Radboud Universiteit

Drought on the Dutch Potato Farm: A Study of the Foreign Language Effect and Message Appeals in Climate Change Communication

Written by Teun Kemmerling

Supervisor and first assessor: Dr. E. R. Felker. Second assessor: Dr. B. C. Hendriks

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Abstract

Given the rapid deterioration of our earth, communication about climate change is present everywhere. The current article tries to study effectiveness of climate change communication (CCC) by investigating two different message appeals: factual and emotional, and by researching the difference between native language (L1, Dutch) and second language (L2, English) and their influence on behavioral intention and attitude. More specifically, the Foreign Language Effect (FLE), which states that information might be perceived as less emotional in the L2 than in the L1 (Pavlenko, 2005), was investigated through an online questionnaire. While various studies did not find decisive results regarding the existence of the FLE (Costa et al., 2014a e.g.), other authors have demonstrated that information processing in the L2 is often paired with more utilitarian and rational decision-making, and less emotional influence (Keysar et al., 2012 e.g.). The latter might therefore suggest that emotional information would be more effective in participants' L1. For the questionnaire, four different texts were created to test the role of emotionality and language. The participants, mainly university students, were asked to read their respective text, followed by questions regarding behavioral intention and attitude. While the text manipulation showed to be successful, no significant differences between the different versions were found for behavioral intention, nor attitude. This could imply that the FLE does not play a significant role in CCC, but other explanations such as the rigidness and plentiful information input regarding this topic, as explained in the social judgment theory (Sherif et al., 1973), could also play a role, as well as the participant sample at hand which showed early acquisition and possibly regular use of the L2 in emotional contexts. The absence of significant differences in evaluation might indicate a preference for a globalized language approach for climate change NGOs over a localized approach. However, given all possible explanations for these findings, as well as the nongeneralizable sample, this advice should be taken with a grain of salt.

Introduction

Climate change communication

Climate change has been one of the most pressing issues of the 21st century. The research of Zimmerman (2008) showed the severity by demonstrating a consensus of 96 to 98% of climate scientists that agree that humankind has caused this climate change. Moreover, Strohmeier et al. (2019) showed on a social level that is it also one of the three biggest worries of young people from the EU, next to unemployment and poverty. Government and mass media have communicated extensively about climate change in the last decades, and their strategies are described by Nerlich et al. (2010). In the 80s, the notion of climate change risk started to be emphasized by politicians and journalists, while in the early 90s it retracted from the public interest again to make a comeback by highlighting the danger of it in the beginning of the 21st century. This brings us to the current situation.

While climate change communication (CCC) is indeed very present in media, and while a majority of the world citizens sees it as a major threat (Pew Research Center, 2019), the public often does not change their behavior accordingly. Gigliotti (1994) showed a negative correlation between faith in technological innovations and pro-environmental behavior, which results in an attitude that entails that innovation will solve the problem and does more than an individual could ever do. On the other side, Swim et al. (2022) demonstrated that climate worry, guilt and anger has increased in 2010 to 2019. However, this was mainly the case for younger generations while less so for older generations. Additionally, Whitmarsh (2009) also found that in the West climate change is seen as an issue that affects people outside of the West, and will not affect them personally, even though the West plays a major role in polluting our world, among other things caused by the rapid growth of our globalized village.

Given this swift pace of globalization, English has rapidly become the lingua franca (Seidlhofer, 2005), which is also reflected in media platforms. Due to this, people are more exposed to English media, and thus also to CCC in both their first language (L1) and second language (L2). In this article, L1 is defined as the language(s) learned from birth, while L2 is defined as the language(s) learned after the early ages of childhood, more specifically after the age of three (Pavlenko, 2012). While some authors have investigated risk perception in L1 and L2 regarding climate change (Hadjichristidis et al., 2015), research regarding differences between languages with respect to practical behavioral and attitude change is still missing. The

current article will investigate the possible persuasive difference between the L1 and L2 to close the gap between attitude and behavior.

Climate change persuasion

Only communicating about a topic does not mean that the issue at hand will be listened to by the public, nor that action will be taken. Persuasion is necessary to convince a public of the gravity of the problem, and to motivate them to undertake action.

When looking at persuasion within societally relevant topics, it is important to keep the social judgment theory into account. Sherif et al. (1973) explain this theory by defining the stances an individual can have towards a topic. If an individual is already a climate activist e.g., they would be categorized within the latitude of acceptance, from where it is quite hard to convince the person in question once again through CCC, given that the information is too close to what they already do or think. However, a climate skeptic thinks the other way around, and is classified within the latitude of rejection. Given that the CCC might be too far away from their current beliefs and attitude, it will therefore be rejected by them without taking into consideration the message too seriously. In between these two groups the latitude of non-commitment can be found, and the individuals in there have not yet decided upon a definitive stance towards the issue. This is therefore the group which can be persuaded most easily.

Jones and Peterson (2017) gave five suggestions to write effective and persuasive climate change stories. They commence by emphasizing the importance of using the narrative form, and taking the audience characteristics into account. Moreover, setting the story in relevant, specific and recent language, and relating and caring about the protagonist is an important part of a story. Lastly, making sure that these positive emotions are evoked through personal control and motivation rather than through a negative frame, and connecting the story to information regarding the human role and the danger of climate change are of importance as well. The current study will adopt these recommendations in the framing of the messages. These will be used to measure the effect of emotional and factual framing of climate change messages on the participants' attitude and behavioral intention.

Emotionality in persuasion

While one can objectively describe the deterioration of our earth through a factual appeal, it might often be more effective to use a message that appeals to emotions. In this article, a factual appeal is defined as the use of non-emotional language consisting of descriptions and facts that are objectively verifiable, with the assumption that consumers will process the given information based on utilitarian and/or logical decisions (Holbrook, 1978). On the other hand, emotional appeals try to influence the receiver through evoking either positive or negative emotions and thus the subjective intangible aspects (Holbrook, 1978).

The Elaboration Likelihood Model (ELM) describes how emotionality plays a significant role in the peripheral processing of messages, which occurs when motivation or ability is low (Petty & Cacioppo, 1986). Objectivity plays a more important role when a message is processed carefully, which happens in the central processing route, or when one already has prior knowledge regarding the respective topic (Wood et al., 1985). Processing through the central processing route occurs when people are motivated and capable to do so given the situation at hand, which is followed by evaluation of arguments, rather than of emotion. The heuristic-systematic processing model (HSM) proposed by Chaiken (1980) shows a similar explanation to message processing with emphasis on content and critical examination in the systematic processing route, and attractiveness and emotion for the heuristic processing route. However, the HSM allows simultaneous processing through two routes, which the ELM does not.

Multiple decades ago, companies like Coca Cola and Kodak were already using emotional appeals in their slogans (Holbrook & O'Shaughnessy, 1984), with some explicit phrasings as well, as can be seen for American Express: *'In addition to all logical reasons for using the American Express card, there is now one that is unabashedly sentimental'*. Besides solely the slogans, Puto and Wells (1984) divided advertisements into two groups: thinking ads, in which the focus is either on the practical use or on the specific features on the product, which appeal to the central processing route, and feeling ads, in which the emotions that come with using the advertised product are emphasized, and therefore activating the heuristic processing route. These feeling ads try to evoke a positive emotion in the consumer. As found by Spears and Singh (2004), a positive attitude towards a product improves purchase intention, and therefore the use of emotional appeals in advertising can be an attractive tool for companies.

Besides for-profit organizations, emotionality is also often used in the communications of non-profit organizations to encourage or discourage certain public behavior (Dillard & Nabi, 2006; Williams-Piehota et al, 2005). More specifically, Noble et al. (2014) already investigated the field of message appeal and climate change. They investigated the effect of message appeal on the effectivity of pro-environmental advertisement across three markets: the USA, the UK and Australia. More specifically, they showed advertisements that stimulated participants to switch off the light when leaving the room in order to save energy. Important aspects such as use of images, color or headlines were kept the same in the three message appeals, which were: positive self-image appeal, guilt-based negative emotional appeal, and rational message appeal. The manipulation of the text only occurred in the main body, and the effect of it was measured by asking participants about attitude towards the issue, ad likability, and behavioral intention. While there was no significant difference between the likeability of negative and positive emotional appeals, it was found that an emotional appeal was more effective than a rational one when looking at behavioral intention and attitude. In the present article, different emotional and factual appeals will be investigated and compared as well in order to test the effect of message appeal in the context of CCC.

Emotionality in L1 and L2

Besides the role of emotionality, the language of this emotionality might also pose an important role in persuasion. Noriega and Blair (2008) hypothesized such a thought in advertising, and tested it through two experiments with advertisements in Spanish and English. They found a more positive attitude towards the Spanish ad than towards the English ad in their sample of participants, which consisted of native Spanish speakers that spoke English as an L2. A more positive attitude was evoked in these Spanish ads, which portrayed an emotional context from the past, a family dinner in this case. The attitude towards the English add was less positive, even though it consisted of a similar ad design. Noriega and Blair (2008) explain that English, the participants' L2, appeared less in an emotional context during their Spanish upbringing. Therefore, the latter was evaluated as more positively when the participants viewed a more emotional ad. They conclude that words and phrases read in the L2 might be perceived as less emotional than in the L1. This theory is defined as the foreign language effect (FLE) (Pavlenko, 2005). Puntoni et al. (2009) investigated this FLE as well through several experiments with bilinguals in which slogans, word pairs, and single words were rated by the participants in their

L1 and L2. They found similar results to Noriega and Blair (2008), namely that for written information, the L1 is evaluated more emotionally than their L2.

Keysar et al. (2012) investigated the FLE in Japanese-English bilinguals through the Asian disease problem, in which participants had to choose between two decisions on how to save people from a hypothetical new disease. In the first possibility, a medicine would be distributed that would always work, yet only for a small group of people, which was the condition of risk aversion. In the second possibility, the group of people that could be saved was bigger, but there was a substantial chance that the medicine could also not work at all, which was the condition of risk seeking. They found that decision biases are reduced when participants think in their L2 instead of their L1. More specifically, they found that the framing effect regarding risk aversion and seeking is not present anymore in the L2 of a speaker. This means that in the L2, the decisions were made through a utilitarian mindset. This showed an absence of fear of losing lives, which could indicate that the information for the decision was processed centrally rather than peripherally as risk aversion due to emotional evaluation did not play a role in the L2. In the L1 however, the opposite was true and participants were more risk averse, which could indicate peripheral processing of the message, where emotions play a larger role. Costa et al. (2014a) replicated the experiments with English-Spanish and Arab-Hebrew bilinguals. They partially confirm the findings of Keysar et al. (2012), but did not find a complete absence of the framing effect. In their second experiment, two frames of money loss were presented: the loss of a ticket or the loss of the money itself, and a discount on a cheap or an expensive product. While the latter did show an FLE, the ticket and money frame did not. They explain that the presence of a third person in the money frame possibly caused less emotional involvement given that it made the situation less directly about the participants themselves, but also state the need for further investigation to be able to either attribute or disassociate this finding to the FLE.

As can be seen by the conflicting evidence of Costa et al. (2014a), not all conclusions regarding the impact or existence of the FLE are decisive. Caldwell-Harris and Ayçiçeği-Dinn (2009) studied the response of Turkish-English bilinguals to emotional phrases and lying through their skin conductance responses (SCRs). As expected, the SCR were higher in the L1 than in the L2 for the emotional phrases. However, while participants indicated that lying in their L1 felt more intense, their SCRs showed more response in their L2, English. The authors state that this could be due to nervousness in producing English speech, but also due to emotional associations because of lying. If the latter is true, this would therefore be

contradicting evidence for the FLE. The same authors, Caldwell-Harris and Ayçiçeği-Dinn (2004), also researched the recall and recognition of emotion and neutral words in Turkish-English bilinguals. They found that for both the L1 and L2, recognition and recall for positive words was superior to neutral words with little between-group differences. The authors conclude that even for speakers who learned English on a later age, rich emotional associations can still be embedded in the language and therefore in their processing of the L2.

A very concrete example of contrasting evidence regarding the FLE is the experiments of Costa et al. (2014b) and Cipolletti et al. (2016). Costa et al. (2014b) expanded the research field of decision bias in L1 and L2 through two experiments regarding the trolley dilemma, and indeed found a similar bias within their participants. In the trolley dilemma, a hypothetical scenario is explained in which one can either pull a lever to switch the direction of the train to save five people on the rails, but kill another that is on the other track, or do nothing. An alternative to this is the footbridge, in which one has to explicitly push someone on the tracks to make the train stop to save five people. Costa et al. (2014b) showed that people tend to think from a utilitarian mindset in their L2, while the emotional reactivity plays a larger role in their L1. In practice this meant that in their L2, the participants were more prone to push the man of the footbridge to save the other five, as well as more prone to push a button to make the train switch direction for a similar effect, which is less reflective of an emotional processing route than was seen in the L1. Cipolletti et al. (2016) investigated the same narratives of the footbridge and the button. They also found that in the bridge condition, native Spanish speakers were more prone to push the person in the English frame, but unlike Costa et al. (2014b), found no significant differences in the button condition. The authors describe that the significant results are likely not to be only due to the FLE given the discrepancy between the two situations and the extensive time participants are given to consider the situation. They also explain that previous research regarding the FLE repeatedly focused on a particular specific set of phrases and topics, such as childhood reprimands, and therefore the FLE cannot be always appointed as the definitive explanation in other contexts. They propose that different cognitive processes might play a larger role, and that the FLE requires more research into whether it really represents emotional distancing or rather something different. The present article therefore tries to test the FLE in a new context through a different mental process, namely that of CCC through attitude and behavioral change, to either strengthen previous evidence or contribute to the conflicting realm of the theory.

Research gap

The role of emotionality and the difference between L1 and L2 have been extensively researched in the realm of moral dilemmas, the processing of words, and in non- and for-profit advertising and messaging, yet a practical application of societal issues is still scarcely researched. Given the rapid rise of danger in climate change and the increasing presence of English as an L2 in media, this article will try to fill the gap of the role of the FLE in CCC. Through these results, this article can possibly assist climate change organizations in their language choices in their campaigns, and thus as to whether an organization should act globally through using the English lingua franca, or rather adapt to one's L1 to persuade their audience. Theoretically speaking, there has been a divide in the various realms of research regarding the implications of the FLE. The current article tries to add to this discussion, while also trying to change the context to lay a foundation for testing the FLE for societally relevant topics. Additionally, the FLE is often researched separately as the most valent independent variable, while authors such as Cipolletti et al. (2016) suggest that the FLE could be an effect which does not take place in isolation, but could rather be influenced by other variables or circumstances as well. The current article therefore adds the dimension of message appeal, for which it could be expected that the emotional appeal will be more effective in one's L1 if an FLE is found. This research gap has led to the following three research questions:

RQ1: Will emotional appeals be evaluated as more persuasive than factual appeals?

RQ2: Will the messages written in the L1 be more persuasive than those written in the L2?

RQ3: Will there be an interaction effect between message appeal and language?

Given the contradictory findings within the research field that on the hand show support for the existence or impact of the FLE (Noriega & Blair, 2008; Puntoni et al., 2009; Keysar et al., 2012 e.g.), while other articles show a more skeptical point of view (Costa et al., 2014a; Caldwell-Harris & Ayçiçeği-Dinn, 2009; Cipolletti et al., 2016 e.g.), research questions instead of hypotheses were drafted. The messages might be more effective in the L1 if an FLE is found, given the possibles differences between languages within the emotional appeal. If this significance is indeed caused by the emotional appeal, a related interaction effect might show as well.

Method

Materials

The present study tries to investigate the FLE in addition to message appeal in the context of CCC. The current study contains two nominal experimental independent variables, namely the language of the text: Dutch (L1) and English (L2), and the appeal used in the folder: emotional and factual. These two languages were chosen because of convenience, but also due to the high English proficiency in the Netherlands, the highest of Europe even (EF, 2021), which could increase the chances of full message comprehension.

Two types of texts regarding floodings in the Netherlands were designed, and both contained information as to how the person reading it can adapt practical measures to reduce their ecological footprint. Both folders were made available in both Dutch and English, yet each participant only viewed one of the folders, in only one of the two languages. The folders were originally created in English and peer-reviewed by the thesis group and supervisor, and were afterwards translated to Dutch and peer-reviewed by the native Dutch students from the group to ensure accuracy and quality. In the folders and recommendations, multiple industries that contribute to climate change were included to increase the validity and avoid finding an effect of only animal wellbeing e.g. rather than climate change recommendations in general. Additionally, to ensure internal validity of the texts, no other media such as images or streamers were used, all texts were similarly long ranging from 432 to 483 words, and the content was kept quite identical. As advised by Jones and Peterson (2017), the role of the human influence on climate change was mentioned through a positive frame of personal control of the situation, as well as using a personal narrative.

While the recommendations were similar, one of the folders was written in a factual manner, while the second in an emotional manner. In these texts, a factual appeal was operationalized through the use of words that are neutral in valence and low in arousal, which were identified through the research of Warriner et al. (2013), in addition to the use of statistics in the text. For the emotional appeal, words that are high in arousal and that show an extreme score in valence, either high or low, were chosen in addition to the use of an anecdotal sorrowful story of a farmer. Appendix A can be consulted for more elaboration regarding the texts, as well as a table regarding the used words and their arousal and valence scores. Here the used sources can be found as well in the form of footnotes which were not shown to, or visible for the participants.

Subjects

Participants were recruited through snowball sampling through the networks of the thesis group. The aim was to recruit 30 participant per condition, and therefore 120 participants in total. There were several exclusion criteria, namely being younger than 18, not speaking English, not speaking Dutch as a native language or speaking an additional native language, and incomprehension of the message. After exclusion of participants, 140 participants out of 250 remained. Multiple contextual independent variables were included, namely two interval variables: education level and age, and one nominal one: gender.

Of the 140 participants, 96 (68.6%) were female, and 44 (31.4%) were male. With respect to their educational level, a vast majority of 91 participants (65%) is studying or studied at a university as their highest level of education, 32 (22.9%) at a university of applied sciences, 4 (2.9%) at an MBO, and 13 (9.3%) at a high school. Furthermore, the mean age of the participants was 24.38 (SD = 7.78), ranging from 19 to 62. Age of acquisition of English also played a role given our exclusion criteria, however, no participants needed to be excluded based on their age of acquisition. The age for exclusion was according to the framework of Pavlenko (2012), which states that until the age of three, the acquisition of a language can be called an L1. For the current experiment, the average age of acquisition was 10.39 (SD = 2.66), ranging from 4 to 18.

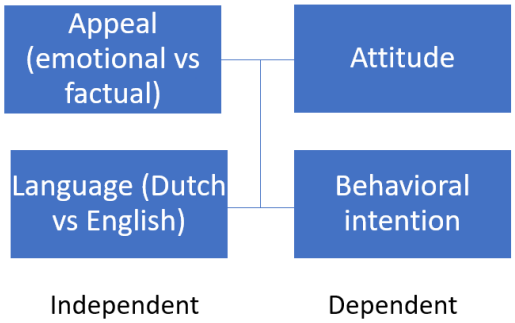
To test the homogeneity of the condition populations, five tests were executed. A Chi-square test did not show a significant relation between education level and condition ($\chi 2$ (9) = 8.82, p = .45). A second Chi-square test also showed non-significance between gender and condition ($\chi 2$ (3) = .232, p = .97). With respect to the interval variables, a one-way ANOVA looking at age and condition did not show a significant relation either (F (3, 136) < 1). Lastly, a similar non-significance was found for both the one-way ANOVA regarding age of acquisition and condition (F (3, 136) < 1), as well as for the one-way ANOVA regarding English proficiency and condition (F (3, 136) = 1.84, p = .14).

Design

The experiment consisted of a 2x2 between-subject design, with language and appeal type as factors. The two levels of language were L1 (Dutch) and L2 (English), and emotional and

factual for appeal type. Each participant was randomly assigned to one of the four conditions. The analytical model is visualized below in Image 1.

Image 1. Analytical Model



Instruments

The experiment contained two interval dependent variables, namely, attitude towards climate change, and behavioral intention. Both dependent variables were operationalized through statements in a questionnaire accompanied by seven-point Likert scales from ‘helemaal mee oneens’ to ‘helemaal mee eens’. The statements regarding attitude were inspired by Dijkstra and Goedhart (2012), while the statements for behavioral intention were inspired by Fishbein and Azjen (2010). They are presented in Table 1.

Table 1. Statements used to measure attitude and behavioral intention.

Attitude	**Behavioral intention**
Mensen zouden zich meer moeten bekommeren om klimaatverandering.	Ik heb de intentie om het in de boodschap beschreven gedrag te volgen.
Klimaatverandering moet de hoogste prioriteit krijgen.	Ik zal het in de boodschap beschreven gedrag volgen.
Mensen maken zich te veel zorgen over klimaatverandering.	Ik ben bereid het in de boodschap beschreven gedrag te volgen.
Klimaatverandering is een bedreiging voor de wereld.	Ik ben van plan het in de boodschap beschreven gedrag te volgen.

De ernst van klimaatverandering is overdreven.	Ik ben niet bereid mijn levensstijl te veranderen om de opwarming van de aarde en klimaatverandering tegen te gaan.
Het is vervelend om te zien dat mensen niets doen voor het probleem van klimaatverandering.	Ik zal alles doen wat ik kan om de nadelige effecten jegens het klimaat te verkleinen.

Given that both dependent variables consisted of multiple items, two Cronbach's α were executed to measure the reliability and the possibility to compute them into two combined variables. The reliability of attitude towards climate change, consisting of six items, was excellent: α = .91. The six items were computed into a new variable: the total attitude, by converting the responses to numbers after which the mean was taken, which was used for further testing. Moreover, the reliability of behavioral intention, consisting of six items as well, was good: α = .85. These six items were computed into a new variable as well: the total behavioral intention, through an identical method to the variable of attitude.

To ensure that participants actually spoke English, a LexTALE test was included in which participants had to judge 63 words on screen as to whether they are existing words or not (Lemhöfer & Broersma, 2012; Radboud University, 2011). On average, the participants scored 79.82 points (*SD* = 11.98) out of 100 on the LexTALE test. According to the framework of Lemhöfer and Broersma (2012), this translates to a B2 to C1 CEFR level of English, which can be defined as an independent to proficient language user (Council of Europe, n.d.), which therefore suffices for the research purposes at hand.

Additionally, the comprehension of the participants was measured to avoid (not) finding an effect due to misunderstanding. To do so, the following statement was presented after having read the text: 'Ik begreep de boodschap die de tekst probeert over te brengen volledig', with 'helemaal mee oneens' and 'helemaal mee eens' as extremes. Participants that indicated 'neutraal' or lower were excluded.

Moreover, a study by De Langhe et al. (2011) researched and documented the anchor contraction effect, which states that respondents are more likely to respond more extremely on scales if they are presented in their non-native language. To avoid this possible confound variable, the questionnaire was presented in Dutch.

Lastly, a manipulation check was executed to examine whether the emotional condition was actually perceived as more emotional than the factual condition. For this purpose, another seven-point Likert scale was composed with the statement: 'Deze boodschap is …', followed by a scale from 'niet-emotioneel' to 'emotioneel', inspired by De Langhe et al. (2011).

Procedure

Given that participants were recruited through the personal networks of the thesis group, no incentive was necessary. The participants received a link through which they could access the experiment online, via the Qualtrics platform. Before starting, participants were shown a short introductory text, which can be seen in Appendix A. Exclusion criteria were presented as well in the form of questions at the beginning of the questionnaire to ensure that participants did not participate unnecessarily. In practice this meant asking them whether Dutch was their native language, whether they spoke English, and whether they were older than 18. Afterwards, each participant would randomly see one of the four created texts, and was asked to fill in questions regarding comprehensibility, behavioral intention, attitude, and emotionality, all in the form of Likert-scales. When finished with this section, participants were asked to participate in the LexTALE test. Towards the end of the experiment, some additional demographic information was asked, such as educational level, gender and age of English acquisition, and the participants were thanked for their participation. Average completion time was measured, however, given the presence of some extreme outliers, the median was used to investigate and report this, which was 8 minutes and 16 seconds.

Statistical treatment

To test the research questions, two two-way ANOVAs were executed, with language, message appeal and their interaction as independent variables, and attitude towards the proposed behavior and behavioral intention as dependent variables. For the manipulation check, an independent t-test was used with emotionality as dependent variable and appeal as independent variable.

Results

To ensure that the manipulation of the texts was successful, the perceived emotionality of the conditions was investigated through an independent t-test. A significant difference between the emotional and factual appeal was found with regard to emotionality (t (131.83) = 10.89, p < .001). The emotional appeal (M = 5.64, SD = 1.08) was evaluated as more emotional than the factual appeal (M = 3.27, SD = 1.47), and the manipulation was therefore successful.

To test the RQs, two two-way ANOVAs were executed. The first two-way ANOVA did not show a significant effect of language on behavioral intention (F (1, 136) = 1.76, p = .187). The effect of message appeal on behavioral intention showed non-significance as well (F (1, 136) < 1). Lastly, the interaction effect between message appeal and language did not show a significant relation either (F (1, 136) = 1.14, p = .29). The means and standard can be found in Table 2.

Table 2. Means and standard deviations of behavioral intention in the various conditions (1 = helemaal mee oneens, 7 = helemaal mee eens)

	N	Mean	Std. Deviation	Minimum	Maximum
English, emotional	31	5.08	1.05	3.17	7.00
English, factual	38	4.93	1.28	1.83	6.83
Dutch, emotional	36	4.63	1.05	1.67	6.67
Dutch, factual	35	4.88	1.02	2.00	6.17
Total	140	4.87	1.11	1.67	7.00

Secondly, a two-way analysis of variance did not show a significant effect of language on attitude (F (1, 136) = 2.24, p = .137). The effect of message appeal on attitude showed non-significance as well (F (1, 136) < 1). Lastly, the interaction effect between message appeal and language also did not show a significant relation (F (1, 136) < 1). The means and standard deviations are presented in Table 3.

Table 3. Means and standard deviations of attitude in the various conditions (1 = helemaal mee oneens, 7 = helemaal mee eens)

	N	Mean	Std. Deviation	Minimum	Maximum
English, emotional	31	5.88	.87	3.83	7.00
English, factual	38	5.66	1.03	2.00	7.00
Dutch, emotional	36	5.49	.91	2.83	6.67
Dutch, factual	35	5.58	.84	3.50	7.00
Total	140	5.65	.92	2.00	7.00

Besides the descriptive results depicted here, both the ANOVA tables can be found in Appendix B.

Conclusion

Three research questions were formulated for this experiment. With respect to RQ1, the results showed that the text with an emotional appeal was not evaluated higher than the factual appeal for neither behavioral intention nor attitude, and it can therefore not be said that the emotional appeal was more persuasive. Secondly, regarding RQ2, similar results were shown, namely that the texts written in the L1 were not evaluated as more persuasive than the texts written in the L2. Lastly, with respect to RQ3, no interaction effect was found either.

Discussion

Possible explanations

While the majority of the literature suggests the existence of the FLE, the present article contradicts this premise in the realm of CCC, yet multiple reasons could be devised as to why this might be the case. The group of participants was acquired through snowball networking, mainly within the study program International Business Communication. Given that this study program is taught in English, and that it enjoys the presence of a high percentage of internationals with whom Dutch students socialize, there are two important factors at play. The first being a high level of English, given that the Netherlands is the highest scoring non-English speaking country with regard to English proficiency (EF, 2021), in addition to the language of instruction of the studies, which is English as well, which might increase proficiency even more. High proficiency can be due to using the language more, or more exposure to it, which might have led to more emotional encounters and therefore connections as well. Secondly, given that Dutch students socialize frequently with international students, emotional connections might have been created throughout the years due to social events e.g.. This could have led to creating more emotional connections in the English language as well, and therefore to a smaller difference of emotional perception between English and Dutch, and thus a decreased chance of there being an FLE. This might be especially relevant given that a great quantity of the thesis students' network are last-year students that have therefore acclimatized to these emotional connections profoundly. This in addition to the participants reporting having started learning English at a young age, namely, on average at 10.39 years, and therefore possibly having created emotional connections already early on, creates a probable explanation for the absence of an FLE in the present article.

Moreover, an online survey was used in the experiment design, which decreases ecological validity given that participants might have been distracted, might have had problems with technology or connection, or might have skimmed it quickly. Secondly, the experiment design asked participants to read the text carefully, and it therefore possibly promoted central processing for all versions, including the emotional texts which might have removed the emotional component leading to a failure of the variable manipulation. However, a manipulation check did show that the emotional texts were evaluated as more emotional than the factual ones, and therefore the current findings cannot be attributed to a lack of emotionality in the texts themselves.

Unexpectedly, with respect to the texts, the results showed for both behavioral intention, as well as for attitude, a more positive evaluation of English than of Dutch, for both the factual as well as the emotional appeal. Even though these differences were non-significant, the results were unexpected, for both the body of literature that supports the FLE (Noriega & Blair, 2008; Puntoni et al., 2009; Keysar et al., 2012 e.g.), where a more positive evaluation of the emotional Dutch version would be expected over the English version, and for the body of literature that is more critical towards the FLE (Caldwell-Harris and Ayçiçeği-Dinn, 2004; Caldwell-Harris and Ayçiçeği-Dinn, 2009; Cipolletti et al., 2016), given that no differences in evaluation would be expected instead of higher evaluations in the English version. Given the sample and the related aforementioned explanations, it could therefore be said that the FLE does not generalize to all different layers of society. For this group of participants for whom English has become a part of daily life, or for other groups who use English to a similar extent, it might be said that an opposite effect to that of the FLE could be found: higher evaluation of the L2. However, this hypothesis would require further research, especially given the non-significance of this difference in the current article.

Furthermore, the answers to behavioral intention and attitude depict several extremes, mostly towards ‘totaal mee eens’. Climate change has been an important topic for the last decades now with a never seen before impact of it on our planet (USGCRP, 2017). The most frequent generation that completed the questionnaire, generation Z, has therefore matured in this era of CCC. This in combination with the polarized situation within society around this topic has probably already determined various beliefs participants have. Therefore, the topic might have not allowed the manipulation at hand, given that participants would possibly already answer the scales in a certain way without taking into account the information of the text. This is in line with the latitudes of acceptance and rejection by Sherif et al. (1973), which

explain that readers cannot be persuaded easily if their current stance is either too similar or divergent from the topic of the text, and will therefore answer in a fixed way regardless of the given information. Besides the beliefs, behavior might have also influenced the answers, given that various participants might already adhere to some recommendations, such as being vegan or refusing to fly, and have probably carefully considered which measures to take to reduce their own ecological footprint. Therefore, this group of participants might have also been less easily persuaded to adhere to the other recommendations. This might have shown in their answers, through either extreme negatives given their already careful considerations, or through extreme positives to show that these steps are already being taken, regardless of the manipulation of the text.

Additionally, various climate change movements regularly emphasize the impact of governments and companies instead of the individual impact, and it might therefore be the case that individuals see their own ecological footprint as a minor change in a mayor system. Due to these pre-existent beliefs, it might also be true that the frame does not matter, given the lack of personal control on the situation (Jones & Peterson, 2017), even when the attempt was still made to include personal control through practical recommendations. Here it might still be the case that one text is more influential than the other, but this is not being measured by the individual behavioral change and attitude variables given that attitude towards more influential institutions was not included in the questionnaire, and rather it constantly referred to ‘me’ or ‘people’.

Previous paragraphs describe possible explanations as to why the current experiment did not show an FLE. However, there is also a body of literature (Caldwell-Harris and Ayçiçeği-Dinn, 2004; Caldwell-Harris and Ayçiçeği-Dinn, 2009; Cipolletti et al., 2016) which suggests alternatives to the FLE, and is simply more cautious towards the existence and impact of it. Therefore, a last explanation is that it might be true that the current experiment simply provides careful evidence that the FLE might not hold ground either within the realm of CCC, for persuasive communication in general, or for this specific sample.

Limitations

The current experiment contained several limitations to mention. First of all, there was a skewed sample with regard to some aspects. The sample consisted of mainly women around twenty who are studying at university. Research shows that women have more positive

environmental attitudes than men (Leppänen et al., 2012; Guastello & Peissig, 1998), and this therefore supports the premise of already having a positive attitude or already acting towards the proposed recommendations and thus not being influenced by the manipulation of the texts. This brings up the next limitation, namely that the statements regarding behavioral intention might have not been ideal given that it could have caused confusion in some of the participants who already follow some or all of the proposed measures. Therefore one cannot indicate that they are planning on following recommendations that they already are. Another limitation is the fact that the vast majority of participants were around twenty, and it therefore does not represent the general population but rather the generation that matured in an era of CCC. Older generations that are less likely to act upon climate change (Swim et al., 2022) were not included, which might be groups that experience different information processing of CCC. Regarding the formulation of questions, there were some negatively formulated questions in the questionnaire which in some cases showed inconsistent responses due to possible misunderstandings and inattentive reading. This might have had an impact on the results, however, the Cronbach's Alphas for these scales were still more than sufficient. The last yet important limitation of the current experiment was the exclusion of the impact of the government and industry in the questions. If they would have been included the chance of finding an effect might have increased.

Future research

In the future, these limitations might be avoided through retesting with adjustments. Future research could try to research the FLE through the same framework for different societally relevant topics. It might be advisable to choose topics with less media exposure to avoid pre-existent biases or beliefs: trying to persuade people to vote during elections, convincing a public of animal rights, or about how to avoid being scammed online e.g. Here an audience might be more easily persuaded given that they are still in the latitude of non-commitment (Sherif et al., 1973). Therefore a manipulation of message appeal and language might be measured more easily as well, given that the participants will be persuaded more easily. The participants could perceive the information as more important given their current stance, and they might therefore be more sensitive towards the in-text differences as well. Secondly, to increase the possibility of measuring an FLE, the role of other important institutions outside of the individual themselves could be included in the measurement of the dependent variables,

and therefore in the questionnaire. In CCC this might be the government and industry, but for other societal topics such as mental health, health insurance companies might also be included to ensure that all influences are measured.

In the future, it might be interesting to examine the existence of the FLE in CCC within different samples, such as men, low-educated people, or older generations, given the specific sample of the current article which cannot be generalized to other groups. Additionally, it might be interesting to test on groups who learned English at a later age, or on groups that learned English in divergent settings: either through socializing and living in a country or through studying a textbook e.g., as this might lead to different results. It could be expected that pupils that studied from a textbook have not experienced the language in an emotional setting, while the people that acquired language through immersion have probably experienced more positive and negative real life experiences in the target language. They have therefore created more emotional connections which might reduce the emotional distance between the L1 and L2, and thus the impact of the FLE.

With respect to the sample, it could be an interesting addition as well to take different variables into account as independent variables, such as current stance towards climate change and behavior, and political orientation, given that these possibly unknowingly could have played a role in the current experiment as well. Moreover, manipulating the instruction for reading the text could be interesting as well. In the current experiment participants were asked to read meticulously, which activates central processing, but it might be interesting as well to ask them to read more superficially to activate heuristic processing. Additionally, it might be interesting to exclude participants based on membership to the latitudes of acceptance and rejection to see whether the FLE exists for a group that is more easily persuaded, namely those that are in the latitude of non-commitment (Sheriff et al., 1973). However, a more representative sample of the population of the Netherlands might also be interesting to be able to make generalizations. Besides the Netherlands, it could also be a good suggestion to research different countries or languages by partially replicating the experiment. A possible manipulation here might be researching a country with areas that are victim to the results of climate change, and comparing those results to the experiment within areas in which the results of climate change are less impactful.

Relevance

However, the current research still contributes to the realm of CCC. Societally speaking, for NGOs or other organizations that spread information regarding climate change, it can be carefully said that both Dutch and English, as well as both factual and emotional messages work equally well for the measured group of the current research: highly educated generation Z students. This might also be true for other societal topics, yet that would require further investigation. This would mean that these organizations do not have to adapt to the local language here and can choose, with regard to language at least for this particular group of people, a globalized approach to try to reach them. Theoretically speaking, the present article adds to the body of literature that did not (fully) find an FLE (Caldwell-Harris and Ayçiçeği-Dinn, 2004; Caldwell-Harris and Ayçiçeği-Dinn, 2009; Cipolletti et al., 2016; Costa et al., 2014a), and presents it into a new possible realm of research: societally relevant behavioral change topics. To make certain claims about this group, further investigation is necessary. Whether the FLE will be found in future CCC research or not, it is important to continue to communicate about and research climate change, because Mother Earth cannot safe herself.

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Appendix A

Introductory text to the questionnaire

Beste deelnemer, op deze pagina nodigen wij u uit tot het deelnemen aan een vragenlijst met betrekking tot klimaatverandering. Het meedoen en invullen van de vragenlijst zal ongeveer 10 minuten duren. Bij deze willen wij u garanderen dat uw ingevulde antwoorden anoniem zullen zijn en ook zo behandeld zullen worden. Uw antwoorden zullen binnen het departement Taal en Communicatie van de Radboud Universiteit vertrouwelijk gebruikt worden ten behoeve van het beantwoorden van de onderzoeksvragen van onze bachelorscriptie.

Deelname: Deelname is vrijwillig en het is dan ook te allen tijde mogelijk om de vragenlijst af te breken en te stoppen met het invullen. Hiermee beloven wij u ook dat uw data gewist zal worden en niet gebruikt zal worden in het onderzoek. Als u besluit om de vragenlijst wel naar voltooidheid in te vullen, zal de data na afronding van de scriptie alsnog ook gewist worden uit het systeem.

Instructies: In de vragenlijst zal eerst aan u gevraagd worden om nauwkeurig een tekst te bestuderen met betrekking tot klimaatverandering. Hierna volgen enige vragen ter evaluatie van de tekst, gevolgd door een korte evaluatie met betrekking tot uw Engels niveau. Afsluitend vragen wij nog enige demografische informatie. Op iedere pagina zal nogmaals de gevraagde opdracht/informatie staan ter verduidelijking.

Contact: Voor nu willen we u hartelijk bedanken voor het lezen van de benodigde informatie en het deelnemen aan onze vragenlijst. Bij vragen en/of opmerkingen over het doel, de data of andere zaken kunt u een email sturen naar Teun.Kemmerling@ru.nl.

Hartelijk dank,

Nina van Loosen, Mynorka Daza Quintero, Iris de Boer, Imke Swinkels, Jelle van Dongen, Moritz Hofstede & Teun Kemmerling

The four text versions

Text 1: Emotional – English

My name is Daan. I am 37 years old, and I am the father of two joyful boys. My wife Tessa and I own a potato farm in beautiful South Limburg in the Netherlands. We inherited the farm in early 2018 after my father died. Ever since, we have had to face terrible weather challenges.

In the summer of 2018, it was incredibly hot and sunny, and it rained less than ever before – a horrible time to grow potatoes. Because of that, our family's farm severely suffered. The severe drought killed most of the harvest, and with awfully little rain, groundwater was scarce. Watering the plants was hopeless. We lost half of our harvest and thus our most important income source. We could not pay our bills.

As we slowly recovered, the next tragedy hit in 2021. Monstrous rainfalls in Limburg, Belgium, and Germany led to disastrous floods. We feared for our lives and evacuated the farm to stay with Tessa's mother in Utrecht. The flood destroyed the fields, causing massive losses in the harvest. Our dearly loved home and cherished belongings are ruined forever. A few days later, a sad message from Germany hit me. My childhood friend Luuk, who had moved to Western Germany, was overwhelmed by the flood. His house was swept away by the forceful stream of a usually peaceful creek, drowning his wife and daughter.

These catastrophes are the result of global warming. Our lifestyle activities release enormous amounts of CO2 which disturbs the usual balance between sunshine and rain. This leads to higher global temperatures, melting polar ice caps, and rising sea levels. More dreadful droughts, storms, and floods will cause families like mine or Luuk's to lose our homes, income, and loved ones.

This is how you can help:

1) Instead of flying to your next beach vacation, consider travelling by train. Trains are much more environmentally friendly. Or start small by taking the bike or bus to university or work rather than driving by car.

2) Next time you go shopping at the supermarket, consider buying local and seasonal foods. Eating fresh food coming right from your neighborhood is very environmentally friendly. The strawberries and tomatoes don't have to travel from far away, exotic countries and, therefore, fewer harmful gases are released.

3) Lastly, try to eat less meat and drink less milk. You can help the environment by not eating animals like cows, pigs, and chickens, or by not drinking cow milk and eating animal products like eggs and cheese. Raising animals for food releases immense amounts of CO2 that harm our beautiful earth. Eating more vegetarian and vegan meals helps with this.

Text 2: Factual – English

The Netherlands is the second biggest exporter of agricultural produce in the world, amounting to 17.5% of Dutch exports and 10% of the Dutch economy and employment.[1] Produce worth €65 billion is exported annually. The sector employs approximately 660.000 people, including 50.000 vegetable and fruit farmers[2] who are affected by the consequences of global warming.

In mid-2018, temperatures increased to up to 38.2°C[3], and only 105 milliliters of precipitation fell over three months, less than 50% of the average[4]. This negatively affected the agricultural sector[5]. A drought causes decreased crop performance due to nutrient-deficient soil, and rainfall is crucial for groundwater collection[6]. 2018 left farmers with no resources to water the

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crops. Potato farmers were especially affected, as their wages were reduced by 56% due to the drought.[7]

Three years later in 2021, another extreme weather event affected Southern Netherlands and Western Germany. In mid-July, some regions observed a precipitation of up to 241 l/m2 in 22 hours[8]. Creeks and rivers overflowed; for instance, the Maas River in Limburg reached a flux of 3168 cubic meters per second, 20 times more than the average[9]. Water levels peaked and were 50% higher than in the previous year. The flood demolished properties, with damage costing approximately €400 million in the Netherlands[10] and around €10 billion in Germany[11]. In Germany and Belgium, around 200 people passed away[12].

These are consequences of extreme weather events due to global warming. Human activity emits extensive amounts of greenhouse gases, increasing the global temperature. Scientists estimate a 3°C increase by 2100[13]. This leads to melting polar ice caps, sea levels rising, and

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increased water vapor in the atmosphere[14]. Consequently, water availability becomes less predictable, causing droughts, storms, and floods.

These are measures to prevent this:

1) Take public transportation. Trains emit less CO2 than planes. A flight from London to Edinburgh releases 193kg CO2 per passenger while a train between the two cities emits 87% less, namely 24kg CO2 per passenger[15]. Moreover, commuting 32km by train rather than by car reduces 9kg CO2 daily[16].

2) Consume regional and seasonal products. Acquiring produce that is manufactured regionally and seasonally emits fewer greenhouse gases than acquiring produce from foreign countries. Products supplied from abroad are transported long distances to stores and can emit up to 20 times more CO2 than regional produce[17].

3) Consume fewer animal products. Consuming animal products emits large amounts of greenhouse gases. Global emission due to livestock amounts to 7.1 Gigatons CO2 yearly, 14.5% of all anthropogenic greenhouse gas emissions[18]. Moreover, consuming oat milk compared to cow milk produces 80% less greenhouse gases and 60% less energy[19].

Text 3: Emotional – Dutch

Mijn naam is Daan. Ik ben 37 jaar oud en vader van twee vrolijke jongens. Mijn vrouw Tessa en ik zijn eigenaar van een aardappelboerderij in het mooie Zuid-Limburg in Nederland. Wij

[14] European Environment Agency. (2018). *Climate change and water — Warmer oceans, flooding and droughts.* Retrieved the 13th of April of 2022, fromhttps://www.eea.europa.eu/signals/signals-2018-content-list/articles/climate-change-and-water-2014

[15] Calculated via: EcoPassenger. (2022). Retrieved the 13th of April of 2022, fromhttp://www.ecopassenger.org/bin/query.exe/en?L=vs_uic

[16] Kansas City Area Transportation Authority. (z.d.). *Environmental Benefits of Public Transit | The Environment | About KCATA | KCATA. KCATA*. Retrieved the 13th of April of 2022, fromhttps://www.kcata.org/about_kcata/entries/environmental_benefits_of_public_transit

[17] Smaed, S. (2018, 29 november). *The Benefits of Buying Locally Sourced Produce.* Global Food, Healthy & Society. Retrieved the 13th of April of 2022, fromhttps://web.colby.edu/st297-global18/2018/11/29/the-benefits-of-buying-locally-sourced-produce/

[18] Food and Agriculture Organization of the United Nations. (z.d.). *Key facts and findings*. FAO. Retrieved the 13th of April of 2022, fromhttps://www.fao.org/news/story/en/item/197623/icode/

[19] Wiseman, C. (2021, 27 april). *Oat milk – 'better' for the environment, but is it good for you?* UQ Healthy Living. Retrieved the 13th of April of 2022, fromhttps://www.uqhealthyliving.org.au/oat-milk-better-for-the-environment-but-is-it-good-for-you/

hebben de boerderij begin 2018 geërfd na het overlijden van mijn vader. Sindsdien hebben we te maken gehad met verschrikkelijke uitdagingen door het weer.

In de zomer van 2018 was het ongelooflijk heet en zonnig, en het heeft nog nooit zo weinig geregend - een verschrikkelijke tijd om aardappelen te verbouwen. Daardoor heeft de boerderij van onze familie zwaar geleden. De ernstige droogte doodde het grootste deel van de oogst, en met akelig weinig regen was grondwater schaars. Water geven aan de planten was hopeloos. We verloren de helft van onze oogst en dus onze belangrijkste inkomstenbron, waardoor we onze rekeningen niet konden betalen.

Terwijl we langzaam herstelden, sloeg in 2021 de volgende tragedie toe: monsterlijke regenval in Limburg, België en Duitsland leidde tot rampzalige overstromingen. We vreesden voor ons leven en evacueerden de boerderij om bij Tessa's moeder in Utrecht te gaan logeren. De overstroming heeft de velden verwoest, waardoor enorme delen van de oogst verloren zijn gegaan. Ons geliefde huis en onze dierbare bezittingen zijn voor altijd geruïneerd. Een paar dagen later kreeg ik een triest bericht uit Duitsland: het huis van mijn jeugdvriend Luuk, die naar West-Duitsland is verhuisd, was overspoeld door de overstroming. Zijn huis werd weggevaagd door de krachtige stroom van een gewoonlijk rustige beek, waardoor zijn vrouw en dochter verdronken.

Deze catastrofes zijn het gevolg van de opwarming van de aarde. Door onze levensstijl komen enorme hoeveelheden CO2 vrij, waardoor het gebruikelijke evenwicht tussen zonneschijn en regen wordt verstoord. Dit leidt tot hogere temperaturen op aarde, smeltende ijskappen en een stijgende zeespiegel. Meer vreselijke droogtes, stormen en overstromingen zullen ervoor zorgen dat gezinnen zoals het mijne of dat van Luuk hun huis, inkomen en geliefden verliezen.

Dit is hoe je kunt helpen:

1) In plaats van vliegen naar je volgende strandvakantie, kun je overwegen met de trein te reizen. Treinen zijn veel milieuvriendelijker. Of begin klein en neem de fiets of de bus naar de universiteit of het werk in plaats van rijden met de auto.

2) Als je de volgende keer boodschappen gaat doen in de supermarkt, overweeg dan om lokaal en seizoensgebonden voedsel te kopen. Het eten van vers voedsel dat rechtstreeks uit je buurt komt is zeer milieuvriendelijk. De aardbeien en tomaten hoeven niet uit verre, exotische landen te komen en daardoor komen er minder schadelijke gassen vrij.

3) Tot slot, probeer minder vlees te eten en minder melk te drinken. Je kunt het milieu helpen door geen dieren te eten zoals koeien, varkens en kippen, of door geen koemelk te drinken en geen eieren en kaas te eten. Het houden van dieren voor voedsel produceert immense hoeveelheden CO2 die onze mooie aarde schaden. Meer vegetarische en veganistische maaltijden eten helpt daarbij.

Text 4: Factual – Dutch

Nederland is de op één na grootste exporteur van landbouwproducten ter wereld, goed voor 17,5% van de totale Nederlandse export en 10% van de Nederlandse economie en werkgelegenheid. Jaarlijks wordt voor 65 miljard euro aan producten geëxporteerd. De sector biedt werk aan ongeveer 660.000 mensen, waaronder 50.000 groente- en fruitboeren die worden getroffen door de gevolgen van klimaatopwarming.

Medio 2018 liepen de temperaturen op tot 38,2°C en viel er slechts 105 milliliter neerslag in drie maanden tijd, minder dan 50% van het gemiddelde. Dit had een negatieve invloed op de landbouwsector. Een droogte veroorzaakt verminderde gewasprestaties als gevolg van een voedingsarme bodem, en regenval is cruciaal voor grondwaterwinning. In 2018 hadden de boeren geen middelen om de gewassen te besproeien. Vooral aardappelboeren werden getroffen, wat te zien is in hun lonen die met 56% daalden door de droogte.

Drie jaar later, in 2021, werden Zuid-Nederland en West-Duitsland opnieuw getroffen door extreme weersomstandigheden. Half juli viel er in sommige regio's tot 241 l/m² neerslag in 22 uur. Kreken en rivieren overstroomden, en zo bereikte de Maas in Limburg een debiet van 3.168 kubieke meter per seconde, 20 keer meer dan het gemiddelde. Het waterpeil bereikte een hoogtepunt en lag 50% hoger dan in het voorgaande jaar. De overstroming vernielde

eigendommen met schade van ongeveer 400 miljoen euro in Nederland en ongeveer 10 miljard euro in Duitsland. In Duitsland en België zijn ongeveer 200 mensen om het leven gekomen.

Dit zijn de gevolgen van extreme weersomstandigheden als gevolg van klimaatopwarming. Menselijke activiteiten stoten grote hoeveelheden broeikasgassen uit waardoor de temperatuur op aarde stijgt. Wetenschappers schatten een stijging met 3°C tegen 2100. Dit leidt tot smeltende poolkappen, een stijgende zeespiegel en meer waterdamp in de atmosfeer. Als gevolg daarvan wordt de beschikbaarheid van water minder voorspelbaar, met droogtes, stormen en overstromingen tot gevolg.

Dit zijn maatregelen om dit te voorkomen:

1) Neem het openbaar vervoer. Treinen stoten minder CO2 uit dan vliegtuigen. Bij een vlucht van Londen naar Edinburgh komt 193 kg CO2 per passagier vrij, terwijl een trein tussen de twee steden 87% minder uitstoot, namelijk 24 kg CO2 per passagier. Bovendien stoot het woon-werkverkeer van 32 km met de trein dagelijks 9 kg minder CO2 uit dan met de auto.

2) Consumeer regionale en seizoensproducten. De aankoop van producten die regionaal en seizoensgebonden zijn geproduceerd, stoot minder broeikasgassen uit dan de aankoop van producten uit het buitenland. Producten die vanuit het buitenland worden geleverd, worden over lange afstanden naar de winkels vervoerd en kunnen tot 20 keer meer CO2 uitstoten dan regionale producten.

3) Consumeer minder dierlijke producten. Het consumeren van dierlijke producten stoot grote hoeveelheden broeikasgassen uit. De wereldwijde uitstoot door de veeteelt bedraagt 7,1 gigaton CO2 per jaar, 14,5% van alle antropogene broeikasgasemissies. Bovendien produceert de consumptie van havermelk in vergelijking met koemelk 80% minder broeikasgassen en 60% minder energie.

Emotionality of the used words

For the emotional words, words with a valence lower than 3.38, or higher than 6.74, and an arousal above 4.21 were chosen, according to the dataset and discussion of Warriner et al. (2013). For non-emotional words, according to the same article, words with a valence between 3.38 and 6.74, and an arousal below 4.21 were chosen. In some cases, no suitable word matched the aforementioned criteria, and the best replacement was chosen. All scores can be seen in the table below.

Table X. Emotional and non-emotional words used respectively in the emotional and factual appeal.

Emotional words (Valence, Arousal)	**Non-emotional words (Valance, Arousal)**
Father (6.88, 3.68*) Joyful (8.21, 5.55) Wife (6.7, 4.21) Beautiful (7.61, 5.71) Inherit (7.11, 4.35) Farm (6.22*, 3.05*) Die (1.67, 6.9) Terrible (2.1, 4.39) Challenge (5.95*, 5.25)	Big (5.64, 4.33*) Export (4.79, 3.45) Agricultural (5.5, 3.55) Produce (6.57, 3.23) Amount (5.42, 3.53) Annual (5.19, 3.7) Sector (4.67, 4) Employ (5.89, 3.83) Affect (5.65, 3.61) Consequence (3.86, 4.31*)
Summer (7.5, 5.48) Incredible (7.59, 6.35) Sunny (7.95, 5.38) Rain (6.58*, 3.29*) Horrible (2.33, 5.95) Family (7.25, 4.35) Severe (3.21, 5.43) Suffer (2.05, 4.5) Kill (1.81, 6.81) Harvest (6.57*, 3.75*) Awful (2.28, 4.86) Plant (7.05, 3.94*) Hopeless (2.2, 4.52) Lose (3.59*, 5.43) Important (6.82, 4.71) Pay (6.23*, 4.42)	Mid (5.21, 2.8) Temperature (5.58, 4.86*) Month (5.78, 3.64) Average (4.89, 3.29) Drought (2.79, 3.55) Cause (5.14, 3.48) Decrease (4.16, 3.05) Crop (5.88, 3.19) Deficient (3.63, 3.56) Crucial (5.16, 4.14) Resource (5.63, 3.17) Wage (6, 3.43) Reduce (5.1, 3.67)
Recover (6.4*, 4.42) Tragedy (2.11, 6.8) Hit (3.95*, 5.48) Monstrous (3.43*, 5.9) Disaster (1.71, 6.35) Flood (2.76, 5.31) Fear (2.93, 6.14)	Region (5.21, 3.24) Observe (5.3, 4.25*) Overflow (4.76, 4.25*) Reach (5.78, 3.35) Flux (4.17, 4.18) Peak (6.1, 3.9) Previous (4.74, 3.59)

Life (6.68*, 5.59) Evacuate (3.4*, 5.17) Mother (7.53, 4.73) Destroy (2.67, 5.16) Loss (2.9, 5.2) Loved (7.65, 5.59) Home (7.48, 3.78*) Ruin (2.32, 5.4) Sad (2.1, 3.49*) Message (6.18*, 3.81*) Childhood (6.65*, 3.73*) Friend (6.79, 4.29) Overwhelmed (2.8, 4.9) Forceful (3.7*, 5.36) Stream (6.9, 4.35) Peaceful (8, 4.38) Drown (2.33, 5.35) Daughter (6.73*, 5)	Demolish (2.67*, 4.5*) Property (6, 4.75*) Pass (5.73, 4.38*)
Catastrophe (2.7, 5.64) Lifestyle (5.95*, 5.52) Enormous (5.68*, 5.05) Sunshine (8.14, 5.32) Dreadful (2.6, 4.5) Income (6.26*, 3.82*)	Emit (4.81, 3.96) Extensive (5.25, 4.75*) Scientist (5.83, 4.14) Vapor (4.68, 3.24) Atmosphere (6.05, 4) Availability (5.68, 4.38*) Predictable (5.25, 2.86)
Help (6.95, 4.29) Fly (6.06*, 4.9) Beach (7.21, 5.1) Vacation (8.53, 5.22) Travel (7.89, 5.55) Train (6.36*, 4.05*) Environmental (5.5*, 6.05) Friendly (7.84, 4.27) university (6.95, 4.24) Drive (6.5*, 4.19*) Car (6.63*, 4.04*) Shop (5.89*, 4.76) Supermarket (6.37*, 4.65) Local (6.77, 3.8*) Seasonal (6.58*, 4.3) Food (7.52, 4.69) Eat (7.1, 4.38) Fresh (6.67*, 2.35*) Neighborhood (6.09*, 4.05*) Strawberry (7.25, 4.05*) Tomatoes (6.25*, 3.82*) Exotic (7.55, 6.9) Harmful (2.29, 4.89) Meat (6.62*, 4.3) Drink (6.67*, 5.19)	Measures (5.14, 4.36*) Prevent (5.42, 4.18) Public (5.33, 3.35) Transport (5.9, 3.76) Planes (5.72, 4.91*) Flight (6.11, 4.2) Commute (4.14, 3.15) Classroom (5.57, 4) Office (4.54, 3.05) Consume (5.48, 4) Regional (4.95, 4.95*) Product (5.5, 3.45) Acquire (5.5, 4.86*) Foreign (4.86, 5.43*) Supply (5.11, 3.28) Distance (3.89, 3.81) Store (5.94, 3.43) Emission (4.1, 3.67) Livestock (5.95, 2.95) Anthropology (5.3, 2.91)

Milk (6.74, 2.33*) Environment (6.7, 3.45*) Animal (7.06, 4.3) Immense (5.48*, 5.85) Harm (1.91, 5.9) Beautiful (7.61, 5.71) Earth (6.83, 5.04) Meal (7.05, 4.85)	

*The given value came close to, but did not perfectly fit in the aforementioned boundaries.

Appendix B

Two-way ANOVA tables from the results section

Table X. Two-way ANOVA regarding the effect of language and message appeal on behavioral intention

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.607[a]	3	1.202	.974	.407
Intercept	3312.485	1	3312.485	2682.940	.000
Language	2.168	1	2.168	1.756	.187
Appeal	.106	1	.106	.086	.770
Language * Appeal	1.402	1	1.402	1.136	.288
Error	167.912	136	1.235		
Total	3493.833	140			
Corrected Total	171.519	139			

a. R Squared = ,021 (Adjusted R Squared = -,001)

Table X. Two-way ANOVA regarding the effect of language and message appeal on attitude

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.671[a]	3	.890	1.049	.373
Intercept	4448.424	1	4448.424	5241.070	.000
Language	1.897	1	1.897	2.235	.137
Valence	.133	1	.133	.157	.692
Language * Appeal	.806	1	.806	.949	.332
Error	115.432	136	.849		
Total	4579.722	140			
Corrected Total	118.102	139			

a. R Squared = ,023 (Adjusted R Squared = ,001)

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Student name: Teun Kemmerling

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