What will be 'right' in the Future? The Influence of Spatiotemporal Metaphors and Visual Priming on Persuasiveness of Political Posters.

Bachelor's Thesis

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Abstract

Political posters have historically served as a formidable tool of political communication, yet the cognitive mechanisms that could be employed to ameliorate their persuasiveness remain underexplored. This study investigates whether the Space-Time Congruency Effect (STCE), a spatiotemporal metaphor, and visual priming enhance the perceived persuasiveness of political posters. The STCE can be described as a psychological phenomenon which leads people to visualise the passing of time spatially in accordance or congruence with their writing directionality. In other words, subject of this study is the left-past right-future conceptual metaphor hypothesis. A 2x2 between-subjects experimental design tested 122 participants, exposing them to political posters with either STCE-congruent or incongruent stimuli, with or without visual priming. Participants rated congruent and incongruent posters' perceived persuasiveness using a validated, reliable scale. Results showed no statistically significant main effects for spatiotemporal congruency of posters or priming on overall perceived persuasiveness. However, a small but significant priming effect emerged for posters concerned with social issues, however not for elective or environmental posters, suggesting priming may enhance persuasiveness in specific contexts. Despite promising theoretical support for STCE in other domains, this study's findings indicate limited practical applicability for political posters.

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Introduction

Political posters are a fundamental staple of politics and have been used persuasively for political issues for at least 4 centuries (Seidman, 2008). Hence, the historical importance of political posters can hardly be overstated, as their function of communication and mass persuasion has been considerable, which is demonstrated by how they contribute to a sense of presence and credibility (Seidman, 2008). They were the primary means of political communication in the 19th century and were a meaningful tool in the effort to shape public opinion and rally support (Geise, 2017). Posters remained paramount in the early 20th century and played a prominent role in the Russian Revolution of 1917 (Seidman, 2008). Furthermore, they were integral in wartime mobilisation in the First and Second World Wars, which Yanker (1970) describes as the high point of the poster as a means of political communication. The Soviet Union and the USA both instrumentalised political posters to promote their respective political ideologies during the Cold War (Seidman, 2008). Using the external environment, like the street, as a place of expression of information was a fundamental step towards raising awareness levels of social and political issues in societies (Vattano, 2020). Furthermore, Vattano (2020) views that political posters, in the case of propaganda imagery, showcase the "cultural values of societies in the passage of time". He even goes so far as to say that graphic propaganda influenced the attitude and culture of populations in increasingly innovative ways through varying strategies and the multimodal nature of message construction in political posters.

Application of Political Posters in the Modern Era

Recently, the digital age has introduced a notable shift from print to digital posters (Lee & Campbell, 2016). Subsequently, the distribution of information and messages is often taking place digitally, as disseminating messages online is significantly cheaper. Lee and Campbell (2016) pointed out that the interactional nature of social networks also allows for social endorsement, as users can decide whether they want to position themselves in favour of, or against, certain topics, which differs from the previously used unilateral posters. This introduces a new, fundamentally different level to the political post(er).

However, the printed political posters, particularly election posters, are still ubiquitous and used extensively in countries like Germany, France or England (Geise, 2017; Seidman, 2008). As Yanker (1970) outlined early, the target group can avoid "propagandistic bombardment" by turning off the radio, television or smartphone today, this cannot be done with the poster. Hence, political posters retained their importance and often form an integral

part of election campaigns. Next to political parties, political groups and organisations continue to utilise posters as a means of persuasion (Pappert, 2023). Next, the multimodal nature, theories and underlying strategies of (political) poster design will be elaborated, followed by a discussion of relevant cognitive concepts.

Theoretical Background of Political Posters

Definition, Categorisation and Strategies

Geise (2017) defined the general poster as persuasive, non-periodical, nonresponsive, usually printed, visual mass media that is traditionally materially fixated in public spaces and serves one-directional, external communication with a disperse audience. Hence, the political poster bears a political, often persuasive, message that follows the outlined principles.

General posters can be categorised as follows: typographic posters, iconic posters and text-image posters (Papper, 2023; Geise, 2017). The typographic poster does not feature imagery, while the iconic poster is purely based on imagery and does not feature written elements. Thirdly, the multimodal text-image poster combines both approaches and uses both written and pictorial elements. From a design perspective, these categories differ fundamentally in terms of what rhetoric features could be present in each respective poster. Traditional rhetorical approaches like orientation of text, typography or letter size and colour can be combined with visual imagery like certain backgrounds, photos of politicians or flags.

Next, Geise's (2017) definitions of poster types in political contexts differentiates between the election poster and the general political poster. The election poster is characterised by its relation to a specific political, usually electoral events like the election to the German Bundestag, which functions as the German parliament, and is the most common type of political poster. The general political poster is a more general term for posters used in public discourses around social movements. Furthermore, we combine Geise’s (2017) definition of posters in political contexts to the term political poster, which will be used to describe any poster that is used in a political context that persuasively conveys a political message.

There are multiple different strategies that can be used in political posters to achieve persuasion. Election posters, as well as general political posters, inherently either try to mobilise their target audience to vote for a certain candidate in an election or they try to persuade while also inciting certain actions, like donations. Pappert (2023) outlines the three key strategies present in posters in election campaigns as Logos, Pathos and Ethos. Logos describes the strategy of using evidence and logical reasoning to build conviction or incite

action. Pathos can be described as the emotionalisation of the target group. Finally, Ethos is the personalisation, image building or characterisation of the person or organisation depicted. It remains an open question how these key strategies may be implemented in different contexts, for instance in political posters that are concerned with environmental or social issues.

Elaboration Likelihood Model

The strategies or concepts of Logos, Pathos and Ethos align fittingly with the Elaboration Likelihood Model (ELM) (Petty et al., 1986; 2009). The ELM is a concept often employed in advertising and inherently describes how people process persuasive messages. The central route (high elaboration) involves logical reasoning and thoughtful considerations of the message, which also requires motivation and ability to process the message, in other terms, Logos. For instance, a voter that is carefully analysing a candidate's policy proposal is centrally processing. The peripheral route (low elaboration) uses superficial cues like symbols, colours, slogans or emotional appeals to influence people that are less engaged, and form opinions based on quick impressions. The peripheral route, Pathos and Ethos, relies on heuristics, or mental shortcuts that reduce the cognitive load. Hence, an example of a peripherally processed poster is a politician smiling with a flag in the background (Ethos). While the overall body of research of the ELM on political posters is not extensive, the implications for mass media, like the political poster, are clear. Petty et al. (2009) emphasise that understanding these processing routes is crucial for designing political messages, as tailoring content to the audience's level of engagement and information processing can significantly affect the impact of poster campaigns. The ELM highlights how important it is to contextualise, categorise and understand the strategies that are used in (political) posters, such as message processing.

Strategies and theories that are applicable in the context of advertisement posters (like the ELM) or election posters (Logos, Pathos and Ethos) can and should be considered when designing political posters. Furthermore, Pappert (2023) went so far as to say that poster rhetorics essentially do not differ substantially between commercial and political advertisements. The rhetoric of a poster is constructed by the multimodal interplay of different persuasive devices and visual elements (Pappert, 2023). Also, general success in communicating political messages through posters can be affected by contact frequency, design features and underlying communication strategy (Geise, 2017). Furthermore, the possible relevant persuasive design features are plentiful, one of them can be cognitive effects

in the form of metaphors. A meta-analysis of studies on metaphorical framing in political discourse showed that the presence of metaphorical concepts can positively influence beliefs and attitudes and thereby persuasion (Brugman et al., 2019).

Cognitive Concepts: Theory and Literature Review

Spatial Metaphorical Concepts

A metaphor in general can be described as a cognitive or linguistic mechanism that implicitly compares concepts that are not directly related, or in other words metaphors are often used to make abstract concepts more tangible. Lakoff and Johnson (1980) argue that metaphors are important factors for cognition. One of the types of metaphors are spatial metaphorical concepts or orientational metaphors. Spatial metaphorical concepts are a means to organise abstract ideas into spatial mappings, for example, "a bright future lies ahead of us", metaphorically anchoring time on a horizontal axis.

Early research by Lakoff and Johnson (1980) investigated how spatial metaphorical concepts are linguistically employed. They highlighted a multitude of orientational linguistic metaphors, particularly on the vertical axis. For instance, "more is up", such as in "My income rose last year" or "good is up", metaphorically conceptualised in "We hit a peak, but it's going downhill since" (Lakoff & Johnson, 1980). This valence can also be seen when talking about different concepts like high and low status (Chae & Hoegg, 2013). Furthermore, Chae and Hoegg (2013) pointed out that spatial relations, just like metaphors in general, are used as fundamental tools to understand and grasp abstract ideas. Divinity, for instance, is also anchored on a metaphorical vertical axis; heaven is above, and hell is below.

Researching spatial metaphorical concepts, or rather how people spatialise time, could lead to understanding how and why we look at concepts like time in a certain way. Research by Li and Cao (2020) found that people's attitude towards time can be associated with political ideology. The attentional focus of temporal events led to conservatives having more favourable attitudes towards the past, whilst liberals were more favourable to the future. Furthermore, de la Fuente et al. (2014) also found that this temporal focus can also differ between cultures and hence be determined by culture. In this study, Moroccans showed greater agreement with past times than Spaniards. The way people visualise or spatialise time can be rooted in a variety of factors, like the aforementioned political ideology, culture but also writing directionality, as will be elaborated in the following subpart about the space-time congruency effect (STCE).

What will be 'right' in the Future?

Space-Time Congruency Effect

The space-time congruency effect (left-past right-future conceptual metaphor hypothesis) is one of the later iterations of the constantly growing body of literature on cognitive metaphorical concepts. The space-time congruency effect is based upon the concept that the directionality of writing systems leads to a specific conceptualisation of time in space (Boroditsky et al., 2011). Boroditsky et al. (2011) conducted an experiment with native English and native Mandarin speakers with a photo of a person in the centre of the screen while having previously seen a photo of the same person at a different age. Two groups of participants received either a horizontally or vertically orientated keyboard, while all keyboards feature a black key representing earlier and a white key representing later. Each orientation was later reversed, so if the horizontal orientation had black-left and white-right first, then it was white-left and black-right in the second round and vice versa for the vertical orientation. The resulting response times showed that English speakers responded quicker with the horizontal canonical (past-left and future-right) orientation of the keyboard. Subsequently, the findings suggest that a left-right writing system will likely lead to a horizontal, left-right mapping of time progress in an abstract sense. Hence, in the case of English speakers, they tend to have a past-left and future-right mapping. Boroditsky et al. (2011) also found that Mandarin speakers are slightly more likely to think about time vertically. Though, it should be noted that Mandarin is a specific case, as horizontal as well as vertical spatiotemporal metaphors exist (Yang & Sun, 2016).

Nevertheless, several different studies and researchers found positive biases towards certain space-time mappings based on directional reading habits (Boroditsky et al., 2011; Santiago et al., 2007). Research by Santiago et al. (2007) found that when tasked to categorise words that appeared randomly on a screen as referring to the past or future with either their left or right hand, they would do so quicker with past-referring words and their left hand and future-referring words with their right hand. Furthermore, the reaction time for the categorisation was significantly quicker for future-referring words when they were shown on the right side of the screen. Santiago et al. (2007) thereby provide strong evidence supporting the left-past right-future conceptual metaphor hypothesis or the STCE.

Concrete examples of manifestations of this left-right conceptual metaphor are calendars or timelines that are commonly based on the directionality of reading and writing. In the case of English, this is from left to right, or as the title of Santiago et al. precisely puts it, "Time (also) flies from left to right." (2007).

What will be 'right' in the Future?

A lot of studies looked at response time which indicates processing efficiency of this cognitive effect, however Chae and Hoegg (2013) was one of the first studies that attempted to research whether the STCE can have an effect on people's product attitudes in advertising. Chae and Hoegg (2013) found evidence that English-speaking participants perceive products with a more favourable attitude when they were positioned congruently with the product's spatial representation of time. Antiques, old furniture or objects from the past, were met with a better attitude when positioned on the left side of the advert, congruently with the STCE (Chae & Hoegg, 2013). This research was conducted in the context of advertising, whereas research by Santiago et al. (2007) and Boroditsky et al. (2011) tested for the STCE, and viewed it as a cognitive effect.

The application of the STCE in different contexts, like the political poster, has not been researched extensively; however, its versatile applicability in advertising suggests that it might as well be used in political contexts, as poster rhetorics do not differ dramatically between the two domains (Pappert, 2023). Additionally, various previous studies of different domains found positive biases towards STCE spatiotemporally congruent mappings, hence, this study raises the question whether these biases can be applied onto political posters (Santiago et al., 2007, Boroditsky et al., 2011, Chae and Hoegg, 2013).

Chae and Hoegg's (2013) research concerned with advertising also found that the manner of presentation of a product, in this case spatiotemporal congruency, can contribute positively to easier processing or in other words processing fluency. Subsequently, it is argued that processing fluency, established through the congruent use of the STCE, can be a mediating factor in evaluation and hence persuasion, which will be discussed in the following paragraph.

Processing Fluency

Processing fluency was defined as "the subjective experience of ease with which a stimulus is processed" by Reber and Unkelbach (2010). Brashier and Marsh (2020) found that truth judgements can be heavily influenced by processing fluency and individuals rely on this processing fluency as a heuristic for truth. Hence, this indicates that ease of processing can overshadow existing knowledge in truth judgements and therefore, processing fluency is a factor that should be carefully considered when it comes to political messages like on political posters (Brashier & Marsh, 2020, Dechêne et al., 2010). Chae and Hoegg's (2013) findings implied that participants naturally relied on the ease of processing that came with the spatiotemporally congruent past-left, future-right mappings to evaluate the products in the

study. Additionally, research by Lee and Aaker (2004) about message-framing effects also established that the development of favourable opinions is more likely when people are fluently processing information, and, additionally, processing fluency seems to be an underlying effect for persuasion. In fact, incongruent spatiotemporal representation of objects may even disrupt processing fluency (Chae & Hoegg, 2013). In conclusion, there is considerable evidence that the congruent use of the STCE can increase processing fluency and can thereby affect evaluation processes positively. In turn, this could be underlying for enhancing the persuasiveness of political posters. Furthermore, the STCE and the resulting enhancements of processing fluency could be further enforced by means of preliminary priming.

Priming

Metaphors can often be categorised as linguistic effects, like in "a bright future lies ahead of us". This past-behind and future-forward metaphor can be categorised as such because it is literally anchored in language. They differ from the STCE in the sense that they are true linguistic effects, whereas STCEs are not. There is no lexical usage of the past-left future-right metaphor in English; hence, it could be considered a visual and spatial cognitive representation of time (Santiago et al., 2007). The results by Rolke et al. (2013) align with these previous findings. This study conducted an experiment in which participants were primed by means of visually presenting temporal words like "yesterday" or "tomorrow" to influence spatial responses. Subsequently, left-past right-future mappings were reinforced by priming. This priming, which included spoken temporal adverbs, did not lead to the same effect (Rolke et al., 2013). Arguably, this suggests that the STCE is not a linguistic effect that is anchored in language, as priming, by means of spoken words, should have led to a similar result. However, priming by means of written words strengthened the STCE, which, in turn, suggests a spatial cognitive representation of time that is rather anchored visually. These arguments are in line with the neuroscientific notion that time is an embodied concept which is mediated through visual spatial processing, resulting in these spatiotemporal mappings (Kranjec & Chatterjee, 2010). Kranjec and Chatterjee (2020) go on to argue that embodied concepts are grounded in sensorimotor representations which provide humans with the bodily and perceptual basis to conceptualise abstract concepts like, as is the basis of this research, time. Consequently, visual priming, anchored in written text, which is presented in the stimuli's instructions, might lead to an enforcement of the STCE, which, in turn, might result in enhanced perceived persuasiveness.

Research Gap and Motivation

The persuasiveness of political posters is generally not researched extensively. The most research that was conducted is in the field of election posters. However, even here, research might be challenging, as a multitude of factors can influence voting behaviour, such as policy suggestions or the overall campaign strategy. Furthermore, the use of cognitive effects in political posters or election posters like the STCE is essentially not researched. Subsequently, this study aims to extend the body of literature on the perceived persuasiveness of the STCE in the context of political posters. Additionally, this study will research the effect that previous priming can have on the efficacy of the persuasiveness of the STCE. Thereby, future poster campaigns might decide to feature cognitive effects like the STCE in their posters to achieve their full persuasive potential on a data-based decision.

As the hypotheses state, we predict that congruent posters will be perceived as more persuasive than incongruent posters, according to the STCE. Furthermore, it is predicted that previous visual priming will enhance the effectiveness of the STCE.

Research Question

To what extent does the congruence (or incongruence) of spatiotemporal mappings following the STCE and the priming for these mappings influence the persuasiveness of political posters?

Hypotheses

H_1: Perceived persuasiveness is higher in posters that feature congruent space-time mappings according to the STCE.
H_2: Priming for the STCE will result in a greater perceived persuasiveness for spatiotemporal congruent (versus incongruent posters) rather than if no previous priming is conducted.

Methodology

Materials

This research featured two independent variables. The first independent variable (IV1), spatiotemporal congruency according to the STCE, was operationalised as follows. Congruent stimuli featured future references, or the word "future" written out on the right side of the poster, as this was the natural position for left-right orientated writing systems according to the STCE (Boroditsky et al., 2011; Chae & Hoegg, 2013; Santiago et al., 2007). Incongruent stimuli featured the same reference one the left side of the poster. For instance,

the future reference was positioned on the left side, and this could, according to Chae and Hoegg (2013), have had a negative effect on processing fluency and thereby perceived persuasion, which tested H_1.

The second independent variable (IV2) was the presence of preliminary priming in the instruction for each respective stimulus. The visual priming was operationalised by means of an introductory text above the stimuli, which read: "Now you are going to view a political campaign poster focused on the **future**. Please take a look at the poster and then answer the questions."; whereas a non-priming example said, "Now you are going to view a political campaign poster. Please take a look at the poster and then answer the questions.".

There were 6 posters: 2 featuring environmental issues, 2 featuring social issues, and 2 featuring a non-explicit general political campaign, each poster had a congruent and incongruent version. The stimuli followed the principles and theories that were discussed in the introduction. Some posters featured more emotional appeals, adhering to the concepts of Pathos and peripheral processing. Poster 3 and 4 distinctively featured emotional appeals in the form of images signifying the environmental issues in the world: a scene of the Los Angeles wildfires of 2025 declaring that the future is burning and a lone polar bear on a detached piece of ice (Petty et al., 2009). Additionally, the campaign posters featured clear examples of Ethos or image building, visible in the text that is featured in poster 1 ("For a fairer future") and in poster 2 ("Climate change the future).

However, this experiment did not differentiate between the different design approaches like Logos and Pathos in terms of conditions. Furthermore, the stimuli were all multimodal text-image posters (Pappert, 2023; Geise, 2017). The formatting of the posters was 4x5 which fitted well for smartphones, as this was the only way this study could be participated in. This study was limited to participation on mobile devices so that the experimental conditions remain similar for all participants.

Participants

The sample for this study consisted of 122 participants, with a gender distribution of 83 females, 36 males, 1 non-binary individual, and 2 individuals who preferred not to disclose. The age range of the participants was from 17 to 62 years old, with a mean age of 24.4 years. The participants were divided into 4 groups according to the 2x2 between-subjects design. The two most common native languages between the participants were Dutch (N = 72) and German (N = 26). The two languages covered 80.3% of the participants; all other 18 native languages that were reported did not surpass a total amount of 4 speakers per language. The most common highest level of education was High School (N = 53), followed by

Bachelor ($N = 38$), HBO ($N = 14$) and Master ($N = 9$). Further education levels reported also did not surpass of a total frequency of 4.

A Chi-square test showed no significant imbalances in gender distribution between the 4 groups ($\chi^2(9) = 11.43$, $p = .247$); furthermore, a one-way ANOVA showed that the age distribution also did not differ significantly ($F(3,118) < 1$).

Design

This study had a 2x2 between-subjects research design. The first independent variable was congruency of spatiotemporal mappings according to the STCE (congruent [right]; incongruent [left]). The second independent variable was the presence of priming (priming; no priming) which preceded the poster.

Instruments

A questionnaire was designed featuring a set of different questions, starting with demographic questions investigating age, gender, native language and educational level.

The dependent variable (DV) of this study was the perceived persuasion of the political posters. As O'Keefe (2018) outlined, operationalising persuasion can be challenging, as persuasion is defined as a change in beliefs, attitudes, or behaviours. Subsequently, operationalising the perceived persuasiveness of a political poster rather than its actual persuasiveness was more practical and attainable for this research. Perceived persuasion as a concept itself was operationalised in the questionnaire, a set of scalable items developed by Thomas et al. (2019). In their paper, they compared and analysed a multitude of different operationalisations of perceived persuasiveness from different studies. Thomas et al. (2019) proposed testing three key factors of persuasion: effectiveness, quality and capability. The questionnaire of this research employed scalable items from the three proposed key factors. The scalable items were anchored to an 8-point Scale ranging from "completely disagree" (0) to "completely agree" (7). The scalable items outlined by Thomas et al. (2019) were:

- "This message will cause change in my behaviour"
- "This message has the potential to change my behaviour"
- "This message is effective"
- "This message is influencing"
- "This message is motivating"

The scaling of perceived persuasiveness was found to be reliable for each of the 6 posters. The reliability of the scales for each poster was assessed using Cronbach's alpha

(Poster 1: α = .94; Poster 2: α = .95; Poster 3: α = .91; Poster 4: α = .94; Poster 5: α = .94; Poster 6: α = .93).

Finally, participants were asked how often they think about the issues that were concerned with the three poster categories or thematic fields: politics in general (elective posters), environmental issues (environmental posters) and social issues (social posters). Participants were asked "How often do you think about the thematic fields of this study?" and could report their answer three scales, corresponding to each thematic field (elective posters, environmental posters and social posters). This was an 8-point scale ranging from "Rarely" (0) to "Frequently" (7).

Procedure

Recruitment of participants was conducted via sharing a link to the Qualtrics study with peer students, friends, colleagues and acquaintances in chats and via mail. Every participant was kindly asked to further spread the link as well. Qualtrics was used to create an online questionnaire which was designed to be filled out on mobile devices, as the stimuli were formatted for mobile layouts. The experiment was conducted on an individual basis; every participant filled out the questionnaire individually, starting with the demographic block, asking questions about language, gender, age, education level and nationality. Then, participants were presented with one of four stimuli blocks, depending on which condition they were assigned to. However, all the posters and questions were presented to the participants in a random order for all stimuli blocks. Every stimulus was followed by the scalable items outlined previously and the 2 primed conditions or blocks featured an additional sentence above the poster in the instructions. Finally, participants answered how often they thought about each respective topic of the posters categories. The questionnaire took 5–10 minutes to fully complete. Finally, the data collection was conducted via Qualtrics. The questionnaire was filled out in English.

Statistical Treatment

Finally, the statistical treatment included a two-way ANOVA to compare the means of scores of perceived persuasiveness. Additionally, eta-squared was calculated to measure the effect size of each main effect as well as Cronbach's Alpha to test for the reliability of the questionnaire. Additionally, the same statistical treatment was conducted for each respective poster category: elective, environmental and social posters. Naturally, descriptive statistics were calculated for perceived persuasiveness and frequency of participants thinking about

each respective subject. Furthermore, frequencies of demographic questions on age, gender, language, education level and nationality were also investigated.

Results

Participants were divided into four conditions characterised by the presence of priming and spatiotemporal congruent (right) or incongruent (left) mappings.

A between subjects, two-way analysis of variance with spatiotemporal congruency (ScreenSide) and priming for this effect did not show a significant main effect of ScreenSide on perceived persuasion of political posters ($F(1,118) <1$). Additionally, whether Priming or not took place before viewing the posters did not significantly influence perceived persuasion ($F(1,118) = 2.42$, $p = .12$). Furthermore, the interaction between ScreenSide and Priming was not statistically significant ($F(1,118) < 1$).

For the mean reported perceived persuasiveness please consider Table 1, though, the groups that were presented with STCE incongruent stimuli (ScreenSide left) scored higher than participants presented with congruent stimuli. Also, conditions that featured priming show slightly higher overall perceived persuasiveness. The overall total mean score of perceived persuasiveness was 2.75 on an 8-point scale, 8 being the highest.

Table 1

Means (and Standard Deviations) for Perceived Persuasiveness of Political Posters that feature per Spatiotemporal Congruency (ScreenSide) and Presence of Priming (0 = Strongly Disagree, 7 = Strongly Agree)

Dependent Variable: PersuasivenessMean

Priming	ScreenSide	Mean	Std. Deviation	N
No	Left	2.7	1.1	34
	Right	2.5	1.1	30
	Total	2.6	1.1	64
yes	Left	3.0	.9	32
	Right	2.8	1.3	26
	Total	2.9	1.1	58
Total	Left	2.8	1.1	66
	Right	2.7	1.2	56
	Total	2.8	1.1	122

Due to the thematic differences but also varying design language of the poster categories further two-way analyses of variance were conducted for each respective category. For instance, the environmental posters featured a design strategy rather adhering to Pathos, emotionally appealing to the viewer, whereas the elective posters featured elements that align with Ethos which can be described as character building. Therefore, the different thematic fields of the categories, design language and approach motivated further statistical analyses. Subsequently, two-way analyses of variances for elective political posters showed statistically non-significant findings for Priming ($F(1,118) <1$), ScreenSide ($F(1,118)$ 1.16, p =.28) and interaction effects ($F(1,118) <1$). Further analyses of Environmental posters also did not result in statistically significant effects of Priming ($F(1,118) <1$), Screenside ($F(1,118) <1$) and interaction ($F(1,118) <1$).

Political posters that are concerned with social issues did show a significant main effect of priming on perceived persuasion with a small effect size ($F(1,118)$ 4.77, p = .031, η^2 = .04). The groups of participants that were in a primed condition (M = 2.77, SD = 1.24, N = 58) reported a greater perceived persuasiveness than non-primed groups (M = 2.28, SD = 1.20, N = 64) for the Social Political Posters, as shown in Table 2. The congruency with spatiotemporal mappings did not have a significant main effect on perceived persuasiveness ($F(1,118)$ 1.48, p = .226) and there was no interaction effect between Priming and ScreenSide for Social Political Posters ($F(1,118) < 1$).

Table 2

Means (and Standard Deviations) for Perceived Persuasiveness of Social Political Posters that feature per Spatiotemporal Congruency (ScreenSide) and Presence of Priming (0 = Strongly Disagree, 7 = Strongly Agree)

Dependent Variable: PersuasivenessSocialPosters

Priming	ScreenSide	Mean	Std. Deviation	N
No	Left	2.4	1.2	34
	Right	2.2	1.2	30
	Total	2.3	1.2	64
yes	Left	2.9	1.1	32
	Right	2.6	1.3	26
	Total	2.8	1.2	58
Total	Left	2.6	1.2	66
	Right	2.4	1.3	56

Total	2.5	1.2	122

Finally, the frequency of how often participants are concerned with the thematic fields of the study investigated to test whether there are significant differences between the fields which may have impacted the persuasiveness of the posters. Participants reported that they think more often about social issues (M = 5.07, SD = 1.44) than environmental issues (M = 4.76, SD = 1.61). Politics in general was thought of the least often (M = 4.13, SD = 1.80).

Discussion

The central aim of this research was to examine whether the Space-Time Congruency Effect (STCE) and visual priming can enhance the perceived persuasiveness of political posters. While the theoretical foundation outlined in the introduction suggests promising applications of spatial-temporal metaphors like the STCE in persuasive communication (Boroditsky et al., 2011; Santiago et al., 2007), the results of this study did not provide sufficient empirical support for the effectiveness of these effects within the specific domain of political posters. Contrary to the expected outcome, spatiotemporally incongruent stimuli, i.e. posters that anchored the future reference on the left side of the screen, lead to a higher reported perceived persuasiveness on average, albeit a small difference and not a trend. This difference was a .2 score as well for the two groups that were primed and the ones that did not get previous visual priming as shown in Table 1. Overall, visual priming increased the reported perceived persuasiveness by around a .3 score for both the congruent and incongruent stimuli. However, this difference is not statistically significant.

Consequently, the results of the statistical analysis leads to a rejection of H_1, which predicted a higher perceived persuasiveness for posters that feature congruent space-time mappings. Coherently, H_2 can also be rejected as no statistically significant category-overarching effect of priming on perceived persuasiveness was found.

Priming did show a statistically significant effect, but only in the category of social political posters. Social issues were also reported to be thought about the most often with a rather high reported score of 5.07. While this suggests a partial acceptance of H_2, the absence of an accompanying effect of spatiotemporal congruency renders this result not only difficult to interpret but it also may be negligible. Nevertheless, it could suggest that priming can enhance persuasion independently of the STCE or spatial metaphors, particularly when people are more involved with a certain issue that they think about often. This, however, falls out of the scope of this study as the visual priming was introduced for its previously successful

application specifically in combination with the STCE (Rolke et al., 2013). Additionally, the effect size was small, which further limits the practical implications of this result and, subsequently, calls into question the robustness of priming as a persuasive enhancer in this study's context. The very low effect sizes also reflect that this statistical result does not allow for deductive statements about the use of visual priming in combination with the STCE in the domain of political posters.

Measurement and Operationalisation

When consulting the aforementioned results, measuring perceived persuasiveness might not have been the most adequate approach to detecting the effects of the STCE. Prior research on STCE (Santiago et al., 2007) and processing fluency (Lee & Aaker, 2004; Chae & Hoegg, 2013) often measured reaction time in laboratory conditions. While perceived persuasiveness is more relevant to real-world effects, and the scalable items employed to measure it showed to be reliable, it remains a possibility that the STCE does not affect persuasion to the predicted extend. The challenges in operationalising persuasion were already discussed by O'Keefe (2018) as outlined in the Methods section. Subsequently, an assessment of neurocognitive methods like reaction time (Santiago et al., 2007) or eye-tracking (Wedel & Pieters, 2008) could have revealed the constraints of this research, specifically whether participants missed to focus on the spatiotemporal cues, and how political posters with cognitive spatiotemporal metaphors are processed. Further operationalisation of the effectiveness of these posters could have included attitude (Chae & Hoegg, 2013) or aided vs unaided recall as developed by Van den Bulck (1993).

Poster Design

Perhaps, the poster design led participants to focus on other features rather than the STCE anchoring in the word future. Hence, consideration of the design principles and rhetoric of the stimuli in this study, which may have impacted message processing, is imperative. Most posters in this study could most likely have been processed peripherally, relying more on emotional appeals like in the environmental posters (Pathos) and image building in the elective posters (Ethos) rather than logical reasoning (Logos) (Petty et al., 1986; 2009; Pappert, 2023). While design following Pathos and Ethos is common in political posters, aligning it with cognitive effects like the STCE might not lead to the expected positive effects in perceived persuasion, as the STCE might have stronger influences on central, logical processing (Logos). Maybe, this could be due to ease of processing that facilitates the overshadowing of truth judgements, which could be considered an important aspect of central processing, as individuals rely on processing fluency as a heuristic for truth (Brashier &

Marsh, 2020). Future research that incorporates processing routes (central and peripheral) and key rhetoric strategies (Logos, Pathos and Ethos) could operationalise these concepts and test for differences.

Additionally, the stimuli of this research differed in terms of typography (font, letter size and colour), imagery and overall design language. These aspects of design stayed coherent within poster categories yet varied strongly between the categories. Though the different poster categories did not result in significant statistical results of the STCE on perceived persuasion respectively, the differences in design language can introduce noise to the experiment. Nevertheless, according to the sound theoretical framework on the STCE there would have been an effect regardless. Furthermore, the approach of having diverse designs per poster category increase external validity and replicability. Again, employing eye-tracking, which has been shown to be a very effective tool to study domains like marketing, could have delivered insights whether participant focus on the spatiotemporally congruent cues and is recommended for future research in the domain of employing cognitive effects in political posters as a persuasive vehicle (Wedel & Pieters, 2008). This could reveal the focus points of the posters and whether altercation of the posters could result in different levels of perceived persuasiveness.

The elective posters featured a white background with a female (Poster 1) or male politician (Poster 2) in the foreground and a set of text that appeals for a fairer (Poster 1) or more climate friendly (Poster 2) future with a call to vote. The environmental posters differed starkly as they featured striking imagery of possible consequences of climate change, the Los Angeles wildfires of 2025 (Poster 3) and a polar bear that is isolated on a small piece of ice (Poster 4), both with large typography mentioning the highlighted word future. The social posters featured a cartoon-like design language one offering a free health sport programme by the municipality of Nijmegen (Poster 5), while the other referenced the ongoing dramatic housing shortage in the Netherlands (Poster 6) which has been discussed extensively, among others by van den Berg et al. (2022). The topical coherency within the category of social political posters should be highlighted as less strong than within the other categories as a fitness-health programme can only be indirectly considered a social issue. Fonts and letter sizes differed between all the six posters, as well as colour palette and imagery. Considering the design approach and the following results, perhaps anchoring the STCE in text and imagery could have yielded different results. Chae and Hoegg's (2013) experiment on adverts featuring imagery of objects that already reflect a certain timely relation, like an antique lamp

that was positioned on the left side of the advert, congruent with the STCE. A multimodal approach featuring STCE congruent text and imagery is recommended for future research.

Experiment and Setting

Another factor that could have diminished the effects of STCE is the setting in which the posters were viewed and how the experiment was conducted. Traditionally, posters are hung in public spaces and usually processed on the spot, where the Mere Exposure Effect (Zajonc, 1968) and environmental context contribute significantly to their persuasive power (Yanker, 1970). The Mere Exposure Effect (Zajonc, 1968) is when repeated exposure to the stimuli ameliorates attitude towards it which is in line with Geise's (2017) notions that contact frequency is one of the key factors for successfully communicating political messages (Van den Bulck, 1993). Hence, this raises the question whether more frequent exposure might have influenced the way the poster would have been processed and thereby the effectiveness of the STCE on perceived persuasiveness. Furthermore, viewing a poster on a smartphone screen, which was conducted in this manner to warrant adequate participation, is retrospectively incoherent as posters would normally appear on the street, and have been for the past centuries (Seidman, 2008; Yanker, 1970). Subsequently, viewing them once on a smartphone screen may have impacted ecological validity, potentially weakening a posters natural spatial processing cues. Again, it remains incongruous that one of the key strengths of the poster, not being able to turn them off like a smartphone or other electronical devices (Yanker, 1970), is negated by this approach, likely further weakening their overall persuasive potential as posters usually rely on frequent exposure (Geise, 2017; Van den Bulck, 1993; Zajonc, 1968).

Nonetheless, conducting an actual poster campaign and measuring its persuasiveness is tremendously challenging as, in the instance of more common elective posters, people are usually exposed to a vast number of stimuli when elections take place and measuring to what extent posters influence attitudes or behaviour is challenging. Van den Bulck (1993) discussed using aided and unaided recall techniques which he employed to measure the impact of political communication strategies, more precisely, elective posters in a Belgian election. By means of the unaided recall recollection of posters could be measured while aided recall is argued to test for the success of parties' positioning (Van den Bulck, 1993). In unaided recall scenarios participants were asked to recall any of the posters that they saw during the election campaigns without being shown prompts what aimed to gauge the general visibility and memorability of the posters. However, the aided recall included prompts in form of political posters that were present during the election campaign. Participants were asked to indicate the posters they recognise to test the effectiveness of design elements and strategies that were

used in the posters. These recall techniques could have offered insightful data on the weight of frequent exposure (Geise, 2017) and should be a consideration for future researchers that conduct an experiment with posters positioned on streets, which unfortunately was not feasible for this study.

Conclusion

Employing spatiotemporal metaphors as a persuasive mechanism in political poster communication, like it was conducted in this study, may require reconsideration. Prior studies mostly focus on contrasts between past and future mechanisms of the STCE (Chae & Hoegg, 2013; Santiago et al., 2007), e.g., left-past vs. right-future, while this study examined future mappings only. This partial application may have diluted the spatiotemporal metaphor's effect. Additionally, the strength of the future-anchoring might not have been sufficient to trigger strong cognitive mappings as this was only anchored in text; as discussed before, future research could investigate incorporating spatiotemporal cues in the imagery, like Chae and Hoegg (2013) did in their study on advertising.

Finally, this study contributes to an underexplored field of research. There has been considerable evidence for cognitive, spatiotemporal mappings that rely on writing directionality (Boroditsky et al., 2011; de la Fuente et al., 2014; Li & Cao, 2020) and, furthermore, they have been successfully applied in marketing contexts (Chae & Hoegg, 2013). However, their potential role in political poster rhetoric remains an open question. Despite theoretical justifications and encouraging findings in adjacent domains, this study's results do not suggest that the STCE, at least as applied here, is a viable enhancer of the persuasiveness of political posters.

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Appendix

Poster 1 (Elective Poster)

Poster 2 (Elective Poster)

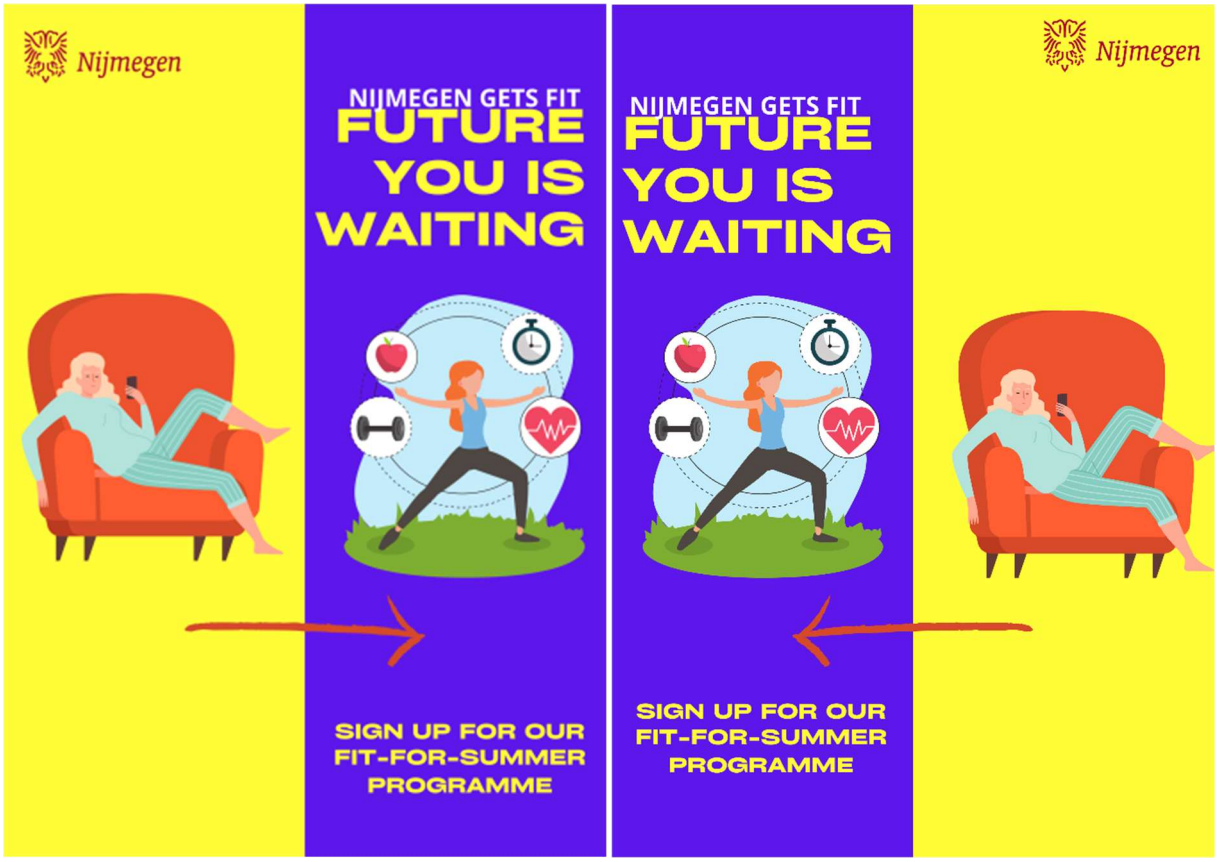
What will be 'right' in the Future?

Poster 3 (Environmental Poster)

Poster 4 (Environmental Poster)

What will be 'right' in the Future?

Poster 5 (Social Poster)



What will be ‘right’ in the Future?

Poster 6 (Social Posters)

CHECKLIST ETHICS ASSESSMENT THESIS PROJECTS

Name	Pantel, F.P. (Fabio)
Email	fabio.pantel@ru.nl
Course Name	2425 Bachelor's thesis (SCRSEM2 V)
Programme	Bachelor
Thesis Theme	What will be 'right' in the Future? The Influence of Spatiotemporal Metaphors and Visual Priming on Persuasiveness of Political Posters.
Radboud Supervisor	Laura Speed
Which situation applies to you?	I will collect new data
Is use of the existing data set allowed?	
Will you collect data from social media platforms and/or newspapers/news sites?	No
Will you collect data from participants?	Yes
Do patient/clients of a health care facility (e.g., a hospital or a nursing home) participate in the study?	No
Does the research include medical-scientific research that might carry risks for the participant?	No
Will the research be conducted on vulnerable or non-healthy participants?	No
Will the research be conducted amongst minors (<16 years of age) or (legally) incapable persons?	No
Is participation in the study voluntary?	Yes
Does the study use material/images/information that could be perceived as shocking or offensive?	No
Can participation in the study cause physical and/or mental harm to the participant?	No
Is compensation for participants in line with the EACH guidelines?	Yes
Does deception take place?	No
Do you make audio and/or video recordings (photo/video) of your participants?	No
Are participants recruited via the Radboud Research Participation System (SONA) and/or is the research conducted in the CLS Lab?	No
I declare that I have answered the questions truthfully.	Yes

RESULT

CHECKLIST RESULT: Review by the Ethics Assessment Committee Humanities is not necessary. If applicable: the next step is to draft an information document, consent form and Data Management Plan. For further explanation, see https://www.radboudnet.nl/facultyofarts/research/ethics-assessment-committee-humanities/student-thesis-research/	I understand (end of checklist)
CHECKLIST RESULT: Review by the Ethics Assessment Committee Humanities is necessary. Contact your thesis supervisor for the assessment procedure.	
CHECKLIST RESULT: This application may have to be reviewed by a recognised Medical Institutional Review Board, for example the METC Oost-Nederland. Contact your thesis supervisor for the assessment procedure.	