Search Results about The War in Ukraine: An Introductory Study about Framing and the Filter Bubble on the Search Engines Google and Brave

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Abstract

This thesis deals with the implications of the filter bubble to unbiased and equal information access for users from different countries. Thus, it investigates how personalisation algorithms on search engines might affect access to information. Consequently, this thesis asks: If any differences are found, what are their possible effects? Can a filter algorithm potentially influence users by framing search results differently? Overall, this paper aims to analyse whether the Internet can provide equal and true information, even when using filtering algorithms.

This paper follows constructivism and interpretivism for its epistemology and ontology. The data collection uses an experiment. Two participants that were recruited based on convenience took part in the experiment. They are both female and international Master's programme students. The participants collected data from search result pages from two different search engines, Google and Brave. Their query was "Ukraine conflict" and they took screenshots of the top three search results on the first search result page for both search engines.

The headlines of the search results did not include special typography or language that is untypical of serious news outlets. However, most search results highlighted Russia's part as the initiator in the war. One participant saw images related to the query at the top of the page on Google, while the second one did not. There was additional information displayed around the search results in both cases and for both search engines. The participants were presented with differing content, both on Google and on Brave. In some cases, they saw information from the same news sources but their display, as well as the overall composition of the search page, varied. In general, the structure of the Google search result page showed a stark contrast between the first and second participants.

The findings of the analysis show that the participants do not have equal access to information. Despite using the same search query and the same search engines, they were presented with differing information, not only content-wise but also with regard to how this

content was framed. It seems like the filter algorithm has some kind of influence on which information users can see, possibly also considering the display of search results.

Keywords: Search engine, filter bubble, Google, Brave, information online, filter algorithms, news online, frame analysis, multimodal analysis

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Chapter 1: Introduction

This introduction offers the first step into the following chapters of the present paper. First, it introduces the reader to the topic of the thesis, the *filter bubble*, and provides some relevant first background information drawing on previous research. In the next step, the fit of this study with the existing research is clarified, as well as which problems it addresses. At the end of this introduction, the reader should have an idea about the objectives of the present paper to be prepared for the upcoming chapters. Finally, a general overview of the structure of the study is presented to offer some reading guidance.

1.1 A Brief Introduction to the Topic of this Thesis

"Technology will only quicken the pace at which news is moving away from the universal and toward the individualised": this is what Blackman et al. established in a newspaper article in 1996. At this point, the Internet[1] had been around for about 13 years. Considering that Blackman et al. (1996) presented this idea 26 years ago from the writing of the present paper, a closer look at this forecast into the future of the World Wide Web could provide interesting insights. Especially, acknowledging another line of thought presented by Swisher (1996): She quotes Rutkowski in her article about cyberspace who underlined that the new online technologies would greatly impact society's perception of the world. Nowadays, one might argue that the Internet is ubiquitous in everyday life. All over the world people turn to the Web to stay connected with their friends in different places, to find information on topics of personal interest, or to read the news, only to mention a few examples.

A look at the use of the Internet since 1996 reveals a considerable and rapid increase in its spread around the globe, particularly from 2005 on (Johnson, 2021). According to Johnson (2021), in 2021, an estimated 4.9 billion people worldwide were on the Web every day. This number has more than doubled compared to a decade ago: In 2011,

[1] Please note that this thesis uses the terms the Internet, Web, World Wide Web and cyberspace as synonyms of each other.

roughly 2.2 billion people used the World Wide Web (Johnson, 2021). As a reference, and linking back to the quote that opened this paper, 26 years ago, in 1996, there were about 80 million people on the Internet (Peterson, 2003). Nowadays, to give an example, that would mean that only the population of Germany, would access the Web. Ten years later, in 2006, this number had already increased considerably to one billion users (Johnson, 2021).

Following these statistics, the influential power that the Internet, as well as information found on it may have on people's decisions becomes apparent. This consideration is further supported when one looks at the number of users who get their information from search engines like Google. Until the present, Google has maintained its position as the most prominent search engine across the globe: In January 2022, 85.55% of users worldwide turned to Google for information (Johnson, 2022). Google's biggest competitor, albeit with a noticeable distance, was Bing with 7.61% of global users in the same month (Johnson, 2022). Another search engine that seems worth an introduction at this point is Brave: Brave brands itself as the browser with the "best privacy online" (Brave, n.d.) and claims to block all ads while offering "protection from Google and Big Tech" (Brave, n.d.). At the end of 2021, the company reported that it reached more than 50 million monthly users (Brave, 2022a). The latter search engine is mentioned at this point, as the present paper uses it as a control variable during the data collection and analysis. A reason for this application is that Brave seems to offer a different approach to search engines: In brief, one could expect it not to create a *filter bubble* that keeps the user from seeing content outside of their usual browsing habits. The concept of the *filter bubble* will be explained in more detail later on as it is central to this thesis.

1.2 The Background of this Thesis

Scholars have investigated the interplay of globalisation and the advance of the Internet (Borcuch et al., 2012). They found that the world is more connected than ever before and, naturally, one might suspect some consequences of this on people's everyday

lives. These findings have prompted further investigation of the World Wide Web and its influence on users. So far, researchers have analysed, for example, the possible impact of the *filter bubble* and fake news on social media platforms on the outcome of elections in the US and the UK (Groshek & Koc-Michalska, 2017; DiFranzo & Gloria-Garcia, 2017). A more recent example can be found in the case of antivaccination movements worldwide but mainly in Europe (van Raemdonck, 2019).

The Internet seems to be a source of knowledge that people use frequently. The number of visits to Google.com supports this idea: In April 2022, 86.29 billion users turned to Google to look for information (similarweb, 2022g). All in all, this factor underlines the need for access to unbiased and comparable information for everyone. Following this consideration, Article 19 of the Universal Declaration of Human Rights (1948) recognises people's fundamental right to freedom and expression: This also includes the right to be able to "seek, receive and impart information and ideas through any media and regardless of frontiers" (United Nations, 1948). Hence, one can regard access to unbiased, true and similar news as a human right, even on the World Wide Web. Furthermore, Article 19 shows that a user's location should not impact their search for knowledge on the Internet (United Nations, 1948). Especially when it comes to high-involvement topics like war, the algorithms behind the search engines should not influence the information flow. Acknowledging the potential for rapid developments in an ongoing war, one might point out that unfiltered information is essential for people all over the world to keep up to date with the most recent situation.

Following these considerations, one might ask themselves how the algorithm behind Google and other search engines could filter information. Not only the display of certain content potentially impacts information access, but possibly also the structure of the search result page. For instance, research on *framing* seems to point to the ability of frames to influence others (Persson, 2018; Vliegenthart & Van Zoonen, 2011; Scheff, 2005). In sum,

both the content as well as how it is *framed* might influence which information people see and perceive as important.

Taking into account how much power the Internet might have on meaning-making and people's decisions (Allcott et al., 2019), the need for further research becomes apparent. More so, since there are still numerous research gaps. Some research projects have focused on news distribution on social media platforms such as Facebook, Reddit and Twitter (Min & Wohn, 2020; Guess et al., 2018; Geschke et al., 2018). However, bearing in mind that many people turn to search engines like Google to quickly gather information about a specific topic, it appears essential to gain more knowledge about the possible implications of the filtering algorithms. In line with this, who or, in the present case, what possibly decides which content and news people see, is probably not yet thoroughly researched. Moreover, some studies focus on the overall population without zooming in on individuals. While this approach might be useful for generic comparisons, it is also crucial to pay attention to what fewer users from smaller samples see. By focusing on which content they look at, one can go into detail during the analysis. Hence, this thesis uses a small sample of two participants to be able to provide a more in-depth analysis of how the search result page might frame information.

To sum up, although the spread of news has been studied before, possible implications of the filtering mechanisms on search engines must be explored further. The degree to which people actually are presented with diverging information on a particular topic requires more attention. Besides, the potential *framing*, thus, the influence on how this information is presented also has to be investigated further. After all, possible implications of *framed* and filtered news on, for instance, intercultural understandings have to be considered. Diverging facts might hinder international collaboration and mutual understanding: different information could frame peoples' perceptions of what is important, for instance.

1.3 Establishing the Research Problem

This Master thesis deals with the topic of the *filter bubble* and its possible implications on the availability of comparable information on issues of public interest in different countries. Relevant concepts such as the *filter bubble* (Pariser, 2011) are discussed. The aim of this paper is to provide a better understanding of the potential effects of filtering algorithms in cyberspace on information flow. Further, the goal is to raise awareness of how information on the World Wide Web potentially is more biased than people might think. Here, this thesis takes a citizen perspective that focuses on the *framing* of information as influencing users.

In brief, this thesis addresses the *filter bubble* and related concepts in the first introductory chapter. It considers whether there are any potential negative implications caused by filtering mechanisms on the Internet on information availability and access.

This paper follows the line of research on online communication, more specifically information flow, on the World Wide Web. Considering that the Web is a popular source of knowledge in today's world, it is crucial to know if users from different countries and cultures have access to comparable information. Also, the use of different search engines or being in different locations should not interfere with the availability of reliable information sources. Two participants from two distinct countries were recruited to comply with the requirements of this Master's thesis to employ an intercultural and international approach. In this sense, this paper focuses on understanding the impact of online communication, to be precise, the access to information, from a globalisation perspective.

Ultimately, access to similar and unbiased information on the Internet can be seen as essential. This applies to everyday life but even more when it comes to topics of public interest, also across different countries and cultures. During the writing process of this Master's thesis, two major events of public interest were taking place: First, the ongoing Covid-19 pandemic and the emerging war between Russia and Ukraine. The latter was chosen as the topic of interest for this thesis. Therefore, in contrast to studies with a more

artificial setup, this thesis aims to conduct research that is applicable to people's everyday lives. Once more, the attack on Ukraine and the resulting war highlight the need to know more about the impact of algorithms on access to comparable information. Hence, one might assume that the participants of this study would have looked for information on the war in Ukraine, without being instructed to do so. In short, a reason might be that it is a topic of global interest. The *methodological* approach of this thesis is based on *frame* and *multimodal* analysis. Two international students in two different countries and from distinct nationalities collected screenshots of the first three search results on Google and Brave. The search query that they used was "Ukraine conflict".

Ultimately, this paper wants to contribute relevant knowledge about the possible implications of the *filter bubble* based on a more 'natural' setup. In the end, this thesis aims to add knowledge to the framing of news that potentially influences how users understand situations. Moreover, the potential insights gained in this research are based on a very current topic.

1.4 Problem Formulation

Taking into consideration the above mentioned, the following problem formulation is established: This thesis deals with the implications of the *filter bubble* to unbiased and equal information access for users from different countries. Thus, it investigates how personalisation algorithms on search engines might affect access to information. Consequently, this thesis asks: If any differences are found, what are their possible effects? Can a filter algorithm potentially influence users by framing search results differently? Overall, this paper aims to analyse whether the Internet can provide equal information, even when using filtering algorithms.

This introduction is followed by an in-depth overview of relevant research to provide information about each significant concept. After that, the chosen *methodological* approach

of *multimodal analysis* is discussed and justified in connection with the problem formulation. Subsequently, the data analysis is presented. Ultimately, this paper draws conclusions based on the findings of the analysis and discusses them, all while referring back to the problem formulation.

Chapter 2: Theory Section

The following chapter introduces the reader to relevant concepts in connection to the chosen problem formulation. A critical position is taken that considers the potential disadvantages of the *filter bubble* and *personalisation algorithms* based on existing research. To begin, the most influential sources of this thesis are briefly introduced as well as their main research interests. In the end, the choice to use these papers might have impacted the present study as well. After this, the reader is offered an insight into the diverse concept of the *filter bubble*. This is followed by further relevant notions for this thesis. At the end of this chapter, the reader should have a general understanding of the main concepts to be able to follow why there might be negative implications to the *filter bubble* on the Internet.

2.1 A Brief Introduction of the Main Sources

The following authors are the main sources used for this chapter. These sources can be grouped into researchers and authors from the following areas of interest: Criminology, Social Media and (political) information exchange on the Internet.

Wolfowicz is a PhD who specialises in research on criminology, radicalisation and terrorism (Michael Wolfowicz, 2020). Whittaker also focuses on radicalisation on social media from a criminology point of view (*Joe Whittaker,* 2022). Pariser is an author with a background in organisations focused on connecting people to drive engagement with political topics (Pariser, n.d.). He informs about “democracy, media and the Internet” (Pariser, n.d.). Similarily, Zuiderveen Borgesius et al. focus on political communication online in combination with computer-based systems (Radboud University, n.d; *Damian Trilling*, n.d; *Judith Moeller*, n.d.).

The research group of Kitchens et al. investigates topics around information systems, social networks and online communities (*Peter Gray*, n.d.; *Brent Kitchens*, n.d.; *Steven L. Johnson*, n.d.). Kaluža specialises in critical media studies (*Jernej Kaluža*, n.d.).

Flaxman et al. hire from different research backgrounds: Flaxman specialises in statistics, Goel works in Management Science and Engineering, and Rao is employed as a senior researcher at Microsoft Research (Flaxman et al., 2016).

2.2 Understanding the Concept of the Filter Bubble

To begin, there has been some critique of a missing fixed definition of the *filter bubble*[2] that, despite entering the research sphere more and more, remains too abstract (Wolfowicz et al., 2021). Along these lines, Whittaker et al. (2021) emphasise that every phenomenon needs a clear definition before it can be measured properly to avoid 'concept stretching': He points out that theoretical disorientation resulting from the many potential meanings of the term *filter bubble* might hinder proper research (Whittaker et al., 2021). In line with this, Kitchens et al. (2020) underline the need for "a richer conceptualization of potential outcomes" (p. 1622) of how online platforms possibly influence which content users see and interact with.

Here, alternative denominations of the concept *filter bubble* illustrate the multitude of included meanings: For instance, researchers also talk about differing degrees of 'information blindness' (Haim et al., 2018), 'social fragmentation' (Vaccari et al. 2016), or refer to other concepts such as *selective exposure* (Knobloch-Westerwick & Meng, 2011; Mertens et al., 2019).

In sum, a clear definition is needed for this thesis to ensure high research quality. Even though there is not a common definition, the following is used in the present paper, based on a combination of previous approaches to ensure the broadest coverage possible: *Filter bubbles* are exclusive 'information cosmos' (Pariser, 2011) with predetermined content provided by personalisation algorithms for individuals which may "inadvertently amplify ideological segregation" (Flaxman et al. 2016, p. 299) and, ultimately, separates users instead of uniting them (Kitchens et al., 2020; Kaluža, 2021).

[2] Sometimes in research, the terms *filter bubble* and *echo chambers* are used as synonyms for each other (Bruns, 2021). For this thesis, only *filter bubble* will be used.

2.3 The Choice for Filter Bubble instead of Echo Chambers

At this point, it should be mentioned briefly that the concept of *echo chambers* which is often dealt with in conjunction with the filter bubble was not considered relevant for this study. The reason for this is that the former regards information personalisation as mainly chosen by the user (Wolfowicz et al., 2021; Van Raemdonck, 2019). This paper, however, aims to investigate the possible impact of algorithms, thus decisions made by 'someone else' than the user. Nevertheless, one should acknowledge a presumed interaction effect between *filter bubbles* and echo chambers (Wolfowicz et al., 2021). From this perspective, what is relevant for this thesis is the concept of the *filter bubble.* After all, researchers have claimed that "immersion in an ideological bubble [requires] [...] just a few short clicks" (in O'Callaghan et al., 2014, p. 459). In the following, different related concepts are debated to go more into detail on why considering the *filter bubble* is essential.

2.4 The Foundations of the Filter Bubble

First of all, the term *filter bubble* was established by Pariser (2011). He used it to refer to personalised filtering online, usually "without the user's deliberate choice, input, knowledge or consent" (Zuiderveen Borgesius et al., 2016, p. 3). Therefore, users are not aware that they might miss out on some information or that they are presented with other facts than their peers (Bozdag & van den Hoven, 2015; Resnick, 2013). In line with this, Guess et al. (2018) highlight that personalisation services online could lead to search results that almost imperceptibly vary from what others see, while Cardenal et al. (2019) refer to this automatic selection by machines as "algorithmic curation" (p. 367). From this perspective, one might argue that this potential content selection is problematic due to its hidden functioning: If users are not even aware that they do not have access to the same information, they will be kept from a holistic picture of topics of all kinds.

Also, Cardenal et al. (2019) stress that the user does not have any control over this selection (Cardenal et al., 2019). In other words, users may have the wrong impression of

being in charge of which content enters their screens (Mertens et al., 2019). Again, if people believe that they are responsible for the news and other content that they find online, they might be influenced without even having a choice. In this sense, the filter bubble could take decisions for the user that potentially limits their access to free and unbiased information. A reference to the 1998 movie *The Truman Show* (Weir, 1998) illustrates how problematic this approach might be: Its main character Truman believes that what he has in life is a result of his own choices, from his wife and best friend to the work that he does. However, one day, he finds out that nothing in his life is really 'true' as he is the involuntary main character in a reality show where everything is controlled by someone else. This causes Truman to fall into a crisis and question everything that ever happened to him. Of course, returning to the user on the Internet, their lives might not be as deeply impacted as that of the fictional character of Truman. Nevertheless, secretly taking away some of one's freedom of choice always remains a questionable action.

At this point, one should briefly distinguish a user's choice, *self-selected personalisation*, from the selection made by algorithms, *pre-selected personalisation* (Cardenal et al., 2019). The latter is the one that the *filter bubble* concerns. A reason for the continuous attention that *personalisation algorithms* receive is that they cloud the important distinction between individual choices and those based on automated algorithms (Kaluža, 2021, p. 6).

Following this perspective, Kaluža's (2021) reference to the concept of *habit* provides another valuable distinction: In contrast to one's free and conscious autonomy, *habit* highlights the link between cognitive and emotional activities and intentional as well as automatic operations that one cannot control. Hence, the original idea of *habit* concerns processing patterns in the human brain that connect cues and behaviour, for instance, to predict human actions (Kaluža, 2021). Hence, they can also be seen as actions that are carried out regularly. One example of a non-harmful *habit* is to take off one's shoes after coming home. *Habits* can also become problematic if they limit people in what they can do or

harm them somehow: For instance, a person who bites their fingernails in a stressful situation. Often, this habitual action is carried out without being aware of it.

The concept of *habit* provides a similarity to algorithms: Humans can also adapt their behaviour to contextual factors (Kaluža, 2021). During the pandemic, people got used to wearing masks and disinfecting their hands when entering a store. In addition, the algorithm eventually caters to people's *habits*: To give an example, what users read or watch strengthens their preferences (Nguyen et al., 2014). However, one can also see this potential support of already-existing *habits* as debatable. In the end, metaphorically speaking, if one always eats the same brand of crisps, one might never discover a cheaper one that tastes even better. In other words, keeping users in their loop of habitual content, be it movies on a streaming platform or news on the search result page of Google does not help to provide new and broader content.

Following this line of thought, *selective exposure* is another important notion in media and communication research (Cardenal et al., 2019). According to this idea, humans prefer to "consume media that reinforces their previous beliefs" (Cardenal et al., 2019, p. 366; Guess et al., 2018) while avoiding information that potentially challenges their assumptions (Zuiderveen Borgesius et al., 2016). With regard to the possible effects of the *filter bubble*, Kitchens et al. (2020) propose that even within already filtered results, users tend to stick to the news sources that confirm their beliefs the most.

This consideration leads to the next concept. *Confirmation bias* is defined as "the individual and collective tendency to seek out information that supports preexisting beliefs" (Kitchens et al., 2020, p. 1622). If the users are presented with information that fits what they interacted with before, they might only see content that confirms their beliefs. Here, one can be critical of a possible negative effect of the *filter bubble*.

To sum up, the algorithm might reinforce *habits* and *selective exposure*, ultimately increasing the potential for *confirmation bias* by pre-selecting information for the user.

2.5 Personal Recommendation Systems

Following the previous notions, the concept of the *filter bubble* points out that machine-learning models refer to, for instance, a user's browsing history to determine how and which content platforms display (DeVito 2016; Flaxman et al., 2016). Increasingly, search engines and social media platforms use so-called *personal recommendation systems*[3] that "learn and react to individual users" (DiFranzo & Gloria-Garcia, 2017, p. 34), thus, creating the *filter bubble* in the first place. Based on Pariser (2011), *filter bubbles* emerged in the 'era of personalisation' that began with Google's introduction of personalised search results in 2009 that considered factors such as location or search history (Kaluža, 2021).

Nevertheless, as Whittaker et al. (2021) highlight, investigating technological pre-selection is difficult because companies do not publish exactly how their *filter algorithms* work. This missing transparency of the algorithm's operation has two downsides: Firstly, as mentioned above, the user might unknowingly be influenced. Not knowing which actions to take to easily block algorithmic tracking might make it hard for users to avoid ending up in a possible *filter bubble*. Also, supervision by regulators of online media is hindered by this absence of transparency (Zuiderveen Borgesius et al., 2016). Acknowledging the power of the Internet with its reach across the globe, one could call for stricter investigations of the potential impacts of these *personal recommendation systems.*

What is known though, as hinted at before, is that these *personalisation algorithms* collect and use "social structure data" (Wolfowicz et al., 2021, p. 4). This is, for instance, information about a user's location and language, as well as their browsing history. The *filter algorithm* uses this data to personalise content for individual users (Wolfowicz et al., 2021). Consequently, the user no longer plays an active part in this chain of information display (Kaluža, 2021): pre-selected content on shopping platforms or search results online is decided by *filtering algorithms* (Zuiderveen Borgesius et al., 2016). As a result, user agency

[3] *Personal recommendation systems*, *personalisation algorithms* and *filter algorithms* are used as synonyms in this paper.

might be restricted by the *personalisation algorithm*. Following this thought, one might question whether this personalised content might unconsciously direct one's opinion in a specific direction (Zuiderveen Borgesius et al., 2016). Additionally, the user might 'forget' to critically approach what they see on the Internet by becoming used to their passive role. Here, one can refer back to the previously mentioned concept of *habit*.

At this point, one could also criticise the 'asymmetrical surveillance' online: Big companies keep a record of one's activities online; thus, the *filter algorithms* 'know' how the users 'function', while the consumers are not informed about what exactly leads to the personalised content that they see (Kaluža, 2021). Again, one could consider that this aspect further hampers avoiding a potential *filter bubble* for users.

Taking another perspective now, users still have to 'participate', at least to a certain degree, if they want to receive information on platforms like Google. This participation does not require much activity; they only have to use the services that collect their data. In this sense, user participation becomes part of an 'economic exchange': "digital platforms commodify users' activity by transforming it into data" (Kaluža, 2021, p. 4). Nevertheless, one might ask if this exchange is fair considering its one-sidedness.

In general, *filter algorithms* create personalised content based on three approaches. First, *collaborative filtering* describes that, as previously mentioned, the content that a user has previously engaged with is used (Geschke et al., 2019). Second, *content-based filtering* means that the *filter algorithm* seeks out similar content (Geschke et al., 2019). Last but not least, a combination of both approaches, also known as the *hybrid model* (Geschke et al., 2019) can be used.

Additionally, the *filter algorithms* operate on a technological level. Online platforms like Google and Facebook are a highly competitive environment: They fight for user attention with the aim to keep them on their site for as long as possible to maximise advertising profits (Geschke et al., 2019). To show the right content out of billions of possible information available on the Web, search engines use *filter algorithms* (Cardenal et al., 2019). Ultimately,

these *personalisation algorithms* are designed to maintain user interest, thus, keeping them engaged with the platform (Wolfowicz et al., 2021). Similarly, Seaver (2019) regards the aim of the *filter algorithm* as keeping people 'hooked'; the users must be captivated by content to make them use the service often or for a longer time. The idea is that information tailored to individuals leads to a higher engagement rate (Geschke et al., 2019). Notably, this personalised content stems from "proprietary, nontransparent automatic algorithms" (Geschke et al., 2019, p. 133).

In sum, the *personal recommendation systems* work in a non-transparent way which makes it difficult to control and avoid them. Even more since the *filter algorithms* use one's data, it might be time to call for stricter regulation of these algorithms.

2.6 Challenging the Idea of a Neutral Algorithm

Based on what has been discussed so far, one should challenge the idea of the 'neutral' algorithm that works independently from any human interference. Nechushtai and Lewis (2019) question whether personal recommendation systems are the only element driving these "patterns of prioritization" (p. 302). In the end, one could argue that algorithms that base their content selection on, for instance, the evaluation of personal relevance for each user, are anything but neutral (Kaluža, 2021). Finally, one can doubt if the display of certain content is pure coincidence (Wolfowicz et al., 2021): Even if the user does not intend to trigger a potential *filter bubble*, they might do so unknowingly just by using certain platforms like Facebook or Google.

Acknowledging that surveys and experimental studies tend to find proof of *confirmation bias* in selecting information (Cardenal et al., 2019), one could suspect that this bias also applies to the *personal recommendation systems*. As previously mentioned, they are built by humans and, after all, pre-existing beliefs influence the process of information selection (Zuiderveen Borgesius et al., 2016). Certainly, if *filter algorithms* are based on human decisions, one should question the potential 'moral' responsibility of *filter algorithms*

for the effects of their operations (Kaluža, 2021). Instead, one might turn to the developers and decision-makers behind these *personalisation algorithms* in the search for accountability.

2.7 Separating Users into their Own 'Bubbles'

Geschke et al. (2019) focus on the exclusive results brought about by the *personal recommendation systems*: Among others, how people search for information and what they select as relevant has an impact on the search page results. Following this line of thought, the *filter bubble* includes a technical selection process online that might block the availability of diverse content and potentially leads to homophily (Wolfowicz et al., 2021). A reason for this emerging restricted information is that users in a *filter bubble* do not see challenging information that might stimulate new considerations (Min & Wohn, 2020). Ultimately, the user no longer has access to "the [whole] universe of available information" (Geschke et al., 2019, p. 130). Instead, they only see a limited selection tailored to their previous history.

In the end, this means that users are separated from the general 'universe' by being locked in their own (Zuiderveen Borgesius et al., 2016; DeVito 2016). Hence, the algorithm might lead to *selective exposure*. Therefore, content consumed online could keep users from sharing the experience of "free-flowing information" (Kitchens et al., 2020, p. 1619). Consequently, the result of the *filter bubble* is an environment that hardly changes (Nguyen et al., 2014). Ultimately, this could reinforce users' beliefs while reducing their ability to learn and be creative (Zuiderveen Borgesius et al., 2016). This ability, however, impacts what Pariser (2011) considers the "root of human intelligence" (in Nguyen et al., 2014, p. 678), namely, the capacity to adapt to new information. Pariser (2011) points out that for a successful democracy, people must come into contact with different viewpoints. When one is stuck in their bubble, they will lack this contrasting view of the world needed for 'cross-referencing' (van den Bulck & Moe, 2017). Kaluža (2021) argues that *filter bubbles* are problematic as they undermine the necessary exchange of opposing and critical

arguments. In the end, advances in technology and the switch to mainly consuming news content based on these algorithms may prove a challenge for democracy (Zuiderveen Borgesius et al., 2016).

Following this perspective, Bruns (2021) regards the *filter bubble* as a metaphor that describes how fragmented and isolated information may lead to social fragmentation. Even though people might expect to grow closer with the Internet, scientists question if *filter algorithms* could break the 'global village' into separate tribes (Nguyen et al., 2014). According to Min and Wohn (2020), the *filter bubble* may be a threat to democracy as users become stuck in a 'cosmos' that hides contrasting arguments. Ultimately, this concealment may foster disinformation and potentially increases political polarisation in society (Kaluža, 2021; Min & Wohn, 2020).

In line with this, Pariser (2011) argues that online companies create 'artificial polarisation' by selecting content based on one's previous interests. Polarisation is a phenomenon that includes both static and dynamic processes at three levels: the individual, the group and the whole population (Kitchens et al., 2020). Ultimately, one may find a potential for a polarised public in *personal recommender systems* that "favour news items framing events in a perspective close to the reader's point of view" (Zuiderveen Borgesius et al., 2016, p. 9). Notably, the frequent exposure to a constant information frame may strengthen framing effects that influence one's perception (Zuiderveen Borgesius et al., 2016).

Here, the algorithm takes the position of a "confirmatory communication partner" (Cho et a., 2020, p. 167). Some research found that, as a consequence, the *filter bubble* may strengthen attitudes to a point where they become 'solid': in the end, these opinions are difficult to change, even when one sees conflicting information (van Raemdonck, 2019, Resnick et al., 2013). Naturally, if one views only information in line with what they already believe, they miss out on content able to challenge these beliefs (van Raemdonck, 2019). In

the end, people's preference for information that aligns with their already existing beliefs is supported by personalisation systems (Cardenal et al., 2019).

To sum up, the *filter algorithm* might separate users online and has the potential to push political polarisation based on *selective exposure* and *confirmation bias*.

2.8 Evaluating the Need for Filter Algorithms

On the one hand, some arguments might prove that *filter algorithms* are not as bad as they may seem. Supporters of the technological pre-selection of information stress that *personalisation algorithms* adjust to individual interests, unlike traditional news editors that have to serve common interests (Kaluža, 2021). In other words: "algorithms are here to serve 'you'" (Kaluža, 2021, p. 4). Moreover, some researchers argue that *filter algorithms* are superior to the content selected by users: While being flexible to dynamic user interests, *personal recommendation systems* can take into account patterns in behaviour that the user is not even aware of, in contrast to one's self-selection (Kaluža, 2021). For instance, the user might not realise that they tend to visit one news platform more than others. However, the algorithm potentially notices this and might facilitate finding content from this site for the user.

Besides, it has also been argued that *personalisation algorithms* do not limit one's choices: basically, users will probably not search for content they are not aware of. In line with this, as discussed before, users might depend on a certain degree of pre-selection. Every day, they are confronted with personal messages and an estimated 4,000 to 10,000 marketing messages (Simpson, 2022). Without some filtering, it would be harder to keep up with the news. Or, as Bruns (2021) puts it: "some degree of personalisation [...] may in fact be desirable, and beneficial to their ability to realise their full potential as an informed citizen" (p. 4). Following this idea, *filter algorithms* and personalised results might facilitate decisions about which content to consume (Nguyen et al., 2014).

On the other hand, one can question whether the negative implications of filtering information might outweigh the positives. Offering only content that fits one's previous interests or beliefs (DiFranzo & Gloria-Garcia, 2017) may have grave consequences. According to Pariser (2011), the most obvious argument against the *filter bubble* is that the user loses access to all available information. An argument that is supported by researchers such as Nechushtai and Lewis (2019). Despite the considerable amount of information to choose from, people still should not be limited in their choices. One might argue that selecting content is necessary to keep users engaged and maintain critical reflections.

Also, one should challenge the controversial idea that *personal recommendation systems* are better at choosing the right content than the users themselves (Kaluža, 2021). Although people tend to choose the information supports their beliefs[4], due to the Internet and social media, this *selective exposure* has now reached a worrying "unprecedented degree" (Min & Wohn, 2020, p. 24). In less than 20 years, systems based on *personalisation algorithms* have become omnipresent on the Web (Nguyen et al., 2014, p. 677). Considering this, one could argue that personalised results have negative implications as they further support the *confirmation bias* (Kitchens et al., 2020, p. 1621). Also, the idea of freedom of choice should also not be neglected on the Internet. In everyday life, apart from some rules, no one really makes decisions for the average, healthy adult. As a result, one could question the need to do so on the Web.

The possible negative implications of the *filter bubble* have also already alarmed the Council of Europe in 2012: It stressed that the algorithmic selection of information on search engines may impact information diversity as well as the access to equal information.

Summarising this perspective, one of the main characteristics of *filter algorithms* is that they increase confirmation bias by using technology to restrict access to diverse information. In the end, this migth potentaially result in a fragmented society that is "manipulated by algorithms [...] and hostile to dialogue" (Pariser 2011, p. 91).

[4] A concept that is also known as *confirmation bias* (Kitchens et al., 2020; Cardenal et al., 2019; Guess et al., 2018; Zuiderveen Borgesius et al., 2016).

2.9 Personalised Search Results and News Distribution Online

It is often claimed that *personal recommendation services* have taken over the news selection process previously done by editors and journalists (Kaluža, 2021). Nowadays, algorithms can be regarded as more prominent in news selection than human editors, especially for young users that access the Internet via their phones: Nechushtai and Lewis (2019) found that more than 54% of users around the world prefer news presented on, for instance, search engines. Importantly, these platforms are based on filter algorithms.

Consequently, one may consider traditional broadcast media less influential regarding which information their readers see. Instead, *personalisation algorithms* have taken this power (Resnick, 2013). Of course, editorial selection or traditional 'gatekeeping' has not been erased (Nechushtai & Lewis, 2019). Nevertheless, online news breaks with previous "arrangements of prioritisation" (Nechushtai & Lewis, 2019, p. 299), meaning that the news hierarchy has changed.

As a consequence, this results in a change in human-machine interaction. Conclusively, online news transformed the process of news display, dissemination and interpretation (Kaluža, 2021; Nechushtai & Lewis, 2019). News editors no longer have "opinion power" (Kaluža, 2021, p. 4). Acknowledging this lost authority over the forming of public and individual opinions, one finds that those in control of the algorithm probably continue to gain influence. Especially considering that nowadays, the majority of people prefer online news over, for example, print media (Cardenal et al., 2019).

The power of online platforms becomes apparent when considering the number of users they attract: About 60% of traffic to news websites now comes from platforms like Meta and Google (Nechushtai & Lewis, 2019). In addition to looking up information, users now also increasingly turn to search engines like Google to access news (Cardenal et al., 2019). In America, 81% of the population uses online platforms to access news (Min & Wohn, 2020). Accordingly, one can regard these companies as a monopoly in control of most news and advertising online (Nechushtai & Lewis, 2019). Also, these platforms change

the dissemination of news in an unparalleled way because they work “across a seemingly limitless number of devices, feeds, apps, and social contexts” (Nechushtai & Lewis, 2019, p. 300).

Flaxman et al. (2016) define four channels that can lead to a user discovering a news story: Direct, aggregator, social and search. In the context of this paper, search is the most relevant one. This category includes all channels via which a user accesses news stories resulting from their online queries on search engines (Flaxman et al., 2016).

In sum, digital technologies have become powerful ‘curators’ of the information who decide which news is shown (Cardenal et al., 2019; Nechushtai & Lewis, 2019). This means that they can be seen as *gatekeepers* in control over content prioritisation based on user data (Nechushtai & Lewis, 2019). Ultimately, filter algorithms can allow access to certain content while hiding others or prioritising information with the order of headlines at the top of the search results page.

At this point, one should remember the role of media “to provide equal access to their channels for all people and all ideas in society” (Bozdag & van den Hoven, 2015, p. 260). However, it was found that the newsfeed algorithm of Meta, for example, determines the order of posts which has a considerable impact on what users read (DiFranzo & Gloria-Garcia, 2017). In the end, one can claim that the same applies to the search results page: The higher the placement, especially on the first search result page, the better the expected interaction with the user. Here, the algorithm’s power of steering user’s attention to specific content becomes apparent.

Still, online platforms often do not acknowledge their editorial role and refuse the label ‘news platform’, thus, neglecting their part in the promotion of diverse content with their algorithms (Bozdag & van den Hoven, 2015). However, the information provided by companies such as Google has become an influential news source (Bozdag & van den Hoven, 2015). Accordingly, one may follow researchers such as Bozdag and van den Hoven (2015) and call for these platforms to take accountability and offer more diverse content.

Also, despite a habit of regulating *gatekeepers* in media law, new *gatekeepers* such as search engines pose a challenge: They cannot be classified as a traditional gatekeeper because of their algorithmic operations, as well as the extent of information and influence that they potentially have on the users and which content they see (Zuiderveen Borgesius et al., 2016). In the end, one may also question if the comparison between human behaviour and algorithms is the best approach (Nechushtai & Lewis, 2019). Likewise, Nechushtai and Lewis (2019) emphasise that the order of the display of news is a "moral question, a matter of normative import" (p. 299). This is due to two factors: First, determining *what* content is displayed in which order can affect user attention (Nechushtai & Lewis, 201ß). Second, news prioritisation once was a human consideration and not determined by algorithms (Nechushtai & Lewis, 2019). Finally, it may be difficult to characterise the ethical significance of algorithms in online news (Nechushtai & Lewis, 2019).

Further, Nechushtai and Lewis (2019) question how to decide which "visions of the public and of public life" (p. 304) the recommender systems should represent and support. At this point, the concept of *fake news* should be discussed briefly. In 2018, The World Economic Forum considered digital misinformation one of the biggest threats to present-day civilisation (World Economic Forum, 2018). Misinformation is not only divergent content but also untrue information, also known as *fake news*. *Fake news* is defined as untrue news stories that are presented and distributed as true ones (DiFranzo & Gloria-Garcia, 2017, p. 34). The distribution of *fake news* might be facilitated and amplified by the *filter bubble*: Studies have found the dissemination of *fake news* to be comparable to epidemics as these false stories stay within one specific group and usually do not reach others (DiFranzo & Gloria-Garcia, 2017). For example, live streams on TikTok about the war in Ukraine went viral at the beginning of the war: They received millions of views within a very short time and used old footage to report on supposed new developments (Sardarizadeh, 2022). Nevertheless, this thesis focuses on misinformation as dissimilar data and not on the intended spread of false information. Hence, the concept of *fake news* will thus not be

treated further in this theory section, although it might come up again in the discussion or conclusion.

To conclude this sub-section, one might say that *personalised recommender systems* now dominate influential communication channels: they frame search results by deciding which content users see and how it is displayed (Nechushtai & Lewis, 2019). In the end, this 'shielding' from all available information on the Internet is a reason for concern (Kitchens et al., 2020).

This chapter presented the reader with essential background knowledge about the most relevant concepts to be prepared for the upcoming chapters. All in all, the need for further investigations of the *filter bubble* based on a critical review of previous research has been highlighted. In the following, the *methodological* approach of this thesis will be outlined to pave the way for the analysis.

Chapter 3: Methodology

In the following chapter, the *ontological* and *epistemological* approaches of this thesis will be presented. Also, the *methods* for the data collection and analysis will be explained. Finally, the present paper's ethical considerations and possible limitations will round up this *methodological* chapter. Overall, this part of the thesis aims to prepare the reader for the following analysis as well as to offer insight into why certain *methods* and *methodologies* were chosen.

Before I outline relevant *epistemological* and ontological *considerations*, I would like to briefly point out the difference between *methods* and *methodology*. *Methods* are a study's techniques based on the chosen research approach (Chakraborty, 2019). The *methodology* involves judging those *methods* (Chakraborty, 2019) and their ability to collect credible information (Rawnsley, 1998) based on the study's framework. Thus, the *methodology* describes how one organises knowledge; it refers to how society knows something and how this knowledge is gathered from theories (Chakraborty, 2019).

Naturally, one must remember that no one 'best' method or methodology fits all research. Depending on the focus, one needs different techniques. Also, the understanding gained from a mix of different *methods* seems to offer more insight than the one based on isolated *methods* (Chakraborty, 2019). The present thesis employs mixed *methods* in the data collection and analysis, as will be explained later on in this chapter.

Moreover, Chakraborty (2019) stresses that the definition of every theory requires a *paradigm*. A *paradigm* consists of combined beliefs about what is and how one should approach investigations of these ideas as well as possible changes and interactions Chakraborty (2019). Thus, one can identify a *paradigm* using certain *epistemological* and *ontological* approaches. After all, to describe and analyse reality, one must consider the underlying concepts. As will be shown in the following paragraphs, consequently, for the

present paper, one must carefully consider the display of the first search result page and its influence on the construction of meaning.

3.1 Ontology and Epistemology

To begin, Smith (2003) defines *ontology* as “the science of what is, of the kinds and structures of objects, properties, events, processes, and relations in every area of reality” (p. 155). In this sense, it deals with how people view reality (Bryman, 2016; Rawnsley, 1998). Consequently, *ontology* uncovers how society constructs experiences of reality and if these experiences exist independently. For this thesis, the most appropriate *ontological* position is a combination of two *methods*, *constructivism* and *interpretivism* as qualitative research approaches tend to apply both methods (Chakraborty, 2019). This claim is further supported by Goertz and Mahoney (2012), who establish that studies using *qualitative ontology* tend to determine features that result in a specific meaning of a concept. The present thesis considers *filter algorithms* and their possible influence on the perception of participants about the war in Ukraine. Thus, it investigates the interaction of different elements, how they may be interpreted and which meaning could be constructed.

In *constructivism*, a phenomenon can never exist independently. Instead, “collective human action, thought, discourse, or other social practices” (Kaldis, 2013, p. 895) come together to construct social facts that impact one’s daily experience and reality (Bryman, 2016). In this sense, people and their actions are never independent or completely free since “human beings act in and through structures and systems” (Kaldis, 2013, p. 501). Both *interpretivism* and *constructivism* recognise that social actors constantly produce ideas about the world as well as social behaviours and actions (Bryman, 2016). Hence, for this thesis, one can consider the potential influence of the *filter bubble* on society and people’s experiences. Here, the potential focus on certain information might have an effect on the system that influences one’s actions. If people are found to see different content, this system may be destabilised.

Moreover, because language and its structures are never fixed, meanings can change through discussions about public interests (Kaldis, 2013). These interests, in turn, can also be altered in the same conversation by negotiating and renegotiating experiences and interests (Bryman, 2016; Kaldis, 2013). In sum, meaning-making is a continuous process. Hence, one should refer to terms such as 'construction' to talk about it to properly its fluidness. The same applies to the search result pages: their content may change after some time or even when merely changing the search query from singular to plural.

In addition, social reality originates from human-made 'objects' and repeated actions (Kaldis, 2013). In other words, people construct their reality based on social experience that is assumed to share at least some similarities among different individuals (Bryman, 2016). Here, one may question if possible differences in search results may hinder this assumption of comparable understandings. Reality as a social composition is "structured according to the categories of [a] particular discourse" (Kaldis, 2013, p. 896) that language arbitrarily generated. It follows, that society and the subject as concepts are always interdependent; thus, must be conceptualised in combination with each other (Kaldis, 2013).

To sum up, one's perception of meanings and reality is subjective and can always change. In the end, meanings motivate how people in a society act; thus, one can never separate those actors from their social knowledge.

This consideration leads to the *interpretivist* position of this paper: It recognises that the researcher as part of this socially-constructed multitude of realities is never fully objective (Chakraborty, 2019; Bryman, 2016; Denzin & Ryan, 2007). Sometimes, this position is also described as *intersubjectivity*. It acknowledges that each step of the investigation, from creating a framework to carrying out the analysis, is influenced by "the personal biography of the gendered [multi-culturally situated] researcher" (Denzin & Ryan, 2007, p. 560). In other words, apart from political and ethical influences, the most important impact to consider is the researcher's personal background which affects their perspective during an investigation. Accordingly, this thesis acknowledges that studying the earlier-mentioned phenomena

results in value-bound research. In the end, the subjective researcher cannot separate herself from the research topic.

Epistemology in social science refers to the source and structure (Rawnsley, 1998) as well as the "nature and scope of knowledge" (Kaldis, 2013, p. 263). Also, it shows how to approach this knowledge by evaluating whether conclusions are sufficiently legitimised (Rawnsley, 1998). In brief, *epistemology* describes what knowledge is and how to obtain and justify it. Considering that this thesis aims to understand and evaluate the possible impact of the *filter bubble* on information flow, *interpretivism* and *hermeneutics* were chosen as *epistemological* positions.

As discussed before, if social agents continuously produce new beliefs about their surroundings and other people, the meaning assigned to concepts is fluid. This becomes essential in the moment of doing research as these meanings may also change during the analysis. Again, this also means that the concepts and meanings discussed in this thesis are value-bound. Hence, one must also pay attention to these interactions and influences during the data collection and analysis. If not, the conclusions that one draws can be questioned. For the present paper, the search result pages may affect the user's perception, hence, their beliefs about events in the war in Ukraine.

In addition, one cannot study social phenomena with *methods* from the natural sciences (Bryman, 2016). Indeed, when human action is the focal point, one requires more adequate theories and interpretations (Bryman, 2016). Here, *hermeneutics* becomes useful. This field of study draws on theories to interpret human actions through applied theory and *methods* (Bryman, 2016). Dowling (2004) presents *hermeneutics* as an 'art of interpretation'. In line with the previously mentioned, language is a crucial point of investigation as it "provides both understanding and knowledge" (Dowling, 2004, p. 30) of social actors and their realities. The present study will interpret, for example, the language used in the search results during the analysis to ensure a well-justified *epistemological* stance. Furthermore, as

Rennie (2012) points out, in *hermeneutics* one repeatedly applies certain logic during the study of various concepts. During the upcoming analysis of the search results, *frame* and *multimodal* analysis are used continuously to interpret those search results.

3.1.1 Interdisciplinarity and Rationality

At this point, *interdisciplinarity* should also be mentioned. It entails different ways to organise knowledge from various fields of study. Even though there might be knowledge from distinct disciplines, an *interdisciplinary* approach tries to combine those different knowledge categories (Kaldis, 2013). After all, and in line with the *methodological* approach of this paper, humans and their experiences and perception are not independent of others. Hence, the analysis of knowledge should use a blended approach. Last but not least, an *interdisciplinary* position also underscores one's attention to "the relation between knowledge production and its use" (Kaldis, 2013, p. 497).

Following this consideration, this paper also recognises the impossibility to determine one 'best' reality (Chakraborty, 2019, p. 37). If multiple realities exist and are always subjective, one can never decide which version is the most adequate. In this regard, this thesis also applies the concept of *rationality*: One's knowledge can never be complete as multiple realities exist and shared knowledge can emerge spontaneously. Once more, this illustrates how the *filter bubble* may further complicate the situation: If different search results are found, one might question how people could know which facts are true. Additionally, this potential for access to different knowledge might increase one's subjective reality even more.

3.1.2 Inductive, Deductive and Iterative Logic

Considering the logic used for this research, there will be a mix of *induction*, *deduction* and *iterative* logic. Firstly, *inductive* logic helps to systematically structure qualitative data for a reliable and valid analysis (Thomas, 2006). To be precise, *inductive* logic helps prepare the data for the investigation: It structures the data by enabling the researcher to develop a framework connected with the study's aim (Thomas, 2006): For

example, one can look for patterns in the collected data. In the present case, the framework is based on identifying patterns in the search results by interpreting the data. Also, there are elements of *deduction* in this paper. *Deduction* describes using assumptions or theories to conclude something, either by falsifying or confirming them (Bryman, 2016; Kaldis, 2013; Thomas, 2006). This study assumes that the *filter bubble* leads to different search page results for each participant. This assumption will either be supported or refuted by the results of the data analysis. Lastly, the analysis applies *iterative* logic. As explained by Lemke (2002): In a *multimodal* analysis, attention continuously moves through various elements in the data on "different pathways" (p. 305) until a first interpretation arises. Next, this interpretation is tested by circling back and forth until all available options have been considered (Lemke, 2002). For this paper, this means that the interpretation might change during the analysis or, in the end, there could be different interpretations regarding the effect of the *filter bubble*.

To conclude, the problem formulation and previously-discussed literature already highlighted that a subjective research approach fits best. If the *filter bubble* keeps people in their own 'world', then, logically, every part of knowledge one obtaines is subjective. Hence, this study combines *interpretivism* and *constructivism*. Ultimately, this fusion acknowledges that social phenomena are based on perceptions that can vary and change. In other words, this paper acknowledges the possibility of simultaneously having multiple versions of reality that stem from, for example, distinct perspectives caused by paying attention to different significances. Additionally, the moment-by-moment determination of meanings is important for this paper. Actors create knowledge in local and diverse contexts and based on how they define a situation. Hence, the researcher must interpret these actions by looking at which meaning people ascribe to what happens. In the end, this is also why this thesis aims to uncover whether there are different search results for the same search query. These differences, if

found, could lead to different perspectives and, ultimately, might further complicate the complex construction of possible realities.

3.2 Data Collection

3.2.1 Qualitative Approaches

As mentioned above, for this thesis, a *qualitative* approach was chosen. It has sometimes been claimed that *qualitative methods* are 'better' as they can uncover subtle details that depend on contexts (Chakraborty, 2019). The choice of using *qualitative methods* was also influenced by acknowledging that the actions of social agents cannot simply be quantified. In this sense, as human behaviour is a combination of many influences, such as psychology, not only collected events of the past influence subject history but the present is also impacted by "its underlying explanations on the basis of materialistic and ideological conflicts amongst others" (Raychaudhuri, 2019, p. 270).

Furthermore, considering the multitude of possible search results to be found on the Internet, *qualitative methods* seem most appropriate to investigate, for instance, contextual influences. *Qualitative* investigations require the use of multiple *methods* as well as an *interpretive* approach (Denzin & Ryan, 2007). Ultimately, by using mixed *methods* within the *qualitative* approach, one can explore rather than seek confirmation (Denzin & Ryan, 2007). This thesis uses mixed *methods*, especially for the analysis of the collected data.

In sum, a *qualitative* approach seemed most appropriate for this thesis as it allows one to investigate concepts that one cannot easily quantify. Also, one should remember that everyone has a past that influences their present and perceptions of actions. In this paper, it is acknowledged that, following the function of the *filter bubble*, one's browsing history may influence online searches. Further, as the aim of *qualitative* techniques is to offer a deep understanding of a more limited group instead of a larger sample, this paper focuses on discovering a possible pattern of information distribution and filtering among two participants. The goal is to offer a descriptive overview, not a prediction or statistical confirmation, in line

with most *qualitative* research positions. Additionally, this paper intends to offer a first insight into how meaning is derived from contextual factors, in this case, online searches. Further, this thesis hints at how these different meanings that might arise could potentially impact a user's behaviour and perception.

3.2.2 Experiment

Following previously-done research by the same author (Holten, 2022), this thesis uses an experiment to collect data. In connection to the above-mentioned, using *qualitative* research involves studying actions in a natural context (Chakraborty, 2019; Denzin & Ryan, 2007), usually by turning to observational studies. This is why an experiment, to be precise, a quasi-experimental approach (Cadena-Iñiguez et al., 2017), was chosen for this thesis: though the selection of participants is not random, the independent variables are manipulated. A 'real' experiment would use random assignment of groups to ensure similarity (Cadena-Iñiguez et al., 2017).

The set-up of an experiment allows an understanding of phenomena in a natural context by investigating a causal relationship between different variables (Schneider, 2007). Overall, the goal of an experiment is to find and measure a variable that is of relevance to the chosen research. Hence, one manipulates one or more *independent* variables to see if this results in a measurable change in the *dependent* variable. Thus, the *dependent* variable is also known as "the outcome measure of interest" (Schneider, 2007, p. 172). The assumption is that if one observes a change, this change must have been caused by the manipulation of the *independent* variable.

The *independent* variables in this study are the two distinct search engines used as well as the location of the participants. The *dependent* variable includes the top three search results for the query on the first page. Moreover, this thesis uses a small sample to carry out an in-depth *qualitative* analysis. This approach is notably supported by the chosen research position.

Also, an experiment should aim for internal *validity* or, put differently: the certainty that the obtained results are adequate and can be used confidently to explain the established relationship between the variables (Cadena-Iñiguez et al., 2017). Two values that require thorough attention in an experiment are *replicability* and *robustness*: The former describes that other researchers following the same steps should get similar results; and the latter defines that one should "obtain the same measures using different measurement techniques" (Kaldis, 2013, p. 324). For this study, a detailed list of instructions was sent to the participants to ensure that the data collected would be comparable. Also, acknowledging that the war was ongoing, it was ensured that both data sets were collected within a timeframe of two hours. Thus, it can be argued that the data is also comparable in its collection time.

In addition, one should keep in mind that every research, including the design and data collection, is influenced by what Schneider (2007) describes as 'reference dependence'. In brief, each study's approach and focal point might impact its results. All in all, each choice that one makes as a researcher affects participants' answers and, ultimately, the conclusions drawn(Schneider, 2007.

To sum up, a different focus could bring about distinct findings. In the present case, the choice to use "conflict" and not "war" in the search query potentially influences the research. This decision was taken following an initial check. For the query with "war", there were about 4.080.000.000 results, for "conflict", 4.060.000.000. Hence, it was decided to use the more generic term to keep the search results for the participants as broad as possible. In addition, by focusing on one topic this research also highlights one event and neglects others, such as other conflicts. As a result, this study's approach and focal point might have impacted its results.

3.2.3 The set-up of the experiment

The experiment works as follows: Two users in two different locations first carry out a query on Google and then switch to another browser, Brave. With this second browser that does not use any private data (Brave Software, 2022b), they repeat the same search query. For this paper, the participants were instructed to take a screenshot of the first three search results for the two separate queries. A detailed list of instructions as well as information about the use of personal data provided to the participants can be found in the appendix (appendix A). The data was collected on April 29, 2022.

The participants were recruited by the author of this paper based on convenience. There was no randomisation in selection. The following requirements for selection were used: they had to be international students following a study programme in English; and they had to be in different countries at the time of the experiment.

The two participants are females. The first participant is a 24-year-old from Italy. She studies for a Master's degree at a university in Denmark. She had heard about the filter bubble before and regarding her measures to block it, she mentioned: "*It depends. Sometimes it is indeed ok to be influenced by my browsing history for instance when I am doing intense research on one topic. However, some other times I try to block it by opening an Incognito window".* The first participant's computer is set to English and Italian, she uses Google mainly in these two languages, as well as occasionally in French. Lastly, she indicated that Google did not have access to her location.

The second participant is a Serbian national living in Denmark. She is 27 and studies a Master at a Danish university. Further, she had also heard about the filter bubble before the experiment. Considering which measures she uses to block it, she wrote: "*Unfortunately not as many as I should and would like to. However, I do use incognito window on Google Chrome, sometimes Bing browser (bing.com). Apart from that, I regularly delete cookies, history (in case that I haven't used the incognito window), and I never save passwords of any of my accounts whether it is on Google or other apps.*". The second participant's computer is

set to English but also uses various other keyboards: Danish and Serbian (Latin and Cyrillic keyboards). She uses Google in English and Danish, sometimes she also uses Serbian and rarely Croatian. Lastly, Google had access to her location in Denmark.

3.3 Data Analysis: A combination of Frame and Multimodal Analysis

The present study applies *interpretive* techniques by considering both visual and other discursive elements (Denzin & Ryan, 2007) in its data analysis. For this, a combination of *frame* and *multimodal* analysis discourse is used.

3.3.1 Frame Analysis

Frame analysis must always consider the frame itself, its structure and what exactly is being framed (Kress, 2009). Important at this point is that there can be multiple *frames* (Vliegenthart & Van Zoonen, 2011).

A *frame* is a foundation based on which elements are highlighted and presented in communicative settings to popularise some subjective opinions or judgements (Vliegenthart & Van Zoonen, 2011. Goffman (1986) defines *frames* as specific, circumstantial explanations that govern what happens in a situation as well as individuals' perceptions of these actions. As such, a *frame* can be seen as a schema for interpretation used to understand the situational meanings or perceptions (Persson, 2018). In the end, even "a framed nothing is more than nothing" (Persson, 2018, p. 52). For instance, saying **there are two kids playing outside that are completely immersed in a game** without any kind of *frame* allows for many different interpretations. However, notice how a description like **there were dark grey clouds in the sky, the wind was getting stronger and thunder was rolling** changes the interpretation. The first description probably leads one to imagine the kids peacefully playing in the sunshine. The *frame* changes this interpretation and makes the situation seem dark, possibly even dangerous. Hence, the arrangement of elements within a *frame* directs attention to specific items within this composition (Kress, 2009) and, in the end, changes

one's interpretation. To sum up, *framing* means trying to promote certain interpretations of subjectively perceived reality by emphasising specific content.

At this point, it becomes obvious that *framing* entails intentionality; someone has a goal in mind when making certain items more salient than others (Persson, 2018; Vliegenthart & Van Zoonen, 2011). In this sense, the use of *frames* to push individual interests and control actions by influencing others' perceptions of a situation becomes important. As such, *frames* stem from a complicated and contextualised way of articulating "a particular issue, popular wisdom, experiential knowledge and media discourse" (Vliegenthart & Van Zoonen, 2011, p. 104). Hence, *frames* highlight specific details about events, reality and other important information. Vliegenthart and Van Zoonen (2011) consider *frames* as belonging to "a struggle for meaning" (p.105) for actors with unbalanced access to resources, both symbolic and material. One may think about how the *filter bubble* might increase inequal information access on the Internet not only by potentially showing different content but also with the arrangement of it.

Consequently, one should keep in mind that *frames* exist everywhere, both in communication as well as in one's head (Scheff, 2005), they span from the culture in which one grows up to the language one uses, "with profound ontological effects" (Kress, 2009, p. 154). Especially discrepancies in the meaning of acts are of interest for *frame* analysis: One can uncover differences in (inter)actions that seemingly share the same meaning (Persson, 2018). It is important to keep in mind that *frames* "are only a part of a still larger structure, the definition of a situation" (Scheff, 2005, p. 370). Ultimately, how one defines each situation is subjective, thus, *frames* belong to this subjective arrangement. These considerations support, once again, the *epistemological* and *ontological* position of this paper.

As meanings are constructed in different contexts and interactions, analysing the *frames* used in these interactions is crucial to understanding why certain information is considered irrelevant or relevant, for example (Vliegenthart & Van Zoonen, 2011). To do so,

frame analysis uses *deductive* means as well as theories and *frames* that have been operationalised (Vliegenthart & Van Zoonen, 2011).

To finish this sub-section, a *frame* restricts the meaning that one can derive from content and impacts peoples' perception of the world. Some research considers social interactions between different media and political actors as the reason for *framing* (Vliegenthart & Van Zoonen, 2011). Nevertheless, apart from the journalist or editor of a news outlet, a second agent influences news *frames*: News sources (Vliegenthart & Van Zoonen, 2011). Much research has focused on how these news sources use *framing* to amplify their power (Vliegenthart & Van Zoonen, 2011).

This paper will not as much focus on power relations but on the assumed impact of offering personalised information that creates distinct *frames*. Still, in line with research trends, *framing* is considered a series of processes happening between different interactors, in this case, between the search engine and the participants. In addition, this study will focus on the possible effects of *framing* on the search result pages. In this sense, the aim is to shift from an individualist approach to one that takes into account "the active multimedia culture in which citizens nowadays operate and compile their political information" (Vliegenthart & van Zoonen, 2011, p. 111).

3.3.2 Multimodal Analysis

To discover a possible *framing* of search results collected by the two participants, *multimodal analysis*[5] will be applied. To begin, the need to consider *multimodal* communication is highlighted by establishing some basic notions about this ambiguous concept involving both talk and text from various social interactions (Kaldis, 2013):

1. Communication includes both written and spoken language, including "various other communicative media" (Lynch, 2007, p 500).
2. Also, communication is more than sentences; it also includes bigger constructs such as narratives and stories (Lynch, 2007).

[5] Also called *multimodal analysis* and *multimodal semiotics* in this paper (following O'Halloran, 2011)

3. Finally, communication always involves some action, reaction and interaction, even in the analysis of 'frozen' textual dialogues.

In sum, communication is language in use: It entails communicative acts in a 'natural context'; hence, in social interactions (Lynch, 2007). As a consequence, language and context are inseparable and must always be analysed jointly.

Nowadays, communication is increasingly *multimodal*: Verbal elements are combined with sounds, images and other elements (Kaldis, 2013). Therefore, the analysis of communication must also consider the influence of the Internet and computers (Kaldis, 2013; O'Halloran, 2011). In this regard, one can see communication as a material and dialogical expression "embodied in media [...] [and] localized in a public space between people" (Lynch, 2007, p. 506). Hence, for this thesis, *multimodal* analysis was chosen for data analysis to acknowledge the interplay of different resources such as language and images in different media, "including contemporary interactive digital technologies" (O'Halloran, 2011, p. 121). Also, *multimodal semiotics* recognises shifts in meanings, depending on contexts and practices (O'Halloran, 2011).

In general, *multimodal analysis* works best when one allows elements to arise during the data collection and analysis to "grasp the relevant context in which [these] elements, no less than holistic actions, are situated" (Lynch, 2007, p. 502). In this sense, one can view communication as a collage in which elements interact with anyone trying to order them (Lynch, 2007). During the analysis, the researcher can establish certain communicative *modes* and investigate their impact on communication (Norris, 2004; 2006). All in all, the above-mentioned considerations further support the *methodology* and *method* of this paper: Meaning-making is interactional, subjective and influenced, for example, by one's culture or merely the facts that one is presented with. In the following paragraphs, *mode, modality* and *hypermodality* as part of *multimodal semiotics* will be explained.

I. Mode

According to Scollon and LeVine (2004), communication always employs plenty of *modes*. People are accustomed to creating co-dependent meanings and tend to consider all *modes* in a communicative event as a whole, even when they are not directly linked (Lemke, 2009). *Modes*[6] consist of a group of resources, such as written and spoken language and images (Norris, 2006; Scollon & LeVine, 2004). These resources enable meaning creation by merging with each other "across sensory modalities" (O'Halloran, 2011, p. 120), such as visual or gustatory. Following Kress (2019), *modes* illustrate how one represents what happens in the world and if these representations are adequate.

Modes can be expressed differently, for example, through the design of an image or the typography used in a text (Scollon & LeVine, 2004). Furthermore, *modes* consist of signs with specific meanings that follow certain rules (Norris, 2004; 2006). For instance, capital letters or exclamation marks are often used to draw attention to the content of the message due to their increased visual salience (Lemke, 2002). Thus, even text without any pictures is *multimodal* as it includes both linguistic as well as typographic elements (Lemke, 2009). According to Lemke (2009), linguistic symbols are also visual ones. Ultimately, all symbols of *modes* form a holistic arrangement. In this sense, *multimodal semiotics* is an essential tool for analysis of communication as made up of many modes, such as language (van Leeuwen, 2004).

To sum up, modes are interesting for the upcoming data analysis. First, the specific design of the headlines and the overall search result page with potential distinct *modes* can be investigated. Also, the analysis will pay attention to how the different elements on the search result page may interact. After all, this interaction could create different interpretations and perceptions, especially, if the display of elements is found to differ between the two participants.

[6] Also known as *semiotic resources* and *modalities* (based on O'Halloran, 2011)

II. Modality

Modality within the *multimodal analysis* is not focused on uncovering 'the' truth. Instead, *modality* is interactional and focuses on judgements of representations and their reliabilities (Ravelli & van Leeuwen, 2018). In addition, there are three types of meaning, *presentational*, *orientational* and *organisational* that work together to create the overall meaning (Lemke, 2002). *Presentational* meaning describes the situation people find themselves in while *orientational* meaning mediates the interaction with this *presentational* meaning between participants (Lemke, 2002). Moreover, the *orientational* meaning in visual media communicates the creator's opinion (Lemke, 2002). Lastly, the *organisational* meaning works as an 'instrument' in the background of the former two meanings: It allows them to become more complex while still maintaining precision (Lemke, 2002). At the end, when one judges the reliability of a representation or a type of meaning, these distinct functions do not work separately but come together as a fusion (Ravelli & van Leeuwen, 2018). Put differently, the three types of meaning are interdependent; thus, "human semiotic interpretation is [...] iterative" (Lemke, 2002, p. 305) and must always consider more than only the combination of all available elements.

Further, the cues that people draw on, *modality markers,* are interpreted against socially-known standards (Ravelli & van Leeuwen, 2018). For instance, the brightness and colours of an image are *modality markers* that, depending on the context, point to different representations and meanings. To give an example, red and pink tones in an advertisement for Valentine's edition of chocolate create a romantic impression. In contrast, a photograph of war showing red splashes on a wall could make one think about blood and violence.

To conclude, modality draws on the different modes to judge the creation of representations of events in the world. For this thesis, this is especially relevant considering the interaction of different elements on the search result page, such as headlines and images. Ultimately, the interplay of these parts is analysed to see which meaning and representation of the war in Ukraine they create. For instance, the elements could indicate

that Ukraine plays a role in the conflict as well, or, Russia might be portrayed as the aggressor.

III. Hypermodality

Lemke (2002) proposes *hypermodality* as a new approach to describing the interplay between meanings from sound, images and text in hypermedia contexts. Hypermedia is all media connected via links (The Merriam-Webster.Com Dictionary, n.d.). Meaning representations via verbal and visual elements complement each other; thus, have become a *multimodal* semiotic mix, or "multiplicative product" (Lemke, 2002, p. 303) that must be analysed accordingly (Lemke, 2002). In application to the present paper, this means that the meaning-creation process on search engines potentially is identified. The upcoming analysis will provide a first understanding of how the meanings from visual and textual elements interact and further create even more meanings.

In addition, Lemke (2002) also stresses the influence of culture and traditions on this process of meaning-making. Growing up with certain ideas means that one never makes the same interpretation as someone from another culture. Ultimately, this is why Lemke (2002) describes *hypermodality* as "the conflation of multimodality and hypertextuality" (p. 301). Again, this point supports the subjective approach of this paper. In other words, the analysis pays the required attention to the interplay of meanings from various sources in a hypermedia context. In the end, these interactions may give way to a multitude of *presentational*, *orientational* and *organisational* resources in different *modes*: For instance, the language used in a text in combination with an image. Ultimately, hypertext connects those distinct resources and modes in a way that traditional print media cannot (Lemke, 2002).

The easiest way to find a connection in hypertext is via a link (Lemke, 2002). Links create a potentially endless sequence (Lemke, 2002) that the user can follow. Thus, following links can thus also be called "trajectories, or traversals" (Lemke, 2002, p. 300).

Though this study will not analyse the links listed on the search result page in detail, it will still acknowledge the sources of the top three links. To give an example, a brief background of the found news outlets will be given.

3.4 Ethical Considerations

The participants of this study were informed about how the use of their data. They gave their consent by replying to the email sent by the researcher (see appendix A). Moreover, the participants knew about the aim of the study from the beginning. Only general information about the participants was included in this paper. All elements, such as the profile image displayed on the Google search result page, were cropped to keep their identity private. Also, the participants were warned about possible graphic images in the search results before the start of the experiment. Additionally, they were told to contact me in case of any problems or concerns.

3.5 Limitations

One might say this research is limited by its small participant sample as well as by using only one search topic. However, this thesis does not aim to offer an in-depth analysis of the topic. Instead, it is designed to start discussions and future investigations about the filter bubble effects. Cadena-Iñiguez et al. (2017) recognise that one should always question the generalisability of the results of an experimental study to ‘real-world’ contexts. In the present case, it can be argued that the external validity, the ‘real-life’ connection is high (Kaldis, 2013), as previously mentioned: The participants would have probably turned to an online search engine for current information about the war at some point, even without being explicitly instructed to do so as the war in Ukraine is an ongoing topic of public interest. Moreover, the fact that only the first three search results were considered, further supports this experiment’s validity: According to Fay (2022), the five top search results receive the most attention with almost 78% of clicks. This thesis considers only the first three search

results, meaning that it reflects what users do every day when searching for something online.

Also, one should always remember that the causal explanation brought about by the manipulation of the *independent* variable might be overstated in an experiment. The chosen variables might not be the ones with the biggest impact on the dependent ones and there might also be other "myriad variables that are likely to have at least some small effect on any phenomenon" (Schneider, 2007, p. 173). Again, as this experiment merely aims to offer first insights into how the *filter bubble* might work, this consideration is acknowledged but considered more crucial in future research projects.

Moreover, inductive logic might be criticised for conclusions based on observation because its conclusions surpass one's experiences, and potentially turn into general laws (Henderson, 2020). Hence, going from what has been observed to something unobserved, thus, unproved, might be problematic. Nevertheless, the present study does not only use inductive logic. Again, one may refer to its mixed-methods approach that tries to add further knowledge. Studies that use *deduction*, are open to criticism due to their focus on one conclusion that fits best in the given context and the chosen theories (Kaldis, 2013). Nevertheless, one should keep in mind that one can never take into account "all possible explanations for the evidence at hand" (Douven, 2013, p. 4). Besides, by using mixed *methodology* and *methods*, this paper tries to assure an equilibrium between in-depth understandings of specific experiences and more general consistencies to be found across different phenomena (Schneider, 2007). To be precise, how knowledge can be constructed based on different search results found online.

Also, one may criticise that this study builds on a previous research project by me, meaning that it continues to follow one direction instead of taking a new perspective. However, this thesis adds frame analysis and more research to broaden the point of view.

Chapter 4: Multimodal Frame Analysis

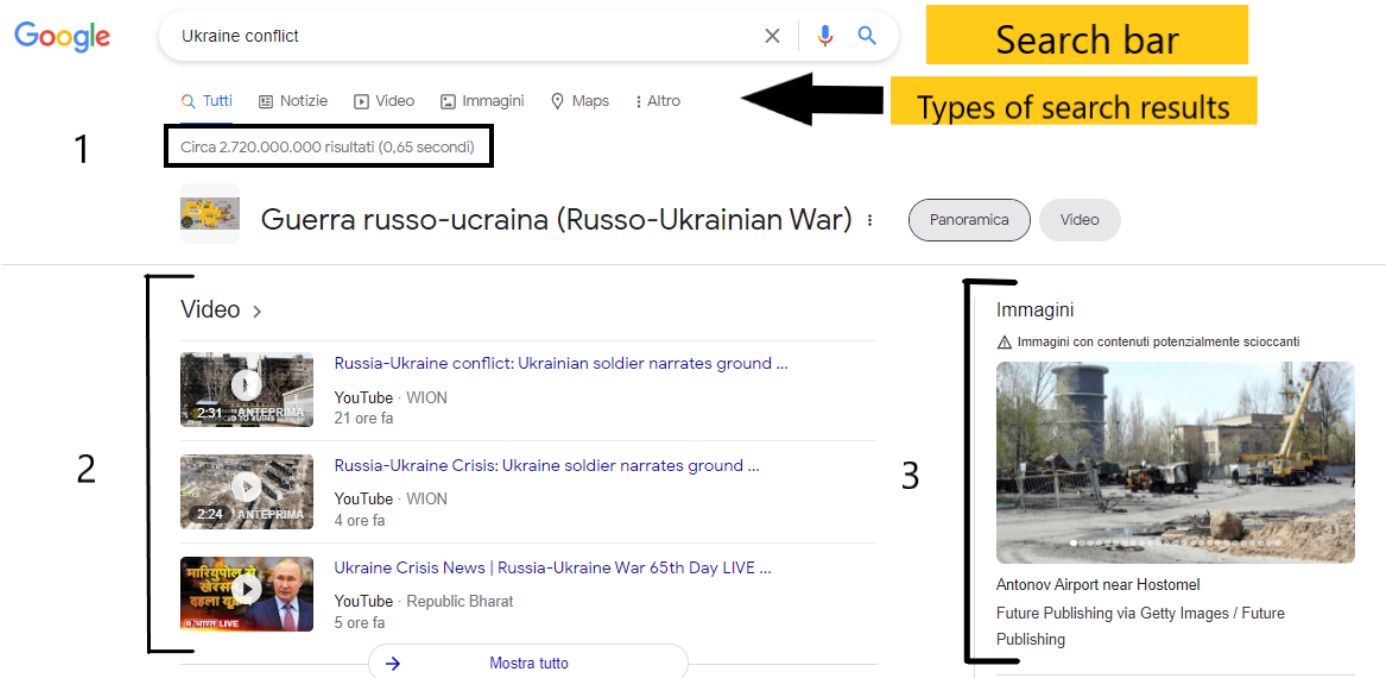
The following analysis is split into two main sections with two subsections each. The search page results of the first participant are analysed first; this analysis is divided into the results of a search on Google and one carried out on Brave. After that, the second participant's search results are analysed with the same split between Google and Brave. The two separate analyses are then compared and combined. In the end, one can find some conclusions based on the findings of the overall analysis, always aligned with the problem formulation focused on the possible impact of the *filter bubble* on access to free and equal information for all users.

As a general guide for the analysis, as outlined before, the *multimodal* elements of each search are considered. To begin, the arrangement of the search result page is described and analysed as this composition is what "guides the eye in its traversals across the page" (Lemke, 2002, p. 310). Next, this analysis merges into an investigation of how these elements might construct a certain *frame*. Each component appearing at the top of the search result page (SERP) is also briefly mentioned. Finally, the last part compares the analysis' findings of the two datasets in relation to the problem formulation, as outlined above.

4.1 The first participant - Search results obtained in Italy

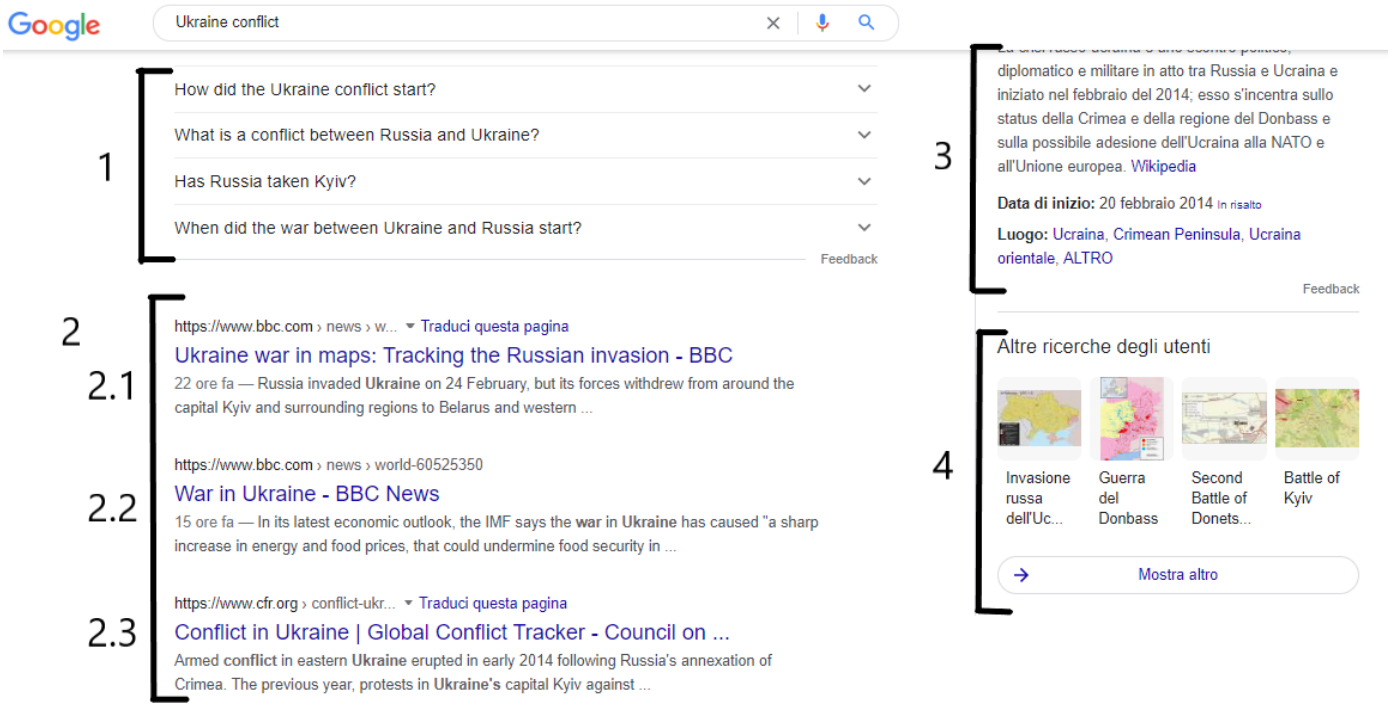
4.1.1 Analysis of the Search Results on Google

Image 1.1 Google Search Results from the Italian Participant[7]



[7] Please note, the words in bold print are selected by Google (Roesler, 2015). Hence, they will not be considered as special typographic elements.

Image 1.2 Google Search Results from the Italian Participant



For the Italian participant collecting the search results from Italy, there were about 2.7 billion search results on Google for the query “Ukraine conflict” (image 1.1, element 1). At the top of the page, one can see the search bar with the search query. Below, the number of search results is displayed (image 1.1, element 1); there is also a small icon of a coloured map on the left, as well as the different types of search results that are available: All, News, Videos, Images and Maps. There are also two buttons, one for “panorama” and one for “video” (below element 1, image 1.1). Beneath this part, one finds a short video section with recent uploads from Youtube that fit the search query (image 1.1, element 2). In total, three videos are displayed, two are from a channel called *WION*, and one is by *Republic Bharat*. The title of the first two seems to include content from a Ukrainian soldier, while the third one focuses on live news (image 1.1, element 2). Next to the videos, there is an image gallery with photos related to the search with a small warning that some content might be graphic (Image 1.1, element 3). The user can click through several different images (image 1.1, element 3). Below this first considerably-sized section of the search result page, one finds a

part with similar questions asked by other users (image 1.2, element 1). Next to this block, there is an excerpt from a Wikipedia article about the topic in Italian (image 1.2, element 3).

In April 2022, Wikipedia had over 5.05 billion visits worldwide (similarweb, 2022a). Below the similar questions, one finds the first three search results for the search query (image 1.2, element 2). There are no images displayed for the three search results. Also, there are no ads shown for this search query (image 1.1). This might be due to a change in Google's advertising policy in connection with the war (Dave, 2022).

The first and second search results come from BBC.com. The BBC, short for British Broadcasting Corporation, is a public service broadcaster in the UK that aims to offer impartial news (BBC, 2015). The BBC is a public corporation that receives most of its funding from the license fee paid by every household in the UK; some other funding comes from commercial branches (BBC, n.d.). The BBC's news department is the world's largest news enterprise (Sambrook, n.d.). According to similarweb.com (2022b), in April 2022, BBC.com had a total number of 466.5 million visits worldwide.

The first search result focuses on the Russian invasion movements; the headline and description use the word "invasion" (image 1.2, element 2.1). In contrast, the second search result provides news content: it includes "war" in the headline and description (image 1.2, element 2.2). Moreover, the first search result states the beginning of the invasion as well as that Russia had to withdraw from the region around Kyiv (image 1.2, element 2.1). The second one mentions an "economic outlook" (image 1.2, element 2.2). Both search results are fairly recent with updates from 22 and 15 hours ago at the time of the data collection (image 1.2, elements 2.1 & 2.2). Also, both headlines are displayed entirely without being cut off (image 1.2, elements 2.1 & 2.2).

The third search result comes from the CRF, short for Council on Foreign Relations. It is an American organisation founded in 1921 that brands itself as an "independent, nonpartisan membership organisation, think tank and publisher" (CFR Editors, 2016). The organisations' members are both corporate and individuals based around the globe (CFR

Editors, 2016). The funding comes from membership fees, donations, corporate memberships, grants, investments, rental income and the Foreign Affairs magazine (CFR Editors, 2017). According to similarweb.com (2022c), in April 2022, cfr.org had a total of 2.337 million visits across the globe. The headline of the search results tells the user that there will be some kind of "conflict tracker" (image 2.1, element 2.3). The headline of this result is not displayed entirely (image 2.1, element 2.3).

The structure of the SERP *frames* the search results. Overall, the arrangement of the different *multimodal* elements on the search page gives a sense of directionality (Kress, 2019): It almost feels like the user is taken by the hand and guided through the different options offering more information. From the top left of the page with suggested videos and related questions to the right with some images and an excerpt from Wikipedia, further down to the search results and related searches, the page guides the user's attention the elements. Also, the fact that the user first sees videos, photographs, and related questions before even looking at the first search results, already creates a *frame*. This visual content might influence the user's perception and could potentially cause some pre-defined expectations without having read any headlines yet.

Moreover, one can see the similar questions section as a connector between the user that googles "Ukraine conflict" and other users with a similar query (Lemke, 2002). This way, the user is presented with what others have searched for and might also adapt their search or even change their mind about the topic. In this sense, one can consider this feature as some kind of reinforcement for the user as they see that others are also interested in this topic. In sum, without even considering possible filtering of search results, the arrangement of the SERP for this query *frames* the search. As Kress (2019) emphasises, this can cause "profound differences in the conceptions about the world" (p. 154). For instance, the fact the images are displayed at the top of the page, coming from different sources, and potentially containing some graphic content, could already impact the user's

perception. Considering that Vliegenthart and van Zoonen (2011) regard images as *framing* devices, one sees the possible impact of their prominent positioning in the present case.

Regarding the three types of meaning described by Lemke (2002), one finds that the site's structure carries some *presentational* meaning: Notably, one must recognise how certain information is presented as this potentially impacts the user's perception of the state of affairs in the war. Besides, the *orientational* meaning is that the page offers various sources of information that potentially also entail a certain degree of opinion by the creator of the source. Regarding the *orientational* meaning, one finds an illustration of how the different elements on the SERP connect their content. For example, the arrangement of the videos between two light grey lines ties together the videos that are listed. In general, the different associations of items on the search result page are both separated by their composition in groups while also being linked by the overall structure of the page (Lemke, 2002). In the end, the different sub-groups are still connected by, obviously, being listed on the same page but also because they include keywords related to the search query.

Turning the focus to the content of the search results now, one finding is that the first headline by the BBC does not use any special typography, such as exclamation marks, to increase visual salience (Lemke, 2002). Nevertheless, one can question if the BBC takes a position as it speaks of a "war" and the "Russian invasion" (image 1.2, element 2.1). If one considers that the participant did not include "war" in the query, one might think that this search result is not as neutral as may be expected. From this perspective, Russia is seen as the driving force in the war.

In addition, the tracking map shows the user that the war is ongoing and offers an overview of events (image 1.2, element 2.1). Users might be more familiar with tracking in connection to following the delivery of a parcel or a run that someone did on an app. A tracking map that shows how events unfold is something completely different. However, this might attract the user to click on the search result because, after all, they are somehow familiar with tracking something. While potentially useful to gather an overview, this

approach to following events via a map may also remind one of a computer game. In this sense, the war in Ukraine might lose some of its horrors and become something more abstract.

The second search result by the BBC also uses language that one may expect from a trustworthy newspaper: There are no exclamation marks or other special typographic elements. In contrast to the first result, this one is less interactive. It might even be considered more 'traditional' as it focuses on the economic impact of the war. For instance, there is mention of the International Monetary Fund and potential threats to "food security" (image 1.2, element 2.2).

The third search result by the CFR uses standard typography as well. Hence, one does not find any unusual elements that might draw a user's attention to this specific search result (image 1.2, element 2.3). Further, this result also offers a tracker to the user. In contrast to the tracker of the Russian invasion by the BBC, the CFR focuses on the overall evolution of the Russia-Ukraine conflict that finally led to the war. In fact, in this search result, the user does not find any mention of "war". Instead, the description offers a first glimpse at the background story of the war, starting in 2014 with Russia's annexation of Crimea (image 1.2, element 2.3). Again, this search result highlights Russia's role as the initiator.

To sum up, Google's SERP offers an entry into the information web of this topic. Still, one can question whether this page and its content are unbiased considering that this analysis found some proof for *framing*. As the analysed search results do not contain any special typography, one may say that the colourful images and video thumbnails on the page draw even more attention. In other words, those elements that are highly salient will become a signal for the user that they have to follow (Norris, 2004). The interplay of visual and verbal features on the SERP offers the first *frame* to the user (Lemke, 2002).

Furthermore, the structure and elements on the SERP interact hence, turn into one single communicative act (van Leeuwen, 2004) and influence how the user perceives and

considers different meaning representations on the page (Ravelli & van Leeuwen, 2018; Lemke, 2002). Even though the page is a two-dimensional structure on the laptop screen (Lemke, 2002), it becomes three-dimensional through the links that the user can follow: All search results link to another page, thus, offering further steps in one's trajectory and travelling across the Internet (Lemke, 2002). Hence, the SERP is far from a mere two-dimensional collection of elements. Instead, it becomes an immersive experience for the user.

Besides, content-wise, one could say that the three search results do not use ideological *framing* though some results use of *framing* focused on economic consequences as well as conflicts (Vliegenthart & van Zoonen, 2011).

In this sense, one may acknowledge that the typographic content of the search results appears to be unbiased, but the content itself is *framed* by the site's structure and certain words that are used. Ultimately, the sources shown on the SERP are based on the *filter algorithm* that decides which elements are placed where and in which order.

4.1.2 Analysis of the Search Results on Brave

Image 2.1 Brave Search Results from the Italian Participant

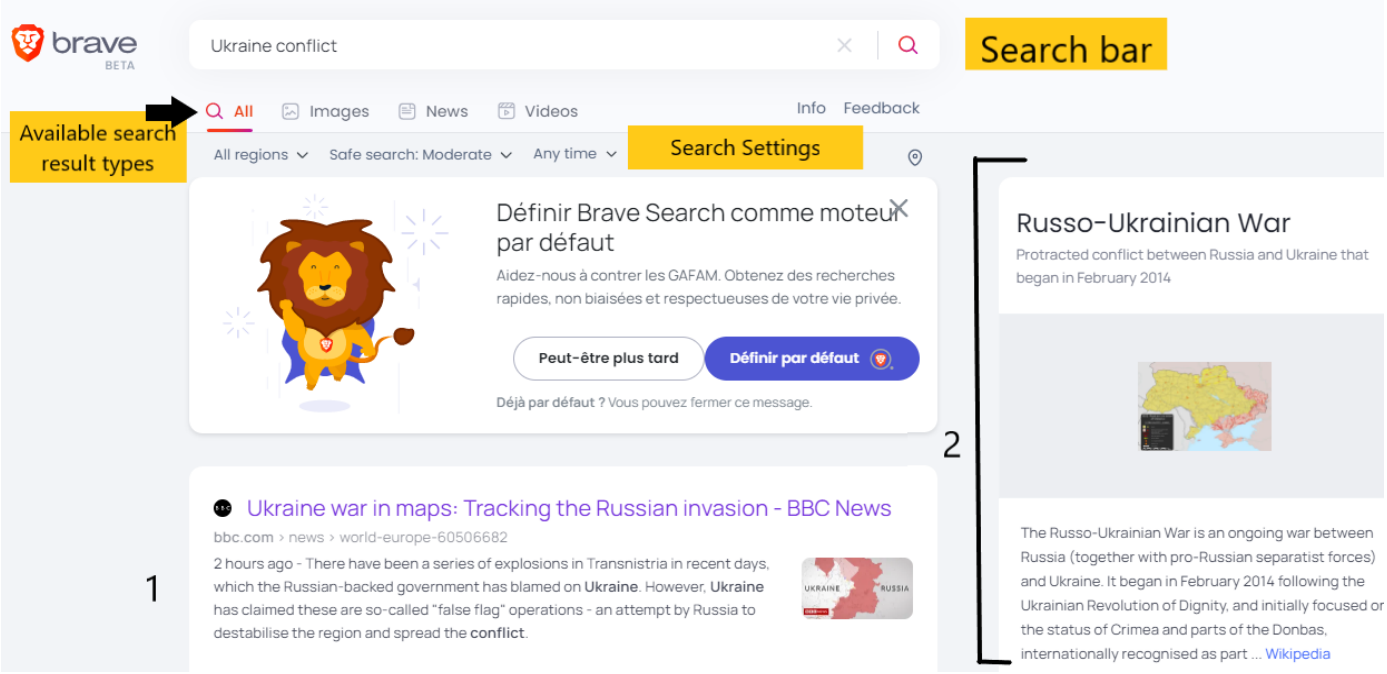
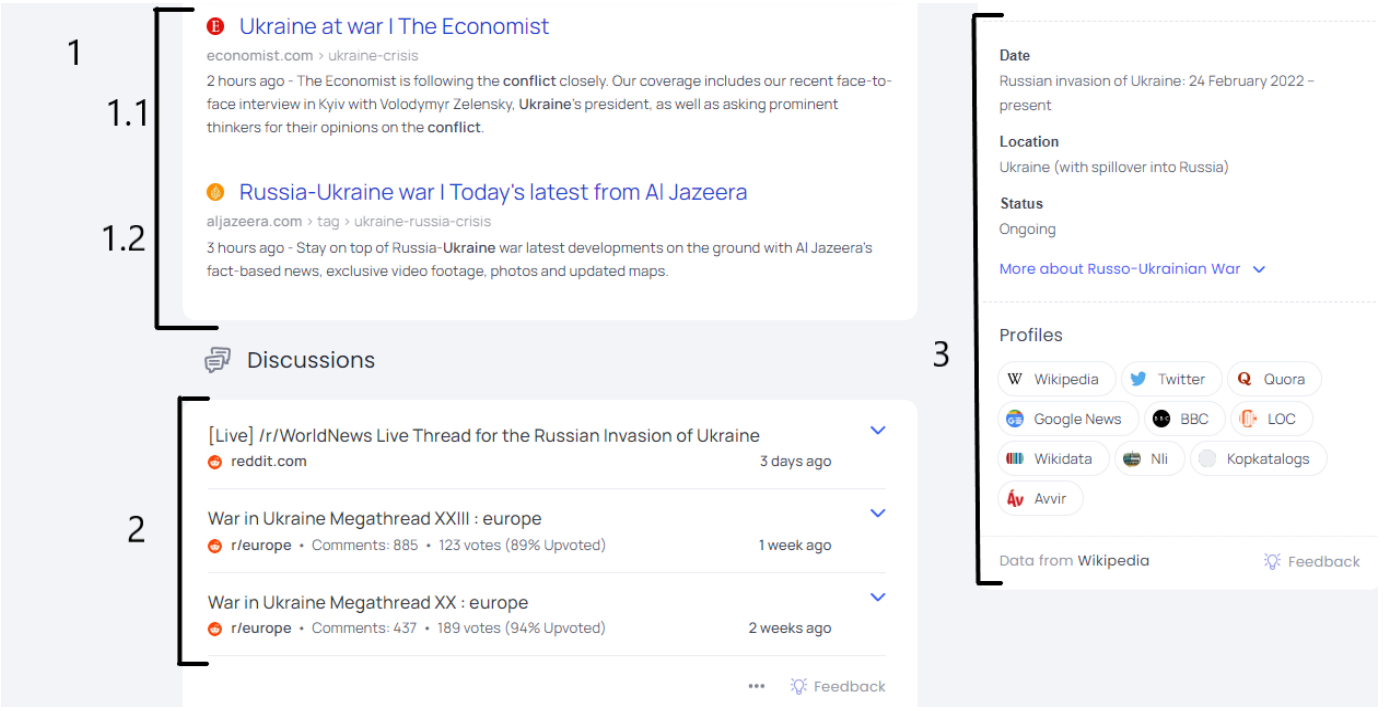


Image 2.2 Brave Search Results from the Italian Participant



The Brave search result page does not display the total number of search results (image 2.1). Apart from that, the structure is similar to Google's SERP: At the top, one finds

the search bar with the query “Ukraine conflict” and below the available search result types (image 2.1). In contrast to Google, Brave also provides additional search settings on the SERP: The user can filter for regions, a time frame as well as which safe search type they wish to activate (image 2.1). Furthermore, there is a pop-up in French asking the participant to set up Brave as their standard browser. Next to this box, one looks at another excerpt from Wikipedia, this time in English (image 2.1, element 2) with an image of a map. To the left, one sees the first search result. It is the same that was also previously shown as the first result by the BBC on Google about tracking the Russian invasion (image 2.1, element 1). This time, though, the page seems to last have been updated two hours ago at the time of the data collection. This seems to be the only difference, therefore, this result will not be analysed again. Lastly, there is an image displayed in the search result that shows a map (image 2.1, element 1).

The second search result is by the newspaper The Economist (image 2.2, element 1.1). This international weekly-published and digital newspaper was founded in 1843 in Scotland (The Economist Group, n.d.). Its values are independence, objectivity and topicality (The Economist Group, n.d.). The business has shareholders but does not allow one person or an organisation to hold most shares (The Economist Group, n.d.). Further, the newspaper’s editor is chosen by independent administrators (The Economist Group, n.d.). According to their website, there is no individual journalist named below an article because the “collective and personality matter more than the identities of individual journalists” (The Economist Group, n.d.). According to similarweb.com (2022d), economist.com had 12.55 million website visits in April 2022. The headline of the second search result mentions “war” in Ukraine, while the description also includes “conflict” (image 2.2, element 1.1). Additionally, the description gives an overview of the scope of content that the news outlet covers.

The third search result comes from aljazeera.com (image 2.2, element 1.2). This internationally-operating news organisation from 1996 is partly funded by the government of

Qatar (Al Jazeera, 2022). Since 2006, it is an independent, private corporation with the goal to benefit the public (Al Jazeera, 2022). In April 2022, aljazeera.com had a total number of 45.03 million visits worldwide (similarweb.com, 2022e). The headline mentions “war” (image 2.2, element 1.2). In addition, this search result addresses the user by saying “stay on top of Russia-Ukraine war [...]” (image 2.2, element 1.2).

The headlines and descriptions of the top three search results are displayed completely. Below the three search results, one can find a discussion section where three discussions from Reddit are displayed (image 2.2., element 2). This feature is new and aims to provide answers based on human conversations and not SEO-optimised content (Brave Software, 2022b). The content is taken from big forum websites, such as Reddit, to offer “alternative or complementary viewpoint[s]” (Brave Software, 2022b). In the present case, this new discussion element on Brave’s SERP takes three discussion threads from Reddit (image 2.2, element 2). The top-most one is the most recent thread and a live one (image 2.2, element 2). The user cannot see any content but rather how many comments there are and how many upvotes the content received. Reddit had more than 1.6 billion visits across the globe in April 2022 (similarweb.com, 2022h). Next to the discussion section, one finds more details from the Wikipedia article (image 2.2, element 3).

In contrast to the Google SERP, the top of Brave’s result page does not contain any videos or an image gallery. As a consequence, this time, the user instantly looks at the search results. The small excerpt from Wikipedia includes a small image of a map and stretches across the side of the page (image 2.1, element 2 & image 2.2, element 3). Thus, it takes up a considerable space at the top of the SERP. There are also some profiles listed that offer further information on the topic (image 2.2, element 3).

Turning to the analysis, first of all, it is interesting to note that Brave offers some search filters at the top of the SERP. For example, the user can choose a region or safe search mode. Hence, it is easy for them to actively take part in the filtering of information. Google

also offers additional search filters, but they are more hidden than on the Brave page: the user has to leave the SERP page to change the settings.

The first result is, as already described, the same one as in image 2, element 2.1. Therefore, it will not be analysed again. Next, one could regard the second result from the Economist as appropriate considering the news outlet's aim to be objective: The headline and description include "war" as well as "conflict" (image 2.2, element 1.1). Hence, they include both keywords, possibly to construct an unbiased perspective. Nevertheless, the headline is bigger, which might cause the user to focus on its contents first. Thus, they would read "war" first (image 2.2, element 1.1). Apart from this, there is no special typography used to draw attention.

The same applies to the third search result: The language appears neutral but highlights "fact-based", "exclusive", and "updated" content (image 2.2, element 1.2). Notably, these words might be used to make the content seem more desirable to users looking for reliable information.

Furthermore, the Reddit threads might spark the user's attention as they do not provide any information on the search result page (image 2.2, element 3). The number of upvotes as an indicator of how many people think this content should be seen by more users (Reddit, 2013) could give users more confidence in what they will find on Reddit.

All in all, one may say that the structure of Brave's SERP does not frame the search results as obviously as Google's. However, the structure of the page still creates a *frame* and places certain information in a more prominent place than others: For instance, the size and the position of the Wikipedia excerpt increase its visual salience and draws attention (Kress, 2019; Norris, 2004; Lemke, 2002). Accordingly, the *presentational* meaning (Lemke, 2002) is probably still impacted. Apart from that, the user can use the headlines, descriptions and the data on the right-hand side to gather some first information and trigger a meaning-making process (O'Halloran, 2011). As a result, the *orientational* meaning (Lemke, 2002) contained

on the SERP is another offer to accessing different information sources, just as for Google. While the offers from the first and third results are indirect, the second one directly approaches the user to “stay on top” (image 2.2, element 1.2). Additionally, the discussion section and the passage from Wikipedia are also visually separated from the search results which facilitates the creation of *organisational* meaning (Lemke, 2002).

Still, one should keep in mind that using various elements from distinct sources to offer broader information, might still *frame* and impact user perception. As mentioned before, humans tend to consider all elements that they are provided with to construct conjunctive meaning (Lemke, 2009).

Lastly, one could acknowledge that the absence of videos and images, apart from the map, potentially decreases the influence of the user by these visual elements. Considering the content of the headlines and descriptions, one cannot find any particular *framing*, such as one found in the Google results that focuses on the economic consequences of the war (Vliegenthart & van Zoonen, 2011; image 1.2, element 2.2).

4.2 The second participant - Search results obtained in Denmark

4.2.1 Analysis of the Search Results on Google

Image 3.1 Google Search Results from the Serbian Participant

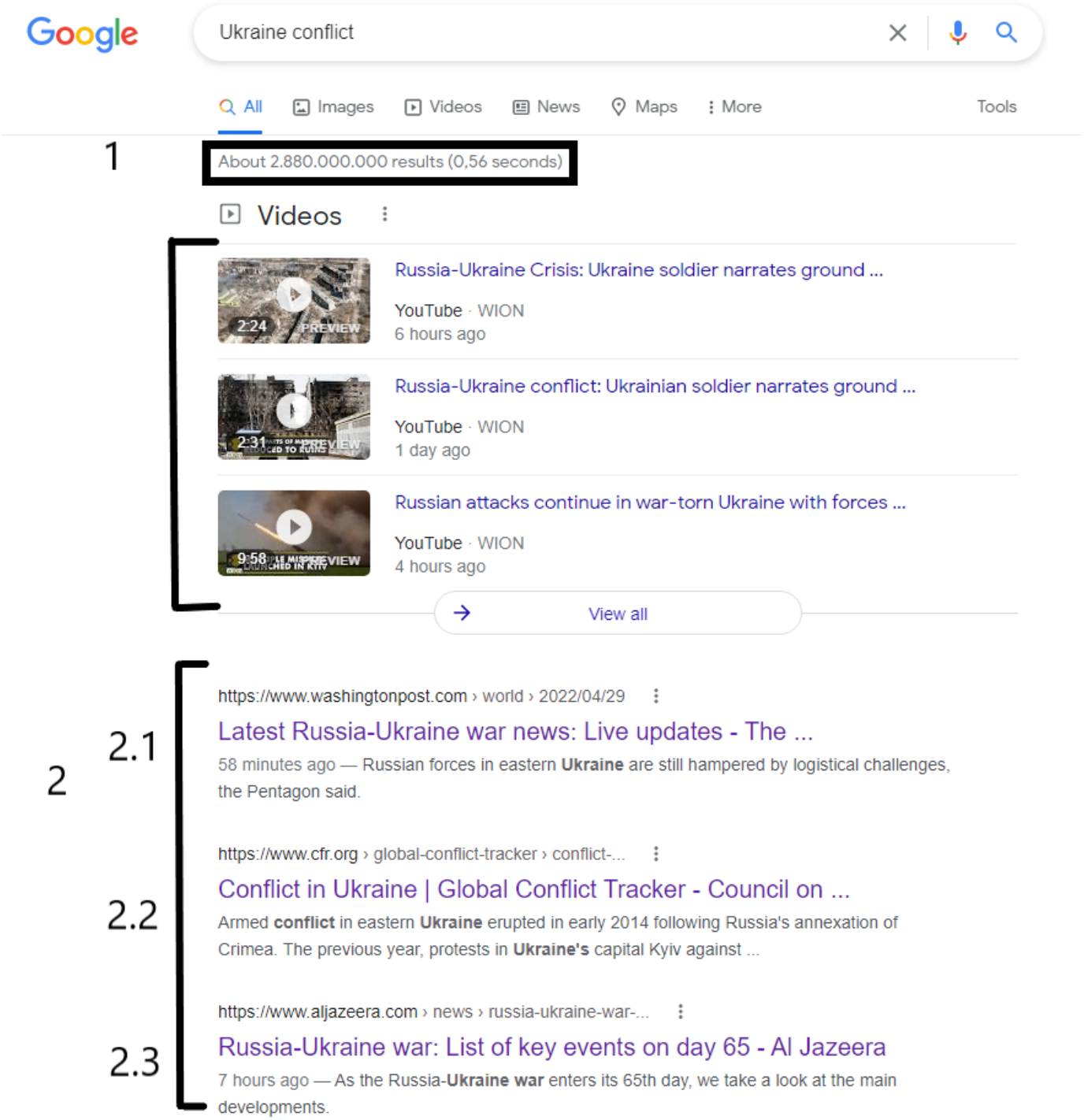
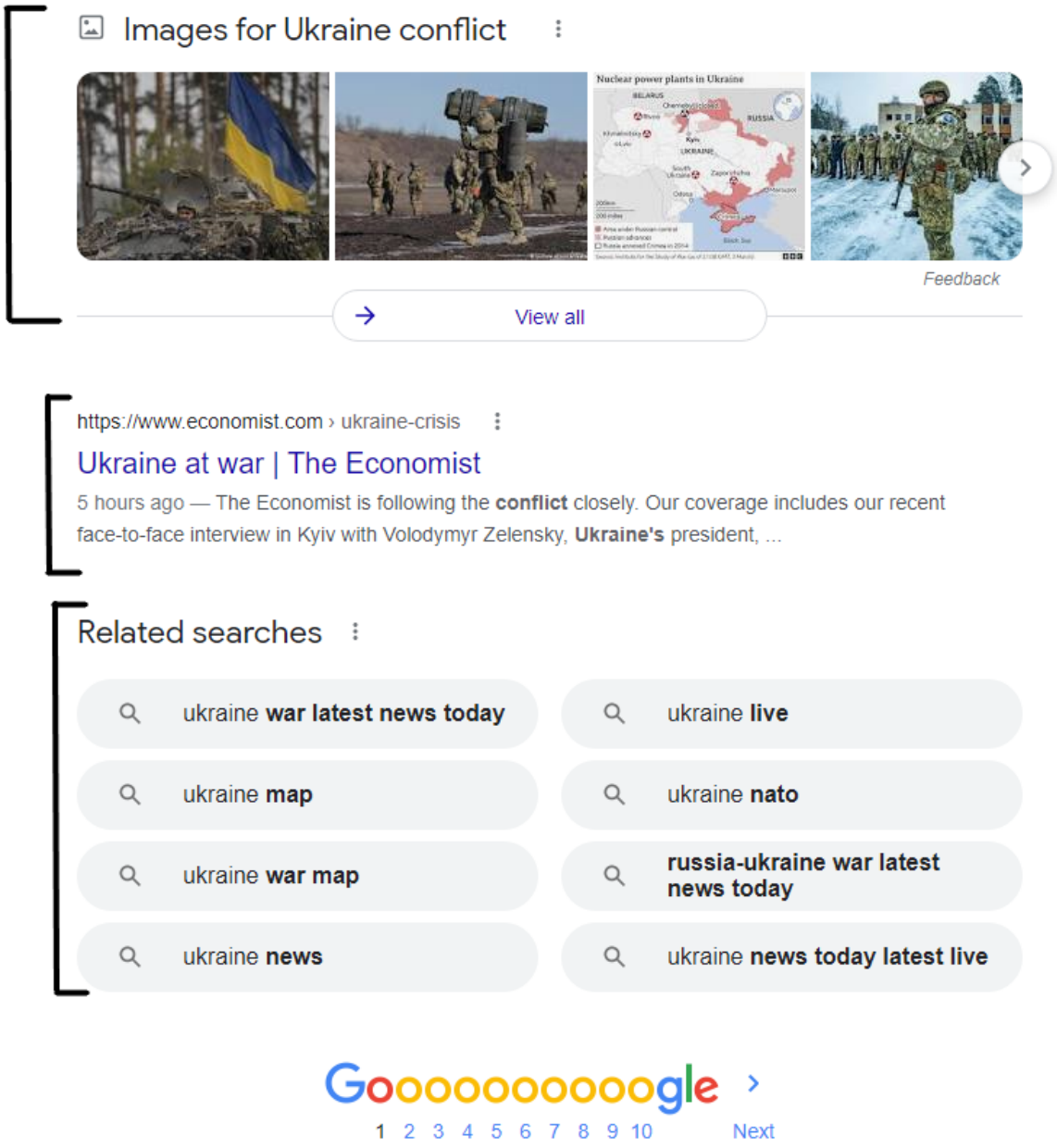


Image 3.2 Google Search Results from the Serbian Participant



For the Serbian participant collecting the search results in Denmark, there were about 2.9 billion search results on Google for the query “Ukraine conflict” (image 3.1, element 1). Again, one finds the search bar with the query, the number of available search results and the different types of available results at the top of the page (image 3.1). Beneath this part, one finds a short video section with three recent uploads from Youtube that correspond to the search query (image 3.1). All three videos come from *WION*: the first two

are narrations by a Ukrainian soldier, while the third one seems to be more of a news update (image 3.1). Below the videos, the first three search results are displayed without any images next to them (image 3.1, element 2). Again, there are no ads shown for this search query (image 3.1).

The first search result is by the Washington Post (image 3.1, element 2.1) which was founded in 1877 (Washington Post Staff, 2021b). It is currently owned by Amazon founder Jeff Bezos but strives to cater to its audience's interests and not its owners (Washington Post Staff, 2021a). The newspaper aims to be "fair and free and wholesome in its [news coverage]" (Washington Post Staff, 2021a). In April 2022, the website of the Washington Post attracted a total of 150.3 million visits worldwide (similarweb.com 2022f). Furthermore, no unusual typography is used in the headline or description of this search result (image 3.1, element 2.1). Content-wise, the headline mentions "war" and "live updates" (image 3.1, element 2.1). Lastly, the headline of this result is not displayed completely, but the description is (image 3.1, element 2.1).

The second search result is by the Council on Foreign Relations (image 3.2, element 2.2). As the same result has already been discussed for the first participant, it will not be repeated at this point. The third result comes from Al Jazeera (image 3.1, element 2.3). Al Jazeera was introduced in the previous analysis; however, this result is different from the one that was analysed before. With a publication time of seven hours from the time of the data collection, it is a fairly recent one (image 3.1, element 2.3). Both the headline and the description are displayed entirely. The headline includes "war" and focuses on the most important events of the 65th day of the war (image 3.1, element 2.3). There is also mention of "war" in the description, and the word "we" is used (image 3.1, element 2.3).

On a side note, there are images displayed below the first three search results; the related questions are also located further down the SERP (image 3.2).

Again, one could say that the structure of the Google search result page *frames* its content. How elements are displayed on the page impacts what the user sees first, ultimately, steering their attention and perception (Kress, 2019). First of all, the videos take a quite prominent place at the top of the SERP (image 3.1). They are literally the first element that the user sees. As discussed before, this top-most part of the SERP is the one that takes the most attention (Fay, 2022). In contrast, the search results do not use any special typography to draw attention (image 3.1, element 2); thus, they might not be the first element that the user looks at.

Again, the structure of the page influences the *presentational* meaning that the user can construct based on the available content (Lemke, 2002). The *orientational* meaning (Lemke, 2002) once more includes an offer to access different sources of information, text, images and videos. The *organisational* meaning (Lemke, 2002) is the same as already mentioned in the analysis of the Google SERP for the first participant: Different sections are visually separated but still connected by the keyword that the user typed in the search bar.

The first and second result use the word “war” and focus on the most recent updates, while the second one seems to be more about a general background of the tensions between Ukraine and Russia, as mentioned before. The language used in the search results seems to be neutral as to be expected from trustworthy news outlets (image 3.1, element 2). Interestingly, both the first and second results emphasise the war and Russia’s part by naming the country first in the “Russia-Ukraine war” (image 3.1, elements 2.1 & 2.3). The contrast with the more general description and background story offered by the second result (image 3.1, element 2.2) appears to be more emphasised by being ‘framed’ by those two results.

Lastly, the use of certain keywords, e.g. “war” and “conflict”, can also be seen as a *framing* device (Vliegenthart & van Zoonen, 2011).

4.2.2 Analysis of the Search Results on Brave

Image 4.1 Brave Search Results from the Serbian Participant

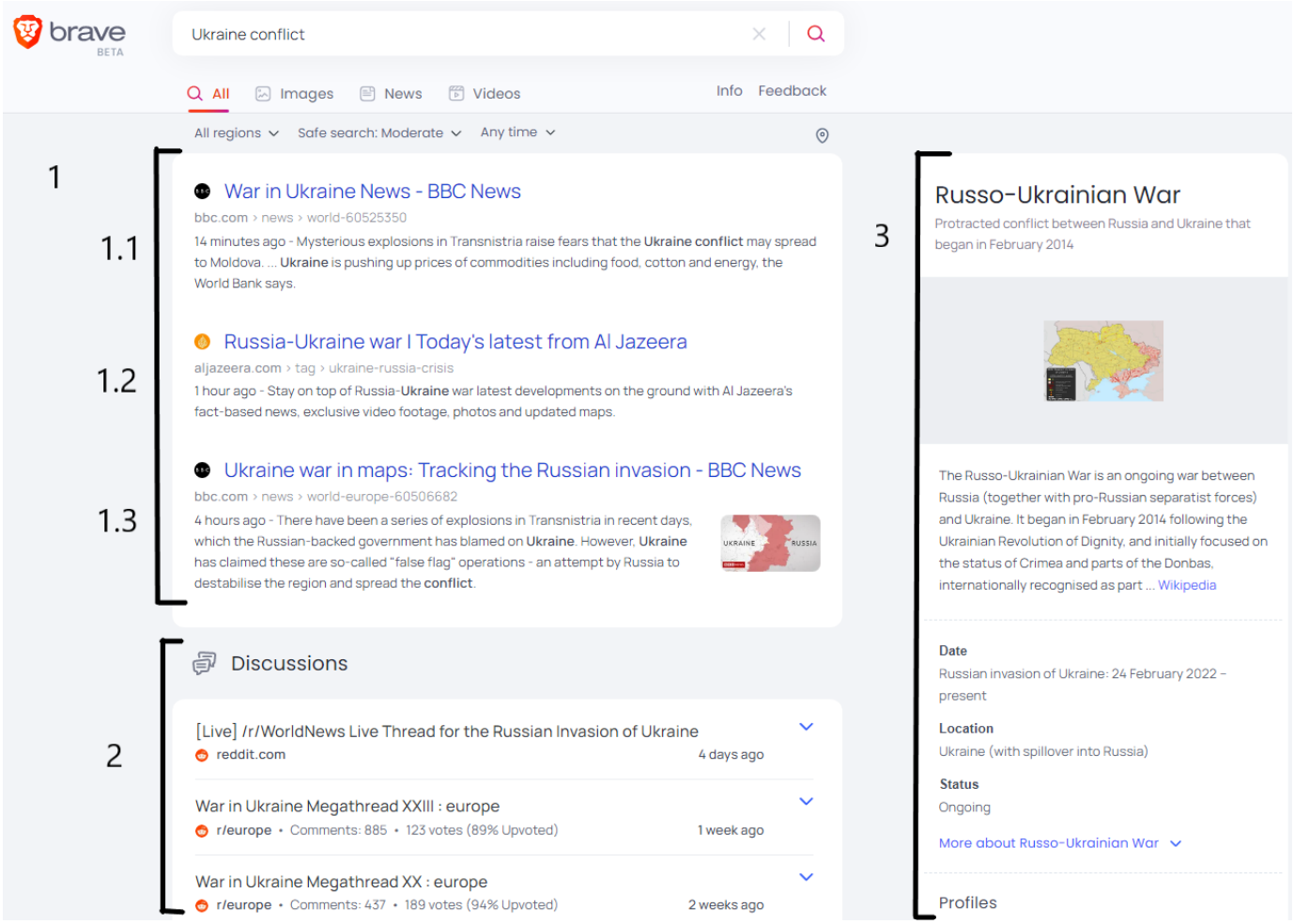
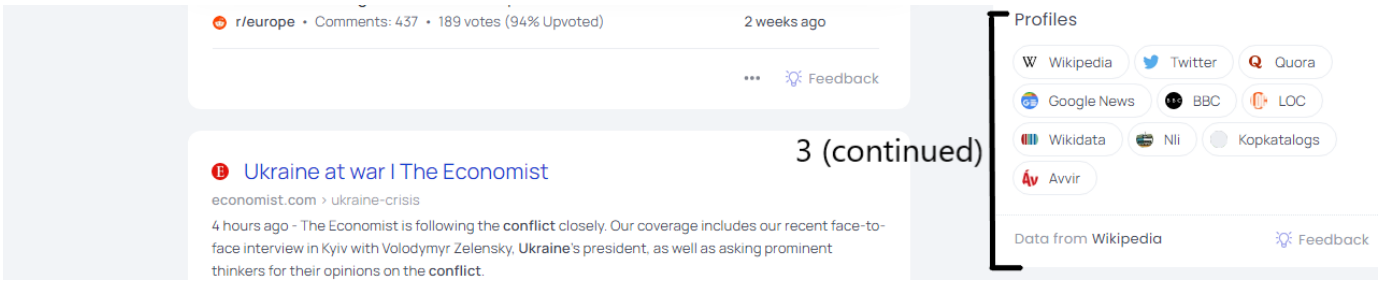


Image 4.2 Brave Search Results from the Serbian Participant



The Brave SERP displays results for any time from all regions with a moderate safe search filter (image 4.1). The first three search results are shown at the top of the page (image 4.1, element 1), followed by the discussion section (image 4.1, element 2). All three results are displayed without being cut off in the headline or the description (image 4.1,

element 1). On the right side, one finds once more the excerpt from a Wikipedia article about the war in Ukraine (images 4.1 & 4.2, element 3). This part takes up a considerable section of the SERP, and the information included is the same as for the first participant.

The first search result is by the BBC and is the most recent of all search results considered in this analysis with a publication time of 14 minutes before the data collection (image 4.1, element 1.1). The headline includes “war”, while the description refers to “conflict” (image 4.1, element 1.1), there is also mention of the word “mysterious” (image 4.1, element 1.1). All in all, the content focuses on recent development in the spread of the war as well as a rise in cost for some products (image 4.1, element 1.1). Also, no special typography is used.

The second search result is by AlJazeera. It contains the same information as for the Italian participant but was updated more recently (image 4.1, element 1.2). The third search result is the one by the BBC that mentions “tracking the Russian invasion” (image 4.1, element 1.3). This result was already discussed for the first participant as well. Moreover, the discussion section includes the same three discussion threads as for the previous participant.

Continuing with the analysis of this last sub-section of the second data set, one can make some interesting observations. Firstly, the Wikipedia excerpt on the right side once more draws attention; it almost looks like a fourth search result that stretches along the whole side of the regular results (images 4.1 & 4.2, element 3). In brief, one may argue that the overall size of the Wikipedia excerpt probably draws user attention: As noted before, what is made most prominent becomes an unmissable signal for the user (Norris, 2004). Ultimately, its position in the page’s sidebar increases the visual salience (Lemke, 2002). Hence, this element might become a signal for the user that the included content is of importance and should be looked at (Norris, 2004). Further, the fragment from the Wikipedia article includes

an image with a map and different colours, which might draw attention as well (images 4.1 & 4.2, element 3).

The only other image in the top part of the SERP, not taking into account the small icons of the websites, is the map by the BBC. This image is smaller than the one from Wikipedia and uses fewer different colours. Here, *modality* markers might be present (Ravelli & van Leeuwen, 2018): The differing amount colours of the two images could point to a difference in the seriousness and importance of the source (Lemke, 2002, p. 317). After all, the BBC's content is published by editors with a journalistic background, while everyone can edit the content on Wikipedia (Wikipedia contributors, 2003).

The search results are placed above the discussion box and to the left of the passage taken from Wikipedia. Even though it was mentioned that the size of this fragment may already draw attention, it could also be argued that most users tend to 'read' a page from left to right. From this perspective, the placement of the search results could still be seen as a guarantee of attention (Lemke, 2002).

To finish this analysis, one can again say that the *presentational* meaning (Lemke, 2002) offered to the user is influenced by the structure of the SERP. As found before, the *orientational* meaning (Lemke, 2002) includes an offer to access different sources of information, text, images and videos, displayed on the search result page. Moreover, the result by Al Jazeera is the one that directly offers the user to "stay on top" (image 4.1, element 1.2) of the events. Again, the structure of the page influences the *presentational* meaning that the user can construct based on the available content (Lemke, 2002). Finally, the *organisational* meaning (Lemke, 2002) is the same as already mentioned in the analysis of the Google SERP for the first participant: Despite being visually separated, the various sections are overall still connected by the keyword that the user typed in the search bar.

4.3 Comparison of the Findings

A striking discrepancy between the first and second participant is the number of search results that they saw on Google. The first participant had about 2.7 billion results, while the second had around 2.9 billion. Acknowledging the considerable amount of search results overall, this 0.2 dissimilarity might not seem substantial; however, it highlights that despite the fact that both participants use their laptops and Google in English, they do not have access to the same amount of information for the chosen search query.

Moreover, the SERP by Brave as well as on Google did not offer the same information to both participants. Even though there were some search results that both participants saw, their order differed. By now, it should be apparent that the arrangement of the elements is essential when it comes to user attention and perception. Again, this dissimilarity in information sources impacts the participants' access to equal information.

Following this finding, one also has to consider the discrepancy in the display of the search results on Google for both participants in how the different elements were ordered. The first participant saw the videos and images at the top of the page, while the second one only saw the videos at this position. Additionally, the second participant did not see any related questions at the top of the page as the first one did. Here, a possible implication of the filter bubble might be present as Brave's SERP did not feature a divergent composition of elements. Consequently, one could argue that considering that Brave does not use, for instance, the browsing history, this could be a reason for the same structure of its SERP for both users.

What can be regarded as comparable for both participants is how the distinct elements on the SERP are separated and still linked for both search engines. Though the content differs, in this sense, the 'basic' *frame* of the "sequential display" (Lemke, 2002, p. 321) on search result pages seems somehow equal. Of course, by adding more elements or changing the structure to make certain items visually more salient, the *frame* is reinforced and signals for attention change.

Likewise, the SERP of Brave and Google are comparable in the layout of the search results: Both search engines use bigger font in the headlines than in the descriptions. Moreover, they both include different elements apart from the search results in both data sets: Google features related questions and searches, whereas Brave focuses on relevant discussions for the search query. Nevertheless, this difference in design might again point to the dissimilarities in the algorithms used by each search engine.

Furthermore, the *presentational* meaning differs for each participant because they are offered access to different sources (Lemke, 2002). Overall, the *orientational* meaning is comparable for both participants as the SERPs offer information in all cases. One search result by Al Jazeera that both participants found directly offers something to the users (image 2.2, element 1.2 & image 4.1, element 1.2); the others can be regarded as a more indirect offer to access more information based on the SERP and the search query. The *organisational* meaning of all search result pages is also similar considering how they tie together different elements despite separating them visually (Lemke, 2002).

Lastly, both participants got different search results on Google and Brave. Thus, differing content was already displayed for one person doing the same search on two distinct search engines.

Chapter 5: Discussion

This last chapter ties together the separate parts of this paper. The goal is to offer a final overview of the implications of the *filter bubble* on equal and free access to information from different locations based on the findings of the analysis. First, there is a recap of the most important theories in conjunction with the findings, the most interesting ones are highlighted referring back to the problem formulation. As a result, the significance of the present paper is underlined once more. Finally, some ideas for future research are presented as well as a consideration about news consumption online.

5.1 Theory Recap in Conjunction with the Findings of the Analysis

The findings of the analysis support previous considerations about the technological operation of filter algorithms. Despite the idea that the Internet may offer users a considerable amount of information that can be found in an instance, the present study found that this information differs between people. The two participants were, generally speaking, presented with dissimilar content. Though some information sources can be found in both data sets, their display and the structure of the overall search result page differs.

It follows that this content may be based on user data, also considering that both participants indicated that they do not delete their browsing history regularly. In this sense, the SERPs might reflect personalised content. The fact that the participants sometimes saw the same news sources though in a different order is interesting as the changed order may impact which results they consider more relevant.

Ultimately, this divergent content and its display might have negative consequences. Search result pages are complex structures in which different elements interact. Ultimately, all of these elements come together to create a first impression, an overview of a topic. This means that all available structures and content have to be analysed to understand the meaning that they create. Hence, the frame that the SERP offers may have a considerable effect on which meaning users create. By following different arrangements and looking at

various elements, people can construct a first idea of, in this case, the war in Ukraine. It is important to highlight that this process starts just by looking at the SERP and does not even require the users to follow any links.

Also, the language, be it ever so subtle, that headlines use can also influence users. The findings of the analysis show that most news sources point to Russia as the 'aggressor' in the war. The most-used framing in the analysed search results is conflict framing. Here, one finds a possible display of opinion by the sources that may also impact the overall perception built on the SERP results.

The placement of images and videos which may be visually more salient than search results with only text may also draw user attention to the former elements first. Also, the long Wikipedia excerpt on the side of the SERP might draw more attention than the headlines. Therefore, the search pages also have the power to steer user attention from one element to the other.

Also, acknowledging that Brave makes it easy for the user to filter their search results, one may refer back to *selective exposure* and *confirmation bias*. Here, one might point out that following previous research, this option may lead users to actively seek information that is even more tailored to them, thus, might confirm their existing beliefs even more. Following this idea of self-selection, on the one side, it may be argued that an option like "safe search" is appropriate, especially in the context of war where search results may be graphic. On the other side, news on the TV does not offer a filter option like this. From this perspective, the user may filter to only see results that they feel comfortable with.

Regarding certain similarities, the overall design of the SERP displayed by both search engines was similar. The search bar sits at the top of the page, and there are different sections that are usually visually separated, such as the search results or the video section. Another point to acknowledge is that there was not one search result that stood out with extremely different content, one may acknowledge that the SERPs create a certain

impression of reliability in the content that they display. The representation that is created may be judged accordingly. In other words, one might consider that the overall representation of Russia as the initiator and driving force behind the war in Ukraine is adequate, based on the data from the search results.

All in all, one can see the potential for filtered information in the findings of this study. Though this only serves as the first indicator of a *filter bubble* and its impact on unequal access to information, the findings highlight that the users do not have access to the same news and knowledge. Also, considering that the content between the two search engines already differed, meaning that one person finds non-identical information based on which search engine they use. From this perspective, the different versions of search result pages and the resulting dissimilar information are just a first step in the user's web traversals. If they already start with divergent information, the potential for a knowledge gap between various users increases with every link that they follow as a next step.

As mentioned in the theories chapter, a well-functioning depends on two ideas: First, people have to have access to information that presents them also with contrasting details to what they already believe about a topic. Second, people must be able to share certain perceptions and experiences despite living in their subjective realities. Especially information about a topic of public interest such as a war requires exchange, hence, access to at least comparable information. Otherwise, there is the potential for misunderstandings and also misinformation. From this perspective, the discussion section on the Brave browser may be viewed as a first step to offering an entrance to more diverse content.

To sum up, the SERP turns text into something interactional as there is an interplay between the different elements. Also, as mentioned before, the search results page might change; thus the content on it becomes flexible. All elements on the SERP interact to create meaning, even without a direct link between them. Moreover, even visually separated sections, such as the discussion part on Brave, still interact with the rest of the page. There

is considerable potential for how a SERP based on filter algorithms can frame information: From the arrangement of elements to deciding which sources are shown. Overall, this study highlights the potential power of the search engines to influence meaning-creation by framing search results.

5.2 Ideas for Future Research

As established, this paper only offers a first insight into the possible implications of the filter bubble on access to information. A next step could be to investigate the potential of promoting radical content to users based on their search history. Acknowledging the popularity of the Internet as a source of information, radicalisation on the Web must be studied more in-depth. Especially, since there is already a confirmation of this potential risk of the personalisation algorithms on, for example, YouTube (Wolfowicz, 2021). Moreover, the influence of the algorithm on neutral searches also requires more investigations: Future investigations could focus on how the filter bubble leads one from generic results down a funnel to more radical content (Wolfowicz, 2021).

Following this consideration, one idea would be to use the same experiment as for this study but spread it over a longer timeframe. The participants could be instructed to use certain keywords, for instance, those indicating a left-wing interest versus those with a right-wing character. After some time, the experiment could then be repeated to check if the created filter bubble increases. Another approach for future investigations could be to let participants follow the links they see on the SERP to construct a web of information. This network could function as a map and might offer insight into how different sources and topics interact.

Additionally, upcoming research could focus more on the individual and how they are impacted by the filter bubble. More data on how much personalised content users see and how they interact with it is required to add to existing knowledge and support findings. From

this point of view, interviewing users that found themselves radicalised on the Worldwide Web might offer useful insights.

Drawing on the findings of this study, one was that the content from the Brave browser still differed between the two participants. Here, one could try to investigate possible reasons, such as location, that might impact the search results considering that the page is supposed not to use the browsing history of a user. In addition, as discussed earlier in this paper, the orientational meaning in visual media expresses the creator's opinion (Lemke, 2002). One could try to analyse more in-depth what the structure of the SERP means and communicates. Further, the analysis of the Brave SERP found that the user can take matters into their own hands by easily choosing filters for their search. From this point, more research into the influence of the individual becomes crucial to understanding their influence on the filter bubble.

Considering the concepts of *selective exposure* and *confirmation bias*, more research on how people process the information they are presented with might also be needed. More specifically, one could focus on possible influences caused by these two concepts.

To finish this thesis, a reference to and reminder of some advice that schools and universities teach students: Never use only one source but read through various ones to make sure that different points of view are included. While most might be aware of potential political influences behind a traditional newspaper in the paper version, thus, probably try to read more than one, this consideration may get lost when quickly browsing through the Web. Still, it is essential to maintain a critical approach to content online and question possible intentions behind the found information.

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7. Appendix

Appendix A: E-Mail Outreach Text Sent to the Participants

Hey,

First of all, thanks a lot for agreeing to participate in the experiment for my Master's thesis. In total, I have recruited two international students to gather the data for my analysis. Of course, all personal information will be handled confidentially. I will not mention any specific details such as your name that would expose your identity. Instead, I will only include more general information like your age, gender and where you are from. By sending in your screenshots you agree to your data being used in this way for my thesis only. If you want, I will share the results of my analysis with you.

The aim of my thesis is to investigate whether searches online are influenced by the so-called “filter bubble”. A filter bubble is information filtering by an algorithm, based on, for example, your browsing history. I chose the war in Ukraine as the topic of my research. You might see some graphic content in your search results. Please let me know if you have any doubts about this topic or do not want to participate due to personal circumstances.

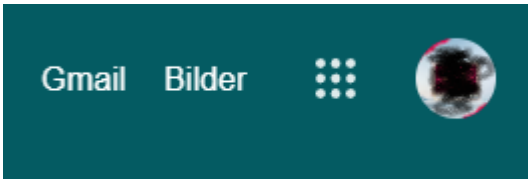
Let’s start with some general information about you. Please fill in the following details:

- Your gender:
- Your age:
- Your nationality:
- The country in which you study:
- What you study (Bachelor's, Master's, etc.):
- Have you ever heard about the filter bubble? (Yes/no)
- If you heard about the filter bubble before, do you take any measures to block it? Please list them.
- In which language(s) do you use Google usually? Please list all.
- Which language(s) is your laptop/computer set to? Please list all.
- Does Google have access to your current location? You can check this by looking at the bottom left corner when you open the search engine. If yes, please list the country/region.

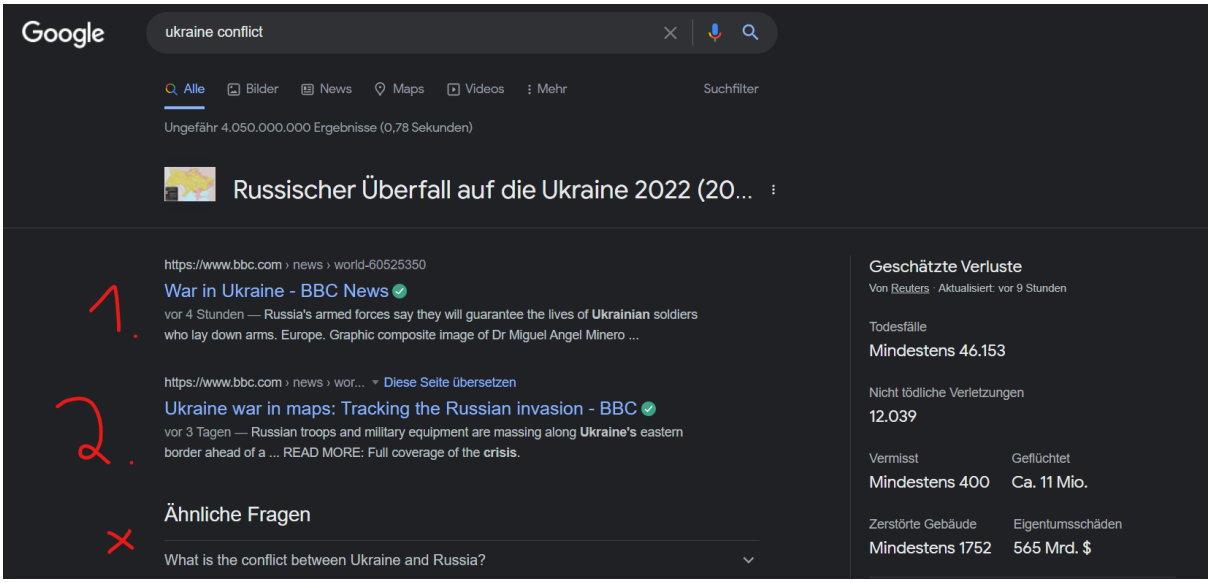
Please follow the instructions below carefully. If you have any questions, please do not hesitate to contact me. It is important that you collect the screenshots within two hours of receiving this mail. The reason for this is that the war is ongoing, thus, events can change quickly and this could impact the search results page.

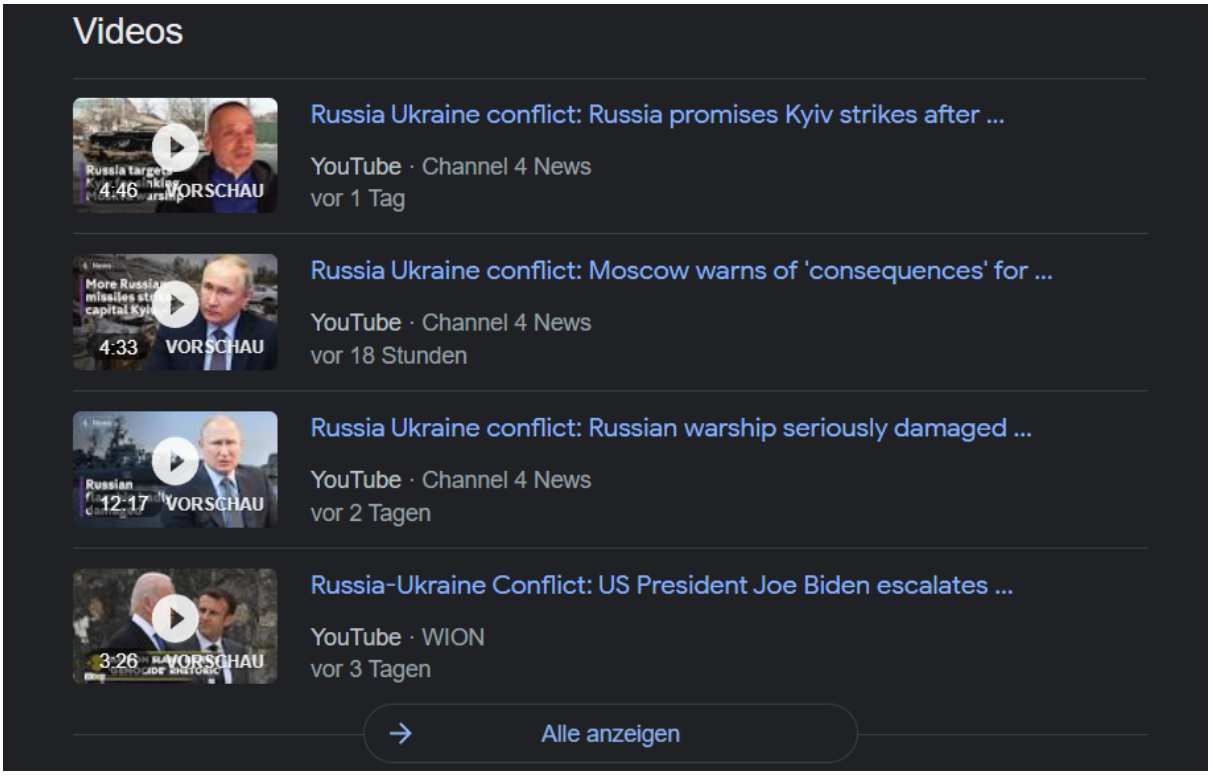
<u>The first part of the experiment</u>

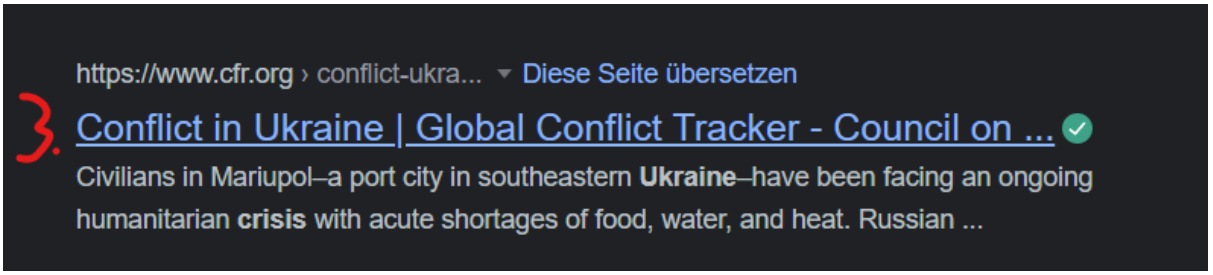
- Please **open Google in a Chrome browser**.
- If you have a **Google account**, please make sure that you are **logged in**. You can check this by looking at the top right corner of your browser:



- Next, please type **Ukraine conflict** in the search bar and press enter.
- Please take a screenshot of the first three search results that you see.
    - ***Instructions***: If you use Windows 10 or upwards: Press the *Windows* key, *Shift* and "S", **select the first search result including the search bar** with your search query and take the screenshot. If you need further instructions: https://www.pcmag.com/how-to/how-to-take-screenshots-in-windows-10
    - **Save this screenshot as a png. file**
    - **Take a separate screenshot of the second and third results if you have to scroll down to see all**. You don't have to include the search bar in these other two screenshots.
    - Please make sure that the **screenshots show the whole page**. This includes the total number of search results at the top and additional information on the right side and, if you see any, suggested videos.
    - You can **exclude** the suggested questions.
    - No need to add numbers in the screenshots but please **indicate in the filename which search result it is (e.g. firstpart1.png)**.
    - Please **copy the links from the first three search results** and **add** them to your response to this mail.



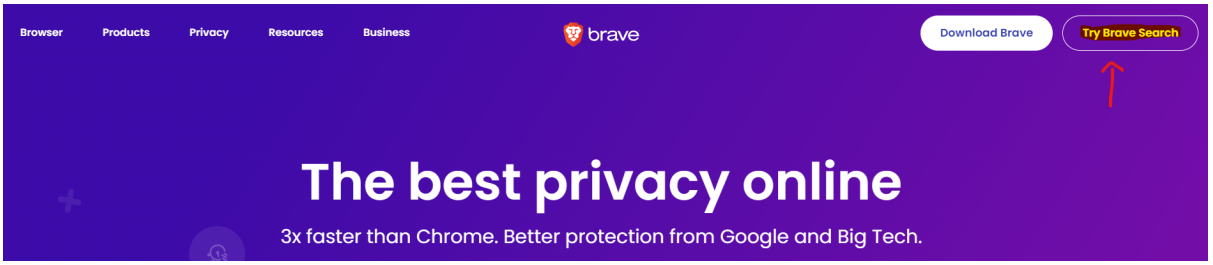




- **Please send me all files as an attachment in response to this mail.**

<u>The second part of the experiment</u>

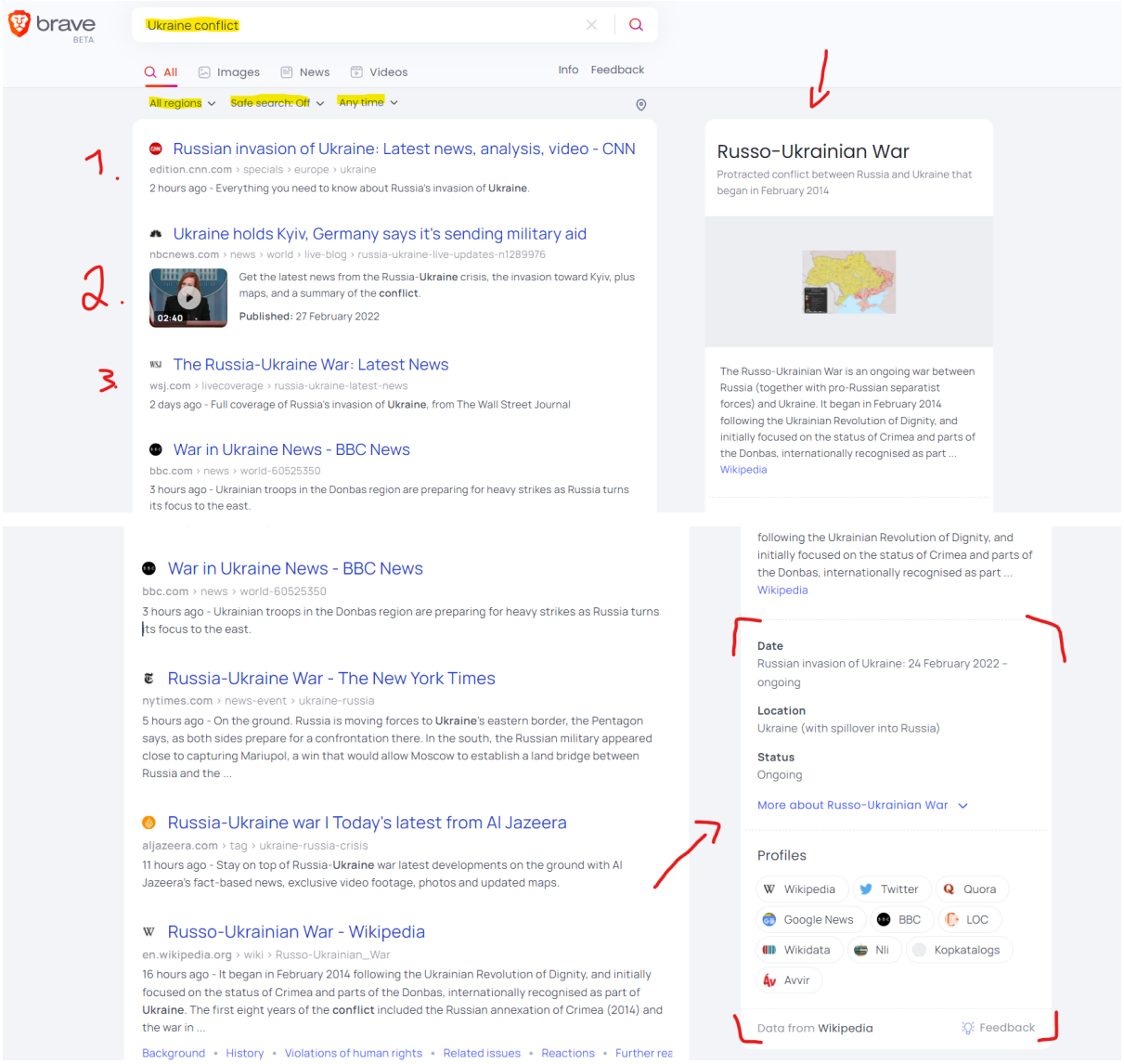
- Go to <u>https://brave.com/</u>
- In the top right corner, select “Try Private Search”



- Type **Ukraine conflict** in the search bar and press enter.
- Take a screenshot of the first three search results if they all fit in one. If you have to scroll down the page, take separate screenshots.
- Please make sure that the **screenshots show the whole page**, including the total number of search results. As well as additional information on the right side and, if you see any, suggested videos.
- You can **exclude suggested questions** if they show up.

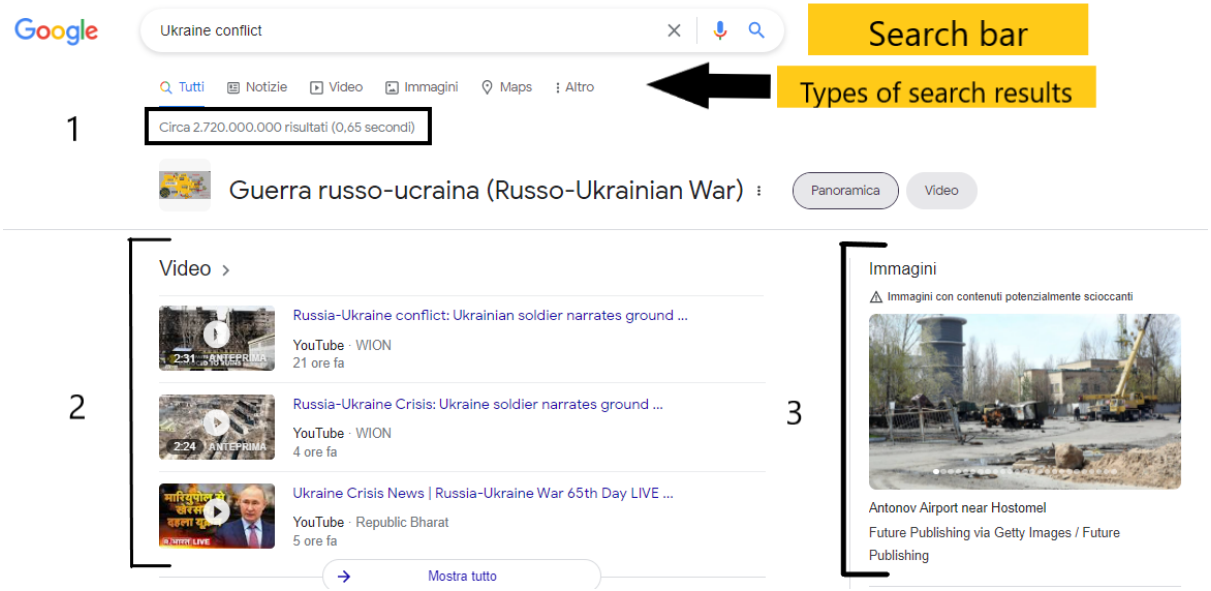
Search Results about The War in Ukraine: An Introductory Study about Framing and the Filter Bubble on the Search Engines Google and Brave, Marie Pauline Holten, Master Thesis 2022, AAU - Culture Communication and Globalisation

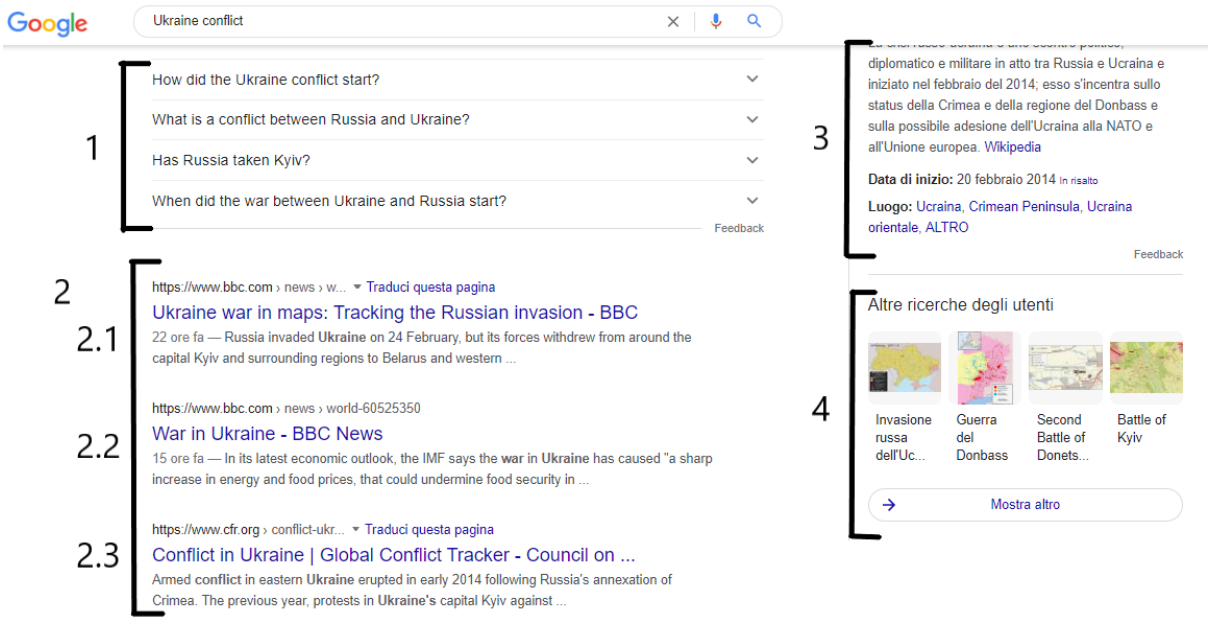
- No need to add numbers in the screenshots but please **indicate in the filename which search results (1,2 or 3) it is (e.g. secondpart1.png)**.
- Please **copy the links from the first three search results** and **add** them to your response to this mail.



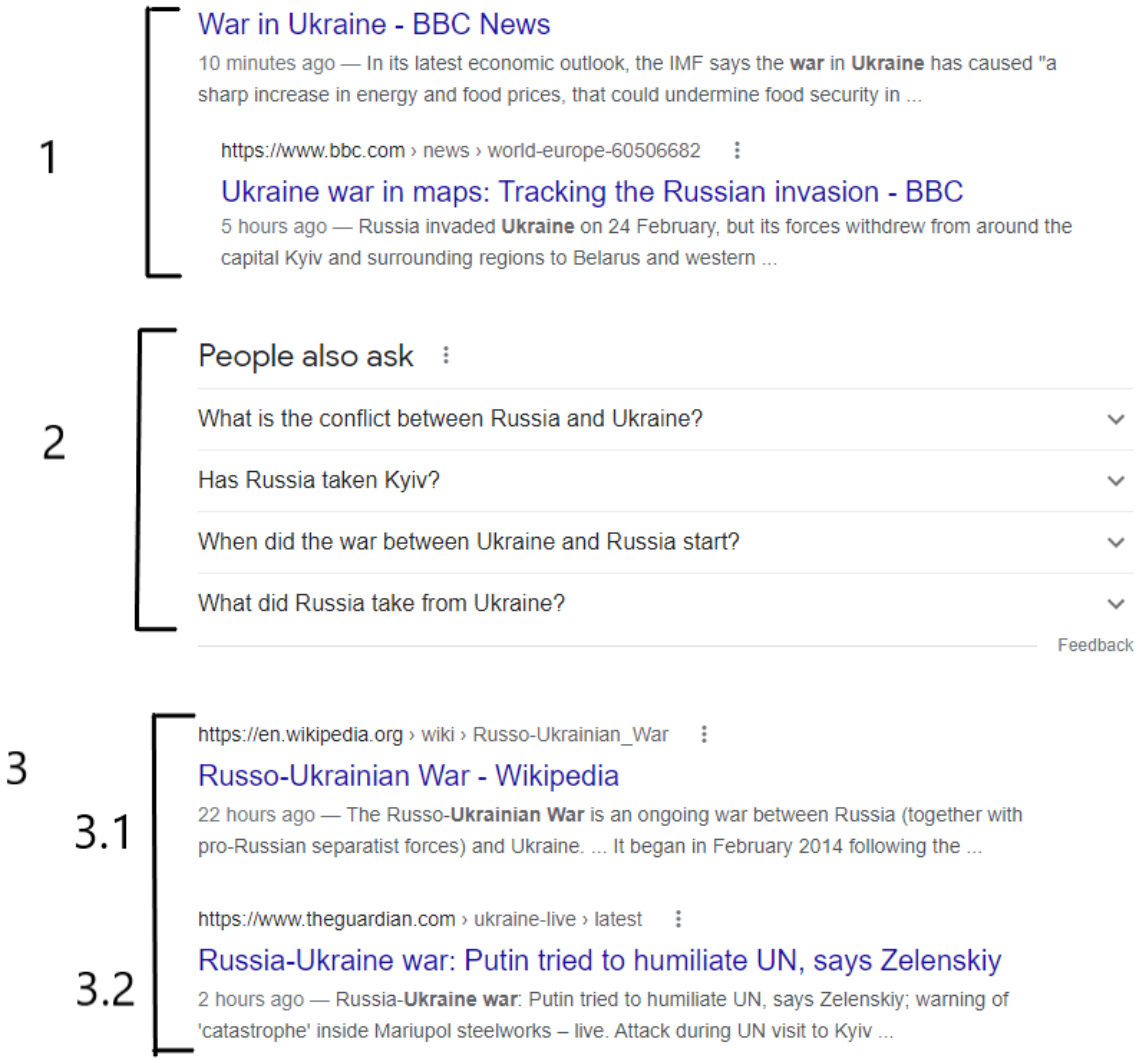
Appendix B: Screenshots provided by the participants

First participant

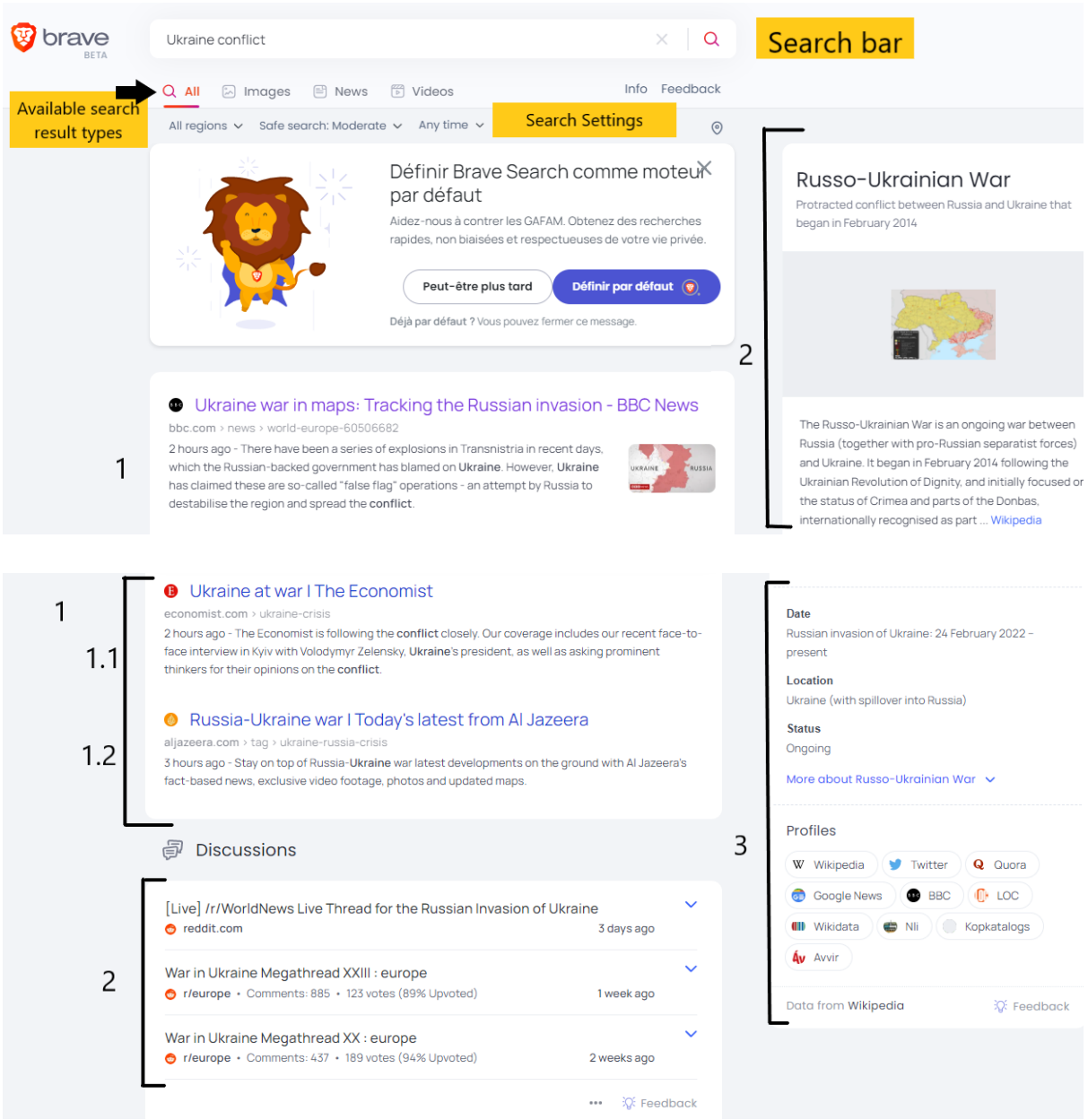




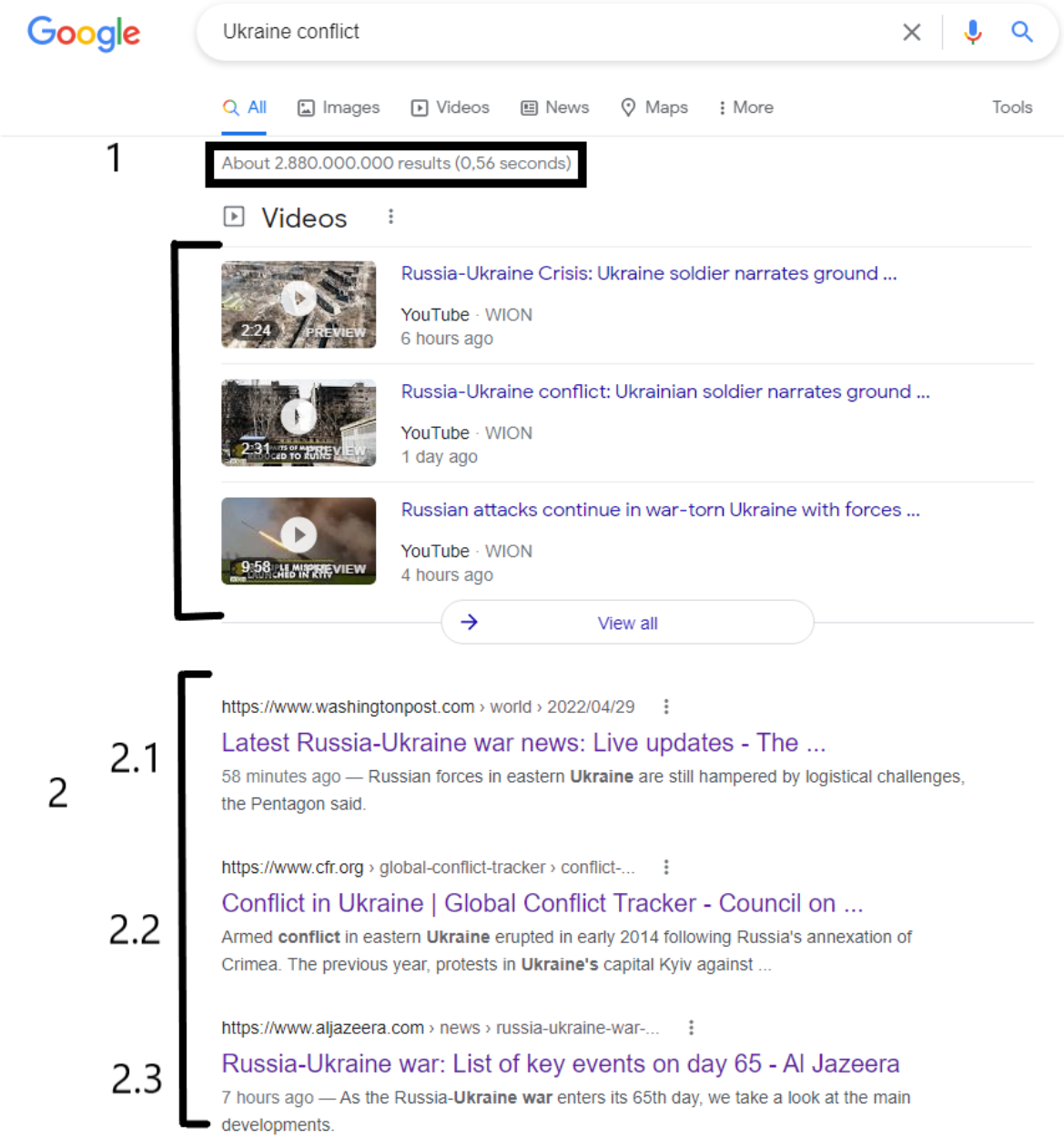
Search Results about The War in Ukraine: An Introductory Study about Framing and the Filter Bubble on the Search Engines Google and Brave, Marie Pauline Holten, Master Thesis 2022, AAU - Culture Communication and Globalisation



Search Results about The War in Ukraine: An Introductory Study about Framing and the Filter Bubble on the Search Engines Google and Brave, Marie Pauline Holten, Master Thesis 2022, AAU - Culture Communication and Globalisation



Second *participant*



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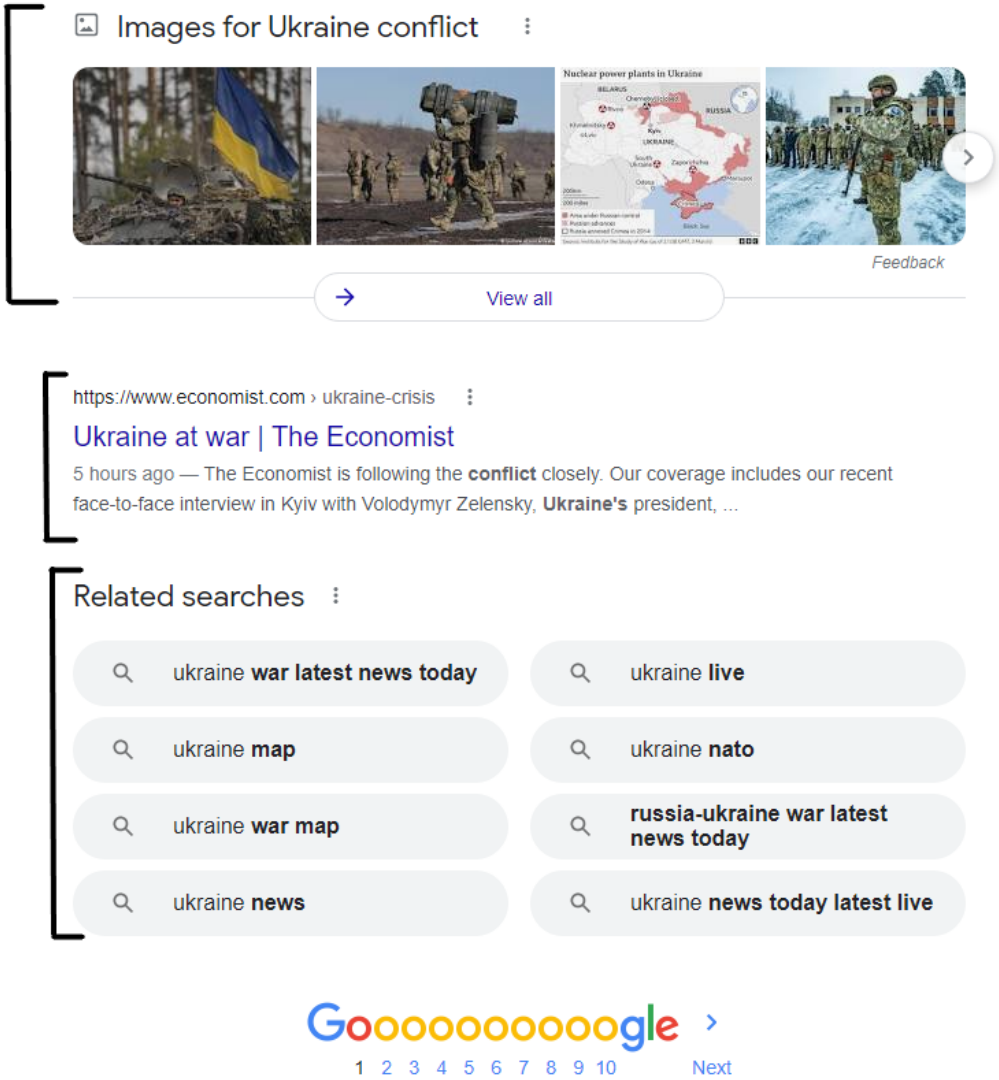

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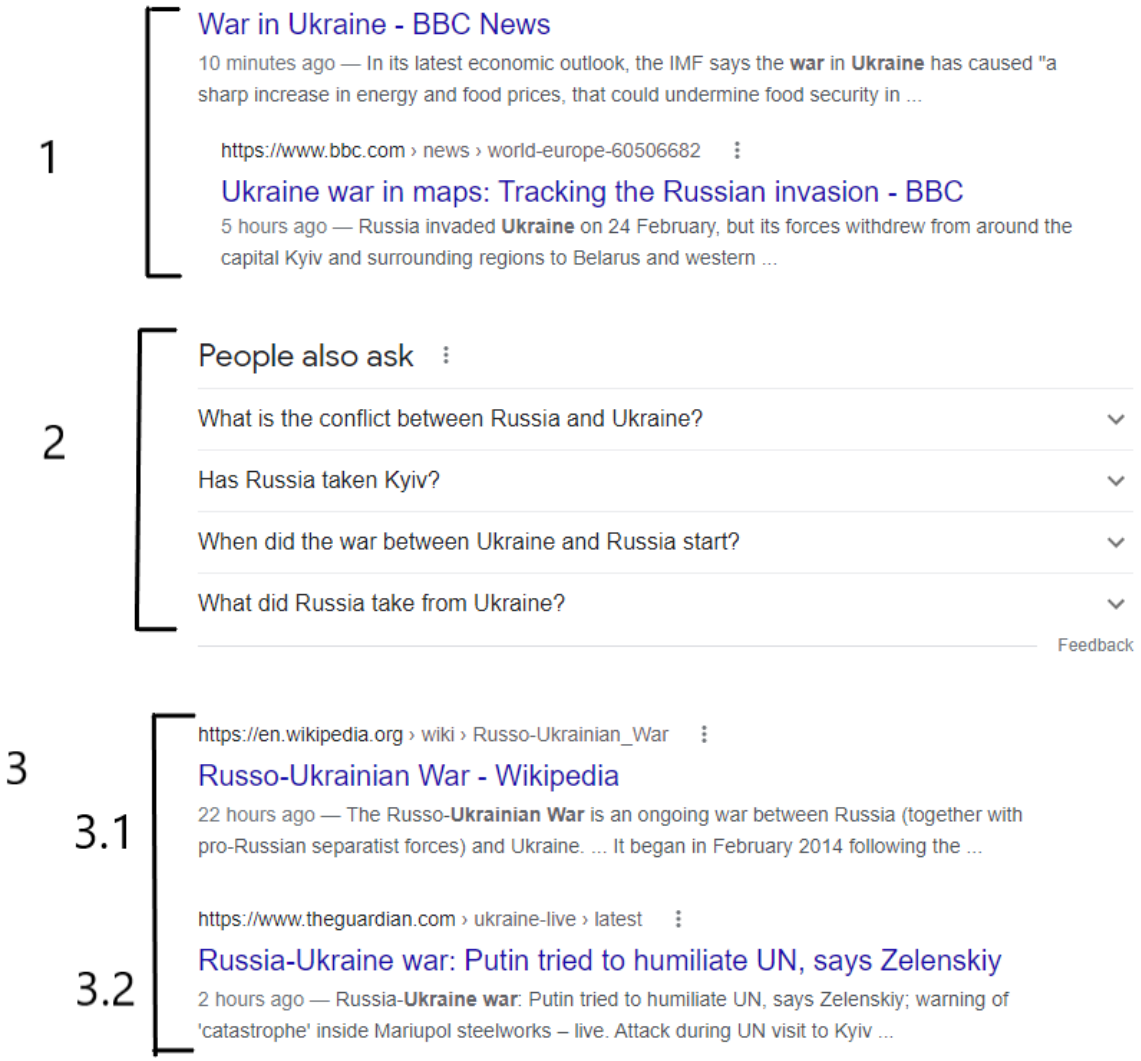

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