was 29.9 years (SD = 11.3), ranging from 18 to 77 years. Concerning participants' nationality, 86.9 % were German, 3.4 % Austrian, 2.6 % Dutch, and 0.9 % English. Furthermore, they reported to be currently living in Germany (82.4 %), Austria (3.98 %), the Netherlands (5.8 %), and England (0.3 %). A large share of the sample was currently studying (58.4 %), whereas 23.5 % of the sample was working full-time and 11 % of the sample worked part-time. The majority of participants were familiar with Instagram (93.6 %). Appendix A provides a complete overview of the sample's demographics.

Technical issues at the beginning of the data collection led to the missing recording of data for the variables information-seeking and actual pro-environmental behavior. Thus, in the analysis of these two variables, an additional 121 participants had to be excluded. For this

second analysis, 210 responses could be included, with $n = 50$ in condition 1, $n = 50$ in condition 2, $n = 60$ in condition 3, and $n = 50$ in condition 4.

From the sample for the second analysis, 146 identified as female, 57 as male, one as non-binary and one preferred not to answer. The participants were aged between 18 and 66, with a mean age of 27.9 years ($SD = 8.9$). Their nationality was German (86.3%), Austrian (4%), Dutch (2%), and English (1.1%). Furthermore, participants were currently living in Germany (86.3%), Austria (4.9%), the Netherlands (2.4%), and England (0.5%). 72.6% of the participants were currently studying, 17.2% were working full-time and 7.4% part-time. Moreover, most of the participants displayed some familiarity with Instagram (96.1%; see Appendix A).

Materials and Measures

The present study was created and carried out on Qualtrics. To manipulate the two independent variables goal frame (gain / loss) and spatial distance frame (proximal / distant), four Instagram posts were created in collaboration with Daniel Schlegel Umweltstiftung (see Appendix B). They contained similar information about a behavior and its effect on the environment but were framed either as a gain / proximal, gain / distant, loss / proximal, or a loss / distant message. The idea for the frames stems from Grazzini et al. (2018), who implemented climate change messages framed in terms of gains or losses. Using the layout of Instagram posts, this study's stimuli included a picture along with written information in the pictures' caption. The environmental behavior of taking the train vs. taking the plane was used. This is based on the finding that the environmental impacts of these travel behaviors are commonly known (Chiambaretto et al., 2021). Since the recruitment procedure mainly targeted participants living in or close to Germany, spatially proximal messages were about Germany and spatially distant messages were about Bangladesh. Goal framing entailed phrasing the environmental impact as decreasing (gain) or increasing (loss) the occurrence of floods, as floods are a common consequence of climate change in both Germany and

Bangladesh (Intergovernmental Panel on Climate Change, 2022). Moreover, the consequences for saved (gain) or destroyed (loss) households were included to increase the messages' perceived relevance. The pictures that were used depicted landscapes of the described environmental consequence. As an example, the message about increasingly occurring floods in Bangladesh (loss / distant frame) was written on a picture of flooded land in Bangladesh.

In addition, a manipulation check was included right after the presentation of the stimuli (Appendix C). It included two questions about the Instagram post: One about the gain / loss dimension and one about the spatial distance communicated in the message. Participants were asked to tick the statement that they perceived to fit best with the Instagram post that they had previously seen.

As a measure of the dependent variable intended pro-environmental behavior, the General Pro-Environmental Behavioral Intentions items constructed by Halpenny (2010) were used (see Appendix D). The items are about universal pro-environmental behaviors, i.e. behaviors that are implementable for many people, as well as diverse (i.e. different kinds of pro-environmental behaviors) and specific pro-environmental behaviors. This study included all 12 questions which were to be answered on a five-point Likert scale. The answer alternatives ranged from '*Strongly Disagree'*, indicating a score of 1, to '*Strongly Agree'*, indicating a score of 5. To obtain the total scores, the item scores were averaged. A high score on this measure reflects high intentions to engage in pro-environmental behavior. A reliability analysis indicated good reliability (α = .79). This corresponds to Halpenny's (2010) reliability analysis, which showed a Cronbach's alpha value of α = .85. One of the questions was mirrored to ensure that participants read the questions attentively and to counteract acquiescence. Additionally, after the fourth question, an attention check was included. This made sure that participants answered the questionnaire attentively, which has been shown to

increase measurement quality and motivation in online surveys (Shamon & Berning, 2020). Failing the attention check led to an exclusion of the participant's data in the analysis.

Moreover, a measure of information-seeking was included to counteract the so-called hypothetical bias, i.e. the tendency to have high intentions to engage in a behavior yet failing to actually implement this (Ropret Homar & Knezevic Cvelbar, 2021). Therefore, this operationalization is a meaningful addition to measuring mere intentions. In order to measure this dependent variable, the participants were provided with a link to a website containing further information about pro-environmental behavior (see Appendix E). They were offered to use this link deliberately. Participants' use of the link was tracked to measure whether they were motivated to learn more about pro-environmental behavior. Clicking on the link was scored as '1', whereas not clicking on the link was scored as '0', which means that a score of 1 on this variable can be interpreted as engaging in information-seeking behavior, reflecting interest to find out more about pro-environmental behavior.

A similar method was implemented to measure the third dependent variable actual pro-environmental behavior, which can be regarded as a useful complementation to measuring intended behavior, too. In detail, after the link to more information about pro-environmental behavior, a second link was provided that led the participants to the donation page of Daniel Schlegel Umweltstiftung (see Appendix F). Daniel Schlegel Umweltstiftung is an environmental foundation using donations for nature conservation projects. Consequently, supporting this foundation monetarily can be deemed a pro-environmental behavior. Again, participants could use the link deliberately, which was tracked. If the link was used, this was scored as '1', if it was not used, this was scored as '0'. Hence, actual pro-environmental behavior is reflected by a score of 1 on this variable.

Procedure

At the beginning of the study, participants were provided with an information letter, explaining the scope of this study and their rights (see Appendix G). They had to indicate

their understanding and consent to this. Next, participants were asked to answer six questions about their demographics, namely about their age, gender, nationality, current country of residence, current occupation, and level of familiarity with Instagram. Afterward, they received an Instagram post framed as either gain / proximal, gain / distant, loss / proximal, or loss / distant. Random assignment to the condition ensured that potential confounding variables were evenly distributed. The participants were asked to read the post and its caption carefully. Then, the manipulation check followed. The next step required the participants to answer the General Pro-Environmental Behavioral Intentions items. Lastly, they were presented with the two links to the websites offering more information about pro-environmental behavior and the opportunity to donate money to the environmental foundation. The links were accompanied by short information on their content. At the end of the study, a debriefing explained the purpose of this study (see Appendix H). Here, participants were given the chance to resign from participating in this study. In total, completing the study took around 10 minutes.

Data analysis

Data were analyzed using IBM SPSS statistics 29. Preparing the data for analysis, respondents who did not pass the attention check, who did not agree to participate in the study, and who withdrew their participation were excluded. Moreover, the General Pro-Environmental Behavioral Intentions item scores had to be averaged to obtain the total scores. Here, the score of item eight was reversed. Finally, the values for the independent variables were derived from the conditions (loss = 0, gain= 1; distant = 0, proximal = 1).

Due to technical issues, the measures of the dependent variables information-seeking and actual pro-environmental behavior only started halfway through data collection. Consequently, data analysis was divided so that only the data from participants who started the study after this were included when analyzing these two outcome variables.

In order to test the hypotheses and the strength and direction of the relationships between the variables, in the first analysis, data were analyzed by means of a two-way ANOVA. Two logistic regression analyses were applied for the second analysis. Moreover, alternative explanations were tested by analyzing the effects of success of manipulation and of outliers. Lastly, a follow-up analysis was conducted to investigate potential confounding variables like age, gender, nationality, and familiarity with Instagram.

Results

Main Analysis 1: Intended Pro-Environmental Behavior

To test the main effects of goal framing and spatial distance framing and their interaction effect on intended pro-environmental behavior, a 2 (goal framing: gain / loss) X 2 (spatial distance framing: proximate / distant) ANOVA was conducted, including the predictor variables' interaction effect. The assumption of independence was met as a randomized design was implemented. Furthermore, Shapiro-Wilk Tests for Normality indicated that normality was not violated either. Lastly, the assumption of homogeneity of variance was met, which was tested with Levene's Test of Equality of Error Variances. By means of an investigation of boxplots, seven cases were identified as outliers. Since no further deviations could be identified for these cases, they were included in the analysis. To investigate the effects the outliers had on the outcomes, an exploratory analysis excluding these cases was performed and is elaborated on below.

The two-way ANOVA revealed that there was no statistically significant interaction effect on intended pro-environmental behavior ($F(1, 327) = .61$, $p = .434$). An analysis of the main effects displayed a non-significant effect of goal framing on intended pro-environmental behavior ($p = .670$). Similarly, spatial distance framing did not affect intended pro-environmental behavior significantly ($p = .872$), see Table 2 for an overview.

Table 2

Analysis 1: Two-way ANOVA Results

	df	MS	*F*	*p*	n^2
Goal Framing	1	.055	0.182	.670	.001
Spatial Distance Framing	1	.008	0.026	.872	.000
Interaction	1	.184	0.614	.434	.002
Error	327	.301			

Main Analysis 2: Information-Seeking and Actual Pro-Environmental Behavior

The main effects of goal framing and spatial distance framing, as well as their interaction effect on information-seeking and actual pro-environmental behavior were tested by means of two binomial logistic regression analyses. All of the assumptions for a logistic regression analysis were met: There was no multicollinearity among the independent variables and observations were independent. The assumption of linearity between the independent variables and the logit of the dependent variables did not apply because the independent variables were categorical. No outliers or missing values could be identified for either information-seeking, or actual pro-environmental behavior.

Neither the dependent variable information-seeking, nor the dependent variable actual pro-environmental behavior displayed any variance. More specifically, none of the participants engaged in either behavior, i.e. the links were not clicked. Models containing both predictor variables for information-seeking (X^2 (3, N = 210) = 4.85, p = .183) and for actual pro-environmental behavior (X^2 (3, N = 210) = 2.99, p = .393) were non-significant, which proposes the conclusion that the models were not able to differentiate between participants who did and did not engage in information-seeking and actual pro-environmental behavior. This makes a detailed reporting of the results redundant, however, an overview of the statistics is included in Appendix I. It can be concluded that neither goal framing, nor

spatial distance framing, nor their combination affected information-seeking or actual pro-environmental behavior.

Since none of the tests was significant, correcting for multiplicity to avoid an inflation of the type 1 error was not necessary. Moreover, the invariance in the dependent variables information-seeking and actual pro-environmental behavior made follow-up analyses dispensable.

Exploratory Analysis 1: Successful Manipulation

In order to test potential alternative explanations for the results obtained in analysis 1, a 2 (goal framing: gain / loss) X 2 (spatial distance framing: proximate / distant) ANOVA with the dependent variable intended pro-environmental behavior including only cases with a successful manipulation check was performed. More precisely, this concerned 327 cases, with n = 79 (97.5%) in condition 1, n = 82 (100%) in condition 2, n = 88 (97.9%) in condition 3, and n = 78 (100%) in condition 4.

The assumption of normality was met for this two-way ANOVA, as indicated by an inspection of the histogram and the normal probability plot of the residuals. Furthermore, Levene's Test of Equality of Error Variances showed that the assumption of homoscedasticity was met. Lastly, five outliers were identified. Since the affected cases showed no further irregularities, they were included in the analysis.

This analysis did not show any changes in significance: There was no statistically significant interaction effect on intended pro-environmental behavior ($F(1, 323) = .64$, $p = .424$). Moreover, the main effect of goal framing on intended pro-environmental behavior remained non-significant ($p = .687$), as did the main effect of spatial distance framing on intended pro-environmental behavior ($p = .977$).

Exploratory Analysis 2: Outliers

In addition, analysis 1 was repeated excluding the outliers to explore whether these cases influentially affected the obtained results. To this end, a 2 (goal framing: gain / loss) X

2 (spatial distance framing: proximate / distant) ANOVA with intended pro-environmental behavior as the dependent variable was conducted excluding seven outliers. Similarly to the main analysis, this analysis revealed no statistically significant interaction effect of goal framing and spatial distance framing on intended pro-environmental behavior ($F(1, 320) = 1.22$, $p = .270$). Also in line with the main analysis, an investigation of the main effects displayed a non-significant effect of goal framing on intended pro-environmental behavior ($p = .864$). Similarly, spatial distance framing did not affect intended pro-environmental behavior significantly ($p = .957$).

Follow-up Analysis 1: Covariates

Follow-up analyses were carried out in order to explore any unexpected effects. Furthermore, to control for demographical characteristics and possibly confounding variables, the main analyses were repeated including these variables. On a scale from 1 ("*Not at all*") to 5 ("*A great deal*"), participants indicated a fairly high degree of familiarity with Instagram ($M = 4$, $SD = 1.2$, $N = 331$). Moreover, after excluding 17 outliers, the average duration for completing the study amounted to 400.7 seconds, i.e. approximately seven minutes ($SD = 624.41$, $N = 314$). A correlation analysis revealed that participants' age ($r = -.54$, $p < .001$, $N = 300$), gender ($r = -.17$, $p < .001$, $N = 300$), and current occupation ($r = -.28$, $p < .001$, $N = 300$) significantly correlated with their degree of familiarity with Instagram. Apart from this, familiarity did not significantly correlate with either nationality ($r = -.01$, $p = .453$, $N = 300$), current country of residence ($r = -.001$, $p = .495$, $N = 300$), or duration of the study ($r = -.07$, $p = .118$, $N = 300$).

In order to control for potential confounding effects of the sample's characteristics, the main analysis 1 was repeated including covariates. A check of assumptions detected 11 outliers. Therefore, one analysis with and one without these cases was conducted. Since the outcomes did not differ from each other substantially, only the results from the analysis excluding outliers are reported. Moreover, the check of assumptions by means of a histogram

and a normal probability plot of the residuals showed that normality was given. However, multicollinearity was detected between the covariates nationality and current country of residence, as judged from their correlation being $r > .70$. Upon further investigation, the variables' Variance Inflation Factors (nationality: $VIF = 2.06$, current country of residence: $VIF = 2.03$) indicated only moderate correlation (Frost, 2019). Hence, no corrective measures were deemed necessary. Since the covariates displayed a lot of overlap in their outliers, these cases were all excluded at once. Lastly, normal P-P plots showed that linearity between the predictor variables and the outcome variable was given.

Then, multiple linear regression analyses with the independent variables goal framing (gain / loss) and spatial distance framing (proximate / distant), and the covariates age, gender, nationality, current country of residence, current occupation, familiarity with Instagram, and duration of the survey were conducted, testing their effects on intended pro-environmental behavior. The results of this analysis demonstrated a significant model ($R^2 = .066$, $F(10, 278) = 1.98$, $p = .036$). Holding all other variables constant, neither the interaction effect of goal and spatial distance framing ($\beta = .11$, $p = .261$) nor the main effects of goal framing ($\beta = -.11$, $p = .192$) and spatial distance framing ($\beta = -.06$, $p = .460$) were significant.

Unexpectedly, age significantly affected intended pro-environmental behavior ($\beta = .19$, $p = .011$). More precisely, for each year older, the score on intended pro-environmental behavior increased by .19. Moreover, including gender as a covariate in the analysis revealed a significant, moderately strong main effect of this variable on intended pro-environmental behavior ($\beta = -.15$, $p = .012$). Hence, males scored .15 points lower on intended pro-environmental behavior than females. It should be noted that these findings do not pose new implications concerning the hypotheses established.

Discussion

The goal of this study was to examine how to optimize climate change communication to effectively motivate pro-environmental behavior. More specifically, the effects of goal framing and spatial distance framing of visual Instagram messages on intended pro-environmental behavior, information-seeking, and actual pro-environmental behavior were investigated. The research resulted in the following key findings. First, participants' intentions to engage in pro-environmental behavior did not differ significantly after seeing a loss-framed message compared to a gain-framed message. This non-significant pattern was also found for information-seeking and actual pro-environmental behavior, which altogether contradicts the first hypothesis. Moreover, in contrast to the second hypothesis, viewing a spatially proximately framed message did not lead to significantly higher intended pro-environmental behavior, information-seeking, and actual pro-environmental behavior than viewing a spatially distant message. Lastly, the findings of this study discarded the third hypothesis, too: No significant interaction effect between goal framing and spatial distance framing could be demonstrated. More specifically, being presented with different combinations of goal and spatial distance frames did not have significantly different effects on participants' levels of intentions to engage in pro-environmental behavior, information-seeking, and actual pro-environmental behavior. The study's results promote the conclusion that goal frames and spatial distance frames do not increase the effects of Instagram climate change messages on intended pro-environmental behavior, information-seeking, and actual pro-environmental behavior, neither by themselves nor in combination.

Goal Framing

The study at hand showed that climate change messages on Instagram framed in terms of losses do not affect subsequent pro-environmental intentions and behaviors differently compared to gain-framed messages. This outcome stands in contrast to the established theoretical framework of Prospect Theory, postulating that loss frames are more influential on subsequent decisions and behaviors than gain frames due to the human tendency of loss

aversion (Tversky & Kahneman, 1981). However, past research has not proven this pattern unequivocally. Additionally, studies that did demonstrate the superior effectiveness of loss frames accounted for mediating factors, such as different values, perceptions of efficacy, emotions like hope or fear, and other personal characteristics (Morton et al., 2011; Updegraff et al., 2007; Woltin et al., 2022). As an illustration, gain-framed messages were found to increase donations in individuals with high nature values or an independent self-view more than loss-framed messages, whereas loss frames were more effective in individuals with an interdependent self-view (Chen, 2016; Woltin et al., 2022). Therefore, this study's attempt to prove a general pattern of goal framing on pro-environmental behavior and intentions might not have been successful because the effects of goal framing demonstrated in prior research might not only interact with but even depend on further internal factors. Hence, these insights suggest that goal frames cannot be implemented in a one-size-fits-all manner. Rather, the target group's specific characteristics might have to be considered carefully, adapting goal frames to the specific preferences. Future studies replicating this finding are warranted to draw generalizable conclusions.

It should be noted that this study has the conceptual shortcoming of distinguishing goal framing merely in terms of gain vs. loss frames. This might have skewed the results because naturally, the phenomenon of climate change does not have outcomes in which humans attain a real gain. Rather, in many scenarios, the gainful outcome is that of keeping the status quo, i.e. not losing our current way of living. In their study on goal framing, Bilandzic et al. (2017) have made a corresponding differentiation between positive (obtaining inherently positive outcomes) and negative (avoiding negative outcomes) gain frames. They found that gain-negative frames were more effective in influencing willingness to sacrifice for climate change mitigation than gain-positive frames. Such a differentiation would have surpassed the scope of this study, however, future studies including gain-negative frames may generate valuable clarification.

Spatial Distance Framing

The results refuting the second hypothesis, supposing that Instagram messages framed in spatially proximate terms influence pro-environmental intentions, behaviors, and information-seeking more strongly than spatially distantly framed Instagram messages, oppose the established framework, too. Making climate change feel closer (i.e. proximizing climate change) is a commonly accepted way to ultimately motivate pro-environmental attitudes and behaviors (Devine-Wright, 2013; Spence et al., 2011) and is supported by Construal Level Theory (Trope & Liberman, 2010). It must be noted that, according to Construal Level Theory, the construal level of information affects which considerations, evaluations, and decisions are made (Trope & Liberman, 2010). In line with this, studies have yielded inconsistent results on the standalone effect of spatial distance (Brügger et al., 2015). Rather, it has been demonstrated that matching the construal level of spatial distance to additional factors, e.g. the values people endorse, individual beliefs, group norms, people's concern about the environment, or their attachment to a certain place, potentiates its effectiveness (Brügger et al., 2015; Brügger & Pidgeon, 2018; McDonald et al., 2015). Amongst others, individuals endorsing biospheric and altruistic values are more likely to engage in pro-environmental behavior when perceiving climate change as distant because this makes them act in line with their values (Brügger et al., 2015). In an attempt to prove a universal pattern of the effects of spatial distance by means of visual messages, the study at hand did not account for such additional factors. Moreover, research has found that the levels of spatial distance differently impact subsequent perceptions of climate change, climate policy attitudes, and engagement with climate change (Spence & Pidgeon, 2010) rather than directly influencing actual pro-environmental behavior and specific pro-environmental intentions. Correspondingly, the Value-Belief-Norm Theory of Environmentalism illustrates that pro-environmental intentions and behaviors are preceded by pro-environmental values, beliefs, and perceived efficacy (Stern, 2000). Following this, the present results may be attributed to

the simplification of the spatial distance effect on intentions and behavior. Future research is encouraged to investigate whether the antecedents of intentions and actual behavior need to be considered as essential predictors or as mediating factors. This might allow the replication of prior results, which demonstrated the effectiveness of spatial distance framing, and would shed light on the stage of the Value-Belief-Norm Theory at which spatial distance exerts its influence.

In a similar vein, decreasing spatial distance may not automatically decrease personal distance as theorized. Rather, one study has demonstrated effects of spatial distance only when personal relevance was stimulated via priming the motivation to leave a positive legacy (Zaval et al., 2015). Since the present study did not investigate whether the implemented frames induced personal relevance, conclusions may only be drawn about ultimately resulting intentions and behaviors. Thus, further studies are necessary to determine which level of spatial distance is effective, accounting for the influence of moderating factors like personal relevance.

Theoretically, this study extends the established pattern, that psychologically proximizing the consequences of climate change is not effective unequivocally, to spatial distance frames implemented in visual Instagram messages. Consequently, the social media channel Instagram is one further context in which the commonsense method of proximizing climate change to stimulate pro-environmental behavior cannot be confirmed.

Interaction Effect

In contrast to the hypothesized interaction effect between goal framing and spatial distance framing, the present study did not demonstrate according changes between different combinations of the frames. This does not confirm past research, which has found the effects of gain frames to be amplified by high-level construals, whereas variants of low-level construals strengthened the effects of loss frames (Chang et al., 2015). Similar patterns have

been demonstrated for different kinds of psychological distance, such as temporal distance (Chen, 2016; Lee & Oh, 2014).

The fact that this study did not yield corresponding results for a moderating effect of spatial distance framing on goal framing can be attributed to different reasons. Firstly, it is possible that the documented effect of other variants of psychological distance, such as temporal distance (Orten Tugrul & Lee, 2018), does not translate to the variant of spatial distance. However, since the different variants of psychological distance have the same theoretical underpinning and proven validity in various contexts (Liberman et al., 2007; Trope et al., 2007), this explanation is unlikely. Rather, this research was based on studies that, similarly to the pattern of spatial distance effects, involved additional factors. In this case, the influence of environmental concern, an independent vs. interdependent self-view, and self-efficacy has been demonstrated to determine the congruency effect between goal framing and construal levels (Brügger et al., 2015; Chang et al., 2015; Chen, 2016). Here, the combination of a gain-frame with low temporal distance increased behavioral intentions in individuals with an independent self-view, whereas a loss-distant combination tends to be most effective for individuals who display high environmental concern (Chang et al., 2015; Chen, 2016). Correspondingly, a more plausible explanation is that the lacking interaction effect from this study is due to the exclusion of such further variables. Perhaps, they mediate the influence of goal framing and spatial distance framing. Hence, it is possible that, since this study did not account for factors like environmental concern, self-view, or self-efficacy, the interaction effect of goal framing and spatial distance could not be demonstrated accordingly.

In addition, conflicting processes such as habits might have been involved, counteracting the influence of the framed messages. More precisely, habits have been shown to be very powerful determinants of whether one engages in pro-environmental behavior (Gifford, 2011; Lorenzoni et al., 2007). A short manipulation by means of one online message may have been too weak to overcome the persuasive influence of habits. To test this

alternative explanation, the exposure to the manipulation could be enhanced in future studies. Further, field studies manipulating real social media content might generate clarifying insights on the effects of framed climate change messages.

Furthermore, the explanation of why this study's results contrast the established framework might have methodological causes. Some research this investigation was based on did not operationalize construal levels in terms of spatial distance but used the construal levels of other concepts, examining e.g. moralistic reasoning vs. behavior-specific information (Grazzini et al., 2018; Lee & Oh, 2014). Furthermore, whereas this study manipulated construal levels, other studies represented this variable by measuring the construal levels of intentions (Ledgerwood et al., 2010; Orten Tugrul & Lee, 2018). To test these methodological explanations, future studies could compare such different operationalizations of the concepts. Findings thereof would allow conclusions about the way and contexts in which goal frames interact with spatial distance frames.

Summing up, the effects of this study encourage the conclusion that merely combining goal and spatial distance framing is too simplistic. Despite the lacking effects, this insight constitutes an exploratory basis for future research: Likely, an interaction effect between goal framing and the psychological distance variant of spatial distance depends on additional individual factors.

Demographic Characteristics

In order to control for the potential effects of demographical and confounding variables, analyses were conducted in addition to the main analyses. The patterns behind information-seeking and actual pro-environmental behavior were not explored further because these variables did not display any variance, that could potentially be explained by factors such as demographic characteristics. It was found that the demographic variables age and gender significantly affected intended pro-environmental behavior. The results from past studies, indicating a positive relationship between age and variables such as sustainable

values and pro-environmental behavior (Wiernik et al., 2013), correspond to the positive association between age and intended pro-environmental behavior found in the present research. Likewise, gender has been proven to influence environmental behavior in that males have lower intentions to act pro-environmentally (Blok et al., 2014). These insights are important to consider when designing communication strategies as different age and gender groups appear to come with different preferences and values. The results from the present study confirm this suggestion: Implementing one universal approach does not achieve the desired outcomes. Instead, implementing e.g. a loss-distant combination may be more effective in stimulating pro-environmental behavior in an older and female target group because they tend to be more environmentally concerned than a young, male target group (Blok et al., 2014; Chang et al., 2015; Wiernik et al., 2013). Consequently, different, target-group-specific messages might have to be created to achieve the desired effects of motivating pro-environmental behavior.

Limitations

This study has certain methodological limitations. Overall, the manipulation check was proven to be successful in this study and past studies have effectively implemented similar manipulations of goal and spatial distance frames (Bilandzic et al., 2017; Grazzini et al., 2018). Nonetheless, the manipulation may have been too weak to initiate the hypothesized effects. First, the online format of this study does not guarantee that participants have looked at the manipulation long and carefully enough to process and internalize it. Similarly, exposing participants to the manipulation only once might have limited the possibility of attaining an effect. Thus, the present study could be extended by measuring actual changes in cognition as a check of manipulation. This could ensure that the climate change message was not merely understood correctly but that it actually influenced the cognitive construal level.

Another shortcoming pertains to the single measure of actual pro-environmental behavior. More precisely, operationalizing pro-environmental behavior by means of donating

to an environmental cause might have not been representative. First, as students made up more than half of the sample, willingness to donate money may be a poor indicator of willingness to engage in (non-monetary) pro-environmental behaviors. Moreover, concerns about what exactly their donations are used for have been shown to be rather high in Germany (Krumbein, 2010). Since the majority of the sample was German, this factor might have affected actual pro-environmental behavior when measured as donating money to benefit the environment. In future research, these possibly confounding effects could be minimized by providing more diverse opportunities to engage in pro-environmental behavior or by measuring this variable in real-life situations.

A methodological limitation lies in the fact that no baseline measures of the outcome variables were obtained, which the manipulation effects could be compared to. Therefore, conclusions can only be drawn regarding the frames' compound effect. Initially, this operationalization was chosen because the frames' interaction effect was of main interest. Nonetheless, future studies could test this proposition by investigating the baseline effects of differently framed Instagram messages in comparison to no manipulation, implementing either a control group or a pre-test.

Lastly, the present sample's demographic composition poses limitations to the generalizability of the found results. More specifically, while different age groups were included, participants constituted a WEIRD sample: The vast majority had a European nationality and were currently living in a Central-European country. Hence, in order to allow generalizable conclusions about climate change communication on Instagram, further populations need to be investigated.

Implications

Notwithstanding the elaborated shortcomings, the study at hand has valuable theoretical and practical implications. First and foremost, it advances the urgent matter of optimizing climate change communication. Considering that pro-environmental behavior is

one of the most influential ways of battling the pressing climate change, understanding its underlying motivating processes is crucial (Li et al., 2019; van Valkengoed & Steg, 2019). Moreover, this study represents a first effort of closing the research gap regarding an interaction effect between goal framing and spatial distance in visualized messages. Thereby, it extends past attempts to experimentally alter perceptions of psychological distance and to come to appreciate its underlying mechanisms (Brügger et al., 2015; Wang et al., 2019). Since more detailed understanding of the concept of psychological distance is crucial to effectively apply it (Wang et al., 2019), future studies are required to further dive into its research.

All in all, the results from this study suggest that combining goal framing and spatial distance framing does not constitute a universal way of increasing pro-environmental intentions and motivating pro-environmental behavior, that is independent of personal factors. Further, visualized messages were not able to overcome the influence of individual factors, which are presumably at play and affect preferences in climate change communication. This challenges the established view that, by activating emotions and altering feelings (Tanford et al., 2020), visual messages have the potential to make climate change consequences more concrete, personally relevant, and ultimately influence decision-making (Ballew et al., 2015; Duan et al., 2021; Minton et al., 2017). Practically, this finding implies that climate change communication has to be target-group-specific, also when implementing visual stimuli, taking into account individual factors like environmental concern personal values. Hence, policy-makers, environmental agencies, or concerned companies are encouraged to tailor the construal level of their climate change campaigns, interventions, and communication strategies to their target group's characteristics. Despite non-significant results in this study, it provides a base for further field analyses in the context of Instagram to find out how to effectively utilize this powerful medium, reaching a large audience. Ultimately, such insights provide the base for designing climate change communication that raises awareness, increases perceived relevance, and stimulates pro-environmental behavior.

Conclusion

To conclude, according to a manipulation in the form of framed Instagram messages, combining goal framing with spatial distance framing increases neither intentions to engage in pro-environmental behavior, nor environmental information-seeking, nor actual pro-environmental behavior. Therefore, the study at hand advocates that framing is a delicate and complex matter that depends on personal factors, also when applied in visual messages. In addition, these insights advance the academic literature on the topic of climate change communication, confirming the difficulties of manipulating psychological distance to motivate pro-environmental behavior and providing an exploratory base for utilizing the medium Instagram to communicate climate change information.

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Appendix A

Table 1

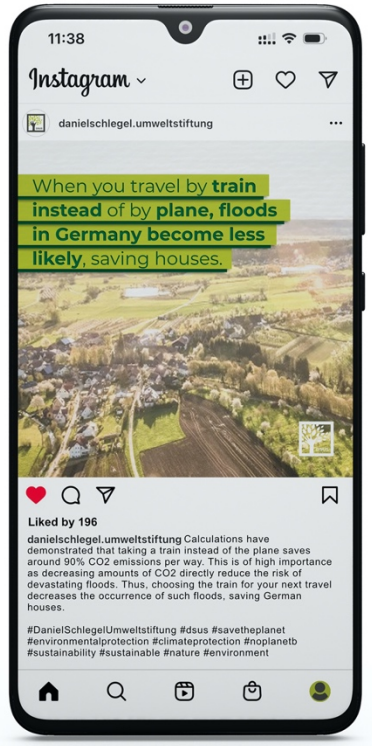
Demographic Characteristics of the Sample for Analysis 1 and Analysis 2

Characteristic		n_1	$\%_1$	n_2	$\%_2$
Gender		326		205	
	Female	214	65.4	146	71.21
	Male	110	33.6	57	27.8
	Non-Binary	1	0.3	1	0.68
	Prefer not to answer	1	0.3	1	0.68
Nationality		326		205	
	German	284	86.9	177	86.34
	Dutch	8	2.59	4	1.95
	English	3	0.87	2	1.13
	Austrian	11	3.37	7	3.95
	Other	20	6.14	16	7.8
Current Country of Residence		327		205	
	Germany	272	82.42	177	86.34
	Netherlands	19	5.8	5	2.44
	England	1	0.3	1	0.49
	Austria	13	3.98	10	4.88
	Other	22	6.73	12	0.98
Current Occupation		326		204	
	Student	191	58.4	148	72.55
	Working Full-Time	77	23.5	35	17.16
	Working Part-Time	36	11.0	15	7.35
	Unemployed	3	.9	1	0.49
	Retired	5	1.5	2	0.98
	Other	14	4.3	3	1.47
Familiarity with Instagram		327		205	
	Not at All	21	6.4	8	3.9
	A Little	32	9.8	16	7.81
	A Moderate Amount	29	8.9	14	6.83
	A Lot	101	30.9	61	29.76
	A Great Deal	144	44.0	106	51.71

Appendix B

Stimuli: Instagram Posts

Condition 1: Gain / Proximal



Condition 2: Gain / Distant

Condition 3: Loss / Proximal

Condition 4: Loss / Distant

Appendix C

Manipulation Checks

Please tick the statement you perceive as fitting best to the Instagram post you have just seen.

a. The post illustrated the benefits of engaging in environmentally FRIENDLY behavior.
b. The post illustrated the risks of engaging in environmentally HARMFUL behavior.

Please tick the statement you perceive as fitting best to the Instagram post you have just seen.

a. According to the post, places NEAR to me will be affected by the consequences of climate change.
b. According to the post, places FAR AWAY from me will be affected by the consequences of climate change.

Appendix D

General Pro-Environmental Behavior Intentions Items

I intend to…

1. … talk to policymakers about environmental issues.
2. … buy fruits and vegetables grown without pesticides or chemicals (i.e., organic food).
3. … pay extra for transportation if it is environmentally friendly (e.g. a fuel-efficient car).
4. … sort garbage into recyclable material and non-recyclables.
5. … invest in companies that utilize green technologies.
6. … reduce energy and water consumption.
7. … learn more about the state of the environment and how to help solve environmental problems.
8. … NOT participate in organized, peaceful environmental protests.
9. … join in community clean-up efforts.
10. … contribute money to environmental organizations.
11. … talk to others about environmental issues.
12. … avoid buying products from companies with poor environmental records.

Appendix E

Link: Information-Seeking

English: https://www.goodenergy.co.uk/the-ultimate-20-step-guide-to-eco-friendly-living/

German: https://utopia.de/ratgeber/nachhaltig-leben-tipps-fuer-den-alltag-mit-wirkung/

Appendix F

Link: Actual Pro-Environmental Behavior

English: https://danielschlegel-umweltstiftung.org/en/spenden/

German: https://danielschlegel-umweltstiftung.org/spenden/

Appendix G

Information Letter

Information about the research
"USING SOCIAL MEDIA TO COUNTERACT CLIMATE CHANGE"
PSY-2122-S-0428

Why do I receive this information?
You receive this information because you are invited to participate in the study "Using social media to counteract climate change". This study is conducted by Emily Waltermann in the context of her Master Thesis at the University of Groningen.

Do I have to participate in this research?
Participation in the research is voluntary. However, your consent is needed. Therefore, please read this information carefully. Ask all the questions you might have, for example because you do not understand something. Only afterwards you decide if you want to participate. If you decide not to participate, you do not need to explain why, and there will be no negative consequences for you. You have this right at all times, including after you have consented to participate in the research.

Why this research?
The purpose of this research is to investigate how to communicate climate change information effectively.

What do we ask of you during the research?
Before beginning this study, you will be asked for your consent to participate. Then, please answer some questions about your demographics. After this, an Instagram post will be presented to you, which contains a picture and a written message. Please read this Instagram post carefully. Next, you will be asked to complete a questionnaire as truthfully as possible. This questionnaire asks you about your intentions to engage in pro-environmental behavior, i.e. behavior that has beneficial effects for the environment. Lastly, after being provided with two links to websites fitting the topic of this research, you have reached the end of this study. Completing the study takes approximately 10-15 minutes. You will not be reimbursed for your participation.

What are the consequences of participation?
Participating in this study has no direct or indirect consequences.

How will we treat your data?
The data you provide throughout this study will be handled completely anonymously, meaning that your data cannot in any way be traced back to you. Data processing is for the purpose of completing the researcher's Master thesis and will be handled by the researcher alone. Moreover, conclusions drawn from this research are intended to be made available to the environmental foundation Daniel Schlegel Umweltstiftung.

What else do you need to know?
You may always ask questions about the research: now, during the research, and after the end of the research. You can do so by emailing the researcher (e.waltermann@student.rug.nl). This research is supervised by Therre van Blerck, whom you can contact via email (t.van.blerck@rug.nl).

Do you have questions/concerns about your rights as a research participant or about the conduct of the research? You may also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl.

As a research participant, you have the right to a copy of this research information.

Appendix H

Debriefing

Debriefing
"USING SOCIAL MEDIA TO COUNTERACT CLIMATE CHANGE"
PSY-2122-S-0428

You made it to the end of this study! Thank you very much for participating and thereby contributing to my Master Thesis.

By conducting this research, I hope to find out more about how to communicate climate change information in a way that effectively motivates pro-environmental behavior.

The purpose of this study could not be disclosed to you entirely in the beginning because this might have biased your answers.
This study has four different conditions, meaning that you were randomly assigned to seeing one out of four different Instagram posts. These posts contained roughly the same information but differed in the way in which this information was presented. Research has shown that messages which emphasize the losses of not engaging vs. the gains of engaging in pro-environmental behavior have different effects on subsequent behaviors. Similarly, stressing spatial proximity or distance to consequences of climate change motivates people differently. For the present study, I hypothesize that framing climate change messages in a way that highlights losses and spatial proximity or gains and spatial distance stimulates pro-environmental behavior more strongly than the other combinations. Ultimately, this study helps to shed light on how to present climate change information in a manner that motivates subsequent pro-environmental behavior most effectively.
Additionally, the two links in the end of the study were to measure whether the Instagram post you saw motivated you to seek out more information on pro-environmental behavior and to actually engage in pro-environmental behavior by making use of the opportunity to donate to an environmental cause. Here, merely your use of the links was tracked. No data was collected on whether or how much money you donated. As with all the other data, your use of the links is anonymous and cannot be traced back to you.

If now that you are clear about the rationale behind this study you wish to resign from participating, please indicate this below. In that case, your data won't be processed any further.

Did any questions or remarks arise throughout your participation in this study? Feel free to contact me (e.waltermann@student.rug.nl) or my supervisor (t.van.blerck@rug.nl).

Do you have questions/concerns about your rights as a research participant or about the conduct of the research? You may also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl

If you are interested in being informed about the outcomes of this study once my Master Thesis is finished, please indicate this by inserting your email address below. Again, this cannot be traced back to the data you provided throughout this study.

Appendix I

Table I 1

Analysis 2: Results of Logistic Regression Analysis for Information-Seeking

							95% CI for odds ratio	
Predictors	**B**	**S.E.**	**Wald**	***df***	***p***	**Odds ratio**	**Lower**	**Upper**
Goal Framing	-17.31	5684.145	.000	1	.988	.000	.000	.
Spatial Distance Framing	0.00	7696.368	.000	1	1.00	1.000	.000	.
Interaction	-0.71	7696.368	.000	1	1.00	.490	.000	.
Constant	21.20	5684.145	.000	1	.997	1615474918		

Table I 2

Analysis 2: Results of Logistic Regression Analysis for Actual Pro-Environmental Behavior

							95% CI for odds ratio	
Predictors	**B**	**S.E.**	**Wald**	***df***	***p***	**Odds ratio**	**Lower**	**Upper**
Goal Framing	-17.31	5684.144	.000	1	.988	.000	.000	.
Spatial Distance Framing	0.00	7696.368	.000	1	1.00	1.000	.000	.
Interaction	0.00	7696.368	.000	1	1.00	.490	.000	.
Constant	21.20	5684.144	.000	1	.997	1615474840		