Framing with metaphors

How metaphorical frames depict climate change in Dutch opinion articles

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Abstract

In recent years, climate change has posed an increasing threat towards humanity and the environment. Given the complex nature of climate change, a general understanding of the issue amongst the non-specialist public might enhance global efforts to solve the issue. Given their simplifying nature, metaphorical frames could play an important role in reaching such a general understanding. Using opinion articles in two Dutch newspapers, the present study aimed to reconstruct the most frequent metaphorical frames for climate change and gain insights in the valence of these frames. Analysis based on the Metaphor Identification Procedure and Framing theory illustrated that various aspects of climate change were depicted via the metaphorical frames of TRANSPORTATION, WAR and in a lesser degree, ILLNESS. The positive and negative metaphors present in the TRANSPORTATION and WAR frames frequently shifted their valence due to their surrounding context, resulting in contrasting arguments while using the same metaphor and metaphorical frame. As such, no fixed valence could be assigned to the metaphorical frames.

The results presented a critical note on framing theory, as (1) a metaphorical frame does not provide a fixed perspective on an issue as it can include various aspects of an issue and (2) these overarching metaphorical frames do not have a fixed valence themselves. Hence, the study made two suggestions. Metaphorical frames for broad issues, such as climate change, should be dissected and reconstructed based on the aspects of the issue rather than the issue as a whole. Moreover, metaphor valence should be added as a factor when reconstructing metaphorical frames. Suggestions for future studies centered around expanding materials in order to identify patterns of metaphorical frames across issues, genres and countries or cultures. Similarly, the potential effects on the audience of the TRANSPORTATION and WAR frames should be studied, as it could prove to be beneficial for the collective counteractions against climate change.

Introduction

In recent years, climate change, and in particular the influence of human activity on global warming, has become one of the most salient topics in news media. Recent reports published by the International Panel on Climate Change (IPCC) state that due to human activities the global temperature has risen with 1°C since the pre-industrial times and is most likely to increase further to 1,5°C between 2030 and 2052. Although this rise in temperature is relatively small, it is expected to have significant consequences, such as prolonged droughts, the extinction of certain animal species and rising sea levels (Intergovernmental Panel on Climate Change, 2018).

Aimed at solving the issue of climate change, various actions have already been taken by humanity in general. For instance, several international policies such as the Kyoto protocol and the Paris Agreement have been introduced which aim to limit CO2 emissions and as a result, limit the rise of global temperatures (United Nations Framework Convention on Climate Change, n.d., 2016). Moreover, a report by the IPCC stated that education and information about climate change could enhance collective and personal efforts of limiting CO2 emissions world-wide (Intergovernmental Panel on Climate Change, 2018). However, the scientific aspects of climate change are rather difficult to comprehend by those not involved in this scientific field. Thus, in order to achieve an improved understanding of climate change, the issue would need to be simplified to be graspable for the 'non-scientific' public.

Several studies have indicated that simplifying and shaping opinions about issues can be achieved by using metaphors (Charteris-Black, 2004; Deignan, Semino & Paul, 2017; Edelman, 1971; Kendall-Taylor, Erard & Haydon, 2013; Mio, 1997), frames (Entman, 1993; Neuman, Just & Crigler, 1992; Scheufele & Tewksbury, 2007; Schuldt, Konrath & Schwarz, 2011) or a combination of both, namely metaphorical frames (Cibulskienė, 2019; Boeynaems, Burgers, Konijn & Steen, 2017; Brugman, Burgers & Steen, 2017; Burgers, Konijn & Steen, 2016; Flusberg, Matlock & Thibodeau, 2017; Thibodeau & Boroditsky, 2011). Given the complex, broad and often abstract aspects which comprise climate change, using metaphorical frames to depict the issue allows audiences to compare climate change with a more graspable and concrete concept (Edelman, 1971). For instance, portraying climate change as a lethal illness might result in the understanding amongst the audience that a cure (i.e. a climate policy) is needed to get better (i.e. reduce climate change). In terms of climate change, such use of a metaphorical depiction might then raise the awareness that

measures need to be taken to prevent the manifestation of the severe consequences of climate change.

In mass media, frames are frequently used, as they 'play a crucial role for the public understanding of science and technology' (Hellsten, Dawson & Leydesdorff, 2010, p. 591) Opinion articles in particular indulge in such use of metaphors and frames, as these types of articles do not only report objective facts about an issue, but also frequently include the personal perspectives of the writer about the issue. Moreover, using a metaphorical frame for climate change might not only simplify the issue for the audience, but might also dictate how the issue is perceived and understood (Kendall-Taylor, Erard & Haydon, 2013; Neuman, Just & Crigler, 1992; Scheufele & Tewksbury, 2007). For instance, depicting climate change as WAR was found to lead to different perceptions of the issue compared to when it was depicted as a RACE (Flusberg, Matlock & Thibodeau, 2017). Moreover, the nature of the linguistic metaphors used within these metaphorical frames might also play an important role (Johnson & Taylor, 1981), as they might induce positive or negative perceptions of the issue (Balteiro, 2017; Charteris-Black, 2004; Cibulskienė, 2019).

As such, the aim of the present study is two-fold. Firstly, it aims to identify and reconstruct the three most frequent metaphorical frames for climate change in Dutch opinion articles. Secondly, the present study aims to demonstrate how positive and negative metaphors are used within these frames and how they subsequently portray climate change.

Theoretical background

Metaphorical frames draw on concepts from both framing and conceptual metaphor theory. As such, the following section will first discuss both theories before introducing metaphorical frames.

Framing theory

Framing is the manner in which information about an issue is presented, which can both simplify the issue as well as persuade the audience (Neuman, Just & Crigler, 1992). It draws on the assumption that 'how an issue is characterized [in news reports] can have influence on how it is understood by audiences' (Scheufele & Tewksbury, 2007, p. 11). When presenting an issue, frames increase the salience (i.e. prominence) of certain aspects of this issue by highlighting them, while giving less attention to other aspects (Entman, 1993). Using frames allows audiences to interpret information but also opens up opportunities for the sender to construct a certain reality for the audience (Neuman, Just & Crigler, 1992).

Core Frames

According to Joris, d'Haenens, Van Gorp and Vercruysse (2013) issues in the news can be framed through a framing package (i.e. core frame), which is 'a cluster of logical organized devices that function as an identity kit for the frame' (Van Gorp, 2007, p. 60). This 'identity kit' comprises of both 'framing devices' and 'reasoning devices'. Framing devices are the explicit and linguistic elements present in the message which refer to a certain core frame by means of metaphorical speech (Joris, d'Haenens, Van Gorp & Vercruysse, 2013). To exemplify, if climate change is framed by the core frame of WAR, the framing devices consist of linguistic elements which refer to this core frame, such as 'Earth must be *defended* from climate change' and 'reducing CO2 emissions will lead to *victory* over climate change'. Although these framing devices generally indicate the presence of a certain core frame, reasoning devices are additionally required in order to interpret the presented core frame (Van Gorp, 2007). Reasoning devices are less explicit and conceptual in nature and center around interpreting the core frame in terms of problem definition, cause, consequences, potential solutions and moral judgements. The reasoning devices help to interpret the core frame of WAR as indicated by the framing devices, as they illustrate how the various components (problem definition, cause, consequences, potential solutions and moral evaluation) of the issue of climate change are presented in terms of the WAR core frame. In this example, the statement that 'Earth must be *defended*' defines the problem of climate

change via war metaphors, while ‘reducing CO2 emissions will lead to *victory* over climate change’ presents the moral evaluation of the issue. By combining the reasoning devices, the core frame of the issue can be reconstructed.

Conceptual metaphor theory

According to the conceptual metaphor theory by Lakoff and Johnson (1980, p. 125) “the essence of metaphor is understanding and experiencing one kind of thing in terms of another”, which could help to understand complex or abstract concepts via more concrete and comprehensible concepts (Edelman, 1971). Lakoff and Johnson (1980) furthermore distinguished two metaphor domains, namely the target domain and the source domain. When using a metaphor, the complex or abstract concepts of the target domain are explained by using more concrete concepts from the source domain (Charteris-Black, 2004). For instance, the scientific process of global warming is rather complex due to a great variety of influencing factors. To make such a complex process more comprehensible, it can be compared with a more concrete concept, for instance, a greenhouse. Via this particular metaphor, the complex process which causes a rise in temperature within the Earth’s atmosphere (the target domain) is explained by comparing it with the more concrete process of increasing the temperature within a greenhouse (the source domain). As the sun shines on the glass roofs of a greenhouse, the temperature within the greenhouse will rise. Without intervention, for instance, opening a window, the temperature within the greenhouse will continue to rise as the glass roofs prevent the generated warmth from escaping. The process of global warming can be seen in a similar fashion, as the sun will increase the temperature within the atmosphere if no actions are taken to let the warmth escape. When a linguistic element from the source domain is used to depict a similar element from the target domain, it is called a linguistic metaphor. For instance, depicting Earth’s atmosphere as the glass roofs of a greenhouse. In a broader sense, the overall reasoning about and conceptualizations of an issue in terms of another is called a conceptual metaphor. In the case of the given example, the conceptual metaphor would be ‘[the process of] GLOBAL WARMING is a GREENHOUSE’ and consists of multiple linguistic metaphors. Similar to a core frame, conceptual metaphors can simplify complex or abstract issues by comparing them with more familiar or concrete concepts (Charteris-Black, 2004; Edelman, 1971; Kendall-Taylor, Erard & Haydon, 2013).

However, although using metaphors to describe complex scientific issues might indeed enhance general understanding about the issue, it might also lead to inaccuracy and misconceptions, as pointed out by Deignan, Semino and Paul (2017). In this study, students

were interviewed with regard to their interpretation of the metaphorical term '*greenhouse effect*'. In the interviews it became evident that a large portion of the students did have a general understanding of climate change and could apply the metaphor of a greenhouse. However, using this metaphor frequently leads to simplified understandings of climate change, as well as slight misconceptions. For instance, a large portion of the students interpreted the metaphor as greenhouse gasses being equally distributed around the outer edges of Earth's atmosphere, while in reality these gasses are distributed across the atmosphere as a whole. As such it can be suggested that although using metaphors might indeed enhance the general understanding of an issue, it is also likely to be the cause of misconceptions about how these issues truly work, which has also been suggested by several other studies (Hellsten, 2005; Pauwels, 2013). The potential misconception about an issue has indeed been outlined by Lakoff and Johnson (1980), which suggested that a metaphorical concept tends to focus on the aspects of an issue which 'fit' with the used metaphor; the mapping between source and target domains is partial which "enables metaphors to highlight some features of a target domain and background or downplay others" (Thibodeau, Matlock & Flusberg, 2019, p. 2). As such, using metaphors to explain complex issues could function as a frame by itself as well.

Metaphorical framing

Framing and conceptual metaphor theory demonstrate a number of similarities. For instance, framing devices within framing theory are often comprised of linguistic metaphors (Joris, d'Haenens, Van Gorp & Vercruysse, 2013). In a more general sense, both core frames and conceptual metaphors can simplify issues by using more concrete or familiar concepts, which can enhance the understanding of the issue amongst the audience.

A recent study by Burgers, Konijn and Steen (2016) elaborated on these similarities between framing and conceptual metaphor theory by suggesting a new type of frame based on figurative language. This so-called figurative framing theory draws on the assumption that figurative language types such as metaphors, contain both linguistic and conceptual content. For instance, in the example 'the Paris Agreement is humanity's main *weapon* against climate change' the metaphor 'weapon' operates on a linguistic level by explicitly comparing the Paris Agreement to a weapon. On a conceptual level, it indicates that there is a war between humanity and climate change and that possible solutions lay in international agreements (e.g. metaphorical weapons). Given that metaphors contain both linguistic and conceptual content, they 'are used as both framing and reasoning devices to shape the

public's opinion on important topics by presenting a particular problem definition, cause and moral evaluation, and implying policy solutions' (Burgers et al., 2016, p. 420). This makes metaphorical frames great tools for both simplifying complex issues as well as shaping opinions about these issues.

Metaphorical framing and persuasion

The fact that metaphorical frames can simplify issues makes them widely applicable in various fields, such as educational communication (Jäkel, Döring & Beger, 2016; Leydesdorff & Hellsten, 2005), politics (Cammaerts, 2012; Charteris-Black, 2004; Brugman, Burgers & Steen, 2017; De Landtsheer, Kalkhoven & Broen, 2011; Michira, 2014) and news media (Cohen, 2011; Neuman et al., 1992). For instance, to provide the public with insights and comprehensible information, the rapid spreading of Ebola's disease in the 2010's was presented in the media through a variety of metaphorical frames, ranging from '*ebola is war'* to '*recovery from ebola is a road'* (Balteiro, 2017). These metaphorical frames of WAR and JOURNEY were identified through framing devices (i.e. linguistic metaphors) such as *'*the immune system *wages war* on *foreign invaders* (i.e. Ebola)*'* and *'*Liberia was *on track* to be declared Ebola-free'. By using the metaphorical frame of WAR to explain how Ebola's disease is spread and how it impacts public health, the complex nature and severity of the epidemic is made comprehensible for the public; terms from a different domain (*war*) are applied to the domain of Ebola. Similarly, the nature and impact of the SARS epidemic in 2003 was frequently depicted through the metaphorical frame of A KILLER in opinion articles in five major UK newspapers (Wallis & Nerlich, 2005). Metaphorically framing the above-mentioned epidemics as WAR and A KILLER does not only simplify these complex diseases, but also stresses their severity (i.e. their rapid spread and lethal consequences), making metaphorical frames not only enhancers for understanding of issues, but also great tools of persuasion.

The persuasiveness of metaphorical frames has recently been outlined by Thibodeau and Boroditsky (2011), who studied the effects of certain metaphors on public opinion and solutions to rising crime numbers in the fictious city of Addison. Participants were informed about the rising crime numbers through the use of two different metaphors to describe crime, namely, CRIME IS A VIRUS and CRIME IS A WILD BEAST. Results showed that participants offered different solutions for combatting this rise in crime, depending on the metaphor they read in the report. Participants who read the virus metaphor proposed solutions such as social reforms to 'cure' this 'virus' of crime. Participants who read the wild beast metaphor on the

other hand, proposed solutions related to caging or killing crime through stricter law enforcement. Although these effects could not be directly replicated (Steen, Reijnierse & Burgers, 2014), several other studies have illustrated similar persuasive effects of metaphorical frames across a range of fields. Scherer, Scherer and Fagerlin (2015) found that using metaphorical frames increased intentions to get vaccinated against the flu. In similar fashion, Thibodeau, Crow and Flusberg (2017) illustrated that metaphorically framing the police as a GUARDIAN led to more positive attitudes towards the police than framing them as WARRIORS. In terms of climate change, a recent study by Flusberg, Matlock and Thibodeau (2017) illustrated that when climate change was metaphorically framed as WAR, audiences perceived a greater urgency, greater risk and a greater willingness to change behavior compared to when it was metaphorically framed as a RACE or not framed at all. Taken together, these studies indicate that framing issues via metaphors could not only provide greater understanding of the issue but could also shape opinions and perceptions about the issue.

Applicability of metaphorical frames

The simplifying and persuasive nature of metaphorical frames can be particularly useful in newspapers and opinion articles; after all, metaphors 'are used as part of journalistic routines for the purpose of popularizing, concretizing and dramatizing issues, in brief for making issues both newsworthy and interesting for the relevant audiences' (Hellsten, 2005, p. 287). Moreover, Cohen (2011) stated that 'metaphors are essential devices for fostering collective understanding and forging political commitment across diverse constituencies' (p. 199). As such, communicating issues such as climate change via metaphorical frames could be beneficial, as this issue is both difficult to grasp for the non-specialist public and requires collective efforts to be solved.

Several studies have studied the use of metaphorical frames for climate change. Atanasova and Koteyko (2017), studying the representations of climate change and its subsequent policies in opinion articles in leading UK newspapers, showed that climate change is often described through the metaphorical frames of WAR and RELIGION. Similar findings were presented by Cohen (2011), which demonstrated an increased use of the metaphorical frame of WAR for climate change in the UK, both to stress the urgency of the issue and subsequently promote more rigorous proposals to reduce greenhouse gas emissions. Similarly, climate change has been framed as RELIGION (Atanasova & Koteyko, 2017;

Woods, Fernández & Coen, 2012) while aspects related to climate change have been framed as ILLNESS (Luokkanen, Huttunen & Hildén, 2013).

Various studies have indicated that cultural background plays an important role in the use of metaphors and metaphorical frames. For instance, a study by Gibson and Zellmer-Bruhn (2001) illustrated that in an organizational context, metaphors for the term 'teamwork' varied between countries and cultures. Countries with more individualistic cultures, such as the United States, were more likely to use a sports metaphor for teamwork in comparison with less individualistic orientated cultures such as Puerto Rico. Lakoff and Johnson (1981) suggested a similar influence of cultural background on the use of metaphors as metaphors might have different meanings for different cultures. Moreover, according to Deignan (2008), using metaphors is often dictated by cultural factors such as the attitudes regarding the source and target domain of a metaphor. As such, metaphorical frames for climate change might differ between cultures.

In recent years, various studies have been conducted which centered around the use of metaphorical frames to depict issues such as the Euro crisis (Joris et al., 2013) and Euro adaptation (Cibulskienė, 2019), various political issues (Brugman, Burgers & Steen, 2017) and mergers and acquisitions discourse (Koller, 2002). Although metaphorical framing regarding climate change has indeed been studied, these studies mainly included experimental research (Flusberg, Matlock & Thibodeau, 2017; Thibodeau & Boroditsky, 2011). The few studies that did analyze newspapers and opinion articles were mainly conducted in the UK (Atanasova & Koteyko, 2017; Cohen, 2011; Woods, Fernandez & Coen, 2012). As such, little is known about the metaphorical frames for climate change in opinion articles published outside the UK. Hence, the present study aims to fill this 'gap' by analyzing Dutch opinion articles centered around climate change, drawing on the following research question:

> *RQ1: How is the issue of climate change depicted via the most frequent metaphorical frames in opinion articles in Dutch newspapers?*

Metaphor valence

In framing these aspects, metaphors might play an important role. For instance, Cohen (2011) illustrated that in British news outlets, climate change was frequently depicted as WAR to stress the severity of the issue. As such, it can be suggested that conceptual metaphors, or metaphorical frames for that matter, have a certain 'valence', which dictates how audiences perceive the framed issue. Johnson and Taylor (1981), suggested that metaphors have indeed a certain underlying valence, either positive, negative or neutral, which could influence the readers' evaluation of the subject in question. In their study, participants had to read four news articles involving political figures or political events. These news articles were modified regarding their valence, meaning that two of the four articles had a positive valence (i.e. the political figure or event was evaluated positively in the news article) and two had a negative valence (i.e. the political figure or event was evaluated negatively in the news article). A positive news article used metaphors such as 'he was squinting like a kind grandfather viewing his assembled grandchildren' (Johnson & Taylor, 1981, p. 309), while a negative news article used metaphors such as 'he was squinting like a careful hoarder counting his change' (Johnson & Taylor, 1981, p. 309). Results of the study showed that participants reading the positive news article evaluated the political figure more positively, while participants reading the negative news article evaluated the political figure more negatively. Thus, these results suggest that the valence of metaphors (positive, negative or neutral) used to describe a political figure or event, might influence the attitude of readers.

A similar process might be present when climate change is framed in opinion articles, as these articles allow the writer to advance an argument and are likely to contain a great amount of metaphorical language (Wallis & Nerlich, 2005). Although the same metaphorical frame can be used, deploying certain linguistic metaphors within this frame might influence the audience and steer their opinion about climate change into a certain direction. For example, two different opinion articles might both frame climate change as WAR, but their different use of metaphors related to war might result in different opinions or understandings amongst the audience. One article might emphasize the negative consequences of climate change by using more war metaphors with a negative valence, such as '*defeat', 'conflict'* or *'casualties'*. On the flipside, the other article might use war metaphors with a positive valence, such as *'victory', 'peace'* and *'survivors'.* Although both articles use the same frame to describe climate change, their use of framing devices might result in different understandings or opinions amongst the audience due to the valence of the linguistic metaphors used within these metaphorical frames.

Differences in metaphor valence are not expected in terms of core aspects of climate change, such as its cause, due to the fact that it is embedded in a large body of scientific research. However, based on political and personal views of journalists regarding climate change, differences in metaphor valence might be present regarding certain aspects of climate change, such as CO2 reduction and environmental sustainability policies.

In order to provide insights in the valence of metaphors and metaphorical frames for climate change, a second research question was formulated:

> *RQ2: What is the valence of the most frequent metaphorical frames for climate change in Dutch opinion articles?*

By answering the presented research questions, the present study aims to add to the scientific knowledge about the use of metaphorical frames for climate change in Dutch opinion articles. Insights in the use of metaphorical frames for climate change in opinion articles from various countries allows for a broader and more accurate overview of frames for and metaphorical representations of climate change. Moreover, the present study aims to provide insights in the role of metaphor valence within these metaphorical frames.

Method

In order to answer the two research questions, a qualitative corpus analysis was conducted.

Materials

The present study analyzed opinion articles centered around climate change in two leading Dutch newspapers, namely *De Volkskrant* and *NRC Handelsblad*. Opinion articles were analyzed because it has been previously suggested that opinion articles are likely to contain 'the heaviest use of metaphorical language' (Wallis & Nerlich, 2005, p. 2631) in comparison with regular news articles.

Selecting *De Volkskrant* and *NRC Handelsblad* was based on several factors. Firstly, both newspapers are considered quality newspapers (i.e. broadsheets) (Boukes & Vliegenthart, 2017). Moreover, these newspapers are the leading Dutch broadsheets based on the number of daily prints; *De Volkskrant* has a daily print of around 200,000, while *NRC Handelsbla*d has a daily print of around 125,000 (Stimuleringsfonds voor de Journalistiek, 2018).

In order to reconstruct the metaphorical frames for climate change, opinion articles from *De Volkskrant* and *NRC Handelsblad* were selected using the database of Lexis Nexis. As these newspapers are published in Dutch, the Dutch term for climate change ('*klimaatverandering*') was used as a keyword in the search engine of Lexis Nexis. Similarly, filtering out opinion articles from the regular news articles was realized by adding the keyword *'opinie'* (Dutch for *'opinion'*) to the search engine.

Article selection

Considering climate change has been an increasingly prominent topic in media outlets over the last decade, only articles published between June 1st, 2017 and March 1st, 2019 were included. Firstly, starting at June 1st 2017, the United States, the second largest country in terms of national CO2 emissions (Global Carbon Atlas, 2017), announced their withdrawal from the Paris Agreement (The White House, 2017), an international agreement to limit CO2 emissions and consequently preventing global temperatures to increase with 2°Celsius (United Nations Framework Convention on Climate Change., n.d.). Hence, it was presumed that this news had been covered frequently by opinion articles in Dutch newspapers, allowing for a sound corpus. Secondly, following the IPCC report of late 2018, climate change has been a salient topic in Dutch news media once more, with reports of failure by the Dutch

government to achieve their 2019 climate goals (NOS, 2018) and students skipping classes to protest national climate agreements (NOS, 2019). Since opinion articles are often centered around recent news stories, the high amount of regular news articles reporting the issue of climate change was thus expected to be accompanied by a similarly increased number of opinion articles about the issue.

A search of the Lexis Nexis database with the above-mentioned search criteria yielded a total of 259 opinion articles of which 139 articles were published in *De Volkskrant* and 120 articles were published in *NRC Handelsblad.* Although both 'klimaatverandering' and 'opinie' were mentioned in all of these 259 articles, it was still unclear whether the main subject of these articles was indeed centered around climate change. To tackle this problem, the 259 opinion articles were subject to a manual analysis. All opinion articles were read to determine their main subject; opinion articles which merely mentioned climate change in a different context were excluded from the corpus. Moreover, since the present study's main aim was to illustrate how climate change is depicted through metaphorical frames in opinion articles in Dutch newspapers, all opinion articles which were not written by journalists of the newspapers themselves were excluded from the corpus. After conducting this manual analysis of the 259 opinion articles, a total of 67 opinion articles (42 published in *De Volkskrant*, 25 published in *NRC Handelsblad*) were found to be centered around climate change and thus included in the corpus and subsequent qualitative analysis.

Procedure

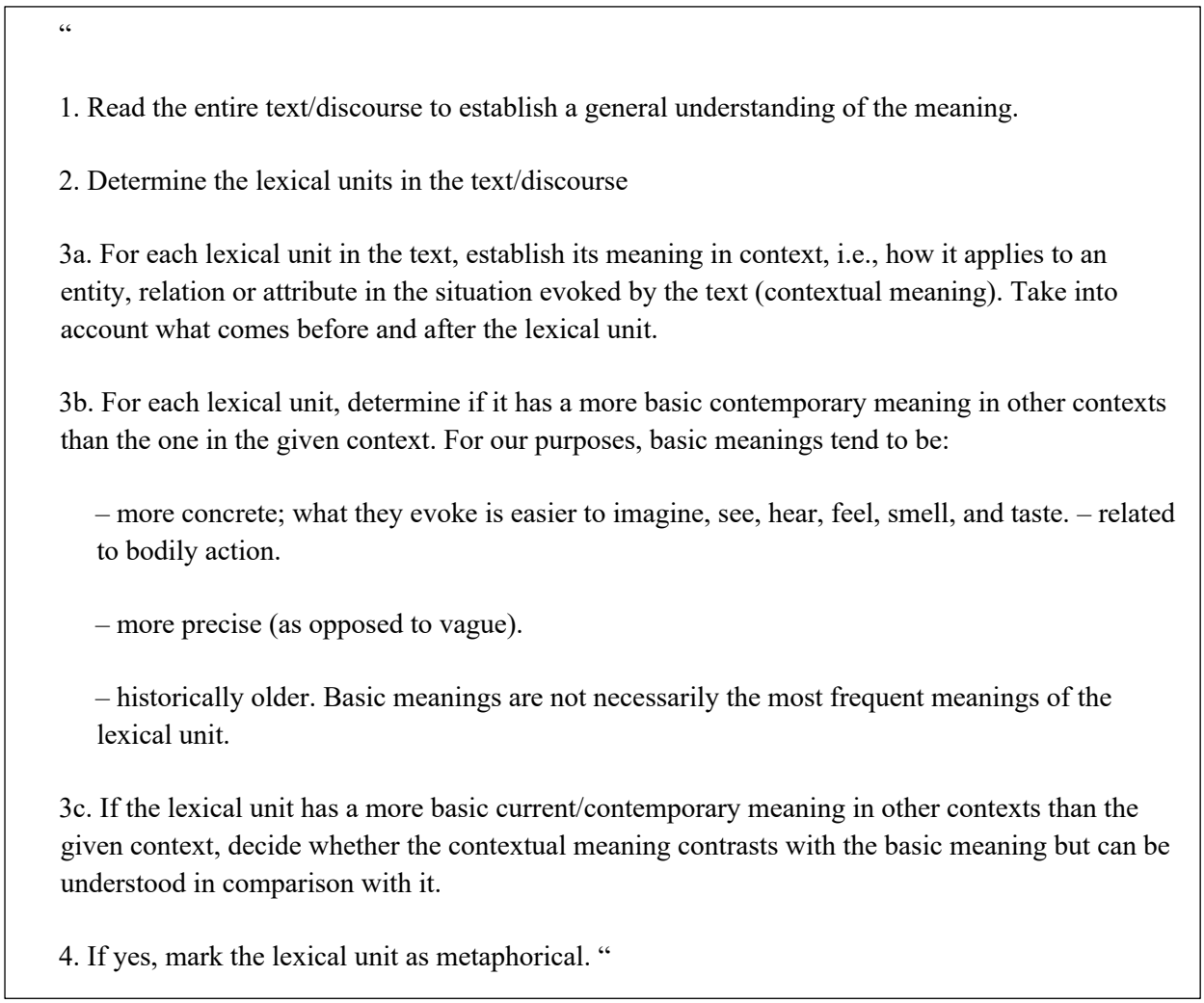
Pre-test

Prior to the main analysis, the most frequent metaphorical frames for climate change were identified by means of a pre-test conducted on a portion of the opinion articles. A total of 10 opinion articles was randomly selected (5 articles published in *De Volkskrant*, 5 articles published in *NRC Handelsblad*) of which only certain sections were analyzed for metaphors to limit the time spent on the pre-test. These sections included the title, the first and the last paragraph, as these sections contain the main argument of the journalist as well as a summary of the article (Vonk, 2014).

Using Frog Tagger (Van den Bosch, Busser, Daelemans & Canisius, 2007), a software program which identifies the part of speech, the content words within these sections were identified. These content words include nouns, verbs, adverbs and adjectives, as metaphors frequently appear as one of these lexical categories (Steen, 2002). It should be noted that although other lexical categories can be used metaphorically as well, they are often

more difficult to identify. For instance, ‘many prepositions are delexicalized, which presents special problems for analysis and hence identification [of metaphors] (Steen, 2002, p. 25).

Subsequent to their identification via Frog Tagger, the content words were analyzed to determine whether they were used metaphorically via the steps of the Metaphor Identification Procedure (Pragglejaz Group, 2007, p. 3) illustrated in Figure 1. Subsequently, the identified metaphors were subject to a contextual analysis to determine whether they depicted climate change. Metaphors which did not depict climate change were excluded from the pre-test analysis. Based on the semantic fields of the remaining metaphors for climate change, the most frequent metaphorical frames for climate change could be identified.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1. Read the entire text/discourse to establish a general understanding of the meaning.

2. Determine the lexical units in the text/discourse

3a. For each lexical unit in the text, establish its meaning in context, i.e., how it applies to an entity, relation or attribute in the situation evoked by the text (contextual meaning). Take into account what comes before and after the lexical unit.

3b. For each lexical unit, determine if it has a more basic contemporary meaning in other contexts than the one in the given context. For our purposes, basic meanings tend to be:

– more concrete; what they evoke is easier to imagine, see, hear, feel, smell, and taste. – related to bodily action.

– more precise (as opposed to vague).

– historically older. Basic meanings are not necessarily the most frequent meanings of the lexical unit.

3c. If the lexical unit has a more basic current/contemporary meaning in other contexts than the given context, decide whether the contextual meaning contrasts with the basic meaning but can be understood in comparison with it.

4. If yes, mark the lexical unit as metaphorical. “

Figure 1. Metaphor Identification Procedure (Pragglejaz Group, 2007, p. 3)

Identification of frequent metaphorical frames for climate change

Analyzing the pre-test corpus yielded a total of 38 linguistic metaphors which depicted climate change (for an overview, see Table 1). Identifying the metaphorical frames of these linguistic metaphors was achieved by the identification of their semantic category, which was executed in two steps. First, the UCREL Semantic Analysis System (USAS) was used to determine the semantic categories of the linguistic metaphors for climate change. This online software program 'assigns semantic domain tags, which are pre-defined in the underlying lexicon, to the types in a corpus' (Koller, Hardie, Rayson & Semino, 2008, p. 144). As the Dutch version of the USAS software experienced prolonged downtime and could not be accessed, the 38 linguistic metaphors were translated and inserted in the English version of USAS. If USAS did not provide a clear semantic category of the inserted metaphor, the context was analyzed in order to identify more words which referred to the same category. For instance, the word 'ombouwen' ('converting') was used to describe how a different economic system might have a positive impact on limiting climate change. Although in both Dutch and English the word is used metaphorically to describe alterations, the more concrete meaning of the Dutch translation is rather different compared to the English translation; 'ombouwen' has a more direct translation of 'building around', which indicates a semantic category related to construction or housing. While the English translation ('converting') had a semantic category related to 'modify/change'. By using both USAS and a context analysis, the semantic categories of the linguistic metaphors could be determined in a more accurate manner, albeit at the expense of the overall reliability of the analysis. Finally, if both approaches still yielded no clear indication of the semantic category, the linguistic metaphor in question would be categorized as 'unclear'. Table 2 provides a visual overview of the semantic categories under which the 38 identified linguistic metaphors were categorized.

Table 1. The number of words analyzed within the 10 opinion articles of the pre-test sorted by newspaper, alongside the number of content words, identified linguistic metaphors and identified linguistic metaphors for climate change

	Number of words	Content words	Linguistic metaphors	Linguistic metaphors for climate change
NRC Handelsblad	430	246	46	15
De Volkskrant	670	362	58	23
Total	1100	608	104	38

The results of the pre-test showed that both 'war' and 'transportation' were the most frequent semantic categories to which the linguistic metaphors of climate change referred, with 6 and 7 occurrences respectively. The third most frequently used semantic category was that of 'other', with 6 observations in the pre-test corpus. These linguistic metaphors referred to six different semantic categories, namely, construction, religion, geography, temperature, helping and theatre. The semantic category of 'color' appeared more frequently than 'illness' within the pre-test, with 5 and 2 observations respectively. However, the metaphorical frame 'color' has not been extensively found in earlier studies and as such, it was excluded from the main analysis. Given that ILLNESS has been found as a metaphorical frame in earlier studies (Joris, d'Haenens, Van Gorp & Vercruysse, 2013; Luokkanen, Huttunen & Hildén, 2013), 'color' was instead replaced by 'illness'.

The results also demonstrated that a total of 12 linguistic metaphors could not be clearly categorized under a certain semantic field despite using both USAS and contextual analysis. As such, these unclear categories were excluded from further analysis.

With 'war', 'transportation' and 'illness' identified as the most frequent semantic categories of the linguistic metaphors for climate change, the final step of the pre-test was initiated.

Table 2. The number of identified linguistic metaphors for climate change, alongside the semantic categories to which they refer

	Semantic category						
	War	Transportation	Color	Illness	Other	Unclear	Total
Number of linguistic metaphors	6	7	5	2	6	12	38

Corpus analysis via keywords

Three lists of 30 keywords related to the semantic fields of war, transportation and illness were produced. These 90 keywords functioned as basis for locating, identifying and ultimately, reconstructing the metaphorical frames of WAR, TRANSPORTATION and ILLNESS in the main corpus. Analysis via pre-determined keywords was based on the fact that it easily provides quantitative data regarding potential linguistic metaphors related to these metaphorical frames. This quantitative data could then be qualitatively analyzed, as 'examination of multiple occurrences of words or phrases reveals nuances and connotations that may not be evident when we experience these words or phrases on an individual basis' (Charteris-Black, 2004, p. 33). As such, comparisons between particular uses of keywords within the context of the corpus could be made, which subsequently aides in providing an overarching image of how climate change is depicted via metaphorical frames.

Corpus analysis via keywords might be limited in scope, as only 30 keywords for each metaphorical frame were included. To tackle this, the context of identified linguistic metaphors was analyzed, as metaphorical frames are often comprised of multiple linguistic metaphors (i.e. framing devices). Thus, words within the context having the same semantic field as the linguistic metaphor were expected to be framing devices of the same metaphorical frame, provided that they are used metaphorically. Hence, words which were not initially included as a keyword could still be identified, enhancing the overall reconstruction of the metaphorical frame. In conclusion, this approach makes it possible to specifically identify the metaphorical frames of war, transportation and illness, within a limited period of time while maintaining a similar reliability due to the contextual analysis.

Keyword inclusion

Determining which words would be included in a wordlist was based on several factors. Firstly, USAS was consulted as it provides several examples of words related to a semantic category. When inserting the word 'war', the USAS tagger would apply a specific tag to this word. Consulting the elaborate introduction to the tags of the USAS Category System provided a list with words which had the same tag as 'war' and were thus related to this specific semantic category. Examples include the words 'hinderlaag (ambush)' and 'arsenaal (arsenal)'.

Secondly, Woorden.org (Woorden.org, n.d.) an online Dutch dictionary was consulted. This website provides both a dictionary and a thesaurus in which synonyms, antonyms and related words can be found. Searching for the Dutch words 'oorlog (war)',

‘transportatie (transportion)’ and ‘ziekte (illness)’ resulted in a list of synonyms, antonyms and related words.

Although both the USAS tagger and the thesaurus from Woorden.org provided a large amount of words related to the three semantic fields, these suggested words had to meet certain requirements to be included as a keyword. Words which are used rather infrequently in modern day speech and writing, were not included. To exemplify, the word ‘kamp’ is a Dutch synonym for ‘war’, but rarely used in modern day speech and writing. Although the selection of keywords was mainly based on intuition, the reliability of the keywords was somewhat maintained due to the additional context analysis described in the previous section.

Secondly, as the present study aims to shed light on the valence of metaphors and metaphorical frames, antonyms of related words were also included. To exemplify, words such as ‘vrede (peace)’ were included in the list of keywords for the metaphorical frame of WAR, as it is an antonym for ‘war’ and might be used as war metaphor with a positive valence. Ultimately, conjugations of words were not included as separate words in the lists but were covered by the non-finite word included in the list. For instance, the word ‘busses’ would be categorized as the word ‘bus’ in the word list, as it is merely the plural form of the latter word. However, conjugations of words were separately searched for in the corpus. An overview of the keywords is located in Appendix I.

After producing the three lists of keywords related to the semantic fields of war, transportation and illness, the pre-test was concluded.

Main analysis

The main qualitative analysis was initiated by executing a thorough search of the corpus for the keywords incorporated in the word lists. This was achieved by uploading the 67 opinion articles into the software program AntConc (Anthony, 2019), which could then be searched for inserted keywords.

AntConc’s ‘ragex’ feature was used which allowed locating letter sequences rather than full words. Therefore, entering ‘strijd’ (‘battle’) would locate all occasions in which this specific sequence of letters was used, allowing for conjugations of words (e.g. ‘strijder’, ‘strijden’) to be found with a single search query. The words found via the ‘ragex’ feature were subject to manual analysis to filter out non-related words with identical letter sequences. For instance, ‘bestrijder’ did have the same letter sequences as ‘strijd’ although the word is not directly related to the semantic field of war. Past tenses of verbs were separately entered

in the AntConc software due to frequent changes in spelling and grammar when converting Dutch verbs to a past tense.

Subsequent to locating a keyword in the corpus, a qualitative analysis based on step 3 and 4 of the Metaphor Identification Procedure (Pragglejaz Group, 2007) was conducted in order to determine whether the keyword was used metaphorically. If the keyword was indeed a linguistic metaphor, a contextual analysis was conducted to determine whether it depicted climate change. Keywords which were identified as linguistic metaphors but did not refer to climate change were excluded from further analysis and frame reconstruction.

The articles containing keywords were read to gain a general understanding of the argument made by the journalist regarding climate change. In doing so, a general understanding of what the identified linguistic metaphors represented within the overarching metaphorical frame could be established. For instance, if 'enemy' was identified as a linguistic metaphor for climate change, the contextual analysis was aimed at determining who or what comprised this metaphorical enemy.

Secondly, as core frames are comprised of multiple framing and reasoning devices, words located in the context which refer to the same semantic category as the identified keyword were expected to be framing devices for the same metaphorical frame. An additional context analysis could thus identify additional words which were not initially included as a keyword in the lists. After their identification, these additional words were subject to MIP to determine whether they were used as a linguistic metaphor for climate change.

Given that reasoning devices are essential for the interpretation of the core frame (Van Gorp, 2007), the collection of identified framing devices within a specific context functioned as a basis for the identification of the reasoning devices. Based on the context, the identified linguistic metaphors were categorized under one of the five reasoning devices, namely problem definition, causes, consequences, potential solutions and moral evaluation. Combining these reasoning devices would then allow the reconstruction of the complete metaphorical frame for climate change. A visual overview of the procedure of the analysis is presented in Figure 2.

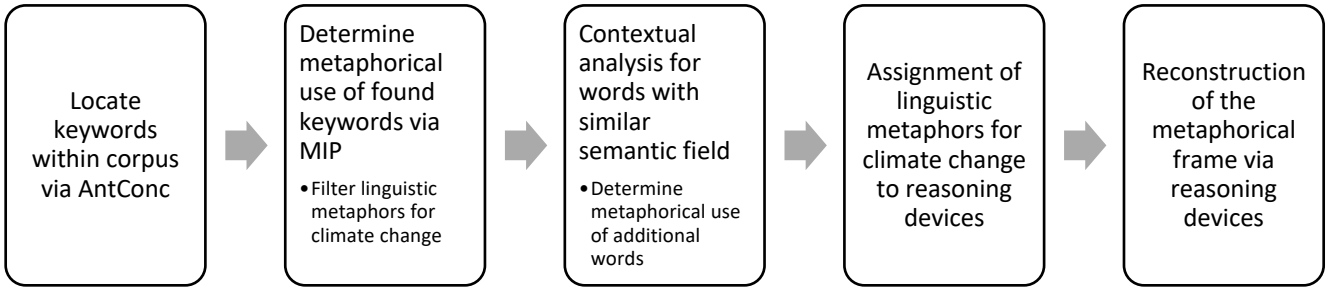

Figure 2. Visual depiction of the procedure of the main analysis in identifying and reconstructing metaphorical frames for climate change

Metaphor valence

Ultimately, the valence of the linguistic metaphors and metaphorical frames was determined via a contextual analysis of the identified keywords and was based on the fact that 'critical analysis of the context of metaphors in large corpora may reveal the underlying intentions of the text producer' (Charteris-Black, 2004, p. 28). Determining the valence of a linguistic metaphor was partially based on Atanasova and Koteyko (2017), which categorized positive and negative metaphors 'by establishing whether metaphors were used to criticize or endorse pro- or anti- climate change arguments' (p. 456). As the present study not merely centers around the process of climate change but also includes related aspects (e.g. climate change policies), metaphor valence was established based on how the metaphor evaluated a specific issue. To exemplify, 'the climate policy was a *victory* for humanity to secure a sustainable environment' would be classified as a positive linguistic metaphor, since it evaluates the climate change related issue positively.

The overall valence of the metaphorical frame was determined based on the context of the linguistic metaphor, given that the context is important for interpreting the metaphor (Charteris-Black, 2004). As such, 'the withdrawal of the US from the Paris Agreement was a *victory* for climate change' would be classified as a negative metaphorical frame despite the positive metaphor *victory*, since this victory implies negative consequences for humanity.

Results

Based on the qualitative analysis described in the previous section, the metaphorical frames of WAR, TRANSPORTATION and ILLNESS were reconstructed and are outlined in the following section. In this section, underlined words represent linguistic metaphors. Moreover, as Dutch newspapers have been analyzed in the study, examples of metaphorical frames found within the corpus will be given in Dutch, with glossed English translations written beneath.

The search for keywords in the corpus yielded a total of 337 observations, of which 117 were used metaphorically and 57 particularly for climate change. An additional 31 linguistic metaphors for climate change were found via contextual analysis of identified keywords. Table 3 provides a visual overview of the keywords which were identified as linguistic metaphors and were related to climate change.

Table 3. The number of keywords identified within the corpus of opinion articles, sorted by metaphorical frame, alongside the number of those keywords identified as linguistic metaphors and the number of linguistic metaphors depicting climate change

	Metaphorical frame	Identified Keywords	Linguistic metaphors	Linguistic metaphors for climate change	Additional linguistic metaphors for climate change in the context
	WAR	129	41	22	7
	TRANSPORTATION	173	62	30	20
	ILLNESS	42	14	5	4
Total		344	117	57	31

TRANSPORTATION frame

The TRANSPORTATION frame is centered around the idea that climate change is a journey towards a certain destination with a certain vehicle. Humanity is the passenger on this vehicle. The destinations and vehicles varied between articles, as different aspects of climate change were depicted. For instance, one article explicitly depicted climate change as following:

(1) De bus rijdt op het ravijn af, ruk aan het stuur nodig.
The bus is driving towards a ravine, pulling the steering wheel is required.
(Article 28, De Volkskrant)

The 'bus' in this example depicts the current state of the Earth in terms of climate change. Humanity is depicted as the passengers on the bus, indicating that everyone is part of this journey and cannot exit the vehicle; one cannot simply stop their involvement with climate change, as it affects all of humanity.

The destination, 'a ravine', depicts the negative consequences of climate change. Although 'ravine' is not a TRANSPORTATION metaphor, it is used to stress the consequences of climate change; driving over the edge of the ravine is irreversible and will likely result in the death of all passengers of the bus. In order to prevent this, a change of direction is necessary. More specifically, 'a pull on the steering wheel', which indicates that the world is nearly over the edge and slowly changing direction will not suffice. Instead, radical measures are needed in order to prevent the bus from crashing. The article further elaborates:

(2) Als een bus met een noodgang op een ravijn afrijdt, moet de chauffeur bijsturen, ook als daardoor sommige passagiers wagenziek worden.
If a bus is driving towards a ravine with great speed, the driver has to adjust its course, even if it causes car sickness amongst certain passengers.
(Article 28, De Volkskrant)

The driver of the bus refers to the political bodies of the world, such as governments, who can determine the direction of the 'bus' by implementing climate change policies. Similar to the passengers on a bus, the influence of world citizens (i.e. the passengers) is limited as they are depending on the directions chosen by the world governments (i.e. the chauffeur). As such, making radical changes (i.e. pulling the steering wheel) is initially the responsibility of

these governments. However, the article does not state that only the driver of the bus can and should radically adjust the course by pulling the steering wheel; Passengers of the bus might pull the steering wheel as well, indicating that if political measures fail, other groups such as activists or civilians can adjust the course. Ultimately, the article states that such radical adjustments will likely result in 'car sickness' amongst certain passengers. as such, it acknowledges that radical adjustments in climate policies will likely cause opposition amongst certain groups or that certain groups could be negatively affected by these adjustments. However, since the bus is moving with great speed towards a ravine, radical adjustments should still be made, regardless of car sickness amongst certain passengers.

However, in making radical adjustments to solve climate change, which mainly include shifting to alternative energy sources, a different issue arises, as depicted in a different article:

(3) Vandaar dat het IPCC nu tot de conclusie komt dat transitiepaden die ten tijde van eerdere waarschuwingen nog mogelijk waren, nu gepasseerde stations zijn. Om nu de milieubeweging te verwijten dat juist bij haar koers de klimaatdoelen uit zicht raken, lijkt daarom chantage.

Hence the fact that the IPCC now comes to the conclusion that transition paths which were available during the time of earlier warnings, have now become passed stations. To now blame the environmental movement that specifically her course causes the climate goals to leave out sight, sounds like blackmailing.

(Article 25, De Volkskrant)

Shifting towards alternative energy sources (e.g. wind and solar energy) is depicted as 'transition paths' in this article. However, these transition paths are deemed to be 'passed stations', indicating that these alternative energy sources are not available or sufficient anymore. After all, a train drives in one specific direction and once it has passed a train station, it does not return to that specific station for a while. Using this specific representation firstly emphasizes the irreversibility of climate change (similar to the bus driving towards a ravine) and secondly the fact that solutions to climate change are rather temporary; trains spend little time at train stations and once the train has departed from the station, it is impossible to board it. Certain climate change policies might therefore only work within a specific time frame (i.e. the time the train spends at stations before departure). This limited time might refer to various things, for instance the fact that certain pro-climate politicians are

in charge and willing to make radical climate change policies during their limited time in office. Similarly, the limited time frame might refer to the state of the environment at that time. Shifting towards alternative energy sources might have been able to solve climate change at one time, but continued deterioration of the climate since then made these alternative energy sources insufficient in solving the issue; If it takes too long to implement these measures, the climate might not recover by means of alternative energy sources.

Contrasting in this particular example is that the three linguistic metaphors related to transportation are all related to different methods of transportation. When referring to the process of transferring to alternative energy sources, the article used 'transition paths'. However, when describing that these transfer processes are no longer an option at this time, it is depicted as a 'passed station'. Finally, the use of 'course' to describe the current measures undertaken by pro-climate movements refers to transportation by ship; although 'course' can be used for several forms of transportation, it is mainly used when navigating at sea. Using terms related to three different types of transportation (i.e. by foot/vehicle, train and ship) might have been done purposefully to stress that transitioning to alternative energy sources or implementing climate change measures at this time cannot be achieved by a single measure or policy, as these different transportation routes cannot be traversed by a single vehicle.

The urgency of climate change is further emphasized in various articles. For instance, one article stated that the 'climate train' is not 'driving fast enough' (Article 2, De Volkskrant) while a different article warned that if greenhouse gasses and rising temperatures 'continue on their *current course*, we will *arrive* at a point where future generations will live in 'greenhouse Earth'' (Article 19, de Volkskrant).

Adding to these difficulties is the opposition from various fronts, particularly in politics:

(4) Terwijl de urgentie hoger is dan ooit, trapt een aantal politieke partijen op de rem waar een versnelling nodig is.

Despite the urgency being greater than ever before, several political parties are stepping on the brakes at a point which requires speeding up.

(Article 38, De Volkskrant)

This example depicts these difficulties in terms of speed, as the brake in this example refers to the lack of adequate climate policies implemented by the Dutch government due to high costs and the believe that they are too radical ('walking too far ahead of the green music', article 38, De Volkskrant). The article further depicts the slow implementation as an 'adempauze (breather)', while climate change requires 'an acceleration'.

The fact that climate change requires radical and urgent measures in order to be solved became increasingly evident throughout the corpus. However, what form these radical measures should take presented another difficulty:

(5) Urgenda en de staat zijn het namelijk eens over het einddoel: een reductie van 95 procent [CO2] uitstoot in 2050. Slechts over de route wordt anders gedacht.
Urgenda and the state namely agree about the final destination: a reduction of 95 percent [CO2 emissions] in 2050. Merely deciding what route to take differs.
(Article 22, De Volkskrant)

In this particular example, the potential solution (e.g. destination of the journey) is explicitly mentioned as a 95% reduction of CO2 emissions. However, there are differences in deciding what route to take to reach this destination. For instance, one article stated that constructing a great number of windmills in the North Sea might 'speed up the wind-at-sea [climate] goals' (Article 7, NRC Handelsblad). However, this is contrasted by a different article:

(6) Meer windmolens erbij remt de stijging van de concentratie broeikasgassen niet. [..] die stijging kan slechts een halt worden toegeroepen door op [het verminderen van de concentratie broeikasgassen] te sturen: beloon de reductie van CO2, bestraf de uitstoot ervan.
Increasing the number of windmills does not slow down the rise in the concentration of greenhouse gasses. [..] that rise can only be halted by steering towards [a reduction of the concentration greenhouse gasses]: reward the reduction of CO2, punish its emission.
(Article 14, NRC Handelsblad)

Other solutions for climate change include 'technologische *vooruitgang* waarborgen' (maintaining technological *progress*', Article 19, De Volkskrant) and policies which 'steer towards results' (Article 26, Volkskrant). Ultimately, climate change is evaluated as an issue

which requires radical, urgent measures which are likely to cause friction within society. However, solving the issue is still possible according to one article:

(7) [recent wetenschappelijk werk] heeft [..] ook de weg vooruit getoond. [..] Een 'Stabiele Aarde' is nog steeds binnen bereik.
[recent scientific work] has also shown the way forward. [..] An 'Stable Earth' is still within reach.

(Article 19, De Volkskrant)

An overview of the reasoning devices of the transportation frame (i.e. frame matrix) is presented in Table 4.

Table 4. Frame matrix for the metaphorical frame of TRANSPORTATION, sorted by the depicted aspects of climate change and the reasoning devices of the frame.

Frame	**Reasoning devices**					**Framing devices**
	Problem definition	*Causes*	*Consequences*	*Potential solutions*	*Moral evaluation*	
Climate change is traveling by bus	The bus is driving towards a ravine	Greenhouse gasses and rising temperatures, if they continue on their *current course*	*Arriving* at a point where future generations will live in 'Greenhouse Earth' Dangerous and irreversible climate changes; a ravine	Maintaining technological *progress* Policies which *steer* towards results *Halting* the rise of CO2 *Course adjustments* by the *chauffeur,* pulling the *steering wheel*	A stable earth is still *within reach*, recent scientific studies have shown *the way forward,* A pull on the *steering wheel* is necessary, even if it causes *car sickness* amongst *passengers*	We have already *arrived* at the maximum of what the Earth can manage
Implementing climate change policies is like transportation	The climate goals are getting out of sight due to *the course* of the IPCC Several political parties are *stepping on the brakes* Agreements are pointless when they *steer towards* wrong quantities	Earnest climate policies are yet to be developed, *Walking to far in front* of the green music when implementing radical policies	Energy *transition paths* are *passed stations*	They are *stepping on the brakes,* at the point where *speeding up* is required	There is no room for a short brake (breather), *speeding up* is required instead	

WAR frame

The metaphorical frame of WAR is centered around a war between humanity and climate change and was mainly focused on the potential solutions for the issue. That is, war metaphors were not used to explicitly depict the problem and causes of climate change but were mainly centered around depicting potential solutions for the issue. Similarly, the consequences of climate change were only depicted once via war metaphors:

(8) En waar het echt mis gaat, wonen de armsten en zwaksten, overgeleverd aan het geweld dat we zelf mede hebben veroorzaakt.
And where it truly goes wrong, there live the poorest and weakest, at the mercy of the violence we ourselves have caused.
(Article 6, NRC Handelsblad)

The 'violence' in this example refers to the substantial alterations of weather patterns as a result of climate change, particularly alterations related to water, such as rising water levels and floods. Depicting these changes as 'violence' emphasizes how damaging these alterations are, particularly for those affected most, namely the poorest and weakest whom are not likely to overcome such frequent natural disasters. Moreover, the fact that climate change uses violence could be interpreted as a result of the constant harassment of humanity against the environment (e.g. the great number of CO2 emissions, disappearance of forests). As such, the violent reaction of the climate is a result of humanity's actions.

Throughout the corpus, the actions of humanity had a central position in the metaphorical frame of war, and was mainly illustrated by the linguistic metaphor 'battle':

(9) Vooralsnog gaan de strijd tegen klimaatverandering en de bestrijding van honger niet goed samen.
Insofar, the battle against climate change and combatting hunger do not go well together.
(Article 17, De Volkskrant)

(10) Voor de strijd tegen klimaatverandering is dat geen goed nieuws.
For the battle against climate change, it is not good news.
(Article 3, NRC Handelsblad)

(11) Dat maakt nu plaats voor klimaatdefaitisme, het opgeven van de strijd [tegen klimaatverandering] voordat die nog maar begonnen is.
That is now making room for climate defeatism, giving up the battle [against climate change] before it has even started

(Article 33, De Volkskrant)

These examples illustrate that humanity is locked in a battle against an enemy, which was often comprised of climate change itself. However, the linguistic metaphor 'battle' did not only depict climate change as the enemy:

(12) Ik strijd tegen klimaatonzin, niet tegen Baudet.
I'm battling against climate nonsense, not against Baudet

(Article 12, De Volkskrant)

This example illustrates that despite the use of the same linguistic metaphor ('battle'), the enemy in the war is not the same. Instead of comprising of climate change, the enemy in this example is 'climate nonsense'. Information about climate change is treated with great skepticism by right wing politicians such as Thierry Baudet and Donald Trump, resulting is different beliefs whether climate change is real and caused by human activity. This article then, illustrates that skepticism and misinformation about climate change is damaging the collective efforts to solve the issue. Therefore, such 'climate nonsense' should be fought in order to solve the issue.

The fact that the enemy in this war is not the same throughout the corpus was neatly illustrated by one article:

(13) Aanvankelijk werden de pijlen op de overheid gericht [in de strijd tegen klimaatverandering]. Nu wordt het vizier meer en meer op het bedrijfsleven gericht.
Initially, the arrows were aimed at the government [in the battle against climate change]. Now, the sights are increasingly being aimed at businesses.

(Article 14, De Volkskrant)

This particular example illustrates that the enemy in the metaphorical war has changed from governments to multinational organizations over time. Likewise, the weapons used to fight

the enemy have also changed. Initially the weapon of choice was bow and arrow, aimed at the government. Over time, this weapon has changed, as the weapon now has sights, which bows do not have. In essence, both metaphorical weapons depict potential solutions to climate change, which include forcing governments and multinational organizations to decrease their CO2 emissions. However, the subtle change of weapon might indicate a deeper layer of the frame. For instance, the shift of target might have made the bow and arrow obsolete; the same article states that suing the government has been done successfully before with the Urgenda-case. The verdict of the Urgenda-case being that the Dutch government was responsible for the well-being of their people, which is endangered by the large amount of CO2-emissions. However, there is no law ruling CO2-emissions illegal in the Netherlands and multinational organizations can thus not be sued on the same grounds as the Dutch government in the Urgenda-case. As such, a different, more sophisticated weapon might be needed to achieve similar results.

Besides various weapons, potential solutions for climate change are presented as 'allies', as shown in the following examples:

(14) Wij roepen de overheid op de energietransitie aan te pakken met oog voor de waarde van natuurgebieden. Om de natuur écht in te zetten als bondgenoot bij het realiseren van een energie neutrale samenleving.
We call upon the government to deal with the energy transition by acknowledging the value of natural reserves. To really make use of nature as an ally in realizing an energy neutral society.
(Article 27, De Volkskrant)

(15) [aanplanten van natuur in de stad] zorgt niet alleen voor een aantrekkelijke en gezonde plek om te leven, maar het bewapent ons ook veel beter ten aanzien van het veranderende klimaat.
[planting nature in the city] does not only cause an attractive and healthy place to live, but it also arms us better regarding the changing climate.
(Article 16, NRC Handelsblad)

Depicting 'nature' as an ally who can arm us in the battle against climate change indicates two things. Firstly, it illustrates that humanity is not the sole actor who is negatively impacted by climate change. It also illustrates that using weapons (e.g. climate policies which reduce CO2 emissions) is not the only measure to fight climate change. Deploying 'nature' as an ally

(e.g. planting trees and maintaining green zones) is also an option which might lead to victory.

Ultimately, the moral evaluation of climate change is centered around the acknowledgement that humanity needs to get out of the current situation of climate change. For instance, one article stated that reducing CO2 emission is possible, despite the fact that 'the battle against climate change seems hopeless' (Article 21, De Volkskrant). However, on a more positive note, recent reports by the IPCC were seen as a 'victory' for science, as it illustrates the failures of politicians in dealing with the issue.

(16) Mensen zijn vastberaden de strijd te voeren *voor* klimaatmaatregelen die de economische groei beschermen […] én een stabiel klimaat voor toekomstige generaties veiligstellen.
People are determined to battle for climate measures which protect the economic growth […] and secure a stable climate for future generations.
(Article 1, De Volkskrant)

Table 5. Frame matrix for the metaphorical frame of WAR, sorted by reasoning devices

Frame	**Reasoning devices**					**Framing devices**
	Problem definition	*Causes*	*Consequences*	*Potential solutions*	*Moral evaluation*	
Climate change is a war	*No depictions via war metaphors*	*No depictions via war metaphors*	The poorest and weakest are subject to the *violence* we partially caused	A collective *battle* against climate change *Arming* ourselves against a changing climate Deploying nature as our *ally*. *Aiming the arrows and* the *sights* at governments and multinational organizations	People are determined to *battle* for climate change policies Recent reports by IPCC are a *victory* for scientist	*Fighter* for sustainability *Battling* for a world without CO2 *Battling* against climate nonsense

ILLNESS frame

The total number of linguistic metaphors for climate change related to the ILLNESS frame was rather scarce throughout the corpus. As a result, identifying the various reasoning devices of this frame was difficult. The limited illness metaphors were centered around the idea that climate change was an 'acute issue' ('acute kwestie', article 22 NRC), whose consequences such as extreme droughts are felt 'on the body' ('aan den lijve', article 30 De Volkskrant) and will 'hurt' ('pijn doet', article 21 De Volkskrant) in the future. Potential solutions to climate change would require 'acute intervention' ('acuut ingrijpen' article 30, De Volkskrant) by humanity and 'painful' decisions (article 20, NRC Handelsblad) such as alternative energy sources. One particular article used the metaphor 'car sickness' (article 28, De Volkskrant) to stress the difficulties and the opposition which is likely to accompany these potential solutions. The moral evaluation included notions that one 'should not linger in gloomy *diagnoses*', '*stare* themselves *blind* on superficial measures', but instead '*embrace/hug* (omhelzen) innovation' (Article 25, NRC Handelsblad).

Valence of the metaphorical frames

Within the TRANSPORTATION frame, both positive and negative metaphors were used which mainly consisted of 'speeding up' and 'slowing down':

(17) De bijna universele aanvaarding was een signaal dat mensen zich realiseerden dat versnelde klimaatactie een vorm van verlicht eigenbelang is.
The near universal acceptance was a signal that people realized that speeded up climate action is a form of enlightened self-interest.

(Article 1, De Volkskrant)

(18) Meer windmolens erbij remt de stijging van de concentratie broeikasgassen niet.
Adding more windmills does not slow down the increase of the concentration greenhouse gasses.

(Article 14, NRC Handelsblad)

(19) Elke actie die onze inspanningen om klimaatverandering aan te pakken wil vertragen, kan de meest kwetsbaren […] alleen maar schaden.
Every action aimed at slowing down our efforts to deal with climate change, can merely damage the most vulnerable.

(Article 1, De Volkskrant)

(20) En er is geen goede reden om te bedenken dat de vooruitgang [van hernieuwbare energiebronnen] niet verder kan versnellen.
And there is no good reason to think that the progress [of sustainable energy sources] cannot speed up any further.

(Article 19, De Volkskrant)

In the examples above, the positive metaphor 'speeding up' is used to promote more radical pro-climate policies. For instance, more emphasis on solar energy technology and energy storage (Article 1, De Volkskrant). On the other hand, 'slowing down' or 'braking' often portrays hindering these radical pro-climate policies for financial reasons. In this case, the emphasis often lays on the negative consequences of this practice, such as increased food scarcities (Article 1, De Volkskrant) and decreased economic growth (Article 31, De Volkskrant).

However, ‘speeding up’ and ‘slowing down’, which were considered positive and negative metaphors respectively, frequently shifted their valence based on the context. For instance:

(21) […] omdat bijna tweehonderd landen hun inspanningen willen versnellen om de klimaatverandering aan te pakken.
[…] due to the fact that nearly two hundred countries want to speed up their efforts to deal with climate change.

(Article 1, De Volkskrant)

(22) Stookolie stoot veel roetdeeltjes uit. Roet slaat neer op sneeuw en ijs, die daardoor minder wit wordt. Het gevolg is dat er meer warmte wordt opgenomen, het ‘albedo-effect’. Dat versnelt weer de opwarming […].
Fuel oil emits a lot of soot particles. Soot descends on snow and ice, making them less white. This leads to more warmth being absorbed, the ‘albedo-effect’. This speeds up the warming process […].

(Article 9, NRC Handelsblad)

These examples illustrate that the valence of metaphorical frames is difficult to determine solely based on the valence of the linguistic metaphors present within the frame. In example (21), the linguistic metaphor ‘speeding up’ resulted in the metaphorical frame being positive, as it is centered around increasing efforts of implementing climate change policies. However, the same (positive) linguistic metaphor was used in example (22), but on this occasion, it was generally negative; ‘speeding up’ referred to an increase of global temperatures due to the Albedo-effect, which damages the environment. Moreover, the use of identical metaphors in both positive and negative metaphorical frames was not limited to the TRANSPORTATION frame either. The WAR frame illustrated similar patterns, particularly via the negatively coded keyword ‘battle’. This linguistic metaphor was frequently used to stress the negative aspects of climate change or its related aspects:

(23) Voor de strijd tegen klimaatverandering is [een terugkeer naar fossiele brandstoffen] geen goed nieuws.
In the battle against climate change, [a return to fossil fuels] is bad news.

(Article 3, NRC Handelsblad)

(24) In de strijd tegen klimaatverandering wordt steeds vaker de rechter ingeschakeld.
In the battle against climate change, judges are increasingly consulted.
(Article 14, De Volkskrant)

In these examples, 'battle' is used to emphasize that humanity is fighting against climate change in order to prevent its negative consequences; a 'battle' against damaging consequences of further climate change. Hence, it is used as a negative metaphor in this context. However, metaphorical frames including the metaphor 'battle' were not solely negative in nature; the metaphor was frequently used to stress positive aspects which could be gained by this battle:

(25) Mensen zijn vastberaden de strijd te voeren *voor* klimaatmaatregelen die de economische groei beschermen […] én een stabiel klimaat voor toekomstige generaties veiligstellen.
People are determined to battle *for* climate measures which protect the economic growth […] and secure a stable climate for future generations.
(Article 1, De Volkskrant)

(26) Daarom moeten [de kinderen van nu] er nu zelf *voor* strijden [voor het oplossen van problemen als klimaatverandering].
That is why [today's youth] must now battle themselves *for* [solving issues such as climate change].
(Article 39, De Volkskrant)

In this example, 'battle' is used to emphasize positive aspects, namely gaining things such as economic growth and a stable environment. It furthermore indicates a more active stance of humanity, namely a 'battle' not to defend oneself against climate change, but to gain something instead. Similar 'positive' metaphorical frames including the negative metaphor 'battle' were found in other articles as well. For instance, an article from De Volkskrant compared the 'battle for a world without CO2' with 'the battle for a society without [social] classes', once again emphasizing the benefits gained when winning this battle.

The ILLNESS frame included mainly negative metaphors, such as 'painful', 'hurt' and 'illness', hence the ILLNESS frames had a predominantly negative valence.

Conclusion

The present study aimed to reconstruct metaphorical frames for climate change in opinion articles in two Dutch newspapers: *De Volkskrant* and *NRC Handelsblad*. By means of a pre-test, the most frequent metaphorical frames for climate change were identified, namely WAR, TRANSPORTATION and ILLNESS. Following the pre-test, the main corpus of opinion articles was subject to a qualitative analysis based on three sets of keywords related to either of these metaphorical frames. In this qualitative analysis, the present study identified the linguistic metaphors for climate change through MIP (Pragglejaz Group, 2007), which were then assigned to one of the five reasoning devices. Combining the reasoning devices would then allow for the reconstruction of the metaphorical frame.

The valence of the metaphorical frames was determined via the valence of the linguistic metaphors used in the frames. Establishing the valence of the linguistic metaphors was initially based on the connotation of the linguistic metaphors but was also subject to contextual analysis to determine their context-specific valence.

The following section provides an overview of the findings of the present study, both regarding the reconstruction of the metaphorical frames for climate change as well as the valence of these frames.

Metaphorical frames for climate change

The findings illustrated that climate change was frequently framed as TRANSPORTATION and WAR. In terms of problem definition, the TRANSPORTATION frame depicted climate change as a journey on which humanity has embarked while the WAR frame depicted the issue mainly as a war between humanity and climate change. Evenly so, the consequences of climate change were also depicted in terms corresponding to these metaphorical frames; The TRANSPORTATION frame depicted the consequences of climate change as the ultimate destination of the journey if no action was undertaken by the passengers, most significantly as 'driving into a ravine'. The WAR frame indicated these consequences as occurring 'violence'. Potential solutions for climate change, which mainly included climate change policies, were presented in terms of speed or course adjustments for the TRANSPORTATION frame and in terms of weaponry and allies for the WAR frame.

For both metaphorical frames, linguistic metaphors depicting the cause of climate change were not identified. Instead, the TRANSPORTATION frame only described climate

change as a journey, without providing specific reasons to embark on this journey (i.e. the causes of climate change). Likewise, the WAR frame only described the battle against climate change as a result of the threat it poses towards humanity. What caused climate change to be a threat was not clarified via war metaphors.

Despite the fact that the pre-test identified ILLNESS as a metaphorical frame for climate change, few linguistic metaphors for climate change referring to this frame were found in the corpus. These few linguistic metaphors depicted climate change as an 'acute issue' whose consequences are felt 'on the body' and which requires 'painful decisions' to be solved, thus mainly centering around the consequences and potential solutions of the issue. However, apart from the 'acute issue', linguistic metaphors related to the problem definition, causes and moral evaluation of climate change were not identified, making the reconstruction the ILLNESS frame in its entirety impossible.

Metaphor and metaphorical frame valence

For the TRANSPORTATION frame, mainly the words 'arriving' and 'speeding up' were identified as linguistic metaphors with a positive valence, while 'slowing down' and 'braking' frequently occurred as negative metaphors. However, the results illustrated that the valence of the overarching metaphorical frame was often difficult to determine via the valence of the linguistic metaphors alone; certain linguistic metaphors could have both a positive and negative valence, depending on the context in which they occurred. As a result, the TRANSPORTATION frame had no predominantly positive or negative valence as a metaphorical frame itself but did instead depend on the context to gain a positive or negative valence.

The WAR frame had a preponderantly negative valence, mainly due the substantial presence of '*battle* against climate change', which was considered a negative metaphor. However, as with the TRANSPORTATION frame, shifts of metaphor valence driven by their surrounding context made it difficult to determine the valence of the metaphorical frame of WAR as either positive or negative. In most cases, the valence of the WAR frame was context specific.

In sharp contrast to the TRANSPORTATION and WAR frames, the metaphorical frame of ILLNESS, although limited in its presence, had a predominantly negative valence; climate change was presented as an 'acute issue', requiring 'painful decisions'. The negative valence of the ILLNESS frame furthermore became evident via negative linguistic metaphors such as 'hurt' and 'illness'.

Discussion

Metaphorical frames for climate change

The findings of the present study illustrated that the WAR frame was frequently used to depict climate change in Dutch opinion articles. One explanation for the frequent use of a WAR frame might be to stress the severity of climate change. As demonstrated by Cohen (2011), stressing the existential nature of climate change through the use of war metaphors has been increasingly popular in news media and politics in the UK. Moreover, it is suggested that 'as war metaphors evoke images of collective effort, they are often used by political figures to instill a sense of unity and patriotism' (Atanasova & Koteyko, 2017, p. 458). This might be especially useful in advocating radical climate prevention measures, given that 'if the public begins to understand global warming as tantamount to armed conflict, interventions that have until now been deemed inappropriate or unduly risky could come to be seen in a more acceptable light' (Cohen, 2011, p. 207); thus, in politics, using war rhetoric to depict climate change could create support for radical measures and collective efforts amongst voters. In line with this reasoning, the use of war rhetoric for climate change in opinion articles might have similar effects, as Flusberg, Matlock and Thibodeau (2017) illustrated that framing climate change as WAR resulted in greater perceptions of the urgency and risk of the issue and 'greater willingness to increase conservation behavior' compared to other metaphorical frames or no frames at all. As such, the WAR frame in the opinion articles might have been purposefully deployed by the journalists to create increased understanding of climate change amongst the audience, emphasize its severity and urgency and prompt audiences to take climate action themselves.

The frequent occurrence of the metaphorical frames of WAR and TRANSPORTATION could also be explained by the limited outcomes of climate change itself, as climate change is either effectively or ineffectively dealt with by humanity. Both war and transportation are limited in their outcomes; a war will in most cases either result in a victory or a defeat, while a transport will either result in arriving at a destination or not. Given the suggestion that 'a metaphorical concept can keep us from focusing on other aspects of the concept that are inconsistent with that metaphor' (Lakoff & Johnson, 1980, p. 13), using the metaphorical frames of WAR and TRANSPORTATION, which both are relatively limited in their outcomes, might furthermore stress that climate change does not have an 'in between' outcome. That is, although the outcomes of climate change might not be limited to only two scenarios, using

metaphorical frames which generally do have only two outcomes, might further emphasize its severity and urgency to the audience.

In line with this reasoning, the relative absence of the ILLNESS frame in the corpus could also be explained. An illness generally has a less defined outcome compared to a war and transportation. Whereas the outcomes of a war are either victory or defeat and the outcomes of a transport are either arriving at a destination or not, the outcomes of an illness are less defined and moreover, dependent on the type of illness itself. Not all illnesses either result in death or recovery; a large number of illnesses, such as diabetes, are not deadly per se but cannot be entirely cured as well. As such, simplifying climate change and stressing the limited options humanity has regarding the issue (i.e. either successfully solving the issue or not) might not be effective when using the ILLNESS frame, as the less defined outcomes of this frame does not fit the defined outcomes of climate change.

In similar fashion, war and transportation both indicate a certain responsibility or active participation, while an illness befalls upon an individual; one does not choose to become ill while one generally does choose to go to war or use transport. Climate change did not befall upon humanity like an illness but is instead a result of human activity. As such, the responsibility for climate change 'fit' with the source domain of war and transportation, in contrast to the source domain of illness. This 'fit' of climate change with the source domains could the explain the frequent use of the WAR and TRANSPORTATION frames and the relative absence of the ILLNESS frame.

Absent reasoning devices

The present study also illustrated that in reconstructing these metaphorical frames, various reasoning devices could not be identified. Linguistic metaphors referring to the causes of climate change were particularly absent in all three metaphorical frames. This finding might have various explanations.

Firstly, the causes of climate change might have been willfully left out by the journalists due to their assumption that these causes are already known given the numerous studies and reports (e.g. Intergovernmental Panel on Climate Change, 2018). Given that journalists are often limited to a word count when writing opinion articles, the 'well-known' causes of climate change might have been left out in order to focus on fewer known aspects of the issue (e.g. potential solutions). This reasoning might thus underline the proposal made by Burgers, Konijn and Steen (2016) regarding metaphorical frames, namely, 'that figurative

frames containing metaphor [..] are used more often when talking about new topics [..] compared to established topics' (p. 422).

In line with this reasoning, the absence of the causes reasoning device might be explained due to how frames work. Framing an issue does not only simplify complex information (Edelman, 1971), but presenting the issue in terms of causes, consequences and potential solutions (i.e. via reasoning devices) also aids audiences in how they should interpret the issue (Van Gorp, 2007). The absence of metaphors referring to the causes of climate change and the abundance of metaphors referring to the potential solutions might thus signal to the audience that instead of dwelling on what caused climate change, one should focus on what can be done to counteract the issue.

A third explanation might be embedded in the methodology of the present study. Metaphorical frames were identified via the identification of keywords related to the semantic field of the frame. Since only 30 keywords were included for each frame, metaphorical frames comprised of linguistic metaphors which were not included as a keyword could have been bypassed. The present study did aim to limit this by conducting an additional context analysis; when a keyword was identified as a linguistic metaphor for climate change, the context was analyzed for words with a similar semantic field as the metaphor. However, the fact remains that in order to identify linguistic metaphors which were not included as a keyword, at least one keyword would have to be present in that specific context. As such, metaphors referring to the causes of climate change might have been present in the corpus but could have been bypassed as a result of different wording.

Metaphor and metaphorical frame valence

The findings illustrated that the metaphorical frames of TRANSPORTATION and WAR did not have a predominantly positive or negative valence. Notable examples from both frames were clearly negative in nature (e.g. 'the bus is driving towards a ravine' and 'a battle against climate change'), but the frames also contained metaphors with a positive valence (e.g. 'ally' and 'the way forward'). This finding can be explained via several factors.

Firstly, metaphor valence frequently shifted from their connotation due to the surrounding context of the linguistic metaphor. As such, contrasting arguments were made while using the same metaphorical frame. For instance, 'this speeds up environmental changes' presents a more negative perspective than 'speeding up climate change policy implementation', even though the exact same linguistic metaphor is used.

Secondly, the metaphorical frames of TRANSPORTATION and WAR were used to depict various aspects of climate change. For instance, environmental changes due to climate change and climate change policies were both depicted in terms of transportation and war. This presented a difficulty, as the environmental aspect of climate change mainly had a negative valence, indicated by sentences such as 'a battle against climate change'. The aspect of climate change policies on the other hand, was predominantly positive in nature, for instance, 'a battle for climate measures which secure a stable climate'. Hence, the positive evaluation of one aspect of climate change and the negative evaluation of another, made it difficult to assign an overarching valence to the metaphorical frames of TRANSPORTATION and WAR. As such, it raises the question whether metaphorical frames can have a specific valence or that merely the metaphors within the frame have a specific valence.

The metaphorical frame of ILLNESS appeared to be predominantly negative in nature, which can be explained by the limited presence of illness metaphors in the corpus; The few linguistic metaphors which were identified had a negative valence, for instance, 'illness', 'hurt' and 'painful'. Whereas contrasting arguments regarding various aspects of climate change were made in the TRANSPORTATION and WAR frames, the limited presence and negative valence of illness metaphors, resulted in the predominantly negative nature of the ILLNESS frame.

The different uses of the same linguistic metaphor indicate that metaphors do not have a fixed valence by themselves. Negative metaphors could be used as positive metaphors and vice-versa, depending on their surrounding context. Moreover, since metaphorical frames included various aspects of climate change and both positive and negative metaphors, contrasting arguments were made within the same metaphorical frame. Therefore, the connotation of a metaphorical frame (e.g. a WAR frame is always negative due to the negative connotation of 'war') does not predict the actual valence of the frame. Instead, the present study concludes that metaphorical frames do not have a fixed valence by themselves.

Implications, limitations and suggestions for future research

Based on the findings, several implications can be made regarding the metaphorical frames for climate change. In the following section, these implications will be discussed, alongside various limitations and suggestions for future studies.

A metaphorical frame includes multiple stories

Firstly, a particular metaphorical frame does not necessarily present a single perspective on the issue. For instance, via the TRANSPORTATION frame, the environmental aspects of climate change were depicted as a 'bus driving towards a ravine'. Solving this issue would require 'a pull on the steering wheel', indicating that radical measures are required. These radical measures, however, did present a problem on its own, namely the fact that not all are in favor of such radical measures. This particular aspect of climate change was also depicted via the TRANSPORTATION frame, for instance, as 'car sickness' and the depiction that 'several political parties are stepping on the brakes where they need to speed up'. Similarly, the WAR frame was also used to depict separate aspects of climate change. Hence, presenting an issue via a single metaphorical frame does not necessarily cover the issue completely; the same metaphorical frame might depict various aspects of climate change.

The notion that a particular metaphorical frame does not necessarily depict an issue in a fixed manner is further emphasized when considering the valence of metaphors and metaphorical frames. As the findings illustrated, metaphorical frames can include both positive and negative metaphors. These linguistic metaphors are not 'fixed' in the sense that negative metaphors always result in a negative evaluation of the issue and vice versa. For instance, 'a battle against climate change' presents a whole different perspective than 'a battle for a sustainable environment', despite the fact that the same linguistic metaphor is used in both cases. The findings thus support the notion by Van Gorp (2007) that 'if one only takes into account the framing devices that are countable, then the actual frame may not be determined' (p. 72).

The valence of linguistic metaphors within the frame can be determined, but contrary to what Johnson and Taylor (1981) suggested, their valence is more often extracted from the surrounding context of the linguistic metaphor rather than the linguistic metaphor itself. Therefore, the present findings concur with earlier findings by Balteiro (2017) and Cibulskienė (2019), suggesting that the valence of a metaphor is due to their surrounding

context and thus ‘an apparently negative metaphor may become positive or vice-versa’ (Balteiro, 2017, p. 226).

To summarize, the present study illustrates that the identification of a single metaphorical frame within a given context does not provide a single perspective on the issue, which is generally suggested in earlier studies (Burgers, Konijn & Steen, 2016; Joris, d’Haenens, Van Gorp & Vercruysse, 2013; Van Gorp, 2007). Great variety might still exist within a metaphorical frame, both in terms of what aspects of the issue are depicted and how these aspects are evaluated via linguistic metaphors (i.e. metaphor valence). Therefore, the present study proposes the following additions to framing theory when reconstructing of metaphorical frames.

First, for broad issues such as climate change should be dissected and reconstructed per aspect. As illustrated by the present study, reconstructing the metaphorical frame as a whole is often inaccurate since it can include several different aspects. For instance, metaphorical frames for climate change included both environmental aspects as well as policies. As such, the metaphorical frame does not present a single story for the issue. Reconstructing a metaphorical frame per aspect of the issue will increase the overall accuracy of how the issue is depicted.

Secondly, metaphor valence should be added as additional factor in reconstructing metaphorical frames to improve the accuracy of the frame. The present study illustrated that a metaphorical frame with a negative connotation, such as WAR, does not result in an overall negative evaluation of the issue. A negative metaphorical frame can also include positive metaphors, which can evaluate certain aspects of issues positively (e.g. ‘a battle for a sustainable environment’). Including metaphor valence as a factor in reconstructing metaphorical frames thus provides a more accurate image of how issues are depicted.

Future studies should consider improving the conceptualization of metaphor valence, as it is often difficult to establish. The present study mainly established metaphor valence based on Johnson and Taylor (1981), which was loosely based on the connotation of a metaphor. However, contextual analysis was also conducted as it became evident that metaphor valence frequently changed based on the surrounding context of linguistic metaphors. Although various methodologies have been proposed for metaphor identification over the years (Charteris-Black, 2004; Lakoff & Johnson, 1980; Pragglejaz Group, 2007), few studies have touched the subject of metaphors valence. The few studies that did, differed in the conceptualization of this metaphor valence. For instance, Atanasova and Koteyko (2017) defined metaphor valence based on whether these metaphors advanced a pro-climate

argument or not, while Balteiro (2017) defined metaphor valence based on the perceptions it evoked amongst the audience. Given that metaphor valence is suggested to be of great importance in metaphorical frame reconstruction, it is suggested that future studies should aim to gain a greater understanding of how it can be conceptualized and ultimately, how it can be implemented in framing theory.

The findings furthermore underline that the metaphorical frames of TRANSPORTATION and WAR are (a) not issue-specific, (b) not genre-specific and (c) not culture-specific. The present study identified both frames for the issue of climate change, similar to earlier studies by Antanasova and Koteyko (2017) and Cohen (2011). However, these metaphorical frames have also been identified for issues such as Ebola's disease (Balteiro, 2017), the Eurocrisis of 2008 (Joris et al, 2013) and mergers and acquisitions discourse (Koller, 2002). Hence, it is suggested that these metaphorical frames are used due to the 'fit' of the source domains of transportation and war with the issue they depict (Lakoff & Johnson, 1980). For instance, the relatively limited outcomes of the source domains of transportation and war or the notion that both source domains indicate a certain degree of responsibility or active involvement.

Similarly, the present study further underlines that the use of these metaphorical frames is not limited to specific genres. Similar to Atanasova and Koteyko (2017), the present study identified these metaphorical frames in opinion articles. However, these frames have also been identified in news outlets in general (Cohen, 2011), as well as scientific magazines (Balteiro, 2017; Koller, 2002) and in political speeches (Cammaerts, 2012; Charteris-Black, 2004). Their occurrence across issues and genres suggests that other factors, such as culture, could dictate the use of the metaphorical frames of TRANSPORTATION and WAR. To exemplify, the present study identified these frames in opinion articles in Dutch newspapers, while they have also been identified in British (Atanasova & Koteyko, 2017; Balteiro, 2017; Cohen, 2011), Belgian newspapers (Joris et al. 2013) and Lithuanian newspapers (Cibulskienė, 2019).

However, the metaphorical frame of RELIGION was not identified in the present study, while it has been identified as a metaphorical frame for climate change in British news media by Atanasova and Koteyko (2017) and Woods, Fernandez and Coen (2012). The absence of the RELIGION frame could be a result of the methodology; the frame was identified in the pre-test but was excluded due to its infrequent occurrence compared to the transportation, war and illness frames. However, the religion frame could also be absent due to cultural differences between the UK and The Netherlands, as suggested by Gibbson and Zellmer-Bruhn (2011). Moreover, differences in attitudes towards the source domain of religion

between both countries could also explain its absence (Deignan, 2008); the Netherlands might have generally more negative attitudes towards religion than the UK. However, additional research should be conducted to test whether this assumption.

As illustrated above, much is still unclear about why certain metaphorical frames are used across issues, genres and cultures and others are not. As such, it presents new avenues for future research. In a sense, the present study was limited as it analyzed opinion articles in two newspapers regarding one issue. Future studies could expand the materials when reconstructing metaphorical frames. For instance, by including a wider range of different newspapers published in different countries. Moreover, different issues and different types of communication (e.g. regular news articles, speeches, news broadcasts) could be studied in order to gain enhanced insights in the use of metaphorical frames.

In a similar vein, the present study only reconstructed the metaphorical frames of TRANSPORTATION, WAR and ILLNESS, while their potential effects on audiences were not measured. Effects of the WAR frame on attitudes towards an issue have been studied earlier (Flusberg, Matlock & Thibodeau, 2017), but the potential effects of a TRANSPORTATION frame have not yet been thoroughly studied. Hence, future research could study the potential persuasive effects of a TRANSPORTATION frame on the audience. Scherer, Scherer and Fagerlin (2015) illustrated that using metaphorical frames increased intentions to get vaccinated. Using transportation and war frames may similarly increase intentions to counteract climate change. Hence, conducting additional studies into metaphorical frames for climate change could not only increase scientific knowledge, but could also be beneficial for the global efforts to counteract climate change.

The present study used a top-down approach in reconstructing the metaphorical frames of WAR, TRANSPORTATION and ILLNESS by locating pre-determined keywords in the corpus through AntConc, determining their metaphorical use via MIP and assigning them to a reasoning device via contextual analysis. As such, metaphorical frames were only identified if they included at least one of the pre-determined keywords for that frame; metaphorical frames present in the corpus would be bypassed if it was depicted via linguistic metaphors which were not included as keywords. Additional contextual analysis of linguistic metaphors was conducted to identify words with similar semantic fields and thus limit bypassing potential frames. However, this measure had limited effects, as it was still reliant on the presence of a keyword within a specific context; potential frames which used completely different words than the keywords would still be bypassed. This in turn, might have influenced the overall accuracy of the present findings, as these excluded frames might have

portrayed climate change via a different perspective. Henceforth, two suggestions can be made for future studies regarding the analysis of metaphorical frame reconstruction.

Firstly, future research might streamline the present top-down approach by expanding the number of pre-determined keywords included for each frame. In doing so, the probability that specific metaphorical frames are excluded as a result of different wording is limited. However, this could present difficulties, as keywords were included based on the semantic fields of these frames, which are rather broad in nature. The semantic field of war can include keywords related to the specific act of fighting as a soldier but can also include keywords related to the civilian side of war. Such an expanded list should thus include keywords as 'firing' and 'bullets' but also words such as 'deportation'. Hence, the number of keywords for identifying a metaphorical frame could be endless, resulting in prolonged analysis without guarantees that the additional keywords included are indeed present in the corpus.

As such, the present study favors a second methodology which uses a bottom-up approach. Similar to the pre-test, such a bottom-up approach would analyze all words in the corpus and follow MIP to identify all linguistic metaphors for climate change. Subsequent analysis could then determine the semantic fields of the linguistic metaphors for climate change and assign them to a reasoning device via contextual analysis (e.g. causes, potential solutions).The main benefit of such an approach is that it could reconstruct all potential metaphorical frames for climate change without being limited to a number of dominant frames; identification of metaphorical frames is based on the semantic fields of linguistic metaphors rather than pre-determined keywords related to specific frames. An increased variety of metaphorical frames could then provide a more accurate image of how climate change is depicted in opinion articles.

However, as experienced in the present study, establishing the semantic field of a linguistic metaphor often presented difficulties. Moreover, analyzing large corpora via this approach is expected to be rather time-consuming. Hence, it is recommended to have multiple coders, both to maintain the reliability when establishing semantic fields and to reduce the time spent on the analysis. The present study did not include a second coder, which could have improved the reliability of the present study. For instance, in identifying linguistic metaphors in both the pre-test and the main analysis (including the contextual analysis) or in establishing the valence of linguistic metaphors. Moreover, an additional coder could have reduced the number of linguistic metaphors with an 'unclear' semantic field in the pre-test and could have enhanced the reliability when assigning metaphors to specific reasoning devices.

Concluding remarks

To conclude, the present study demonstrated a frequent use of TRANSPORTATION and WAR frames for climate change in Dutch opinion articles. The potential explanations for this finding were embedded in the 'fit' of both frames with the issue, emphasizing its urgency and focusing on potential solutions to prompt audiences into counteractions.

Moreover, the present study illustrated that assigning a fixed valence to a metaphorical frame presented difficulties as these frames (a) depicted several aspects of climate change and (b) included both positive and negative metaphors. The valence of these metaphors could furthermore change based on their surrounding context, resulting in contrasting arguments via the same metaphor.

Given the variety of aspects and metaphor valence present within the frame, the present study concluded that a single metaphorical frame does not present the issue of climate change as is. Therefore, the study proposes the following additions to framing theory. Broad issues should be dissected, and their metaphorical frames reconstructed per aspect. Moreover, metaphor valence should be added as a factor in framing theory when reconstructing metaphorical frames. The present study furthermore illustrated that the metaphorical frames of transportation and war are used across various topics, communicative genres (e.g. news outlets, political speeches) and country. Hence it is suggested that using transportation and war frames is based on the fit of their source domains with the issues these frames depict.

Suggestions for future research were centered around increasing the variety of materials in order to identify patterns in the use of transportation and war frames across issues, genres and countries or cultures. Similarly, future studies could test which metaphorical frame (transportation or war) is most effective in communicating climate change to a wide audience. That is, how effective these frames are in creating increased understanding of climate change and how these frames could effectively prompt audiences to counteract climate change.

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Appendix I Included keywords for the main analysis, sorted by their semantic fields (war, transportation, illness) and including their glossed English translation (between brackets)

	War	**Transportation**	**Illness**
1	Strijd (battle)	Reizen (traveling)	Ziekte (illness)
2	Vechten (fighting)	Vertrekken (departing)	Aandoening (condition)
3	Verdedigen (defending)	Aankomen (arriving)	Gezondheid (health)
4	Aanvallen (attacking)	Bestemming (destination)	Virus (virus)
5	Overwinnen (conquer)	Versnellen (speeding up)	Tegengif (antidote)
6	Verliezen (losing)	Vertragen (slowing down)	Genezen (cure)
7	Bondgenoot (ally)	Remmen (braking)	Overlijden (decease)
8	Vijand (enemy)	Gas geven (accelarating)	Terminaal (terminal)
9	Oorlog (war)	Route (route)	Medicijn (medicine)
10	Vrede (peace)	Bereiken (reaching)	Ingreep (surgery)
11	Conflict (conflict)	Chauffeur (chauffeur/driver)	Chirurg (surgeon)
12	Offensief (offensive)	Sturen (steering)	Dokter (doctor)
13	Defensief (defensive)	Inhalen (overtake)	Arts (physician)
14	Verzetten (resisting)	Achterblijven (stay behind)	Ziekenhuis (hospital)
15	Overgeven (surrender)	Verplaatsen (move/displace)	Pijn (pain)
16	Veldslag (battlefield)	Rijden (driving)	Pijnstillers (painkillers)
17	Invasie (invasion)	Vliegen (flying)	Kanker (cancer)
18	Doden (killing)	Passagier (passenger)	(Chemo)kuur (chemotherapy)
19	Soldaat (soldier)	Trein (train)	Pleister (band aid)
20	Overleven (survive)	Auto (car)	Lichaam (body)
21	Schieten (shooting)	Fiets (bicycle)	Geest (mind)
22	Geweld (violence)	Bus (bus)	Koorts (fever)
23	Slachtoffer (casualty)	Verkeer (traffic)	Infectie (infection)
24	Hinderlaag (ambush)	File (traffic jam)	Besmetting (contamination)
25	Wapen (weapon)	Bagage (luggage)	Ziektebed (sickbed)
26	Arsenaal (arsenal)	Station (station)	Diagnosticeren (diagnose)
27	Bom (bomb)	Vliegveld (airport)	Symptoom (symptom)
28	Geweer (rifle)	Op gang komen (get going)	Operatie (operation)
29	Pistool (pistol)	(Snel)weg (highway)	Eerste hulp (first aid)
30	Zwaard (sword)	Thuiskomst (homecoming)	Vaccinatie (vaccin)