Due to climate change up to 95% of the glaciers in the
Canadian rocky mountains will be lost until 2100, in comparison
to 2005 (Clarke, Jarosch, Anslow, Radić, Menounos, 2015).
If the global warming exceeds 3°C, in the alps, 80% of the
glacier areas (in comparison to 2000) will vanish and small
glaciers (which make up 90% of the glacier areas in the alps) will
be completely gone (BMU, 2008).

**CLIMATE CHANGE - A GLOBAL PROBLEM
ARE THE NEWS MEDIA STILL SCEPTICAL?**

CLIMATE CHANGE SCEPTICISM IN THE GERMAN ONLINE NEWS

MASTER THESIS
M.A. MEDIA & CREATIVE INDUSTRIES

MILENA EICKHOFF

Moraine Lake, Alberta, Canada (own picture)

Climate change sceptics in the German online news

To what extent is scepticism about climate change present in German online news websites?

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Abstract

Climate scientists agree on the existence, human cause and negative impact of climate change. Nonetheless, there are still people who are sceptical about it and this is reflected in the media, also in Germany, the 6th most CO_2-emiting country in the world. Currently climate change mitigation policies are urgently needed to avoid a global warming of more than 1.5°C and media outlets play an important role in this process. They can not only increase public attention but also provoke or undermine public action. In a time when the internet becomes increasingly important for news consumption in Germany, there is very little research on online news regarding climate change scepticism. Furthermore, a study that combines climate change scepticism with an analysis of (political) actors and framing theory is still missing. This Master Thesis analyses to what extent scepticism about climate change is present in the German online news using a quantitative content analysis. The sample of this thesis consists of 241 online news articles from Der Spiegel, tagesschau.de, Bild.de and Focus Online in the period of January to December 2019.

The focus of the analysis is to investigate the general level of fundamental, attribution and impact scepticism, the most important actors in the articles and the frames that are being used to report about climate change. This study shows that overall scepticism about climate change is not present in the German online news. Because previous studies emphasize that conservative news outlets are usually the most sceptical about climate change, this finding leads to the conclusion that especially conservative online news outlets have become less sceptical in the past years. Nevertheless, sceptical actors are frequently mentioned, and politically left-wing oriented news websites are more likely to mention and criticise them. Furthermore, the framing of the climate change debate does not depend on the political orientation but instead on the topical focus and/ or type of news outlet. For instance, the tabloid news website Bild.de highlights conflict frames and is least likely to mention consequences of climate change while the political quality news website Der Spiegel is most likely to use responsibility frames and highlights consequences of climate change in nature.

This thesis emphasizes the responsibilities that news outlets have in times of crisis, by, for example, highlighting the scientific consensus on climate change instead of focussing on conflicts between famous actors to increase revenue. Future research could either qualitatively analyse how news websites report about sceptical actors or take social media into account, as it is also increasingly used for news consumption.

Keywords: Climate change, online news, framing, scepticism, Germany

Preface and acknowledgements

Currently, climate change is increasingly noticeable for me: The glaciers in the mountains where I love to go hiking are melting, the summers are getting hotter and dryer, I read about natural catastrophes in the news regularly (just to give examples). The impacts of climate change are countless, and that made me very interested in learning more about what can be done to take action against it. Therefore, the topics of climate change and sustainability have guided me through my academic career. For example, I wrote my bachelor thesis about how Dutch start-up companies can support the development of a circular economy in the Netherlands by 2050 and I worked on an honours project during my Master that developed a future scenario of the water, food and energy industries in the Netherlands for the government of South-Holland.

While it is inspiring to see what is already being done, we cannot forget that people are still sceptical about climate change in a time where mitigation policies are urgently needed to prevent a global warming of more than 1.5°C. 2019 has been an impactful year in Germany in the discussion about climate change because of growing "Fridays for Future"-demonstrations and the passing of a climate change mitigation law. I hope to see more change in the future, and I hope that I can be part of it.

I would like to thank several people for their help in the process of writing this Master Thesis (during the Covid-19-crisis). First of all, I would like to thank my supervisor Dr. Marc Verboord, who constantly shared his knowledge and expertise with me. Even during a difficult time like this he was always available for questions and encouraged me to give my best for this thesis.

I would also like to thank my boyfriend Javier Fatou Gómez for constantly motivating me and discussing with me about my thesis to get new ideas. I am infinitely grateful for his support over the past months. He has been my greatest support and motivator.

I am also thankful for my parent's constant encouragement and interest in my work. Because of their support I was able to go to Erasmus University and write this Master Thesis. I would also like to thank Jean-Gabriel Tarnaud because he read 10% of my sample as the second reader for the intercoder reliability test and stayed for hours discussing and improving the coding frame with me. A package filled with Stroopwafels is not enough to express how grateful I am for his help during the coding process. I am also grateful for the support and motivation from my best friend Nina Schulz. She was not only always there for me during my studies, but also helped my family in the last months, when I could not. Lastly, I would like to thank my Premaster classmates (and especially Boryana Mileva) who have been my second family in the Netherlands for the past two years. I feel very lucky to be part of a unique international group as this one.

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List of abbreviations

Latin symbols

F	F-ratio
N	Population size
n	Sample size
p	Probability value
R^2	Coefficient of determination

Greek symbols

α	Measurement of inter-rater reliability (Krippendorff's α)
β	Degree of change
χ^2	Chi-square

Abbreviations

AfD	Alternative für Deutschland [Alternative for Germany]
ARD	Arbeitsgemeinschaft der öffentlich-rechtlichen Rundfunkanstalten der Bundesrepublik Deutschland [Association of the public service broadcasters of the Federal Republic of Germany]
BDZV	Bundesverband Digitalpublisher und Zeitungsverleger [Federal Association of Digital Publishers and Newspaper Publishers]
BMU	Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit [Federal Minister for the Environment, Nature Conservation, and Nuclear Safety]
CDU	Christlich Demokratische Union Deutschlands [Christian Democratic Union of Germany]
CO_2	Carbon dioxide
EIKE e.V.	Europäisches Institut für Klima & Energie (eingetragener Verein) [European institute for climate and energy (registered association)]
EU	European Union
IPCC	Intergovernmental Panel on Climate Change
MIA	Most important actor
NASA	National Aeronautics and Space Administration
NGO	Non-governmental organization
SE	Societas Europaea (European public company)
SPSS	Statistical Package for the Social Sciences
UN	United Nations

US	United States
ZDF	Zweites Deutsches Fernsehen [Second German television]

1 Introduction

"It doesn't matter what is true, it only matters what people believe is true."

Paul Watson, Co-founder of Greenpeace

(as cited from Spencer, Bollwerk, & Morais, 1991)

This quote was given by one of the co-founders of Greenpeace, an NGO that campaigns for climate change and can be seen as one of the pioneers of environmental activism. The quote also reflects the importance of media: the more people believe that climate change exists and that it will have a strong negative impact on our lives, the more people will act on it and the more it will be taken into consideration by the government and international politics (Barkemeyer et al., 2017; Leiserowitz, 2005).

There is a scientific consensus on the existence of human-made climate change and its impact on our lives (Doran & Zimmerman, 2009). A survey by Doran and Zimmerman (2009) showed that 97% of active and publishing climate scientists agree that human activities are contributing to the changing climate. Nonetheless, the existence, causes and impacts of climate change are still faced with scepticism in the media and public opinion worldwide (e.g. Tranter & Booth, 2015).

Also in Germany, studies suggest that news media still report sceptically about the changing climate (Kaiser & Rhomberg, 2016; Tschötschel, Schuck, & Wonneberger, 2020). However, 2019 has been an eventful year for climate change in Germany because of ongoing "Fridays for Future"-demonstrations and the government's agreement on a climate protection law (tagesschau.de, 2019a). Today, especially online news websites have become increasingly important for the consumption of news in Germany and climate change is a widely discussed topic (Reuters Institute for the Study of Journalism, 2019). For example, Bild.de reports on the climate conference in Madrid in December 2019 with the heading "Müder Auftritt von Klima-Greta [tired performance by climate-Greta]" (Bild.de, 2019) while tagesschau.de publishes an article with the title "Greta Thunberg fordert Ergebnisse [Greta Thunberg demands results]" (tagesschau.de, 2019d). One article makes the climate activist seem tired and discouraged, in the other one she appears to be strong and convincing. This study will quantitatively analyse to what extent climate change scepticism was present in the German online news in 2019, how the issue was framed in different online news outlets and which actors were mentioned.

1.1 Climate change in Germany

The changing climate is generally associated with global warming, which is defined as the rise of the global mean surface temperature since the industrialization in the late 19th century (NASA, n.d.). Apart from that, the NASA states that the term climate change also refers to naturally caused warming and the impact that global warming has on the planet such as sea level rise, melting of glaciers or natural catastrophes. The organization also states the very high probability (more than 95 percent) that the majority of the recent warming trend is resulting from human activity in the last 70 years. Therefore, although climate change is connected to both naturally and human-caused phenomena, often both terms are used as synonyms (IPCC, 2018; NASA, n.d.).

The Intergovernmental Panel on Climate Change (2018), created by the UN, estimated that human actions have generated approximately 1°C of global mean temperature increase, which will further increase by 0.5°C in the coming decades. This will cause massive environmental, social and economic damages such as floods, draughts, sea level rise and species extinction, and therefore, pressure on resources such as food and drinking water (IPCC, 2018). The pressure on resources is already high. In 2014 the global economy was using 1.7 times the resources that the Earth can produce yearly and this number is constantly growing by approximately 2% per year (Lin et al., 2018).

A survey by the European Commission in 2014 shows that half of the EU citizens see climate change as one of the most serious problems in the world, while 16% see it as the most serious problem (European Commission, 2014). The survey also shows that many European citizens think that the responsibility to face climate change belongs to the national governments (48%), the industry (41%) and the EU (39%) while half of the Europeans state that they have taken action against climate change themselves during the past half year.

The European Commission (2019) states that tackling the causes of climate change is one of the main goals of the European Union. The EU aims to become more sustainable by reducing greenhouse gases, increasing renewable energy production, investing in the circular economy and becoming more resource efficient (European Commission, 2019). According to the European Commission, Germany is currently one of the most eco-innovative countries in the EU and is known for its successful waste management and recycling. Nonetheless, it is emphasized that Germany needs to work on decreasing air pollution (especially in urban areas) and water pollution, but also invest more in the prevention of waste-generation.

In Germany specifically, climate change is expected to cause heat waves, draughts, flooding, heavy rainfalls and storms, melting of the glaciers in the Alps and pressure on food production, water management, tourism and infrastructure (Umweltbundesamt, 2008). The

Global Climate Risk Index 2020 states that Germany was ranked third on the list of countries most effected by climate change in 2018 (Eckstein, Winges, Künzel, Schäfer, & Germanwatch, 2019) and in 2017, 74% of the German citizens saw climate change as a very serious problem (Statista, 2017).

Nevertheless, Germany is still producing 2.08% of the CO_2 emissions worldwide and is therefore the 6th most CO_2-emiting country in the world (Statista, 2018). Furthermore, the German ministry of environment stated in 2019 that the country will not be able to fulfil the climate protection goals that were set for 2020 (BMU, 2019b). This shows that climate change is a strongly discussed topic in Germany and the EU, but also that German climate change policies are still in need for improvement. Adding to that, there is still a significant number of Germans who are sceptical about climate change (infratest dimap, 2019), as will be discussed in the following section.

1.2 Climate change scepticism

Climate change scepticism is defined in current research as doubting the existence of a changing climate or the rise of the mean temperature worldwide (so-called fundamental or trend scepticism; Rahmstorf, 2004). Moreover, the study suggests that it can also include two other elements, which are doubts about the anthropogenic cause of climate change (attribution scepticism) or the seriousness of it (impact scepticism).

The study also emphasizes that there is a controversy between the consensus of many scientific organizations worldwide on the existence, anthropogenic cause and seriousness of climate change and the media's disproportionate representation of the few climate change sceptics. The media often dramatizes or de-emphasizes the changing climate and does not argue scientifically, which can lead to the publishing of falsified results and can influence the public and important decision-makers (Rahmstorf, 2004). Media scholars also emphasize that it is important to show the consensus of scientists on climate change in the media because it might not only convince the public opinion of the seriousness of climate change but also enhance political action (Engels, Hüther, Schäfer, & Held, 2013).

Recent surveys show that climate sceptics are still present in Germany (infratest dimap, 2019). A survey in 2019 shows that 2% of Germans (above 18 years old) do not believe in the existence of climate change and 11% of Germany (above 18 years old) believe that humans do not have an influence on it (infratest dimap, 2019). In comparison to that, a survey conducted in 2011 showed that approximately 4% of Germans, especially older people, were sceptical about the existence and seriousness of climate change (Tranter & Booth, 2015).

The earlier study claims that in Germany climate change sceptics are mostly focused on materialistic values, give greater concern to economic stability or national security and that in general climate scepticism is correlated to low trust in government, low environmental concerns and a conservative political orientation (Tranter & Booth, 2015). Additionally, another study states that German climate scepticism is often linked to low political participation and disapproval of renewable energies, as the energy transition period is seen as difficult and slow in results (Engels et al., 2013).

In the German news media, the existence and anthropogenic cause of climate change is primarily agreed on (Tschötschel et al., 2020). Nonetheless, there is still a debate about its urgency and the right strategy to deal with climate change (especially the reduction of CO_2 and the energy transition; Tschötschel et al., 2020). Also, conservative news outlets have been identified as being generally more sceptical (Kaiser & Rhomberg, 2016). Conservative sceptics can also be found in the German politics. Especially the AfD (a right-wing political party in Germany) represents scepticism about the seriousness and existence of climate change in Germany (Tschötschel et al., 2020). Hence, next to studying media outlets it is also relevant to study the "media attention to political actors and motivated reasoning" (Tschötschel et al., 2020, p.10).

1.3 The role of the media in the discussion

Studying media attention in the public debate about climate change is important (Barkemeyer et al., 2017; Leiserowitz, 2005). A cross-national study of newspapers in 41 countries showed that media can not only mirror the public opinion but also have the power to mobilize people and create widespread public support (Barkemeyer et al., 2017). Additionally, research on climate change risk perceptions in the US shows that "public risk perceptions are critical components of the socio-political context within which policymakers operate" (Leiserowitz, 2005, p. 1434). The study claims that public risk perceptions can influence the formation of climate policies, for example. Hence, the more people see climate change as an existing risk, and the more this is reflected in the media, the more it will influence the establishment of climate policies or the general political support for sustainability.

Especially in the case of climate change, the public opinion is not only influenced by scientific explanation but also by social and psychological aspects such as personal experiences, worldviews, imagery, trust and predestined values (Leiserowitz, 2005). For example, the danger that climate change poses might be interpreted differently based on the place where someone lives. The Global Climate Risk Index 2020 shows that overall, less developed countries are more affected by climate change than developed countries,

although the latter are responsible for the vast majority of CO_2 emissions (Eckstein et al., 2019). However, Germany was placed third in the ranking of the countries most affected by climate change because of heat waves, heavy rainfalls and droughts which caused health problems, deaths and substantial decline in harvest (Eckstein et al., 2019). Scholars therefore suggest that finding a common definition of the impact of climate change in the media worldwide will determine the actions that will be proposed and implemented against it (Leiserowitz, 2005).

Because of the psychological aspect of news consumption, framing is an important concept to take into consideration when analysing news media. Framing is defined as the way media report about an event and give it a certain meaning that might have an influence on how audiences think about this event (Valkenburg, Semetko, & De Vreese, 1999). For example, framing climate change with a focus on a local event instead of an international issue increases the perception that climate change is a threat and increases the support for local mitigation policies, especially for people who are generally not in favour of mitigation policies (Wiest, Raymond, & Clawson, 2015). Thus, the way media reports about climate change can provoke or hinder public action. Also, general news frames are important to consider in the climate change debate, as a personalized, dramatized and emotionalized story (human-interest frame) reduces the ability of the reader to recall information from the news article (Valkenburg et al., 1999). This frame is most commonly used by sensationalistic newspapers while a frame that blames a group, an individual or the government for causing or solving an issue (responsibility frame) is more commonly used by quality news outlets (Valkenburg et al., 1999). Because of the ability to highlight and leave out aspects of a story and, therefore, to influence which aspects are most prominent in people's minds, framing analysis is also relevant for this analysis.

Research has shown that because public debates about climate change are influential on political agendas, the trend of the politicization of climate change and the spread of misinformation is growing (van der Linden, Leiserowitz, Rosenthal, & Maibach, 2017). The same study emphasizes that, in the past, campaigns that focused on the very few scientists who oppose the human-made climate change theory have successfully created polarization in the public opinion. Overall, informing the public about 1) scientific consensus on the existence of anthropogenic climate change and 2) the occurrence of politically motivated misinformation campaigns, can discourage the politization and polarization of opinions about climate change (van der Linden et al., 2017).

To conclude, the media are important for the climate change discussion because they reflect public opinions and stimulate political debates. Apart from scientific facts, the public is also influenced by social and psychological aspects in the media, which make politically motivated misinformation campaigns more successful. In general, to tackle

polarization, a worldwide consensus on the impact of climate change in international negotiation needs to be set and the public needs to be informed about the scientific consensus and the occurrence of misinformation campaigns. Today, in Germany, online news are becoming increasingly important for news consumption and therefore public discussions about climate change (Reuters Institute for the Study of Journalism, 2019).

1.4 German online news

Germany was in 2018 the biggest market for newspapers in Europe and the 5th biggest market for newspapers worldwide according to the Federal Association of German Newspaper Publishers (BDZV, 2017). 57.9% of Germans above 14 years read a printed newspaper regularly, the study states. Nonetheless, while the market for printed newspapers is declining, the market for e-newspapers and online paid-content-models is rapidly growing (BDZV, 2017; Kemmerich, 2018). Two thirds of all the German newspapers also publish their content online in a similar form (BDZV, 2017). The online news websites with the highest weakly reach in Germany in 2019 were Der Spiegel, t-online, Focus Online, Bild.de, Web.de and tagesschau.de (Reuters Institute for the Study of Journalism, 2019). The online news websites that were selected for this research on climate change scepticism are: Der Spiegel, tagesschau.de, Bild.de and Focus Online. Those news websites were selected based on their popularity, to represent a broad political orientation and to include quality as well as tabloid news outlets. This will be further discussed in the methodology chapter.

The Reuters Institute for the Study of Journalism (2019) states that the (online) news market in Germany is characterized by mergers and job cuts, with Axel Springer SE (publisher of Bild.de) as one of the most successful companies in 2018. The report further mentions that mergers are used to broaden the portfolio and to become increasingly digitalized. Problematic for the digital development is that only 8% of Germans were willing to pay for online news in 2018, the report showed, and that 70% of those only subscribe to one online news outlet. This creates possibilities for the most popular and most trusted news sources and threatens the smaller online news institutions (Reuters Institute for the Study of Journalism, 2019).

In Germany, the most used news source is television, although its reach is declining while the use of the internet for news consumption is increasing (Reuters Institute for the Study of Journalism, 2019). The same report states that 22% of Germans share news via email, social media or messaging, which increases the risk of 'fake news'. Even though 'fake news' and hate speech become increasingly restricted in Germany, the overall trust in news media is still declining (Reuters Institute for the Study of Journalism, 2019). The report claims that the trust in online news on social media is significantly lower (16%) than the trust

in other news media (47%). The public broadcasters ARD and ZDF have been identified as the most trusted news source in the country and the tabloid news outlet Bild as one of the least (Reuters Institute for the Study of Journalism, 2019).

In conclusion, the German news media landscape is becoming increasingly digitalized and online news media is rising in importance. Furthermore, the trust in news media is declining and only few people want to pay for online content. This study aims to examine to what extent the most popular online news websites in Germany are sceptical about the occurrence, causes and impact of climate change.

1.5 Problem statement and research question

Climate change is a worldwide threat to the environment, society and economy, which is confirmed by 97% of climate scientists (Doran & Zimmerman, 2009). Nevertheless, scepticism about climate change can be found in the public opinion and the media in Germany (e.g. infratest dimap, 2019; Tranter & Booth, 2015). Media have an impactful role in this debate because they have the power to create widespread public support, mobilize people and set issues on the political agenda (Barkemeyer et al., 2017; Leiserowitz, 2005). Because the internet and online news websites are becoming more important for news consumption in Germany (Reuters Institute for the Study of Journalism, 2019), it is relevant to look into the current situation of climate change scepticism online.

Therefore, the following research question was formulated for this thesis:

To what extent is scepticism about climate change present in German online news websites?

More precisely scepticism about climate change is divided into fundamental, attribution and impact scepticism (Rahmstorf, 2004). Apart from quantitatively analysing to what extent those types of scepticism are present, this study will also look at political orientation of the news websites, at actors mentioned in the news articles and at framing analysis. Based on that, the following sub-questions were defined:

- Is fundamental, attribution or impact climate change scepticism present in German online news?
- Is climate change scepticism only a phenomenon in conservative, populistic or right-wing online news platforms?
- Is climate change scepticism linked to the politization of specific (political) actors in German online news? And further, do the political actors confirm or contrast the political values of the news outlet?
- Is climate change discussed under different frames in the news websites with different political orientations?

In this study, 241 online news articles from Der Spiegel, tagesschau.de, Bild.de and Focus Online in the period of January to December 2019 were analysed to identify fundamental, attribution and impact climate change scepticism, frames that are used and the connection to important (political) actors in the articles.

1.6 Social relevance

As argued before, in the face of the worldwide threat of climate change, international climate agreements and national policies on sustainability and renewable energies are urgently needed to motivate actions of climate change prevention. The IPCC (2018) states that we have approximately until 2030 to avoid a global warming of more than 1.5°C and resulting damages such as rising sea levels or resource scarcity.

The media plays an important role in the establishment of climate change policies and the public's motivation to act sustainably (Barkemeyer et al., 2017; Leiserowitz, 2005). On the one hand, the public awareness of the risks of global warming is rising (European Commission, 2014) but, on the other hand, scepticism still exists (Tranter & Booth, 2015) which can be used by politically motivated misinformation campaigns to postpone sustainable policies (van der Linden et al., 2017). Research suggests that media have the responsibility to inform their audiences about existing misinformation campaigns and the scientific consensus about human-made climate change (van der Linden et al., 2017).

This study will help to create awareness of the responsibility of news media in the debate about climate change. Using a quantitative content analysis this thesis will reveal to what extent scepticism about climate change is reported in the German online news, which actors are presented, and which frames are used. Moreover, the study will discuss how the results correlate with the current levels of scepticism of German citizens and in the scientific community.

1.7 Scientific relevance

Many studies have been conducted on framing or discourses around climate change and climate change scepticism (e.g. Kaiser & Rhomberg, 2016; Tschötschel et al., 2020). Nevertheless, most studies focus on newspapers instead of online news websites (Kaiser & Rhomberg, 2016) or do not combine framing analysis with an analysis of political actors and motivated reasoning (Tschötschel et al., 2020). It has been suggested that more analyses of online media (especially online news) that combine both research elements and focus on the climate change debate are needed (Kaiser & Rhomberg, 2016; Tschötschel et al., 2020). This study aims to bridge the identified gap by conducting a quantitative content analysis of

online news articles that does not only focus on framing theory but also takes into account (political) actors.

Framing analysis has been identified as an important part of studying climate change scepticism in the media because frames can provoke or undermine public actions (Morton, Rabinovich, Marshall, & Bretschneider, 2011). For example, reporting a local frame of climate change increases the perception that climate change is a threat, especially to people who generally do not support mitigation policies (Wiest et al., 2015). Furthermore, in the debate about climate change it has been identified that more research needs to focus on the media attention to political actors and especially to climate change sceptics (Tschötschel et al., 2020). To illustrate this, studies show that scepticism can be caused or reinforced through a political actor that fits one's own political orientation (Taber & Lodge, 2006). This is especially relevant to analyse since the emergence of representative opposing characters in the debate of climate change (like Greta Thunberg and Donald Trump) in the media.

1.8 Outline

This Master Thesis presents a quantitative content analysis of German online news articles. It specifically examines the existence of fundamental, attribution and impact climate change scepticism and its correlation to the political orientation of the online news websites, political actors mentioned in the articles and news frames that are used. After the introduction, chapter 2 examines the theoretical background of the study and focuses on explaining the main concepts of the thesis in greater detail: climate change scepticism, the role of the media (and media actors) and framing analysis. Chapter 3 discusses the methodological choices by giving a justification for the quantitative method and explaining the data collection process. Chapter 3 also provides a detailed description of the variables and operationalization process as well as the data analysis and examines the validity and reliability of the thesis in the section quality assurance. In chapter 4 the results of the analyses are discussed by giving a general overview and showing the outcomes of the analyses that focused on climate change scepticism, the most important actors and the news frames. The last chapter answers the main research question and the four sub-questions and discusses the results of this research.

2 Theoretical framework

The following chapter will introduce the theoretical background of the research. Firstly, the concepts of scepticism and denial will be defined in general and in relation to climate change, their advantages and disadvantages will be discussed and the question of why people are sceptical about climate change will be answered. Secondly, the role of the media in public debates will be discussed. More specifically media trends that might have an influence on sceptical thinking about climate change, the question of which media outlets are more likely to be sceptical about climate change and the role of media actors will be analysed. Thirdly, framing theory will be explained, the most used frames in the climate change debate will be assessed and the importance of frames and communication strategies will be discussed.

2.1 Climate change scepticism

The word scepticism comes from the Greek word 'skepsis' which can be translated to enquiry or questioning and generally refers to the belief that the chosen methods to solve a problem are unable to generate the truth (Blackburn, 2016). The Oxford Dictionary of Journalism states that scepticism refers to "a questioning approach to statements, evidence, received opinions, common sense, and anything that initially appears to be blindingly obvious" (Harcup, 2014, para. 1). The dictionary further states that scepticism is considered to be fundamental and necessary for good investigative journalism. However, The Blackwell Guide to Epistemology describes scepticism as "often associated with incredulity" (Williams, 2017, p. 35), the unwillingness to believe something. Apart from questioning opinions, a sceptical mind also experiences uncertainty and acts intuitively, not always based on theoretical justification, and can therefore be too radical or too general (Williams, 2017). Overall, scepticism can be defined as the act of questioning statements that might seem obvious and is seen as a necessary quality for investigative journalism (Harcup, 2014). Nonetheless, intuitive scepticism that is not based on theoretical justifications is perceived as problematic by scholars (Williams, 2017).

In the climate change debate, scholars differentiate between scepticism and denial (e.g. Harding, 2019; Lewandowsky, Mann, Brown, & Friedman, 2017). Denial is defined by the Oxford Dictionary of Psychology as the inability to accept facts, thoughts, feelings or desires that are true and is often unconsciously used as a defence mechanism (Colman, 2015). Hence, scepticism describes the act of questioning statements, theories or methods to generate the truth, while denial is identified as the act of being unable to accept a truth that has been established.

A study on academic literature discourses of environmental sceptics proposes a slightly different definition of climate change scepticism and denial (Harding, 2019). It is argued that climate change scepticism "aim[s] to downplay the importance or urgency" (Harding, 2019, p. 297) of the problem, while climate change denial refers to people who believe that climate change does not exist or is not caused by humans. The study further suggests that both sceptics and denialists need to be acknowledged as a serious threat, because they can influence public opinion but also the political agenda. This shows that within the debate of climate change, denial and scepticism are two concepts that are often used as synonyms and are difficult to differentiate.

Furthermore, this differentiation is seen as necessary because other researchers suggest that scepticism is needed in democracy and science, while denial can be seen as a "politically motivated effort to undermine science" (Lewandowsky et al., 2017, para. 20). The study emphasizes that it is important to include the public, and especially denialists, in scientific debates because otherwise the denialist might develop a sense of legitimacy. Nonetheless, the discussions should always be evidence-based and scientific results and methods should be transparent (Lewandowsky et al., 2017). In the case of climate change, there is a large consensus among climate scientists that the mean temperature on Earth is rising due to human activities (Doran & Zimmerman, 2009). Being sceptical about climate change is, therefore, not based on scientific research and seen as problematic.

There are three types of climate change scepticism that were identified by Rahmstorf (2004) and are used in various recent studies (e.g. Kaiser & Rhomberg, 2016; Poortinga, Whitmarsh, Steg, Böhm, & Fisher, 2019; Schmid-Petri, Adam, Schmucki, & Häussler, 2017). Those are trend scepticism (also defined as fundamental scepticism; Schmid-Petri et al., 2017), attribution scepticism and impact scepticism:

1) Fundamental scepticism is defined as doubting the existence of climate change.
2) Attribution scepticism means accepting the existence of climate change but doubting that it is caused by humans. Instead attribution sceptics either believe that CO_2 emissions do not have an impact on climate change or that the climate change has natural causes (e.g. increase in solar activity or cosmic radiation).
3) Impact scepticism describes the belief that a rising mean temperature mainly has positive consequences and that therefore there is no urgency to act against climate change.

Climate change scepticism can be any of these three or a combination of these three elements (Rahmstorf, 2004). Nevertheless, these sceptical arguments are not based on the results of almost 100% of climate researchers worldwide (Doran & Zimmerman, 2009).

Other research emphasizes an additional fourth type of scepticism which concerns the scientific consensus (Engels et al., 2013). This type of scepticism can be identified when

the argument that there is not a consensus between scientists about the occurrence, causes and impacts of climate change is presented in the media (Engels et al., 2013). For this thesis, only the first three types of scepticism were considered as they are the most used in recent research on this subject.

A case study on climate change scepticism in Australia identified five different variations of the three most popular types of scepticism (Hobson & Niemeyer, 2013): The first type, emphatic negation, includes a general doubt about the existence of climate change coupled with a distrust in public authority figures. The second one, unperturbed pragmatism, does not include scepticism about the occurrence of climate change but the belief that sustainable changes will cause economic damage. Thirdly, proactive uncertainty, is defined as being unsure if climate change is occurring and therefore stating that the government should not act upon it but instead individuals, groups and businesses. Fourthly, earnest acclimatisation means that climate change is a natural process that does not involve anthropogenic causes; therefore, people should adapt to it but not by reducing greenhouse gases. Lastly, noncommittal consent involves all the sceptics that agree to the causes of climate change but are uncertain about the seriousness of it and how politics should deal with it. The study shows that scepticism about climate change can have many variations and forms, but the three main foundations are fundamental, attribution and impact scepticism, which will be the types of scepticism that this thesis will focus on.

In Germany specifically, research suggests that the existence of anthropogenic climate change is primarily acknowledged in the media (Tschötschel et al., 2020). However, the study shows that impact scepticism is often still represented, especially when it comes to the political debate around which measures should be taken against the changing climate (most importantly the energy transition and the reduction of CO_2). Therefore, it is expected that impact scepticism will be the most common kind of scepticism that will be identified in the German online news, especially in combination with the political debate around CO_2 reduction and the energy transition.

Next to identifying which kinds of scepticism exist, previous research has also identified possible reasons why people are sceptical. For instance, a study about politically motivated scepticism states, that in science, being sceptical about new theories and counterarguing them is common practice (Taber & Lodge, 2006). However, when it comes to political beliefs of citizens, scepticism can also occur as part of a confirmation bias or so called "motivated reasoning" (Taber & Lodge, 2006, p. 756). Motivated reasoning is defined in the study as arguing or making decisions based on preconceived opinions. The study shows that people process new information about politics based on their preconceived beliefs and that individuals with less strongly developed opinions also show a less biased argumentation.

This means, if a citizen has a strong political identity, it is likely that he or she will be more sceptical about statements that lie outside this identity. In the case of climate change that would mean that someone can become sceptical about climate change if their political party strongly emphasizes the disbelief in global warming. Politically motivated scepticism is seen as a problem for democracy because those citizens cannot rationally respond to changes in the environment and it can also lead to attitude polarization (Taber & Lodge, 2006).

It is suggested that the most apparent reason for climate change scepticism is the argument that the topic can stimulate uncertainty or scepticism because of its complexity (Corner, Whitmarsh, & Xenias, 2012). More precisely, the study explains that the science behind climate change is based on various research disciplines and is therefore difficult to fully comprehend. Additionally, to prevent a further global warming, wide-ranging political and economic changes need to be implemented that are difficult to achieve (Corner et al., 2012). Another study shows that the feeling of complexity can not only cause insecurity or scepticism, but it can also create the idea of powerlessness within audiences (Hobson & Niemeyer, 2013).

A study about biased assimilation (evaluating a subject based on prior beliefs) and opinion polarization (contradictory opinions drift apart further after having analysed content in a biased way) suggests that people perceived novel information about climate change in a biased way (Corner et al., 2012). According to this study, both concepts can be seen as separate entities. Nonetheless, the study also suggests that both can cause perceived uncertainty by the public audience. Uncertainty was named as an influential factor on different types of climate change scepticism, which is seen as a "barrier to public engagement" (Corner et al., 2012, p. 463). Motivated reasoning can also be emphasized by disinformation campaigns (e.g. van der Linden et al., 2017) which will be further discussed in the following chapters. Thus, motivated reasoning or biased assimilation can be identified as two aspects that construct scepticism and can work in connection with or independent from opinion polarization. Further, perceived uncertainty is a strong determinant of climate change scepticism.

To analyse in greater detail which motivations people have to be sceptics or denialists of scientific evidence, apart from political assimilation and/or uncertainty, previous research also suggests other conceptual clusters (Harding, 2019; McLintic, 2019). Four motivated rejections of scientific evidence were identified: scientific facts are not accepted if they threaten religious or cultural views (cultural cognition), distrust in authority (conspiracy ideation), dismission of scientific evidence that threatens profits (free-market ideology) and political promises about prioritization of inhabitants and economy over obligation imposed by establishment elites (political populism; McLintic, 2019). The study suggests that even small

numbers of denialists can have a big impact on public opinion and to change the minds of scientific denialists the consensus of scientific experts needs to be well communicated and the people need to be convinced without detaching from their ideology or group identity (McLintic, 2019).

In the case of climate change scepticism another study introduces four different motivations of sceptics or denialists (Harding, 2019): One line of argumentation is that human wellbeing should always be prioritized and environmental protection matters directly threaten human wellbeing. The second reasoning states that technological progress will overcome the threat of a rising mean temperature and change is not needed. The third discourse directly portrays environmentalist as leftist extremists who strive for extreme regulation and lastly, the fourth line of reasoning only accepts selective scientific results that fit their ideology. Overall, the study showed that sceptical discourses towards a changing climate do not seem to connect human wellbeing with environmental protection (Harding, 2019). The study also claims that these four lines of reasoning that are used by sceptics might hinder the rapid change in political agenda that is needed to stop the global mean temperature rise. The four identified conceptual clusters also show similarities to the study by McLintic (2019) especially to the concepts: cultural cognition, free-market ideology and political populism. A similar concept to conspiracy ideation was not recognized.

To conclude this discussion on climate change scepticism, it can be said that scepticism is defined as questioning statements that seem to be obvious and even though it is seen as a quality in science and investigative journalism it can be problematic if it is not based on (scientific) evidence. In the debate about climate change, different types of scepticism are defined. The research that is referred to most often was published by Rahmstorf (2005), who differentiates between trend (fundamental), attribution and impact scepticism.

Research suggests that in the German media impact scepticism is most commonly found, especially in connection to the debate about CO_2 reduction and the energy transition. Therefore, impact scepticism is also expected to be found in the German online news in 2019. Lastly, different possible motivations for climate change scepticism have been identified such as confirmation bias and motivated reasoning because of, for example, cultural, ideological or political views, distrust in government and uncertainty. This can be used in the analysis of this study to understand why some news websites report more sceptically than others. Another major influence on climate change scepticism can be disinformation campaigns and the impact of media, which will be discussed in the following chapter.

2.2 The role of the media

The importance of media in any public debate comes from their ability to widely create awareness of a topic. Cohen (1963) states that the media "may not be successful much of the time in telling people what to think, but [they are] stunningly successful in telling its readers what to think about" (p. 13). While media might not create people's opinions, they generally spark attention. A cross-national study of newspapers in 41 countries showed that media create public support for climate change and sustainability and can serve as "mirrors of public concern" (Barkemeyer et al., 2017, p. 1031). Furthermore, it is suggested that public attention consequentially has an impact on the political agenda (Leiserowitz, 2005). More precisely, it can be extracted from the study that if the public perceives the climate crisis as personally dangerous and people think that it has an immediate local impact, it creates greater support for policies such as treaties, regulations, subsidies or taxes. Hence, the media in the climate change crisis have an informative role for the public but can also consequentially have an impact on the political agenda.

Apart from the influence on the local public, a study on intermedia agenda setting showed that German media can also have an impact on other countries (Guo & Vargo, 2017). Agenda setting can be identified as the theory that "the salience of objects […] will transfer from the news media to the public's mind" (Guo & Vargo, 2017, p. 5). According to the study, intermedia agenda setting can be seen as an extension to that and covers the aspect of how different media outlets interact between each other. Germany has been identified in 2017 as the 5th most discussed country in online news as well as in traditional media worldwide, due to its economic and political power, the research discovered. The same study suggests that countries that are most discussed in the news can endorse their narratives to other news outlets in the world.

An example for Germany's influence on the news of other countries is the German energy transition, that was discussed in the news worldwide. A cross-national study of news media in Great Britain, Finland and Hungary argues that because the German energy transition was talked about frequently in the media worldwide, it had an impact on British, Finish and Hungarian policies regarding the transition to renewable energies (Antal & Karhunmaa, 2018). Although every country's policy was adapted locally and discussed with a local point of view, the German transition was seen as a "point of reference" (Antal & Karhunmaa, 2018, p. 2). Concludingly, German online news media does not only have an impact on public attention and the political agenda but can also impact other countries' news media.

In Germany, the media landscape is changing, and the internet is increasingly used to consume news (Reuters Institute for the Study of Journalism, 2019). Nonetheless,

scholars still suggest different opinions about how the rising importance of online media for news consumption will change the way people consume and perceive news. It is suggested that, on the one hand, people consume more news that are in line with their own ideology and therefore have a very one-sided news consumption, but on the other hand people get introduced by search engines to a broader range of perspectives (Flaxman, Goel, & Rao, 2016). However, the same study claims that, in general, mainstream media also dominate the online news consumption.

Other research suggests that online media are more complex than traditional media, both in the types of media outlets and the way people consume media (Schroeder, 2018). The shift from traditional to online media has a social (e.g. by sharing news online) but also a political aspect, the study claims. The engagement in online media reduces the gap between the public and elites (e.g. politicians), which can lead to a more direct influence of politicians or other public figures on the public opinion, through e.g. social media (Schroeder, 2018). For instance, the research states that, not only public opinion (as an input to the political agenda) is nowadays monitored over social media. But also, politicians (especially populistic politicians) are more active on social media (e.g. Twitter) and their posts become popular by sharing it on popular online news media. In conclusion, the shift to online news consumption raises the concerns that people will solely get in contact with one-sided opinions and that politicians have a more direct access on the public through online media (e.g. social media). In the climate change debate this could be problematic because the confirmation bias could be supported by only consuming news that fit to one's own ideology.

Another recent development in the German media landscape is the decreasing trust in news overall. The Reuters Institute for the Study of Journalism (2019) identified this trend and states that Germans trust 47% of news overall (3% less than the year before) and 60% of the news they consume themselves. This can be problematic because studies suggest that the effect of news media is weakened by the declining audience trust (Tsfati, 2003; Tsfati & Cappella, 2005). In general, a study claims that, news media trust is established through the perception of competence in the journalistic customs of the news outlet (Tsfati & Cappella, 2005). However, the study also states that people still consume news outlets which they do not trust because, apart from information seeking, there are other reasons to consume news like for example the need for entertainment or social recognition.

It is suggested that trust and credibility of news outlets in public debates such as climate change are important because it makes the public feel engaged and interested (Grundmann, 2007). This can lead to greater recognition of climate change in the mass media and can consequentially stimulate political debates, the study states. Concludingly, the declining trust in German news media is an important aspect to note in the climate change debate and could possibly influence the effect of news media on the public.

Apart from the journalistic competence, the declining trust in news media is also fuelled by misinformation and disinformation campaigns regarding the climate change debate. One major example of a German institution that campaigns misinformation is the European Institute for Climate and Energy (Haupt, 2020). On their website, the institution describes themselves as "Germany's Leading Private Think Tank on Climate and Energy Questions", operates under the slogan "Not Our Climate is in jeopardy – Freedom is", openly states that they are against climate policies and claim that there is no rigorous scientific consensus on anthropogenic climate change (EIKE e.V., n.d.). The institution only includes very few nature scientists, mainly consists of politicians and business representatives, collaborates with other international climate change sceptical institutions (e.g. the conservative American Heartland Institute) and is known for its active lobbying in the German politics and media (Haupt, 2020). Overall, they mainly represent the sceptical ideologies of political populism and free-market ideology, as identified by McLintic (2019), by stating that climate policies are enforced by leftist elites and that the money invested in climate change research should instead benefit cancer or atomic research (Haupt, 2020).

An American study on climate change misinformation campaigns claims that disinformation campaigns are considered especially dangerous because they destabilize the public understanding of climate change and spark uncertainty and polarization (van der Linden et al., 2017). The study shows that this can lead to scepticism, less engagement in the topic by the society and consequentially less engagement in politics. The same study also claims that political polarization is often more influenced by partisan media than only by motivated reasoning. These developments raise the question of how scientific evidence can be communicated to the public to diminish the effects of (media) misinformation campaigns.

To answer this question, studies suggest that it is important to inform the public about existing (economically motivated) misinformation campaigns and the scientific consensus around anthropogenic climate change (Cook, Lewandowsky, & Ecker, 2017; van der Linden et al., 2017). Because "people tend to favour information that confirms existing beliefs" (Cook et al., 2017, p. 2) it is very difficult to convince sceptics of the scientific evidence. Therefore, both studies discuss the impact of "inoculation messages" (Cook et al., 2017, p. 5). If contestants are informed about misinformation campaigns and the scientific consensus on climate change before they read sceptical information about it, they are less likely to be influenced by it, the studies explain.

The aim of both studies was to make people think critically about the information they receive, because critical attitudes are less likely influenced by misinformation. In general, the perception of the scientific consensus is so important in this debate because it is seen as a "gateway belief" (Cook et al., 2017, p. 3) that leads to other forms of climate change scepticism. Media content that evenly reports on the views of sceptics and climate change

advocates also fuels the gateway beliefs of people (Cook et al., 2017). According to the two studies, the scientific consensus should be clearly supported in the media to diminish the 'gateway belief'. Further, to reduce scepticism and motivate critical thinking, the media is also responsible to inform the public more about economically motivated misinformation campaigns.

After discussing the importance of media in this debate the types of news media outlets that are most sceptical will be examined. A survey about climate change scepticism in Germany identified that significant indicators for climate change scepticism are high materialistic values, low environmental concern, a conservative political orientation and low trust in government (Tranter & Booth, 2015). Furthermore, the survey showed that older people are more likely to be sceptical about climate change and that women are more likely to have a high environmental concern. A similar survey in the UK shows that people with right-centred political views and low pro-environmental values are more likely to be sceptical but also people who have a conservative worldview or are older (Whitmarsh, 2011). Based on that, it can be assumed that the more conservative, right-wing oriented news websites, like Focus Online or Bild.de, are more likely to show scepticism about climate change.

Lastly, for this study, it is relevant to consider the role of actors and representatives in the media debate about climate change as they have an influence on motivated reasoning and political assimilation as discussed in chapter 2.1. The importance of media actors in the debate of climate change has been briefly studied previously. A cross-national study on online news websites state that actors have a significant influence on audience reaction to a message and that representatives of a certain opinion increase the newsworthiness (Tschötschel et al., 2020). Disbelief of the negative impact of climate change is often represented by Donald Trump in the US and by the AfD in Germany, the study shows. The AfD (alternative for Germany) is a far-right-wing, nationalistic political party in Germany. This finding supports other previous research (Tranter & Booth, 2015; Whitmarsh, 2011) where right-wing and conservative ideologies were identified as an indicator for climate change scepticism.

Adding to that, a study that focused on the representation of different actors in English-speaking media articles claim that climate change sceptics are overrepresented (Petersen, Vincent, & Westerling, 2019). The study shows that especially in mainstream media the sceptics are mentioned with almost the same frequency as the non-sceptical actors even though the number of sceptics is much smaller. Moreover, the study claims that climate change sceptics are more likely to be stated together with non-scientific quotes, while the climate change believers are mentioned together with scientific authorship or quotes. Also, sceptics are often mentioned to communicate a sense of subjectivity or to reject their opinions directly (Petersen et al., 2019). Nonetheless, the researchers emphasize

that drawing attention to sceptics in this frequency might make sceptical arguments more believable or at least more substantial. Therefore, the study encourages journalists and editors to report more proportionally to the scientific consensus and motivate more people to take action.

To conclude the discussion about the role of the media in the climate change debate, it can be said that media has an informative role for the public and has consequentially the power to also influence the political agenda. Additionally, it has been shown that German media reporting on climate change can also have an impact on international media worldwide. Apart from that, this chapter also identified trends such as the rise of online media and the declining trust in media which could have an effect on sceptics. Scholars argue that media outlets should emphasize the threat of existing misinformation campaigns and focus on reporting the scientific consensus (which has been identified as the so-called gateway belief). Overall, mostly conservative, right-wind news outlets are expected to be sceptical. Therefore, in this study, it is expected that scepticism will be found mostly in news outlets like Focus Online and Bild.de. Lastly, media actors as representatives of opinions are important elements in this debate because they have a significant influence on the audience and increase newsworthiness. Scholars argue that it is important to mention those actors in a proportionate way (97% of climate scientists agree on anthropogenic climate change) because otherwise it could make the arguments of the sceptics seem more believable. In Germany, members of the AfD have been identified as the main representatives of climate change scepticism.

2.3 Framing theory

To understand the importance of how media report about scientific evidence, like climate change, and how it can reinforce scepticism, it is important to discuss framing theory. The Oxford Dictionary of Journalism defines framing as "[t]he placing of events (such as those being reported within a news story) within a particular explanatory narrative or discourse" (Harcup, 2014, para. 1). Adding to that definition, Valkenburg et al. (1999) define media frames as "a particular way in which journalists compose a news story to optimize audience accessibility" (p. 550) and "a schema of interpretations that enables individuals to perceive, organize, and make sense of incoming information" (p. 551). Their research shows that news media can not only impact what the audience thinks about but can also use media frames to affect the direction of how the audience thinks about it. Therefore, framing refers to the way media report about an event and give it a certain meaning that might have an influence on how the audience thinks about this event. Often, frames are set up to tailor news events to a certain audience. Frames can be problematic when they lead to leaving out or adapting information which compromises the non-objective reporting of journalists.

According to Entman (1993) framing has four stages which consist of (1) the definition of the problem, (2) the identification of the causes, (3) a moral evaluation of causes, effects and agents in the process and (4) a justification of treatments, and effects that are likely to be achieved. He also points out that frames use "selection and highlighting" (p. 53) as well as leaving out information to make some evidence, actors or topics seem more important than others. He concludes that framing theory is especially relevant for journalists to keep their objectivity but also for researchers that want to conduct content analyses, to be aware of the audience's dominant interpretation.

A study on general news frames distinguishes between four different frames in their research (the conflict frame, the human-interest frame, the responsibility frame and the economic consequences frame) and state that these frames "played a significant role in the readers' thought-listing responses" (Valkenburg et al., 1999, p. 550). While the conflict frame focuses on the clash of groups, institutions or individuals and emphasizes the importance of winning or losing, the human-interest frame creates a more personalized, dramatized and emotionalized story, according to the study. The responsibility frame blames a group, an individual or the government for causing or solving an issue, while the economic consequences frame focuses on the consequences that a problematic situation will have on a group, region, institution or an individual. The study also claims that human interest frames reduce the ability to recall information from the news article because the emotional response of the reader might disrupt the process of information-processing.

In a later research on Dutch national newspapers a fifth news frame (the morality frame) was added (Semetko & Valkenburg, 2000). The study states that this frame highlights moral or religious principles which are often introduced indirectly, for example, through quotes. The research showed that the attribution of responsibility frame was most commonly used overall, but especially by national media outlets. The conflict frame and the attribution of responsibility frame were more often used by the "serious newspapers" (p. 106) while the human-interest frame was most commonly used by sensationalistic newspapers (Semetko & Valkenburg, 2000). An American study focussing on US business crisis news coverage in three US elite newspapers indicated a similar result, where attribution of responsibility, economic and conflict frames were used most commonly (An & Gower, 2009). This indicates that the responsibility frame might be the most commonly used frame overall, also in this Master Thesis, and especially in quality news outlets (like tagesschau.de and Der Spiegel) while the human-interest frame might be used more commonly in sensationalistic news outlets (like Bild.de).

Taking a closer look at the framing of climate change in the news, four different frames were identified in the US: valid science (often in combination with extreme weather events), ambiguous cause or effect (focusing on making scientific findings seem less urgent), uncertain science (focusing on the unbalanced reporting of sceptical scientists and emphasizing uncertainty) and controversial science (emphasizing controversies and disputes between scientists; Antilla, 2005). However, these frames mainly focus on fundamental and attribution scepticism and do not take impact scepticism into account. In addition, the study also emphasizes that controversies about climate change that are generated by the media make it difficult for the policy-makers and the public to get a general understanding of the problem.

A different study in the US print media quantitatively measured the use of the three types of climate change scepticism and found that impact scepticism was the most salient in the US print media and only a small part of other types of scepticism were found (Schmid-Petri et al., 2017). In total, 30% of the articles in the sample of the study contained a sceptical frame. In general, many studies have identified impact scepticism to be the most dominant frame nowadays (e.g. Boykoff & Boykoff, 2004; Painter & Ashe, 2012).

Based on these findings it can be said that impact scepticism is expected to be the most salient type of scepticism in the news media. Nevertheless, existing qualitative studies that have identified climate change frames in the news only identified frames that include attribution and fundamental scepticism (Antilla, 2005). Therefore, for this study, general news frames (Valkenburg et al., 1999) will be used to be able to identify the frames that are used for all types of climate change scepticism.

After identifying which kinds of frames are used in relation to climate change, it is also relevant to discuss how the frames can be used. In Germany specifically, a mixed-method analysis on sceptical frames about climate change in the German newspapers was conducted and found sceptical arguments in 15% of the articles analysed (Kaiser & Rhomberg, 2016). More specifically, two frames were identified in the study: scepticism about the phenomenon of climate change and scepticism about climate science. Overall, the study showed that in the German news sceptical arguments were mostly mentioned just to be rejected by the journalist afterwards but also that sceptical arguments about climate change might slowly be increasing in Germany. Therefore, it is important to not only count the sceptical argument but also to analyse the journalists' evaluation of the argument and this study was one of the only ones to consider both elements (Kaiser & Rhomberg, 2016). The study further showed that conservative newspapers report more sceptically than liberal newspapers (although the Bild Zeitung was mentioned as an exception). It was also questioned in the study whether the conservative journalists were actually more sceptical or if the sceptical frame was just more acceptable for the conservative audience.

Another way in which framing can shape the understanding of an article is the differentiation between local and global frames. A study in the US showed that framing of news has an influence in behavioural intentions of the public (Wiest et al., 2015). The study showed that local frames (projections of a local impact) increase the perception that climate change is a threat. The use of local frames also increases the support for local mitigation policies, especially for Republicans and Independents, which brings their attitudes closer to those of Democrats, who are generally in favour of mitigation policies (Wiest et al., 2015). Therefore, the study recommends using local frames to convince people of the severity of local problems and local mitigation policy support. For this reason, the use of local and global frames in the German online news will be investigated in this thesis.

Because climate change is not only a discussion in the news but also a scientific discussion, frames are not only important for journalists but also for scientists. Scientists want to report their findings about climate change in a way that shows the urgency to act (Morton et al., 2011). While there is a general scientific consensus on human-made climate change, there are still uncertainties about the extent or time-scale of its impact (Morton et al., 2011). And, as discussed previously, uncertainty has been identified as an important determinant of climate change scepticism (Corner et al., 2012). Due to that it is difficult for scientists to find a balance between reporting those uncertainties and showing certainty about the urgency of climate change (Morton et al., 2011).

Research suggests that framing of scientific results has the power to provoke or undermine public actions, "subtle changes to what is fore-grounded in a judgmental context can have surprising consequences" (Morton et al., 2011, p. 104). This same study shows

that even slight changes in framing of news about climate change can either endorse scepticism or inspire action. While journalists want to make their articles newsworthy and attract a large audience, scientists want the news about climate change to be understandable and to emphasize the need for action. The previous study showed that a positive frame of uncertain predictions regarding climate change (i.e. mentioning what will not happen) engaged more people to say that they were willing to do something against it than a negative frame. However, a negative frame might be more newsworthy for journalists. A dilemma that is relevant to take into consideration for this study.

   To conclude the discussion about framing analysis in the debate about climate change scepticism it can be said that framing is an important element not only for journalists but also for scientists because it can motivate people for direct action or endorse scepticism. Framing can be defined as the way that media outlets report about an issue, which can influence the meaning-making process of the audience. It includes selecting, highlighting and leaving out elements. For this study general news frames will be taken into consideration because other specific frames for climate change do not take impact scepticism into consideration, which has been identified as the most salient type of scepticism in the German news. Based on previous research, it is expected that the quality news outlets (like tagesschau.de and Der Spiegel in this research) will mostly use the responsibility frame, while the sensationalistic news outlets (like Bild.de in this research) will mostly use the human-interest frame. Studies show that human-interest frames make it more difficult for people to recall the information in the articles afterwards, as they focus more on the emotional response and the people mentioned in the article (Valkenburg et al., 1999). Other research suggests that media-generated controversies about climate change interfere with the public understanding of the problem and complicate the work of policy makers (Antilla, 2005). It will also be relevant to compare the local with the global news frame, as local frames have been identified to increase the support for local mitigation policies of people that are usually against climate change mitigation policies (Wiest et al., 2015).

2.4 Summary of the theoretical framework

Scepticism is defined as the act of questioning statements, theories or methods to generate the truth and is generally seen as a good quality in investigative journalism (Harcup, 2014). Nonetheless, it becomes problematic when sceptical arguments are not based on scientific evidence like in the debate around climate change (Lewandowsky et al., 2017). The most commonly identified types of climate change scepticism are fundamental, attribution and impact scepticism. Those can be defined as being sceptical about either the occurrence, causes or consequences of climate change (Rahmstorf, 2004). In the German media, previous research suggests that impact scepticism is the most common type of scepticism, especially in the debate around CO_2 reduction and the German energy transition (Tschötschel et al., 2020). Research about why people are sceptical gives various explanations such as politically motivated reasoning, insecurity, the complexity of the issue of climate change, distrust in authority, the belief in the free-market ideology, political populism or the threat to cultural or religious views (e.g. McLintic, 2019; Taber & Lodge, 2006). Understanding the reasons for sceptical opinions will be important in this thesis to discuss why specific news websites or actors are more sceptical about climate change than others. In this thesis it is expected that mostly impact scepticism will be found in the German online news while the other two types of scepticism will be less common.

Media are important in the debate about climate change because of their ability to create awareness of a topic (Cohen, 1963). Public attention can then have an impact on the political agenda (Leiserowitz, 2005). The German media also influence other international media outlets abroad because Germany is one of the most discussed countries worldwide (Guo & Vargo, 2017). In 2019, two trends especially had an influence on the German media consumption: Germans increasingly consume news online and their trust in news outlets overall is declining (Reuters Institute for the Study of Journalism, 2019). These two developments could be problematic because online news consumption could lead to a one-sided consumption of news that only fit one's own ideology (Flaxman et al., 2016) and a low trust in news media could weaken the agenda setting effect of media in the climate change debate (Grundmann, 2007). Misinformation and disinformation campaigns about climate change also spark uncertainty and polarization about the topic (van der Linden et al., 2017). Studies suggest that mainstream media should inform people more about the existence of such campaigns but also the existence of the scientific consensus around climate change (Cook et al., 2017). Media actors as representatives of opinions are relevant in this debate because they increase newsworthiness but also might influence people's (politically) motivated reasoning (Tschötschel et al., 2020). Scholars argue that sceptical media actors should not be mentioned with the same frequency as non-sceptical actors because it might

make the sceptical arguments more believable (Petersen et al., 2019). Studies show that conservative and politically right-wing oriented news outlets are most likely to report sceptically about climate change (Kaiser & Rhomberg, 2016; Tranter & Booth, 2015). Hence, in this Master Thesis it is expected that the conservative, right-wing oriented news websites (Focus Online and Bild.de) will report most sceptically about climate change and that news actors with a right-wing political orientation (especially members of the AfD in Germany) will be the most common representatives of sceptical opinions.

Framing theory is an important part of this study because it can provoke but also undermine public action with regards to climate change (Morton et al., 2011). Framing is not only important for journalists to create newsworthy content but also for climate change scientists to emphasize the urgency of the problem. For this study general news frames will be taken into consideration to understand the wide picture of frames in which news about climate change are published and the differentiation between local and global frames will be analysed because research suggests that local frames specifically provoke the support for local climate change mitigation policies (Wiest et al., 2015). Studies that include a quantitative content analysis similar to this thesis that examines to what extent local and global frames are used by news outlets in the climate change debate could not be found. Therefore, no specific expectations can be given on this aspect. Nevertheless, it can be assumed that the conservative, right-wing oriented news websites (Focus Online and Bild.de) might use the local frame more often as that seems more appealing to the political orientation of their audience. Furthermore, in this thesis it is expected that quality news outlets (like tagesschau.de and Der Spiegel) will mostly use the responsibility frame while the tabloid news outlet Bild.de will mostly use the human-interest frame when reporting about climate change.

3 Methodology

In this Master Thesis, online articles of the most popular German news websites are being analysed to examine whether climate change scepticism is present, how it is framed, and which actors represent sceptical opinions. By conducting and analysing a quantitative content analysis, the following research question is being answered:

To what extent is scepticism about climate change present in German online news websites?

The following chapter will discuss all the methodological choices in greater detail and the assurance of the quality, validity and reliability of the research. This includes the justification for a quantitative method, the data collection, the operationalization, the data analysis and the quality assurance.

3.1 Quantitative method justification

For this thesis, quantitative methods will be used to provide generalizability of the data and to analyse a large number of online news articles from different sources in a "structured observation" (Neuman, 2011, p. 364). In particular, quantitative content analysis will be used, which has been identified as one of the most important methods in the social sciences (Krippendorff, 2004). This method is especially relevant now, when great amounts of online data become increasingly important for analyses in social sciences and communication studies (Krippendorff, 2004).

Furthermore, this method is useful because of its unobtrusive nature (Babbie, 2014; Krippendorff, 2004). In other words, the analysed data are not being influenced during the observation and analysis phase. This gives the method an advantage in comparison to, for example, interviews where the researcher might induce social desirability bias and influence the interviewee to answer in the most favourable but not honest way (Babbie, 2014). Also, the concreteness of the approach makes it easy to repeat the analysis, improves reliability and excludes "anecdotal evidence" (Babbie, 2014, p. 458). An additional advantage of quantitative content analysis is that the conditions of the source of the data can be easily kept as part of the analysis (Krippendorff, 2004). In this thesis the conditions of the source could be the political background of the news outlet, when an article was published or who wrote it. The source (in this study, online news websites) is an important factor of how a reader will 'decode' the information. For instance, a reader with a right-wing political orientation might be more sceptical about reading articles from news outlets with a left-wing ideology. To keep the conditions of the source in mind is important for comparing news outlets and representative actors. Because of the possibility to analyse large amounts of unstructured data, the ability to generalize results, analysing unobtrusively and keeping the

source of the data as part of the analysis, the method of quantitative content analysis was chosen.

Apart from that, a quantitative study with the same research focus is still missing. Previous studies about climate change scepticism in the news have identified that more quantitative content analyses of online media (especially online news) are needed that take into account (political) actors but also framing theory (e.g. Kaiser & Rhomberg, 2016; Tschötschel et al., 2020). This study aims to fill the identified gap, which was an additional reason why quantitative content analysis of online news was chosen.

3.2.1 Data collection – news websites

The data collected for this study are news articles from the most popular online news websites in Germany. In general, it is difficult to represent the news coverage of a whole country in a generalized way. One approach that has been used by previous studies on climate change news coverage combines the most popular news outlets in a country with a reflection of a wide variety of political orientations of the audience segments (e.g. Schmid-Petri et al., 2017; Tschötschel et al., 2020). It is suggested to also include national public broadcasters and business-oriented media outlets (Tschötschel et al., 2020).

The most popular news websites in Germany in 2019 were Der Spiegel, t-online, Focus Online, Bild.de, Web.de and ARD News (including tagesschau.de; Reuters Institute for the Study of Journalism, 2019). The Reuters Institute (2019) also identified some newspapers and audiences of these news websites on the political spectrum: Spiegel was identified as left, Bild as centre-right, Web.de as right and tagesschau.de as centre-left. Also, in other previous research Focus was identified as right-wing oriented and tagesschau.de was identified as centre left (Tschötschel et al., 2020). In Germany the most trusted news sources were the public broadcasters ARD and ZDF, while Bild.de was one of the least trusted online news sources (Reuters Institute for the Study of Journalism, 2019).

To choose the most representative media outlets, the most viewed news websites from a broad political spectrum were chosen for the research. These are Der Spiegel (left), ARD (tagesschau.de) (centre-left), Bild.de (centre-right) and Focus Online (right). Four news outlets seemed to give a sufficient amount of news articles per news outlet within the time available for this study.

Der Spiegel offers free and fee-based content (Spiegel +) and is the most quoted online source in Germany (eurotopics, n.d.b). In January 2020 the news website changed its name from Spiegel Online to Der Spiegel to rebrand the online version, the editorial boards of the online news and printed newspaper Der Spiegel were merged, and the website's technological infrastructure was updated to increase readability (Krei, 2020). The news

website tagesschau.de offers online content completely free of charge and is owned by the German public broadcaster ARD (Reuters Institute for the Study of Journalism, 2019). Recently, the German news media industry debated whether the public broadcaster should offer a news website in such a direct competition with privately owned newspaper publishers, the Reuters Institute states. In 2019 ARD agreed to reduce written online news content that would compete directly with newspapers and magazines (Reuters Institute for the Study of Journalism, 2019). Bild is a tabloid newspaper owned by the Axel Springer SE and is the national daily newspaper with the highest number of readers per issue in Germany (Koptyug, 2019). In 2018 it was also the most cited national and international daily newspaper in Germany, followed by Der Spiegel (Koptyug, 2019). Two thirds of Bild readers are male (Koptyug, 2019), compared to the national average of around 51% (BDZV, 2017). The main age group of those Bild readers is 50 to 59-year old (Koptyug, 2019). In the 4imn.com Newspaper Web Ranking, that works with different algorithms (including Google page rank and Alexa traffic rank) to identify the popularity of online news websites worldwide, Bild is on the 29th place worldwide and ranks first in Germany (4 International Media & Newspapers, n.d.). Lastly, Focus Online was founded as a conservative newspaper (Focus) with a business focus to directly compete with Der Spiegel and generally offers more graphical content and shorter text than its competitor (eurotopics, n.d.a).

The four news websites also included a different textual focus. Bild.de is considered as the most famous tabloid news outlet in Germany and is seen as a contrast to the German so-called quality media (Berghofer, Greyer, & Dogruel, 2014). Der Spiegel and tagesschau.de are considered quality media, which means that they achieved the highest scores in the categories timeliness, relevance, accuracy, comprehensibility, diversity, completeness and impartiality in comparison to other online news outlets (Wellbrock, 2011). It can be expected that Der Spiegel might have decreased its score on the ranking in the last year because it was discovered that for many years several news stories were falsified by a top reporter of the news magazine who also created false quotes for many other news outlets (Reuters Institute for the Study of Journalism, 2019). This also caused the trust of Germans in Der Spiegel to decrease in the last year (Reuters Institute for the Study of Journalism, 2019). To add a business-oriented news website, as suggested by previous research (Tschötschel et al., 2020), Focus Online was added.

The choice of news outlets can be seen in figure 3.1. This figure compares the political orientation and the trust scores of the chosen news outlets. It can be seen that Bild.de has the lowest trust score, while tagesschau.de has the highest and Der Spiegel and Focus Online have a slightly lower trust score (Reuters Institute for the Study of Journalism, 2019).
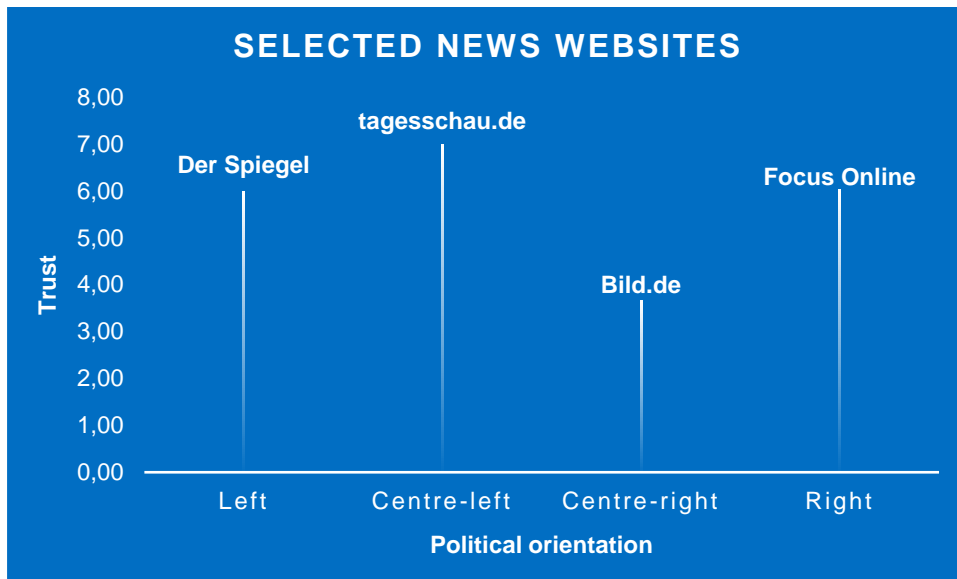
Figure 3.1. Selected news websites (Reuters Institute for the Study of Journalism, 2019)

3.2.2 Data collection – sampling

From these four platforms, around 60 articles per online news platform were selected. A sample of 150 or 15 units of analysis per independent variable is typically identified as the minimum amount for a quantitative research, especially when regression analysis is chosen as a data analysis method (Stevens, 1996). Therefore, approximately 240 articles can be considered as a sufficient amount within the time available for this research.

To collect the news articles, a search term needed to be defined. Similar studies in the past that were focusing on newspaper articles used the terms 'climate change' and 'global warming' to collect articles on platforms such as LexisNexis (e.g. Antilla, 2005; Schmid-Petri et al., 2017). For this thesis, the keyword 'Klimawandel' (climate change) was used to select articles because it was the search term that was the most precise (as will be discussed in section 3.5) and was included in all previous researches.

A previous study on online news websites used search terms such as 'climate change', 'carbon dioxide' or 'fossil fuels' on Google to find news articles from selected platforms, because some of their platforms did not have a search option (Tschötschel et al., 2020). This study brought up the concern that their method possibly generates a sample bias because it is influenced by the Google algorithm. In this thesis, the Google sample bias could be avoided in three out of four news outlets because they included an article search option on their own website. The search results on those news websites were ranked by date. Only Focus Online articles needed to be selected using Google. For the time frame in which articles were selected for the sample, January to December 2019 was chosen because previous studies suggest that a larger time frame than six months was needed in future research (e.g. Tschötschel et al., 2020).

After searching for 'Klimawandel' on the online news websites, the articles were selected using simple random sampling. Every $N/60^{th}$ article was selected (N being the total population of articles in the search results) to generate 60 articles per news platform, and the first article was randomly selected from the first results page. Lastly, previous studies also emphasized the importance of excluding articles that contain personal opinions from the sample (Antilla, 2005). Therefore, interviews, commentaries and letters were excluded from the sample. To make sure these types of articles were excluded, every article needed to be read during the sampling process to verify if different opinions were present. Additionally, videos, live tickers and articles on other topics, that only mention climate change as an example for another argument were excluded as well. These articles were substituted by the following article in the list without changing the order of the systematic random sampling. However, three articles needed to be excluded from the sample later during the analysis process because they were only after the sampling process identified as interviews. These articles needed to be excluded from the sample and were not substituted. The final sample consists of 241 online news articles and can be found in Appendix A.

3.3 Operationalization

For this study four groups of variables are analysed: the first group of dependent variables that includes the three types of scepticism, the group of independent variables that concerns background information of the news websites, the second group of dependent variables that investigates the most important actors and the third group of dependent variables for the framing analysis. The distinction between the groups is based on previous research that used two groups: the document level and the actor-argument level (Schmid-Petri et al., 2017). This approach is used and expanded for this thesis.

The first group of dependent variables in this study are the three types of climate change scepticism that were identified by Rahmstorf (2005): fundamental, attribution and impact scepticism. These variable are defined based on previous research by Schmid-Petri et al. (2017) who conducted a quantitative content analysis on climate scepticism in American newspapers. The three variables for climate change scepticism are measured using a Likert scale with five values. To ensure the reliability of the variables between different coders, a Krippendorff's α intercoder reliability test was conducted. Krippendorff's α is a commonly used metric in media content analysis. The test will be explained in detail in section 3.5. A satisfactory value is suggested to be between .75 and 1 (De Swert, 2012). Fundamental scepticism ranges from 'the article only presents the argument that climate change exists' to 'the article only presents the argument that climate change does not exist' and showed a Krippendorff's α of 1 in the intercoder reliability test.

Attribution scepticism ranges from 'the article only presents the argument that anthropogenic global warming exists' to 'the article only presents natural causes for climate change'. A category for 'not mentioned in the article' was also added. The variable attribution scepticism generated a Krippendorff's α of .7706. Lastly, impact scepticism is divided into two dimensions: 1) which action the article recommends against climate change (obligatory actions, voluntary actions, something should be done in general or nothing should be done) and 2) if positive or negative consequences are mentioned. By using these two dimensions it is possible to differentiate the arguments that concern the influence of climate change from the urgency to act on it and draw conclusions on both aspects of impact scepticism separately. To both dimensions the option 'not mentioned' was added. Dimension one showed a Krippendorff's α of .7755 while dimension two showed an α of 1. The exact scales for the variables can be found in Appendix B.

The group of independent variables can be seen as background information about the article. The most important independent variable is the political orientation of the news website which contains four categories on a spectrum from left-wing to right-wing ideology (Krippendorff's α = .9434). The group also contains the variables name of the article (which was not used in the analysis process but provided some background information about the content of the articles), publication date and publication month (Krippendorff's α = 1), topic of the article in keywords (this variable was also just used to give background information about selected articles and therefore a Krippendorff's α was not calculated) and number of words per article (Krippendorff's α = .9953).

The third group of variables concerns the most important actors of the article (MIAs). Most important actors are individuals that are mentioned with regards to climate change or a climate change policy and are mentioned with a higher number of words than other individuals in the article. The group of variables concerning MIAs include first the number of MIAs mentioned in the article (Krippendorff's α = 1). This can be a maximum of three MIAs per article just to get an overview of the most important ones mentioned and because a previous study has shown that on average, news articles do not use more than 3 MIAs (Schmid-Petri et al., 2017). This was also found in the thesis, as 1.74 MIAs were mentioned on average per news article.

Apart from that, the background of every MIA that was identified was coded in two different dimensions: 1) function or occupation of the actor (Krippendorff's α (actor 1) = .9402, α (actor 2) = **.**8821, α (actor 3) = .7792) and 2) political orientation of the actor (Krippendorff's α (actor 1) = .9195, α (actor 2) = **.**8949, α (actor 3) = 1). In the first dimension it was sometimes difficult to distinguish a business representative from an expert or scientist, which caused the variations in the α-value, so the context in which the actor was presented needed to be examined more carefully. In the second dimension external sources could be

consulted in case a politician was not mentioned with their political orientation, but it could be considered common knowledge (from the point of view of a German citizen; e.g. Donald Trump is a republican, Angela Merkel is from the CDU). Lastly, for every MIA the level of fundamental, attribution and impact scepticism was examined in three variables which were also based on previous research (Schmid-Petri et al., 2017). These variables needed to be adapted after the first intercoder reliability test because the results were not satisfactory. Therefore, for every variable a category of 'explicit' and 'implicit' was added as well as the category 'not mentioned' and an intercoder reliability test was executed for a second time with satisfactory results, as can be seen in table 3.1.

Table 3.1

Krippendorff's α values for variables concerning level of scepticism per MIA

Variable	MIA	Krippendorff's α
Occurrence of climate change (Fundamental scepticism)	1	.8406
	2	.9001
	3	.7901
Cause of climate change (Attribution scepticism)	1	.8113
	2	.8421
	3	1.000
Climate change seen as problem by actor (Impact scepticism)	1	.8945
	2	.8141
	3	.9471

The last group of variables investigates the framing of the news articles and can be used to identify if different news outlets report about climate change in a different way. This is relevant to examine because, as discussed in chapter 2.3, frames can influence an audience's dominant interpretation of the information (Entman, 1993). Three types of frames are analysed in this group. The first frame differentiates between local, global or local and global reporting (Krippendorff's α = .9367). This frame was chosen because it has been identified that a local frame increases the reader's perception that climate change is a direct threat (Leiserowitz, 2005; Wiest et al., 2015). The second frame focusses on the main consequences that are mentioned in the article (Krippendorff's α = .7786). This variable can be considered part of the impact scepticism because identifying various consequences of climate change might enhance the belief that something should be done against climate change (Schmid-Petri et al., 2017). The last frame concerns general news frames (Krippendorff's α = . 8337) and is based on previous research by Valkenburg et al. (1999). Those news frames are the conflict frame, human-interest frame, responsibility frame and economic consequences frame. General news frames were selected because climate change scepticism news frames focus mainly on fundamental and attribution scepticism (e.g. Antilla, 2005; Kaiser & Rhomberg, 2016) but it is expected that impact scepticism will be clearly the most salient kind of climate change scepticism, especially in the German online

news (Tschötschel et al., 2020). In addition to that, the independent variables (fundamental, attribution and impact scepticism) have been used by previous research as climate change scepticism frames (e.g. Antilla, 2005; Kaiser & Rhomberg, 2016). The exact definition and measurement of all the variables can be found in the codebook in Appendix B.

3.4 Data analysis

After the coding process, the data was analysed using logistic and ordinal regressions, Chi-square tests for independence and Fisher's exact tests on SPSS. The data analysis also included descriptive data, crosstabs and plots for data visualization. To get an overview of the articles (e.g. when they were published), statistical moments were computed. To identify if there was a correlation between the level of scepticism in the articles and the political orientation of the news websites, one logistic regression was executed. To detect correlations between the political orientation of the news outlets and the most important actors mentioned, Chi-square tests for independence and ordinal regression analyses were performed. Lastly, to compare the different frames used by the news websites, Chi-square tests for independence and Fisher's exact tests were implemented. The results of the data analysis can be found in the following chapter.

3.5 Quality assurance

Reliability is given when "a particular technique, applied repeatedly to the same object, yields the same result each time" (Babbie, 2014, p. 152). In research using quantitative content analysis, reliability is ensured by stability, reproducibility and accuracy (Krippendorff, 2004). To ensure stability in this study, a codebook was created and tested before the analysis was carried out and was used in the same way for every article in the sample. This codebook with clear coding instructions also makes it easier to reproduce the study in the future. To ensure full reproducibility, the data analysis and data collection process for this study is described in the most transparent way. Moreover, to ensure accuracy most of the variables concern manifest content, which has been identified as more reliable than latent content (Krippendorff, 2004).

Additionally, to ensure that the variables have been generated accurately and are understood in the same way by other researchers a Krippendorff's α intercoder reliability test was generated for every variable using the program SPSS. Krippendorff's α has been identified by many researchers as the most useful reliability test for media content analysis and is usually accepted as satisfactory at a value of around .8 (this includes variables that can be rounded up to .8) unless the variable is very easy to code (e.g. publication month of

the article), then a value of 1 would be expected (De Swert, 2012). Values of around .8 were achieved for every variable of the dataset.

The intercoder reliability test was conducted together with a second coder, a native German speaker also studying a subject that is part of the social sciences on a Master level. A native German speaker was chosen to make sure that even subtle or implied details in the text could be coded correctly. Both coders analysed 10% (24 articles) of the sample and discussed the coding frame afterwards to improve it. Only the variables concerning the level of scepticism per MIA (as can be seen in table 3.1) needed to be adapted and were coded twice to achieve a better result.

Validity can be defined as "the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration" (Babbie, 2014, p. 154f). One of the ways to ensure validity is to use already established concepts, variables and sampling procedures from previous research (Babbie, 2014; Krippendorff, 2004). In this study all the concepts are thoroughly discussed based on relevant existing research. Furthermore, variables as well as the sampling procedure are based on previous research that has generated valid results. In online sampling procedures the data collection process through a search engine is often seen as problematic for validity (Krippendorff, 2004). In this study, the search term 'climate change' was chosen. In German this term is only one word (Klimawandel). Therefore, there are no articles in the sample that only include the word climate or only include the word change. To make sure that only relevant articles were part of the sample, every article was read during the sampling process and articles that did not talk about the natural phenomenon of climate change were not selected. Only three articles needed to be skipped during the sampling process for that reason. Due to this, it can be said that the search term was precisely selecting the right articles for this research. To see whether choosing the term 'Klimawandel' would be the most suitable term and would not exclude relevant articles, a Google Trends search in the category news search in Germany in 2019 was performed. It showed that in comparison to other terms (such as global warming, fossil fuels or carbon dioxide) climate change was the term that was most often and most regularly searched for throughout 2019. This is visualized in figure 3.2.

Relative search interest in Google news Germany in 2019
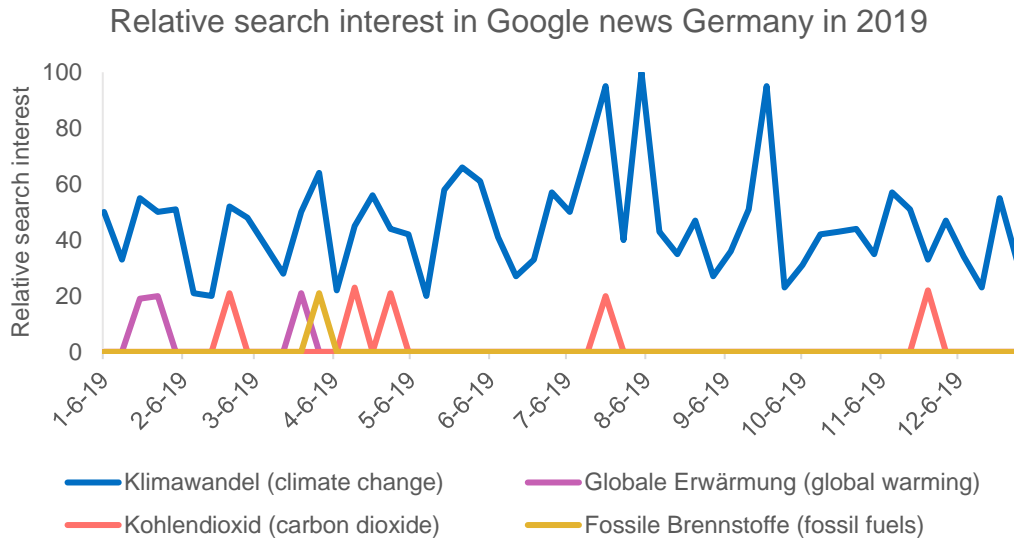
Figure 3.2. Google trends relative search interest in Google news in Germany in 2019 for the key words Klimawandel (climate change), globale Erwärmung (global warming), Kohlenstoffdioxid (carbon dioxide) and fossile Brennstoffe (fossil fuels; Google, 2020). The value 100 shows the peak of the popularity of the term and a value of 0 shows that there was not enough data.

In addition to that, global warming (globale Erwärmung) was only mentioned nine times in the whole sample, fossil fuels (fossile Brennstoffe) only eight times and carbon dioxide (Kohlenstoffdioxid) not at all (carbon is more frequently used in the sample than carbon dioxide). Therefore, it can be said that 'Klimawandel' seems like the most precise term for this study and if any other term from previous research had been chosen many articles would have been missed. It can be said that this study is valid because every sampling, data collection and data analysis decision is based on previous research and considering the search term, the most precise and relevant option was chosen.

4 Results

The following chapter summarizes the results of this thesis with the main research question: *To what extent is scepticism about climate change present in German online news websites?* To answer this question 241 news articles published in 2019 from four different German online news platforms were analysed. The results show that generally German online news websites are not sceptical about the occurrence, causes or impact of climate change. Nonetheless, left-wing news websites are more likely to mention and criticise sceptical actors and no sceptical actors with a left-wing political orientation are named.

In the following sections (4.2, 4.3 and 4.4) the results are visualized using several figures. The data used to generate those figures (4.2 - 4.5 and 4.7 – 4.17) can be found in Appendix C.

4.1 Overview

For this thesis 241 news articles were analysed from four different online news websites with different political orientations: Der Spiegel (*n* = 63), tagesschau.de (*n* = 59), Bild.de (*n* = 60) and Focus Online (*n* = 59). The average number of words per article is 622.5 words, with a minimum of 177 and a maximum of 1797 words.
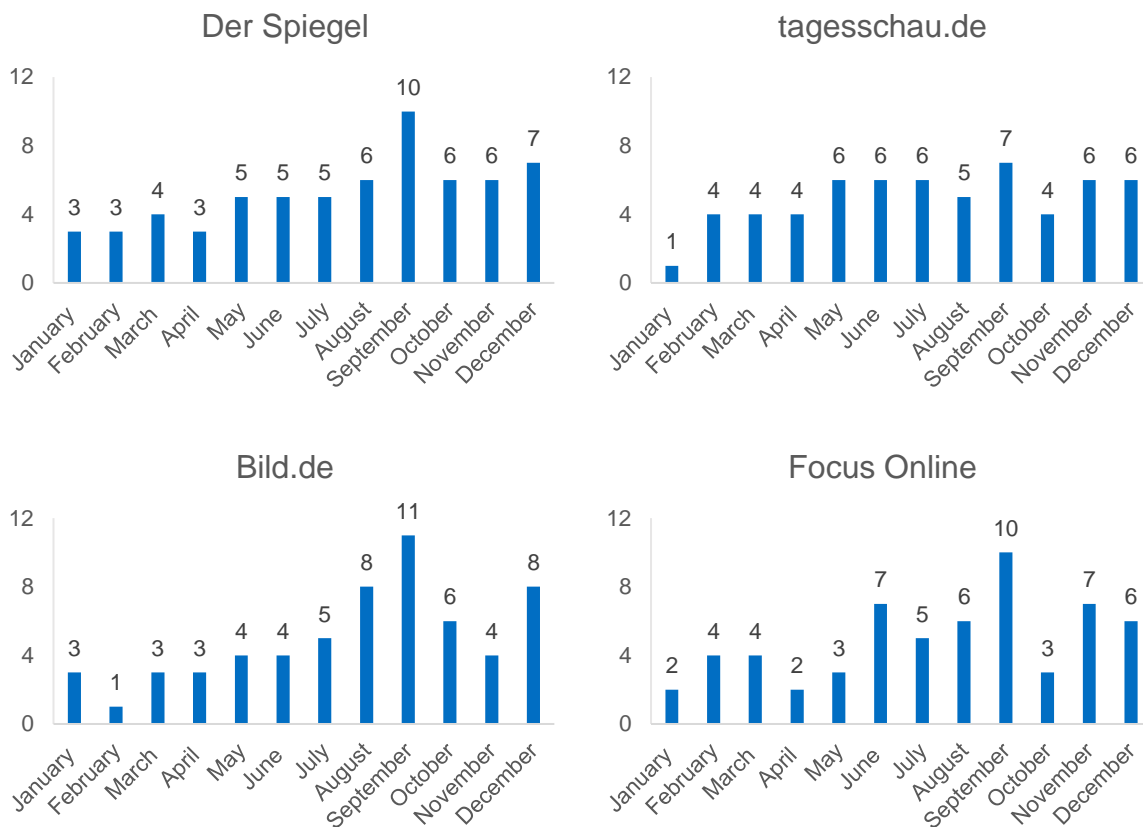
Figure 4.1. Number of articles per month per news outlet

Overall, as can be seen in figure 4.1, September 2019 was the month with the highest number of published news articles (38 articles), followed by December and August (27 and 25 articles, respectively). 44.4% of the articles were published in the last four months of 2019 and 63.5% in the second half of the year. The reason for the accumulation of news articles at the end of the year and especially September could relate to the fact that on the 20th of September 2019 the German government agreed on a climate protection law to reduce CO_2 emissions in Germany by 40% until 2030 in comparison to 1990 as agreed in the Paris agreement (BMU, 2019a). Around this time many people were demonstrating in Germany because they were not pleased with the climate action law and were demanding stronger political action to fight climate change from the German government (tagesschau.de, 2019a). In addition to that, the number of people at "Fridays for Future" demonstrations grew worldwide throughout 2019 which could have increased the media attention as well (tagesschau.de, 2019a).

The increased media attention to climate change in December could be due to the 2019 United Nations Climate Change Conference in Madrid which took place from the 2nd to the 13th of December (United Nations, 2019). The finding that more articles were published at the end of the year, when important climate change related events were happening, is in line with previous research which concludes that media attention on climate change increases when important (international) climate summits or events take place (Schäfer, Ivanova, & Schmidt, 2012).

Table 4.1

Overview (per news website) of mean, standard deviation, skewness and kurtosis of the months weighted by the frequency of articles published in 2019 and mean and standard deviation of news articles published per month per news website

	Based on months				Based on news articles	
	Weighted mean	Standard deviation	Skewness	Kurtosis	Mean	Standard deviation
Der Spiegel	7.48	3.25	-.408	-.866	5.25	2.01
tagesschau.de	7.22	3.16	-.121	-1.046	4.92	1.62
Bild.de	7.8	3.08	-.565	-.421	5	2.80
Focus Online	7.44	3.21	-.380	-.844	4.92	2.39

Note. Based on months: 1 is January, 12 is December. Based on news articles: number of news articles.

The previously discussed figure 4.1 shows per news website how many articles in the sample were published in every month of 2019. Table 4.1 shows the weighted mean, standard deviation, skewness and kurtosis of the distribution of articles over the months and the mean and standard deviation based on news articles per month. If the same number of articles were published every month the weighted mean would be equal to 6.5 (June). In this case the weighted means show numbers higher than 7 (July). Bild.de has the highest

weighted mean with a value of 7.8 (*SD*= 3.08). Der Spiegel has a weighted mean of 7.48 (*SD*= 3.25), which is similar to Focus Online (*M*= 7.44, *SD*= 3.21). Lastly, tagesschau.de shows the lowest weighted mean (*M*= 7.22, *SD*=3.16). Thus, in general more articles were published at the end of the year. A uniform distribution of articles over the whole year would also show a kurtosis of -1.2 and skewness of 0. Figure 4.1 and table 4.1 show that the distribution of articles of tagesschau.de is not as skewed to the end of the year in comparison to the other articles. The distribution of articles for tagesschau.de is the closest to a uniform distribution from all the news websites.

Additionally, the standard deviation of the news articles can be taken into consideration to see which news outlet deviates the most from the mean of around 5 articles per month. With a standard deviation of 1.62 articles (*M*= 4.92) tagesschau.de deviates the least while Bild.de with a standard deviation of 2.80 (*M*= 5) deviates the most from the mean. Der Spiegel shows a standard deviation of 2.01 articles (M= 5.25), which is slightly lower than Focus Online (*M*=4.92, *SD*= 2.39). This leads to the conclusion that, while most of the news websites report about climate change when there is a main event happening like a climate conference, tagesschau.de reports about climate change more consistently throughout the year. The distribution of articles for Bild.de seems to be the most concentrated at the end of the year and especially in September and December. This can be seen in figure 4.1, in the skewness value of -.565 and the high standard deviation (based on news articles). Therefore, it is possible to conclude that Bild.de reports mainly about climate change when related events take place (in line with research by Schäfer et al. (2012)) while tagesschau.de reports more regularly about climate change throughout the year.

4.2 Climate Change Scepticism

The following section focuses on the results of the scepticism analysis and reflects on which types of scepticism are present in general and in the different online news websites.

Table 4.2

Number of articles per level of fundamental and attribution scepticism

Variable	Categories	n	%
Fundamental **scepticism**	Only presents the argument that climate change exists	222	92.1%
	Presents both sides, but emphasizes that climate change exists	15	6.2%
	Presents a balanced account of both sides	3	1.2%
	Presents both sides, but emphasizes that climate change does not exist	1	0.4%
	Only presents the argument that climate change does not exist	0	0.0%
Total		**241**	**100%**
Attribution **scepticism**	Not mentioned	74	30.7%
	Only presents the argument that anthropogenic global warming exists, clearly distinct from natural variations	148	61.4%
	Presents both sides, but emphasizes that anthropogenic global warming exists, distinct from natural variations	16	6.6%
	Presents a balanced account of both arguments surrounding the existence of anthropogenic global warming	1	0.4%
	Presents both sides, but emphasizes the dubious nature of the claim that anthropogenic global warming exists	2	0.8%
	Only presents natural causes for climate change	0	0.0%
Total		**241**	**100%**

Table 4.2 shows that only one article was found that showed fundamental climate change scepticism because the arguments explaining that climate change does not exist were longer than the arguments explaining that climate change exists. Articles that only claimed that climate change does not exist were not found in the sample. The vast majority of articles (92.1 %) only state that climate change exists and do not mention any other opinions. Hence, it can be concluded that the German online news outlets are generally not sceptical about the occurrence of climate change.

When it comes to climate change attribution scepticism, table 4.2 shows that two articles were found that give more space to the argument that climate change is not mainly caused by humans. One of the two articles that have been identified as sceptical about the cause of climate change is the same article that has been identified as fundamentally sceptic. Articles that only claimed that climate change is not mainly caused by humans were not found in the sample. However, 30.7% of the sample (74 articles) did not mention at all if climate change is mainly caused by humans or not. Even though those articles do not give any explicit information about attribution scepticism it cannot be assumed that they are sceptical about the human cause of climate change. There are three arguments for that.

Firstly, those 74 articles mention several actors (*n* = 7) who were categorized as believers of a human cause of climate change in an implicit way. Secondly, the articles do not mention any sceptical actors. Finally, there are also no fundamentally sceptical articles included. Additionally, 61.4% of all the articles (148 articles) only present the argument that anthropogenic global warming exists and is clearly distinct from natural variations. Therefore, it can be assumed that German online news websites are also not sceptical about the human cause of climate change.

The finding that fundamental and attribution scepticism frames are generally not present in the German online news is in accordance with previous research on online news websites (Tschötschel et al., 2020) and surveys in Germany about climate change scepticism (Tranter & Booth, 2015). Nonetheless, recent studies show that Germans are more sceptical about the human cause of climate change than about the occurrence of climate change itself (infratest dimap, 2019).

Table 4.3

Number of articles per level of impact scepticism

Impact scepticism	Categories	n	%
Dimension 1	Not mentioned	70	29.0%
	Obligatory action recommended	119	49.4%
	Voluntary action recommended	12	5.0%
	Something should be done (generally)	39	16.2%
	Nothing should be done	1	0.4%
Total		**241**	**100%**
Dimension 2	Not mentioned	69	28.6%
	Consequences of climate change will be negative	172	71.4%
	Consequences of climate change will be positive	0	0.0%
Total		**241**	**100%**

Climate change impact scepticism is measured in two dimensions: (1) which climate action the main actor recommends or is recommended in the overall conclusion of the article and (2) if negative, positive or no consequences of climate change are mentioned. Table 4.3 shows that overall, there was only one article that concluded that there should be no action to fight climate change and no article mentioned that consequences of climate change would be mainly positive. Nonetheless, 28.6% of the articles do not mention any consequences of climate change and 29.0% of the articles do not mention if something should be done or not to fight climate change.

In total, 19 articles do not mention both dimensions of impact scepticism. Comparing those 19 articles with the 74 articles that do not mention attribution scepticism it can be noted that all the articles have a very low amount of words in comparison to the overall word count average of the sample of 622.5 words. The articles that do not mention impact scepticism have an average of 489.5 words and the articles that do not mention attribution

scepticism have an average of 581.2 words. Additionally, the most commonly used frames for these articles are the human-interest frame and the conflict frame and they are mostly published by Der Spiegel and tagesschau.de. The low amount of words and the choice of frames indicates that the articles were probably not mainly informative about cause and consequences of climate change but instead mainly discussed people and conflicts between them with relation to climate change. Nonetheless, it is clear that overall most of the articles in the sample state that the consequences of climate change will be negative or that obligatory action (such as laws and state investments) is recommended (81 articles include both statements). Voluntary action (such as eating less meat or using the bike more frequently) are mentioned less often, only in 5.0% of the articles.

This shows that while German news websites strongly emphasize that climate change exists (92.1%), they are less clear about which actions should be taken against it, mainly mention obligatory actions (49.4%). Nonetheless, the news articles tend to emphasize that the impact of climate change will be negative (71.4%). This finding is in line with previous research, which found that German online media tend to emphasize the need to lower CO_2 emissions to prevent global warming as it will have a negative impact on humans (dimension 2) but presents controversies when it comes to the question of how this should be done (dimension 1; Tschötschel et al., 2020). Because the dataset in this thesis is more recent and the German government just passed a climate change mitigation law in 2019 it could be that the reporting about a need for obligatory actions increased in Germany.
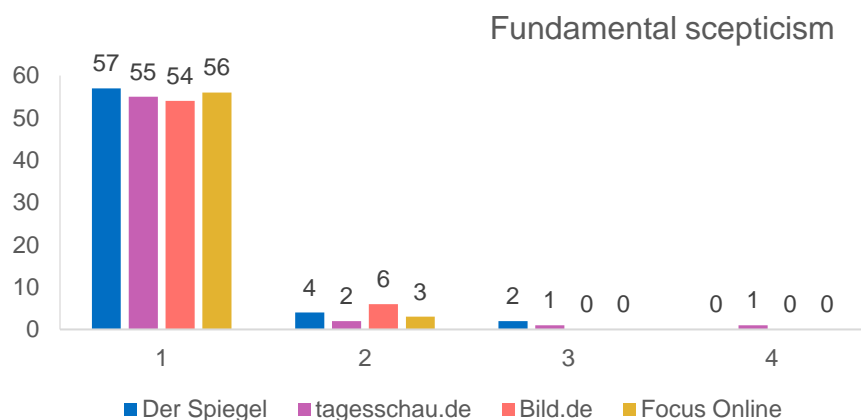
Figure 4.2. Level of fundamental scepticism per news website. The levels on the horizontal axis refer to: (1) Only presents the argument that climate change exists. (2) Presents both sides but emphasizes that climate change exists. (3) Presents a balanced account of both sides. (4) Presents both sides but emphasizes that climate change does not exist. No articles were found in the sample for (5) only presents the argument that climate change does not exist.

Attribution Scepticism
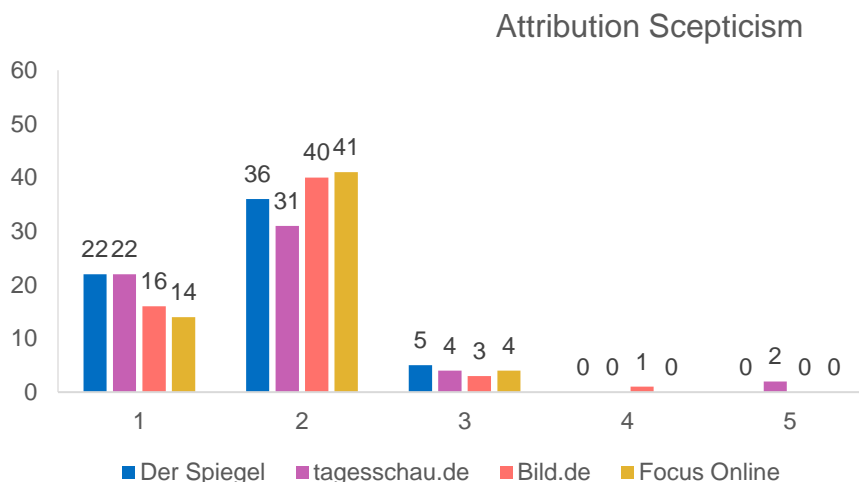
Figure 4.3. Level of attribution scepticism per news website. The levels on the horizontal axis refer to: (1) Not mentioned. (2) Only presents the argument that anthropogenic global warming exists, clearly distinct from natural variations. (3) Presents both sides, but emphasizes that anthropogenic global warming exists, distinct from natural variations. (4) Presents a balanced account of both arguments surrounding the existence of anthropogenic global warming. (5) Presents both sides but emphasizes the dubious nature of the claim that anthropogenic global warming exists. No articles were found in the sample for (6) Only presents natural causes for climate change.

There is a very small number of articles that are sceptical about the existence or cause of climate change (as can be seen in figure 4.2 and figure 4.3). Due to this fact, a regression analysis has not been conducted, since there are insufficient samples and variation in the categories 2 to 4 in fundamental scepticism and 3 to 5 in impact scepticism. The only article that can be labelled as sceptical about the occurrence of climate change comes from tagesschau.de, the centre-left public broadcaster, and talks about the AfD (a German right-wing political party) and why they are sceptical about climate change. The same article has also been identified as sceptical about the cause of climate change. Furthermore, the only two articles that can be labelled as sceptical about the anthropogenic cause of climate change are also published by tagesschau.de and discuss the AfD. The only article that can be labelled as being sceptical about the impact of climate change was published by Bild.de and discusses Donald Trump and his opinion about the French climate mitigation policies.

Impact scepticism (1)
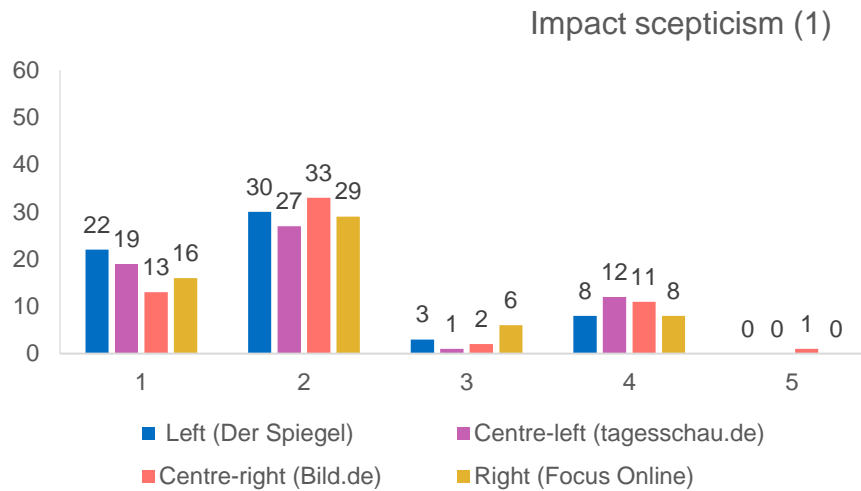
Figure 4.4. Level of impact scepticism (dimension 1) per news website. The levels on the horizontal axis refer to: (1) Not mentioned. (2) Obligatory action recommended. (3) Voluntary action recommended. (4) Something should be done (generally). (5) Nothing should be done.

Impact scepticism (2)
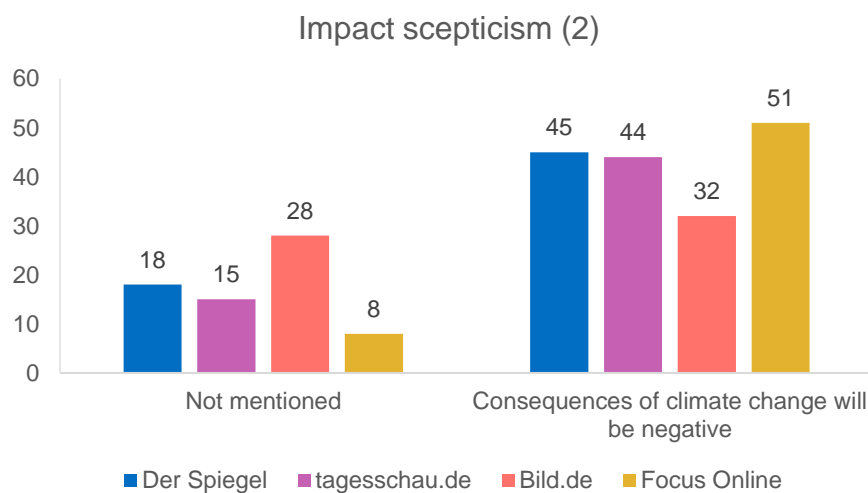
Figure 4.5. Level of impact scepticism (dimension 2) per news website

Figure 4.4 and figure 4.5 visualize how many articles were identified under the two levels of impact scepticism, categories with 0 articles were excluded. To see if there is a correlation between the level of impact scepticism (dimension 1) and the news websites, a logistic regression was executed, excluding the category not mentioned and summarizing the categories voluntary actions, general recommendations and no recommendations into a single category. Dimension 1 of impact scepticism was used as the criterium (0 = obligatory actions, 1 = all other recommendations) and political orientation of the news website as predictor. The model was found to be not significant χ^2 (1, N = 171) = 0.21, *p* = .651, indicating that there is no significant variance between the different news websites. The

Hosmer & Lemeshow test, however, indicates a good model fit ($p =.890$). The results of the logistic regression are presented in table 4.4.

Table 4.4

Logistic regression of impact scepticism (dimension 1) with respect to the political orientation of the news websites

	B	Exp(B)	Score
Political orientation of the news website	.068	1.070	
Constant	-1.002	.367	
Nagelkerke R2			.002
Hosmer & Lemeshow Test			.890
N			171

The high value of significance of the Hosmer & Lemeshow test indicates that the logistic regression is well fitted to the data. Nonetheless, the influence of political orientation on the model is not significant. The cause of this is that one of the included parameters in the logistic regression fit is a constant value, which has a higher influence on the model than the political orientation of the news website. This constant has a higher influence because there are more articles in general that recommend an obligatory action (0) than those recommending other actions or no actions (1) against climate change. This is visualised in figure 4.6, which illustrates that the logistic regression fitted to the data has a downward trend. Nevertheless, it should be pointed out that in the analysed data, the percentage of articles that recommend an obligatory action is similarly high for every news outlet (on average 69.6%). Hence, the influence of the political orientation in the fitted logistic regression was found to be not significant, as figure 4.6 shows.
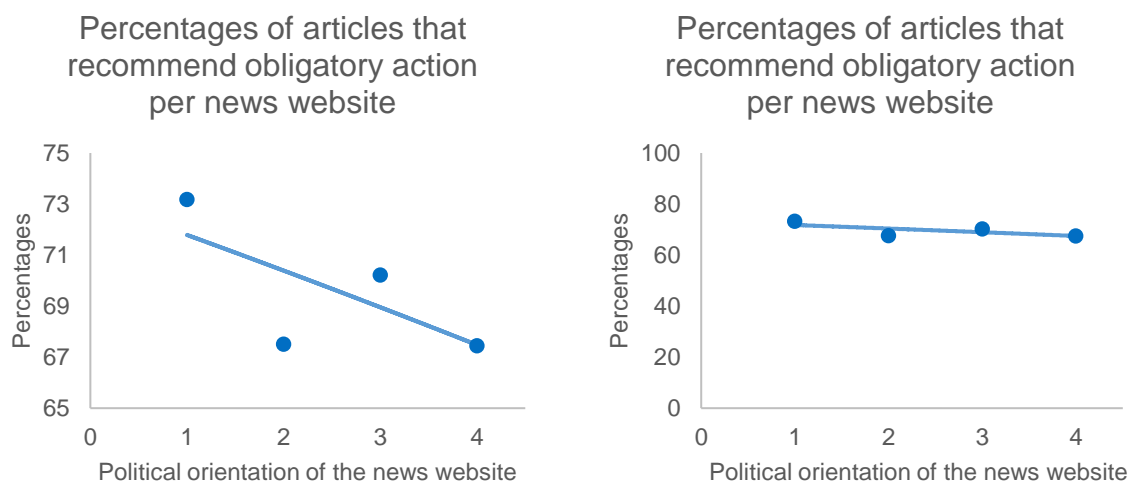
Figure 4.6. Percentages of articles that recommend obligatory action per news website and fitted logistic regression. Left on a scale from 65% to 75%, right on a scale from 0 to 100%. The levels on the horizontal axis refer to: (1) Left (Der Spiegel), (2) Centre-left (tagesschau.de), (3) Centre-right (Bild.de), (4) Right (Focus Online).

Therefore, it can be concluded that the German online news websites generally do not report sceptically about climate change and there is no significant correlation between scepticism and the political orientation of the news website. This result is contradictory to previous research on German newspapers and climate change scepticism, which found a significant correlation between conservative newspapers and climate change scepticism (Kaiser & Rhomberg, 2016). The same study found sceptical arguments in 15% of the articles analysed, although, they were mostly mentioned to be dismissed by the journalists afterwards However, it should be noted that the coding process of that study was different than the coding process of this thesis. In this thesis an article including sceptical arguments would only have been coded as sceptical if the sceptical argument was more extensively described than the explanation of the journalist afterwards. In the sample of this study 7.8% of articles included sceptical arguments about the occurrence of climate change and 7.8% of articles included sceptical arguments about the cause of climate change. An argument about impact scepticism was only explicitly found in one article. Also, Kaiser and Rhomberg (2016) have mentioned Bild as an exception. The study identified the tabloid newspaper as less sceptical about climate change in comparison to other conservative newspapers.

The difference in results could be due to the fact that either conservative newspapers are reporting more sceptically than conservative online news websites or that overall German (conservative) news outlets have become less sceptical in the past years.

4.3 Most Important Actors

The most important actors (MIAs) have been selected as part of the analysis to investigate different opinions that were mentioned in the news article. A maximum of three actors per article were analysed and on average 1.74 actors were coded per article. The actors always needed to be mentioned as individuals and needed to be directly mentioned with regards to climate change or a climate change policy. Bild.de mentioned the most MIAs per news article with an average of 1.88 actors. In total 419 MIAs were coded and there were 21 articles that did not mention any actors. An overview can be seen in figure 4.7.

Number of MIAs per article
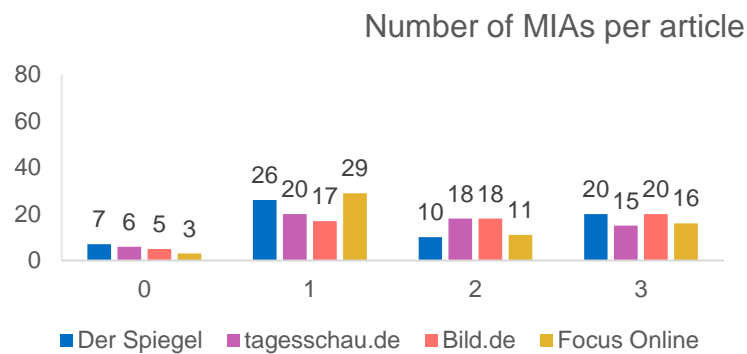
Figure 4.7. Number of most important actors mentioned in an article per news website

While most of the news websites only included one MIA (most important actor) in their article, only Bild.de had mostly three MIAs in their articles. Focus Online and Spiegel mentioned 1.68 MIAs on average while tagesschau.de mentioned 1.71 MIAs on average. This cannot be explained by the amount of words per article because on average Focus Online has the most words per article (725.1 words) while Bild.de has 542.1 words per article on average. The large number of MIAs mentioned in Bild.de could be due to the fact that the online news platform belongs to a tabloid newspaper and therefore often discusses people and conflicts between people, while other news websites focus more on events.

Function/ occupation of MIAs
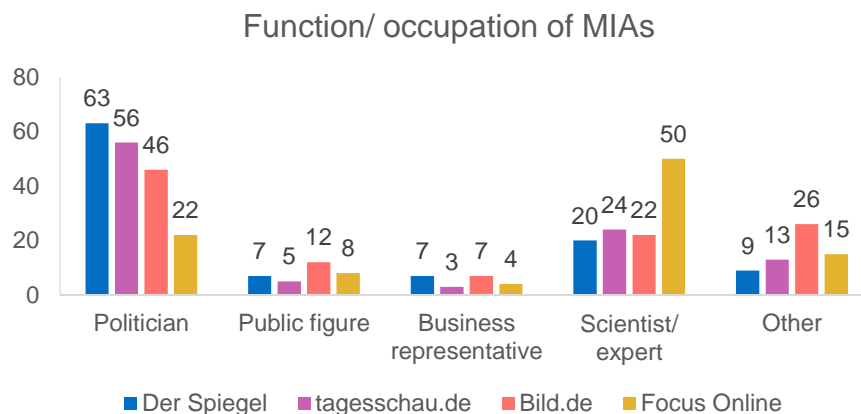
Figure 4.8. Function/ occupation of most important actors per news website

Figure 4.8 shows that politicians were the most mentioned MIAs overall (*n* = 187), followed by experts (*n* = 116). A Chi-square test revealed that the type of news website was related to the likelihood of mentioning a certain function or occupation of an MIA in 2019 χ^2 (*N* = 419, 12) = 56.73, *p* < .001. Der Spiegel is most likely to mention a politician, Bild.de is most likely to mention a public figure (although the difference here is not very high) or someone who could not be defined as either of the categories, while Focus online is most likely to mention a scientist or expert. The distribution of function or occupation of the MIAs was not as clear for tagessschau.de as for the other news outlets.

Political orientation of MIAs
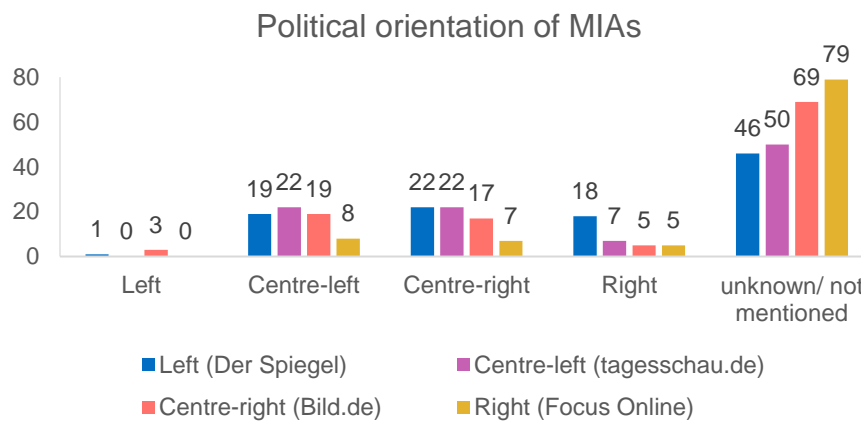
Figure 4.9. Political orientation of MIAs compared to political orientation of news websites

As can be seen in figure 4.9 most of the MIAs did not have or were not mentioned with a political orientation. The most political orientations that were mentioned were centre-left (*n* = 68) and centre-right (*n* = 68). This could also be due to the fact that it was determined in the codebook that if the coder was unsure how left or right an MIA was it should be coded as centre-left or centre-right. An ordinal regression was executed with political orientation of the MIA as dependent variable (excluding the category unknown/ not mentioned) and political orientation of the news website as independent variable. The results of the ordinal regression are shown in table 4.5. The model was found to be not significant, $\chi^2(1)$ = 2.59, *p* = .107. Hence, the political orientation of the online news website does not predict the political orientation of the MIAs mentioned.

Table 4.5

Ordinal regression of political orientation of the MIAs with respect to the political orientation of the news websites

	Political orientation of MIA	Score
Political orientation of the news websites	-.226	
Threshold cat. 1	-4.262	
Threshold cat. 2	-.848	
Threshold cat. 3	.916	
Nagelkerke R^2		.016

Table 4.6

Most common MIAs in the German online news in 2019

Rank	Number of articles	MIA
1	29 articles	Greta Thunberg
2	20 articles	Donald Trump
3	11 articles	Svenja Schulze
4	10 articles	Angela Merkel
5	9 articles	Jair Bolsonaro

Table 4.6 lists the most mentioned MIAs in the sample of articles. The actor that was mentioned the most in connection to climate change or climate change policies in the German online news in 2019 was Greta Thunberg (a Swedish environmental activist). She was mentioned in 29 articles as one of the most important actors. After her the most mentioned MIAs were Donald Trump (the current president of the United States), Svenja Schulze (the current German environment minister), Angela Merkel (the current chancellor of Germany) and Jair Bolsonaro (the current president of Brazil). In Der Spiegel and tagesschau.de, Donald Trump was the person that was most often an MIA in the news articles and in Bild.de and Focus Online Greta Thunberg was most often mentioned as an MIA.
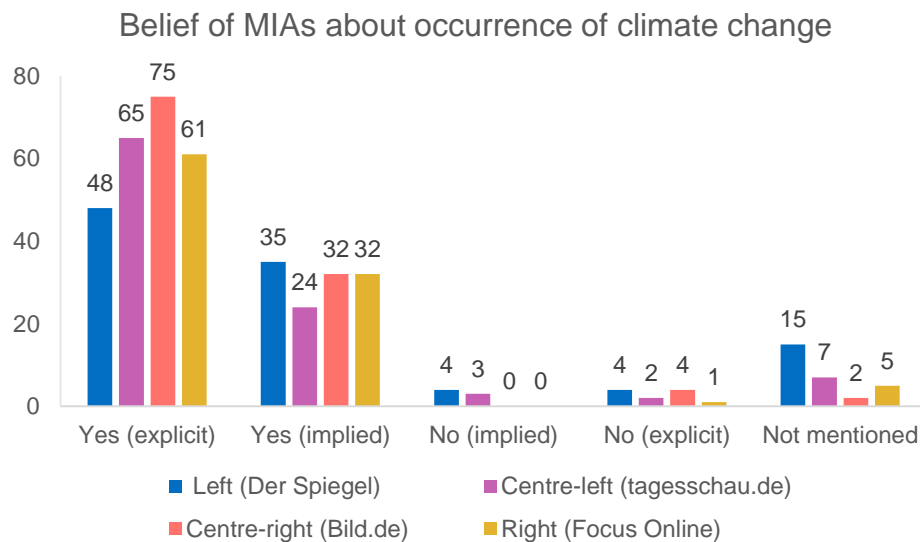
Figure 4.10. Belief of MIAs about occurrence of climate change per news website

As can be seen in figure 4.10, most actors that were mentioned in the news articles were explicitly stated as believers of the occurrence of climate change (59.43%) or it was implied that they believed in the occurrence of climate change (29.36%). 4.3% of the actors (in total 18 actors) that were mentioned were sceptics and for 6.9% of the MIAs it was not mentioned. In comparison, 4% of Germans were sceptical about the occurrence of climate change, based on a survey conducted in 2010 (Tranter & Booth, 2015). A more recent

survey conducted in 2019 shows that 2% of Germans (above 18 years old) are fundamental sceptics (infratest dimap, 2019). The 18 sceptics (4.3%) were mostly politicians and one business representative: 16 were politically right-wing oriented and the other two unknown or centre-right, nine times it was Donald Trump and four times Jair Bolsonaro. Those sceptics were mostly mentioned by Der Spiegel or tagesschau.de. An ordinal regression analysis was executed with the belief in occurrence of climate change of the MIA as criterium (excluding the category not mentioned) and political orientation of the news website as predictor. The results of the regression analysis can be found in table 4.7. The model was found to be not significant, $\chi^2(1) = 3.43$, $p = .064$. Hence, the political orientation of the online news website does not predict the likelihood of mentioning an MIA that is sceptical about the occurrence of climate change.

Table 4.7

Ordinal regression of belief in occurrence of climate change of the MIAs with respect to the political orientation of the news website

	Belief in occurrence of climate change of the MIAs	Score
Political orientation of the news websites	-.176	
Threshold cat. 1	.123	
Threshold cat. 2	2.597	
Threshold cat. 3	3.110	
Nagelkerke R^2		.011
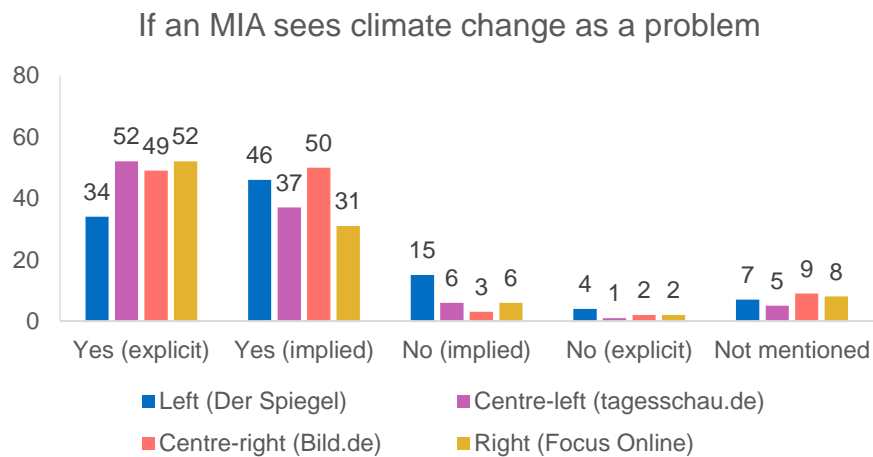
Figure 4.11. If an MIA sees climate change as a problem per news website

As can be seen in figure 4.11, most actors were reported as seeing climate change as a problem explicitly (44.6%) and implicitly (39.1%). 9.31% did not seem to see climate change as a problem and for 6.92% it was not mentioned. The 9.31% of impact sceptics were mostly politicians (35 MIAs out of 39) but also one scientist, one business representative and two people with unknown function or occupation. 33 out of 39 MIAs had a

right-wing political orientation, two centre-right and four had an unknown political orientation. 20 out of those 39 MIAs were, again, Donald Trump and eight were, again, Jair Bolsonaro. An ordinal regression analysis was executed with the variable if an MIA sees climate change as a problem as criterium (excluding the category not mentioned) and political orientation of the news website as predictor. The results are presented in table 4.8.

Table 4.8

Ordinal regression of the variable if an MIA sees climate change as a problem with respect to the political orientation of the news website

	If an MIA sees climate change as a problem	Score
Political orientation of the news websites	-.279	
Threshold cat. 1	-.779	
Threshold cat. 2	1.542	
Threshold cat. 3	3.101	
Nagelkerke R^2		.028

This model was found to be significant $\chi^2(1) = 9.70$, $p = .002$. The more a news website has a left-wing political orientation the more likely it is that the website mentions an MIA who does not see climate change as a problem. However, the Nagelkerke R^2 of 2.8% is very low. Nonetheless, this result does not imply that left-wing news websites report more sceptically, but instead that that the sceptical actors are criticised more often by the left-wing news websites. For instance, Der Spiegel writes about Trump's offer to buy Greenland in 2019 for example:

"Auf so einen politischen Schnapper hofft auch Trump. Der Mann, der den Klimawandel leugnet, sehnt offenbar den Klimawandel herbei, der Grönlands Bodenschätze freilegen könnte. So abwegig der Kaufplan auch klingt - neu ist er nicht." [That is the kind of political catch that Trump is hoping for. The man who denies climate change is apparently longing for the climate change that could expose Greenland's natural resources. As absurd as the purchase plan sounds - it is not new] (Gunkel, 2019, para. 9).

Identified cause of climate change by MIAs
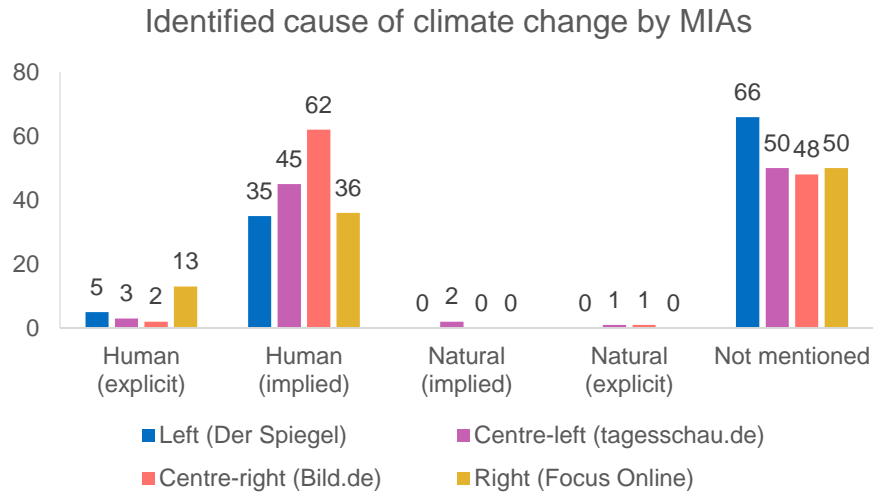
Figure 4.12. Identified cause of climate change by MIAs per news website

As can be seen in figure 4.12, most actors were not reported as having an opinion about the cause of climate change (51.1%). The belief in anthropogenic climate change was mainly implied (42.5%) and not so often explicitly mentioned (5.5%). Only four actors (0.95%) were reported as believing in mainly natural causes of climate change. In comparison, a recent survey showed that 11% of Germans (above 18 years old) fit to the attribution scepticism definition (infratest dimap, 2019). The four attribution sceptics were all politicians with either right-wing or centre-right political orientation: Alexander Gauland (the co-leader of the German AfD), Donald Trump, Jair Bolsonaro and Scott Morrison (the Australian prime minister). An ordinal regression analysis was executed with the identified cause of climate change by the MIAs as criterium (excluding the category not mentioned) and political orientation of the news website as predictor. The results of the ordinal regression are shown in table 4.9.

Table 4.9

Ordinal regression of the identified cause of climate change by the MIAs with respect to the political orientation of the news website

	Identified cause of climate change by MIA	Score
Political orientation of the news websites	-.413	
Threshold cat. 1	-3.213	
Threshold cat. 2	2.93	
Threshold cat. 3	3.635	
Nagelkerke R^2		.033

The model was found to be significant, $\chi^2(1) = 4.14$, $p = .042$. Hence, the more a news website has a left-wing political orientation the more likely it is that the website mentions an MIA who is sceptical about the human cause of climate change. However, the R^2 of 3.3% is very low. This result also shows that news websites with a left-wing orientation

are more likely to mention and criticise actors that are sceptical about anthropogenic climate change. For example, tagesschau.de writes:

"Allen wissenschaftlichen Erkenntnissen zum Trotz äußert US-Präsident Donald Trump wiederholt Zweifel am menschengemachten Klimawandel. Erst kürzlich leitete er mit seiner Regierung offiziell den Rückzug vom Pariser Klimaabkommen ein." [Despite all scientific evidence, US President Donald Trump repeatedly expresses doubts about man-made climate change. Only recently, he and his government officially initiated the withdrawal from the Paris Climate Convention] (tagesschau.de, 2019c, para. 3).

The results from this section also show that the sceptical MIAs that are mentioned in the articles are mostly right-wing politicians (52 out of 61 mentioned sceptics). Nonetheless, there are also a few business representatives, scientist or people where the function or occupation is unknown. Donald Trump and Jair Bolsonaro are the most mentioned sceptical MIAs. No left or centre-left political orientations are presented in connection to climate change scepticism. This means that even though right-wing online media outlets in Germany are not sceptical about climate change, extreme right-wing politicians such as Donald Trump, Jair Bolsonaro or politicians from the AfD are presented as being sceptical about climate change. None of the centre-left or left-wing politicians were reported to be sceptical in any of the news outlets. In addition to that, news websites with a left-wing political orientation are more likely to mention and criticise MIAs that are sceptical about the cause and impact of climate change.

4.4 Framing Analysis

In the last part of the quantitative content analysis the frames that news websites used to report about climate change are taken into consideration. First it was analysed if German online news websites would discuss mostly local or global events when it comes to climate change or mention both a local and a global perspective in their articles.

Frame combinations: Local, global or both
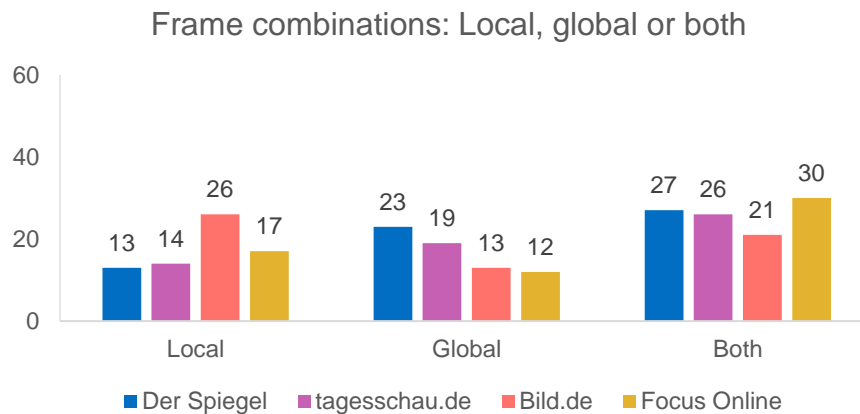
Figure 4.13. Frame combinations (local, global or both) in the news articles per news website

Figure 4.13 shows that most articles mentioned both local and global perspectives when talking about climate change. Bild.de is the only news website that uses mostly local events when talking about the changing climate. The most articles with only a global perspective were published by Der Spiegel. When using the three categories local, global and both, a Chi-square test revealed that the type of news website was not significantly related to the likelihood of using any of the three frame combinations in 2019, χ^2 ($N = 241$, 6) = 12.20, $p = .058$. When isolating the categories local and global, a second Chi-square test was significant, χ^2 ($N = 137$, 3) = 8.67, $p = .034$. This is mainly driven by the differences between Bild.de and Der Spiegel, who have the highest number of articles that use local and global frames, respectively. Therefore, it can be concluded that there are two news websites (Bild.de and Der Spiegel) with clear preferences in their use of frames while the tendencies of the remaining news outlets (tagesschau.de and Focus Online) are less pronounced. Overall, using both frames seems to be the most common option.

After looking at the local or global orientation of the content, the analysis further focuses on the consequences of climate change that were mentioned. This variable can be seen as part of the impact scepticism, because mentioning various negative consequences of climate change can give the impression that it is more important to do something against climate change (Schmid-Petri et al., 2017). This variable is divided between the most important consequence of the article and other consequences that were mentioned. Overall, most articles did not mention any specific consequences of climate change ($n = 121$). After

that, the category that was mentioned the most was consequences in nature. Those are consequences such as droughts, floods or species extinction. This category was mentioned 103 times in total and 87 times as the most important consequence. Economic consequences of climate change (such as the impact on agriculture or other industries) were mentioned in 33 articles and 16 articles were focussing mainly on an economic consequence. Personal consequences (such as the impact on personal health due to extreme heat) were mentioned in 32 articles and 13 articles were mainly about personal consequences of climate change. Only political consequences (such as climate refugees) were very rarely mentioned in the articles. Only 14 articles mentioned it and 4 articles from the sample were emphasizing mainly political consequences of climate change.

Most important consequences of climate change
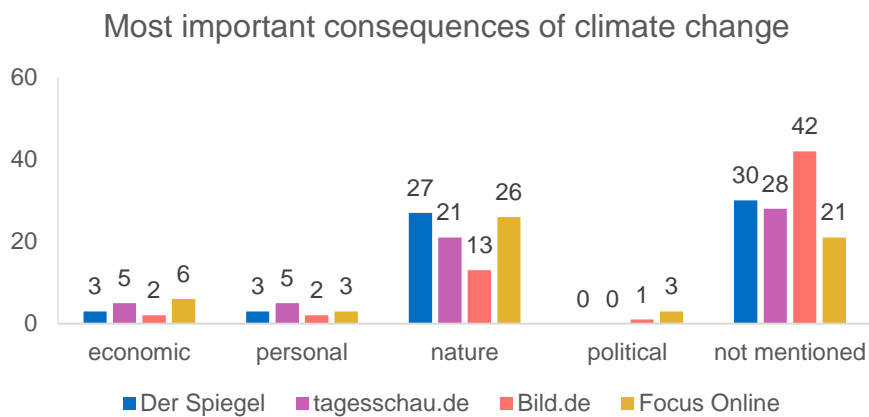
Figure 4.14. Most important consequences of climate change per news website

Figure 4.14 shows the distribution of most important consequences mentioned in a news article per news website. Bild.de has the most articles that do not mention any consequences of climate change ($n = 42$) while Der Spiegel and tagesschau.de do not have any articles that mention political consequences as the most important consequence of climate change. Also, Bild.de has the least number of articles that mention a consequence in nature as the most important consequence. This could be due to the fact that consequences in nature are often a global phenomenon and Bild.de had used more local than global frames in 2019.

Because there are several categories that have a value under 5 it is not possible to do a Chi-square test for independence. Therefore, a Fisher's exact test was executed and found to be significant ($p = .023$). Hence, Bild.de is the news website that is most likely to not mention any consequences in their articles. If natural consequences are highlighted Der Spiegel and Focus Online are most likely to mention them. For the other three categories, while there are differences, it should be noted that the differences in number of articles per category is very small. Focus Online and tagesschau.de are most likely to emphasize economic consequences, if personal consequences are discussed tagesschau.de is most

likely to focus on them and, lastly, Focus Online is most likely to highlight political consequences.

Mention of an economic consequence

Bars (Not mentioned): Der Spiegel 57, tagesschau.de 51, Bild.de 56, Focus Online 44. Bars (Mentioned): Der Spiegel 6, tagesschau.de 8, Bild.de 4, Focus Online 15.

Legend: ■ Der Spiegel ■ tagesschau.de ■ Bild.de ■ Focus Online
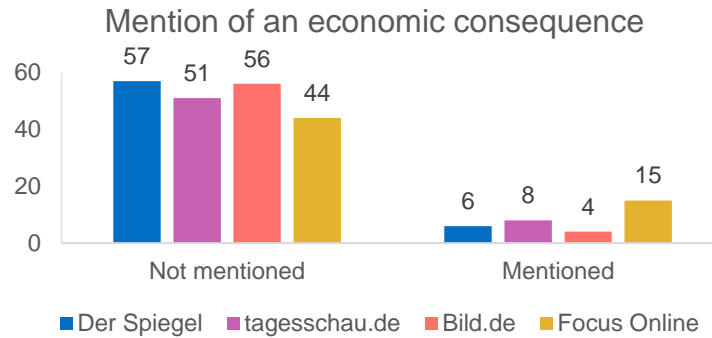
Figure 4.15. Mention of an economic consequence per news website

Mention of a consequence in nature

Bars (Not mentioned): Der Spiegel 34, tagesschau.de 34, Bild.de 46, Focus Online 24. Bars (Mentioned): Der Spiegel 29, tagesschau.de 25, Bild.de 14, Focus Online 35.

Legend: ■ Der Spiegel ■ tagesschau.de ■ Bild.de ■ Focus Online
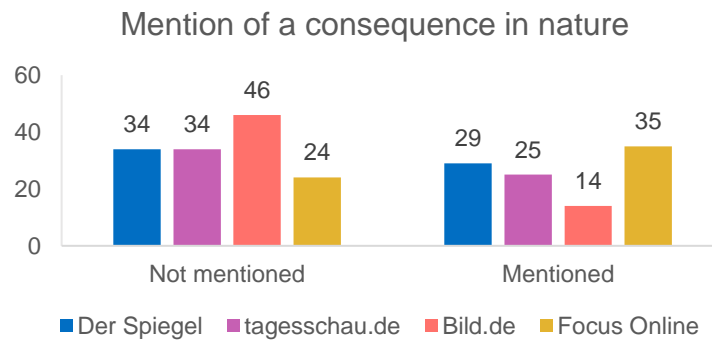
Figure 4.16. Mention of a consequence in nature per news website

Figure 4.15 and figure 4.16 show how often an economic consequence and a consequence in nature were mentioned in the articles of the news websites. The Chi-square test revealed that the type of news website was related to the likelihood of mentioning an economic consequence in 2019, χ^2 ($N = 241, 3) = 10.30$, $p = .016$. Focus Online is most likely to mention an economic consequence of climate change. The type of news website was also related to the likelihood of mentioning a consequence in nature in 2019, χ^2 ($N = 241, 3) = 16.15$, $p = .001$. Focus Online is most likely to mention a consequence in nature while Bild.de is least likely to do so. Additionally, the type of news website was not related to the likelihood of mentioning a personal consequence in 2019, χ^2 ($N = 241, 3) = 3.21$, $p = .361$. For the mentioning of political consequences, a Fisher's exact test of independence was executed because the number of articles per category was less than 5 in 3 out of 8 categories. Nonetheless, the Fisher's exact test was found to be not significant ($p = .101$). Hence, the type of news website is also not related to the likelihood of mentioning a political consequence.

Lastly, the sample was tested for the news frames based on research by Valkenburg et al. (1999). Seven articles did not fit into the four suggested news frames. Five of those news frames were found in the news website Der Spiegel and two in Focus Online. Six out

of the seven articles included only one MIA who was an expert or scientist and believed in the existence of climate change (the seventh article did not include any MIAs at all). All seven articles were not identified as being sceptical about climate change and were discussing a scientific study regarding climate change or an extreme weather event in a way that could not be compared with the news frames in the codebook. Instead they were very similar to the valid science frame based on previous research about framing of climate change science (Antilla, 2005). In future research, this frame could also be taken into consideration. Nevertheless, seven articles were just a small number in this sample and could be excluded for the analysis.
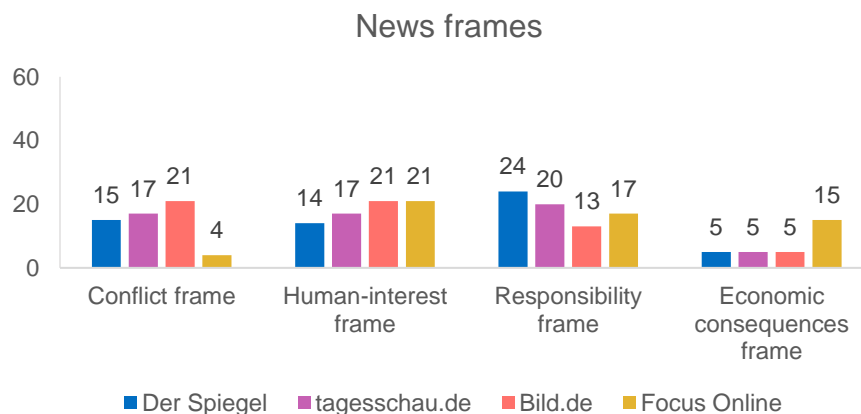
News frames

Figure 4.17. News frames used per news website

Figure 4.17 shows the number of articles per news frame for each news website. A Chi-square test revealed that the type of news website was related to the likelihood of using a specific news frame in 2019 χ^2 (N = 234, 9) = 26.74, p = .002. Bild.de is most likely to use the conflict frame when reporting about events related to climate change. Der Spiegel is most likely to use the responsibility frame when talking about climate change and Focus Online is most likely to use the economic consequences frame when discussing climate change. This finding is in line with the type of news outlet: Bild.de is based on a tabloid newspaper is known for focussing on conflicts between people, while Focus Online is a business-oriented news outlet and Der Spiegel focusses mainly on political news. Therefore, it can be said that the different news outlets report about climate change based on their topical focus or type (e.g. tabloid or business-oriented) but less based on their political orientation (as established in chapter 4.2). Only tagesschau.de varies more in their use of frames than other news outlets.

5 Discussion and conclusion

Even though there is a large scientific consensus on the existence of human-made climate change and its impact on our lives (Doran & Zimmerman, 2009) there are still Germans that are sceptical about the occurrence, causes and impact of it (e.g. infratest dimap, 2019; Tranter & Booth, 2015). In the current debate about climate change the media play an important role because they can create awareness about an issue which further can have an impact on the political agenda (Cohen, 1963; Leiserowitz, 2005). While online news websites are increasingly used for news consumption in Germany (Reuters Institute for the Study of Journalism, 2019), this study investigated the presence of climate change scepticism in the German online news. Therefore, 241 news articles published in 2019 from four different German online news platforms were analysed to answer the main research question: *To what extent is scepticism about climate change present in German online news websites?*

Overall, the study provides three main findings:

1) German online news websites generally do not report sceptically about the occurrence, causes and impact of climate change.
2) Mostly extreme right-wing politicians are portrayed as being sceptical about the occurrence, impact and cause of climate change and left-wing oriented news websites are more likely to mention and criticise them.
3) German online news websites differ in framing and reporting of news about climate change based on the topical focus and/ or type of the news outlet, not based on their political orientation.

5.1 Climate change scepticism in the German online news

It was expected that in the sample of German online news articles of this thesis, impact scepticism would be the most prevalent type of climate change scepticism. However, the results showed that German online news websites were generally not sceptical about the occurrence, causes and impact of climate change. At the same time, the news websites emphasized the fact that climate change exists more than the human cause of climate change, which was often not mentioned in the articles. The news outlets reported even less about which actions should be taken but mainly emphasized obligatory actions. Furthermore, the news articles tended to focus on the negative impact of climate change and did not highlight a positive impact at all. Nonetheless, there was a significant number of articles that did not mention the impact that climate change has.

This result is not in line with recent studies on German news outlets (Kaiser & Rhomberg, 2016; Tschötschel et al., 2020). A study on German newspapers found sceptical

arguments in 15% of the articles analysed, although, they were mostly mentioned to be dismissed by the journalists afterwards (Kaiser & Rhomberg, 2016). A study on German online news websites suggested that impact scepticism about which actions should be taken against climate change can still be found (Tschötschel et al., 2020). However, it should be noted that the study by Tschötschel et al. (2020) only took the opinions of actors in the article into consideration and not the overall conclusion of the article. In this study those two layers were separated.

It was also expected, that news websites with a politically right-wing or conservative orientation would report most sceptical. Instead, a correlation between political orientation of the news outlet and level of scepticism was not found in this study neither. Previous research suggested that conservative, right-wing newspapers were more likely to mention sceptical arguments than other newspapers (Kaiser & Rhomberg, 2016).

The difference in findings could either come from the fact that online news outlets (especially conservative ones) are generally less sceptical than newspapers or that the level of scepticism in the German news has generally decreased over the last years. Kaiser and Rhomberg (2016) analysed newspaper articles from 2011 and 2012. A general decrease in the level of scepticism is more likely. Firstly, since 2012 the public has become more aware of climate change and its existence (96% of Germans state that they have taken some kind of action to fight climate change; European Commission, 2014). Secondly, the German government has taken several actions against climate change, such as signing the Paris agreement in 2015 and passing a climate change mitigation law in 2019. Thirdly, several studies show that printed newspapers and their online counterparts generally do not report differently about current issues (e.g. Gerhards & Schäfer, 2010; Ghersetti, 2014). This thesis included several news websites that belong to print newspapers or print news magazines (Der Spiegel, Bild.de and Focus Online).

Furthermore, there were many articles that did not mention the impact of climate change. Bild.de was the news website that was most likely to publish these articles. It can be said that news outlets that report the negative consequences of climate change are less sceptical because they emphasize the urgency of it (Schmid-Petri et al., 2017). Bild.de was also the only news website that published an article that emphasized that nothing should be done against climate change by discussing Trump's comments about the French climate change mitigation policies. This could lead to the conclusion that Bild.de uses framing (by excluding the negative consequences of climate change) to report more sceptically about the impact of climate change and what should be done against it.

To conclude, the results of this thesis suggest that the German online news (especially conservative ones) are becoming less sceptical about the occurrence, cause and impact of climate change in general. However, it was observed that the cause of climate

change as well as the treatment recommendations were often not explicitly mentioned in the articles. To be able to motivate citizens and policy-makers to take action, research suggests going further than just not being sceptical. For instance, news outlets should actively inform about misinformation campaigns and the scientific consensus of scientists on the topic (Cook et al., 2017; van der Linden et al., 2017).

5.2 Sceptical political actors in the German online news

For the analysis of sceptical actors in the articles, it was expected that MIAs with a right-wing political orientation would be the most common representatives of sceptical opinions. Specifically, in Germany those were expected to be members of the AfD. This expectation was in line with the results. As expected, mostly extreme right-wing politicians were portrayed as being sceptical about the occurrence, impact and cause of climate change. Apart from AfD politicians, those were especially the current presidents of the US and Brazil, Donald Trump and Jair Bolsonaro. None of the identified sceptics had a left-wing political orientation. This is in line with previous research suggesting that mainly the AfD represents sceptical opinions about climate change in Germany (Tschötschel et al., 2020). It is also in line with a survey that identified a conservative, politically right-wing ideology as a significant predictor for climate change scepticism (Tranter & Booth, 2015).

Just like Donald Trump and Jair Bolsonaro, the AfD argues that the government should not restrict the development of the economy by passing climate change mitigation laws because this would impact the lives of people much more than climate change (tagesschau.de, 2019b). For example, one article quotes AfD leader Alexander Gauland:

"'Selbst wenn unser Land morgen zu existieren aufhörte, wären die Auswirkungen auf die Welttemperatur praktisch nicht nachweisbar', sagte Gauland. 'Und dafür setzen Sie alles aufs Spiel, dafür machen Sie eine Energiewende und dafür ruinieren Sie unsere Autoindustrie und die Maschinenbauindustrie.'" ['Even if our country ceased to exist tomorrow, the effects on world temperature would be practically undetectable,' said Gauland. 'And for that you are risking everything, for that you are making an energy turnaround and for that you are ruining our automotive industry and the mechanical engineering industry'] (tagesschau.de, 2019b, para. 12).

This shows that the key sceptical actors in the German online news represent the motivation of free-market ideology (McLintic, 2019) or the argument that environmental protection matters directly threaten human wellbeing (Harding, 2019). Studies that have identified these frames suggest that even a small number of sceptic actors or denialists can have a big impact on public opinion (Harding, 2019; McLintic, 2019).

The number of sceptical MIAs were overall small in every type of scepticism. Most actors were reported as being sceptical about the impact of climate change. This is in line with previous studies about actor-issue positions that concludes that there is still a controversy in the German online news about the impact of climate change, especially about which actions should be taken against it (Tschötschel et al., 2020).

This study also shows that left-wing news websites are more likely to mention sceptical MIAs, not to emphasize but to criticise their opinions. Der Spiegel wrote, for example, about Jair Bolsonaro during the world climate conference in Madrid:

"Die Uno kann - mit oder ohne Weltklimavertrag - Staaten wie Brasilien nicht daran hindern, ihren Regenwald abzuholzen. Die Staatengemeinschaft kann nur versuchen, den brasilianischen Präsidenten Jair Bolsonaro davon zu überzeugen, dass es vorteilhafter für das Land ist, wenn der Wald stehen bleibt - beispielsweise indem sie mehr finanzielle Hilfen oder bessere Absatzmärkte für brasilianische Produkte in Aussicht stellt." [The UN - with or without a global climate treaty - cannot prevent countries like Brazil from cutting down their rainforests. The community of states can only try to convince the Brazilian President Jair Bolsonaro that it is more beneficial for the country if the forest is left standing - for example, by promising more financial aid or better sales markets for Brazilian products] (Götze, 2019, para. 10).

The reason why politically left-wing oriented news websites (in this study Der Spiegel and tagesschau.de) are more likely to criticise right-wing politicians can be explained by the concept of motivated reasoning. News outlet with a strong left-wing oriented ideology are generally more sceptical about statements or opinions that lie outside this identity (Taber & Lodge, 2006). Conversely, it means that people with extreme right-wing or conservative values are more likely to be sceptical about climate change if it restricts their belief in a free-market ideology. Therefore, it is important that also right-wing news website strongly dismiss sceptical opinions especially if they are brought forward by an actor that might share similar values on other issues as the reader. Conservative actors who are not sceptical about climate change are mentioned frequently.

5.3 Framing of news about climate change

Considering the framing analysis, it was expected that conservative, right-wing oriented news websites would be most likely to use a local frame. Moreover, it was expected that quality news outlets would be most likely to use the responsibility frame and the tabloid Bild.de would be most likely to use the human-interest frame. The first two expectations are fairly similar to the results of this thesis. However, the results showed that German news

websites did not report about climate change based on their political orientation but based on the type and topical focus of the news outlet.

To illustrate this, Bild.de belongs to a tabloid newspaper and focused on local frames and conflicts between people. Focus Online is based on a business magazine and focused on economic consequences of climate change but was also most likely to mention scientists or experts. Der Spiegel is a left-wing news outlet with a political focus and highlighted politicians and responsibility frames. Nonetheless, tagesschau.de did not clearly focus on certain frames but instead reported about climate change more frequently and with a greater variety of frames than other news outlets. Hence, against expectations only Bild.de was most likely to use a local frame, while the preference of Focus Online in this aspect was not so explicit. Furthermore, the quality news outlet Der Spiegel used mostly responsibility frames, while the preference of tagesschau.de was not so clear. Lastly, against expectations, Bild.de was most likely to use the conflict frame, not the human-interest frame. An overview of all the specific findings per news website can be found in Appendix D.

Bild.de, as the most famous German tabloid news outlet, stands in contrast with the German quality media and this is reflected in the analysis. Bild mentioned the most actors per article on average and was most likely to use the conflict frame. While, at the same time, the news website was least likely to mention any consequences of climate change and primarily reported about climate change when important international events were taking place. Bild.de was also most likely to use a local frame when discussing climate change.

Hence, the results suggest, that Bild.de has a strong monetary focus and aims to attract readers by using conflict frames, famous actors and current events. This can be problematic when it comes to climate change scepticism. If the issue is framed as a constant conflict between politicians and experts without mentioning the scientific consensus or the negative consequences of climate change regularly, it can cause impact scepticism. The audience of Bild.de might remember the discussions rather than the need for action against climate change. It is suggested that news frames can have an influence on readers ability to recall the information that is stated in a news article (e.g. Valkenburg et al., 1999). Moreover, research suggests that a focus on media-generated controversies makes it difficult for readers and policy-makers to understand and form an opinion about the problem of climate change (Antilla, 2005).

In contrast to that, tagesschau.de reported about issues regarding climate change more frequently than other news outlets and not only when important events were taking place. This gives the issue of climate change a much more omnipresent place in public discussions. Also, tagesschau.de was not more likely to prefer certain frames.

In conclusion, this study shows that German news outlets use different ways of framing information about climate change based on type and/or topical focus. Because

framing can influence how the readers understand and remember information, this can have social implications. Media-generated controversies and the omission of negative climate change consequences make it difficult for readers to make sense of the problem and to be willing to take action against it. However, reporting about climate change regularly and under different frames might create more public attention and understanding.

5.4 Implications and suggestions for further research

This thesis emphasizes the responsibility that news media have in times of crisis. Sceptical argumentation is generally seen as a good quality in investigative journalism, unless it is not based on scientific facts, like in the debate about climate change. This study shows that a tabloid news outlet like Bild.de takes advantage of an often-discussed topic like climate change. While conflict frames might generate more clicks for online news articles, they might also impact the way climate change is perceived by the audience. This can cause scepticism because of media-generated controversy, due to insecurity about the topic or motivated reasoning due to sceptical actors that share the same values as the readers.

Adding to that, in the climate change debate scientists aim to emphasize that actions to limit the emissions of greenhouse gases need to be taken as soon as possible. Research currently emphasizes that not being sceptical in the news is not enough, news outlets should also inform about misinformation campaigns or the scientific consensus on the issue. Furthermore, it is especially important that right-wing oriented sceptical actors like AfD politicians, Donald Trump and Jair Bolsonaro are also more criticised in the right-wing oriented media outlets as readers are more likely to agree with actors that have a similar ideology. This thesis emphasizes that even though the results show that the German online news do not report openly sceptical, there is still more that can be done. The German online news can still be more responsible in times of crisis. Actors with sceptical opinions should be criticised more also by politically right-wing news websites, a monetary focus of a tabloid news outlet should not interfere with responsible reporting about the topic and, lastly, people should receive more information about misinformation campaigns and the scientific consensus on climate change.

For further research the topic of political actors in the climate change debate could be analysed qualitatively. This study shows that left-wing online news websites are more likely to mention sceptical political actors and that only right-wing political actors are reported as being sceptical, especially as representatives of the free-market ideology. Due to the quantitative focus, this study could only provide small examples of how those news actors are discussed. Therefore, it would be interesting to see how left-wing online news outlets

discuss the sceptical political actors in a more detailed way or to make a comparison between the reporting of politically right-wing and left-wing news outlets on that matter.

Future research should also take the decrease in trust in the German media into consideration. Because audiences trust news media less, they read news more often only for reasons of entertainment or social recognition (Yariv Tsfati & Cappella, 2005). This has an impact on how effective news media can introduce issues to the public and stimulate political debates. It should be researched further which elements influence the decrease in trust and how people perceive news differently, especially when it comes to climate change. Adding to that, surveys show that there is still a significant number of climate change sceptics in Germany (infratest dimap, 2019). It could be that the low trust in overall media causes sceptics to read niche media outlets, most likely with a strong conservative, right-wing orientation. This is worth investigating in future research.

With the rise of the internet for news consumption and the decreasing trust in traditional news media, social media also plays a major role for news consumption. 34% of Germans consumed news through social media in 2019, which was an increase of 16% since 2013 (Reuters Institute for the Study of Journalism, 2019). Therefore, the sceptical reporting about climate change should also be investigated on social media platforms.

Due to the exploratory focus of the thesis, only general news frames were taken into consideration. Nevertheless, seven articles were found that did not fit within the general news frames but instead were similar to the valid science frame (Antilla, 2005). This frame was identified in a qualitative research on the reporting of climate change science and could be included in future research.

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Appendix A: Sample

1: Der Spiegel, *N* = 828, *n* = 63			828/60=13,8	**every 13th article**
#	Date	Title		
1	30.12.19	"Der Klimawandel ist auf der Überholspur"		
2	21.12.19	Buschbrände in Australien - Wie eine 13-Jährige zum Gesicht des Protests wurde		
3	15.12.19	Klimakonferenz in Madrid - Das Ende naht		
4	12.12.19	Verhandlungen auf der Klimakonferenz - Die Kohlenstoffbombe von Madrid		
5	09.12.19	Konzepte zur CO2-Reduktion - Technik for Future		
6	05.12.19	Studie mit 70.000 Tieren - Wie der Klimawandel die Vögel verändert		
7	02.12.19	Umweltgipfel in Spanien - Noch zwei Wochen für das Klima		
8	28.11.19	Klima-Resolution im EU-Parlament - Grüne Kernspaltung		
9	25.11.19	Satellitenbild der Woche - Vom Klimawunder zum Klimasünder		
10	20.11.19	Nutzerdaten als Kunst - Der Code hinter einer Amazon-Bestellung		
11	14.11.19	Überschwemmungen - Italiens Regierung ruft Notstand in Venedig aus		
12	11.11.19	"Brown to Green"-Report zur Klimakrise - Industrieländer treiben die Welt Richtung drei Grad Erwärmung		
13	05.11.19	Pariser Klimaabkommen ohne USA - Die Rettung der Welt muss sich lohnen		
14	30.10.19	Rekordbrände in Kalifornien - Der Fluch des Windes		
15	26.10.19	Ski alpin - Auftakt mit drei Fragezeichen		
16	21.10.19	Kanadas Klima-Wahlkampf - Dieser Mann will Trudeau ablösen		
17	15.10.19	Shell-Studie 2019 - Mehrheit der Jugendlichen glaubt, die Regierung verschweige "die Wahrheit"		
18	07.10.19	"Extinction Rebellion" in Berlin - "Streiken allein reicht anscheinend nicht"		
19	04.10.19	Klimaschutz-Debatte - AfD unterstützt Anti-Greta-Aktivisten		
20	27.09.19	Globaler Klimastreik - "Ich will ein heißes Date, keinen heißen Planeten"		
21	24.09.19	Klimawandel - Eisfläche der Arktis schrumpft auf zweitniedrigsten Stand		
22	22.09.19	Klimawandel - Gletscher in der Schweiz beerdigt		
23	20.09.19	Schüler als Klima-Demonstranten - Das apokalyptische Klassenzimmer		
24	19.09.19	Überblick - Antworten auf die zehn wichtigsten Fragen zum Klimawandel		
25	17.09.19	Erfolg im globalen Umweltschutz - Ozonloch so klein wie vor 30 Jahren		
26	14.09.19	Streit um Gesetz - Warum die Klimawende gelingen kann		
27	12.09.19	Weltrisikobericht - Wo der Klimawandel am gefährlichsten ist		
28	05.09.19	AfD-Talk bei "Dunja Hayali" - Die ewige Suche nach einem Patentrezept		
29	02.09.19	Rügenwalder Mühle - Wurstproduzent fordert, weniger Tiere zu essen		
30	28.08.19	Naturparadies in Gefahr - Trump will Regenwälder Alaskas zur Abholzung freigeben		
31	22.08.19	Vorläufer von Trumps Grönland-Plan - Schnäppchen Alaska		
32	18.08.19	"Biosphere 2" - Im Glashaus		
33	14.08.19	Klimaschutz in der Mensa - Londoner Uni verkündet Rindfleisch-Verzicht		
34	07.08.19	Forderungen nach Reform - Darum wird Fleisch niedriger besteuert als Babynahrung		
35	02.08.19	Klimaschutzdebatte in der Union - Söders Vorschläge stoßen auf Kritik		
36	29.07.19	Protest gegen Klimawandel - Greta Thunberg segelt in die USA		
37	25.07.19	Aktionsplan für extreme Temperaturen - Grüne fordern Recht auf Hitzefrei bei Freiluftjobs		
38	16.07.19	Rede von Ursula von der Leyen - "Es lebe Europa!"		
39	09.07.19	Management trifft Mensch - Projektplanung nach dem Greta-Thunberg-Prinzip		
40	02.07.19	Radaruntersuchung - 56 Seen unter Grönlandeis entdeckt		
41	28.06.19	G20-Gipfel in Japan - Falsche Harmonie		
42	24.06.19	Appell von US-Milliardären an die Politik - "Besteuert uns stärker!"		
43	18.06.19	Uno-Weltkarte - 30 Minuten Weg für sauberes Wasser - und das nennt sich "Basisversorgung"		
44	11.06.19	Gletscher-Initiative für Klimaschutz - Herr Hänggi will die Welt retten		
45	04.06.19	Klimawandel - Chancen und Risiken aus Sicht der Konzerne		
46	31.05.19	Kraftwerk in Datteln - CDU geht beim Kohleausstieg auf Grüne zu		
47	27.05.19	Klimawandel - Südafrika führt eine CO2-Steuer für Firmen ein		
48	21.05.19	Klimaschädlicher Flugverkehr - Macron will europaweite Kerosinsteuer		
49	10.05.19	Klimaschutz - Weltweit größter CO2-Speicher in der Nordsee geplant		
50	06.05.19	Dramatischer Uno-Bericht - Eine Million Arten vom Aussterben bedroht		
51	30.04.19	Heiko Maas trifft Jair Bolsonaro - Zu Besuch beim "Tropen-Trump"		
52	25.04.19	Rodungen und Brände - Tropenwald schwindet dramatisch		
53	20.04.19	"Fridays for Future" - FDP ringt um Verhältnis zu Klimaschützern		
55	31.03.19	Neue Apo gegen den Klimawandel - Keine Panik, Greta!		
56	19.03.19	Schwedische Klimaaktivistin - Greta Thunberg bekommt Goldene Kamera		
57	13.03.19	Klima-Aktivisten - Schüler stören im EU-Parlament		
58	01.03.19	Rechentrick - EU-Kommission erklärt Fusionsreaktor zum Klimaschutzprojekt		
59	17.02.19	Münchner Sicherheitskonferenz - Klare Ansagen, tiefe Gräben		
60	13.02.19	Naturschutz - Vom Mauerblümchen zum Mainstream-Thema		

61	05.02.19	Himalaja und Hindukusch - Das Dach der Welt verliert seine Gletscher
62	25.01.19	Klimaaktivistin Thunberg in Davos - "Alle sollen die Angst spüren, die ich selbst jeden Tag spüre"
63	18.01.19	Rechtsruck in Brasilien - Europa-Abgeordnete rebellieren gegen Abkommen mit Südamerika
64	09.01.19	Schätzung für 2018 - CO2-Ausstoß der USA soll deutlich gestiegen sein

2: tagesschau.de, only "Meldungen" [reports], *N* = 420, *n* = 59			420/60 = 7	every 7th article
65	24.12.19	Waldbrände in Australien - Mehr Freiwillige sollen helfen		
66	15.12.19	Ergebnis der Klimakonferenz - Was beschlossen wurde und was nicht		
67	13.12.19	Ostafrika - Wo der Klimawandel längst Realität ist		
68	11.12.19	Saudischer Ölkonzern - Spitzenstart für Aramco-Aktie		
69	06.12.19	Demo bei Weltklimakonferenz - Greta Thunberg fordert Ergebnisse		
70	02.12.19	Prominentes US-Bündnis - "World War Zero" gegen den Klimawandel		
71	29.11.19	Nordrhein-Westfalen - Schunkeln, schimpfen, schreien - XXL-Demos fürs Klima		
72	27.11.19	Merkel im Bundestag - "Meinungsfreiheit kennt Grenzen"		
73	18.11.19	Kritik an Bundesregierung - DGB und BDI fordern mehr Investitionen		
74	13.11.19	Rekord-Hochwasser - "Venedig ist eine verletzte Stadt"		
75	08.11.19	Klimawandel - Kaiserpinguine vom Aussterben bedroht		
76	01.11.19	Ostafrika - Hunderttausende fliehen vor Fluten		
77	25.10.19	Brände in Kalifornien - "Es regnet Feuer"		
78	15.10.19	IWF-Prognose - Trübe Aussicht für Weltwirtschaft		
79	09.10.19	Gesetz gebilligt - Kabinett bringt Klimapaket auf den Weg		
80	06.10.19	Konzept der Grünen - Kritik an "neoliberalem" Klimaplan		
81	27.09.19	Umweltstudie - Hälfte der europäischen Baumarten bedroht		
82	25.09.19	IPCC-Bericht vorgestellt - Weltklimarat stellt düstere Prognose		
83	21.09.19	Thunberg bei Jugendklimagipfel - "Uns kann niemand stoppen"		
84	17.09.19	Erfolg für "Gletscher-Initiative" - Schweizer stimmen über Klimaneutralität ab		
85	12.09.19	Kretschmann tritt wieder an - Die Grünen-Spitze freut's		
86	10.09.19	Bundeshaushalt - Geht es ohne neue Schulden?		
87	02.09.19	Analyse zu Brandenburg - Speckgürtel oder nicht Speckgürtel		
88	29.08.19	Steigender Meeresspiegel - Hallig Hooge trotzt dem Klimawandel		
89	24.08.19	Feuer in Brasilien - Bolsonaro schickt Militär ins Brandgebiet		
90	16.08.19	Klimawandel in der Arktis - Steine, wo früher Eis war		
91	08.08.19	Pläne der Parteien - Das Klima retten, ja - nur wie?		
92	03.08.19	Strategien gegen Starkregen - Experten fordern die "Schwammstadt"		
93	31.07.19	"Fridays for Future" - Die Auferstehung der Klimapolitik		
94	25.07.19	Nordrhein-Westfalen - Klimaschwankungen: "Nicht mehr natürlich erklärbar"		
95	23.07.19	Deutscher Wetterdienst - Hitze "für die Geschichtsbücher" möglich		
96	16.07.19	Von der Leyens EU-Rede - Ein Appell an die Einheit Europas		
97	11.07.19	Rohingya in Bangladesch - Monsun überflutet Flüchtlingslager		
98	04.07.19	Studie der ETH Zürich - Aufforstung wäre effektivster Klimaschutz		
99	29.06.19	Trotz Klimastreits - G20-Staaten einigen sich auf Gipfelerklärung		
100	26.06.19	Welthungerhilfe - Kriege und Klimawandel verschärfen die Not		
101	21.06.19	Klimastreik in Aachen - "Fridays for Future" wird international		
102	19.06.19	Russland - Umweltaktivist auf der Flucht		
103	14.06.19	Adrian neuer WMO-Präsident - Deutscher wird Wächter des Weltwetters		
104	04.06.19	Nordrhein-Westfalen - Bonner Haus der Geschichte bekommt Pariser Klimahammer		
105	28.05.19	Nordrhein-Westfalen - Ärztepräsident: "Viele Ärzte am Rande der Erschöpfung"		
106	23.05.19	Anti-CDU-Video - Die Jugend wehrt sich		
107	18.05.19	Australien - Premier Morrison gewinnt Wahl		
108	16.05.19	Debatte der EU-Spitzenkandidaten - Wer will Europa wie stärken - und wer nicht?		
109	09.05.19	EU-Gipfel in Rumänien - Merkel ruft zu Geschlossenheit auf		
110	06.05.19	UN-Bericht - Eine Million Arten vom Aussterben bedroht		
111	29.04.19	Nordrhein-Westfalen - April in NRW: Wärmer, sonniger und trockener als früher		
112	25.04.19	Umweltzerstörung in 2018 - Regenwald von der Fläche Englands zerstört		
113	12.04.19	Frühjahrstagung mit dem IWF - Neuer Weltbankchef unter Beobachtung		
114	06.04.19	Obama in Berlin - "Verändert die Welt!"		
115	28.03.19	UN-Bericht zum Klima - Der Meeresspiegel steigt und steigt		
116	25.03.19	EU will das Geld grüner machen - Lässt sich Nachhaltigkeit verordnen?		
117	15.03.19	"Fridays for Future"-Bewegung - Protest für Klimaschutz - heute weltweit		
118	06.03.19	US-Präsidentschaftswahl - Bloomberg will nicht kandidieren		
119	23.02.19	Nominierung durch Trump - Craft soll neue UN-Botschafterin werden		
120	17.02.19	Steigender Meeresspiegel - Die Wirtschaft geht den Bach runter		
121	12.02.19	Klimaschutz mal anders - Heizung aus, dicker Pullover an		
122	07.02.19	Australien leidet unter Dürre - An der Belastungsgrenze		

123	25.01.19	Klima-Appell in Davos - "Ich will, dass Ihr in Panik geratet"		
3: Bild.de, *N* = 896, *n* = 60			896/60 = 14,93	**every 15th article**
124	31.12.19	VON 0 BIS 1,88 BILLIONEN - Das Jahr 2019 in 19 Zahlen		
125	25.12.19	WEIHNACHTSBOTSCHAFT - Overbeck ruft zu mehr Umweltschutz auf		
126	23.12.19	FRIDAYS FOR FUTURE - Mieser Tweet gegen alle Großeltern		
127	18.12.19	ES SOLL DEUTLICH TEURER WERDEN - Grüne fordern Klima-Aufpreis für Fleisch		
128	15.12.19	Greta reiste auch 1. Klasse mit Sitzplatz		
129	11.12.19	Müder Auftritt von Klima-Greta		
130	06.12.19	Tausende demonstrieren mit Greta fürs Klima		
131	02.12.19	Vier Tipps für klimabewusstes Reisen		
132	30.11.19	Klima-Aktivisten verlassen Tagebaue in Sachsen und Brandenburg		
133	26.11.19	So brutal trifft der Klimawandel Deutschland		
134	20.11.19	Wir denken grün, handeln aber NICHT grün		
135	07.11.19	Umweltschützer in Sorge um den Amazonas		
136	30.10.19	Chaos-Alarm! Chile sagt Weltklima-Gipfel ab		
137	24.10.19	Sachsens Linke wollen radikalen Neuanfang		
138	15.10.19	Darum geht der Sommer jetzt immer bis Oktober		
139	09.10.19	Wo die Kanzlerin kein Klima-Vorbild ist		
140	08.10.19	Polizei greift gegen Klima-Kämpfer durch		
141	02.10.19	GroKo-Zoff um Klimapaket		
142	29.09.19	"Fridays for Future"- Proteste werden radikaler		
143	26.09.19	Linke Rebellen stoppen Klimanotstand		
144	24.09.19	In Schweden werden die Elche kleiner		
145	23.09.19	Altmaier holzt gegen die Grünen		
146	21.09.19	"Alles was wir wollen, ist eine sichere Zukunft!"		
147	21.09.19	"Fridays for Future hat uns alle aufgerüttelt"		
148	19.09.19	Globaler Klimastreik der Fridays for Future - Bewegung		
149	17.09.19	Greta wird in den USA ausgezeichnet!		
150	16.09.19	"Ich mache das, was einem kein Anlageberater empfiehlt"		
151	12.09.19	Unsere Autos werden durch den Klimaschutz teurer!		
152	02.09.19	Alarm am Great Barrier Reef!		
153	29.08.19	"Der Krieg gegen die Natur muss aufhören"		
154	26.08.19	Greta auf der Zielgeraden		
155	23.08.19	Wo bei uns überall Amazonas drinsteckt		
156	18.08.19	Massensterben! Hitzewelle tötet Alaska-Lachse		
157	12.08.19	SPD will Abgeordnete zu Klimaspenden verpflichten		
158	08.08.19	Fliegen bleibt billig, aber…		
159	05.08.19	Juli 2019 weltweit heißester Monat seit Messungsbeginn		
160	01.08.19	Zwischen diesen Fotos liegt ein Jahr		
161	29.07.19	Ressourcen für 2019 jetzt schon aufgebraucht		
162	23.07.19	Bis 2035 sollen Inlandsflüge überflüssig sein		
163	16.07.19	Ministerin Klöckner wettert gegen Plasberg		
164	10.07.19	Öko-Milliardär will gegen Trump in den Ring steigen		
165	04.07.19	Mit dieser Methode können wir den Klimawandel stoppen		
166	25.06.19	Streit um dieses Grönland-Foto		
167	17.06.19	Krank durch Klimawandel?		
168	11.06.19	Was macht denn diese Wildkatze vorm Kanzleramt?		
169	05.06.19	"Kein Pillepalle mehr in der Klimapolitik"		
170	29.05.19	Rezo fordert Bekenntnis zu Kurswechsel von CDU		
171	26.05.19	Das Thema Klima hat der GroKo die Wahl verhagelt		
172	17.05.19	Kurzstreckenflüge sollen abgeschafft werden		
173	03.05.19	Erste deutsche Stadt ruft Klima-Notstand aus!		
174	19.04.19	Schüler-Streik zum Klimawandel auch in den Ferien?		
175	12.04.19	Weniger Teilnehmer bei Schüler-Klimademos		
176	05.04.19	Fahren wir bald alle Hybrid?		
177	29.03.19	Die große Greta-Show in Berlin		
178	17.03.19	Trump verspottet Macron		
179	06.03.19	Klimawandel-Skeptiker "sind ignorant"		
180	22.02.19	Schulze legt Knallhart-Gesetz zum Klimaschutz vor		
181	23.01.19	Skandinavier verbieten Benziner und Diesel		
182	18.01.19	Schüler schwänzen Schule – für den Klimaschutz		
183	10.01.19	Schlimmstes Schnee-Chaos seit 20 Jahren		

4: Focus Online, *N* = 310, *n* = 59			310/60 = 5,17	**Every 5th article**
184	30.09.19	Klimawandel betrifft alle! Philosophen sagen, warum Menschen Verhalten nicht ändern		
185	27.11.19	Kipppunkte werden früher erreicht: Forscher warnen vor "planetarem Notfallzustand"		
186	02.10.19	Jetzt schmilzt auch der 3. Pol: Das passiert, wenn Himalaya-Gletscher verschwinden		
187	06.09.19	Wetter extrem: Grusel-Szenarien zeigen, wie der Klimawandel Deutschland bedroht		
188	12.01.19	Erst der Klimawandel führt zur Schnee-Zange, die Deutschland im Griff hat		
189	28.05.19	Erwärmung der Arktis führt zu Wetterextremen in Deutschland		
190	22.10.19	Neue Bäume als CO2-Killer? Forscher weltweit zweifeln an prominenter Klima-Theorie		
191	10.03.19	Lindner kanzelt streikende Schüler ab: Klimawandel ist "eine Sache für Profis"		
192	13.09.19	Angst vor dem Klimawandel: Neue Sorge beschäftigt Eltern zunehmend		
193	07.11.19	Schon ab nächstem Jahr: Der Klimawandel wird in Italien zum Schulfach		
194	15.02.19	Forscherin klärt auf: So belastet Klimawandel schon heute unsere Gesundheit		
195	09.07.19	51 Millionen Hektar Wald: Hier kann Europa aufforsten, um den Klimawandel zu stoppen		
196	10.12.19	Kommt jetzt der Wasserstoff-Durchbruch? Neue Technologie soll Klimawandel stoppen		
197	23.05.19	Prima Klima? Was die Kunst zum Klimawandel zu sagen hat		
198	15.08.19	Palmöl gefährdet Menschenleben und verstärkt den Klimawandel: Was Sie tun können		
200	26.11.19	Schon 1,5 Grad mehr: Wie der Klimawandel Deutschland trifft		
201	08.12.19	Investieren in den Klimaschutz		
202	28.03.19	UN-Klimaexperten stellen Rekordanstieg des Meeresspiegels fest		
203	11.08.19	CDU-Vize Armin Laschet will Klimapolitik intensivieren		
205	23.06.19	Jane Goodall sieht Hoffnung im Kampf gegen Klimawandel		
206	18.02.19	Klimawandel erhöht Migration und Terrorismus - doch kaum Politiker interessiert's		
207	29.09.19	Sven Plöger: Viel Unsicherheit in Debatten über Klimawandel		
208	14.11.19	Deutliche Gefahr für die Gesundheit		
209	27.06.19	Hurrikans und Klimawandel: Münchener Rück rüstet sich für turbulente Zukunft		
210	18.01.19	Wälder abgeholzt, Klima verändert: Kaffeepflanzen sind vom Aussterben bedroht		
211	27.02.19	Bedroht der Klimawandel Italiens berühmten "Wald der Geigen"?		
212	19.02.19	Allgäuer Bergführer: Situation wird durch den Klimawandel immer gefährlicher		
213	28.10.19	H&M-Chef warnt vor sozialen Folgen einer Verzichtskultur		
214	23.08.19	TSG Hoffenheim agiert gegen Klimawandel und stellt neue Projekte vor		
215	30.12.19	„Klimawandel auf Überholspur" - 2019 wohl drittwärmstes Jahr		
216	08.08.19	Forderungen des Weltklimarates: Wir müssen unsere Essgewohnheiten ändern		
217	01.10.19	Kein Gegensatz zu wirtschaftlichem Erfolg: Wie Deutschland am Klimaschutz verdient		
218	29.12.19	Wer sich Gretas Botschaft näher anschaut, entdeckt einen großen Irrtum		
219	16.06.19	"Jeder Euro rentiert sich": Spitzen-Grüne rechnet vor, was Klimaschutz kostet		
220	18.07.19	Grün wählen und alles wird gut? Klimaforscher erklärt, warum das zu kurz greift		
221	15.11.19	Gemeinderat lehnte Klimaschutz-Maßnahmen für Venedig ab - kurz darauf kam die Flut		
222	17.09.19	Klimaschutz wird 1,64 Billionen Euro kosten – und viermal so viel einbringen		
223	15.11.19	Vegetarier werden, weniger fliegen? Das würden die Deutschen fürs Klima ändern		
224	06.06.19	Erklärt Wassertemperatur: Forscher finden verblüffendes Phänomen im Gardasee		
225	24.09.19	Mythen der Verkehrswende: Wenn das Saubere vom Himmel versprochen wird		
226	27.03.19	Kohle-Monster USA und China treiben CO2-Ausstoß auf Rekordniveau		
227	25.09.19	Greta Thunberg legt Klima-Beschwerde gegen Deutschland ein		
228	12.12.19	Rechnungen zeigen, wie teuer das Klimapaket für jeden Deutschen wird		
229	10.12.19	In neuem Ranking hinter Indien: Nächste Klimaschutz-Klatsche für Deutschland		
230	13.04.19	Warum diese Apfel-Bauern die Bundeskanzlerin verklagen		
231	22.07.19	"Können ihnen die Fürze nicht austreiben": Ist die Kuh ein Klima-Killer?		
232	08.07.19	Droht uns eine Quallen-Plage? Jetzt klärt eine Ozean-Forscherin auf		
233	03.08.19	Deutschland kann das Klima nicht alleine retten		
234	24.09.19	Greta fleht, Merkel moderiert: Rede-Duell zeigt das größte Problem in Klima-Frage		
235	04.07.19	Ernte, Wälder, Trinkwasser: 3 Forscher erklären die Folgen der Rekord-Hitze		
236	14.11.19	Klimaerwärmung hat starke Auswirkungen auf die Gesundheit		
237	10.08.19	Ende der Demokratie? Flirt mit Öko-Diktatur ist die dunkle Seite der Klimadebatte		
238	11.06.19	Welches seltene Phänomen uns den Horror-Hagel brachte - und wo jetzt Gefahr droht		
239	12.06.19	Bei erneutem Hitzesommer: Forst-Experte prognostiziert Waldsterben wie in 80ern		
240	30.03.19	„Earth Hour": Licht aus für den Klimaschutz		
241	29.11.19	„Stoppt Black Friday!" - Hunderttausende bei Klimaprotesten		
242	28.09.19	Thunberg fordert von Kanadas Premier mehr Engagement		
243	28.05.19	Hier stehen wir wirklich im Kampf gegen die Klimakrise		
244*	24.04.19	Wandern daheim statt Flugreisen: Wie weit geht der Klimaschutz der Schüler?		

*The reason why the number of articles ends on 244 is because three articles (articles 54, 199 and 204) needed to be excluded from the sample during the analysis process. Therefore, they were skipped after the sample was already established.

Note: Global warming is defined as the long-term warming of the planet. Climate change includes global warming but also refers to the broad range of changes that are happening to our planet because of global warming (e.g. sea level rise, melting of glaciers, natural catastrophes). They are often used as synonyms but actually refer, by definition, to slightly different concepts.

Group 1: Dependent variables

#1 Fundamental CC scepticism (based on Schmid-Petri et al., 2017)

Fundamental climate change scepticism is defined as the belief that climate change and therefore global warming does not exist. It is measured in five levels based on a rough estimation of lines per argument:

1 = Only presents the argument that climate change exists;

2 = Presents both sides, but emphasizes that climate change exists;

3 = Presents a balanced account of both sides

4 = Presents both sides, but emphasizes that climate change does not exist;

5 = Only presents the argument that climate change does not exist.

#2 Attribution CC scepticism (based on Schmid-Petri et al., 2017)

Attribution climate change scepticism is defined as the belief that climate change exists, but it is not caused by human industries, transport or agriculture, instead it is caused by a natural change of temperature due to e.g. increase in solar activity or cosmic radiation. Anthropogenic global warming is defined as the idea that greenhouse gases that are generated by human actions cause the global temperature to rise. Attribution CC scepticism is measured in five levels based on a rough estimation of lines per argument:

1 = Is not mentioned in the article

2 = Only presents the argument that anthropogenic global warming exists, clearly distinct from natural variations; *(this includes mentioning that CO_2 emissions caused by humans have an impact on climate change)*

3 = Presents both sides, but emphasizes that anthropogenic global warming exists, distinct from natural variations;

4 = Presents a balanced account of both arguments surrounding the existence of anthropogenic global warming;

5 = Presents both sides, but emphasizes the dubious nature of the claim that anthropogenic global warming exists;

6 = Only presents natural causes for climate change.

#3 Impact CC scepticism (based on Schmid-Petri et al., 2017)

Impact CC scepticism can be defined as the belief that climate change exist but there is no need for urgent actions, as the impact of climate change will be less severe than scientists say. It will be measured in two dimensions: 1) treatment recommendation and 2) positive or negative consequences for each MIA (most important actor) that is mentioned in the article.

Dimension 1:

Note: this refers to the main actor in the article (if several are present), or if no actor is present then to the overall conclusion of the article, it is important to only include explicit recommendations.

    1   = Not mentioned in the article

    2   = The actor recommends an obligatory action to fight climate change (e.g. laws, policies, government investments)

    3   = The actor recommends a voluntary action to fight climate change

    4   = The actor states that something should be done to fight climate change (generally)

    5   = The actor recommends that there should be no action to fight climate change

Dimension 2:

Note: this refers to the main actor in the article (if several are present), or if no actor is present then to the overall conclusion of the article

    0   = Not explicitly mentioned

    1   = The actor mentions that consequences of climate change will be negative

    2   = The actor mentions that consequences of climate change will be positive

Group 2: Independent variables (background information)

#4 Name of the article

#5 Publication date

#6 Political orientation of the news website (and name of the news website, as the four news outlets each have a different political orientation)

    1   = Left (Der Spiegel)

    2   = Centre-left (tagesschau.de)

    3   = Centre-right (Bild.de)

    4   = Right (Focus Online)

#7 Topic of article in keywords

#8 Number of words

Group 3: Dependent variables (Most important actors, based on Schmid-Petri et al., 2017)

#9a Number of most important actors mentioned in the article (max. 3)

Note: An actor refers to a person as an individual (e.g. politician, scientist or representative of a company) not a group, a company or an institution itself.

#9b Most important actors in the article (max. 3)

This variable will be measured through the amount of words that are used for statements from actors in the article or the amount of words that are used to talk about an actor. The actor needs to directly refer to or be mentioned with regards to climate change or climate change politics, the actors chosen need to represent a wide spectrum of opinions and functions on the topic and in the best case they should be mentioned with a quote. The variable has three dimensions: function/ occupation of the actor, political orientation of the actor and name of the actor.

Dimension 1: (carefully consider if it is an expert or business representative)

    1   = Politician

    2   = Public figure

    3   = Business representative

    4   = Scientist/ expert

    5   = other

Dimension 2: (if unsure always chose centre and not extreme)

Note: If an actor is presented as a politician and it should be common knowledge to know his/ her political orientation it can be added even though it is not explicitly stated in the article.

    1   = Left (e.g. Die Linke)

    2   = Centre-left (e.g. Die Grünen, SPD, Obama, Democrats)

    3   = Centre-right (e.g. CDU/CSU, Republicans)

    4   = Right (e.g. AfD, Trump, Bolsonaro)

    5   = unknown/ not mentioned

Dimension 3: name of the actor

#10 Occurrence of climate change

Note: implicitly mentioned means that something is indicated by inference, association, or necessary consequence rather than by direct statement

    1   = Yes, the actor thinks that climate change is occurring (explicitly mentioned).

    2   = Yes, the actor thinks that climate change is occurring (implicitly mentioned or can be inferred from the text).

3   = No, the actor does not think that climate change is occurring (implicitly mentioned or can be inferred from the text).

4   = No, the actor does not think that climate change is occurring (explicitly mentioned).

5   = Not mentioned

#11 Climate change seen as a problem by actor

1   = Yes, climate change is seen as a problem by the actor (explicitly mentioned).

2   = Yes, climate change is seen as a problem by the actor (implied e.g. by supporting a law).

3   = No, climate change is not seen as a problem by the actor (implied e.g. by by disproving a law or withdrawing from a climate agreement)

4   = No, climate change is not seen as a problem by the actor (explicitly mentioned).

5   = Not mentioned

#12 Identified main cause of climate change by actor

1   = Human (explicitly mentioned).

2   = Human (implied e.g. this includes accepting that CO_2 emissions caused by humans have an impact on climate change).

3   = Natural (implied e.g. this includes disapproving of the reduction of CO_2 emissions caused by humans because the actor believes that they do not have an impact on climate change).

4   = Natural (explicitly mentioned).

5   = Not mentioned

Group 4: Dependent variables (Frames)

#13 Local or global news frame

1   Local event mentioned in connection to climate change (e.g. political discussion in Germany, weather forecast or climate demonstration in Germany)

2   Global event mentioned in connection to climate change (e.g. political conference/ debate outside of Germany or natural catastrophe outside of Germany)

3   Both (this category also includes articles that are mainly focussing on one frame but include examples from the other frame)

#14 Consequences *(multiple answers possible, most important consequences first)*
Be aware that it needs to be a direct consequence of climate change, suggestions for solutions such as planting more trees or creating laws for CO_2 reduction are not included in this variable.

1 = The article mentions economic consequences (e.g. impact on an industry, a country's economy or a company)

2 = The article mentions personal consequences (e.g. personal health)

3 = The article mentions consequences in nature (e.g. biodiversity, floods, draughts)

4 = The article mentions political consequences (e.g. climate refugees)

5 = Not mentioned in the article

#15a News frames (based on Valkenburg et al., 1999)

Note: Focus on what is highlighted and what is left out

1 = The conflict frame (the focus of the article is on the conflict between groups, institutions or individuals and whom of them is winning or losing) *[keywords: conflict (Konflikt), criticize (kritisieren), criticism (Kritik), fraud (Betrug), to accuse (vorwerfen), fight [Kampf], rant [schimpfen]]*

2 = The human-interest frame (the focus of the article is on a personal story or an emotional presentation of a problem, issue or event)

3 = The responsibility frame (the article focuses on giving responsibility to a group, individual or the government for causing or solving an issue or a problem)

4 = The economic consequences frame (the article focuses on the economic consequences that an event, problem or issue will cause for a group, region, country, institution or individual) *[keywords: costs (Kosten), benefits (Nutzen), cheap (billig), expensive (teuer), economies (Volkswirtschaften), revenues (Einnahmen), investors (Investoren/ Anleger), share (Aktie)]*

Appendix C: Tables

Appendix C 1

Level of fundamental climate change scepticism per news website. The column numbers refer to: (1) Only presents the argument that climate change exists. (2) Presents both sides but emphasizes that climate change exists. (3) Presents a balanced account of both sides. (4) Presents both sides but emphasizes that climate change does not exist. No articles were found in the sample for (5) only presents the argument that climate change does not exist.

	1		2		3		4		Total	
	n	%	n	%	n	%	n	%	n	%
Der Spiegel	57	25.7%	4	26.7%	2	66.7%	0	0.0%	63	26.1%
tagesschau.de	55	24.8%	2	13.3%	1	33.3%	1	100.0%	59	24.5%
Bild.de	54	24.3%	6	40.0%	0	0.0%	0	0.0%	60	24.9%
Focus Online	56	25.2%	3	20.0%	0	0.0%	0	0.0%	59	24.5%
Total	222	100.0%	15	100.0%	3	100.0%	1	100.0%	241	100.0%

Appendix C 2

Level of attribution scepticism per news website. The column numbers refer to: (1) Not mentioned. (2) Only presents the argument that anthropogenic global warming exists, clearly distinct from natural variations. (3) Presents both sides, but emphasizes that anthropogenic global warming exists, distinct from natural variations. (4) Presents a balanced account of both arguments surrounding the existence of anthropogenic global warming. (5) Presents both sides but emphasizes the dubious nature of the claim that anthropogenic global warming exists. No articles were found in the sample for (6) Only presents natural causes for climate change.

	1		2		3		4		5		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Der Spiegel	22	29.7%	36	24.3%	5	31.3%	0	0.0%	0	0.0%	63	26.1%
tagesschau.de	22	29.7%	31	20.9%	4	25.0%	0	0.0%	2	100.0%	59	24.5%
Bild.de	16	21.6%	40	27.0%	3	18.8%	1	100.0%	0	0.0%	60	24.9%
Focus Online	14	18.9%	41	27.7%	4	25.0%	0	0.0%	0	0.0%	59	24.5%
Total	74	100.0%	148	100.0%	16	100.0%	1	100.0%	2	100.0%	241	100.0%

Appendix C 3

Level of impact scepticism (dimension 1) per news website. The column numbers refer to: (1) Not mentioned. (2) Obligatory action recommended. (3) Voluntary action recommended. (4) Something should be done (generally). (5) Nothing should be done.

	1		2		3		4		5		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Der Spiegel	22	31.4%	30	25.2%	3	25.0%	8	20.5%	0	0.0%	63	26.1%
tagesschau.de	19	27.1%	27	22.7%	1	8.3%	12	30.8%	0	0.0%	59	24.5%
Bild.de	13	18.6%	33	27.7%	2	16.7%	11	28.2%	1	100.0%	60	24.9%
Focus Online	16	22.9%	29	24.4%	6	50.0%	8	20.5%	0	0.0%	59	24.5%
Total	70	100.0%	119	100.0%	12	100.0%	39	100.0%	1	100.0%	241	100.0%

Appendix C 4

Level of impact scepticism (dimension 2) per news website

	Consequences of climate					
	Not mentioned		change will be negative		Total	
	n	%	n	%	n	%
Der Spiegel	18	26.1%	45	26.2%	63	26.1%
tagesschau.de	15	21.7%	44	25.6%	59	24.5%
Bild.de	28	40.6%	32	18.6%	60	24.9%
Focus Online	8	11.6%	51	29.7%	59	24.5%
Total	69	100.0%	172	100.0%	241	100.0%

Appendix C 5

Number of most important actors mentioned in an article per news website

	0		1		2		3		Total	
	n	%	n	%	n	%	n	%	n	%
Der Spiegel	7	33.3%	26	28.3%	10	17.5%	20	28.2%	63	26.1%
tagesschau.de	6	28.6%	20	21.7%	18	31.6%	15	21.1%	59	24.5%
Bild.de	5	23.8%	17	18.5%	18	31.6%	20	28.2%	60	24.9%
Focus Online	3	14.3%	29	31.5%	11	19.3%	16	22.5%	59	24.5%
Total	21	100.0%	92	100.0%	57	100.0%	71	100.0%	241	100.0%

Appendix C 6

Function/ occupation of most important actors per news website

	Politician		Public figure		Business representative		Scientist/ expert		Other		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Der Spiegel	63	33.7%	7	21.9%	7	33.3%	20	17.2%	9	14.3%	106	25.3%
tagesschau.de	56	29.9%	5	15.6%	3	14.3%	24	20.7%	13	20.6%	101	24.1%
Bild.de	46	24.6%	12	37.5%	7	33.3%	22	19.0%	26	41.3%	113	27.0%
Focus Online	22	11.8%	8	25.0%	4	19.0%	50	43.1%	15	23.8%	99	23.6%
Total	187	100.0%	32	100.0%	21	100.0%	116	100.0%	63	100.0%	419	100.0%

Appendix C 7

Political orientation of MIAs compared to political orientation of news websites

	Left		Centre-left		Centre-right		Right		unknown/ not mentioned		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Left (Der Spiegel)	1	25.0%	19	27.9%	22	32.4%	18	51.4%	46	18.9%	106	25.3%
Centre-left (tagesschau.de)	0	0.0%	22	32.4%	22	32.4%	7	20.0%	50	20.5%	101	24.1%
Centre-right (Bild.de)	3	75.0%	19	27.9%	17	25.0%	5	14.3%	69	28.3%	113	27.0%
Right (Focus Online)	0	0.0%	8	11.8%	7	10.3%	5	14.3%	79	32.4%	99	23.6%
Total	4	100.0%	68	100.0%	68	100.0%	35	100.0%	244	100.0%	419	100.0%

Appendix C 8

Belief of MIAs about occurrence of climate change per news website

	Yes (explicit)		Yes (implied)		No (implied)		No (explicit)		Not mentioned		Total
	n	%	n	%	n	%	n	%	n	%	n
Left (Der Spiegel)	48	19.3%	35	28.5%	4	57.1%	4	36.4%	15	51.7%	106
Centre-left (tagesschau.de)	65	26.1%	24	19.5%	3	42.9%	2	18.2%	7	24.1%	101
Centre-right (Bild.de)	75	30.1%	32	26.0%	0	0.0%	4	36.4%	2	6.9%	113
Right (Focus Online)	61	24.5%	32	26.0%	0	0.0%	1	9.1%	5	17.2%	99
Total	249	100.0%	123	100.0%	7	100.0%	11	100.0%	29	100.0%	419

Appendix C 9

If an MIA sees climate change as a problem per news website

	Yes (explicit)		Yes (implied)		No (implied)		No (explicit)		Not mentioned		Total
	n	%	n	%	n	%	n	%	n	%	n
Left (Der Spiegel)	34	18.2%	46	28.0%	15	50.0%	4	44.4%	7	24.1%	106
Centre-left (tagesschau.de)	52	27.8%	37	22.6%	6	20.0%	1	11.1%	5	17.2%	101
Centre-right (Bild.de)	49	26.2%	50	30.5%	3	10.0%	2	22.2%	9	31.0%	113
Right (Focus Online)	52	27.8%	31	18.9%	6	20.0%	2	22.2%	8	27.6%	99
Total	187		164		30		9		29		419

Appendix C 10

Identified cause of climate change by MIA per news website

	Human (explicit)		Human (implied)		Natural (implied)		Natural (explicit)		Not mentioned		Total
	n	%	n	%	n	%	n	%	n	%	n
Left (Der Spiegel)	5	21.7%	35	19.7%	0	0.0%	0	0.0%	66	30.8%	106
Centre-left (tagesschau.de)	3	13.0%	45	25.3%	2	100.0%	1	50.0%	50	23.4%	101
Centre-right (Bild.de)	2	8.7%	62	34.8%	0	0.0%	1	50.0%	48	22.4%	113
Right (Focus Online)	13	56.5%	36	20.2%	0	0.0%	0	0.0%	50	23.4%	99
Total	23		178		2		2		214		419

Appendix C 11

Frame combinations (local, global, both) in the news articles per news website

	Local		Global		Both		Total	
	n	%	n	%	n	%	n	%
Der Spiegel	13	18.6%	23	34.3%	27	26.0%	63	26.1%
tagesschau.de	14	20.0%	19	28.4%	26	25.0%	59	24.5%
Bild.de	26	37.1%	13	19.4%	21	20.2%	60	24.9%
Focus Online	17	24.3%	12	17.9%	30	28.8%	59	24.5%
Total	70	100.0%	67	100.0%	104	100.0%	241	100.0%

Appendix C 12

Most important consequences of climate change per news website

	economic		personal		nature		political		not mentioned		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Der Spiegel	3	18.8%	3	23.1%	27	31.0%	0	0.0%	30	24.8%	63	26.1%
tagesschau.de	5	31.3%	5	38.5%	21	24.1%	0	0.0%	28	23.1%	59	24.5%
Bild.de	2	12.5%	2	15.4%	13	14.9%	1	25.0%	42	34.7%	60	24.9%
Focus Online	6	37.5%	3	23.1%	26	29.9%	3	75.0%	21	17.4%	59	24.5%
Total	16	100.0%	13	100.0%	87	100.0%	4	100.0%	121	100.0%	241	100.0%

Appendix C 13

Mention of an economic consequence per news website

	Not mentioned		Mentioned		Total	
	n	%	n	%	n	%
Der Spiegel	57	27.4%	6	18.2%	63	26.1%
tagesschau.de	51	24.5%	8	24.2%	59	24.5%
Bild.de	56	26.9%	4	12.1%	60	24.9%
Focus Online	44	21.2%	15	45.5%	59	24.5%
Total	208	100.0%	33	100.0%	241	100.0%

Appendix C 14

Mention of a consequence in nature per news website

	Not mentioned		Mentioned		Total	
	n	%	n	%	n	%
Der Spiegel	34	24.6%	29	28.2%	63	26.1%
tagesschau.de	34	24.6%	25	24.3%	59	24.5%
Bild.de	46	33.3%	14	13.6%	60	24.9%
Focus Online	24	17.4%	35	34.0%	59	24.5%
Total	138	100.0%	103	100.0%	241	100.0%

Appendix C 15

News frames used per news website

	Conflict frame		Human-interest frame		Responsibility frame		Economic consequences frame		Total	
	n	%	n	%	n	%	n	%	n	%
Der Spiegel	15	26.3%	14	19.2%	24	32.4%	5	16.7%	58	24.8%
tagesschau.de	17	29.8%	17	23.3%	20	27.0%	5	16.7%	59	25.2%
Bild.de	21	36.8%	21	28.8%	13	17.6%	5	16.7%	60	25.6%
Focus Online	4	7.0%	21	28.8%	17	23.0%	15	50.0%	57	24.4%
Total	57	100.0%	73	100.0%	74	100.0%	30	100.0%	234	100.0%

Appendix D: Overview of findings per news website

	Der Spiegel	tagesschau.de	Bild.de	Focus Online
Overview		- Reports about climate change most regularly	- Reports about climate change mostly when important events are taking place	
Climate change scepticism		- Mentions the two articles that are sceptical about cause and occurrence of climate change. They discuss the views of the AfD.	- Mentions the only article that is sceptical about the impact of climate change. This article discusses Trump's view on the French climate policies.	
MIA: function/ occupation	- Most likely to mention a politician	- Mentions functions/ occupations equally	- Mentions most actors on average (1,88) per article. Most likely to mention a public figure.	- Most likely to mention a scientist or expert
Most mentioned MIA	- Donald Trump	- Donald Trump	- Greta Thunberg	- Greta Thunberg
Actors and climate change scepticism	- More likely to mention and criticise an actor who is sceptical about the cause or impact of climate change.	- More likely to mention and criticise an actor who is sceptical about the cause or impact of climate change.		
Framing theory: Local/ global perspectives	- Mentioned the most global perspectives.		- Mentioned the most local perspectives.	
Framing theory: consequences	- Most likely to mention consequences in nature as most important	- Most likely to mention personal consequences as most important	- Most likely to not mention any consequences of climate change	- Most likely to mention economic and political consequences as most important and mention natural and economic consequences in general
Framing theory: news frames	- Most likely to use the responsibility frame	- Is not more likely to use one specific frame	- Most likely to use the conflict frame	- Most likely to use the economic consequences frame