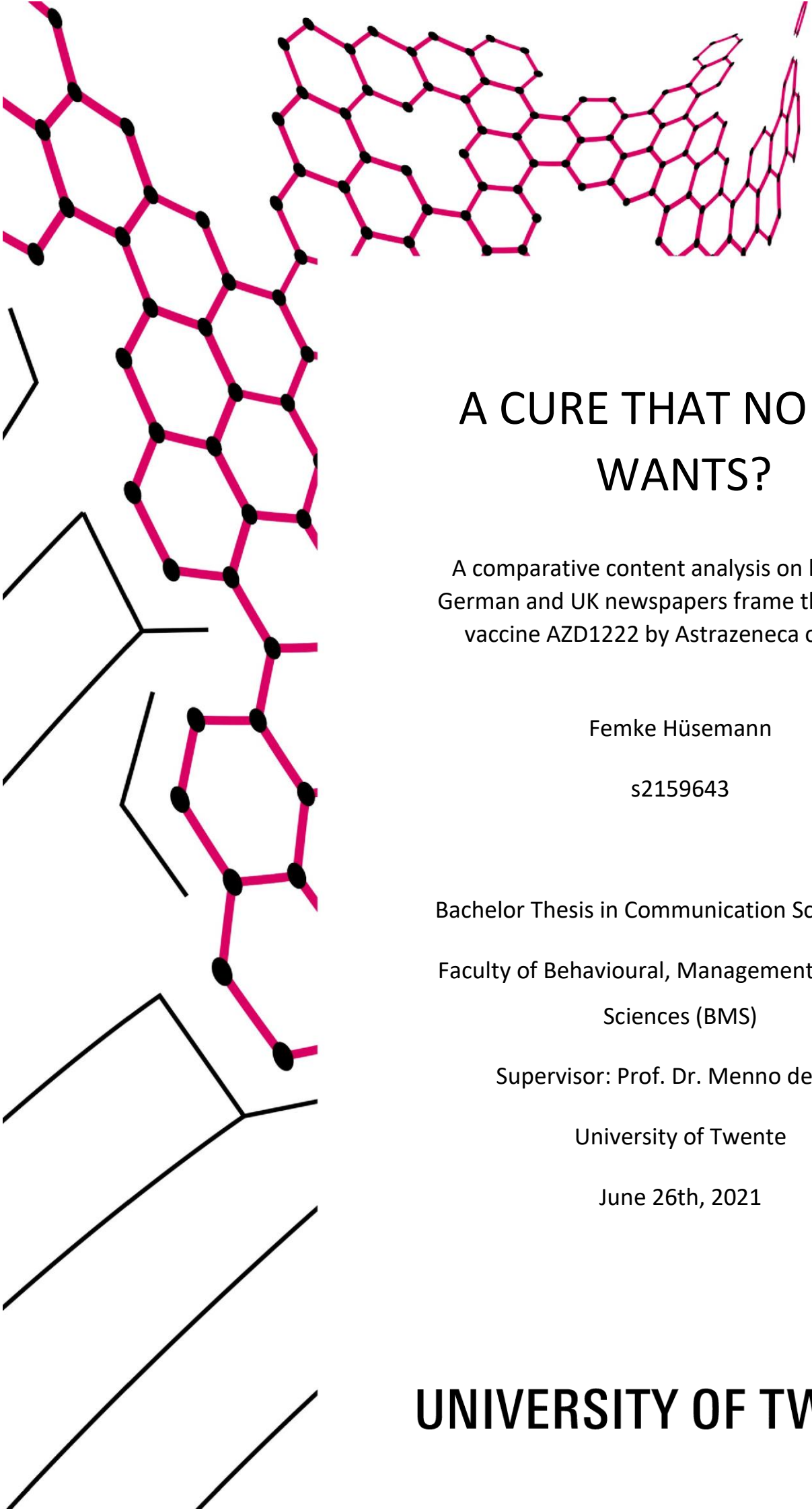

A CURE THAT NO ONE WANTS?

A comparative content analysis on how different German and UK newspapers frame the Covid-19 vaccine AZD1222 by Astrazeneca over time

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ABSTRACT

Aim: One of the most important means of overcoming the Covid-19 pandemic is the vaccines that have been developed to protect against the coronavirus. Although all vaccines reliably protect against severe disease progression, some are more widely adopted and others less so; with the AZD1222 vaccine produced by Astrazeneca ranking poorly with many. Since media coverage during crisis situations has a great impact on the perception and behavior of the general public, this study aims to investigate how different German and UK newspapers have framed the named Astrazeneca vaccine in the months February to April 2021. Thereby, the occurrence of rare cases of thrombosis which were put in connection with vaccination, lies in this period. Furthermore, the research works towards identifying similarities and differences in framing that emerged over time.

Method: Using an 86-item coding scheme, containing ten main code categories, 174 articles from three different German and three different UK news outlets were examined by means of a quantitative and qualitative content analysis. To explore the temporal changes in framing, three time periods were distinguished and compared to each other. Throughout this analysis, the articles were coded regarding criticism and appreciation toward the drug, its sentiment on it, as well as the sentiment on the UK and Germany or the EU.

Findings: The results of this study showed that the framing of the vaccine changes over time and there were also some differences between UK and German newspapers. First there are a lot of confounding and confusing information about the vaccine, while during the second period, it is mainly stated that there would probably no link between vaccine and rare blood clot diseases, which occurred in people who just got the vaccine. The focus here is also very much on political decisions, rather than on the vaccine itself. Later in the third period, the Astrazeneca vaccine is then seen as the probable trigger for the diseases; nevertheless, the benefit of the vaccine is emphasized, as this is greater than its risks. Overall, the German articles concentrated on the events in Germany, while the UK articles also had their focus on the happenings in EU countries, rather than on itself. Moreover, in the UK articles, the vaccine was overall framed more positively and neutrally, compared to the German articles.

Conclusion: Differences in framing over time and per country could be found. Overall, the study adds to the framing theory and suggests that to inform about the Covid-19 vaccine different sources of information should be used.

Keywords: vaccines, Covid-19, newspapers, frames, news frames, pandemic

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1. Introduction

It has been almost exactly one year since the World Health Organization has declared the lung disease Covid-19 caused by the Coronavirus as a pandemic (WHO, 2020a). During this year, our social life has changed drastically, but also many other areas of life are affected, such as education, politics or economy. While some countries, for instance New Zealand, could curb the spread of the pandemic and control it, most European states are still far from that. The everyday life of most people continues to be characterized by contact restrictions, social distancing, forgoing leisure activities and much more.

When the first vaccines against the virus were approved in the European Union in December 2020 (Bundesregierung, 2020; EMA, 2020), hopes of getting back to a normal life quickly were high. The EU had relied on a strategy in which it had theoretically pre-ordered sufficient vaccine from six different manufacturers; namely, these are Curavec, Sanofi, Biontech/Pfizer, Moderna, Astrazeneca, and Johnson & Johnson, however, not all vaccines from these manufacturers are currently approved or fully developed (European Comission, n.d.). At the moment, it is permitted in the European Union to vaccinate with vaccines from four manufacturers (Moderna, Astrazeneca, Johnson & Johnson, Biontech/Pfizer) (Bundesregierung, 2021). In addition, there are supply bottlenecks for all approved vaccines and the agreed quantities cannot be delivered on time. For example, Johnson & Johnson's vaccine has been approved since March 11, 2021, nevertheless the ordered supply is not to be delivered until April at the earliest (Ueberbach, 2021). All these pragmatic difficulties sober the initial hopes for a quick return to normality.

Yet, these logistic issues are not the only factors stalling the vaccination process. Many people hesitate about getting the vaccine; in various countries, researchers identified a striking decrease in vaccination intentions across the globe (Fridmann et al., 2021; Boyon, 2020). Looking at Germany, the intent to get the vaccine decreased by 2% in one month, falling from 69% in August to 67% in October 2020 (Boyon, 2020). Different analyses about vaccine hesitancy and reasons for it, all published before the Corona crisis, show similar results: the main reasons for vaccine hesitancy are fear of side effects, concerns about safety of the vaccine and lack of knowledge (Kulkarni et al., 2021; Lane et al., 2018). Novel research indicates that these are also the main reasons of people to hesitate particularly with the vaccine against Covid-19 (Robertson et al., 2021; Troiana & Nardi, 2021).

Herd immunity to Corona must be achieved to return to normal. This will then provide an indirect form of protection, but herd immunity can only be achieved if the majority of the population is immune to the virus. Vaccination against is, according to Fontanet and Cauchemez (2020), the safest and fastest way to achieve this community protection. Vaccine willingness is therefore essential to the success of this strategy. Therefore, it is important to pay closer attention to where the hesitation of many people comes from and what it is due to.

One factor that plays an important role in this context are mass media, as they strongly

influence public opinion. Here, the framing of the media must be considered; according to Ogbodo et al. (2020), two principles of reporting by the mass media collide when reporting on Corona. On the one hand, it is their responsibility to educate and inform truthfully. On the other hand, popular media have the desire for lurid headlines to keep their recipients interested. Previous research shows that mass media can influence a change in behavior of people towards health-related topics (Wakefield et al., 2010; Bertrand & Anhang, 2006). To give an example, Paek et al. (2011) found evidence that antismoking campaigns present in media positively influence and nudge young people's perception towards smoking. However, media can also negatively change people's behavior towards something and raise skepticism. For example, Hackett (2008) found that after negative news reporting, more parents refused to have their children vaccinated against mumps, measles and rubella. Moreover, Betsch et al. (2010) conducted an experiment related to perception of risk of vaccines and found evidence that when the participants retrieved information from vaccine critical websites for just five to ten minutes, their willingness to receive vaccinations decreased. Similar, a study by Capanna et al. (2015) found that in in the region of Lazio (Italy), after the media incorrectly attributed several deaths to an influenza vaccine, in the following year 10% less people got vaccinated against influenza.

As can be seen from the examples, the framing of (health related) information in the media is not limited to a particular topic. Thus, to establish a basis for exploring vaccine hesitancy in the Corona crisis, it is of great importance to first investigate more closely how different media frame vaccinations against the Covid-19 virus. To explore the framing further, it was chosen to explore newspaper articles from the UK and Germany. The reason for this is that these two countries are handling the vaccination process quite differently: While Germany follows the plan of the EU as mentioned above, which comes with supply bottlenecks and other difficulties, the UK is not bound to the EU plan due to the Brexit. Therefore, the UK has more vaccines available and by now 67 million people have received at least the first jab against the Coronavirus (status: June 6, 2021). In Germany just 37 million people got the first vaccination so far (status: June 6, 2021) (Hörz et al., 2021).

Furthermore, this research will focus specifically on the framing of the vaccination AZD1222 produced by Astrazeneca. Over the past few months, there has been a lot of discussion about the vaccine developed by researchers of the Oxford University. The vaccine gained the most media attention in the days between 07th and 17th of March 2021 when a certain type of sinus thrombosis in the brain occurred in several patients worldwide after vaccination with the vaccine. A connection between the blood clot disorder and the vaccine has not yet been confirmed (status: April 5, 2021). As a result, several countries still had briefly withdrawn the vaccine, however, most of them continued to use the vaccine about a week after stopping its use. The reason therefore was that the European Medicines Agency (EMA) claimed that the benefits of the vaccine would outweigh the risks (EMA, 2021). One of those countries was Germany, which continued the use of the vaccine, but only

recommends and allows it to be used for people over 60 years of age since the end of March. Even though it is again allowed to vaccinate with Astrazeneca, the vaccine does not seem to be wanted by many. A study showed that more people in Germany did not show up to their vaccination appointment when they would have been vaccinated with the Astrazeneca vaccination (Waterfield, 2021).

On the opposite, the United Kingdom does not only have more vaccine doses available, but it also seems like people are more willing to receive the treatment as well. AZD1222 was used in nearly half of the vaccinations completed to protect against Covid-19 in the UK (Hehrlein, 2021). Besides that, it should be mentioned that during the period in which most European countries restricted the use of the vaccine in March 2021, the UK did not withdraw the vaccine from circulation. Similarly like the EMA, the Medicines and Healthcare products Regulatory Agency (MHRA) of the UK released a statement saying that the benefits of the Astrazeneca vaccine would be by far bigger than its risks and that people should continue to get vaccinated with it (MHRA, 2021a). On April 7, on the other hand, the MHRA issued a press release expressing a possible, but very rare, link between AZD1222 and the thromboses. Nevertheless, because they continue to see greater benefits in the vaccine, and because the number of those who suffered such cerebral venous thrombosis was very small (79 out of 20 million, as of March 31), they decided against age restrictions on the use of AZD1222. However, because the side effect appears to be more likely to occur in younger people, the MHRA decided in the process to offer citizens younger than 30 an alternative to the Astrazeneca vaccine - so they can decide for themselves which Covid-19 vaccine they will be vaccinated with (MHRA, 2021b).

Another factor that significantly differentiates Astrazeneca's dealings in the two countries are the contracts and its complications that the firm Astrazeneca has with the United Kingdom and the European Union. There were already disputes between the EU and Astrazeneca when the manufacturer announced in January 2021 that it would only be able to supply a third of the planned quantity of vaccine doses. At the same time, the company expressed that they were reserving vaccine doses produced in the UK for UK. The reason for this are the differences in the contracts that the respective parties have with the pharmaceutical company. While the EU has a contract where Astrazeneca pledges "best efforts," the UK has a contract where the company pledges exclusivity (dpa, 2021). The UK Health Minister Matt Hancock also said in an interview with the financial times that the UK contract is superior to the EU contract (Khalaf & Parker, 2021). As a result, the EU Commission initiated legal action against the company on April 23, 2021 (Reuters, 2021a).

1.1 Aim of this research

This research paper will aim to deliver findings that give insights to the previously explained phenomenon – How media frame vaccines against Covid-19. Therefore, a content analysis of articles from different German and UK newspapers will be conducted. As described above, in addition to

behavioral differences regarding the Astrazeneca vaccine within the populations of the UK and Germany, there are also legal differences involving age restrictions on use, but also delivery quantities and options for the vaccine itself. All these differences suggest that in the media, including newspapers in Germany and the UK, the said vaccine is presented and framed differently. In order to be able to investigate and explore this further in this study, the first research question is as follows:

RQ1: How do German newspapers compared to different UK newspapers frame the Covid-19 vaccine by Astrazeneca in the time from February 2021 to April 2021?

Moreover, it was explained above that within a noticeably short time there were many new findings and events around the vaccine, such as the occurrence of brain vein thrombosis. The researcher looked at these in more detail and developed a timeline of the major events of the AZD1222 vaccine (**Table 1**). Using this chronological classification, it was possible to identify four different phases through which the vaccine passed during the last twelve months. In the process, three phases were passed through in the first four months of 2021 alone, precisely because of the many events that took place during those months. These findings lead to the impression that the framing of the vaccine changed in this time. Therefore, the second research question of this study is:

RQ2: How did the framing of the Covid-19 vaccine by Astrazeneca change over the time from February 2021 to April 2021 in different German and UK newspapers?

Although media framing has been widely researched, there are only a few studies investigating the framing of the corona pandemic, which is of course related to the novelty of the pandemic itself. Accordingly, there are even fewer insights into the framing of the Covid-19 vaccines or specifically the Astrazeneca vaccine. Therefore, this research might contribute to the framing theory in a way, that the analysis is performed in a context not previously studied. Furthermore, the gained insights can help to understand the attitudes and behaviors of the newspapers' readers better. In order to carry out the analysis, the theoretical background will be elaborated on by focusing on characteristics of pandemics in general and the communication challenges they pose. Next to that, the power of media and consequently framing itself will be discussed. This is followed by an explanation of the research instruments and method, whereafter the results will be presented. In the end, the main findings of the content analysis will be summarized and limitations as well as practical and theoretical implications of the study will be pointed out, finishing with the study's overall conclusion.

2. Theoretical framework

Mainstream media in general have a significant influence on society. Credible journalism and accountability are of great importance in reporting (Rao et al., 2020), and especially in crisis situations such as the Covid-19 pandemic it is essential to adhere to such principles in order to adequately inform the general public. Thus, this theoretical framework will concentrate on media coverage during the pandemic. Therefore, first the pandemic's features and its impact on the public in general will be discussed. After that, attention will be paid to pandemic communication, what it involves and what challenges it brings with it. Subsequently, the power of the media will be explained using different theories, including the framing theory.

2.1 Characteristics of a pandemic

According to the Robert Koch Institute (RKI) in Germany, a pandemic is a "new, but temporally limited, worldwide strong spread of an infectious disease with high numbers of cases and usually also with severe courses of disease" (RKI, 2015, p. 99). The key factor in this definition is that the infection takes place on a global level and does not affect only individual countries or other isolated localities, as in an epidemic. This development is possible because people often underestimate unfamiliar, new viruses and therefore do not act against them at the beginning (Krause et al., 1997). All of the factors mentioned in the definition apply to the Corona outbreak, and as mentioned earlier, it was then declared a pandemic last year (WHO, 2020a). Due to the widespread nature of the infection, the impact and consequences of this pandemic are also greater than in the case of an epidemic. One big factor that shapes everyday life in times of a pandemic is uncertainty. Lyon (2020) notes that this sense of uncertainty is felt both by people as individuals, but also by society as a whole. Contributing factors have been media in which death, disaster, and disease have been recurrent themes (Horesh & Brown, 2020). However, the rapid spread of the disease as well as the rapid development of events are also features that increase the feeling of unpredictability. Other characteristics of a pandemic that also apply to the corona pandemic are that health systems are overburdened, insufficient medical care, and social and economic collapses (Centers for Disease Control and Prevention, n.d.). Spitzer (2020) found that the Covid-19 pandemic occurs as something showing characteristics of both, natural disasters (long period of time, lockdown, unemployment) but also terrorist attacks (many deaths in many countries, chronic insecurity and fear). Just like in these crises, these factors characterizing them also mean stress for the ones experiencing them. An example for this is prolonged isolation which triggers stress and then in turn can weaken the immune system and make someone more susceptible to diseases, such as Corona (Spitzer, 2020). Overall, the Covid-19 pandemic has also a major impact on people's mental health and well-being. There is a general decrease in public's psychological well-being since the very beginning of the pandemic, while individuals with pre-existing mental illnesses being

particularly affected (Vindegaard & Benros, 2020; Moreno et al., 2020). Furthermore, literature suggests that those experiencing stress, for example through job loss or other burdens which are due to the pandemic, have an increased risk of feeling stressed and thus experiencing deterioration in mental health (Mancini, 2020). Yet, it should be kept in mind that limiting social contact as a pandemic containment measure is also seen as a stressor. Since most countries were at least temporarily in lockdowns, many people were therefore also affected by the associated restriction of social contacts. Next to that, all the aforementioned characteristics of the pandemic, such as unpredictability and fear, function as potential stressors as well and can have negative impacts on affected persons' well-being (Mancini, 2020). However, there are still many research gaps regarding mental health and Corona, so it is difficult to conclude what other factors may also have influences. Moreover, the pandemic will have economic consequences, too. Examples for this are financial insecurity, unemployment, and even poverty (Moreno et al., 2020; Pak et al., 2020), which has next to its impact on the individuals experiencing it, also an impact on the whole society in the long run.

The corona pandemic affects basically all public spheres of life and many private ones as well. In times characterized by so much uncertainty and fear of physical and mental health consequences, mass media have become the main source of information about coronavirus (Anwar et al., 2020). If information is communicated in a prudent, strategic, ethical and socially responsible manner (Navarro et al., 2021), the ones affected by the pandemic can benefit by being appropriately informed and educated. This in turn can have a positive impact on their attitudes, behaviors and therefore on their own health (Finset et al., 2020). Hence, mass media are of essential importance in public health communications regarding the pandemic and are a key element to contain the virus.

2.2 Pandemic communication

In times of public danger, effective communication is essential for all people experiencing its impacts. Disasters in which many people die, such as the Covid-19 pandemic, are fundamentally characterized by a lot of uncertainty, rapid developments and interactive complexity (Seeger, Sellnow, & Ulmer as cited in Reynolds, 2006). Consequently, suitable pandemic communication is important, on the part of the government, but also through the media reporting on the pandemic and related events. Bad and ineffective communication can lead to unfavorable public health results, for instance vaccine hesitancy (Abraham, 2010). Nevertheless, strategic and purposeful communication can prevent those negative consequences. During this pandemic, strategies and concept originating from risk communication and crisis communication are being applied quite often (Macnamara, 2021). Therefore, these two and their overlaps will be elaborated on in this section, before pandemic communication itself will be explained.

The WHO defines risk communication as an "exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being. The

[…] purpose of risk communication is to enable people at risk to take informed decisions to protect themselves […]" (WHO, n.d., para. 1). Covello et al. (1986) made a further distinction into four objectives of risk communication. Namely, these are to (1) inform and educate people about a risk, (2) change people's behavior into acting protectively to reduce the risk, (3) provide guidance in emergency situations and (4) involve the public in the problem and conflict solving process. Put into simple words, risk communication is all about communicating things that might go wrong in the future to the people who are at risk of something (Telg, 2013), in order to either reduce the risk or help them through a threatening situation. Here, mass media play an important role as they function as the main information source for the public (Lichtenberg & MacLean, 1991). For example, Ding and Zhang (2010) provided evidence that various media were of great advantage for governmental institutions when informing the public about risk decisions during the H1N1 flu epidemic in the US and China. However, the use of media can also be a threat for risk communication. McCarthy et al. (2008) conducted a study about the media coverage of food risks and concluded that journalists used vague terms and overemphasized some parts which resulted in sensational articles. Thus, it is not only important to which extent risks are being communicated appropriately, but also to use the means for communication appropriately in order to convey the message as intended. The described issue is a so-called channel problem of risk communication (Covello et al., 1986). In addition, there may also be message problems (e.g. the risk itself is very complex), source problems (e.g. public does not trust the sender of the message), and receiver problems (e.g. lack of interest in risk) (Covello et al., 1986). If one encounters at least one of these problems, the effectiveness of the risk communication might be hampered.

Although several scholars focus on the application of risk communication in a corporate environment and in relation to reputation theory (Gutteling 2000; Beretta & Bozzolan, 2004), there is also much research investigating risk communication in the field of public health (Gilk, 2007). Various studies found that when people are confronted with a risk that might have a negative impact on their health, they might have a variety of different emotional and behavioral reactions (Fischhoff et al., 1993; Covello, 2003; Gilk, 2007). Gilk (2007) argues that for this reason it might be harder for some to process important information which should be taken into consideration by risk communicators. This is also true when it comes to the Covid-19 pandemic. Waren and Lofstedt (2021) researched different vaccine rollout risk communications across European countries and found that the communication concentrated on the timeline of the vaccine rollout and the group prioritization in the rollout. Afterwards, they recommended that the countries' governments should follow the advice of scientists about the rollout, allow family doctors and generalist practitioners to administer the vaccine as they are being trusted and that the communicators should be open and honest, among other things. Therefore, trust is an essential part of the vaccine rollout and trusting Covid-19 vaccines, such as

AZD1222. Also, it is worth mentioning that in this pandemic that both, Corona and the vaccine against it, are both health-related risks for the public. That is why it is important to distinguish between both and highlight the importance of vaccination for risk communicators.

While risk communication is a preventive action, crisis communication is a reaction to an event that has already happened. It originates from public relations and is made use of when a company's reputation is being threatened by an unpredictable event (Coombs, 2007; Reynolds & Seeger, 2005). The main task of an organization when engaging in crisis communication is to find out how to respond and behave after the crisis (Coombs et al., 2010). Hereby, Coombs (2009) describes that crisis communication can be divided into two categories, public crisis communication and private crisis communication. According to him, private crisis communication is the exchange between crisis team members, those are the ones making decisions about how to respond to a crisis, in which this very decision-making process takes place. Contrarily, public crisis communication describes the exchange between the crisis team and all those stakeholders that are affected by the crisis that are not part of the crisis team or the organization.

Also for crisis communication media are an essential instrument. The choice of the right medium through which an organization communicates to its stakeholders during a crisis situation is crucial. In line with this are the findings by Schultz et al. (2011) which found in an experimental study that the medium used in crisis communication had a significant effect on the organization's reputation, the participants' reactions and secondary crisis reactions, whereas the message itself only had a significant effect on the participant's reactions. Hence, the medium used for crisis communication matters and should always correspond to the crisis response strategy in order to be effective and avoid negative consequences for a company.

During the Covid-19 pandemic, the key organizations communicating are (governmental) health institutions, such as the European Medicines Agency, Robert-Koch-Institute (Germany), Medicines and Healthcare Products Regulatory Agency (UK) or the World Health Organization. Even if they are not for-profit companies, they have a reputation to maintain in order to retain the public's trust. Furthermore, it can be said that the Covid-19 pandemic is an "unique challenge for public health practitioners and health communicators" (Ratzan et al., 2020, para. results). Ratzan et al. (2020) state that the pandemic can be overcome through resilience of the people and vaccinations. Therefore, an effective and proactive crisis communication would be important to communicate uncertainty and risks about Corona but also the vaccines against it. Besides that, there is the British-Swedish pharmareceutical group Astrazeneca which produces the Covid-19 vaccine AZD1222. Since the vaccine has been produced, there have been supply shortages in the EU and, in addition, there have been several worldwide incidents involving rare blood clots in people who received the first vaccination with AZD1222 (**Table 1**). Now its image seems to be damaged and Wise (2021) attributes this to poor

communication. Whether the crisis can now be overcome for the company depends on whether and how they will manage and communicate the situation to the outside world.

As mentioned at the beginning, pandemic communication is similar to risk and crisis communication in large part because it emerges from them. For instance, it has the same intentions as risk communication, namely, to educate and inform people in order to bring about behavior change. In the Covid-19 pandemic, for example, these include social distancing and increased hand washing. In addition, in communicating the pandemic, there may also be channel, message, source, or receiver problems (Covello et al., 1986). Because it is a new disease, the medical information communicated in the media may be confusing (Farooq et al., 2020), which would be a message problem. Next to that, the WHO itself stated that the corona pandemic is "accompanied by a massive 'infodemic'" (WHO, 2020b, p. 2), which suggests that source problems are also common. In terms of crisis communication, pandemic communication is similar in that the event it is communicating about is unpredictable. What is different, however, is the organizational context of crisis communication. As described before, it applies to specific institutions and firms that hold key positions and stakes in the pandemic, but for mass media it is different. What distinguishes pandemic communication from both, risk and crisis communication, is that the risk or crisis is defined – it is a pandemic. Therefore, a pandemic is also accompanied by specific features and communication challenges. As already touched upon, there is a substantial flow of health information due to the corona pandemic, that takes place in media of all kinds and is driven by important public figures (such as celebrities, scientists or politicians), but also private individuals (Finset et al., 2020). The associated misinformation can lead to information insufficiency and even information avoidance (Kim, 2020), which is exactly the opposite of what pandemic communication is intended to achieve. Finset et al. (2020) propose that honest and open communication about what is known or unknown regarding the pandemic on the part of the media. They add that the information needs to be presented in a “clear, specific, unambiguous, and consistent” (Finset et al., 2020, para. 10). Furthermore, they explain that emotions such as uncertainty or fear need to be accepted and reflected upon in order to better deal with them. This can also be promoted through the media. So, in summary, mass media communication in the corona pandemic should be honest and based on facts. If the dissemination of information is done in the right way (clear, unambiguous, specific and consistent) a behavior change, which is necessary to contain the virus, can evoke in the receivers of the messages. Hence, the media have a lot of power, which must be used skillfully.

2.3 Power of media

Before the outbreak of the Covid-19 pandemic, it was already clear that media strongly influence our everyday lives and society in general. Already Zucker (1978) found that television news broadcasts

shape public opinion on certain topics. Research on the relationship between media and society has been conducted for decades and continues today. For example, Mehraj et al. (2014) explained that mass media can not only influence people's opinions about something but can also change their habits and attitudes. Exemplary for this is a study by Yoo et al. (2016), in which evidence was found that media directly influence college students' intentions and attitudes toward smoking. Especially in the area of health, the influence of the media on society is an essential factor that also influences people's behaviors, which also applies to the corona pandemic. There are some underlying concepts and theories that clarify why this influence of the media is possible. Before explaining these, it is first necessary to discuss how mass media can reach the various groups of people in the general public in the first place. In terms of the Covid-19 pandemic, health experts and political leaders have the responsibility to inform the public accurately (Finset et al., 2020). This accords to the multi-step flow theory as proposed by Katz and Lazarsfeld (1955), which describes that messages of the mass media disseminate via opinion leaders who reach the individuals of the target audience. Hereby, the core element of the theory is the exchange between the medium, opinion leaders and the individuals and the people of the target audience (Ognyanova, 2017). Nevertheless, it should be noted that communication does not only take place from the top down, but that opinion leaders, for example, are also influenced by how the target audience behaves and what they think (Stansberry, 2012). The target audience in the case of Covid-19 is the general public, as it concerns the entire society and impacts the life of each individual. Moreover, it was highlighted several times throughout this theoretical framework that mass media are the main information source for the public when it comes to Corona - There is a constant exchange between opinion leaders, the media and the public.

Apart from that, the exchange between those groups leads to a mutual influence between them as well. One theory that builds on this is the agenda-setting theory which was first developed by McCombs and Shaw (1972). It is based on the assumption that there are three different agendas: Policy agenda, media agenda and public agenda. The main message behind the mutual influence of these three agendas is that the theory explains that if media highlight specific topics more than others, these issues will seem as more important than other topics to the public. Coleman et al. (2009) define agenda setting theory as “the process of the mass media presenting certain issues frequently and prominently with the result that large segments of the public come to perceive those issues as more important than others” (Coleman et al., 2009, p. 147). The policy agenda displays events based on politics, economics or science, such as the Covid-19 pandemic and the associated measures. The media select issues from the policy agenda and display them in their own way, this is the media agenda. As the mainstream media is publicly retrievable, in turn, the public agenda emerges; especially because most people use those media to get informed about the virus. Because the media choose to publish specific issues only, the public might perceive some issues as more important than other issues, which are not elaborated

on in the media. This concept is called first-level agenda setting. There is also a second-level agenda setting, which focuses on how and in what way media discuss characteristics of the issues they portray (Coleman et al., 2009). It has the same result as first-level agenda setting, meaning that the way in which media portray something is the way in which the public often talks about it as well (Coleman et al., 2009; Kiousis et al., 1999). The agenda setting theory can have great benefits in the news coverage about the pandemic, if done appropriately. Medina et al. (2021) argued that reporting about the available Covid-19 vaccines, their side effects, vaccination figures and scientific terms should be clearly explained in the mass media (WHO, 2020c), in order "to effectively guide people in making informed decisions" (Medina et al., 2021, para. 389). This also applies to education about the disease corona itself. Nevertheless, reporting complying with agenda-setting theory can have negative effects as well. Frangogiannis (2020) found that in media coverage related to Corona, journalists tend to set media sensationalism as its priority over accuracy. In turn, misinformation reach the public and can likewise shape people's opinions and behaviors. In the case of Corona, this type of reporting would not be desirable as it could reinforce fear or uncertainty. The fact that media emphasize certain information can hence be both, an advantage and a disadvantage at the same time.

A further theory explaining the power of media is the cultivation theory, as first proposed by Gerbner (1967). It suggests that people who watch television more often rather tend to be influenced by the messages spread on television. In turn, heavy TV watchers are more likely to perceive the social reality as portrayed on television, which again might even affect their behavior or attitudes (Nabi & Riddle, 2008; Morgan & Shanahan, 1996). Mosharafa (2015) adds that "the danger of television lies in its ability to shape not a particular view point about one specific issue but in its ability to shape people's moral values and general beliefs about the world" (Mosharafa, 2015, para. 2). So while agenda setting theory suggests that media influence what issues the society considers important, cultivation theory argues that media and especially television influences a person's perception of the reality itself. Furthermore, Mosharafa (2015) explains that cultivation is a multi-directional process, meaning that the television content does not just arrive by itself, but is generated by the ongoing process of creating, consuming and sharing content from mass media of different groups of people and institutions within a society. Although the cultivation theory as described by Gerbner is mainly limited to the influence of television, there is research that shows a cultivation effect also with frequent consumption of other media as well. Arendt (2010) conducted a study in which he found that in one specific newspaper foreigners were often overrepresented as offenders and the sentiment on the EU was negative. To test the cultivation hypothesis, he conducted a survey with readers of the newspaper and found evidence that those who read the newspaper more often did classify foreigners as offenders more frequently and tended to have a negative attitude towards the EU. Referring to more recent events, cultivation theory can also be applied to media representation of the Covid-19 pandemic. Tang et al. (2021)

illustrated that government social media promote users' information security behavior regarding COVID-19 scams. Besides that, Manzoor and Safdar (2020) proved that media are strongly cultivating fear among individuals from middle and upper socio-economic backgrounds regarding the pandemic.

It follows from these theories that media are selective about what they report. Especially in the case of the corona pandemic, it is almost impossible to report on everything. There is the huge amount of infodemic spread, where it is difficult to distinguish between facts and rumors (Zarocostas, 2021). The process of selecting and emphasizing specific issues or information is called framing. Entman (1993) explains that framing is choosing “some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation” (Entman, 1993, p. 52). To highlight something specific, the choice of words or images is often important in the media (Bryant et al., 2013). The effect of framing is a possible change of the ones receiving the framed message, which could be either and individual or the whole public (Iyengar & Kinder, 1987; De Vreese, 2005; Poirier, 2020). De Vreese (2005) further argues that attitudinal changes often occur at the individual level, while framing effects at the societal level tend to consist of "political socialization, decision-making, and collective actions" (De Vreese, 2005, p. 52). Ogbodo et al. (2020) clarified that that framing is powerful, especially in the context of Covid-19. They explain that the public’s perception and interpretation of the virus is based on how media frame it. They add that it is of great importance that the media do not sensationalize those essential health-related information, as this could reinforce fear and other negative feelings among the people. Instead, reporting should be constructive, which is very much in line with the principles regarding Covid-19 news reporting by Finset et al. (2020). Besides that, a study by Palm et al. (2021) found that when a Covid-19 vaccine was framed as something safe and effective, the participants willingness to get the vaccine increased. In the context of this research, this is an interesting finding that can be built upon.

Although little research is available on the framing of the corona pandemic or the vaccines, it is clear from the literature and the various theories addressed that the targeted highlighting of issues in the media is not only powerful, but perhaps the most powerful tool that can be used. By doing so, people are influenced not only in their thinking, but also in their actions, which is important to consider regarding the vaccination campaign and problems such as vaccine hesitancy. Generally speaking, it can be concluded that media make a difference. However, whether this is used to advantage or disadvantage, depends on the media and the frames they chose to use.

3. Data collection

3.1 Method and instruments

In order to be able to answer the research questions adequately, it is important to choose an appropriate research design beforehand so that the target content can be identified and explored further. For the purpose of identifying temporal and national differences in the framing of the Astrazeneca vaccine in different newspapers, a media content analysis was applied. This media content analysis is not exclusively quantitative or qualitative in nature, but rather a mix of both. The reason for this is that either a fully qualitative or quantitative analysis would leave out certain aspects, which in turn would yield less meaningful results. According to Macnamara (2005), quantitative content analysis deals with volume of mentions of key words, frequency of specific words, as well as the form of texts. While these numerical results, such as how often certain topics are mentioned in the articles, are valuable, they cannot bring conclusions to more complex effects. As Newbold et al. (2002) describe it as follows:

> "The problem [with quantitative content analysis] is the extent to which the quantitative indicators are interpreted as intensity of meaning, social impact and the like. There is no simple relationship between media texts and their impact, and it would be too simplistic to base decisions in this regard on mere figures obtained from a statistical content analysis" (p. 80).

Due to this methodological issue, but also the complexity and novelty of the research topic itself, qualitative content analysis is therefore being applied as well. It focuses on the relationship between a text and its audience and hence investigates the underlying patterns and deeper meanings of it (Macnamara, 2005). In terms of this specific research, the qualitative content analysis will help to reconstruct and identify the storyline and narrative over time of the vaccine by Astrazeneca. Nevertheless, this type of content analysis has its disadvantages as well; it is argued that the researcher's interpretation of texts might be subjective and scientific reliability cannot be ensured (Macnamara, 2005).

As both types of analyses have their shortcomings, they can not only make up for each other's limitations, but also, this combination will give the most expressive answers to the research questions. Hansen et al. (1998) concluded that such a combination will offer "the best of both worlds", which will let one fully understand the meaning and impact of texts.

3.2 Newspaper overview

In total, six newspapers were compared to each other, three German and three UK newspapers. The UK newspapers in question namely are *The Guardian*, *The Independent* and *The Daily Telegraph*. All of

them are broadcast and rather quality newspapers than tabloid. Regarding the political orientation of these news outlets, YouGov conducted a research in 2017 in which Britons were asked to describe where they see the UK's national newspapers on the political spectrum (YouGov, 2017). It turned out that *The Guardian* is considered to be the most left-wing news outlet of the UK's big newspapers. However, it should be added that this does not mean that it is far-left; The Guardian editors have publicly stated in the past that the newspaper is rather center-left (AllSides, n.d. a). On the other hand, *The Daily Telegraph* is a center-right news outlet (AllSides, n.d. b). This is also reflected in the YouGov (2017) survey, in which the majority described it as either "slightly-right-of-center" or "fairly right-wing". Next to that, it should be noted that it is also a conservative paper (Curtis, 2006). Furthermore, *The Independent* was mostly labeled as a centrist paper with a very slight bent to the left (YouGov, 2017). Apart from that, *The Independent* describes itself as liberal (The Independent, n.d.).

The German newspapers included in the analysis are *Die Welt*, *Die Tageszeitung* and *Der Tagesspiegel*. Here, *Die Welt* is the news outlet most described as right-wing. The newspaper can be described as center-right (Brocchi, 2008) and conservative (Hanke, 2011). *Die Tageszeitung* (also commonly referred to as *TAZ*) stands in direct contrast to *Die Welt*: The newspaper is left-wing alternative and critical of the system ("Die Zeitungen im Medienland Deutschland", 2012). Of all the news outlets mentioned, *Die Tageszeitung* is probably the most politically left leaning. Nevertheless, it does not fall under the extreme side of the political spectrum either. The third German newspaper used for analysis is *Der Tagesspiegel*. Concerning its political orientation, it is being described as liberal (Eurotopics, n.d.; Warwick, n.d.).

All UK and German newspapers are published daily and are national newspapers. Additionally, it is important to note that all news outlets included in the analysis are part of the mainstream media. Even if papers such as *Die Tageszeitung* or *The Daily Telegraph* show a clear tendency to the left-wing or right-wing, respectively, none falls under one of the extremes. Therefore, all newspapers can be considered mass media and target the general public.

3.3 Corpus selection

Before the compilation of a corpus could take place, a timeline of all important dates in the history of the Covid-19 vaccine by Astrazeneca was constructed (**Table 1**). On the one hand, creating such a timeline helped to get a general overview of all the events concerning the drug; on the other hand, and most importantly, different phases were identified through which the vaccine passed throughout the last year. Those phases functioned as a basis in choosing the time frame from which the articles for the research were selected. Three time periods were then chosen; 16.02.201 - 06.03.2021; 07.03.2021 - 17.032021 and 18.03.2021 - 08.04.2021. These three time windows cover three phases previously identified in the timeline: The first time period falls under the end of the Market

introduction phase, during this time AZD1222 was already being used for about two months in different countries, however, there have not been any big incidents yet. The second time period is the phase Interruption of use, where a lot of countries reported about cases where people would have gotten a rare form of cerebral vein thrombosis or other blood clotting disorders. As a result, many countries stopped the use of AZD1222. Lastly, the third time period and last phase of the timeline, the restricted use phase, was chosen. During this time, Germany, as well as other countries, reinstated the vaccine, after the EMA (2021) said that the benefits of it would outweigh the risks. However, as a safety measure, Astrazeneca is now only vaccinated in people over 60 in Germany, as those affected by thrombosis were all younger than that. Next to that, in this phase the UK introduced the option to people under 30 to choose an alternative vaccine. This was the first safety measure taken by the UK concerning the blood clot incident; during the interruption of use phase they continued to use the vaccine normally.

To investigate in framing differences and similarities between the two states over time, the described phases deemed to be most suitable. Simplified, they could also be called "before", "during" and "after" the occurrence of the dangerous blood clots. By doing so, changes in framing could be linked to the happenings which took place before this.

Table 1

Astrazeneca vaccine timeline.

Phase	Date	Event
Testing phase	May 2020	Oxford University chooses to work with Astrazeneca as a partner for production and clinical trials of the vaccine (Department for Business, Energy & Industrial Strategy, 2020)
	July – November 2020	Clinical trials (in US, UK, Japan, South Africa, Brazil, India)
	23.11.2020	Astrazeneca presents interim results of studies from UK and Brazil; 70% efficacy on average of the vaccine (Kemp, 2020)
	26.11.2020	New study, as there were inconsistencies in the calculation of the efficiency of the others; result is an efficacy of 90% (Boseley, 2020)
Market introduction phase	30.12.2020	UK is first country to allow use of AZD1222 (with emergency approval) (Department of Health and Social Care, 2020)
	21.01.2021	Astrazeneca announces that it will supply the EU with only 31 million vaccine doses in the first quarter of 2021 instead

		of the planned 80 million (reason: production problems) (Mussler, 2021)
	29.01.2021 Beginning of February 2021	Conditional market approval in the European Union Limited efficacy of AZD1222 against South African COVID-19 mutation, vaccination with AZD1222 discontinued in South Africa (Dingermann, 2021)
Interruption of use	07.03.2021	Austrian authorities report two cases of blood clotting disorders after vaccination with AZD1222; Danish and Dutch authorities report similar cases in the days after (Dean & Schuster-Bruce, 2021)
	11.03.2021	Denmark and Norway are the first countries to suspend the use of Astrazeneca's vaccine (Reuters, 2021b)
	12.03. – 15.03. 2021	Iceland, Bulgaria, The Democratic Republic of Congo, Ireland, The Netherlands, Indonesia, France, Italy, Spain, Cyprus, Portugal, Latvia, Slovenia suspend (temporary) use of AZD1222. More countries follow in the days after
	15.03. 2021	Discontinuation of vaccinations with AZD1222 in Germany. Reason for all the suspensions are the occurrence of increased incidence of cerebral venous thrombosis in patients who received the vaccine (Paul-Ehrlich-Institut, 2021)
Restricted use	18.03.2021	EMA say that the benefits of vaccine outweigh risks (Wise, 2021); AZD1222 vaccinations in most European countries continue on March 19, 2021 Medicines and Healthcare products Regulatory Agency of the UK nevertheless publishes similar information to the EMA, saying it is safe and people should continue to get vaccinated with it (MHRA, 2021a)
	End of March 2021	More cases of cerebral venous thrombosis occur after vaccination with Astrazeneca's vaccine. Germany's Standing Committee on Vaccination now recommends AZD1222 only for people over 60 years of age (Wise, 2021)
	07.04.2021	MHRA decides that people under the age of 30 will be offered alternative vaccines, as younger people have a higher risk than older people to suffer from the blood clot diseases (Triggle, 2021)

After having made the temporal division into three periods, the corpus was selected. In total, it consists of N = 174 articles, 71 from German newspapers and the other 103 from UK newspapers. In addition, 44 articles are from the first time period, 49 from the second and 81 from the third previously defined

time period. **Table 2** shows the composition of the corpus and the proportion of each newspaper in it more detailed. All articles were retrieved via the database LexisNexis.

While selecting the articles, several criteria were applied to find out whether an article was appropriate for the media content analysis. Search terms used in LexisNexis were “Astrazeneca”, “Oxford”, “Oxford vaccine” and “Oxford Impfstoff”. Although the actual name of the vaccine is AZD1222 or ChAdOx1 nCoV-19, the media barely refer to these names. They rather call it the vaccine developed by Oxford/produced by Astrazeneca or just call it Astrazeneca itself. For instance, when using the specific names of the vaccine, there were only four results in LexisNexis. Besides the search terms, the results were filtered by the time periods, language (English/German), the publication type (Newspaper) and the source.

The articles were then selected by their relevance as indicated by a following examination of each paper. As the total number of results per newspaper and time period was quite low (for example, *Die Welt*, first time period, n = 50), the researcher inspected all outcomes when adjusting the respective filters. Only articles that mentioned one of the search terms at least twice and mainly focused on Astrazeneca’s vaccine were selected. Articles that concentrated on the economy, the corona pandemic in general or different countries’ vaccination strategies were not included. Subsequently, 182 articles met these criteria and were downloaded. Afterwards, the researcher scrutinized the articles again and deleted those articles which appeared twice (n = 6) or did not seem to have their main focus on the vaccine after inspecting once again (n = 2).

Table 2

Articles from each newspaper per time period.

Newspaper	Time periods			
	16.02. – 06.03.2021	07.03. – 17.03.2021	18.03. – 08.04.2021	Total per newspaper
Die Welt	04	08	09	21
TAZ	06	06	06	18
Tagesspiegel	09	10	13	32
The Independent	08	10	21	39
The Guardian	09	08	16	33
The Daily Telegraph	08	07	16	31
Total per time period	44	49	81	174

4. Data Analysis

4.1 Codebook

After having compiled the corpus, a codebook was created as a mean to analyze the newspaper articles (APPENDIX A). Overall, the codebook consists of ten main codes which all have subcodes. These subcodes are more detailed parts of the main codes and some of these have even further subcodes (see *06.1 side effects of vaccine*). It can be said that the codes from main code to subcode 1 to subcode 2 get more detailed and specific to certain contents.

To develop the final version of the codebook, both inductive and deductive coding methods were used. This goes in hand with the combination of a quantitative and qualitative analysis; Soiferman (2010) explains that for quantitative analysis usually deductive approaches are applied, while for qualitative analysis researchers rather rely on inductive approaches. The main difference of those two coding methods is that deductive codes are already existing codes which are being defined before the researcher starts the coding process (Boeije, 2009). Contrarily, when using the inductive approach to code data, the codes are developed during the process of coding and tend to be more context specific.

In this codebook, the first three main codes were devised deductively before starting the coding itself. The first two codes, *01. Newspaper* and *02. Date of publication* can be seen as form codes. As explained before, the time periods derived from a closer examination of the events regarding AZD1222 and chosen as the time frame for this study. Likewise, the selection of which newspapers would be used for the corpus was decided previous to the coding process. Since the research questions ask for temporal and national differences in framing the vaccine, those two codes are important to comparably investigate in these similarities and differences. Moreover, the code *03. News frame* by Semetko and Valkenburg (2000) was added to the codebook in the very beginning as it specifically describes different types of frames used in newspapers, which are the focus of this research. The frames namely are *03.1 Conflict frame*, *03.2 Human interest frame*, *03.3 Economic consequences frame*, *03.4 Morality frame* and *03.5 Responsibility frame*. They help to understand from what different angles an issue or event is being portrayed as in the media. These news frames have been used in different analyses before (An & Gower, 2009; Muhamad & Yang, 2017; Ogbodo et al., 2020) and have also proven to work for analyses in the field of crisis communication in mass media (An & Gower, 2009). Hence, it deemed appropriate to apply these frames as codes to identify the frames used when reporting about AZD1222. All of those three predefined main codes were coded on the articles as a whole and not single fragments or paragraphs of it. Additionally, an article could use more than one frame, therefore, multiple subcodes of *03. News frame* could be applied to an article.

The codes *04*. Sentiment, 05*. National context*, *06. General information*, *07. AZ criticism*, *08. Blood cloth*, *09. AZ appreciation* and *10. Stakeholders* were generated in the process of inductive

coding, while further reading the articles. During the selection of the corpus, the development of these codes already started since the researcher had to read through the results on LexisNexis carefully in order to choose which articles to include into the analysis. This provided a good overview of issues raised and other factors addressed concerning the Astrazeneca vaccine, so that compiling the corpus and the creation of some codes took place at the same time. The code *04. Sentiment* was included in the codebook to be able to analyze how and to what extent the vaccine was judged or assessed in the different papers and over time. For example, the sentiment can be negative or positive without the vocabulary used indicating this. Especially when analyzing the articles in direct comparison, the sentiment can also be identified by addressing or avoiding certain topics. In addition, *04. Sentiment* was divided into three sentiment codes: Besides the sentiment related to Astrazeneca, also one related to the UK and the EU/Germany. These were added because it became apparent early on that the sentiment in the articles was often not only attributable to the vaccine, but also to the respective countries that were the subject of the articles. In order to be able to differentiate this better, three sentiments were created and in the course of this also the code *05. National context* emerged, which investigates whether the different newspapers rather tended to report about the events relating to the Astrazeneca vaccine in their own country/union or about how other countries handle the vaccine. *04. Sentiment* and *05. National context* were the inductively generated code that was coded to the entire article. The respective sentiments related to countries were only coded if the article was about a country or at least addressed it. If, however, the content was neither directly nor indirectly about a country or its policy in relation to the vaccine, no country sentiment (*04.2 Sentiment on EU/GER* or *04.3 Sentiment on UK*) was assigned to the article. Similarly, *5. National context* was also coded only if the article mentioned countries at all; moreover, both subcodes of *05. National context* could also be used if the article addressed both. Nevertheless, the code *04.1 Sentiment on AZ* was always used.

The codes *07. AZ criticism* and *09. AZ appreciation* list which and how many accompanying features and phenomena were mentioned around the vaccine. All negative things fell under *07. AZ criticism* and all positive things under *09. AZ appreciation*. Some of the subcodes 1 of both codes refer to the same factor (for example *07.1 Not safe* and *09.1 Safe*), but it can be clearly distinguished that in one case it is mentioned or described as something bad and in the other case as something good. The code *06. General Information* contains all the topics related to the Astrazeneca vaccine, which are treated as neutral. These are logistical problems and facts, but also the side effects of the vaccine. The reason for this is that it quickly became apparent that the side effects were not necessarily described as criticism, but often neutrally.

Besides that, the code *08. Blood clots* includes the topics that appear in the articles regarding rare cerebral venous thrombosis or other blood clot diseases in relation to AZD1222. It is important to add that this code was not intentionally assigned under criticism or side effects – On the one hand, it

is a very extensive code that has several second subcodes itself and on the other hand, he classification into the solely negative *07. AZ criticism* or the often neutral *06.1 Side effects of the vaccine* code would not have done justice to this scope and complexity of the addressed themes in the context of the blood clots. Thus, a further code was created for the reference to blood clots in the media. The last code, *10. Stakeholders*, was added to the codebook to differentiate whose quotes and statements are being by the newspapers. Semetko & Valkenburg (2000) explain that since journalists should stay objective, they often use someone else's words to position themselves indirectly. Again, these indirect statements may indicate the attitude and associated framing of the vaccine. Moreover, Stakeholders were coded only if they said or did something directly or indirectly; if a stakeholder was named only, it was not coded. The codes *06. General information*, *07. AZ criticism*, *08. Blood clots*, *09. AZ appreciation* and *10. Stakeholders* were coded paragraph or sentence wise.

After the first draft codebook was developed, it was tested using the corpus to see if it would fit the data. Therefore, a sample of 20 random articles was chosen from the corpus, consisting of texts from all newspapers and time periods. By doing so, limitations of the codebook and missing themes of it could be identified and the codebook was revised after. This cycle was repeated three times until the codebook as described above was finalized and the actual research was conducted. For all actions involving coding, the software Atlas.ti was used.

4.2 Reliability

After the codebook was completed, its reliability was ensured with the help of a second, independent coder. For this purpose, a sample of the corpus consisting of 18 articles was forwarded to him, whereupon the texts were also coded with the codebook. Hereby, the objective is to find out to what extent the two researchers agree in the coding. 18 articles were chosen as this represents approximately 10% of the total corpus (n=174) and is a sufficient proportion to determine intercoder reliability (Boeije, 2009). Besides the two form codes, a Cohen's Kappa was calculated for all main codes and the exact values can be seen below in **Table 3**. Since all Cohen's Kappas are higher than .6, the agreement between the two researchers was sufficient to make use of this codebook. Moreover, a Cohen's Kappa for the whole codebook was calculated as well, which is κ = .87 and hence, sufficient, too.

Table 3

Intercoder reliability of each Code group

Main codes	Cohen's κ coefficient
03. News frames	.632
04. Sentiment	.85

05. National context	1
06. General information	.75
07. AZ criticism	.763
08. Blood clots	.822
09. AZ appreciation	.811
10. Stakeholders	.92

5. Results

In the following, the results of the performed content analysis on German and UK newspapers will be presented. The findings of the two types of newspapers will be discussed chronologically one after the other according to the time periods. In the end, there will be a short overview with the most important findings regarding the qualitative content analysis. However, to first give a little numerical comparison, **Table 4** and **Table 5** show the frequencies of main codes used in each, German and UK newspapers throughout the analysis. Further tables indicating the frequencies of all the subcodes used during the different periods in the articles can be found in APPENDIX B. Based on these numbers, the quantitative part of the analysis was conducted.

Table 4

Frequency of main codes in German articles

Codes	First period (GER)	Second period (GER)	Third period (GER)
3. News frames	23	32	33
4.1 Sentiment on AZ	19	24	28
4.2 Sentiment on EU/Ger	15	23	24
4.3 Sentiment on UK	0	1	3
5. National context	19	25	30
6. General information	28	11	18
7. AZ criticism	37	8	19
8. Blood clot	0	82	92
9. AZ appreciation	37	22	29
10. Stakeholders	41	63	57

Table 5

Frequency of main codes in UK articles

Codes	First period (UK)	Second period (UK)	Third period (UK)
3. News frames	32	25	64
4.1 Sentiment on AZ	25	25	53
4.2 Sentiment on EU/Ger	20	24	28
4.3 Sentiment on UK	9	13	42
5. National context	27	23	55
6. General information	34	12	22

7. AZ criticism	46	7	26
8. Blood clot	0	180	213
9. AZ appreciation	74	38	96
10. Stakeholders	70	137	210

5.1 First time period

5.1.1 German newspapers

First off, the results of the content analysis in the German newspaper articles from the first time period will be discussed. The first finding that is important to mention before getting further into the analysis, is that all German articles from the first period exclusively reported on Astrazeneca in Germany (n=19) or no (inter)national context could be identified. There was no text that focused on the use of the vaccine in other countries. Likewise, the subcode Sentiment on UK was not used once, because either nothing or only very little was mentioned about Astrazeneca's situation in the UK. It can therefore be concluded that the articles analyzed in this section concentrated exclusively on the vaccine in Germany.

The first thing that stands out when looking at the **Table 4** is that Astrazeneca criticism (n=37) and Astrazeneca appreciation (n=37) occurred exactly the same number of times. Looking at the negative aspects of the vaccine, the unwillingness to get vaccinated with it was mentioned most often of the subcodes of Astrazeneca criticism (n=13), while the positive counterpart, willingness to get vaccinated with AZD122 was used significantly less (n=6). In this context, the majority of the codings referring to unwillingness to get vaccinated with Astrazeneca again refer to a generalization or the mere notion that this problem exists (n=9). For instance, in an article from *Der Tagesspiegel* the following was described: *“Only one-third of those under 65 want to be vaccinated with Astrazeneca's substance as soon as possible”*. Next to that, a smaller proportion made up specific examples in which individuals or groups of people rejected the vaccine (n=4). What stands out here is that all of these specific examples occurred with or were stated by doctors or medical practitioners. For example*, Die Tageszeitung* reports the story of a doctor and describes his position as follows: *"Now Frantz should get his first vaccination with AstraZeneca. If I take it now, then I have gambled away my vaccination joker, says the young doctor. So for the time being, he's not getting vaccinated and is waiting for his hospital to vaccinate again with Biontech or Moderna"*. Similarly, *Die Tageszeitung* explains that *"especially caregivers don't want Astrazeneca"*. Also pertinent to this observation is the statement by the president of the World Medical Association, Frank Ulrich Montgomery, whose quote *"the lower effectiveness [of the vaccine] cannot be argued away"* is reproduced in two of the articles. In the course of this, he also calls for the vaccine not to be given to doctors and nursing staff. One more observation

related to the code of unwillingness to get vaccinated with the Astrazeneca vaccine is that it often occurred together with the word 'scepticism', which is being used as the reason for the unwillingness, i.e. *"The skepticism is apparently due not least to the vaccine from the British-Swedish pharmaceutical manufacturer AstraZeneca"*.

The second most frequently cited disadvantage of the Astrazeneca vaccine was that it was less effective than other vaccines (n=9). Here it is noticeable that this effectiveness is indicated and interpreted differently: Most frequently, it is mentioned that the vaccine has an effectiveness of 70% (n=5), while other articles simply describe it as less effective without expressing it in numbers (n=3). Another article also says that the Astrazeneca vaccine's effectiveness would be around 60% (n=1). In addition, few of these articles (n=2) stated that this lower efficacy does not mean that the agent does not work in some cases, but refers to a severe course of the disease and the term efficacy is often misunderstood (e.g. *"[…] when the term efficacy is mentioned, many people think that AstraZeneca's vaccine only works in 7 out of 10 vaccinated people, and not in three. But this is a misconception. The value merely expresses the difference in the number of symptomatic courses in the vaccinated and non-vaccinated study participants."*). Considering additionally that different newspapers give different figures on effectiveness, it can be confusing for people who do not have adequate scientific knowledge to understand what is exactly meant by a vaccine's efficacy.

In contrast, *09.2 Efficacy +* was the most used code concerning the positive aspects of the vaccine (n=10). In this context, efficacy is only described once as 70%, while the remaining codes for a positive efficacy do not contain any numerical values (n=9). In addition, positive statements regarding the efficacy were most likely made by German politicians than any other stakeholders (n=4). For example, Saxony's prime minister says that *"Astrazeneca's vaccine has a great effect" and "that it protects as well as Biontech's"*. However, German institutions (n=2) were also in favor of a good effectiveness of the vaccine, as well as a researcher (n=1) and a doctor (n=1). Moreover, the codes regarding a positive efficacy occurred among eight different articles, of which half was coded with *03.5 Responsibility frame* as well (n=4). This can often be seen in the fragments containing the code *09.2 Efficacy +*; in which various people often try to name others who are responsible for the rejection of the vaccine. Exemplary for this, the German politician Karl Lauterbach critizizes that *"the Stiko's* [Standing Committee on Vaccination] *recommendation to only use the vaccine for those under 65 years of age has obviously damaged the vaccine, with many unjustifiably seeing it as a second-class vaccine"*. German politician Kordula-Schulz Asche, on the other hand, blames *"massive communication failures on the part of the government"* for citizens' skepticism towards the vaccine.

Also frequently represented was the code stating that AZD1222 protected against a severe course of corona and associated hospitalization (n=8). In connection with this, the code Researcher/Scientist was also used a few times (n=3) and in all cases refers to the virologist Christian

Drosten, who always emphasizes the importance of the Astrazeneca vaccine. For instance, he made the following statement: *"The vaccines were extremely good compared to what could be expected. Because they all fulfilled the most important effect: to minimize the risk of a severe course of the disease"*.

Regarding general information, it is striking that again the code concerning the vaccine's efficacy, in this case it is *06.2 Unsure about efficacy*, makes up a big share of the subcodes used of the main code (n=11). However, in most cases (n=10), the code refers to the fact that the German Standing Committee on Vaccination had not yet released the vaccine for people over 65 during the first period because there were too few data on its effectiveness in older people (i.e. *"The Standing Commission on Vaccines had previously advised against this* [the release for older people] *due to what it considered to be an insufficient number of studies, but last week announced that it would now extend its recommendation to people over 65."*). Nevertheless, what is striking is that the effectiveness of the Astrazeneca vaccine is repeatedly described and expressed differently. As mentioned above, this causes confusion and also uncertainty, which is already due to the pandemic situation. The skepticism mentioned in many articles as being felt by citizens may be due, among other things, to this exact inconsistency of information.

Next to the responsibility frame (n=8), the conflict frame was used most frequently (n=9). Predominantly, there were conflicts about the vaccine's efficacy, but further, other conflicts could be identified as well. For instance, production and delivery issues (n=3) on the part of the manufacturer Astrazeneca were mentioned (e.g. *"Although the EMA, the EU Commission and the German Paul Ehrlich Institute (PEI) gave the go-ahead for the vaccine at the end of January, the company initially had to contend with delivery problems because a plant in Belgium initially produced significantly less vaccine than planned."*). Apart from that, the general German vaccination campaign was discussed, and various aspects were criticized, such as the vaccination sequence (e.g. *"Instead of offering the material to other occupational groups - daycare centers or teachers - the vaccination sequence should be fundamentally reconsidered"*). Accordingly, the sentiment towards the EU/Germany is also different, so that no pattern can be discerned. About the same number of articles were neutral (n=4), negative (n=5) or mixed (n=5) towards the EU/Germany. Hardly any articles had portrayed the EU/Germany as positive (n=1), which is another indication that criticism predominates. Another striking finding is that although in the first period no occurrence of blood clots was identified yet, the image of Astrazeneca is already described as damaged (n=5). The reasons given for this are, on the one hand, the production problems already mentioned, but also confusion about the efficacy of the vaccine (e.g. *"Now add to that the fact that there is a vaccine that many don't want: AstraZeneca's."*). *Die Welt* cites *"technical errors"* that occurred during the test studies as a further reason. To testify to the contrary, a couple of articles mention that German politicians Karl Lauterbach (n=2) and Jens Spahn

(n=2) want to be vaccinated with the Astrazeneca vaccine, i.e., *"Jens Spahn (CDU) emphasized that the AstraZeneca vaccine is safe and that he himself would be vaccinated with it."*; *"[...] Karl Lauterbach wants to be demonstratively vaccinated with Astrazeneca in the coming week as a sign that it is a safe and good vaccine."*.

Although there is a lot of negative reporting about the vaccine, the sentiment on Astrazeneca is mainly mixed (n=9) or positive (n=8). The majority of the positive articles follow a similar argumentation approach: At the beginning it is mentioned that the vaccine has a bad reputation among the population. Then, however, the articles usually end with a paragraph emphasizing the effectiveness and importance of the vaccine. This can be seen very well in the articles D22, D10 or D9. Another characteristic of these argumentations is that the authors reveal their opinion themselves. So, instead of using a quote from a politician or doctor to make their point, the benefits of the vaccine are actively mentioned, i.e. *"Astrazeneca is much better than its reputation anyway, reliably protects against severe courses of disease and the side effects are unpleasant but not dangerous"*.

5.1.2 UK newspapers

Consequently, the findings of the UK newspapers from the first time period will be discussed. The first important thing that needs to be reported are the findings about the national context. Hereby, the majority of the articles focused on the events surrounding Astrazeneca in other countries (n=16), while way less focused solely on the UK (n=5) or both, a national and international context (n=3). It is also interesting to note that of the articles dealing with Astrazeneca abroad (n=19), around 80% relate to the EU (n=17). Of these, the majority focus on either vaccination activities in Germany (n=8) or France (n=6).

Accordingly, the stakeholder that was coded the most frequently were European politicians (n=20), which were followed by German politicians (n=8). In addition, quotes from Angela Merkel were mentioned (n=3), which were all about the Chancellor rejecting the Astrazeneca jab because of her age; an example is the following excerpt: *"I am 66 years old and I do not belong to the recommended group for AstraZeneca."*. At the time she made these statements, the vaccine was licensed in Germany only for people under 65. In the German articles of the first period, on the other hand, Merkel's quotes were not reproduced at all. Taking a closer look at the European politicians, it is clear that most of the time this code refers to Emmanuel Macron, the president of France (n=13). Each time he is mentioned in the same context: The UK newspapers very often pick up on the fact that Macron described the Astrazeneca vaccine as *"quasi-ineffective"* (More detailed: *"Mr Macron fanned scepticism about the jab developed by the pharmaceutical giant and Oxford University in January, hours before it received a green light from the European Medicines Agency, by saying: 'Everything points to thinking it is quasi-ineffective on people older than 65, some say those 60 years or older.'"*). Therefore, code *07.2 Efficacy* - (n=15) occurred mainly in relation to Emmanuel Macron (n=9). He then attempted to respond to this

statement in late February 2021 by stating that he would be happy to take the Astrazeneca jab (e.g. *"'In view of the latest scientific studies, the efficacy of the AstraZeneca vaccine has been proven,' Macron said. 'My turn will come, but I've got time. If that's the vaccine that's offered to me, I will take it, of course.'"*), however, he could not reverse his statement, which was often reproduced in the media at that point.

In general, the negative aspects regarding the vaccine mostly appeared in relation to other countries. For instance, image problems of the vaccine (n=13) are being reported as present in France (n=7), Germany (n=5) or Europe in general (n=1). It is quite similar with the unwillingness to be vaccinated (n=10), here it is said that in countries of the European Union in general (n=2), France (n=3), but especially Germany (n=5) people would not want the Astrazeneca vaccine, i.e. *"The resistance to AstraZeneca is particularly fierce in Germany"*. Furthermore, it is being argued that the media would be responsible for the rejection of the vaccine. For instance, *The Guardian* wrote that *"limited data from AstraZeneca's early trials and some misleading reporting in German media have also fuelled scepticism among health workers"*, while *The Daily Telegraph* published an article saying *"French doctors have blamed deep domestic scepticism about the AstraZeneca vaccine on the "bad press" it has received […]"*. In another article, *The Daily Telegraph* elaborated that even further by stating that *"fake news"* about the vaccine would have caused *"mass hysteria"*. Moreover, the behavior of some politicians, such as Angela Merkel and Emmanuel Macron, is also seen as a reason for image problems and unwillingness to be vaccinated (e.g. *"A good chunk of the vaccine scepticism is down to deeper cultural, social and political reasons."*). In one article the author even states that Europe has a *"long and ignoble anti-vaxxer tradition"* which would be based on political misdeeds and therefore the rejection of the vaccine in Europe would have been clear before the Corona vaccine was even on the market. In addition to the responsibility frame (n=10), the conflict frame (n=13) appeared most frequently, just as in the German articles. This was also exclusively due to the conflicts within the EU with the vaccine, as this is what the UK newspapers reported about mostly.

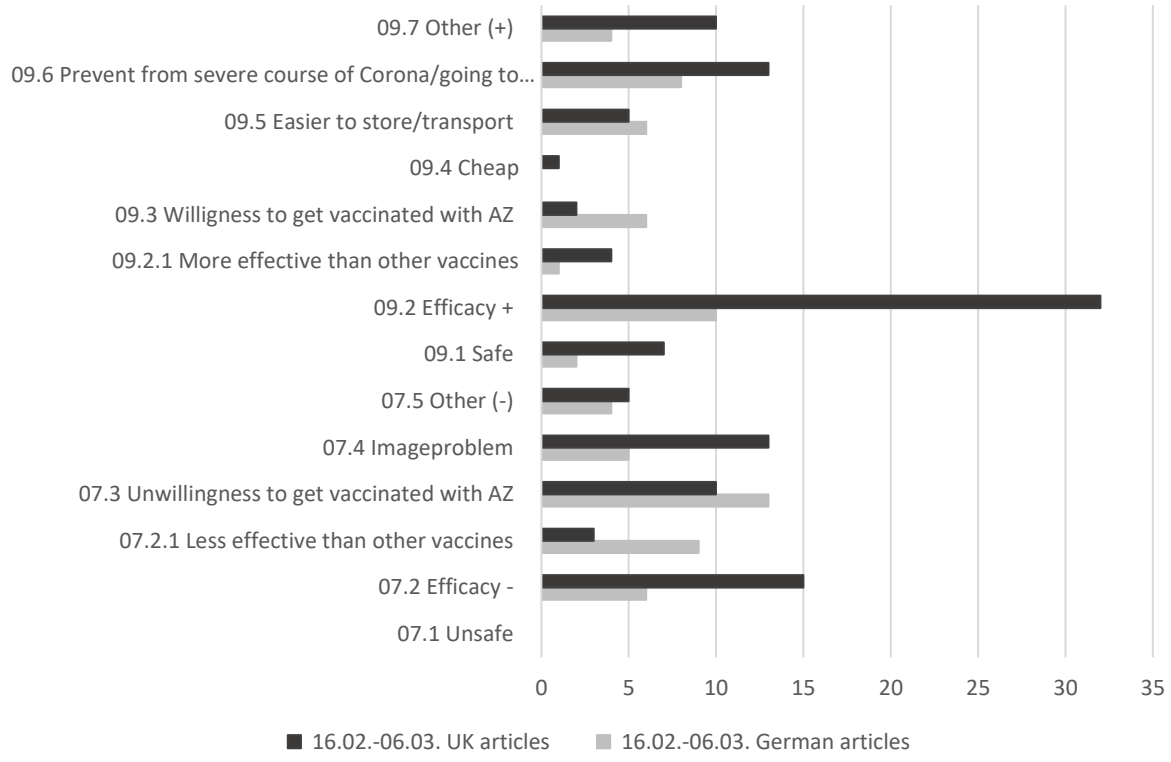
As can be seen from some of the quotes, the sentiment toward the EU/Germany was mainly negative (n=10). A couple of times it was also mixed (n=7), hardly neutral (n=3) and never positive. Especially from the adjectives used, a clear attitude emerges: In the last-mentioned quote, the word *"ignoble"* is used, in another article there is talk of an *"awkward European anti-science strain"*, while Germany's political approach is described as *"inflexible"* in another article. A further interesting observation was that sometimes articles tried to explain the events in Europe and why the vaccine is being rejected. A prime example is the aforementioned fragment in which it was argued that Europe had an *"anti-vaxxer tradition"*. Another example is an article in which the nocebo effect was used to explain side effects of the vaccine (e.g. *"Europe has succumbed to the nocebo effect. If people are primed to believe that something makes them ill, they discover illness. It is the reverse placebo."*). This

form of reporting did not only seem to contribute to a negative sentiment towards the EU/Germany, but also to justify the vaccine itself by considering not the vaccine as the problem, but people.

Besides that, it is striking that although a great deal is reported about the criticisms and drawbacks of the vaccine as perceived in the EU, Astrazeneca appreciation was coded most often overall (n=67) and clearly dominates, while in the German articles criticism and appreciation occurred equally often (see **Figure 1**).

Figure 1

Astrazeneca vaccine appreciation and criticism in German and UK articles from the first period



Concerning the positive aspects in the UK articles, *09.2 Efficacy +* (n=32) accounted for almost half of the codes. Most of the time, no specific number was given about the effectiveness (n=28), otherwise it was described few times as about 80% (n=3) and once titled as 89.3% (n=1). In contrast to the German articles, the information on effectiveness was thus more consistent and similar. Interestingly, Astrazeneca was also reported a few times to be more effective than other vaccines (n=4). This knowledge was obtained from data on Astrazeneca vaccine doses administered in Scotland and was measured by the number of hospitalizations and infections after vaccination (e.g. *"AstraZeneca outperforming Pfizer, with one dose reducing infections by between 60 and 73 per cent, while one dose of Pfizer achieved between 57 and 61 per cent."*). Keeping in mind that none of the articles shared information that one would be uncertain about the efficacy of the drug and that everything related to

the negative aspects of the efficacy portrayed the EU view on the vaccine, it can be concluded that the UK newspapers evaluated the effectiveness of AZD1222 in the first time period overall as very positive. Otherwise, the benefit that the vaccine prevented severe disease progression occurred second most often (n=13) and the *code 09.7 Other (+)* occurred third most often (n=10), among which fell, for example, the long interval between the first and second vaccination (e.g. *"The 12-week gap between AstraZeneca vaccinations 'means that more Australians will have more vaccines earlier', Hunt said. 'That's a happy byproduct of the decision.'"*). Furthermore, the sentiment on the Astrazeneca vaccine was mainly neutral (n=13) or positive (n=9), which accords to the rest of the findings.

As mentioned before, most articles did not have a sentiment towards the UK as they simply did not give information about the UK at all. Some articles, however, did and these were either positive (n=4) or neutral (n=3). In terms of content, these articles mostly discussed good study results from trials conducted in the UK, which again emphasized the effectiveness of the vaccine (n=4), an example for this is the article *"'Spectacular' outcomes of both vaccines offer reasons for optimism; Risk of hospital admission falls by 94 per cent after just one dose of Oxford jab, UK rollout figures reveal"*.

5.2 Second time period

5.2.1 German newspapers

During the second time period, the focus of reporting on the Astrazeneca vaccine seemed to have changed. What stands out directly is that the proportion of appreciation (n=21) and criticism (n=8) to the vaccine have received less attention than in the first period. Notably, the number of criticism codes shrank to one-fifth of the previously coded criticisms in the first time period (n=37). It can be noted that unwillingness to get vaccinated with the vaccine is still the most frequently mentioned criticism (n=4) (e.g. *"'Better no vaccination than AstraZeneca!' That's what many people now think. "*) but makes up a significantly smaller share in the overall picture. However, in contrast to the articles from the first period, there were barely reports about poor efficacy or lower efficacy compared with other vaccines (n=1).

Moreover, the main code *08. Blood clot* appeared most frequently (n=82). The occurrence of blood clots (n=9) and the associated stop of using the vaccine (n=11) were often reported, and also frequently occurred together (n=7), such as in the following quote: *"[…] Germany is also suspending vaccinations with Astrazeneca for the time being. The background to this is newly reported cases of thrombosis of the cerebral veins that occurred in connection with a vaccination, […]."*. Nevertheless, the fact that the blood clots are very specific and rare forms was hardly mentioned during the period (n=3), i.e. *"[…] the cases of thrombosis that have occurred in the temporal context of the Astrazeneca vaccination are extremely special. They normally occur very rarely and never in the way that has happened now."*. Accordingly, it was also more frequently suggested that the number of thromboses

occurring was still normal in the overall population (n=5), rather than classifying them as above average (n=3). Another striking finding is that the stop of the use of the vaccine was much more often perceived as bad or inappropriate (n=14) than as an appropriate precaution (n=5). For example, *Die Welt* reported on 17th of March 2021 that *"the decision to completely suspend vaccinations with AstraZeneca will prove to be a serious mistake with severe consequences"*. In addition, the opinion of the German politician Karl Lauterbach was also often represented and his statement reproduced that the Astrazeneca Stop was a *"mistake"* (n=6). A further observation is that in most cases, it was either stated that there would probably be no link between the blood clots and the vaccine (n=8) or that it was unclear if there was a link (n=8). Thereby, those judgments mostly refer to statements of the EMA (n=4) (e.g. *"So far, however, the authority [EMA] does not assume that the link to the vaccine exists and assesses its benefit higher than the possible risks"*) or the WHO (n=2) (e.g. *"However, it is unlikely that the authority will change its recommendation for the vaccine [...] said WHO spokesman Christian Lindmeier"*). The fact that there could (probably) be a connection between vaccination and the dangerous side effect was hardly discussed (n=2). Generally, the occurrence of blood clots after AZD1222 vaccination and the related political decisions were the most covered topic in the articles.

Apart from that, concerning the benefits of the vaccine (n=22), its safety was highlighted most often (n=10). These codes are all recorded as either related to or in response to the occurrence of blood clots, which can be demonstrated by the following quote: *"In the clinical trial of the vaccine, three cases of serious adverse events related to vaccination were documented among the approximately 24 000 participants. Blood clots did not occur. The safety profile of the vaccine was acceptable [...]."*). Also, the manufacturer Astrazeneca itself commented on the blood clot incidents, always emphasizing the safety of the product (n=3). Besides that, effectiveness (n=6) and the willingness to get vaccinated with the vaccine (n=4) are commonly being mentioned, which is similar to the frequencies from the German articles of the first time period.

Also once again, the context in which the articles are written mainly focus on Germany (n=19) and less about Astrazeneca events in other countries (n=6). It should also be noted that hereby, the sentiment towards Germany is mainly negative (n=9). Only slightly less frequently was it neutral (n=7) or mixed (n=6), and just as in the first time period, hardly positive (n=1). The reason for this is the stop of the use of the vaccine, which, as already mentioned, was considered to be negative. The problem behind this is that the entire vaccination campaign would be delayed by this stop. An article that clearly describes this is *"AstraZeneca is not the problem"* in *Die Tageszeitung*, which suggests that pandemic management has much more devastating effects than the AZD1222 vaccine and calls the whole situation a *"government failure"*. In another article, the suspension of the vaccine is described as a *"serious mistake with serious consequences"*, a further article says the federal government is sending a *"fatal signal"* by doing so. So, while in some texts a clear rejection of the government's behavior is

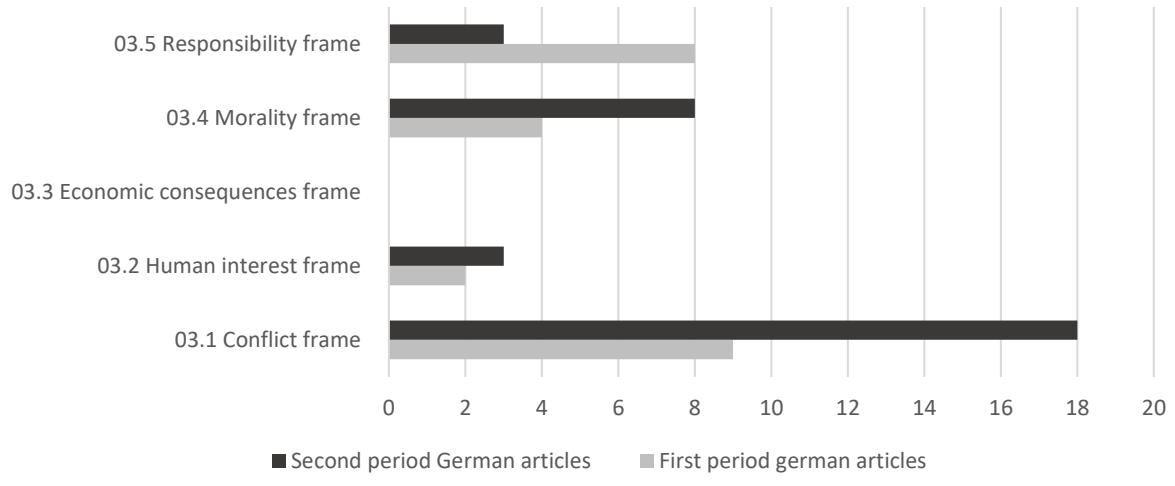
evident, in other texts it is again more indirect, for example through quotes (e.g. *"Müller said the temporary halt to the AstraZeneca drug was a bitter setback and also let subtle criticism of the decision by German Health Minister Jens Spahn (CDU), who had very quickly suspended vaccinations after reports of dangerous blood clots, come through"*).

About the sentiment on the UK, however, it cannot be concluded much as only one article had its focus on the UK (n=1). Yet, this one article is interesting because its content is about how the British would view the German vaccination strategy and more specifically, EU politics in general. From it, the EU's failure to vaccinate would evidence that the UK would be better off because of the Brexit. It is added that the Britons would think the EU stopped the Astrazeneca use with the purpose to present it in a bad light (*"Instead, suspicions prevailed that the EU wanted to deliberately badmouth the vaccine, which is also known as "Oxford vaccine" in the UK"*). The relationship between the EU and the UK is even described as hostile (*"The hostility of the EU is becoming ludicrous"*). These are interesting observations; however, one article is not giving enough insight to conclude something about the view of German newspapers overall would have on the UK's opinion about the EU.

The most used frame was again the conflict frame (n=18), which was also due to Astrazeneca's ban and the reactions to it. As mentioned several times, this is mainly seen as a bad thing (n=14) and thus a conflict arises between what the government has decided and how the news outlets report about it. Because of this, the morality frame was also coded more often (n=8) than before (see **Figure 2**). The assessment could already be seen in the headlines of some articles, such as *"A gamechanger - in the worst sense; The German government follows other states that stop the vaccination of AstraZeneca after the occurrence of dangerous side effects. A decision with far-reaching consequences"* or *"This should not have come now [...]"*.

Figure 2

Frequencies of news frames coded in German articles from the first and second period



All in all, the sentiment on Astrazeneca was relatively even either neutral (n=9), positive (n=7) or mixed (n=7). The fact that it is often neutral is due on the one hand to the fact that, despite the blood clot occurrences, the criticism was more political in nature. Otherwise, articles were rated as mixed because they were neutral or positive towards the vaccine, but negative towards the manufacturer. One prime example for that is article D46, in which the company is held responsible for canceling vaccination appointments *("The announcement by AstraZeneca in recent days that it would supply fewer doses to Europe had already led to the cancellation of vaccination appointments in the German states"*). In addition, it was mentioned for the first time that Astrazeneca would prefer other countries over the EU (n=2) (*"It gives the impression that other countries are being favored over the EU, Weber told Welt am Sonntag"*), which also did not have a good impact on the sentiment on Astrazeneca. On the whole, however, the information about the vaccine itself predominates, which is why the sentiment is also predominantly neutral (n=7) and positive (n=9).

5.2.2 UK newspapers

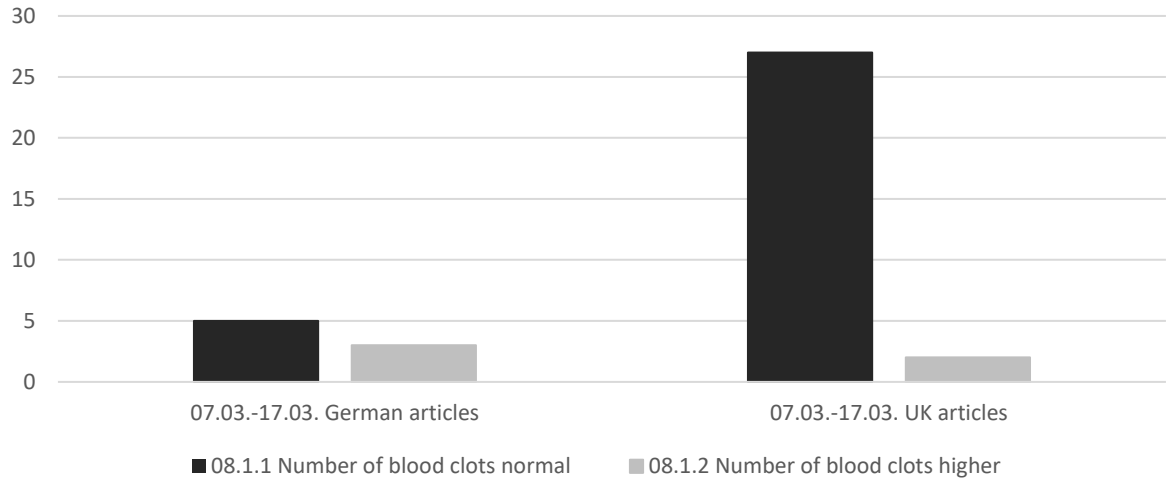
Just like before, the findings in UK newspapers from the second period will be discussed. To start off, it should first be mentioned that just like in the UK newspapers from the first period, the articles from the second period almost exclusively reported on the events in other countries concerning the Astrazeneca vaccine (n=20). It is also important to add that during the second time period, there were no restrictions on vaccinating with the Astrazeneca vaccine in the UK in response to the blood clots occurrence (see **Table 1**). Nevertheless, blood clots and thrombosis were the most frequently addressed topic (n=180).

Taking a closer look at the distribution of the subcodes for *08. blood clots*, it can be seen that in this context, the most frequent statement was that there was probably no link between the blood clots and the vaccination (n=42). Such statements were mostly made by the EMA (n=13) or WHO (n=7), for instance *"The European Union's drug regulator, the European Medicines Agency, said on Wednesday there was no evidence so far linking AstraZeneca's jab to the two cases in Austria"*. In addition, UK institution MHRA (n=5) and Astrazeneca (n=5) also commented that there was more likely no link (e.g. *"A spokesperson for AstraZeneca said: "An analysis of our safety data that covers reported cases from more than 17 million doses of vaccine administered has shown no evidence of an increased risk of pulmonary embolism, deep vein thrombosis or thrombocytopenia with Covid-19 vaccine AstraZeneca"*; *"It [MHRA] said there was no evidence to suggest the vaccine caused blood clot problems, which "can occur naturally and are not uncommon"*). Moreover, similar to the German articles of the second period, the stopped use of the vaccine in EU countries was mainly perceived as wrong (n=16) and significantly less as appropriate (n=6). However, here the evaluations were rather direct, as in the German articles, which can be clearly seen from the following quotes: *"Peter Openshaw […] said the decision to pause rollout of the AstraZeneca jab could be a 'disaster' for Covid-19 vaccine*

uptake in Europe."; *"Several European countries have stopped using the AstraZeneca Covid vaccine 'as a precaution' because of fears it may cause blood clots - At best this seems a curious choice of words, and at worst a failure to understand risk management."*; *"I would not have argued for pausing vaccination given the tenuous nature of the evidence currently available."*. Compared to the German articles, where the decision was also very directly described as a *"mistake"*, the choice of words is even clearer in the UK articles, and it is also described more reprehensibly. It is also striking that these assessments were mainly made by UK institutions, researchers or politicians (n=9), while negative statements by European politicians and institutions are limited to the statement made by the German politician Karl Lauterbach (n=3) (e.g. *"But Karl Lauterbach, a qualified doctor and a health spokesman for the Social Democrats, called the vaccine pause a "mistake" that would threaten more lives than it might save"*). What else differs from the German articles is that in the UK articles the risk-benefit argument was used much more frequently to defend the vaccine (n=22). In addition, it was mentioned much more often that the number of blood clots was normal within the whole population (n=27), such as *"[…] Andrew Pollard said there was 'very reassuring evidence that there is no increase in a blood clot phenomenon here in the UK, where most of the doses in Europe have been given so far.'"*. That the number was increased, however, was mentioned only twice (n=2). In the German articles of the second time period, it was also predominant that the number of blood clots was normal (n=5), but the difference between the two codes was not so great (see **Figure 3**). A further interesting observation that one article in *The Guardian* even argued, there would be more blood clotting diseases in people who got the Pfizer jab (*"Data from the MHRA meanwhile shows that the regulator has received more reports of blood clotting among recipients of the Pfizer vaccine than the AstraZeneca one"*).

Figure 3

Comparison of frequency of the codes concerning the number of blood clots in the whole population in relation to the Astrazeneca vaccine in German and UK articles during the second time period



Another similarity, on the other hand, is that the UK articles also had more positive comments (n=38) than criticisms on AZD1222 (n=7). Thereby, the main emphasis was on its safety (n=18) and effectiveness (n=9), i.e. *"Downing Street said the AstraZeneca jab 'remains both safe and effective'"*. Criticism, however, was not dominated by any code, as all were used fairly equally often and at most once or twice (Efficacy (-) n=2; Unwillingness to get vaccinated with AZ n=1; Image problem n=2; Other (-) n=2). Also quite similar to the German articles were the coded news frames. The conflict frame was used most often (n=14). Here, the conflict concerning the occurrence of blood clots and a possible link to the vaccine is most centrally mentioned, too. At the same time, or just because of this, there were also evaluations whether the suspension was useful or not, as already mentioned, which is why the morality frame occurred a couple of times as well (n=6).

The sentiment on the EU/Germany was mainly neutral (n=9) and negative (n=8), sometimes mixed (n=6) and barely mixed (n=1), so in the overall it is very similar to the sentiment towards the EU/Germany in the German articles. In contrast to the UK articles from the first period, the focus of the articles is no longer limited to individual EU member states, but rather to several countries or the entire EU. This is mainly due to the fact that many countries have suspended the Astrazeneca vaccine very close to each other, which are therefore also mentioned and covered in the reporting, for instance *"Germany, France, Italy and Spain joined the growing list of mostly European countries - starting with Denmark last week - that temporarily halted use of the AstraZeneca vaccine in recent days to investigate cases of blood clots that occurred after vaccination"*. In addition, individual incidents in EU countries are also described in more detail and it is described very precisely what side effects occurred and how often (e.g. *"The Netherlands clarified on Monday that it had recorded 10 cases of 'noteworthy adverse side-effects' from the AstraZeneca vaccine, while Denmark said 'highly unusual' symptoms were seen in a 60-year-old recipient who died from a blood clot*."). The fact that the focus was so strongly on what was happening in the EU can be attributed primarily to the fact that no security measures were taken in the UK with regard to blood clots for the time being. At one point, it was even described that there had been no cases of blood clot diseases in the UK after vaccination with AZD1222 (*"Britain's medicines regulator also said it had not received any reports of blood clots in people that were caused by the AstraZeneca vaccine."*). In one article by *The Daily Telegraph*, the suspension of the vaccine is described as an *overreaction*, which overall, summarizes the news outlets' sentiment on the EU countries and its decisions fittingly. The sentiment on the UK was predominantly neutral (n=10), which fits the finding that mainly other countries, their events and politics were discussed, whereas the UK rather held back itself and took the position of the observer. Besides that, the other articles' sentiment on the UK was positive (n=2), however, these made up only a relatively small part.

Despite all, the sentiment on the vaccine itself was mainly mixed (n=11) or positive (n=9) and a couple of times neutral (n=5). In particular, an ambivalent sentiment grew, which rather tended to

be neutral during the first period. Thus, although the occurrence of blood clots had practically no impact on the British vaccination strategy for the time being, it nevertheless influenced the presentation of the Astrazeneca vaccine in news outlets and also changed it. Overall, the sentiment was even more often labeled as mixed than in the German articles from the second period (n=7). Still, the sentiment and also other findings of the German and UK newspapers of the second period are similar, with a few exceptions.

5.3 Third time period

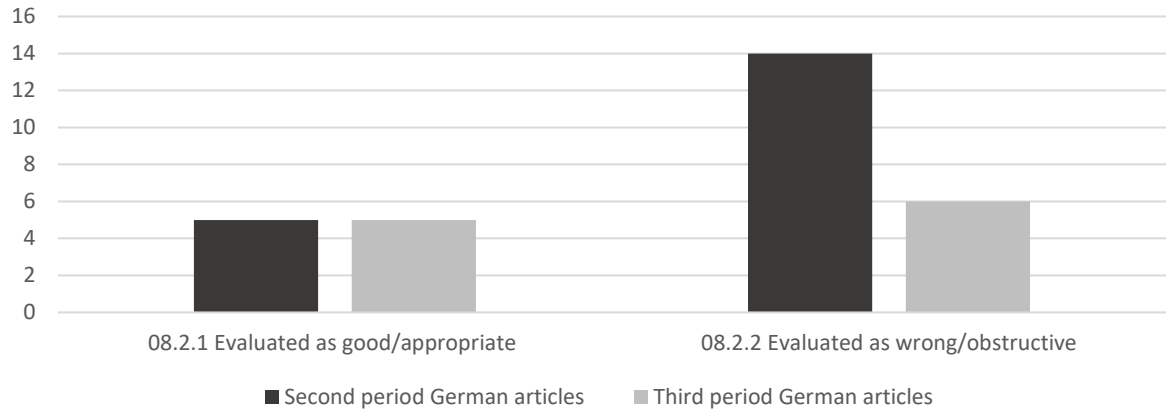
5.3.1 German newspapers

Subsequently, the results of the third period German news articles will be discussed in detail. Again, the focus on the drug in Germany (n=25) was way heavier than the news reporting in international contexts (n=5). In line with this and also the observations from the previous periods, the number of articles stating something about the UK is relatively low and so was the sentiment on the UK barely coded (n=3). In the three articles in which there was information about the UK, the sentiment was neutral in all of them, just like in the German articles from the other periods.

The occurrence of blood clots was still the most discussed topic (n=92). The subcode *8.5.1 Limited use* was coded most often (n=16) and refers to the continuation of Astrazeneca use in Germany from the end of March 2021 on, however, only for people over 60 (e.g. "*The Standing Commission on Vaccination changed its recommendation 'based on currently available data on the occurrence of rare but very severe thromboembolic adverse events' in younger vaccinated individuals. Only people 60 years and older should receive the vaccine"*). Twice, this change to vaccinate the vaccine was rated as poor (n=2), on the grounds that it slowed the vaccination campaign (*"In light of the halt of Astrazeneca vaccinations in people under 60 years of age, Bremen epidemiologists warn of the consequences of a slowed vaccination campaign. In an open letter to* […] *Angela Merkel,* [the epidemiologists] *call for weighing the harm from a rare side effect against the harm from delaying the vaccination campaign"*). It is noticeable, however, that overall, there were far fewer evaluations of the stopped use or limited use of the vaccine compared to the articles; in addition, the evaluations that occurred were almost equally often good (n=5) and bad (n=6), while in the second period, the stopped use was evaluated by far more often negatively (**Figure 4**).

Figure 4

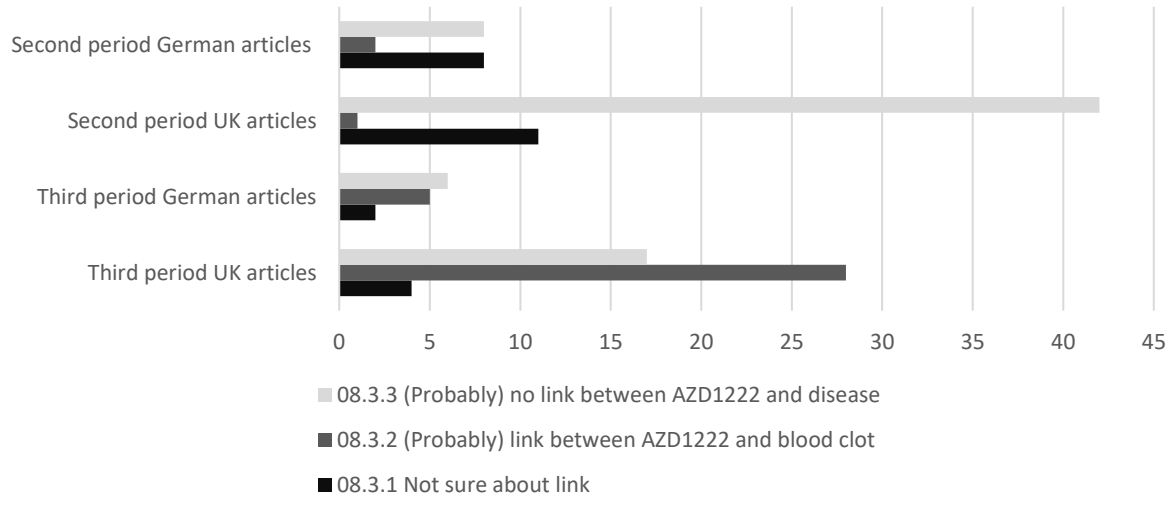
Frequencies of evaluations during the second and third period in German articles



However, the risk-benefit argument (n=10) was used more frequently and was expressed by the EMA in 70% of all the times it occurred, i.e. *"'The benefits of the compound in combating covid-19 clearly outweigh the risks,' EMA chief Emer Cooke said."*. Besides that, it is also striking that it was more often reported, that supposedly, there was a link between the vaccine and the blood clots (n=5) (e.g. "*This also contradicts the opinion of many experts who, in view of the strikingly high number of sinus vein thromboses in women and in younger people, no longer believe it is a coincidence"*), while the number of times in which it was stated that a link was unlikely slightly decreased (n=6). Thus, the difference between the two codes has decreased compared to older articles or British articles (see **Figure 5**), so that it was no longer possible to identify a predominant trend.

Figure 5

Frequencies of predictions about link between vaccine and blood clotting diseases over time in UK and German articles



A further observation is that there was scarcely news reporting related to whether the number of blood clots occurring in the population would be normal or higher than usual (n=1). Altogether, the emphasis was still on the blood clots and related actions. However, on the one hand, there was no longer a polarizing attitude, and on the other hand, other topics were more in focus than before, such as the fact that family doctors were also allowed to vaccinate in Germany (n=6).

When it comes to criticism on the vaccine (n=19), it increased a little bit compared to the second period German articles (n=8) but is still significantly less than in the first period (n=37). Most frequently mentioned were the unwillingness to be vaccinated with AZD1222 (n=6) and the image problem of the vaccine (n=7). The unwillingness is often measured by the fact that after the vaccine is released again, many appointments would not be booked at all, i.e. *"There are now thousands of appointments still to be made at the Tegel vaccination center alone in March. Apparently, many Berliners shy away from the vaccine from Astrazeneca, despite the increasing risk of infection"*. This is an interesting development, as in the first time period it was reported that appointments would be booked, however, people then did not show up. Although both points of criticism were frequently discussed before already in the German newspapers, it seems like the occurrence of blood clot would have changed the perception of both once again. In contrast, appreciation of the vaccine (n=29) was more prominent than the criticism as usual. The most mentioned form of appreciation was the willingness to get vaccinated with the Astrazeneca vaccine (n=10), e.g. *"Steinmeier had himself injected with the Astrazeneca vaccine on Thursday to set an example"*. Hence, in total the willingness was stressed more often than the unwillingness for the vaccine.

Just like in all other periods, the conflict frame occurred mostly, too (n=21). The conflict continues to be the vaccine itself and its bad image, but other issues were raised in the articles that were not mentioned before: For example, the demand that the vaccination sequence in Germany should be changed comes up in several articles (n=6) (*"A less strict vaccination sequence is now being called for across party lines"*). Besides that, it was also mentioned that people encountered problems in booking a vaccine appointment (e.g. *"Berlin's vaccination hotline for 60- to 70-year-olds seeking vaccinations has been unavailable to many callers since its launch Thursday"*). So, in addition to the existing Astrazeneca conflict, there were also more general debates about the entire vaccination campaign. Similar to the framing in the German articles from the second period, other frames were used again very little: The second most common frame was the human-interest frame, but only five times. Three of those five articles are interviews, Responsibility frame (n=4) and Morality frame (n=3) occurred almost equally little.

For the first time in articles from German news outlets, the sentiment on the EU/Germany was mainly neutral (n=13). Before that it was predominantly negative and mixed, while now, those made up less share of the total sentiment code (negative n=4; mixed n=6). On balance, it seems like the

criticism on political decisions relaxed, which can also be seen by the decrease in codes of whether the limited use was evaluated as good or bad. Compared to that, there was notably more disapproval of the political decision to interrupt the use of the drug during the second period. It also should be kept in mind here, that the focus lied on other previously mentioned vaccine issues that are not necessarily linked to the Astrazeneca jab as well and are also not directly connected to politics.

Concerning the sentiment towards Astrazeneca, it can be said that it was mostly positive (n=12) and mixed (n=11). This is in accordance with the fact that, although the blood clots are still the main topic, the benefit of the vaccine has now been emphasized more strongly in order to keep the vaccination campaign going. In addition, the restricted use was not rated as inappropriately as often as the stopped use in the period before. Nevertheless, the vaccine is associated with uncertainty, after all the incidents, which explains the ambivalent attitude. AZD1222 was hardly presented as neutral (n=2) or negative (n=3) in this period.

5.3.2 UK newspapers

Lastly, the according findings from the UK newspapers from the third time period will be presented. Before starting to look at the results, it should be mentioned that this time, the number of articles included in the analysis was significantly higher than in the other periods (n=53). While usually, there were about 20 to 30 articles per time period and news outlet, this time there are about twice as many. Due to the large number of articles, the frequency of codes used is notably higher than before, too. Next to that, it is also worth mentioning that while most UK articles still have their main focus on events outside the UK (n=35), there is a big increase in articles who do look at the situation on a national basis (n=20) compared to the last periods.

The blood clot code was once again used most often overall (n=213). The risk-benefit-argument occurred quite frequently again (n=45). Moreover, it stands out that it was more often reported that there would be a link between the vaccine and the blood clots (n=28) rather than there would not be a link (n=17). This is a big change from the second period, where the UK articles almost exclusively reported that there was (probably) no link. The majority of text sites reporting that a link was likely were based on communications from the EMA (n=10) or MHRA (n=11), e.g. *“The MHRA said there was a ‘strong possibility’ that the AstraZeneca vaccine was driving the dangerous clotting although more work was needed to establish "beyond all doubt" that the vaccine caused clotting”*. Also similar to the German newspaper articles from the third period, it was talked about limited use very often (n=41). Hereby, about one half of the codes related to the limited use of the vaccine in Germany and other European countries (n=20), whereas the other half concentrated on the regulation in the UK that people under 30 would have a choice of whether they want AZD1222 or another vaccine (n=21). The reason for this decision is that *“the small risk of developing a dangerous side effect in this age group was not outweighed by the small risk of developing life-threatening Covid”*. It cannot be

concluded whether this decision was evaluated as appropriate or inappropriate, as the codes for this occurred only in context of the restrictions in European countries. However, those were still mainly evaluated as wrong (n=11), but the number of judgements in general (n=14) has fallen sharply compared with the previous period (n=22), while there were way more articles this time. Furthermore, it was also mentioned a couple of times that the blood clotting diseases occur very rarely (n=10) (*"The thromboses, lowering of the blood platelets, and various haematological changes. All of them are consistent with an event, which occurs very, very rarely, and certainly only with a drug called heparin.*"), which was not being talked about in the second period UK articles.

Once again, more appreciation (n=96) was expressed than criticism to the Astrazeneca vaccine. Mostly, the safety (n=35) and efficacy (n=25) got highlighted, while also willingness to get vaccinated with AZD1222 made up a substantial part of the appreciation (n=18). In contrast to that, unwillingness to get vaccinated with it was the most frequent mentioned criticism on the vaccine (n=8), implying that the attitudes are mixed. Next to that, the code *07.5 Other (-)* was used as frequently (n=8). Surprisingly, the topics covered under this code do not refer to the vaccine this time but to the company Astrazeneca. Thereby, refers to a study conducted by the company that has been declared invalid by US health officials (e.g." *[…] Encouraging trial data from the US raised hopes that any lingering doubt surrounding the jab could finally be put to bed. Hours later, however, new concerns were raised by American health officials that AstraZeneca had included 'outdated information' in its large-scale study, which may have provided 'an incomplete view of the efficacy data.'"*). In general, there was more reporting in the articles about the company than before; for instance, problems between the EU and the pharmaceutical company were raised (n=5), and also the code regarding general information about the company appeared more often (n=8), i.e. *"The choice of AstraZeneca for Oxford's pioneering vaccine research was none the less a surprising one; the company is world-renowned for its cancer treatments but had no prior experience in vaccines"*.

Other observed differences between UK and German articles from the third period include that in the UK articles, it was more often reported what the symptoms of the dangerous blood clotting diseases looked like and when one should go to the doctor for that, e.g. *"This includes a severe or persistent headache or blurred vision, shortness of breath, chest pain, leg swelling or persistent abdominal pain, or unusual skin bruising or pinpoint spots beyond the injection site"*. Furthermore, it was also often mentioned that blood clotting diseases also occurred after vaccination with other vaccines, as the following quote exemplifies: *"There had been three cases of venous thromboembolism blood clots with low platelets involving the Johnson & Johnson jab, a European Medicines Agency (EMA) official said"*. Both of these topics were not mentioned in the German articles.

The conflict frame was by far most used in the UK news reporting during the third time period (n=47), similar to the articles in German news outlets. It also focused on the blood clot conflict again.

The second most frequently recorded here was the responsibility frame (n=8), while the morality frame (n=5) and the Human-interest frame (n=4) were used least. Nevertheless, compared to the conflict frame, all the other frames just made up a relatively small part.

While the sentiment on the EU/Germany was still mixed (n=6) and negative (n=6) from time to time, it was mainly neutral (n=15). This is also the first time that it is predominately neutral in the UK articles, just like for the German articles in the last time period. Again, it can be explained by the fact that criticism of political decisions about the vaccine in European countries has died down. In addition, the articles often focused on the UK (n=20), which may also indicate that the media generally began to emphasize the nation in the third period. The UK sentiment itself was as usual mainly neutral (n=27) and sometimes slightly more positive (n=9) than negative (n=1) or mixed (n=5), which represents no change compared to the last period.

The sentiment on the Astrazeneca vaccine was mostly positive (n=24) and also quite often mixed (n=17), which is similar to the outcomes of the sentiment in the third period German articles. Nevertheless, this is the first time that in the UK articles, a positive sentiment predominated so clearly. Sometimes the sentiment was neutral (n=10) and twice negative (n=2). It is the first time that UK articles had a negative sentiment on vaccine, but after analyzing the articles it is clear that both are negative towards the firm Astrazeneca and not the drug itself (e.g. *"Reputation of AstraZeneca's COVID vaccine marred by missteps [of the firm]"*).

6. Discussion

This chapter will discuss the previously presented results. The main findings will be presented first in order to answer the research questions. After that, the theoretical contribution and practical implications of this study will be elaborated on. Next to this, limitations of the research will be considered as well as suggestions for future research will be given. Finally, a conclusion will be drawn.

6.1 Main findings

The goals of this research were on the one hand, to find out how the framing of the Astrazeneca vaccine differed in UK and German newspapers during the time from February to April 2021 and on the other hand to find out how the framing of the Astrazeneca vaccine changed over this time.

Firstly, the framing over time in the German newspapers will be discussed. During the first time from 16th of February to 6th of March 2021, both criticism and appreciation of the vaccine dominated the news about it equally. One thing that was discussed above all was the question of the effectiveness of the vaccine. Hereby, the effectiveness was described differently quite often and titled with percentages varying between 60% to 89%. Another striking feature was that physicians and medical practitioners in particular were unwilling to be vaccinated with AZD1222. The events surrounding the vaccine were viewed exclusively in a national context. The sentiment on Germany and the EU was mainly negative or mixed, the reason for that was criticism of political decisions such as the vaccination sequence or too little vaccine available. While the sentiment on the vaccine was mainly mixed, it can be concluded that the Astrazeneca vaccine was framed in a way that could possibly lead to confusion amongst the readers; not only did reports about efficacy differ considerably, there was also much reporting about the fact that the vaccine would be less effective than others. Coming back to that statement frequently, the image problem and rejection of the jab might have been reinforced by the way of news reporting. What was different in the second period of the German newspaper articles, was that criticism had declined sharply in contrast to before and that the discussion about effectiveness almost died down completely. The vaccine's appreciation prevailed; above all, the safety of the vaccine was emphasized. This was in response to the occurrence of blood clots, which were the main topic in the period from the 7th of March to the 17th of March 2021 in the coverage of the vaccine and seemed to be an act to defend the vaccine from this harmful possible side effect. The associated short-term suspension of the vaccine was portrayed as bad and inappropriate in the newspapers, again leading to a negative attitude towards the EU and Germany. Furthermore, this criticism of political decisions was more in the foreground than the vaccine itself. Accordingly, sentiment on the vaccine was mainly neutral. However, the German newspapers often emphasized that a link between the vaccine and the blood clotting diseases was unlikely or simply not certain. Overall, it seems that they have tried to protect the drug from even greater damage to its image.

During the third period, the criticism on the vaccine slightly increased a little again, by

commenting on the image problem again and reporting about more unwillingness to get the vaccine because of the blood clot occurrences. However, the mentioned positive aspects about the vaccine still dominated, by reporting about politicians stating they would take the vaccine and other people not regretting that they got it. Nevertheless, the occurrence of blood clots was still the most talked about topic, with reports of AZD1222 being available only to people over 60. However, this measure was now rated as appropriate and obstructive about equally often. Another change was that there was now more writing about the likelihood of a link between vaccine and disease. What was striking was that for the first time the sentiment on the EU/Germany was mainly neutral instead of negative. It seems like the strong criticism of policy decisions subsided somewhat in the third period, and the focus also returned to more general immunization issues, such as booking appointments for vaccination. Therefore, the Astrazeneca vaccine itself also gained a little more attention than before in the second period. Once again, it was mainly portrayed as the vaccine with the imageproblem that no one wants, however, compared to the first period, it was portrayed more positively, which seemed to again to have the purpose to persuade the readers of the benefits of the vaccine.

Regarding the UK newspaper articles from the first period, it can be said that they almost exclusively reported about events linked to Astrazeneca as they happened or occurred outside the own country. Hereby, it was especially striking that the majority was all about European countries. Criticisms were made of the vaccine, but these related to problems perceived by people in other countries; that is, they were simply restated rather than actually representing the viewpoints of the critics. In addition, the reason for the rejection of the vaccine in the EU was blamed on the media and politics. So again, the sentiment on the EU is mainly negative or mixed, due to the fact that the vaccine would be unfairly maligned there. The positive aspects of the vaccine, on the other hand, were not merely passively reproduced as the viewpoint of others from which to distance oneself but were clearly stated themselves. Above all, the effectiveness of the vaccination with Astrazeneca was emphasized. Here, this was also expressed in varying numbers, which, however, had less variance than the numbers given in the German articles. Overall, the vaccine was presented mainly as something positive or neutral, with criticism hitting countries that rejected the vaccine rather than the vaccine itself.

Also during the second period, the news articles concentrated on the international context of the vaccine. The blood clot emergence was the main topic of the news coverage, too and it was mostly reported that there would probably be no link between the vaccine and the rare diseases. To underline this attitude, it was also often mentioned that the number of blood clotting diseases would be normal calculated on the whole population. Furthermore, the stop of AZD1222 usage in the EU, which did not take place in the UK, was evaluated as inappropriate and unnecessary and hence, the UK articles' sentiment on the EU/Germany was mainly negative again. There was again significantly more appreciation than criticism on the drug, with safety being highlighted the most in response to the blood

clots, as in the German articles. Overall, it appeared like the UK newspapers tried to defend Astrazeneca by arguing against the halted use of the drug in the EU and continuing to emphasize the benefits of the vaccine. The sentiment was mainly positive or mixed, while before it tended to be neutral. Although there were no measures taken in the UK regarding the blood clots during this time period, it seems like they still influenced the news coverage about the Astrazeneca vaccine and also its framing.

For the first time, the articles also focused on the national events around the vaccine in the third period. This was due to the fact that during this period it was decided in the UK that those under 30 would have the choice of receiving a different vaccine, which was occasionally evaluated as a bad decision. While this limited use was often mentioned, blood clots remained the most discussed topic during the third period. Even in the UK articles it was admitted that the blood clotting diseases were probably due to AZD1222. However, the risk-benefit argument was also often used to support the benefit of the vaccine, with safety and effectiveness again being emphasized. Criticism had increased somewhat compared to the previous period but was still much less concentrated on than the positive aspects. In addition, some of the criticism was directed more at the company Astrazeneca than at the vaccine itself. In general, although the blood clots occurred, the vaccine was mostly portrayed positively or mixed; it seems that once again an attempt is being made to defend the vaccine in this way.

Based on these findings, it is now possible to answer the research question, which concerned how the framing of the Astrazeneca vaccine changed over time in German and UK newspapers. Even though there were differences in framing in the newspapers, which will be explained in the following, a general development of framing could be identified. During the initial time period, the framing of the vaccine was primarily characterized by confusing and conflicting information. Because the image problem already existed, one of the issues was who would be blamed, rather than science-based education about the vaccine. Thus, no clear picture of the vaccine could emerge for the reader, since not only inconsistent but even contradictory data characterized most of the reporting. Then, in the second period, the occurrence of blood clots clearly came to the fore. However, the Astrazeneca vaccine was framed as something that could be the cause of the diseases, but probably was not. In the course of this, its advantages were highlighted to continue to convince the general public of the vaccine. In contrast to that, during the last period of time the vaccine was then presented as a probable cause for the blood clot diseases, after it was reviewed by various institutions. However, the vaccine was mostly framed positively to emphasize that it would still save many lives and that the benefits would outweigh the risks of vaccination, which is why the positive aspects were once again emphasized. In this period, there was even more emphasis than in the previous one on the Astrazeneca vaccine being a necessary means to get out of the pandemic.

The other research question dealt with differences in German and UK newspapers in framing the Astrazeneca vaccine during the time from February to April 2021. Although the framing development was similar in both countries' newspapers, two major differences could be identified throughout the articles. The first difference would be that the UK focused on international events regarding the vaccine and especially on the European Union. In contrast, the German newspapers report the local events regarding the vaccine in Germany itself. In both articles, sentiment toward the EU was initially negative, but then became neutral during the final period. Even if this is a common feature, it should be borne in mind that the German articles thus criticized the politics of their own country. In the British articles, on the other hand, the politics of another country and its handling of the vaccine were targeted. As already emphasized, this often refers to individual countries, but also to the EU as a whole. Therefore, the impression of an 'anti-EU' attitude was created, which was not the case in the German articles where most of the criticism was directed towards the German politics rather than the EU. This related to the finding, that the criticism of the vaccine mainly took place in a passive way, by portraying the negative aspects as something that can be found in the EU, however not in the own country. This made it easier to defend the vaccine from those critics, as they were presented as something that was "far away" and moreover, voiced by a side with which the UK newspapers generally did not sympathize.

The other main difference was that overall, the UK newspapers framed the vaccine altogether more positively than the German news outlets did. Just by looking at the numbers, it becomes clear that the UK newspapers appreciated the vaccine more often than the German ones. Besides that, their appreciation was also more high-grade, as for instance the efficacy was labelled with higher percentages. Next to that, in addition to politics, the media's portrayal of the vaccine has also been blamed for its image problem. To try to explain this rejection by explaining what went wrong further gives the impression that the vaccine was defended in order to continue to legitimize it.

6.2 Theoretical contribution

Comparing the findings with the discussed literature in this thesis, it can be said that this study adds to the framing theory in the context of media. Framing appears to be instrumental in reporting about the Astrazeneca vaccine. However, this study provides more evidence for the negative framing effects and what happens when framing is used ineffectively. The principles about effective pandemic communication after Finset et al. (2020) described that information should be conveyed in a consistent, clear, specific and unambiguous way. However, from the findings of this study, it appears that reporting was often very ambiguous and also inconsistent. The inconsistency can be justified to a certain extent: The events were partly contradictory, just after the occurrence of the blood clots. But already before, for example, the effectiveness of the vaccine was described with varying numbers.

Referring back to the study by Palm et al. (2021), in which it was found that highlighting safety and efficacy of a Covid-19 vaccine leas to higher vaccination readiness, it can be concluded that this study is the antithesis of that: If the efficacy of a vaccine is described lower (than other vaccines) and also inconsistently, the willingness to get vaccinated with this specific vaccine is negatively influenced.

6.3 Practical implications

Next to the theoretical implications, there are also practical implications deriving from this research. The first one addresses the people from the general public, who want to get informed about the vaccine. One finding was that there was a difference in the framing of the vaccine in German and UK news reporting. When looking for sources to retrieve information, it should be kept in mind that there might be cross-country differences regarding a topic, as it was the case in this study. Just focusing on the news published in one country might lead one to a biased opinion which is based on the framing of a topic in the news. Therefore, in order to develop one's own point of view, it is essential to get information based on different, mutually independent sources. The fact that they come from different countries can be advantageous in that widespread views or ideologies conveyed in the media can also differ internationally. Thus, gaining knowledge from various news sources with different origins can prevent such bias.

The second practical implication is directed to journalists. They also should be aware about the effects of framing, especially in times characterized by a lot of uncertainty, fear and unpredictability, just like the Corona pandemic. Of course, negative aspects, such as the blood clots as possible side effect, need to be reported about as well, however, especially when it comes to such risks for the general public, it is important to talk about it in an informative and neutral way. Therefore, one should stick to the facts and rely on basic principles such as clarity or unambiguity.

6.4 Limitations

Although this study provided valuable insights into the framing of the Astrazeneca vaccine, it also has two main limitations. First off, it is important to note that the study did not directly investigate what effects the articles would have on the readers' perceptions, attitudes or knowledge about the vaccine. By including the extent to which the articles are instructive and helpful for readers in sensemaking about the Astrazeneca vaccine, the appropriateness of what was reported could have been judged from a different perspective. This could have provided valuable insights, for example, regarding the complexity of the articles, but also other factors that contribute to the comprehensibility of a text and have an impact on the reader.

The other limitation that will be addressed, is that the content analysis only took three identified time periods into account. Although the Covid-19 vaccines themselves are relatively novel,

the development and thus reporting about them started already about a year ago. As new results on the Astrazeneca jab in March 2021 almost rolled over, the phases before and after seemed most interesting to examine framing. As can be seen from the analysis, a damaged image of the vaccine was reported even before these incidents. If several older articles, for example from the last quarter of 2020, had been included, it would have been possible to compare more and also to understand the development about this damaged image even more, which could have provided further reasons and explanations for the framing.

6.5 Suggestions for future research

In reference to the previously described limitations, but also to the insights gained while reading literature on the topic, this study provides several implications for future researcher in the field of framing Covid-19 vaccines. Following up upon the above, it is recommended that in the future, more newspapers or other media outlets should be taken into consideration when replicating this study. Like this, it could also be examined whether news outlets of different political orientations frame the Astrazeneca vaccine differently, but also whether the framing depends via what medium the vaccine is talked about. For instance, a comparison between reporting in traditional and new media could provide meaningful insights. Furthermore, the size of the corpus should be increased, for instance, articles that only briefly discuss the vaccine while focusing on something else should be included as well, since these articles can also provide valuable insights into framing.

In addition to that, it would be interesting to also investigate in articles that are from other countries outside Europe, for example the US, where the vaccine campaign differs again from the German or the UK once. Next to that, it would also be interesting to choose from different news outlets within the European Union. For example, the UK often talked about Germany and France when referring to the EU in general, hence it would be interesting to see to what extent the framing of the vaccine in French media varies to the German media. Hereby, it is also interesting to consider the different political contexts of each country as well, when examining the framing.

Another recommendation would be to duplicate the research but to focus on one of the other Covid-19 vaccines. As can be seen from some results of this study, the Astrazeneca vaccine was quite often compared to other vaccines, at least in terms of efficacy. Therefore, it would be interesting to see if, how and to what extent other vaccines were compared to each other. But also in terms of framing, looking for differences and similarities of other vaccines in the news can help to make sense of framing and get more aware of it.

6.6 Conclusion

Ultimately, the present research found differences in the framing of the Astrazeneca vaccine over time but also between UK and German newspapers. The main contribution of this is that before the occurrence of blood clots, the news reporting was inconsistent and informed in a contradictory and confusing way. After the blood clotting diseases occurred, the vaccine was portrayed as something that most likely was not the cause of the diseases, while the political decisions regarding vaccination discussed almost overshadowed the vaccine itself. Afterwards, the tone changed, and the vaccine was presented as the probable cause of blood clotting diseases, but its benefits were emphasized with the intention of not further arousing distrust in the general public towards the vaccine. The framing in UK and German newspaper articles differed in that the UK articles focused on the EU while the German articles focused on Germany. In addition, the UK articles framed the vaccine slightly more positively than the German articles. This study proves that media framing is a powerful tool in reporting, which especially important to consider by both, the general public and journalist, during a health crisis as the Covid-19 pandemic.

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Appendices

Appendix A: Codebook

Table 6

Codebook

Main code	Subcode 1	Subcode 2
01. Newspaper	01.1 Die Welt 01.2 TAZ 01.3 Tagesspiegel 01.4 The Independent 01.5 The Guardian 01.6 The Daily Telegraph	
02. Time period	02.1 16.02. - 06.03. 02.2 07.03. - 17.03. 02.3 18.03. – 08.04.	
03. News frame (Semetko & Valkenburg, 2000)	03.1 Conflict frame 03.2 Human interest frame 03.3 Economic consequences frame 03.4 Morality frame 03.5 Responsibility frame	
04. Sentiment	04.1 Sentiment on AZ 04.2 Sentiment on EU/GER 04.3 Sentiment on UK	04.1.1 Positive AZ 04.1.2 Neutral AZ 04.1.3 Negative AZ 04.1.4 Mixed AZ 04.2.1 Positive EU 04.2.2 Neutral EU 04.2.3 Negative EU 04.2.4 Mixed EU 04.3.1 Positive UK 04.3.3 Neutral UK 04.3.3 Negative UK 04.3.4 Mixed UK
05. National context	05.1 About AZ in own country 05.2 About AZ in other countries	
06. General information	06.1 Side effects of vaccine 06.2 Unsure about efficacy 06.3 Information about AZ company 06.4 How AZ is working	06.1.1 Minor/small/common side effects 06.1.2 Major/big/unusual side effects 06.3.1 Production/delivery issues 06.3.2 Numbers about deliveries 06.3.3 AZ prefers UK/Problems AZ and EU

07. AZ criticism	07.1 Unsafe 07.2 Efficacy (-) 07.3 Unwillingness to get vaccinated with AZD1222 07.4 Imageproblem 07.5 Other (-)	07.2.1 Less effective than other vaccines
08. Blood clot	08.1 Occurrence of blood clots 08.2 Stop of AZ usage 08.3 Link between blood clots and AZ 08.4 Risk/benefit argument 08.5 Continuation of AZ usage 08.6 No cases in UK	08.1.1 Number of blood clots normal 08.1.2 Number of blood clots higher 08.1.3 In a particular demographic group 08.1.4 Blood clot form is rare/specific 08.2.1 Evaluated as good/appropriate 08.2.2 Evaluated as wrong/obstructive 08.3.1 Not sure about link 08.3.2 (Probably) link 08.3.3 (Probably) no link 08.5.1 Limited use 08.5.2 Allowed for family doctors 08.5.3 Change of product information/added as side effect 08.5.4 Vaccination order should be changed
09. AZ appreciation	09.1 Safe 09.2 Efficacy (+) 09.3 Willingness to get vaccinated with AZD1222 09.4 Cheap 09.5 Easier to store/transport 09.6 Prevent from severe course of Corona/going to hospital 09.7 Other (+)	09.2.1 More effective than other vaccines
10. Stakeholders	10.1 Politicians 10.2 Researchers/Scientists 10.3 Doctors/Medical practitioners 10.4 Institutions 10.5 Companies 10.6 Other	10.1.1 German politicians 10.1.2 EU politicians 10.1.3 UK politicians 10.4.1 German institutions 10.4.2 EU institutions 10.4.3 UK institutions 10.4.4 Other institutions

Appendix B: Frequency tables

First period, German newspapers

Table 7: 3. News frames (First period, German articles)

Code	Frequency
3.1 Conflict frame	9
3.2 Human interest frame	2
3.3 Economic consequences frame	0
3.4 Morality frame	4
3.5 Responsibility frame	8

Table 8: 4. Sentiment (First period, German articles)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	8
4.1.2 Neutral	2
4.1.3 Negative	0
4.1.4 Mixed	9
4.2 Sentiment on EU/GER	
4.2.1 Positive	1
4.2.2 Neutral	4
4.2.3 Negative	5
4.2.4 Mixed	5
4.3 Sentiment on UK	
4.3.1 Positive	0
4.3.2 Neutral	0
4.3.3 Negative	0
4.3.4 Mixed	0

Table 9: 5. National context (First period, German articles)

Code	Frequency
5.1 About AZ in own country	19
5.2 About AZ in other countries	0

Table 10: 6. General information (First period, German articles)

Code	Frequency
6.1 Side effects	0
6.1.1 Minor/common side effects	6
6.1.2 Major/uncommon side effects	5
6.2 Not sure about efficacy	11
6.3 Information about AZ company	2
6.3.1 Production/delivery issues	3
6.3.2 Numbers about deliveries	0
6.3.2 AZ prefers UK/Problems AZ and EU	0
6.4 How AZ is working	1

Table 11: 7. AZ criticism (First period, German articles)

Code	Frequency
7.1 Unsafe	0
7.2 Efficacy -	6
7.2.1 Less effective than other vaccines	9
7.3 Unwillingness to get vaccinated	13
7.4 Imageproblem	5
7.5 Other -	4

Table 12: 9. AZ appreciation (First period, German articles)

Code	Frequency
9.1 Safe	2
9.2 Efficacy +	10
9.2.1 More effective than other vaccines	1
9.3 Willingness to get vaccinated with AZ	6
9.4 Cheap	0
9.5 Easier to store	6
9.6 Prevent from severe course of Corona/going to hospital	8
9.7 Other +	4

Table 13: 10. Stakeholders (First period, German articles)

Code	Frequency
10.1 Politicians	0
10.1.1 German politicians	13
10.1.2 EU politicians	0
10.1.3 UK politicians	0
10.2 Researchers/Scientists	7
10.3 Doctors/Medical practitioners	10
10.4 Institutions	0
10.4.1 German institutions	7
10.4.2 EU institutions	1
10.4.3 UK institutions	0
10.4.4 Other institutions	1
10.5 Companies	1
10.6 Other	1

First period, UK newspapers

Table 14: 3. News frames (First period, UK articles)

Code	Frequency
3.1 Conflict frame	13
3.2 Human interest frame	1
3.3 Economic consequences frame	4
3.4 Morality frame	4
3.5 Responsibility frame	10

Table 15: 4. Sentiment (First period, UK articles)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	9
4.1.2 Neutral	13
4.1.3 Negative	0
4.1.4 Mixed	3
4.2 Sentiment on EU/GER	
4.2.1 Positive	0
4.2.2 Neutral	3
4.2.3 Negative	10
4.2.4 Mixed	7
4.3 Sentiment on UK	
4.3.1 Positive	4
4.3.2 Neutral	4
4.3.3 Negative	0
4.3.4 Mixed	1

Table 16: 5. National context (First period, UK articles)

Code	Frequency
5.1 About AZ in own country	8
5.2 About AZ in other countries	19

Table 17: 6. General information (First period, UK articles)

Code	Frequency
6.1 Side effects	
6.1.1 Minor/common side effects	8
6.1.2 Major/uncommon side effects	2
6.2 Not sure about efficacy	0
6.3 Information about AZ company	4
6.3.1 Production/delivery issues	7
6.3.2 Numbers about deliveries	10
6.3.2 AZ prefers UK/Problems AZ and EU	1
6.4 How AZ is working	2

Table 18: 7. AZ criticism (First period, UK articles)

Code	Frequency
7.1 Unsafe	0
7.2 Efficacy -	15
7.2.1 Less effective than other vaccines	3
7.3 Unwillingness to get vaccinated	10
7.4 Imageproblem	13
7.5 Other -	5

Table 19: 9. AZ appreciation (First period, UK articles)

Code	Frequency
9.1 Safe	7
9.2 Efficacy +	32
9.2.1 More effective than other vaccines	4
9.3 Willingness to get vaccinated with AZ	2
9.4 Cheap	1
9.5 Easier to store	5
9.6 Prevent from severe course of Corona/going to hospital	13
9.7 Other +	10

Table 20: 10. Stakeholders (First period, UK articles)

Code	Frequency
10.1 Politicians	3
10.1.1 German politicians	8
10.1.2 EU politicians	20
10.1.3 UK politicians	5
10.2 Researchers/Scientists	6
10.3 Doctors/Medical practitioners	6
10.4 Institutions	1
10.4.1 German institutions	5
10.4.2 EU institutions	5
10.4.3 UK institutions	7
10.4.4 Other institutions	0
10.5 Companies	3
10.6 Other	1

Second period, German newspapers

Table 21: 3. News frames (Second period, German articles)

Code	Frequency
3.1 Conflict frame	18
3.2 Human interest frame	3
3.3 Economic consequences frame	0
3.4 Morality frame	8
3.5 Responsibility frame	3

Table 22: 4. Sentiment (Second period, German articles)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	7
4.1.2 Neutral	9
4.1.3 Negative	1
4.1.4 Mixed	7
4.2 Sentiment on EU/GER	
4.2.1 Positive	1
4.2.2 Neutral	7
4.2.3 Negative	9
4.2.4 Mixed	6
4.3 Sentiment on UK	

4.3.1 Positive	0
4.3.2 Neutral	0
4.3.3 Negative	0
4.3.4 Mixed	1

Table 23: 5. National context (Second period, German articles)

Code	Frequency
5.1 About AZ in own country	19
5.2 About AZ in other countries	6

Table 24: 6. General information (Second period, German articles)

Code	Frequency
6.1 Side effects	0
6.1.1 Minor/common side effects	2
6.1.2 Major/uncommon side effects	0
6.2 Not sure about efficacy	0
6.3 Information about AZ company	0
6.3.1 Production/delivery issues	6
6.3.2 Numbers about deliveries	0
6.3.2 AZ prefers UK/Problems AZ and EU	2
6.4 How AZ is working	1

Table 25: 7. AZ criticism (Second period, German articles)

Code	Frequency
7.1 Unsafe	0
7.2 Efficacy -	0
7.2.1 Less effective than other vaccines	1
7.3 Unwillingness to get vaccinated	4
7.4 Imageproblem	2
7.5 Other -	1

Table 26: 8. Blood clots (Second period, German articles)

Code	Frequency
8.1 Occurrence of blood clots	9
8.1.1 Number of blood clots normal	5
8.1.2 Number of blood clots higher	3
8.1.3 In a particular demographic group	6
8.1.4 Blood clot form is rare/specific	3
8.2 Stop of AZ usage	11
8.2.1 Evaluated as good/appropriate	5
8.2.2 Evaluated as bad/inappropriate	14
8.3 Link between b.c. and AZ	0
8.3.1 (Probably) link between b.c. and AZ	8
8.3.2 (Probably) no link between b.c. and AZ	2
8.4 Risk/benefit argument	8
8.5 Continuation of AZ usage	5
8.5.1 Limited use	3
8.5.2 Allowed for family doctors	0

8.5.3 Change of product information	0
8.5.4 Vaccination order should be changed	0
8.6 No cases in UK	0

Table 27: 9. AZ appreciation (Second period, German articles)

Code	Frequency
9.1 Safe	10
9.2 Efficacy +	6
9.2.1 More effective than other vaccines	0
9.3 Willingness to get vaccinated with AZ	4
9.4 Cheap	0
9.5 Easier to store	0
9.6 Prevent from severe course of Corona/going to hospital	2
9.7 Other +	0

Table 28: 10. Stakeholders (Second period, German articles)

Code	Frequency
10.1 Politicians	0
10.1.1 German politicians	20
10.1.2 EU politicians	3
10.1.3 UK politicians	1
10.2 Researchers/Scientists	10
10.3 Doctors/Medical practitioners	2
10.4 Institutions	0
10.4.1 German institutions	8
10.4.2 EU institutions	7
10.4.3 UK institutions	1
10.4.4 Other institutions	4
10.5 Companies	6
10.6 Other	1

Second period, UK newspapers

Table 29: 3. News frames (Second period, UK newspapers)

Code	Frequency
3.1 Conflict frame	14
3.2 Human interest frame	1
3.3 Economic consequences frame	0
3.4 Morality frame	6
3.5 Responsibility frame	4

Table 30: 4. Sentiment (Second period, UK newspapers)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	9
4.1.2 Neutral	5
4.1.3 Negative	0

4.1.4 Mixed	11
4.2 Sentiment on EU/GER	
4.2.1 Positive	1
4.2.2 Neutral	9
4.2.3 Negative	8
4.2.4 Mixed	6
4.3 Sentiment on UK	
4.3.1 Positive	2
4.3.2 Neutral	10
4.3.3 Negative	0
4.3.4 Mixed	1

Table 31: 5. National context (Second period, UK newspapers)

Code	Frequency
5.1 About AZ in own country	3
5.2 About AZ in other countries	20

Table 32: 6. General information (Second period, UK newspapers)

Code	Frequency
6.1 Side effects	0
6.1.1 Minor/common side effects	3
6.1.2 Major/uncommon side effects	4
6.2 Not sure about efficacy	0
6.3 Information about AZ company	0
6.3.1 Production/delivery issues	3
6.3.2 Numbers about deliveries	1
6.3.2 AZ prefers UK/Problems AZ and EU	0
6.4 How AZ is working	1

Table 33: 7. AZ criticism (Second period, UK newspapers)

Code	Frequency
7.1 Unsafe	0
7.2 Efficacy -	2
7.2.1 Less effective than other vaccines	0
7.3 Unwillingness to get vaccinated	1
7.4 Imageproblem	2
7.5 Other -	2

Table 34: 8. Blood clot (Second period, UK newspapers)

Code	Frequency
8.1 Occurrence of blood clots	19
8.1.1 Number of blood clots normal	27
8.1.2 Number of blood clots higher	2
8.1.3 In a particular demographic group	2
8.1.4 Blood clot form is rare/specific	0
8.2 Stop of AZ usage	23
8.2.1 Evaluated as good/appropriate	6

8.2.2 Evaluated as bad/inappropriate	16
8.3 Link between b.c. and AZ	0
8.3.1 (Probably) link between b.c. and AZ	11
8.3.2 (Probably) no link between b.c. and AZ	1
8.4 Risk/benefit argument	42
8.5 Continuation of AZ usage	22
8.5.1 Limited use	8
8.5.2 Allowed for family doctors	0
8.5.3 Change of product information	0
8.5.4 Vaccination order should be changed	0
8.6 No cases in UK	0

Table 35: 9. AZ appreciation (Second period, UK newspapers)

Code	Frequency
9.1 Safe	18
9.2 Efficacy +	9
9.2.1 More effective than other vaccines	0
9.3 Willingness to get vaccinated with AZ	0
9.4 Cheap	1
9.5 Easier to store	1
9.6 Prevent from severe course of Corona/going to hospital	5
9.7 Other +	4

Table 36: 10. Stakeholders (Second period, UK newspapers)

Code	Frequency
10.1 Politicians	2
10.1.1 German politicians	5
10.1.2 EU politicians	16
10.1.3 UK politicians	3
10.2 Researchers/Scientists	17
10.3 Doctors/Medical practitioners	5
10.4 Institutions	0
10.4.1 German institutions	7
10.4.2 EU institutions	33
10.4.3 UK institutions	15
10.4.4 Other institutions	21
10.5 Companies	11
10.6 Other	2

Third period, German newspapers

Table 37: 3. News frames (Third period, German articles)

Code	Frequency
3.1 Conflict frame	21
3.2 Human interest frame	5
3.3 Economic consequences frame	0
3.4 Morality frame	3
3.5 Responsibility frame	4

Table 38: 4. Sentiment (Third period, German articles)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	12
4.1.2 Neutral	2
4.1.3 Negative	3
4.1.4 Mixed	11
4.2 Sentiment on EU/GER	
4.2.1 Positive	1
4.2.2 Neutral	13
4.2.3 Negative	4
4.2.4 Mixed	6
4.3 Sentiment on UK	
4.3.1 Positive	0
4.3.2 Neutral	3
4.3.3 Negative	0
4.3.4 Mixed	0

Table 39: 5. National context (Third period, German articles)

Code	Frequency
5.1 About AZ in own country	25
5.2 About AZ in other countries	5

Table 40: 6. General information (Third period, German articles)

Code	Frequency
6.1 Side effects	0
6.1.1 Minor/common side effects	2
6.1.2 Major/uncommon side effects	3
6.2 Not sure about efficacy	1
6.3 Information about AZ company	2
6.3.1 Production/delivery issues	5
6.3.2 Numbers about deliveries	2
6.3.2 AZ prefers UK/Problems AZ and EU	3
6.4 How AZ is working	0

Table 41: 7. AZ criticism (Third period, German articles)

Code	Frequency
7.1 Unsafe	0
7.2 Efficacy -	0
7.2.1 Less effective than other vaccines	1
7.3 Unwillingness to get vaccinated	6
7.4 Imageproblem	7
7.5 Other -	5

Table 42: 8. Blood clots (Third period, German articles)

Code	Frequency
8.1 Occurrence of blood clots	5
8.1.1 Number of blood clots normal	1
8.1.2 Number of blood clots higher	0
8.1.3 In a particular demographic group	5
8.1.4 Blood clot form is rare/specific	5
8.2 Stop of AZ usage	5
8.2.1 Evaluated as good/appropriate	5
8.2.2 Evaluated as bad/inappropriate	6
8.3 Link between b.c. and AZ	0
8.3.1 (Probably) link between b.c. and AZ	2
8.3.2 (Probably) no link between b.c. and AZ	5
8.4 Risk/benefit argument	6
8.5 Continuation of AZ usage	10
8.5.1 Limited use	5
8.5.2 Allowed for family doctors	16
8.5.3 Change of product information	6
8.5.4 Vaccination order should be changed	4
8.6 No cases in UK	6

Table 43: 9. AZ appreciation (Third period, German articles)

Code	Frequency
9.1 Safe	5
9.2 Efficacy +	3
9.2.1 More effective than other vaccines	0
9.3 Willingness to get vaccinated with AZ	10
9.4 Cheap	1
9.5 Easier to store	3
9.6 Prevent from severe course of Corona/going to hospital	4
9.7 Other +	3

Table 44: 10. Stakeholders (Third period, German articles)

Code	Frequency
10.1 Politicians	0
10.1.1 German politicians	15
10.1.2 EU politicians	2
10.1.3 UK politicians	1
10.2 Researchers/Scientists	3
10.3 Doctors/Medical practitioners	6
10.4 Institutions	0
10.4.1 German institutions	4
10.4.2 EU institutions	15
10.4.3 UK institutions	3
10.4.4 Other institutions	0
10.5 Companies	3
10.6 Other	5

Third period, UK newspapers

Table 45: 3. News frames (Third period, UK newspapers)

Code	Frequency
3.1 Conflict frame	47
3.2 Human interest frame	4
3.3 Economic consequences frame	0
3.4 Morality frame	5
3.5 Responsibility frame	8

Table 46: 4. Sentiment (Third period, UK newspapers)

Code	Frequency
4.1 Sentiment on AZ	
4.1.1 Positive	24
4.1.2 Neutral	10
4.1.3 Negative	2
4.1.4 Mixed	17
4.2 Sentiment on EU/GER	
4.2.1 Positive	1
4.2.2 Neutral	15
4.2.3 Negative	6
4.2.4 Mixed	6
4.3 Sentiment on UK	
4.3.1 Positive	9
4.3.2 Neutral	27
4.3.3 Negative	1
4.3.4 Mixed	5

Table 47: 5. National context (Third period, UK newspapers)

Code	Frequency
5.1 About AZ in own country	35
5.2 About AZ in other countries	20

Table 48: 6. General information (Third period, UK newspapers)

Code	Frequency
6.1 Side effects	0
6.1.1 Minor/common side effects	5
6.1.2 Major/uncommon side effects	0
6.2 Not sure about efficacy	0
6.3 Information about AZ company	8
6.3.1 Production/delivery issues	4
6.3.2 Numbers about deliveries	0
6.3.2 AZ prefers UK/Problems AZ and EU	5
6.4 How AZ is working	0

Table 49: 7. AZ criticism (Third period, UK newspapers)

Code	Frequency
7.1 Unsafe	2
7.2 Efficacy -	6
7.2.1 Less effective than other vaccines	0
7.3 Unwillingness to get vaccinated	8
7.4 Imageproblem	2
7.5 Other -	8

Table 50: 8. Blood clots (Third period, UK newspapers)

Code	Frequency
8.1 Occurrence of blood clots	16
8.1.1 Number of blood clots normal	7
8.1.2 Number of blood clots higher	4
8.1.3 In a particular demographic group	7
8.1.4 Blood clot form is rare/specific	10
8.2 Stop of AZ usage	2
8.2.1 Evaluated as good/appropriate	3
8.2.2 Evaluated as bad/inappropriate	11
8.3 Link between b.c. and AZ	0
8.3.1 (Probably) link between b.c. and AZ	4
8.3.2 (Probably) no link between b.c. and AZ	28
8.4 Risk/benefit argument	17
8.5 Continuation of AZ usage	45
8.5.1 Limited use	7
8.5.2 Allowed for family doctors	41
8.5.3 Change of product information	0
8.5.4 Vaccination order should be changed	11
8.6 No cases in UK	0

Table 51: 9. AZ appreciation (Third period, UK newspapers)

Code	Frequency
9.1 Safe	35
9.2 Efficacy +	25
9.2.1 More effective than other vaccines	0
9.3 Willingness to get vaccinated with AZ	18
9.4 Cheap	4
9.5 Easier to store	4
9.6 Prevent from severe course of Corona/going to hospital	5
9.7 Other +	5

Table 52: 10. Stakeholders (Third period, UK newspapers)

Code	Frequency
10.1 Politicians	3
10.1.1 German politicians	10
10.1.2 EU politicians	21
10.1.3 UK politicians	23
10.2 Researchers/Scientists	19

10.3 Doctors/Medical practitioners	5
10.4 Institutions	0
10.4.1 German institutions	3
10.4.2 EU institutions	48
10.4.3 UK institutions	45
10.4.4 Other institutions	14
10.5 Companies	11
10.6 Other	8