

# **Increasing climate change risk portrayal**

A comparative framing analysis of selected US and German news on the portrayal of climate change.

Bachelor Thesis in Communication Science (BSc)

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Date: June 26, 2020

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## ABSTRACT

*Aim:* The communication on climate change has increased considerably during the last years. Reaching millions of people that read the news media, journalists play a crucial role in shaping public opinion, behavior and attitude by their presentation of climate change. As journalistic practices are highly shaped by cultural norms and standards, this study investigates the portrayal of climate change in German and US news. Examining the use of journalistic norms and styles, the framing of climate change, as well as its portrayal of risk, this study aims to discover cultural differences in the news media's reporting affecting the presentation of climate change. Ultimately, practical implications on how to improve the communication on climate change are presented.

*Method:* Using a 26-item coding scheme, containing four categories, 60 articles from German and US news broadcasters were examined making use of a content analysis. Throughout this analysis, the articles were coded regarding their use of journalistic norms and styles, framing, as well as risk portrayal.

*Findings:* The results of this study show a clear difference in the portrayal of climate change between German and US news in their use of journalistic norms and styles, framing, and portrayal of risk. US news mostly made use of a reflective style of reporting, and presented climate change most frequently with high risk, whereas German news most frequently employed an information model of reporting and portrayed climate change overall with a lower connotation of associated risk.

*Conclusions:* Employing different journalistic norms, styles, and frames of news reporting for the communication on climate change resulted in great differences in how the issue is presented to its audience. Due to this, when trying to effectively communicate about climate change, and to influence public opinion, behavior or attitude, incorporating the journalistic norms of dramatization, authority-order, and personalization, as well as making use of a reflective style of news reporting, by convincing and persuading the audience of the seriousness posed by climate change is of benefit. The communication on climate change, therefore, should be adjusted from a mere transmission of facts to a persuading message for its audience.

**Keywords:** climate change communication, framing, journalism, risk portrayal

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## 1. INTRODUCTION

Global climate change represents one of the greatest threats to the environment in the 21st century. Its potential to damage, impact, and change ecosystems, human life, and infrastructures is, without doubt, the greatest environmental threat to humanity today. Burning millions of tons of oil, coal, and fuel, the atmospheric concentrations of greenhouse gases has increased many times since the Industrial Revolution, causing our earth to heat up and become warmer (Mitchell 1989). This so-called greenhouse effect, and the corresponding progress of global warming, play a huge factor in climate change, which presents a serious threat to humans and the environment. Due to this continuous change of our climate, the temperature of the earth's atmosphere is rising, causing glaciers to melt and sea levels to rise. Increasing weather extremes, such as forest fires, rainstorms, floods, and droughts, thereby contribute to an increase in climate refugees and shifting climate zones, to name only a few of the resulting problems. The changing climate thereby damages the global ecosystem, by accelerating the extinction of species and the loss of biodiversity. As one should be able to recognize, this issue of climate change is of great importance to humankind. Due to this, research, and especially communication on climate change, has been attracting more and more attention from scientists, politicians, and activists, as news media coverage concerning has increased significantly in recent years.

After emerging in public agenda during the 1980s, the communication on climate change has increased considerably (Moser, 2009). With the growth of social networks and the internet, information has been made available for an ever-increasing proportion of the population, which mostly acquire their information from news media (Painter, Kristiansen, & Schäfer, 2018). With the growing public discourse on climate change, an increasing audience has been addressed using a wider range of messages and frames of reporting (Moser, 2009). Nevertheless, although communication on climate change has been going on for almost thirty years, in many populations, the understanding of causes and consequences still remains limited (Moser, 2009). As the exchange between the communicators of climate change information and those researching it lacks intensively, climate change consequences seem to be invisible for some audiences (Chadwick, 2017; Moser, 2009; Nerlich, Koteyko, & Brown, 2010). Thereby, causes and effects are often temporarily and geographically distant, making climate change a concept of great complexity resulting in uncertainty on the side of the audience (Chadwick, 2017; Moser, 2009; Nerlich, Koteyko, & Brown, 2010). Because of this uncertainty and lack of understanding and acceptance, journalists and communicators have to present the issue in

different ways to provide the audience with suitable information in order to influence their behavior, opinion, and attitudes (Chadwick, 2017). The role of the public in addressing climate change is thereby of great importance, as policymakers react to trends and changes in the public opinion, and each individual can significantly contribute to implementing a sustainable and adaptable response to minimize the effects of climate change (Areia, Intrigliolo, Tavares, Mendes, & Sequeira, 2019).

Playing a crucial role in forming the audience's attitudes on this topic, journalists frequently adjust their presentation to provoke differing reactions (Schäfer & Oneill, 2017). The most influential way to shape public opinion on a topic like climate change is by making use of frames (De Vreese, 2005). Reading the news, watching TV, or scrolling through social media, frames are used almost everywhere to alter attitudes by highlighting certain features of an event (Chong & Druckman, 2007). Framing, by which certain aspects of a story are emphasized by a journalist, and others are not, is thereby used to portray climate change in different ways, in order to influence what people think and believe about a particular issue, how they form attitudes, and whether they trust the underlying science (Schäfer & Oneill, 2017). In addition to that, a "journalists' scientific knowledge [,] professional norms [,] ideological standpoints [,] political alignment [,] and expertise [...] influence" the reporting on an issue highly, and news media can exert a great impact on the audiences opinions and attitudes (Schäfer & Oneill, 2017; Stecula & Merkley, 2019). As news media are seen as a primary information source for the general public for opinion and attitudes formation, journalists have the option to select and choose which view on that matter they would like to present and promote, when reporting on a complex issue such as climate change (Stecula & Merkley, 2019). Due to this, journalists framing of climate change in news media highly determine publics support and willingness to act in favor of climate change or against it (Stecula & Merkley, 2019). Thereby, as millions of people read the news media daily, it is a highly influential way for journalists to shape public opinion using certain frames in their news media. Current research in climate change communication especially analyzes public understanding of climate change, its media coverage and effects, the framing of messages, as well as risk perceptions of audiences (Chadwick, 2017).

Since journalistic activities are not only influenced by the individual journalist but are also shaped to a great extent by cultural norms and standards, the presentation of climate change highly depends on cultural factors and circumstances (De Mooij, 2013). Journalistic practices are thereby subject to cultural influences which significantly shape and guide how an issue like climate change is presented to the audience. It is therefore expected that also the presentation of climate change is affected by the culture in which a journalist operates, and thus the cultural

influences the journalist is exposed to. This research aims to analyze the portrayal of climate change in German and US news. Thereby, it is to be found out to what extent the different journalistic cultures in Germany and in the United States of America shape the reporting on climate change. Already at first glance, it becomes apparent that the reporting in Germany and the USA is fundamentally different. Already in the headlines of articles, US news broadcasters make use of a more dramatic and forceful presentation, whereas German news media use more factual and formal expressions. For instance, where in German news, headlines such as "Number of skin cancer cases rising rapidly - health insurance blames climate change" or "How storms could endanger the energy supply" can be found, a more dramatic picture can be found in US news, where headlines such as "Climate change could pose 'existential threat' by 2050: report" or "Today's climate change is worse than anything Earth has experienced in the past 2,000 years" are used.

This research aims to analyze the portrayal of climate change in German and US news media by their use of different frames of reporting, journalistic norms and styles, and their portrayal of risk. By analyzing the relation between the use of frames and journalistic norms styles of reporting, influencing the presentation of risk in news media, differences in the reporting on climate change are to be discovered. How different reporting styles result in the portrayal of risk, and whether there are national differences be found. Lastly, this study aims to formulate practical implications on the effective presentation of climate change in news media and its portrayal of risk. Based on these aims, several research objectives have been determined. The first objective of this present study is to investigate the portrayal of climate change and thereby compare US and German news in their use of frames, journalistic norms, and journalistic styles. Secondly, how the use of journalistic styles in German and US news media relates to the use of frames is to be analyzed. Thirdly, differences in the portrayal of the risk of climate change between German and US news media are to be discovered. Deriving from these objectives, this study aims to highlight differences in reporting between German and US news broadcasters on the reporting of climate change. Lastly, the fourth objective of this study is to formulate practical implications, on how to increase risk portrayal in climate change communication. From these four research objectives, the following research questions (RQ) can be derived:

*RQ 1: How are frames, journalistic norms, and styles of reporting used by US and German news to portray climate change?*

*RQ 2: How is the use of journalistic styles related to the use of frames in US and German news?*

*RQ 3: How does the portrayal of risk of climate change differ between US and German news?*

*RQ 4: What practical implications for the reporting on climate change and its risk portrayal can be made?*

The theoretical novelty and added value of this study especially includes the analysis of relations between the use of frames and journalistic styles in the reporting on climate change. Being able to draw conclusions from the analysis on whether the use of certain frames occurs mainly whilst certain journalistic styles are utilized thereby adds to the understanding of differences in the reporting on climate change. In relation to this, this study serves to investigate whether these different reporting styles, norms, and frames, give rise to different levels of risk portrayal and thus represent climate change in different lights between the two countries. This allows to draw conclusions on how the reporting in the US and German news differ and whether practical implications can be made for one of the countries on how to present climate change with higher risk portrayal.

Although much research has already been conducted on climate change communication, this research aims to analyze and contrast, particularly German and US digital news. The analysis of the communicational aspect of journalistic norms and styles and use of frames is especially interesting between these two countries as the United States of America and Germany are two of the greatest emitters of CO<sub>2</sub> and are thereby of great interest for the analysis of media coverage on climate change. Analyzing how journalistic reporting and media coverage on climate change differs between these countries will thereby lead to discovering whether German news broadcasters may report using an informational style of reporting and whether US news broadcasters may utilize another style of reporting to produce sensationalism with their reporting on climate change. Establishing a linkage between the use of frames, journalistic norms and styles of reporting, as well as the portrayal of risk will thereby serve to formulate practical implications on how to compose and present climate change as more urgent, relevant and endangering, in order for the audience of the news to understand its magnitude.

This study contains five chapters. After this introduction, a theoretical framework on the use of journalistic norms and styles, the use of frames in news media, and the presentation of risk will be presented to define the constructs in use and to conceptualize the research model. In the third chapter, the methodological choices are presented and justified. After that, the analysis of results are elaborated on in chapter four. The discussion and interpretation of results is given in the fifth chapter, including the study's conclusions and the giving of practical implications for the communication on climate change.

## **2. THEORETICAL FRAMEWORK**

The coverage of climate change and the presentation of its risks in news media presents a significant influence on public reactions and the understanding of the concept of climate change. It is thereby of great importance to understand how the presented risks and uncertainties in the reporting on climate change fluctuate, and how an issue of such importance needs to be presented in news media to heighten public understanding and response. According to Painter (2013), emphasizing the risks associated with climate change, instead of its uncertainties, leads to a greater audience response and increases the influence it has on behavior. Focusing on factors affecting public understanding of climate change and related behavior, analyzing the use of journalistic norms and styles, the use of framing and the consequential risk portrayal in media coverage on climate change thereby provides a valuable means to draw inferences for improved reporting on climate change.

### **2.1. Journalistic norms and style**

News media present one of the primary sources of citizens to inform themselves about current events, to gain social and political knowledge, and to form beliefs on various issues (Ghavamnia & Dastjerdi, 2013). Reading a great range of articles, which is part of everyday life for many people, does not only lead to the acquisition of knowledge and understanding, but also to the formation of attitudes and opinions on an issue. As the manner in which journalists report on the topic of climate change differs enormously, different presentations of news have a strong influence on the formation of attitudes, perceptions, and behaviors of citizens and audiences (Chong & Druckmann, 2007). Due to this, it is of high importance to review the news media's coverage on climate change for journalistic norms and styles and to analyze how those differences relate to the framing of the topic and how it eventually leads to different presentations of risk (Chong & Druckmann, 2007).

As different norms of reporting affect the use of styles and frames of reporting on an issue, it is of great importance to analyze how the communication on climate change is influenced by the use of journalistic norms in US and German news. For this study, the basic journalistic norms of reporting are being considered. For that, the study of Boykoff and Boykoff (2007), which focuses on how journalistic norms have been shaping media coverage on climate change, is being used for theoretical input. During this study, first-order and second-order journalistic norms have been found out to shape media coverage on climate change to a great extent. According to Boykoff and Boykoff (2007), first-order norms, which highly influence



the selection and content of news stories, are the personalization of social issues by putting focus on “individual claim-makers”, the use of dramatization, by which sensationalizing and alerting reporting becomes thrilling for audiences, as well as the use of novelty, as causes and long-term consequences are frequently overlooked in order to present an ever new point of view (Wilson, as cited in Boykoff & Boykoff, 2007). In addition to these first-order norms, the second-order norms of authority-order, by which journalists limit themselves to consulting authorities for their reporting on climate change to reassure order, safety, and security, and the norm of balance, by which conflicting sides are presented with equal attention (Entman, as cited in Boykoff & Boykoff, 2007; Boykoff & Boykoff, 2007), will be used to analyze the portrayal of German and US digital news of climate change. According to Brüggemann and Engesser (2017), the journalistic norm of balance encourages journalists in news media to provide neutral account by demonstrating objectivity in order to counter accusations of biased reporting.

Influenced by those journalistic norms of reporting, Broersma (2007) identifies journalistic styles which represent “the choice between functionally equivalents of language” and do not present a personal quality of an individual journalist, but rather as organized in accordance with industrial and cultural norms. According to Broersma (2007), the first division in journalistic styles can be made between the reflective style of reporting, which has its origins in partisan journalism and focuses on educating, persuading, and instructing its audience of political and sociocultural viewpoints, and the news style of reporting, which centers around the presentation of facts, which can be used in either a story or an information model. News outlets making use of the story model are popular or sensationalist magazines, which use storytelling to create satisfying experiences in the mind of their audience, by using emotional connotations or sensationalism aiming at addressing the audience’s emotions (Broersma, 2007). The information model, on the other hand, aims at disseminating information using the ideals of “rational, empirical ideals of objectivity, balance, fairness, and neutrality”, by appealing to the minds of the audience instead of the emotions (Broersma, 2007, p. 16).

For this recent study, the presented journalistic norms, as well as the journalistic styles for the analysis of news on the portrayal of climate change, are applied. Those constructs are used to determine to what extent journalistic norms and styles are related to the use of frames and the portrayal of risk in the reporting on climate change. Thereby, it will be analyzed how the use of journalistic norms influences the use of journalistic styles and frames and, lastly, the presentation of risk.

Due to different cultural influences on journalistic practices in German and US news, it is assumed that the use of journalistic norms and styles differs significantly between these two

nations. Affecting the use of journalistic styles, frames, and the portrayal of risk, it is hypothesized that US news broadcasters are increasingly making use of the norm of dramatization, leading to a story model and reflective style of news reporting to persuade and generate news to entertain the audience. In contrast to that, it is hypothesized that German news broadcasters most frequently use the norm of balanced reporting, resulting in an information model of news reporting. Consequently, the following hypothesis has been deduced:

*“US news broadcasters more frequently make use of a story model or reflective style of news reporting, whereas German news broadcasters are mostly utilizing an informational model of news reporting.”*

## **2.2. Framing**

Influencing the attitudes and opinions of the audience, different presentations of news can achieve particular intended behaviors and engagement just by defining an issue using certain frames of presentation (De Vreese, 2005; Vu, Liu & Tran, 2019). Those frames, highly influenced by cultural differences in reporting, involve the selection of certain aspects of an issue or story and presenting it more saliently in the communication on the issue of interest (Entman, as cited by Kozman, 2017). According to Zaller (1992), “the alternative phrasings of the same basic issue significantly alter its meaning to respondents”, meaning, that small changes in the presentation of an issue can lead to great changes in attitude and opinion formation on side of the audience (as cited in Chong & Druckmann, 2007, p. 104). In explanation, by highlighting certain features of a story or an issue, framing in news media is frequently used to alter audiences’ opinions and attitudes on a topic like climate change.

As frames are selected and utilized by journalists, different framing bias can be found in news media. Erdmann (2007) proposes three framing bias used in news reporting in public discourse. Erdmann (2007) thereby makes a distinction between the distortion bias, in that reality is allegedly distorted or falsified, the content bias, in which news are presented solely for the benefit of one side of the reporting rather than making use of a balanced comparison, and finally, the decision-making bias, in which a journalist's motivation and attitudes produce biased content on an issue. Consequently, journalistic framing bias highly influences the correct presentation of a topic in news media and is therefore perceived and received very differently by its audience. According to De Vreese (2005), the process of framing poses a dynamic process between frame-building and frame-setting. The process of frame-building, how news organizations and journalists frame issues, is followed by the process of frame-setting, by which

the used frames affect the audience's interpretation and evaluation (De Vreese, 2005). According to De Vreese (2005), this can either occur on an individual level, leading to the formation of personal attitudes, or on a societal level, shaping society by stimulating decision-making processes or collective action.

In order to study news media content and the used frames of reporting, two approaches of analysis can be made use of. Using an inductive approach for analysis, frames are not priori defined and only emerge during the course of analysis (De Vrees, 2005). In contrast to that, when making use of a deductive coding approach, frames to be analyzed in media content are defined and operationalized prior to the analysis (De Vrees, 2005). De Vrees (2005) argues that researchers favor a deductive approach of analysis of media content, as it is more concise and easier to replicate. Frames in a deductive approach can be categorized into either issue-specific frames or generic frames. According to the study of Kozman (2017), although issue-specific frames provide the opportunity for greater specificity and detail, generic frames have the advantage of being able to do a systematic comparison across various issues, frames and topics in media (de Vreese, Peter, & Semetko, as cited in Kozman, 2017). The most used generic frames, which are content-related but not specific for an issue, are "economic consequences", "responsibility", "conflict", "human interest", and "morality" (Semetko & Valkenburg, as cited in Schäfer & Oneill, 2017). Nevertheless, Kozman (2017) introduces a combination of issue-specific frames and generic frames for the analysis of news media, as its combination will heighten the scope of this research by incorporating the analysis of how climate change has been presented by selection and salience (Matthes & Kohring, as cited in Kozman, 2017).

According to the study of Myers, Nisbet, Maibach, and Leiserowitz (2012), the framing of climate change as a public health issue heightens its relevance and importance for the audience and therefore leads to increased engagement, awareness, and benefits action. Due to this, the "public health" frame will be incorporated into the coding scheme for the analysis of the portrayal of global climate change. In addition to the public health issue, Myers et al. (2012), also introduce a national security frame, which, although it has been found to generate considerable anger in the dubious and hostile sections of the public, this frame has been incorporated into the coding scheme as it poses an interesting concept in analysis regarding mistakenly used frames of journalists in the portrayal of climate change. In addition to this, a study on the communication on climate change from the University of California has been investigated, which discovered that framing climate change from a collective perspective, rather than from a personal perspective, is more effective in achieving a change in behavior of people

(University of California, 2016). Due to this, the collective perspective on climate change, as well as a personal perspective on climate change, will be used for this study’s coding scheme.

Lastly, the study of Vu, Liu, and Tran (2019) on the news coverage of climate change in 45 different countries also serves as input for the development of the coding scheme for this study. Proposed frames, used to present climate change in news media, are especially the frame of “uncertainty”, the “international relations” frame, the “environmental impact” frame, the “economic impact” frame, the “scientific issue” frame, the “political issue” frame, and the frame of “energy”, as the human burning of fossil fuel presents the biggest cause of the greenhouse effect (Vu et al., 2019). Because of their specificity for the topic of climate change, these issue-specific frames will be incorporated into this study’s coding scheme. The frame of threat will not be included, as the portrayal of risk will be incorporated as a separate coding category to uncover how risk is portrayed in German and US news.

Serving as theoretical input, three studies on the use of frames in climate change communication have been used to obtain information and to establish issue-specific frames for the analysis of the content in this present study. Several issue-specific frames have thereby been made use of to allow for an in-depth analysis of the reporting on the issue of climate change and to prevent important frames concerning the topic to be neglected or overlooked. Due to this, frames, specific to the issue of climate change, which are less transferable to other news issues, have been included for this study (Schäfer & Oneill, 2017). In addition to that, a variety of generic frames have been incorporated to allow for a general framing analysis of the issue of climate change and to enable generalization and replication of this study. Table 1 illustrates the expected co-occurrences of journalistic styles and frames of reporting. It is thereby also expected that the use of different frames by German and US news broadcasters in the reporting of climate change highly influences the portrayal of risk of the issue.

Table 1  
*Expected occurrences of Journalistic style and Frames*

<b>Journalistic style</b>	<b>Frame</b>
Reflective style	Public health, Environmental impact, Human responsibility, Scientific reference
Story model	Personal perspective, National security, National frame, Economic impact, Political focus
Information model	Collective perspective, Environmental impact, Scientific reference, Energy focus, International frame

In this research, the use of frames in reporting on climate change is expected to differ to a great extent between the two countries under investigation, due to cultural influences on journalism practices and the focus of reporting. To study these differences, the following hypothesis has been developed:

*“US news broadcasters are more likely to use a personal perspective on the issue of climate change, resulting in frequent usage of the public health and human responsibility frame, a national and national security frame, as well as the economic impact frame and political issue frame. German news broadcasters, on the other hand, are expected to especially incorporate a collective perspective and an international frame on the issue of climate change, the environmental impact frame, the energy focus frame, as well as a scientific reference.”*

### **2.3. Risk portrayal**

The use of certain journalistic norms and styles, as well as the use of particular frames for the reporting on an issue, highly influences how threatening the audience of news broadcasters perceive it. Risk perceptions are thereby highly depending on how journalists make use of specific frames and which journalistic norms and styles are made use of. By analyzing how the risk of climate change is presented in German and US news media, hypotheses about possible correlations between the use of frames and journalistic styles and norms in relation to the portrayal of risk can be drawn.

According to Ghavamnia and Dastjerdi, (2013), news media is frequently used to shape the audiences risk perceptions on urgent events. Due to this, as perceived risk increases, news media becomes more important to the audience as a source of information and thereby leads to increased awareness of the particular issue at hand (Ghavamnia & Dastjerdi, 2013). According to Leiserowitz (2005), whose study elaborates on the risk perceptions of climate change of American citizens, public support, beliefs, and attitudes are shaped to a great extent by how risks and dangers of climate change are perceived. Colette (2016) defines risk as “the probability of a threat of damage, injury or loss” (p.44), and agrees that how risk is framed and presented ultimately shapes the audience’s understandings, beliefs, and actions regarding climate change.

For this present study, the analysis of portrayed risk in US and German news articles has been incorporated, in order to discover whether differences in the use of journalistic norms, styles, or frames subsequently influence the portrayal of risk in climate change communication. To study the portrayal of risk in German and US digital news, the categories of low, moderate,

and high risk have been included. The portrayal of risk is thereby expected to vary between US and German news due to cultural differences in journalistic reporting, resulting from differing uses of journalistic norms and styles, as well as their use of frames. Due to this, the following hypothesis can be depicted:

*“US news broadcasters, utilizing a story model or a reflective style of reporting, will present the issue with greater risk in order to produce exciting and stimulating news to entertain and persuade the reader, whereas German news broadcasters are expected to present the issue with less risk as by limiting themselves to the factual presentation of the news to inform the audience by use of an information model of news reporting.”*

#### **2.4. Conceptualization of research model**

The conceptualization in Figure 1 illustrates the before mentioned hypotheses and serves to visualize the expected differences and similarities between German and US news broadcasters in their portrayal of climate change. The conceptual model includes that the portrayal of risk, which ultimately influences public opinion and behavior on climate change, is ubiquitous in news media coverage on climate change, but is influenced by different journalistic norms and styles, as well as frames of media reporting. Communication on climate change in news media, whether being presented with low, moderate, or high risk, is thereby hypothesized to be affected by differentiating presentations of the issue in US and German news media.

This leads to the hypothesis that the reporting in US news media, by more frequently using dramatization to initiate sensationalism and persuade the audience by employing a personal perspective on the issue of climate change leads to a greater portrayal of risk. On the other hand, it is hypothesized that German news media more frequently use the journalistic norm of balance to objectively inform the audience on the issue of climate change, using a collective perspective, which will ultimately lead to a lower risk portrayal. US news broadcaster are thereby thought to be utilizing especially the journalistic norm of dramatization to initiate sensationalism. Table 2 serves to give an overview of the before stated hypotheses for this study.

Figure 1

*Conceptual model*

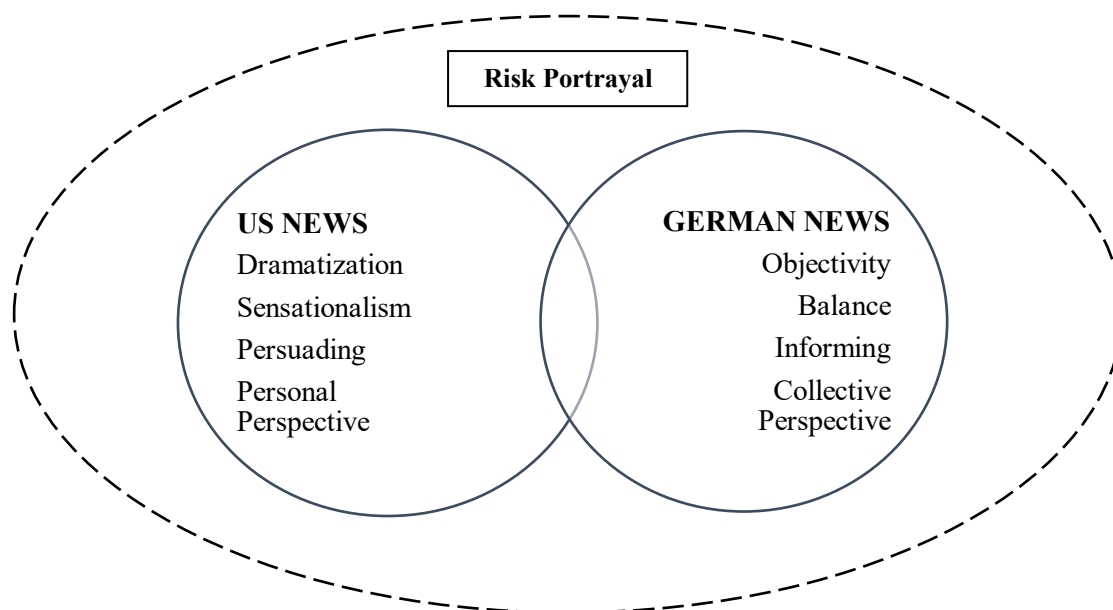


Table 2

*Overview of proposed hypotheses*

No	Hypothesis
H1	“US news broadcasters more frequently make use of a story model or reflective style of news reporting, whereas German news broadcasters are mostly utilizing an informational model of news reporting.”
H2	“US news broadcasters are more likely to use a personal perspective on the issue of climate change, resulting in frequent usage of the public health and human responsibility frame, a national and national security frame, as well as the economic impact frame and political issue frame. German news broadcasters, on the other hand, are expected to especially incorporate a collective perspective and an international frame on the issue of climate change, the environmental impact frame, the energy focus frame, as well as a scientific reference.”
H3	“US news broadcasters, utilizing a story model or a reflective style of reporting, will present the issue with greater risk in order to produce exciting and stimulating news to entertain and persuade the reader, whereas German news broadcasters are expected to present the issue with less risk as by limiting themselves to the factual presentation of the news to inform the audience by use of an information model of news reporting.”

### **3. METHODS**

#### **3.1. Design and instruments**

To study the portrayal of climate change in US and German news, a primarily qualitative research design has been made use of. For this, a content analysis of German and US news broadcasters has been conducted in order to assess the use of journalistic norms and styles, the different application of frames, and the resulting portrayal of risk of climate change. This content analysis, thereby served to identify patterns in news media communication on the issue of climate change, to make inferences on differences between German and US news broadcasters.

For this content analysis, a deductive coding process has been made use of to assign journalistic norms and styles, frames, and the portrayal of risk to the selected news articles. With this deductive approach of coding, the to be analyzed codes have been defined and operationalized prior to the analysis, serving to make the analysis to be more concise and easier to reproduce (De Vrees, 2005). In addition to the analysis of the relation between the codes, also the quantitative aspect of the frequency of codes per country has been analyzed to be able to draw connections between the use of frames and national differences in reporting. Thereby, it was ought to find out how journalistic norms, styles, and frames of reporting influence the portrayal of risk of climate change in news media. For the manually coding of articles by the researcher, the program Atlas.ti 8 has been used. Intercoder reliability has been guaranteed by a pre-test with a second coder coding ten percent of the corpus of articles used for analysis in this study.

#### **3.2. Corpus**

To establish the corpus of articles to be analyzed in this study, criteria for inclusion have been formulated. For a restriction of articles to be selected, only articles from the time after the 2018 United Nations Climate Change Conference in Poland have been used, as it serves to ensures a timewise restriction of the articles. Due to this, only articles within the timespan of these one and a half years have been included for the analysis of this recent study. In addition to that, also criteria for the selection of news from German and US digital news broadcasters have been established. For US news, news from the conservative news outlet Fox News have been included, as it is known that it often misinforms the public on climate science, its context, history, and social impact by disseminating misinformation (Maxwell & Miller, 2016; Stecula & Merkley, 2019). In addition to that, the American newspaper New York Times, which is seen



as a liberal left-leaning news outlet, has been used for the analysis of news. Lastly, for the analysis of US digital news, the left-leaning online news outlet CNN has been included in the analysis. For German digital news media, the online magazine SPIEGEL Online, which can be classified as politically left-liberal and presents one of the news portals with the highest reach in Germany, has been included for this study. As the magazine FOCUS Online had a conservative political orientation but was often assumed to be right-wing political, this German news broadcaster has been included for analysis as well. Furthermore, the Sueddeutsche Zeitung (SZ) is used for the analysis of the news articles as it presents the largest German supra-regional subscription-based daily newspaper and positions itself politically left-liberal.

To ensure topical specificity, the articles of those selected news broadcasters had to contain the keyword “climate change” for US news articles, or the keyword “Klimawandel” for German news articles. Furthermore, videos, social media content, transcriptions of interviews, and opinion pieces have not been included in the analysis of content. Making use of modified Google search operator options, search results have been limited to articles from the chosen six outlets, from within the timespan and to articles containing the chosen keywords. An overview of the corpus and average length of the articles to be analyzed can be found in Table 3.

Table 3

*Overview of corpus*

<b>Country</b>	<b>News Outlets</b>	<b>Articles</b>	<b>Avg. word count</b>
USA	CNN, New York Times, FOX News	30	940 words per article
Germany	FOCUS Online, Sueddeutsche Zeitung, SPIEGEL Online	30	737 words per article

### 3.3. Analysis

Because of the deductive design of this content analysis, the code categories to be analyzed have been established beforehand and can be found in the presented codebook, Table 4. For this codebook, four coding categories, namely being *Journalistic norms*, *Journalistic styles*, *Frames*, and *Risk portrayal*, have been designed.

Table 4

*Codebook*

Variable	Code	Description	Example
Journalistic Norm	(1) Personalization	Focusing on claims and statements of individual actors	“Maria Daskalakis from the Institute of Economics at the University of Kassel points out that a multidisciplinary approach is needed”
	(2) Dramatization	Dramatization of events for entertainment and increasing threat	"After nuclear war, human-induced global warming is the greatest threat to human life on the planet"
	(3) Novelty	Presenting the newest information and an ever-new point of view	“A new study suggests that "virtually all" nations will be negatively affected by climate change by 2100”
	(4) Authority-order	Consultation of authorities to provide orders, warnings, and instructions	"We must not be diverted from the urgency of tackling it by reducing our greenhouse gas emissions to zero as soon as possible"
	(5) Balance	Presenting conflicting sides, views arguments and opinions with equal attention	“Scientists insist that climate change has acerbated already ripe conditions for calamitous fires, while critics have contended that such devastation is nothing new to the Australian landscape”
Journalistic Style	(6) Reflective Style	Educating, persuading, and instructing the audience of certain viewpoints	“The economist Claudia Kemfert warns of the gigantic consequences of climate change - not only for the environment, but also for the economy”
<i>(Assigned once per article)</i>	(7) News Style Story Model	Using storytelling to create exciting experiences, using emotional connotations or sensationalism	“A child born today could, on its 71st birthday, experience a world that has become on average four degrees warmer. It may have experienced times when food became scarce because rising temperatures reduced the yields of corn, soy and rice”
	(8) News Style Information Model	Informing the audience using “rational, empirical ideals of objectivity, balance, fairness and neutrality”	“Although the report may seem dour about the prospects of the global economy, not all hope is lost”
Frames	(9) Public Health	Frames climate change as a public health issue	“Climate change could "halt and reverse" progress made in human health over the last century”
	(10) National Security	Climate change as a national security issue impacting society and posing societal challenges	“The United States' existing security will likely need to change as the planet warms”

Frames	(11) Collective Perspective	Portrays climate change as a collective issue	“Climate change will affect everybody, not just people in distant lands”
	(12) Personal Perspective	Portrays climate change as a personal issue	“Everyone must decide for themselves what value they place on the worst case scenario in their thinking”
	(13) Uncertainty	Stresses the associated uncertainty, insecurity, confusion, ambiguity, and vagueness	“No one is terribly sure about what will happen by 2100”
	(14) International Relations	Frames the issue as to be approached together with the assistance of other countries	“This requires the leaders of China, and the US in particular, along with Europe, to take a strong leadership role and set the stage for the rest of the world to follow”
	(15) Environmental Impact	Stresses the environmental impact of climate change	“In the course of climate change, more and more extreme weather phenomena are occurring”
	(16) Economic Impact	Stresses the economic impact of climate change	“Plastic pollution found in the world's oceans and the melting permafrost in the Arctic could have startling economic burdens, perhaps as much as \$2.5 trillion and \$70 trillion”
	(17) Political Focus	Frames climate change as a political issue	“German politics is arguing about CO2 prices, domestic flights and kerosene taxes to slow down climate change”
	(18) Scientific Reference	Refers to scientific evidence, studies insights, or researchers	“According to the study, climate change does not have the same impact on floods everywhere”
	(19) Energy Focus	Refers to the greenhouse gas emissions/reductions and the burning of fossil fuels	“If fossil-fuel emissions continue to rise rapidly, the maximum amount of fish in the ocean could decrease by as much as a quarter by century's end”
	(20) Morality	Frames climate change as a moral issue	“The use of fossil fuels is immoral”
(21) Human Responsibility	Focuses on human responsibility for climate change or demands action for counteraction	“California's wildfires are 500 percent larger than they would be without human-induced climate change”	
(22) National Frame	Frames climate change as a national issue	“Climate change has significantly aggravated the flood events in Germany according to a study”	
(23) International Frame	Frames climate change as an international issue	“Around the world, glaciers in the mountains are receding quickly”	
Risk Portrayal <i>(Assigned once per article)</i>	(24) Low Risk	The article presents climate change with low to no risk	“This is not Australia's hottest year. Bushfires are a common occurrence there, going back a long time”
(25) Moderate Risk	The article presents climate change with moderate or neutral risk connotations	“We know we can adapt to slow changes”	
(26) High Risk	The article presents climate change with high risk	“That's equivalent to dropping roughly four Hiroshima bombs into the oceans every second over the past quarter of a century”	

For the first category of *Journalistic Norm*, the codes (1) to (5) are made use of to identify how journalists utilize those first-, and second-order norms. Thereby, it is ought to uncover the influence of those norms on journalists' style of reporting, possible correlations with the use of frames and how they influence the portrayal of risk. During the coding process, the codes of journalistic norms have been assigned to a paragraph whenever the author utilizes one or several of these norms for their reporting on climate change. For this, the study of Boykoff and Boykoff (2007), on the shaping of journalistic norms on climate change media coverage has been used. These journalistic norms of news reporting represent a pattern content to be analyzed. In order to reasonably code this pattern content, the coder has to recognize when statements by individual claim makers are presented, when events are dramatized presented, when new information is named, when authorities provide warnings or instructions, and when journalists balance their reporting using several views.

The coding category *Journalistic Style* aims to uncover differences in the styles which are employed to portray the issue of climate change in German and US news media. The three codes of (6) Reflective Style, (7) News Style Story Model, and (8) News Style Information Model are thereby employed for the analysis of how the use of journalistic style differs between the countries. Using these codes for the analysis of articles from the six news broadcasters, it can be assessed what reporting style is utilized for the communication on climate change. The journalistic style has only been assigned once per article and contains latent pattern content that must be recognized by the individual coder. This pattern content should be recognized during coding, with the help of the codebook, when an article applies a reflective style and focuses on educating, persuading and instructing its audience, whether the article contains a story model and creates satisfying experiences using emotional connotations or sensationalism, or whether it uses an information model to disseminate information with objectivity, balance, and neutrality.

Furthermore, several issue-specific and generic *Frames* have been developed for this study on the portrayal of climate change in German and US news. These codes have been incorporated to analyze differences in the presentation of climate change. In addition to the before mentioned codes that have been derived from studies on the communication on climate change, the codes of (20) Morality and (21) Human responsibility have been added to the codebook after the first round of coding with a second coder. Those codes have been included for the analysis of news articles to uncover whether climate change is presented as a moral issue and whether it focuses on the distribution of responsibility and stresses the human contribution to the increasing development of climate change. The codes (9) to (23) have been assigned to a

paragraph whenever the author utilizes one or several of these frames simultaneously for their reporting on climate change and represent a manifest content to be analyzed. This involves analyzing the occurrence of a word, phrase, or element discussed in the articles to be observed, which is easily observable by the coder. For example, when assigning the code Environmental impact, elements, and phrases such as “drought”, “flood”, “heat”, “weather extremes”, “forest fires” or “melting glaciers” can be looked for.

The last coding category, *Risk Portrayal*, is supposed to uncover to what extent the news article portrays the risk posed by climate change. Risk is measured using the frames (24) Low Risk, (25) Moderate Risk, and (26) High Risk. Those codes have been assigned only once per article. The last coding category once again presents latent pattern content to be analyzed for this study. To avoid subjective interpretations as much as possible, a set of rules for the coding of the category risk portrayal has been established. It was determined that an article which contains dramatization of events and thus presents the consequences or causes of climate change in a dramatized manner, cannot be assigned to a low-risk portrayal, as it does not report neutrally and objectively on the topic. To be coded a moderate connotation of risk portrayal, a news article must present the dangers of climate change neutrally, or with only a light to moderate connotation of risk and dramatization of the topic. The norm of dramatization may be used occasionally, but not more than once per article. Of course, articles with frequent use of dramatization and exaggerated depiction of climate change and its consequences were given the code of high-risk portrayal.

Before performing the full analysis of news articles, the reliability of the codebook had to be determined and reassured. Assessing the codebook’s reliability, ten percent of the corpus of analysis has been subjected to an intercoder reliability pretest. To do this, two coders independently coded the same share of the corpus using the identical codebook. By comparing the assigned codes, four Cohen's Kappa have been calculated, which are used to assess the codebook’s reliability, accuracy, and explanatory power. To reach sufficiency, the Cohen’s Kappa has to exceed a score of 0.6. For this present study, to guarantee the reliability of the analysis, two coding rounds were completed. As after the first round of coding, observed deviations between the coding results of the two coders were too large, codes have been slightly modified and defined more precisely to assure the validity of the coding scheme. Since the coding categories journalistic style and risk portrayal each contain only three codes and are each mutually exclusive, twice the number of articles were analyzed for these categories using a second coder. The subsequently calculated intercoder reliability from the second round of coding can be found in Table 5. As it can be derived from the table, all codes have achieved a

sufficient Cohen's Kappa, ensuring the reliability of the coding process and the validity of the coding scheme. The coding categories journalistic style and risk portrayal were even assigned a Cohen's Kappa of 1.00 as a perfect match of the coding results have been observed.

Table 5

*Intercoder Reliability*

<b>Category</b>	<b>Codes</b>	<b>Cohen's Kappa</b>
Journalistic Norm	5	0.76
Journalistic Style	3	1.00
Frames	15	0.85
Risk Portrayal	3	1.00

## 4. RESULTS

In the following, the results of the performed analysis of German and US news on the portrayal of climate change will be presented. Firstly, the results regarding the use of journalistic norms and styles in both nations will be presented, before elaborating on the results of the analysis of frames. Thereby, after presenting the general findings regarding the number of frames used in total and the most frequently used frames, the framing in German and US news will be presented separately. Subsequently, results from the co-occurrence analysis of frames and journalistic styles and norms will be presented. Lastly, the findings regarding the portrayal of risk in German and US news, including the correlations between risk portrayal and other constructs, will be presented.

### 4.1. Journalistic norms and style

Looking at the use of journalistic norms and styles in the reporting on climate change in US and German digital news, several differences in their use between the countries can be observed. First of all, it can be pointed out that US news outlets mostly make use of the journalistic norms of personalization (n=175) and dramatization (n=59). Although German news outlets also make use of the journalistic norm of personalization (n=109) most frequently, in comparison, this norm has been used a lot less. German news outlets found out to be also frequently using the journalistic norm of authority-order (n=40). For both German and US news outlets, the least frequently used norm was the norm of novelty with German news outlets using it even less (n=14) than US news outlets (n=20).

Table 6

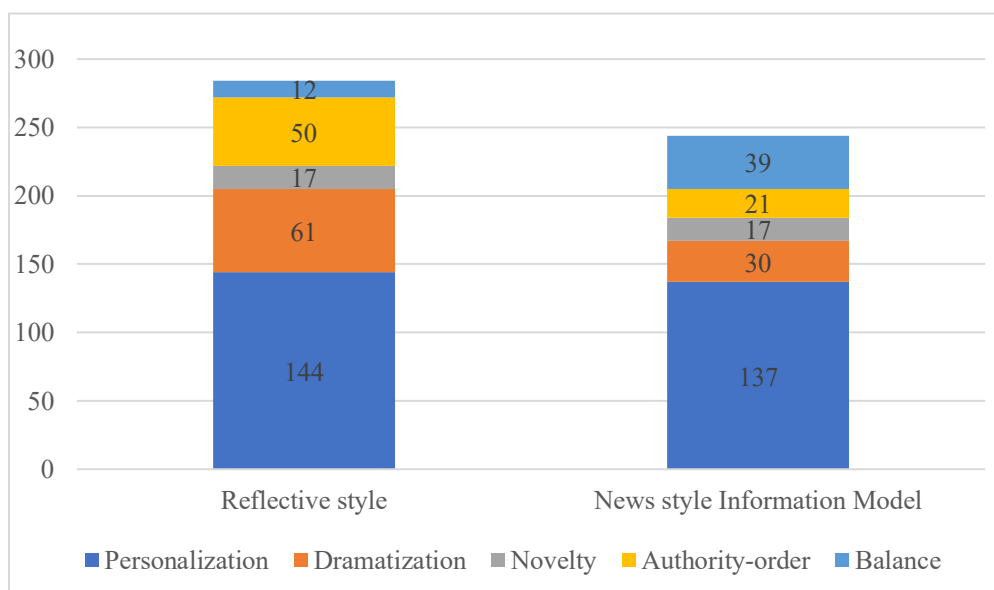
#### *Frequencies of Journalistic norms and Journalistic style*

<b>Journalistic norms and styles</b>	<b>German News</b>	<b>US News</b>
(1) Personalization	109	175
(2) Dramatization	32	59
(3) Novelty	14	20
(4) Authority-order	40	31
(5) Balance	24	28
(6) Reflective Style	13	16
(7) News style Story model	1	0
(8) News style Information model	16	14

Also, results for the use of journalistic styles in news reporting on climate change have been found. The two journalistic styles that have been almost entirely used for the reporting are the reflective style (n=29) and the news style information model (n=30). The news style story model has only been utilized once by a German news outlet (n=1), wherefore it is not considered in the further elaboration of results. With regard to the first hypothesis, German news outlets most frequently made use of the news style information model (n=16), whereas US news outlets mostly made use of the reflective style of news reporting (n=16). The observed frequencies of journalistic norms and styles can be found in Table 6.

Additionally, also co-occurrences between the journalistic norms and styles have been observed. According to these co-occurrences, when utilizing the reflective style of news reporting, mostly the norm of personalization (n=144), dramatization (n=61), and authority-order (n=50) are being used. In contrast to that, when utilizing a news style information model for the reporting on climate change, mostly the journalistic norms of personalization (n=137) and balance (n= 39) have been made use of. These co-occurrences can be found in Figure 2. To test whether these frequencies between journalistic styles and journalistic norms are related, a chi-square test has been conducted. Thereby, a significant relation between the use of journalistic norms and journalistic styles has been found,  $X^2(4, N = 528) = 34.04, p = .00$ . The null-hypotheses that there is no relation between the use of journalistic norms and journalistic styles, can be rejected, meaning that the observed frequencies of the journalistic norms within the journalistic styles is significant and therefore not due to coincidence or chance.

Figure 2  
*Co-occurrences of Journalistic norms and Style*





## 4.2. Framing

In order to be able to answer the first research question, and to test the second hypothesis, the analysis of frames for the reporting on climate change has been conducted and will be elaborated on in the following by firstly presenting some general observations. In total, a number of 2171 frames have been identified in the selected articles. German news outlets thereby made use of less frames (n=935) than US news outlets (n=1236) in the presentation of climate change. However, this observation could also reflect the fact that US news broadcasters, on average, reported on the issue of climate change with lengthier articles. As a result, generally, a higher number of frames were employed than from German broadcasters, which used an average of 200 words less for their reporting in news media. Overall, the environmental impact frame has been observed to be the most frequently used frame for the reporting on climate change by German and US news outlets together (n=435). Furthermore, the scientific reference frame (n= 406), the international frame (n=262), and the public health frame (n=160) have been used the most commonly for the reporting on climate change. In contrast to that, the fewest references have been given to the international relations frame (n=11) and the morality frame (n=7).

### 4.2.1. Framing in German news

Furthermore, through this analysis of articles, it is also possible to gain insights into the use of frames for the reporting on climate change in German news outlets. For German news outlets, the most frequently used frames in use have been the scientific reference frame (n=179), and the environmental impact frame (n=195), the international frame (n=135) and the energy focus (n=79). The frames of national security, international relations, and morality were not frequently used by German news outlets.

Results of the analysis showed that, in contrast to US news outlets, German news more frequently make use of the uncertainty frame (n=23), and the energy focus (n=79), as well as the international frame (n=135). German news outlets thereby more frequently made use of the collective perspective (n=56) over the personal perspective (n=12), as well as the international frame (n=135) over the national frame (n=35). German news outlets also favored the presentation of climate change with the environmental impact frame (n=195), rather than with the economic impact frame (n=36). Additionally, the presentation of climate change with an energy focus frame (n=79) was used more commonly than the presentation of the issue with a political focus frame (n=41), as presented in the following articles, which read: „already last

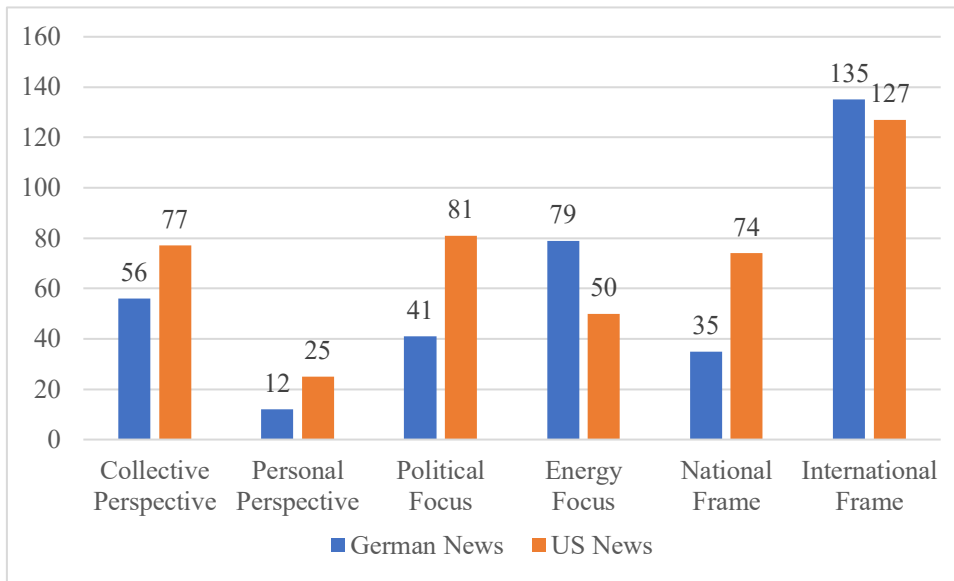
year, Taalas warned that "climate change will have destructive and irreversible consequences for the Earth" if there is no reduction in greenhouse gases" (SPIEGEL, Article 15), while another stated „for the year 2100, if emissions continue to rise without restraint, the researchers now estimate a sea-level rise of probably 0.61 to 1.10 meters compared to the turn of the millennium“ (SZ, Article 24).

#### 4.2.2. Framing in US news

As stated before, US news outlets used a greater amount of frames for the reporting on climate change. As in the case of German news outlets, US news outlets most frequently made use of the environmental impact frame (n=240), the scientific reference frame (n=227), and the international frame (n=127). US news outlets used the frames of morality, international relations, and uncertainty the least for their reporting on climate change. The analysis of articles also showed that, in comparison to German news, news published by US news outlets more frequently made use of the national security frame (n=50), economic impact frame (n=84), the public health frame (n=105), and the political focus (n=81). Furthermore, also the use of the frames within US news outlets has been discovered. Although the use of the personal perspective on climate change in US news (n=25) is higher than in German news outlets (n=12), the collective perspective in US news is used even more often for the reporting on climate change (n=77). The same applies to the use of the national frame and international frame. Although, compared to German news outlets, US news outlets use a national frame more than twice as often (n=74), an international frame is being incorporated even more frequently by US news outlets for reporting on climate change (n=127). Furthermore, it was also found that US news outlets prefer a political focus (n=81) to an energy focus (n=50). In relation to these insights on the reporting in US news, one article read “If the leaders of the world changed course, a revolution could take place over about 15 years ... this requires the leaders of China, and the US in particular, along with Europe, to take a strong leadership role and set the stage for the rest of the world to follow”(CNN, Article 38). Figure 3 presents a selection of frames used by German and US news broadcaster.

Figure 3

*Frequencies of Frames (selection)*



#### 4.2.3. Framing and journalistic style

Next to the frequencies of journalistic styles and frames used by German and US news outlets for the reporting on climate change, also the relationship between these two constructs has been analyzed for this present study. To answer the second research question, the co-occurrences of journalistic styles and frames have been analyzed. Thereby, patterns regarding the use of frames in connection with journalistic styles had been identified, which can be found in Figure 4. Besides the observed differences in the use of the frames, the reflective style, as well as the news style information model, both use the environmental impact frame, the scientific reference frame, and the international frame most often, as those are generally the most frequently used frames. After that, the reflective style of news reporting, especially incorporates the human responsibility frame (n=113), the collective perspective (n=96), as well as the public health frame (n=94). After the use of the environmental impact frame, the scientific reference frame, and international frame, the news style information model also increasingly made use of the energy focus (n=68), the economic impact frame (n=63), and the national frame (n=63). By conducting a chi-square test, it has been confirmed that there is a significant relationship between the use of frames and the journalistic style of reporting,  $\chi^2(8, N = 1861) = 73.36, p = .00$ . It can therefore be concluded, that after employing the three most used frames, the frequencies of the frames human responsibility, collective perspective and public health frame are more related to the use of a reflective style of reporting, whereas the frequent usage of an

energy focus, the economic impact and the national frame are more frequently related to the use of an information model of news reporting.

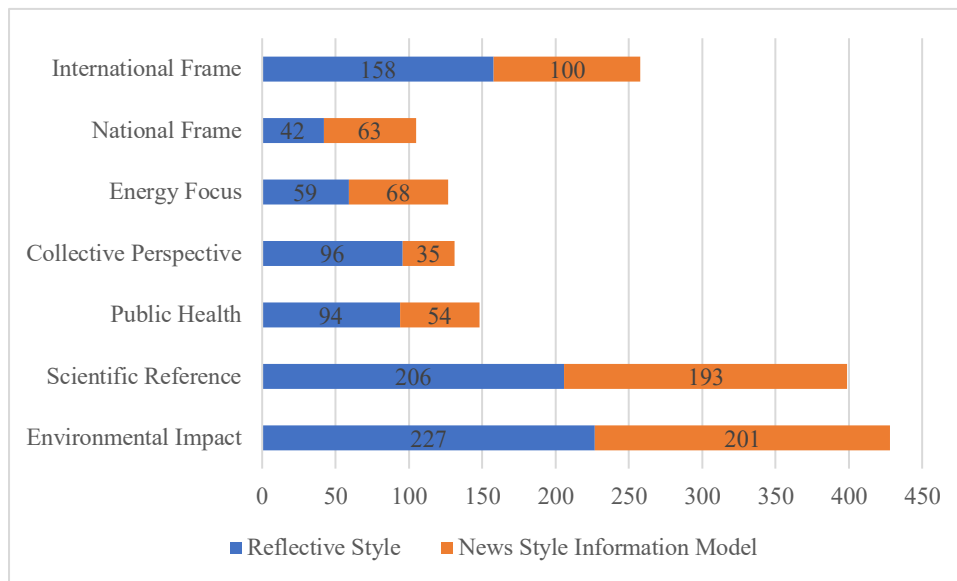


Figure 4  
*Frames by Journalistic style (selection)*

### 4.3. Portrayal of risk

Lastly, to answer the third research question, also the portrayal of risk in the reporting of climate change in German and US news has been analyzed. Thereby, differentiations in the portrayal of risk between German and US news could be found. US news outlets thereby reported on the topic of climate change most frequently with high risk (n=19). German news outlets reported on the topic only 15 times with high risk. Also, US news outlets reported on the issue of climate change with less frequently with low risk (n=3) than German news outlets did (n=9). Moderate risk of climate change, on the contrary, has been portrayed almost equally by US and German news outlets. Frequencies of risk portrayal in US and German news outlets can be found below in Table 7.

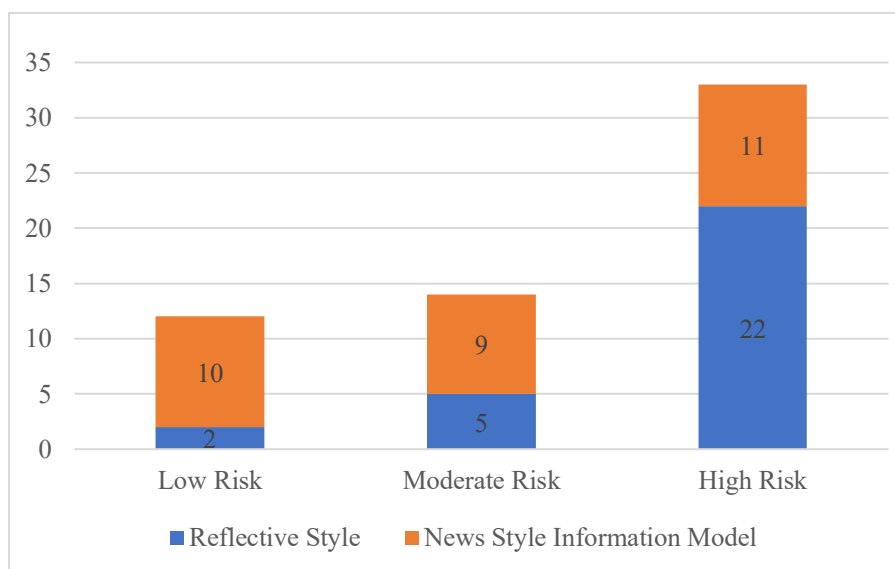
Table 7  
*Risk portrayal in US and German news outlets*

<b>Risk portrayal</b>	<b>German news</b>	<b>US news</b>
Low risk	<b>9</b>	<b>3</b>
Moderate risk	6	8
High risk	15	<b>19</b>

Also, the relationship between risk portrayal and employed journalistic style has been analyzed by this media analysis. Relating to the final hypothesis, it was discovered that a reflective style of news reporting on climate change overall presents the issue of climate change more frequently with high risk (n=22) than a news style information model (n=11). The reflective style has thereby been assigned mostly to high risk portrayal news and has only portrayed climate change twice with low risk. In contrast to that, the news style information models risk portrayal has been overall rather evenly distributed. It thereby has been portraying the issue of climate change with low risk (n=10), moderate risk (n=9), as well as high risk (n=11). Frequencies of risk portrayal per journalistic style can be found in Figure 5. To test the relationship between the use of journalistic styles and risk portrayal, a chi-square test has been conducted, which revealed a significant relation between the use of journalistic styles and risk portrayal,  $\chi^2(2, N = 59) = 10.13, p = .01$ . Due to this, the null-hypotheses that there is no relation between the use of journalistic styles and risk portrayal can be rejected. It can be stated that there is a relation between the frequencies of use of journalistic styles and the portrayal of risk, meaning that high risk portrayal of climate change is more often related to a use of a reflective style as compared to the use of an informational model of reporting.

Figure 5

*Risk portrayal by Journalistic style*



For this present study, also the risk portrayal in relation to journalistic norms has been analyzed. Thereby it has been observed that for all three categories of risk portrayal, the journalistic norm of personalization has been the most frequently used one. Nevertheless, there are significant differences in the frequency of use of this specific norm within the three categories. The norm of personalization has thereby been mostly employed in high risk

portrayal articles (n=170), has been less used for moderate risk portrayal (n=61), and least used in low risk portrayal articles (n=53). In addition to that, it has been observed that the journalistic norms, most frequently associated with high risk, are the norms of dramatization (n=81), as well as authority-order (n=50). An example of how journalists made use of these norms, related to a high portrayal of risk is:

"It points to a threat that is greater to our species than any known virus -- we must not be diverted from the urgency of tackling it by reducing our greenhouse gas emissions to zero as soon as possible." (CNN, Article 40)

Low risk portrayal has been most frequently observed with the journalistic norm of balance (n=19). Using a cross-tabulation, a significant chi-square test of independence was conducted,  $\chi^2(8, N = 532) = 56.13, p = .00$ . The null-hypotheses that there is no relation between the use of journalistic norms and risk portrayal can therefore be rejected. Due to this, it can be stated that there is a relationship between the use of journalistic norms and the portrayal of risk. A frequent use of the norm of personalization, as well as the norms of dramatization and authority-order, are thereby more often related to a high portrayal of risk, whereas a low use of the journalistic norm of personalization, as well as the use of the norm of balance, are more frequently related to a low portrayal of risk in the reporting on climate change.

## 5. DISCUSSION AND CONCLUSIONS

The following section discusses the previously presented results in connection with the research questions and hypotheses. It will thereby be examined to what extent the hypotheses have been met and how the earlier formulated research questions of the study can be answered. After the discussion of the study's results, the limitations of this study are explained, and suggestions for future research are given. Finally, practical implications for the communication on climate change are presented, and the conclusions of this study are provided.

### 5.1. Discussion of the findings

The findings of this study support the general claim that the use of frames, journalistic norms, as well as journalistic styles in the reporting on climate change, differs between German and US news outlets. These discovered differences in the reporting on climate change in German and US news media, significantly influence the risk portrayal of climate change. In the following, the findings of this study will be discussed and, in connection with the previously presented insights from literature, explained.

#### 5.1.1. Journalistic norms and style

Relating to the first hypothesis (*“US news broadcasters more frequently make use of a story model of news reporting, whereas German news broadcasters are mostly utilizing an informational model of news reporting and a reflective style.”*), it can be concluded that German and US news broadcasters employ different journalistic styles when presenting climate change. It was observed that German news more often use an information model of news reporting, whereas US news more often use a reflective style for their articles on climate change. In contrast to the presented hypothesis, the story model of news reporting was hardly used at all in this study's articles of analysis. US news thereby took an attempt to convince and persuade the audience and use dramatization to engage with their emotions, whereas German news remained factual and focused on informing the audience. Given that both US and German news broadcasters have almost exclusively chosen not to employ a news style story model of reporting, it can be concluded that provoking experiences in the minds of the reader, through storytelling to create emotional connotations and sensationalism, is not necessarily a preferred way to present a topic as important and serious as global climate change in the media. However, it can frequently be found in papers that, for effective climate change communication, especially narrative storytelling and personal stories should be included in order to engage the

public, as through a personal style is supposed to help the reader to better understand climate change and to put the issue into their own perspective (Corner, Shaw & Clarke, 2018). During this study, the news style story model of reporting, which uses emotional connotations to address the readers emotions, has not been used contrary to the claims that it is of high effectiveness. This observation could be explained by the fact that the analyzed news articles did not aim at explaining climate change, and that it is not supposed to be viewed from a solely personal perspective, but rather, as argued above, aims to emphasize its risks through a collective perspective and thus does not attempt to tell a story, but to provide information to persuade the audience of its risks and dangers. Therefore, it can be argued that the choice of journalistic styles is certainly based on the aim of the journalist. If the aim is for the reader to better understand climate change and to consider the issue from a personal point of view, a news style story model is certainly appropriate. On the other hand, if the risks of climate change are to be emphasized in order to increase risk perceptions, a reflective style of reporting is most appropriate.

The use of the journalistic norms of reporting was also observed to differ in US and German news. Although both applied mostly the norm of personalization, US news also frequently employed the norm of dramatization and German news the norm of authority-order. This confirms with the claim presented in the conceptual model that US news broadcasters seek to persuade and entertain the audience by using these very journalistic norms, whereas German news broadcasters try to inform the audience by using the norms of personalization and authority-order. This allows these findings to be linked to the statement by Broersma (2007), as US news broadcasters focus on educating, persuading, and teaching their audiences, while German news broadcasters aim to disseminate information on climate change through their reporting on a very factual basis.

### 5.1.2. Framing

Also, the second hypothesis (*“US news broadcasters are more likely to use a personal perspective on the issue of climate change, resulting in frequent usage of the public health and human responsibility frame, a national and national security frame, as well as the economic impact frame and political issue frame. German news broadcasters, on the other hand, are expected to especially incorporate a collective perspective and an international frame on the issue of climate change, the environmental impact frame, the energy focus frame, as well as a scientific reference.”*) can be answered using these studies results.



Contrary to the presented hypothesis, US news preferred a collective perspective over the personal perspective and an international frame to a national frame and framed the topic of climate change primarily with the frame of environmental impact and the scientific reference. In addition to that, contrary to expectations, an environmental frame was used more frequently than the economic impact frame, as well as the political issue frame. Although, US news broadcasters did use the personal perspective, a national frame, the national security frame, the economic impact frame, and the political focus, more frequently than German news broadcaster did, those frames were not the most prominently used frames by US news, and thereby do not support the first part of the second hypothesis. For German news media, however, the hypothesis can be confirmed. Due to the fact that US news used a greater number of frames than German news media, the frequencies of frames used by German news have been overall lower. However, the collective perspective has been used more often in German news than the personal perspective, and the international perspective more often than the national perspective. Also, expected, the frames of environmental impact and scientific reference were the most frequently used frames in German news. With regard to the study from the University of California, which stated that presenting climate change from a collective perspective achieves greater change in behavior from the audience than a personal perspective on the issue does, it can be concluded that as both German and US news more frequently used the collective perspective frame on climate change than the personal perspective frame, these news should also be relatively more effective in convincing the audience and in influencing their behavior. As elaborated on earlier in this paper, the use of frames is highly influenced by cultural differences in reporting, whereby different aspects of climate change in the two countries are presented with higher and lower attention (Entman, as cited by Kozman, 2017). However, the subsequent most frequently used frames in German and US news did differ between the countries and thus partly determine the presentation of the topic in news media in the respective country, which also influences subsequent risk portrayal of these news. Regarding RQ 1 (*How are frames, norms, and styles of reporting used by US and German digital news to portray climate change?*), it can therefore be concluded that German and US news broadcasters both presented the issue of climate change mostly with an international frame, a collective perspective, as well as with the environmental impact and scientific reference frame to increase their effectiveness in convincing the audience and in influencing their behavior.

To answer the second RQ (*“How is the use of journalistic styles related to the use of frames in US and German news?”*), the co-occurrence analysis of journalistic styles and frames is used. It has thereby been observed that the reflective style and the news style information

model both use the environmental impact frame, the scientific reference, and the international frame most often. Thus, it can be made clear that regardless of whether the audience is to be persuaded and engaged through the use of dramatization and sensationalism, or whether it is to be informed through the use of balance and objectivity, the three frames of environmental impact, scientific reference, and international frame are most commonly used for both journalistic styles. In addition to that, utilized with increasing frequency for the reflective style of news reporting, the human responsibility and public health frame have been mostly used, supporting the expected co-occurrences of journalistic styles and frames. As stated by Myers, Nisbet, Maibach, and Leiserowitz (2012), using a public health frame heightens the relevance and importance of climate change for the news broadcaster's audience and thereby leads to increased engagement, awareness, and action. Therefore, the utilization of a reflective style of news reporting, with frequent use of the public health frame, should lead to a greater involvement of the audience.

As expected, the informational model of news reporting increasingly employed an energy focus on climate change, referring to the burning of fossil fuels and the resulting increased greenhouse gas effect, but however, also frequently made use of an economic impact frame and national frame, which have been expected to rather occur for the story model of news reporting. Nevertheless, in this journalistic style, contrary to the assumption, the collective perspective has been used less frequently than expected beforehand. On the other hand, the reflective style of reporting employed the collective perspective more frequently, indicating that news composed in an information model, are less effective in bringing about a change in people's behavior than news with a reflective style of reporting, which more frequently employed the collective perspective for their climate change reporting.

### 5.1.3. Risk portrayal

Lastly, the findings of this study provide answers for the third RQ (*"How does the portrayal of risk of climate change differ between US and German news?"*). Referring to the results of this study, it can be concluded that the portrayal of risk of climate change between German and US news significantly differs and that the use of a particular journalistic style can be seen as an antecedent for this effect. By the fact that articles from US news broadcasters were more often associated with high risk portrayal than articles from German news broadcasters, whose articles portrayed relatively evenly low, moderate and high risk, it can be stated that risk of climate change is represented with higher frequency in US news than in German news. Through these insights, the third hypothesis of this study (*"US news broadcasters, utilizing a story model or*

*a reflective style of reporting, will present the issue with greater risk in order to produce exciting and stimulating news to entertain and persuade the reader, whereas German news broadcasters are expected to present the issue with less risk as by limiting themselves to the factual presentation of the news to inform the audience by use of an information model of news reporting.*”) can be confirmed. According to Ghavamnia and Dastjerdi (2013), increased risk portrayal of climate change in US news media is thereby supposed to increase awareness on the issue on side of the audience, which would imply that news articles from US broadcasters increase their audience’s awareness to a greater extent than articles from German broadcasters do.

## **5.2. Limitations and future research**

In the following, it will be reflected upon what limitations need to be addressed for the present study and what implications for further research on the topic of climate change communication in news media arise. Although this research focuses exclusively on news articles with relation to the issue of climate change in German and US news, the issue of climate change itself poses a very broad topic, with many sub-themes to be looked into. As different sub-topics in the reporting of climate change are written with different priorities, and thus with different risk portrayals, it can lead to issues being presented differently in the reporting on climate change in news media. The same applies to a timewise classification of news media articles. Since it can be assumed that during certain events and political debates on climate change, the interest of the media will increase, the reporting of journalists could be affected. Due to this, it would be of great interest to analyze differences in reporting on climate change with attention to a temporal categorization. For future research, it would therefore be interesting to look into different presentations of sub-topics of climate change, which may result in different uses of journalistic norms and styles, frames, and ultimately risk portrayal, and into whether certain events in time affect the presentation of climate change in news media. Thereby, it would be made possible to link different presentations of climate change in news media to certain events and debates concerning the issue.

Finally, the subjectivity of manual coding is also a limitation of this study. Although a sufficient degree of intercoder reliability was determined before the analysis of articles, meaning that quality assurance of the coding process to increase the credibility of the analysis has been ensured, certain coding categories could certainly be interpreted slightly differently by other coders, since code categories such as journalistic style and risk portrayal are considered subjectively. Although the deductive coding process of this study certainly represents higher

validity than an inductive coding process, the manual coding process is always subject to the subjectivity of the coder. For future research, when assessing the portrayal of risk in climate change communication, a more sensitive scale could be put to use. Thereby, when making use of a 5-point scale for the coding of the portrayal of risk in news media, the coding's specificity should increase.

In addition to that, it would be interesting to find out how portrayed risk is actually perceived by the audience and how behavior, attitudes, and opinions are changed and influenced by the news coverage on climate change. In particular, conducting reader surveys on the assessment of risk portrayals, and how the issue of climate change in news media is perceived by them would certainly pose a step towards making communication on climate change more effective. Thereby, for further research on the communication of climate change in news media, it would be interesting to find out how the findings of this study relate to cultural differences between Germany and the USA. For this purpose, it could be studied how cultural differences between countries influence the presentation of climate change and how the issue has to be presented due to cultural differences in order to influence the reader's attitudes, opinions and behavior most effectively.

### 5.3. Practical implications

To conclude this study, the final aim of formulating practical implications on how to increase risk portrayal in climate change communication will be elaborated on, and the conclusion for this study will be provided. To answer the fourth and final RQ (“*What practical implications for the reporting on climate change and its risk portrayal can be made?*”), to following will elaborate on several practical implications to be considered when communication on climate change in news media.

As this study found out, there are a number of significant differences in the presentation of climate change between German and US news broadcasters. Thereby, it has been discovered that different journalistic styles and norms, as well as frames result in altered risk portrayals. It was found that above all a reflective style of news reporting on climate change was most commonly related to a high-risk presentation of the topic, as well as a frequent use of the journalistic norm of personalization, the norm of dramatization and authority-order resulted in a riskier presentation of climate change in news media. A purely factual and balanced presentation of facts and information alone on climate change did not lead to a high-risk portrayal, suggesting that in order to portray climate change as persuading and of high risk, a sense of urgency, dramatization, and demand is needed. When putting these recommendations into practice, journalists, as well as spokespersons from organizations and companies that want to effectively communicate about climate change such as Greenpeace or the UN, should, when seeking to influence public opinion, behavior or attitudes on climate change, incorporate especially the journalistic norms of dramatization, authority-order, and personalization, and embed the information into a reflective style of news reporting, by convincing and persuading the audience of the seriousness posed by climate change. Thereby, it is recommended, instead of solely concentrating on presenting balanced and neutral information, to emphasize the dramatic consequences and to stress the orders of authorities directed at the audience.

As the use of different styles, norms, and frames of news reporting for the communication on climate change results in major differences in how the issue is presented and directed at the audience, one should be aware that the application of different frames in news media can put the debate on climate change in a whole different perspective. The same applies to the use of journalistic norms and styles, as through the skillful use of such, the communication on climate change can change from a mere transmission of facts to a persuading message for its audience.

## **5.4. Conclusions**

In conclusion, the aim of this study was to investigate the portrayal of climate change in German and US news, in order to formulate practical implications on how to communicate on the issue of climate change. By examining the use of journalistic norms and styles, the framing of climate change, as well as its portrayal of risk, it has been found that the presentation of climate change in German and US news significantly differs. The employment of different journalistic norms, styles, and frames of news reporting therefore resulted in great differences in how the issue is presented to the audiences and should thereby lead to a different public understanding and behavior of citizens between German and US news media audiences.

Altogether, it can therefore be concluded, that readers of US news broadcasters, which are presented articles with an overall higher risk portrayal, should show greater response to the debate on climate change, as well as increased behavioral impact, than readers of German news broadcasters do. Gained insights of this study thereby allowed to draw conclusions on how climate change risk portrayal can be heightened. In conclusion, when trying to effectively communicate on climate change with the goal to influence public opinion, behavior or attitudes, the choice of writing style, the journalistic norms to be used, as well as the framing of the issue are highly important to be considered. Because as heightened risk portrayal increases acceptance of the issue's urgency and the need for action considerably, news media reporting is made more effective and a greater tool for informing the public.

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## APPENDIX A: Corpus

A complete transcript of the articles in an Atlas.ti file is available at the secretary of the Communication Science department from the University of Twente. In the below tables, an overview is given on the German and US news articles that have been analyzed for this study.

Table 8

### *Corpus German news*

Nr	Source	Article
1	FOCUS	March 19, 2019_Hunderte Forscher schlagen Alarm: Wenn wir nicht sofort handeln, kollabiert uns Ökosystem
2	FOCUS	June 3, 2019_Gefährliche Kipp-Punkte: Das passiert, wenn wir das 1,5-Grad-Ziel nicht einhalten
3	FOCUS	August 2, 2019_Zahl der Hautkrebsfälle steigt rasant - Krankenkasse gibt Klimawandel die Schuld
4	FOCUS	August 28, 2019_Ist der Kampf gegen den Klimawandel noch zu gewinnen? Das sagen Experten
5	FOCUS	August 28, 2019_Klimawandel wird künftig schwere Hochwasser in Deutschland verstärken
6	FOCUS	November 26, 2019_Alarm-Bericht der Regierung: Klimawandel trifft Deutschland mit voller Wucht
7	FOCUS	January 18, 2020_McKinsey-Studie zeigt an drastischen Beispielen Folgen des Klimawandels
8	FOCUS	January 19, 2020_Ökonomin Kemfert: "Klimawandel ist ein Milliardenesaster, wenn wir nicht gegensteuern"
9	FOCUS	February 19, 2020_Hohe Blackout-Gefahr durch Klimawandel? Forscher entkräften Schock-Studie
10	FOCUS	February 19, 2020_"Unsere Welt brennt": Kinder leiden weltweit unter Armut, Klimawandel und Kommerz
11	SPIEGEL	July 24, 2019_Schweizer Forscher entkräften Argument von Klimawandel-Leugnern
12	SPIEGEL	August 1, 2019_"Je wärmer es wird, desto mehr Tote wird es geben"
13	SPIEGEL	August 2, 2019_Warum wir uns fürs Fliegen schämen sollten
14	SPIEGEL	November 14, 2019_Wie der Klimawandel krank macht
15	SPIEGEL	November 25, 2019_Neuer Rekord an Treibhausgasen in Atmosphäre
16	SPIEGEL	January 17, 2020_Konzerne sollen Klimaschutz im Alleingang betreiben
17	SPIEGEL	January 20, 2020_Klimaforscher setzen Finanzwelt unter Druck
18	SPIEGEL	Januar 25, 2020_Woher die gewaltige Energie des Klimawandels stammt
19	SPIEGEL	April 20, 2020_Das Eis am Nordpol ist nicht mehr zu retten
20	SPIEGEL	May 5, 2020_Ein Drittel der Weltbevölkerung könnte bis 2070 unter großer Hitze leiden
22	SZ	July 24, 2019_"Die von Menschen verursachte globale Erwärmung ist beispiellos"
22	SZ	August 22, 2019_Der Klimawandel ist nicht von oben zu stoppen
23	SZ	September 20, 2019_Millionen Menschen könnten ihre Heimat verlieren
24	SZ	September 25, 2019_Es ist noch nicht zu spät
25	SZ	January 14, 2020_Ozeane so warm wie nie seit Beginn der Erfassung
26	SZ	January 31, 2020_Ein bisschen Panik ist schon okay
27	SZ	February 19, 2020_Aufsteigende Hitze
28	SZ	February 22, 2020_Wie Stürme die Energieversorgung gefährden könnten
29	SZ	March 30, 2020_Offenbar nicht nur Westantarktis von Klimawandel getroffen
30	SZ	April 2, 2020_Autobranche will EU-Klimapläne bremsen

Table 9

*Corpus US news*

Nr	Source	Article
31	CNN	January 16, 2019_250,000 deaths a year from climate change is a 'conservative estimate,' research says
32	CNN	February 28, 2019_Earth's fish are disappearing because of climate change, study says
33	CNN	May 7, 2019_Climate anxiety is real, but there's something you can do about it
34	CNN	June 4, 2019_Climate change is seriously threatening human health
35	CNN	June 5, 2019_Climate change could pose 'existential threat' by 2050: report
36	CNN	November 6, 2019_11,000 scientists warn of 'untold suffering' caused by climate change
37	CNN	December 5, 2019_Climate change is forcing one person from their home every two seconds, Oxfam says
38	CNN	January 13, 2020_Oceans are warming at the same rate as if five Hiroshima bombs were dropped in every second
39	CNN	February 29, 2020_Climate change is threatening winter sports' very existence
40	CNN	March 10, 2020_The climate crisis is disrupting life for millions, a report finds
41	FOX	December 14, 2018_Mountain of evidence confirms: Climate change is really, really bad for human health and well-being
42	FOX	January 15, 2019_Climate change is causing waves to get bigger and more powerful, study shows
43	FOX	January 17 2019_Climate change or poor policy? As Australia's wildfires see some relief, blame game ascends
44	FOX	January 21, 2019_More than 250,000 people may die each year due to climate change
45	FOX	March 2, 2019_Half of world's beaches will disappear by 2100 because of climate change, experts say
46	FOX	March 13, 2019_Dire UN climate change report reveals it's not too late to save planet
47	FOX	April 23, 2019_Majority of Americans think climate change will cause humanity's extinction
48	FOX	July 29, 2019_Today's climate change is worse than anything Earth has experienced in the past 2,000 years
49	FOX	August 19, 2019_Climate change will shrink 'virtually all' economies around the globe by 2100, study warns
50	FOX	September 5, 2019_Mattis turns up heat on climate change deniers, pushes for more federal action on 'national security issue'
51	NYT	January 17, 2019_Climate Change's Giant Impact on the Economy: 4 Key Issues
52	NYT	February 21, 2019_What Is the Green New Deal? A Climate Proposal, Explained
53	NYT	August 8, 2019_Climate Change Threatens the World's Food Supply, United Nations Warns
54	NYT	August 28, 2019_The Amazon, Siberia, Indonesia: A World of Fire
55	NYT	September 25, 2019_The World's Oceans Are in Danger, Major Climate Change Report Warns
56	NYT	October 17, 2019_Bank Regulators Present a Dire Warning of Financial Risks From Climate Change
57	NYT	November 13, 2019_Climate Change Poses Threats to Children's Health Worldwide
58	NYT	December 4, 2019_Climate Change is Accelerating, Bringing World 'Dangerously Close' to Irreversible Change
59	NYT	February 20, 2020_Climate Change Rises as a Public Priority. But It's More Partisan Than Ever.
60	NYT	April 16, 2020_'There's No More Water': Climate Change on a Drying Island

## APPENDIX B: Mandatory Literature Search Log

### 1. Research Questions and Main Concepts for the Literature Study

RQ 1: What journalistic norms and styles are there for news reporting?

RQ 2: How is framing used in the communication on climate change?

RQ 3: How does the communication on climate change shape audiences' attitudes and behavior?

### 2. Databases and Materials

In order to find the most suitable literature for the present study, the databases Scopus and Web of Science were used. Both databases are characterized by additional filtering options, which allows further exclusions to be made in order to keep an overview of the available literature. Furthermore, both databases are fully accessible, which allows all articles to be read and used for the study. Furthermore, the database Google scholar was used to get a general overview of the available literature.

Special care was taken to select materials from peer-reviewed journals or scientific books. This ensured reliability and high quality of information to use only accurate information for the present study. Furthermore, with regard to the selection of materials, only papers in the English language were used to give any reader of the study the opportunity to read the framework's references if necessary.

### 3. Search Matrix

*Table 10*  
*Literature Search Matrix*

<b>Constructs</b>	<b>Related Terms</b>	<b>Broader Terms</b>	<b>Narrower Terms</b>
Journalistic norms and style	Journalistic quality, Reporting style, Journalism standards	Media journalism	Dramatization, Balanced/Neutral reporting
Framing	Framing theory, Media analysis, Priming, Content analysis	Agenda-setting	Generic/Specific frames, Deductive/Inductive framing process
Climate change communication	Communicating climate change, Language of climate change	Climate science	Framing of climate change

#### 4. Search Actions and Results

Table 11

*Examples of Search Actions and Results*

Nr	Date	Database	Search action and technique	Total hits
1	09/03	Scopus	(priming OR framing)	98,625
2	09/03	Scopus	framing AND “content analysis” AND (“framing theory” OR priming OR “media analysis”)	147
3	11/03	Scopus	(“communicating climate change” OR “framing of climate change”) AND “climate change” AND framing	98
4	12/03	Web of Science	(“communicating climate change” OR “framing of climate change”)	165
5	12/03	Scopus	(“journalistic norms” OR “journalistic styles”) AND (dramatization OR “balanced reporting”)	8
6	12/03	Scopus	(“climate change communication” OR “framing of climate change”)	414
7	18/03	Web of Science	framing AND “framing of climate change”	66
8	18/03	Web of Science	journalism AND (dramatization OR balance)	271
9	18/03	Scopus	“media journalism” AND (dramatization OR balance)	2
10	18/03	Scopus	framing AND “framing theory” AND priming	5

#### 5. Found References in APA (Examples)

Boykoff, M. T., & Boykoff, J. M. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum*, 38(6), 1190–1204. doi: 10.1016/j.geoforum.2007.01.008

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## **6. Reflection**

For this study, it was important to find literature matching the construct under analysis. In order to achieve this, literature was only searched in known and recognized databases. As Scopus and Web of Science contain peer-reviewed articles and it is possible to use further exclusion criteria after the search, these two databases were used most frequently. By narrowing down the results in the individual databases by relevance, time, or access, the search was also made easier and faster, so that suitable articles and papers were presented relatively at the beginning. With this approach, whenever a suitable source was found, the references of the paper have been gone through and further suitable sources have been looked for. This often saved the search for further papers and very good articles on the topic were found. However, the search for literature was often made more difficult by the lack of access to some platforms. As a result, it was not possible to use papers which would have been very suitable as literature for the present study, meaning that the search had to be continued.

With regard to the applied search terms, it can be concluded that the best hits for matching papers were found when a few hundred hits have been found. After the first search results showed far too many hits, and it would have been impossible to inspect all articles listed, search terms were adjusted. However, if search terms were too exclusive and only a few papers were found during the search, most of the time there were no suitable and matching articles.