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The influence of L1 versus L2 messages and modality on the effectiveness of online persuasive communication and the Foreign-Language Effect

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Abstract

The global use of English as a medium of communication has increased the importance of research about the influence of language (native versus non-native). The present study examined whether language (native: Dutch versus non-native: English) influenced the effectiveness of a persuasive message about climate change presented in the auditory or written modality.

Dutch respondents ($N = 151$) evaluated a written or an auditory persuasive message presented in Dutch or English in a matched-guise experiment. Findings revealed that language did not influence respondents' perceived emotionality, attitudes, and behavioural intentions. However, an interaction effect was found between language and modality concerning behavioural intentions. Within the auditory modality, English messages evoked higher scores on behavioural intentions than Dutch messages. Within the written modality, there was no difference. These findings suggest that if companies and governments want to persuade their Dutch audience, it might be better to use the English language for an auditory message. For a written message, both languages are likely similar in persuasiveness.

The present study is the first study that investigated the influence of language and modality on respondents' attitudes and behavioural intentions in a persuasive context. Almost no significant effects were found, likely because of respondents' high levels of English proficiency and high levels of exposure to English. Within the context of language and modality, it is interesting to investigate whether attitudes and behavioural intentions are driven by emotional versus rational processes or by other potential factors. Therefore, future studies need to investigate additional factors that might influence attitudes and behavioural intentions. The context of societal issues such as climate change is relevant to take into account because it is of great importance to persuade people to improve the world for current and future generations.

Keywords: Foreign-Language effect, modality, perceived emotionality, persuasiveness

Introduction

As a result of globalization, boundaries between nations and states are receding, resulting in the culturally diverse society we live in today (Liu et al., 2019; Morrison, 2015).

Consequently, the English language is used globally as a medium of communication (Taguchi & Ishihara, 2018). For example, individuals are increasingly approached through marketing-related persuasive messages in their foreign language (L2: English) instead of their native language (L1) (Puntoni et al., 2009).

Considerable research has been conducted on the difference in perceived emotionality between an L1 and an L2 (e.g., Brouwer, 2021; Dewaele, 2004; Puntoni et al., 2009). These studies (Brouwer, 2021; Dewaele, 2004; Puntoni et al., 2009) showed that the perceived emotionality of words and phrases is stronger in an L1 than in an L2. This difference in intensity of emotionality can be attributed to the Foreign-Language Effect (FLE), which refers to “the idea that actively thinking in a non-native language influences the cognitive processes responsible for judgement and decision-making” (McFarlane et al., 2020, p. 1).

The FLE has been investigated within various contexts, such as the decision-making context, the persuasive context, and the context of swear and taboo words (e.g., Dewaele, 2004; Keysar et al., 2012; Puntoni et al., 2009). However, the FLE in persuasive communication has been investigated rarely and only in the marketing context (Puntoni et al., 2009). Moreover, besides emotionality, attitudes and behavioural intentions have not been explored before in a persuasive context regarding the FLE. It can be of great importance for companies and governments to understand how language (L1 versus L2) might influence individuals’ attitudes and behavioural intentions because this information may be used to improve the persuasiveness of their messages. Therefore, the present study aimed to investigate the influence of L1 versus L2 messages on perceived emotionality, attitudes, and behavioural intentions in a persuasive context. Climate change was chosen as the topic for the persuasive context because it is one of the most significant issues faced globally that is communicated about at a global level (Bulkeley, 2003; IPCC, 2022). Therefore, in order to solve the issue of climate change, it is crucial to understand what kind of influence the use of an L1 versus an L2 has on the effectiveness of persuasive communication.

A factor that could play a role in the intensity of the FLE is the modality, audio or written, in which linguistic information is received. The effect of modality has been investigated in the decision-making context and the context of emotionally charged words, phrases, and narratives (e.g., Brouwer, 2021; Harris, 2004). However, the modality has not been investigated yet in a persuasive context. Therefore, the present study also addressed the

modality due to the influence it might have on the intensity of the FLE in a persuasive context. All things considered, the present study aimed to investigate the influence of L1 versus L2 messages about climate change (concerning perceived emotionality, attitudes, and behavioural intentions) presented in the auditory or written modality.

Theoretical framework

Extensive research has been conducted on the difference in emotionality between an individual's L1 and L2 (e.g., Brouwer, 2021; Caldwell-Harris & Aycicegi-Dinn, 2016; Dewaele, 2004; Puntoni et al., 2009). According to Caldwell-Harris and Aycicegi-Dinn (2016), reading emotional words and phrases provides a stronger emotional experience in an individual's L1 than L2. The authors explain their view by the fact that emotional regulation and early language acquisition develop simultaneously (Caldwell-Harris & Aycicegi-Dinn, 2016). Therefore, it is conceivable that words and phrases learned at an early age (L1) are more connected to physical experiences of emotion than words and phrases learned at a later stage (L2). Consequently, emotional experiences are stronger in an individual's L1 than L2. However, languages learned at a later stage can also show high emotionality if the proficiency level is high. The extent to which there is a difference between an individual's L1 and L2 concerning emotionality is therefore dependent on the age of acquisition and the proficiency level of the L2 (Caldwell-Harris & Aycicegi-Dinn, 2016).

According to Pavlenko (2012), age of acquisition and language proficiency are likewise factors that influence emotionality. However, the context of acquisition and frequency of language use were also emphasized as prevalent factors. Dewaele (2004) investigated these factors in a study in which respondents had to complete a questionnaire related to bilingualism and emotions. The central question was how high respondents perceived the emotional weight of swear and taboo words in their different languages. These word types were chosen because L2 learners have very limited knowledge of swear and taboo words compared to L1 learners. Consequently, misunderstandings may occur if L2 speakers use these words with L1 speakers. In general, findings revealed that the swear and taboo words were perceived more emotionally in respondents' L1 than in languages learned thereafter. However, the perceived emotionality of words in respondents' L2('s) was higher when respondents had learned their L2('s) in natural (i.e., outside of school) and mixed contexts compared to instructed contexts (i.e., at school). In addition, the perceived emotionality of words in respondents' L2('s) was higher for respondents who had acquired their L2 at a younger age, were highly proficient in their L2, and/or used their L2 frequently (Dewaele, 2004). Thus, Dewaele (2004) showed that age of acquisition, language proficiency,

context of acquisition, and language frequency influence the FLE due to differences in the intensity of perceived emotionality.

Besides investigating the perceived emotionality of words and phrases in an L1 versus L2, emotionality in an L1 versus L2 has also been investigated in decision-making contexts (e.g., Brouwer, 2021; Keysar et al., 2012). This is reasonable because emotions and affect play an essential role in decision-making and the consideration of risks (e.g., Loewenstein et al., 2001; Quartz, 2009). Keysar et al. (2012) studied the framing effect in a decision-making context. When a choice is framed positively (gain frame), people are generally more risk-averse. When the same choice is framed negatively (loss frame), people are usually more risk-seeking (Kahneman & Tversky, 1979). Finding these differences in risk preferences between frames (i.e., framing effect) is thought to be linked to a more emotional versus rational reasoning process (Keysar et al., 2012). Keysar et al. (2012) showed that the framing effect occurred when participants read the positive and negative framed text in their L1. However, the asymmetry of risk preferences disappeared when participants read the same text in their L2. An explanation for these findings is that individuals go through a more rational reasoning process when confronted with a text in their L2 compared to a more emotional reasoning process when confronted with a text in their L1 (Keysar et al., 2012). Thus, when individuals are confronted with a text in their L2, they make more rational decisions than when the same text occurs in their L1. Besides the framing effect, moral dilemmas have also been investigated in the decision-making context (e.g., would you sacrifice one individual to save the lives of six?) (e.g., Brouwer, 2021; Cicolletti et al., 2016; Costa et al., 2014). In line with the findings of Keysar et al. (2012), bilinguals made more emotional decisions when moral dilemmas were presented in their L1 than in their L2 (Brouwer, 2021; Cicolletti et al., 2016; Costa et al., 2014). Participants were more likely to sacrifice the individual when the dilemma was presented in their L2 than when it was presented in their L1 (Brouwer, 2021; Cicolletti et al., 2016; Costa et al., 2014). Sacrificing the individual is a utilitarian decision that is driven by rational processes. Therefore, the decision to sacrifice the individual is regarded as more rational, and not sacrificing the individual is regarded as more emotional (Brouwer, 2021; Cicolletti et al., 2016; Costa et al., 2014). Additionally, Costa et al. (2014) showed that the FLE was reduced by language proficiency. Respondents with high proficiency in their L2 responded more emotionally because they had developed more emotionality in their L2 than respondents with low proficiency. Moreover, other studies (Brouwer, 2019; Cavar & Tytus, 2018) even revealed that the FLE was eliminated by language proficiency. Respondents with high proficiency in their L2 made similar decisions when a dilemma was presented in their L1

or their L2 (Brouwer, 2019; Ćavar & Tytus, 2018). Thus, on the whole, the FLE also takes place in decision-making contexts, but it can be reduced or eliminated when L2 proficiency is higher, which is in line with Caldwell-Harris and Aycicegi-Dinn (2016), Dewaele (2004), and Pavlenko (2012).

Another context in which emotional differences between languages have been investigated is the persuasive context (Puntoni et al., 2009). Puntoni et al. (2009) revealed in their study that participants rated the emotional intensity of advertising slogans higher when the slogans were expressed in their L1 compared to their L2. Puntoni et al. (2009) attribute the emotionality differences between the languages to the Episodic Trace Theory, which suggests that every experience of an individual leaves a separate episodic trace in memory (Raaijmakers & Shiffrin, 1992). When an individual is confronted with a particular stimulus, the traces in memory are activated. These traces associate the stimulus with past emotional experiences. Consequently, emotional reactions (unconsciously) may occur (Hintzman, 1986; Hintzman, 1988). Auditory details, such as vocal pitch and intonation, are also stored in the memory of individuals (Palmeri et al., 1993; Schacter & Church, 1992). Based on this finding, Puntoni et al. (2009) argued that episodic traces also contain lexical representations in an individual's L1 or L2. Moreover, Puntoni et al. (2009) argue that when an experience occurs in an individual's L1 (L2), the association to past emotional experiences is stronger when a certain stimulus also occurs in the L1 (L2) of the individual. Generally, most emotional experiences occur in an individual's L1 because this is the language an individual learns from birth (Caldwell-Harris & Aycicegi-Dinn, 2016). Therefore, it is plausible that the perceived emotionality of the advertising slogans was higher when the slogans were presented in the L1 compared to the L2 of the participants.

Puntoni et al. (2009) revealed that the perceived emotionality of persuasive communication is stronger when presented in the L1 of individuals compared to their L2. However, the question remains whether the persuasive message is also more effective when presented in the L1 of individuals. More specifically, what are individuals' attitudes and behavioural intentions towards such a persuasive message? This question remains underexplored. Petty and Cacioppo (1981) developed the elaboration likelihood model (ELM), which distinguished two different routes to persuasion, namely: the central route and the peripheral route. In the central route, attitudes are formed through thoughtful consideration of arguments (rationality). In the peripheral route, attitudes are formed through simple, peripheral cues (e.g., language and modality) (Petty & Cacioppo, 1981). Thus, the central route involves more cognitive effort than the peripheral route (Petty & Cacioppo,

1981). If individuals are exposed to their L1, they likely go through the peripheral route because their reasoning process is more emotional. But if individuals are exposed to their L2, they likely go through the central route because their reasoning process is more rational. If the persuasion of a message is influenced by emotion, the L2 might lower the attitudes and behavioural intentions because of the emotional distance the L2 creates compared to the L1. But, if the persuasion of a message is actually driven by rationality and needs more emotional distance to, for instance, care about climate change, then using the L2 might actually help to improve the attitudes and behavioural intentions. To examine whether persuasion is influenced by emotion or rationality, the present study aimed to investigate the influence of language (L1 versus L2) on perceived emotionality, attitudes, and behavioural intentions.

As previously described, the perceived emotionality of words and phrases is stronger in an L1 than in an L2 (e.g., Brouwer, 2021; Dewaele, 2004; Puntoni et al., 2009). However, the intensity of the FLE might be influenced by the modality (auditory versus written) in which linguistic information is received. When individuals learn their L1 early in life, this is acquired through hearing (i.e., the auditory modality) (Harris et al., 2003). Reading is a skill acquired at a later age, which develops over time (Harris et al., 2003). The auditory modality is more tightly connected with the brain's emotional systems than written language because emotional regulation and early language acquisition develop simultaneously (Caldwell-Harris & Aycicegi-Dinn, 2016). Consequently, when individuals listen to auditory stimuli, emotionality will be stronger than in the written modality (Harris et al., 2003). The number of associations in the L1 is expected to be higher in auditory representations than in written representations because more varied and emotionally rich language experiences occur in an auditory context (Harris et al., 2003). However, in the case of the L2 of individuals, a more significant amount of experiences generally take place in written contexts because individuals learn their L2 mainly in instructed contexts like a classroom (Harris et al., 2003). Therefore, it is expected that the auditory modality would only elicit greater emotionality when it is represented in the L1 of individuals and not the L2. Thus, modality (auditory versus written) has been associated with emotionality. Therefore, the FLE is expected to be influenced by modality. More specifically, listening to an auditory modality would increase emotionality in the L1, consequently increasing the intensity of the FLE in that modality.

Harris et al. (2003) and Harris (2004) investigated the influence of modality (written versus auditory) and language (L1 versus L2) on emotional arousal in a skin conductance experiment. Both studies measured the emotional arousal of emotionally charged words and phrases. The study of Harris et al. (2003) revealed that the auditory modality elicited greater

skin conductance responses (SCRs) than the written modality when the modalities were exposed in the L1 of the respondents. A greater SCR indicates that respondents experience more emotion physiologically. However, SCRs were equivalent for the auditory and written modality in the L2 of respondents. These findings are in line with the previously mentioned explanation of Harris et al. (2003), who expected that the auditory modality would only elicit greater emotionality in the L1 of individuals and not the L2. The study of Harris (2004) extended the research of Harris et al. (2003) by showing that the size of the effect of modality in the L2 depends on the age of acquisition of the L2. When respondents acquired their L2 at an early age, greater SCRs occurred in the auditory modality compared to the written modality in both languages. This is reasonable because experiences have occurred in both languages at a younger age, which is connected to emotional regulation and the auditory modality (Caldwell-Harris & Aycicegi-Dinn, 2016; Harris et al., 2003).

In contrast to the findings of Harris et al. (2003) and Harris (2004), Jankowiak and Korpala (2018) revealed in a skin conductance experiment that an emotionally charged written narrative showed more emotional arousal than an emotionally charged spoken narrative when presented in the respondent's L1. Jankowiak and Korpala (2018) explain their findings by the 'self-reference effect' (Rogers et al., 1977), which indicates that information is processed at the deepest level when it relates to ourselves. When people read narratives, they can refer the stories to their own experiences. But when people listen to narratives, they might be aware that the stories they listen to are experienced by the person telling the story. Therefore, it might be the case that people relate the spoken narrative less to their own experiences than when they are reading the narrative. Consequently, more intense emotions occur when people read the narrative because information processing happens at a deeper level (Jankowiak & Korpala, 2018).

More recently, Brouwer (2021) investigated the FLE together with modality in a decision-making context. Participants had to read or listen to moral dilemmas and judge the appropriateness of the proposed actions. Findings revealed that irrespective of language, participants gave more emotional responses in the written condition than in the listening condition (Brouwer, 2021). This finding is in contrast with the studies of Harris et al. (2003) and Harris (2004). They revealed that modality effects were language-dependent and that emotional arousal was greater in the auditory modality versus the written modality when the modalities were exposed in the L1 of the respondents (Harris et al., 2003; Harris, 2004). Brouwer (2021) links the contrasting finding to the assumption that the reading task took more cognitive effort than the listening task, causing a decrease in rational decision-making

(Cummins & Cummins, 2012). Another finding in Brouwer's (2021) study concerns that there was an FLE, but it was not dependent on modality. Thus, no interaction effect was found between language and modality. This finding is also in contrast with Harris et al. (2003) and Harris (2004), who did find an interaction effect between language and modality. Brouwer links this contrasting finding to other studies that found that the FLE was not driven by changes in emotions (e.g., Chan et al., 2016; Geipel et al., 2015). However, Chan et al. (2016) and Geipel et al. (2015) proposed that further research is necessary to identify potential mediators, other than emotions, that trigger the FLE on moral decisions.

The abovementioned studies (Brouwer, 2021; Harris, 2004; Harris et al., 2003; Jankowiak & Korpala, 2018) show contradicting findings concerning the influence of modality on the FLE, but all show plausible explanations. However, as to the authors' knowledge, modality has not been investigated yet in a persuasive context. Due to the global use of English as a medium of communication, persuasive communication may occur more often in the L2 (i.e., English) of individuals (Puntoni et al., 2009). Moreover, emotion plays a significant role in persuasive communication, and the two modalities (auditory versus written) may differ in how much they elicit emotion. Hence, it is highly relevant to research this context. Accordingly, the present study investigated the influence of modality on the FLE in a persuasive context.

Another new aspect of the present study was that the persuasive messages presented to the participants were formatted as social media Instagram posts. Due to the COVID-19 pandemic, the global digitalisation trend accelerated, consequently increasing the amount of time people spend online (Amankwah-Amoah et al., 2021). Therefore, it is meaningful to investigate the effects of emotionality in an online context. Climate change was chosen as the topic for the persuasive messages because previous research (Sinatra et al., 2011) showed that persuasive communication about climate change has the potential to change the attitudes and behavioural intentions of people positively. The current study aimed to examine whether language and modality could also influence the effectiveness of a persuasive message about climate change. English was chosen as the L2 because of its global use as a medium of communication (Taguchi & Ishihara, 2018). Dutch was selected as the L1 because a recent report revealed that Dutch native speakers have the highest English proficiency levels in 112 countries worldwide (Education First, 2021). Therefore, it may be implied that the English proficiency levels of native Dutch speakers are sufficient to understand the messages in the English conditions.

The following research question and hypotheses were formulated:

RQ: To what extent does language (L1 versus L2) affect the effectiveness of an Instagram message about climate change (concerning perceived emotionality, attitudes, and behavioural intentions) presented in the auditory or written modality?

The present study expected to replicate previous research (e.g., Brouwer, 2021; Dewaele, 2004; Puntoni et al., 2009), which showed that emotionality is stronger in an L1 than L2. Accordingly, the following was hypothesised:

H1: Perceived emotionality will be rated higher when the persuasive message is presented in an L1 than in an L2.

Attitudes and behavioural intentions have not been investigated before in a (persuasive) context regarding the FLE. Therefore, it is hard to predict a direction of a possible effect. However, because language (L1 versus L2) is expected to influence emotionality, attitudes and behavioural intentions may also be influenced by language. There are namely two routes to persuasion (peripheral: emotional versus central: rational), and the question is whether the persuasion is influenced by emotion or rationality (Petty & Cacioppo, 1981). Moreover, people make different decisions depending on whether they are using emotional versus rational thought processes (e.g., Brouwer, 2021; Keysar et al., 2012). Therefore it is plausible that different decisions are being made concerning attitudes and behavioural intentions if individuals are emotionally influenced. The following was hypothesised:

H2: Attitudes and behavioural intentions will be rated differently when the persuasive message is presented in an L1 versus an L2.

Based on Harris et al. (2003) and Harris (2004), the present study expected that the FLE would be greater in the auditory modality than in the written modality. Brouwer (2021) and Jankowiak and Korpál (2018) found contradicting findings, but Brouwer (2021) investigated another context (moral dilemmas), and no evidence was given for its assumption that the FLE was not driven by emotions. Moreover, Jankowiak and Korpál (2018) likely found contradicting findings due to the use of narratives. In the current study, no narratives were used. Therefore, the following was hypothesised:

H3: The Foreign-Language Effect will be greater in the auditory modality than in the written modality.

Method

In an experiment, Dutch participants evaluated a written or an auditory persuasive message about climate change presented in their L1 (Dutch) or their L2 (English). The matched-guise technique was used, whereby one speaker recorded the Dutch and English auditory messages that had the same content.

Materials

The two independent variables of the present study were language of the message (two levels: Dutch = L1, versus English = L2) and modality (two levels: auditory versus written). The auditory and written modalities were created as social media posts on Instagram. In the Dutch condition, Dutch respondents were exposed to a message (auditory or written) in their L1. In the English condition, Dutch respondents were exposed to a message (auditory or written) in their L2.

Both modalities consisted of the same persuasive message. The auditory modality was created as a video message on Instagram and consisted of a static image and spoken text (Appendix A). The written modality was created as a regular Instagram post and consisted of the same static image as the auditory modality and a written text (Appendix A). The decision was made to include the same static image in both conditions to create the conditions as similar as possible. The downside of making the conditions as identical as possible was that respondents had to watch a video where no movement took place. Consequently, it might have been challenging for respondents to listen to the message actively. However, several steps were taken to minimize the risk that respondents would lose their attention. First of all, the video message was shown at the beginning of the experiment when respondents reasonably had the most attention and energy. Moreover, respondents were explicitly told to pay attention. Lastly, a speaker with a dynamic voice was chosen to hold people's attention.

Concerning the auditory modality, a pre-test was conducted with six native Dutch speakers who could speak with a native-like English accent. Speakers were recruited from the English language and culture program of Radboud University and other educational institutions because these speakers were expected to have a native-like English accent. The speakers made an English recording about climate change. Subsequently, 22 Dutch listeners rated the recordings on nativeness, comprehensibility, and voice characteristics (e.g., pleasant voice and dynamism). The pre-test can be found in Appendix B. The speaker with overall the highest scores on all aspects was chosen for the experiment. The chosen speaker also made a recording of the Dutch auditory message. In this way, there were no differences in speaker's voice between the L1/L2 auditory conditions. Thus, having a bias for one speaker over the

other was excluded because the speakers were the same. The software program Audacity was used to edit the Dutch and English recordings to ensure they were similar in length, speech rate, and volume.

The content of the social media message was based on the sixth assessment report of IPCC that recently came out, in which the consequences of global warming were described (IPCC, 2022). Concerning the vocabulary of the message, emotionally charged language was used because it was expected that an FLE would be found more easily if the message was emotionally charged (Caldwell-Harris & Aycicegi-Dinn, 2016). Three components of emotions are commonly distinguished in research: valence, which refers to the pleasantness or unpleasantness of certain stimuli; arousal, which refers to the emotional intensity provoked by certain stimuli; and dominance, which refers to the degree of power/control certain stimuli exerts (Warriner et al., 2013). By analysing a database consisting of 4.300 Dutch words, the text about climate change could be considered emotionally charged (Moors et al., 2012). Words were used that were especially high or low in valence and high in arousal. For instance, the Dutch word 'ziekte' (disease) has a valence of 1.78 on a 7-point scale, which indicates that people associate this word with being very negative/unpleasant (Moors et al., 2012).

Social media posts are relatively short in general. For instance, the ideal length of an Instagram post is 138 to 150 characters because this promotes the highest engagement (Shleyner, 2018). However, since such short messages might provide insufficient language exposure for significant differences across the four experimental conditions, a longer message length of around 150 words was chosen. The message was first created in Dutch. Then, the English version of the message was formed by translating the Dutch version into English. The translation was done by a native Dutch speaker who recently graduated as an English teacher at the University of Applied Sciences. Moreover, to verify whether the Dutch and English versions were equivalent, the English version was back-translated to Dutch by another English teacher who recently graduated (Brislin, 1970). The messages of the Instagram posts can be found in Appendix C.

Subjects

In total, 162 respondents completed the survey in the current experimental study. However, 11 respondents were excluded from the experiment because they indicated that their level of English proficiency was not sufficient, that their mother tongue was not Dutch, or they did not give consent. Consequently, analyses were conducted on the remaining 151 participants (age: $M = 45.32$, $SD = 18.68$, range = 20 – 79; gender: 62.3% female, 37.7% male). Concerning the

educational level, 45.7% of the respondents reported the University of applied sciences as their highest level of education, 27.8% WO Master, 12.6% MBO, 9.9% WO Bachelor, 3.3% High School, and 0.7% PhD. Self-assessed English proficiency was as follows: $M = 5.07$, $SD = 1.29$, range = 1.75 – 7. A more detailed explanation of the numbers can be found in the instruments section. Regarding the age of acquisition, most respondents reported learning English after the age of ten (76.2%), followed by the age between five and ten (21.2%), and before the age of five (2.6%). Concerning the context of acquisition, most respondents reported learning English in an instructed context (66.2%), followed by both an instructed and natural context (29.8%), and a natural context (4%). The level of exposure to the English language is presented in Table 1, consisting of speaking, listening, reading, and writing.

Table 1. Frequency distributions of the level of exposure towards the English language

	Speaking	Listening	Reading	Writing
<i>Never</i>	5.3%	2.6%	11.3%	22.5%
<i>Every year</i>	29.8%	7.9%	13.9%	26.5%
<i>Every month</i>	27.2%	19.9%	21.9%	18.5%
<i>Every week</i>	20.5%	21.9%	15.9%	12.6%
<i>Every day</i>	11.3%	39.1%	29.1%	16.6%
<i>Several hours a day</i>	6.0%	8.6%	7.9%	3.3%
<i>Total</i>	100%	100%	100%	100%

Distributions across the four conditions

Age, self-assessed English proficiency, gender, educational level, age of acquisition, context of acquisition, and level of exposure were equally distributed across the four conditions.

Detailed analyses can be found in Appendix D.

Design

The design of the present experimental study was a 2 (language of the message: Dutch/English) x 2 (modality: auditory/written) between-subjects design. Language of the message and modality were between-subject factors. Each respondent evaluated either a written or an auditory message presented in their L1 or L2. This resulted in four conditions which are presented in Table 2.

Table 2. Distribution of respondents (N = 151) across the four conditions

Modality	Language	
	Dutch	English
Audio	37	37
Written	38	39

Instruments

The dependent variables in the present study were the *emotional intensity of the message*, *attitudes towards the message*, *attitudes towards climate change*, and *behavioural intentions*. When the reliability was sufficient, each dependent variable was created by computing the mean of the sub-items.

To measure the *emotional intensity* of the message, respondents were asked to rate the following statement 'I think this message is emotional' on a 7-point Likert scale, anchored by 1 'strongly agree' to 7 'strongly disagree' (based on Puntoni et al., 2009).

To measure the *attitudes towards the message*, respondents were asked to rate the statement 'I think this message is' with one of the following items: 'engaging', 'informative', 'persuasive', 'trustworthy'. 7-point Likert scales were used, anchored by 1 'strongly agree' to 7 'strongly disagree' (inspired by Puntoni et al., 2009). The reliability of 'attitudes towards the message' comprising four items was insufficient: $\alpha = .63$. Therefore, the following item was removed from the analyses to improve the reliability 'I think this message is engaging'. Consequently, the reliability of 'attitudes towards the message' comprising three items increased to $\alpha = .67$.

To measure the *attitudes towards climate change*, respondents were asked to rate the following items: 'Global warming represents a major problem', 'Global warming is a proven scientific fact', and 'Global warming is not overstated' (based on Kim et al., 2012). 7-point Likert scales were used, anchored from 1 'strongly agree' to 7 'strongly disagree'. The reliability of 'attitudes towards climate change' comprising three items was acceptable: $\alpha = .77$.

To measure the *behavioural intentions*, respondents were asked how likely they would take action to reduce their own greenhouse gas emissions. The following statements were included: 'I am willing to eat less meat and dairy products', 'I am willing to cut back on flights and travel more by public transport', 'I am willing to spend €5 more a month on electricity produced from renewable energy sources such as wind and air', 'I am willing to leave my car more often at home and use public transport, my bike or walk instead', 'I am willing to buy fewer new clothes and wear my clothes longer' (inspired by Hart, 2011). 7-point Likert scales were used, anchored by 1 'very likely' to 7 'very unlikely'. The reliability of 'behavioural intentions' comprising five items was acceptable: $\alpha = .78$.

Besides the main dependent variables, some background variables were measured because these variables may influence the FLE. Information about these variables could possibly explain some of the findings. *Age of acquisition* was measured through the following

question: ‘At which age did you start learning your foreign language (English)?’ (based on Dewaele & Pavlenko, 2001). The answer options were as follows: before the age of five, between the age of five and ten, or after the age of ten.

Context of acquisition was measured through the following questions: ‘Do you speak English as your foreign language?’, ‘In which context did you acquire your foreign language (English)?: naturalistic (outside of school), instructed (at school), or both?’. The questions were based on Dewaele and Pavlenko (2001).

Language proficiency was measured through four items, followed by 7-point Likert scales ranging from ‘poor’ to ‘excellent’. The four items included: speaking, listening, reading, and writing (based on Flaitz, 1988). Respondents indicated their level of competence for each item concerning their foreign language (English). The reliability of ‘language proficiency’ comprising four items was good: $\alpha = .94$.

Level of exposure was measured through the following question: ‘How frequently do you speak/listen/read/write in English?’ The answer options were as follows: never, every year, every month, every week, every day, and several hours a day (based on Dewaele & Pavlenko, 2001).

Procedure

The experiment was conducted as an online questionnaire using the survey tool Qualtrics (the questionnaire can be found in Appendix E). The respondents were recruited through convenience sampling (social media and e-mail) and snowball sampling. In Qualtrics, respondents first read a brief introduction in which instructions were given. The actual purpose of the study was not mentioned. It was solely stated that the respondents would be presented with a message about climate change, of which they needed to answer questions. Moreover, respondents were asked for their informed consent. In addition, it was stated that their responses would remain completely anonymous and would be dealt with discretely. To exclude the anchor contraction effect (ACE), the survey was conducted in the native tongue (Dutch) of the respondents. The ACE refers to respondents using the extreme ends of the scale when answering questions in their L2 (De Langhe et al., 2011). Respondents first had to answer three general questions to test whether they met the requirements. Subsequently, respondents were exposed to the social media message (written or auditory) because they were expected to have the most attention and energy at the beginning of the experiment. Thereafter, respondents had to answer questions about the main dependent variables (emotional intensity, attitudes, and behavioural intentions), related to the social media message they were exposed to. The questionnaire followed with questions concerning their L2

(age of acquisition, context of acquisition, language proficiency, level of exposure), ending with the remaining demographic questions (e.g., gender). Thanks were expressed to respondents who completed the survey.

For each condition, the procedure was the same for all respondents. The only difference between the conditions was the language of the message and the modality. Concerning the auditory modality, respondents could start, pause, and restart the video themselves. A timer was added to the video to ensure that respondents watched the entire video before going to the next question. Moreover, respondents were clearly instructed to only listen once to the recording. Respondents were also clearly instructed to read the message only once in the written modality.

Statistical treatment

To answer the research question and to test the hypotheses, two-way ANOVA's were performed. The aim was to test how the two independent variables (language of the message and modality) influenced the dependent variables (emotional intensity, attitudes, and behavioural intentions), and whether there was an interaction effect between the two independent variables. Moreover, Cronbach's alphas were performed to indicate the reliability of the scales of the dependent variables comprising of more than one item.

Results

The purpose of the present study was to investigate the influence of the language of the message (L1: Dutch versus L2: English) and modality (auditory versus written) on the effectiveness of online persuasive communication and the Foreign-Language Effect (FLE) by analysing the perceived emotionality, attitudes, and behavioural intentions of respondents. Two-way analyses of variance were performed to answer the research question and hypotheses.

Emotional intensity of the message

A two-way analysis of variance with language of the message and modality as factors showed no significant main effect of language of the message on emotional intensity ($F(1, 147) < 1, p = .776, \eta^2 = .00$). Modality also showed no significant main effect on emotional intensity ($F(1, 147) = 2.67, p = .105, \eta^2 = .02$). The interaction effect between language of the message and modality was also not statistically significant ($F(1, 147) = 1.62, p = .205, \eta^2 = .01$). Table 3 displays the means and standard deviations of the emotional intensity of the message.

Table 3. Means, standard deviations (between brackets), and group size for emotional intensity of the message (1 = low; 7 = high)

	Language of the message	Modality	M (SD) n
<i>Emotional intensity of the message</i>	Dutch	Auditory	4.27 (1.73) 37
		Written	4.37 (1.70) 38
		Total	4.32 (1.70) 75
	English	Auditory	4.00 (1.78) 37
		Written	4.79 (1.51) 39
		Total	4.41 (1.68) 76
	Total	Auditory	4.14 (1.75) 74
		Written	4.58 (1.61) 77

Attitudes towards the message

A two-way analysis of variance with language of the message and modality as factors showed a significant main effect of modality on attitudes towards the message ($F(1, 147) = 5.23, p = .024, \eta^2 = .03$). Irrespective of the language of the message, exposing respondents to the auditory modality ($M = 4.91, SD = 1.13$) evoked more positive attitudes towards the message than when respondents were exposed to the written modality ($M = 4.47, SD = 1.18$). However, no significant main effect was found for language of the message on attitudes towards the message ($F(1, 147) < 1, p = .566, \eta^2 = .00$). The interaction effect between language of the message and modality was also not statistically significant ($F(1, 147) < 1, p = .891, \eta^2 = .00$). Table 4 displays the means and standard deviations of the attitudes towards the message.

Table 4. Means, standard deviations (between brackets), and group size for attitudes towards the message (1 = very negative; 7 = very positive)

	Language of the message	Modality	M (SD) n
<i>Attitudes towards the message</i>	Dutch	Auditory	4.84 (1.12) 37
		Written	4.43 (1.18) 38
		Total	4.63 (1.16) 75
	English	Auditory	4.97 (1.16) 37
		Written	4.51 (1.20) 39
		Total	4.74 (1.20) 76
	Total	Auditory	4.91 (1.13) 74*
		Written	4.47 (1.18) 77*

* $p < .050$

Attitudes towards climate change

A two-way analysis of variance with language of the message and modality as factors showed no significant main effect of language of the message on attitudes towards climate change ($F(1, 147) < 1, p = .615, \eta^2 = .00$). Modality also showed no significant main effect on attitudes towards climate change ($F(1, 147) < 1, p = .329, \eta^2 = .00$). The interaction effect between language of the message and modality was also not statistically significant ($F(1, 147) = 1.49, p = .225, \eta^2 = .01$). Table 5 displays the means and standard deviations of the attitudes towards climate change.

Table 5. Means, standard deviations (between brackets), and group size for attitudes towards climate change (1 = very unproblematic; 7 = very problematic)

	Language of the message	Modality	<i>M (SD) n</i>
<i>Attitudes towards climate change</i>	Dutch	Auditory	6.09 (0.85) 37
		Written	6.12 (0.72) 38
		Total	6.11 (0.78) 75
	English	Auditory	6.32 (0.86) 37
		Written	6.03 (0.90) 39
		Total	6.17 (0.89) 76
	Total	Auditory	6.21 (0.86) 74
		Written	6.07 (0.81) 77

Behavioural intentions

A two-way analysis of variance with language of the message and modality as factors showed no significant main effect of language of the message on behavioural intentions ($F(1, 147) = 1.67, p = .199, \eta^2 = .01$). Modality also showed no significant main effect on behavioural intentions ($F(1, 147) = 2.30, p = .132, \eta^2 = .02$). However, the interaction effect between language of the message and modality was statistically significant ($F(1, 147) = 3.98, p = .048, \eta^2 = .03$). To disentangle the significant interaction, separate one-way analyses of variances were carried out for the auditory and written modality.

The one-way analysis of variance for the written modality only with as between-subjects factor language of the message for behavioural intentions showed no significant main effect of language ($F(1, 75) < 1, p = .639, \eta^2 = .00$). However, the one-way analysis of variance for the auditory modality only with as between-subjects factor language of the message for behavioural intentions did show a main effect of language ($F(1, 72) = 6.19, p = .015, \eta^2 = .08$). Within the auditory modality, English messages ($M = 5.82, SD = 1.06$)

evoked higher scores on behavioural intentions than Dutch messages ($M = 5.25$, $SD = 0.90$). Thus, the significant interaction effect appears to be due to the fact that language only had an effect in the auditory modality and not the written modality. Table 6 displays the means and standard deviations of the attitudes towards climate change.

Table 6. Means, standard deviations (between brackets), and group size for behavioural intentions (1 = low; 7 = high)

	Language of the message	Modality	<i>M</i> (<i>SD</i>) <i>n</i>
<i>Behavioural intentions</i>	Dutch	Auditory	5.25 (0.90) 37
		Written	5.34 (0.96) 38
		Total	5.30 (0.92) 75
	English	Auditory	5.82 (1.06) 37*
		Written	5.22 (1.28) 39*
		Total	5.51 (1.21) 76
	Total	Auditory	5.54 (1.01) 74
		Written	5.28 (1.13) 77

* $p < .050$

Conclusion

The purpose of the present study was to investigate the influence of the language of the message (L1 versus L2) and modality (auditory versus written) on the effectiveness of online persuasive communication and the Foreign-Language Effect (FLE) by analysing the perceived emotionality, attitudes, and behavioural intentions of respondents. For a persuasive message to be effective in the Netherlands, it is better to use the English language when the message is presented auditory, at least for behavioural intentions. However, if the message is written, both English and Dutch will be similar in persuasiveness.

In the present study, the language of the message did not seem to influence the perceived emotionality of the message. This finding is inconsistent with hypothesis 1, which expected that the perceived emotionality would be rated higher when the persuasive message was presented in the L1 versus the L2. Therefore, hypothesis 1 was not supported. Regarding the attitudes towards the message and the attitudes towards climate change, language likewise did not have an influence. This finding is inconsistent with hypothesis 2, which expected that the attitudes and behavioural intentions would be rated differently when the persuasive message was presented in the L1 versus the L2. Concerning the behavioural intentions, language only had an influence in the auditory modality. Therefore, hypothesis 2 was only partially supported. Hypothesis 3 expected that the FLE would be greater in the auditory

modality than in the written modality. No interaction effect was found between language and modality on the perceived emotionality, attitudes towards the message, and attitudes towards climate change. These findings are inconsistent with hypothesis 3. However, there was an interaction effect between language and modality on behavioural intentions. Within the auditory modality, English messages evoked higher scores on behavioural intentions than Dutch messages. Within the written modality, there was no difference. Thus, the FLE was greater in the auditory modality than the written modality. Therefore, hypothesis 3 was partially supported. However, the direction of the effect (English being more persuasive than Dutch) is interesting. It has the opposite direction of what was expected concerning emotionality.

Discussion

The finding that hypothesis 1 (about the predicted benefit of an L1 over an L2 for perceived emotionality) was not supported is in contrast with previous studies that showed that, overall, the (perceived) emotionality of words and phrases is stronger in an L1 versus an L2 (Caldwell-Harris & Aycicegi-Dinn, 2016; Dewaele, 2004; Puntoni et al., 2009). Moreover, it is also in contrast with findings in the decision-making context, in which individuals make more emotional decisions when texts are presented in their L1 versus their L2 (Brouwer, 2021; Cipolletti et al., 2016; Costa et al., 2014; Keysar et al., 2012). A possible explanation for the lack of difference in emotionality might be due to the fact that the average English proficiency levels of the respondents in the current experiment were relatively high ($M = 5.07$ on a 7-point Likert scale). Moreover, the level of exposure to the English language was likewise relatively high. At least half of the respondents reported speaking (65%), listening (89.5%), reading (74.8%), and writing (51%) in English at least every month. According to Caldwell-Harris and Aycicegi-Dinn (2016), Dewaele (2004), and Pavlenko (2012), both language proficiency and frequency of language use are factors that may influence the FLE due to differences in the intensity of perceived emotionality. If an L2 is used frequently and/or if the proficiency level is high, individuals may experience more emotionality than when an L2 is not used frequently and if the proficiency level is low. Moreover, Brouwer (2019) and Çavar and Tytus (2018) also showed that a high language proficiency led to no difference in decision-making between participants exposed to their L1 versus their L2. Thus, in the case of the present experiment, it is plausible that both the high levels of English proficiency and the high levels of exposure of respondents led to a decrease in the FLE in such a way that there was no FLE concerning emotionality.

Concerning hypothesis 2 (about the predicted benefit of an L1 or an L2 for attitudes and behavioural intentions), this is the first experimental study that investigated respondents' attitudes (towards the message and climate change) and behavioural intentions in a persuasive context regarding the FLE. Concerning the attitudes, a similar pattern as to the emotional intensity of the message was found. Namely, language did not influence the attitudes of the respondents. Therefore, hypothesis 2 was not supported concerning the attitudes. Although this is the first study that investigated the attitudes and behavioural intentions in this specific context, it was expected that there would be a difference concerning the language in which exposure to the message took place. This is because language likely influences which route to persuasion (central: rational versus peripheral: emotional) the respondents would take. If individuals are exposed to their L1, they likely go through the peripheral route because their reasoning process is more emotional. But if individuals are exposed to their L2, they likely go through the central route because their reasoning process is more rational. Thus, depending on the language of the message, respondents' would undergo a different route to persuasion. Subsequently, their attitudes and behavioural intentions would differ from each other. In other words, if the persuasion is influenced by emotion, the L2 might lower the attitudes and behavioural intentions because of the emotional distance the L2 creates compared to the L1. But, if the persuasion is actually driven by rationality and needs more emotional distance to care about climate change, then using the L2 might actually help to improve the attitudes and behavioural intentions.

The finding that language did not influence the attitudes of respondents is in contrast with the studies of Brouwer (2021), Cipolletti et al. (2016), Costa et al. (2014), and Keysar et al. (2012), who indicated that more emotional decisions were made when moral dilemmas and the framing of choices were presented in the L1 versus the L2 of individuals. When individuals were presented with moral dilemmas and the framing of choices in their L2, more rational decisions were made. In the present study, respondents had to make decisions concerning their attitudes and behavioural intentions. It is plausible that language did not affect the respondents' attitudes because language also did not affect the perceived emotionality of respondents. Thus, it may be concluded that respondents were equally emotional/rational in both languages (L1 versus L2). However, it is unclear whether the positive attitudes ($M = 4.43 >$ on a 7-point Likert scale) were driven by emotional or rational processes because there is no evidence of which route to persuasion the respondents' had undergone. It is suggested for future research to investigate whether and in which contexts,

attitudes and behavioural intentions are driven by rational or emotional processes to receive a better understanding of the persuasiveness of messages.

Concerning the behavioural intentions of hypothesis 2 (about the predicted benefit of an L1 or an L2 for attitudes and behavioural intentions), the present study showed that language had an influence in the auditory modality. This finding will be elaborated in the discussion of hypothesis 3 concerning behavioural intentions.

To answer hypothesis 3 (about the predicted benefit of the auditory over the written modality concerning the FLE), analyses were done on the possible interaction effects between language and modality on the four dependent variables (perceived emotionality, attitudes towards the message, attitudes towards climate change, behavioural intentions). First of all, the analyses of the present study showed that almost an identical pattern emerged concerning the influence of modality (auditory versus written), regardless of language, on all four dependent variables. Modality only influenced the attitudes towards the message. Respondents were more positive about the message when they were exposed to the auditory modality versus the written modality. A possible explanation could be that the dynamic voice of the speaker increased the persuasiveness, trustworthiness, and informativeness of the message. However, the effect size was rather small ($\eta^2 = .03$), and the reliability of the variable 'attitudes towards the message' was not sufficient ($\alpha = .67$). Therefore, this finding is arguably not so meaningful in terms of real-world implications.

The finding that modality, regardless of language, did not influence the emotional intensity of the message is in line with the study of Harris et al. (2003). According to Harris et al. (2003), modality could only influence the perceived emotionality through an interaction effect between language and modality. Thus, it would be unlikely that modality would have an effect in both languages. Concerning the attitudes towards climate change and the behavioural intentions, it was expected that there would be an FLE and an interaction effect, but not a main effect of modality. In the present study, no main effect was found for these dependent variables.

The present study expected an interaction effect between language and modality concerning all four dependent variables. It was expected that the FLE would be greater in the auditory modality than in the written modality. For the perceived emotionality, it was predicted that the Dutch message would be more emotional than the English message. However, for the attitudes and behavioural intentions, the direction of the effect was not predicted because no previous research concerning these dependent variables was conducted in the context of language and modality. However, because language (L1 versus L2) was

expected to influence emotionality, it was expected that language would also influence attitudes and behavioural intentions. This is because individuals form their attitudes and behavioural intentions through rational (central route) or emotional (peripheral route) processes.

Hypothesis 3 (about the predicted benefit of the auditory over the written modality concerning the FLE) was not supported for the dependent variable perceived emotionality because no interaction effect was found between language and modality. This finding is in line with the study of Brouwer (2021), who also did not find an interaction effect between language and modality. Brouwer (2021) indicated that, possibly, no interaction effect was found because the FLE was not driven by a change in emotions. Though, the alternative explanation is still open for research. In the present study, language (L1 versus L2) did not affect emotionality. However, Brouwer (2021) did find an effect of language. Therefore, the argument of Brouwer (2021) cannot be applied in the present study because there was a lack of an FLE.

On the contrary, the lack of an interaction effect between language and modality on perceived emotionality is in contrast with Harris et al. (2003) because Harris et al. (2003) expected greater emotionality in the auditory modality versus the written modality when the modalities were exposed in the L1 of the respondents. Moreover, Harris et al. (2003) expected an equivalence of emotionality for the auditory and written modality in the L2 of respondents. In the present study, the perceived emotionality was equivalent for both modalities in both the L1 and L2 of respondents. Moreover, the lack of an interaction effect between language and modality on perceived emotionality is also in contrast with the study of Jankowiak and Korpala (2018), who found the opposite effect of Harris et al. (2003). Emotionality was greater in the written modality than in the auditory modality when the modalities were presented in the respondents' L1 (Jankowiak & Korpala, 2018). A possible explanation for the lack of an interaction effect between language and modality on perceived emotionality in the present study could be that the messages of the present study were too short to find a possible effect between the auditory and the written modality. For instance, the messages of Jankowiak and Korpala (2018) were at least 74 words longer. By contrast, Harris et al. (2003) did not use a text consisting of several phrases but only used emotional words and phrases in their study. A possible explanation why Harris et al. (2003) did find an interaction effect could have been because the researchers measured participants' emotional arousal through skin conductance responses (SCRs) instead of measuring the perceived emotionality as in the present study. Measuring SCRs is an implicit measurement method that gives an accurate view of

physiological arousal. Hence, it might be the case that in the present study, participants were more physiologically aroused in the auditory condition but did not perceive this. Jankowiak and Korpala (2018) similarly measured SCRs and not perceived emotionality.

Hypothesis 3 (about the predicted benefit of the auditory over the written modality concerning the FLE) was also not supported for the dependent variables attitudes towards the message and attitudes towards climate change because no interaction effect was found between language and modality. Similarly, as to the perceived emotionality, possible explanations could be that the messages of the present study were too short to find a possible effect between the modalities (auditory versus written) and that the respondents were more physiologically aroused in the auditory condition but did not perceive this. Moreover, respondents' involvement in the issue of climate change was not measured in the present study. However, it might be the case that respondents were already quite involved in this issue because climate change is a well-known topic that is discussed a great deal in the media nowadays (Hase et al., 2021). In addition, the results showed relatively extreme values for the attitudes towards climate change ($M = 6 >$ on a 7-point Likert scale), supporting the view that climate change is a well-known issue. Thus, assumingly, respondents' attitudes were already quite high before they were exposed to the message. Therefore, it might be the case that their attitudes are resistant to change on the basis of peripheral factors like language and modality when such attitudes are already so strong. This reasoning is in line with previous research (Chaiken, 1980; Petty & Cacioppo, 1981) about issue involvement which indicated that when people are highly involved with an issue, their attitudes change based on content cues. However, if people are low involved with an issue, their attitudes change based on peripheral cues (e.g., language and modality). Therefore, it is reasonable that respondents were already highly involved with the issue in the present study because language and modality did not have an influence.

An interaction effect between language and modality was found on behavioural intentions. Therefore, hypothesis 3 (about the predicted benefit of the auditory over the written modality concerning the FLE) was partially supported. The FLE was present in the auditory modality and not in the written modality. Surprisingly, within the auditory modality, English messages evoked higher scores on behavioural intentions than Dutch messages. A medium effect size occurred here ($\eta^2 = .08$), making it a meaningful finding. Within the written modality, there was no difference in behavioural intentions. The direction of the effect (English being more persuasive than Dutch) is interesting because it has the opposite direction of what was expected concerning perceived emotionality. A possible explanation for the

direction of the effect could be that the L2 activated rational thought processes and that the persuasiveness of the message about climate change was more driven by reasoning than emotion. In other words, the L2 might have helped to improve the behavioural intentions of respondents because the persuasion was driven by rationality (the central route) instead of emotion (the peripheral route) (Petty & Cacioppo, 1981). Thus, it might be the case that more emotional distance is necessary to care about climate change, at least in the auditory modality.

Limitations and recommendations

One of the limitations of the present study is the insufficient reliability of the variable ‘attitudes towards the message’ ($\alpha = .67$). In other words, the items measuring the attitudes towards the message are not reliable enough. For future studies, it is recommended to do a pre-test regarding the dependent variables to ensure that the alpha level is high enough during the experiment. Moreover, it might be helpful to increase the number of items that measure the attitudes towards the message. If the alpha level is still too low, inter-item correlations can be measured to indicate which items should be deleted to increase the alpha level to a sufficient degree.

Another limitation of this study is that only the respondents’ perceived emotionality was measured and not the physiological arousal (through SCRs), which can be regarded as objective emotionality. A subjective measurement has been used because of the low availability of resources and the short period in which the research had to be conducted. Moreover, it was also more convenient to find at least 120 respondents with an online questionnaire. For future studies, it is recommended to combine both subjective and objective measurements for emotionality. In this way, it can be investigated whether individuals’ perceptions concerning emotionality are in line with emotional arousal via SCRs. Moreover, if this is not in line, it might be the case that individuals are unconsciously emotionally influenced by a message. Or vice versa, individuals perceive that they are more emotional, but they are not emotionally aroused. With the information about actual and perceived emotionality, it is essential for future studies to investigate the influence of language and modality on respondents’ attitudes and behavioural intentions more thoroughly. More specifically, do individuals’ attitudes and behavioural intentions change because they are influenced by emotion, or are there other potential factors that might play a role? And if emotion plays a role, does high emotionality lead to an increase in attitudes and behavioural intentions or to a decrease?

Respondents’ high levels of English proficiency and high levels of exposure to English can also be regarded as a limitation. Based on previous research (e.g., Caldwell-Harris &

Aycicegi-Dinn, 2016; Pavlenko, 2012), it was likely that almost no significant effects would occur in the present study due to the high levels of English proficiency and exposure to English. However, Dutch native speakers are known for their high English proficiency levels, which made it hard to find a population with low- or intermediate proficiency levels (Education First, 2021).

The final limitation of this study is that the message was, overall, not perceived as very emotional. The means were slightly above four and below five on a 7-point Likert scale. Thus, respondents viewed the message to be slightly more emotional than neutral. It might be the case that it is easier to find possible effects if the message is clearly perceived as emotional. In the present study, words were used that were high or low in valence and high in arousal. It could be that too few of these words were used in the messages. For future studies, it is recommended to ensure beforehand that the message is perceived emotionally. This can be done through a pre-test.

Implications

The present study has given new insights into current research about the influence of a message's language (L1 versus L2) and modality (auditory versus written) on its persuasiveness. The present study is unique because it is the first study that, besides (perceived) emotionality, also investigated whether individuals' attitudes and behavioural intentions were influenced by language and modality. Moreover, both younger and older adults were included in the present study sample (age: $M = 45.32$, $SD = 18.68$, range = 20 – 79). A diverse sample concerning age can be regarded as a strength because it is more representative of the general population than typical research that only has younger adult participants (e.g., Brouwer, 2021; Harris et al., 2003; Jankowiak & Korpala, 2018; Keysar et al., 2012; Puntoni et al., 2009).

Based on the findings in the present study, the following implications were formed. If companies and governments want to persuade their Dutch audience with a written message, it may often make no difference whether this is done in Dutch or in English. The attitudes and behavioural intentions will likely be similar. However, if companies and governments consider using an auditory persuasive message instead, it may be better to use the English language because the behavioural intentions of individuals might be higher than when the Dutch language is used. As explained in the discussion, the persuasiveness of the auditory message was likely more driven by rationality than emotion. However, future research is necessary on this topic. First of all, it is important to (also) measure individuals' physiological arousal through SCRs because this might be different from the perceived emotionality. If

physiological arousal is measured, it is important to understand the possible impact it might have on the attitudes and behavioural intentions of individuals. Do attitudes and behavioural intentions of individuals change if they are exposed to a different language and/or different modality? If so, is this change in attitudes and behavioural intentions driven by emotional versus rational processes or by other potential factors? Moreover, it is interesting to investigate other contexts besides climate change to get a better understanding of which language and/or modality is better to use in which context to persuade an audience.

In the present study, respondents' high levels of English proficiency and high levels of exposure to English likely eliminated the FLE. This confirms previous research that also showed that the FLE could be reduced or eliminated if L2 proficiency and level of exposure to the L2 are high (e.g., Brouwer, 2021; Costa et al., 2012; Dewaele, 2012; Pavlenko, 2012). Thus, the present study, and previous studies, showed that the FLE does not occur very broadly. In other words, whether the FLE occurs is likely dependent on the L2 proficiency levels and the levels of exposure to the L2 of the audience. For instance, Dutch native speakers have the highest English proficiency levels in 112 countries worldwide (Education First, 2021). It may be less relevant to focus on the possible effects of the FLE if a Dutch audience needs to be persuaded. However, it may be more relevant to keep in mind the effects of the FLE in other countries in which the L2 proficiency levels and the level of exposure to the L2 are lower. All things considered, if more research is conducted on the attitudes and behavioural intentions concerning emotion, the FLE, and modality, companies and governments can use this information to possibly increase the persuasiveness of their messages. For instance, for global issues such as climate change, it can be of great importance to persuade people to improve the world for current and future generations.

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Appendix

Appendix A. Instagram message - auditory modality



klimaatverandering



11.649 vind-ik-leuks


3 UUR GELEDEN








Een opmerking toevoegen...

Plaatsen

Appendix A. Instagram message - written modality

 **klimaatverandering** ⋮



11.649 vind-ik-leuks


klimaatverandering Kom ook in actie voor het klimaat! Zoals je ongetwijfeld weet, is klimaatverandering een wereldwijd probleem dat ons allemaal aangaat.

Onlangs is er een alarmerend rapport over het klimaat uitgebracht door de Verenigde Naties. De temperatuur stijgt sneller dan verwacht. Als de uitstoot van broeikasgassen in hetzelfde tempo doorgaat wordt het steeds warmer, met drastische gevolgen voor mens, natuur en milieu.

De zeespiegel stijgt. Er ontstaat extreem weer zoals hittegolven en droogte, maar ook perioden met veel neerslag. Hierdoor ontstaan er overstromingen, mislukte oogsten en hongersnood. Ziekten verspreiden zich en het aantal vluchtelingen neemt toe.

Vroeger kwamen deze extreme weersomstandigheden eens in de honderd jaar voor, naar verwachting kunnen ze eind deze eeuw ieder jaar voorkomen. Om toekomstige generaties te beschermen is het belangrijk om de uitstoot van broeikasgassen te verminderen. Het is belangrijk dat overheden wereldwijd met elkaar samenwerken om dit voor elkaar te krijgen, maar ook jij als individu kan je steentje bijdragen!

3 UUR GELEDEN

 Een opmerking toevoegen... Plaatsen

Appendix B. Pre-test

The nativeness of the speakers was measured by the statement ‘this speaker sounds like a native speaker of English’, anchored on a 7-point Likert scale ranging from 1 ‘completely disagree’ to 7 ‘completely agree’ (based on Jesney, 2004).

Comprehensibility of the speakers was measured by the statement ‘I think the speaker is easy to understand’, anchored on a 7-point Likert scale ranging from 1 ‘strongly disagree’ to 7 ‘strongly agree’ (based on Munro et al., 2006).

The following five voice characteristics were measured: pleasant voice, natural voice, loud voice, dynamism, and speaker pace. Respondents were asked to rate the statement ‘this speaker has a’ with one of the following items: ‘pleasant voice’, ‘natural voice’, ‘loud voice’. 7-point Likert scales were used, ranging from 1 ‘completely agree’ to 7 ‘completely disagree’ (based on Bayard et al., 2001; Jesney, 2004).

To measure dynamism, respondents were asked to rate the statement ‘this speaker sounds’ with one of the following items: ‘energetic’, ‘enthusiastic’, ‘confident’. 7-point Likert scales were used, anchored by 1 ‘completely disagree’ to 7 ‘completely agree’ (based on Nejjari et al., 2020).

Speaker pace was measured by the statement ‘what is the speaker pace?’, anchored on a 7-point Likert scale ranging from 1 ‘slow’ to 7 ‘fast’ (based on Jesney, 2004).

The speaker that was eventually included in the experiment received the highest scores on nativeness ($M = 5.45$), comprehensibility ($M = 6.55$), voice characteristics (pleasant, natural, and loud voice, $M = 5.73$), and dynamism ($M = 5.52$). Speaker pace ($M = 4.32$) received a neutral score, which implies that the speaker’s pace was neither too fast nor too slow.

Appendix C. Messages of the Instagram posts

Dutch version:

“Kom ook in actie voor het klimaat! Zoals je ongetwijfeld weet, is klimaatverandering een wereldwijd probleem dat ons allemaal aangaat. Onlangs is er een alarmerend rapport over het klimaat uitgebracht door de Verenigde Naties. De temperatuur stijgt sneller dan verwacht. Als de uitstoot van broeikasgassen in hetzelfde tempo doorgaat wordt het steeds warmer, met drastische gevolgen voor mens, natuur en milieu. De zeespiegel stijgt. Er ontstaat extreem weer zoals hittegolven en droogte, maar ook perioden met veel neerslag. Hierdoor ontstaan er overstromingen, mislukte oogsten en hongersnood. Ziekten verspreiden zich en het aantal vluchtelingen neemt toe. Vroeger kwamen deze extreme weersomstandigheden eens in de honderd jaar voor, naar verwachting kunnen ze eind deze eeuw ieder jaar voorkomen. Om toekomstige generaties te beschermen is het belangrijk om de uitstoot van broeikasgassen te verminderen. Het is belangrijk dat overheden wereldwijd met elkaar samenwerken om dit voor elkaar te krijgen, maar ook jij als individu kan je steentje bijdragen”!

English version:

“Take action to stop climate change! Without a doubt, climate change is a worldwide issue that affects us all. Recently, the United Nations published an alarming report about the current state of the environment. The temperature is rising more rapidly than expected. If greenhouse gas emissions proceed at the same pace, it will get warmer, which will have drastic consequences for the environment, nature and mankind. The sea level is rising. Heatwaves and droughts occur alongside lengths of periods with heavy rainfall. Consequently, there are floods, failed harvests and famines. Illness and disease will spread and there will be an increase in the number of refugees. In the past, these extreme weather conditions appeared only once in a century. It is expected that at the end of this century, they will arise annually. To protect future generations, it is of great importance to reduce the emission of greenhouse gasses. It is crucial that governments work together on a global level to achieve this. However, you as an individual can make a contribution, too!”

Appendix D. Detailed analyses of the distributions across the four conditions

A one-way analysis of variance showed no statistical difference concerning the age ($F(3, 147) < 1, p = .695$) or self-assessed English proficiency ($F(3, 147) = 1.13, p = .340$) of the respondents across the four conditions.

A Chi-square analysis showed no significant relation between gender and the four conditions ($\chi^2(3) = 3.06, p = .383$).

A Chi-square analysis showed no significant relation between educational level and the four conditions ($\chi^2(15) = 13.82, p = .539$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .592$) was performed alternatively because this gives a more accurate view of the results.

A Chi-square analysis showed no significant relation between age of acquisition and the four conditions ($\chi^2(6) = 2.98, p = .840$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .856$) was performed alternatively.

A Chi-square analysis showed no significant relation between the context of acquisition and the four conditions ($\chi^2(6) = 6.14, p = .417$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .409$) was performed alternatively.

A Chi-square analysis showed no significant relation between level of exposure (speaking) and the four conditions ($\chi^2(15) = 11.68, p = .703$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .728$) was performed alternatively.

A Chi-square analysis showed no significant relation between level of exposure (listening) and the four conditions ($\chi^2(15) = 12.46, p = .644$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .752$) was performed alternatively.

A Chi-square analysis showed no significant relation between level of exposure (reading) and the four conditions ($\chi^2(15) = 13.36, p = .574$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .605$) was performed alternatively.

A Chi-square analysis showed no significant relation between level of exposure (writing) and the four conditions ($\chi^2(15) = 12.54, p = .638$). However, more than 20% of the cells had an expected count of less than five. Therefore, Fisher-Freeman-Halton's Exact test ($p = .660$) was performed alternatively.

Appendix E. Questionnaire

Beste deelnemer,

U bent uitgenodigd om deel te nemen aan een onderzoek naar de beoordeling van verschillende berichten over klimaatverandering. Dit onderzoek wordt uitgevoerd door een Master student aan de Radboud Universiteit van de Faculteit der Letteren.

De procedure van het onderzoek betreft het invullen van een online enquête. Het is belangrijk dat u audio kunt afluisteren op het apparaat waarop u de enquête invult. Het invullen van de enquête neemt ongeveer vijf minuten in beslag. Er zijn geen foute antwoorden.

De resultaten van de enquête worden gebruikt voor mijn Master Thesis. De antwoorden op de vragen blijven volkomen anoniem. Er zal discreet en volgens de privacyrichtlijnen van de Radboud Universiteit worden omgegaan met de persoonsgegevens.

Deelname aan dit onderzoek is vrijwillig. U kunt op elk momenten stoppen met uw deelname aan deze enquête en uw toestemming intrekken. U hoeft de reden niet aan te geven. Alle data die op moment van stoppen verzameld zijn, zullen worden vernietigd.

Indien u verdere vragen over het onderzoek heeft kunt u contact opnemen met Liina Pijnenburg (liina.pijnenburg@ru.nl).

Als u aan dit onderzoek mee wilt doen, vraag ik u om toestemming te geven. Door akkoord te gaan met deelname bevestigt u dat u:

- 18 jaar of ouder bent
- Vrijwillig deelneemt aan het onderzoek
- Alle bovenstaande informatie gelezen heeft

Succes met het invullen van de enquête.

Met vriendelijke groet,
Liina Pijnenburg

- Ik ga akkoord met deelname aan dit onderzoek
- Ik wil niet deelnemen aan dit onderzoek

Wat is uw leeftijd (in jaren)?

Is Nederlands uw moedertaal?

- Ja
- Nee

Kunt u Engels spreken en/of lezen?

- Ja
- Nee

Op de volgende pagina krijgt u in het Nederlands in een video te horen over klimaatverandering. Luister alstublieft één keer zorgvuldig naar deze video.

Op de volgende pagina krijgt u in het Engels in een video te horen over klimaatverandering. Luister alstublieft één keer zorgvuldig naar deze video.

Op de volgende pagina wordt een Nederlands bericht over klimaatverandering getoond. Lees dit bericht alstublieft één keer zorgvuldig.

Op de volgende pagina wordt een Engels bericht over klimaatverandering getoond. Lees dit bericht alstublieft één keer zorgvuldig.

U gaat nu een aantal vragen beantwoorden over het bericht. Let op! Zodra u op de pijl klikt, kunt u niet meer terug naar de vorige vraag.

Hoe beoordeelt u het bericht?

	Helemaal niet mee eens (1)	Niet mee eens (2)	Beetje oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik vind het een emotioneel bericht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hoe beoordeelt u het bericht?

	Helemaal niet mee eens (1)	Niet mee eens (2)	Beetje oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Het bericht trekt mijn aandacht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het bericht niet informatief	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het bericht niet overtuigend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het bericht betrouwbaar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wat is uw houding ten opzichte van klimaatverandering?

	Helemaal niet mee eens (1)	Niet mee eens (2)	Beetje oneens (3)	Neutraal (4)	Beetje eens (5)	Mee eens (6)	Helemaal mee eens (7)
Opwarming van de aarde is een groot probleem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opwarming van de aarde is een bewezen wetenschappelijk feit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Het is overdreven dat de aarde aan het opwarmen is	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hoe waarschijnlijk is het dat u de volgende acties wilt ondernemen om uw eigen uitstoot van broeikasgassen te verminderen?

	Helemaal niet mee eens (1)	Niet mee eens (2)	Beetje oneens (3)	Neutraal (4)	Beetje mee eens (5)	Mee eens (6)	Helemaal mee eens (7)
Ik ben bereid om minder vlees en zuivelproducten te eten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik ben bereid om te bezuinigen op vluchten en meer via het openbaar vervoer te reizen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik ben bereid om €5 meer per maand uit te geven aan elektriciteit geproduceerd uit hernieuwbare energiebronnen zoals wind en lucht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik ben bereid om mijn auto vaker thuis te laten en in plaats daarvan gebruik te maken van het openbaar vervoer, mijn fiets, of door te wandelen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik ben bereid om minder nieuwe kleren te kopen en mijn kleren langer te dragen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Op welke leeftijd begon u met het leren van de Engelse taal?

- Vóór de leeftijd van 5 jaar
- Tussen de leeftijd van 5 en 10 jaar
- Na de leeftijd van 10 jaar

In welke context heeft u Engels geleerd?

- In een natuurlijke context (buiten school)
- In een geïnstrueerde context (op school)
- Beiden

Hoe bekwaam bent u in het Engels met betrekking tot de volgende vaardigheden?

	Slecht (1)	(2)	(3)	(4)	(5)	(6)	Uitstekend (7)
Spreken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Luisteren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lezen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schrijven	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hoe vaak spreekt u in het Engels?

- Nooit
- Ieder jaar
- Iedere maand
- Iedere week
- Iedere dag
- Een paar uur per dag

Hoe vaak luistert u in het Engels?

- Nooit
- Ieder jaar
- Iedere maand
- Iedere week
- Iedere dag
- Een paar uur per dag

Hoe vaak leest u in het Engels?

- Nooit
- Ieder jaar
- Iedere maand
- Iedere week
- Iedere dag
- Een paar uur per dag

Hoe vaak schrijft u in het Engels?

- Nooit
- Ieder jaar
- Iedere maand
- Iedere week
- Iedere dag
- Een paar uur per dag

Er worden nog enkele algemene vragen gesteld

Wat is uw geslacht?

- Man
- Vrouw
- Anders
- Ik zeg dat liever niet

Wat is uw hoogst genoten opleiding?

- Geen opleiding
- Middelbare school
- MBO
- HBO
- WO Bachelor
- WO Master
- PhD
- Anders

Appendix F. Statement of own work


Student name: Liina Pijnenburg

Student number: S1063609

PLAGIARISM is the presentation by a student of an assignment or piece of work which has in fact been copied in whole or in part from another student's work, or from any other source (e.g. published books or periodicals or material from Internet sites), without due acknowledgement in the text.

DECLARATION:

- a. I hereby declare that I am familiar with the faculty manual (<https://www.ru.nl/facultyofarts/stip/rules-guidelines/rules/fraud-plagiarism/>) and with Article 16 "Fraud and plagiarism" in the Education and Examination Regulations for the Bachelor's programme of Communication and Information Studies.
- b. I also declare that I have only submitted text written in my own words
- c. I certify that this thesis is my own work and that I have acknowledged all material and sources used in its preparation, whether they be books, articles, reports, lecture notes, and any other kind of document, electronic or personal communication.

Signature: 

Place and date: Tilburg, the Netherlands, 03-06-2022