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BIASED POLITICAL INFORMATION IN SEARCH ENGINES AND THEIR EFFECTS

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Tag der Promotion:

To my family, for encouragement and

for introducing me to curiosity and creativity.

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Introduction

1.1 Importance of Search Engines for the Political Opinion Formation

1.1.1 Use of Search Engines for Political Information Seeking

Along with increasing digitization, the search for political information in the online world has also increased. In a 2020 survey conducted as part of the dissertation project, 85% of 1200 respondents in Germany said that they use search engines at least once a week, and as many as 61.42% of respondents use them at least once a day (see Figure 1.1, questionnaire built on Dutton et al. 2017, see also chapter 2 for more information on the sample). A study from 2017 has found comparably high values in the frequency of search engine use in several countries (Dutton et al. 2017).[1]

This study adds to the importance of search engines for politics. It reveals that search engines have been an important source for political information search as they are the first place to go for immediate information about a new political event, political topic or an unknown politician (Dutton et al. 2017). Likewise, having a specific information need leads most users to consult a search engine, for example, when learning about political gaffes. Further, studies suggest that they might influence and are important for voting decisions (Epstein and Robertson 2015; Dutton et al. 2017). For instance, 68% of voters with access to the Internet rated online search as important to their voting decisions (Dutton et al. 2017).

Concerns have been raised in the scientific community that the access to online knowledge structuring provider Alphabet (Google) wields the most power. Tech firms like Alphabet (Google), Amazon and Apple have gained increasing market power that leads to monopolistic

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1. They found that 64% of all their respondents across the countries Germany, Britain, France, Italy, Poland, Spain, and the United States use search engines at least once a day.
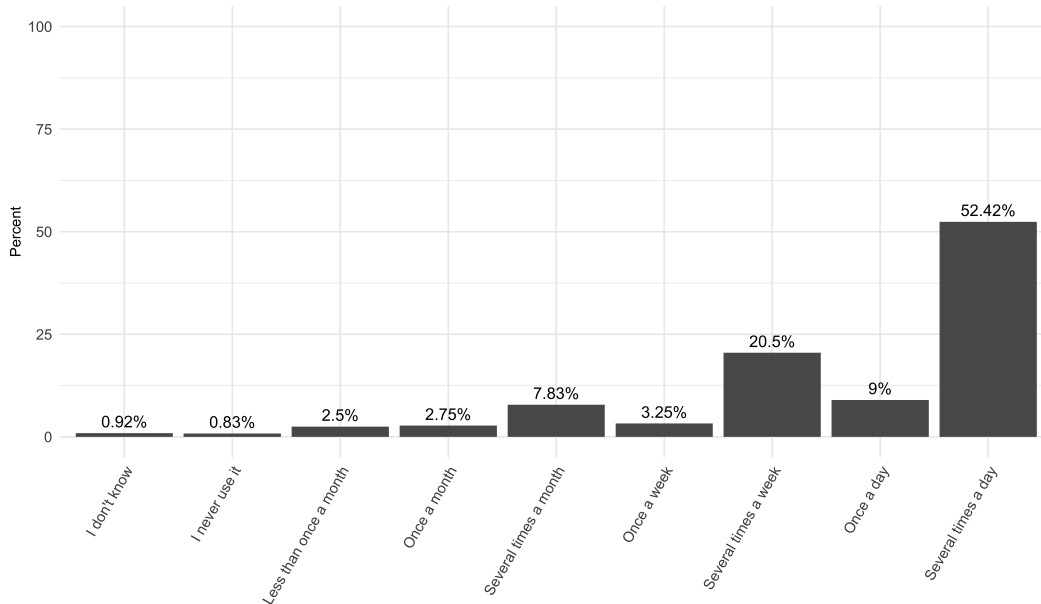
Figure 1.1: Frequency of using a search engine in Germany

online platforms markets (Moore and Tambini 2018). Google search is by far the most used search engine with more than 90% market share worldwide.[2]

1.1.2 Perceptions, Political Interest and Information Seeking

Internet users often seek information about politicians, which is also guided by how they perceive them. Various empirical studies have been conducted on the perception of politicians. These studies have found that the party membership, gender and nationality (international context) of politicians have a significant influence on how they are perceived.

The party affiliation of politicians has been gaining much attention to explain perceptions (Hayes 2005; Bittner 2014; Bittner 2011) because it determines what they emphasize in their speeches and writing. As politicians are repeatedly talking about party issues and are often present in the public when it comes to party issues, citizens tend to associate the politicians with the party issues (Hayes 2005). The so-called partisan stereotypes that

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2. The data has been obtained from the website https://gs.statcounter.com/search-engine-market-share (June 2021).

are emerging are different depending on which party the politicians belong to (liberal or a conservative). The difference relies on the focus each party gives to political issues. An important contribution has been made by Bittner (2011), who showed that political leaders of conservative parties tend to be evaluated more on a competence-dimension and those of liberal parties more on a character-dimension: voters perceive them through a partisan lens and evaluate conservative politicians as having more traits like leadership, intelligence and knowledge, while they evaluate left leaders as having more traits like being compassionate, honest and caring. Additionally, in the international political arena, the national identity of politicians seems to be crucial for the portrayal in media as the news coverage focuses more on foreign leaders than on their countries' (Balmas and Sheafer 2013) and seems to have an increasingly negative tone (Balmas 2017). One of the dissertation studies also reflects that, in the international context, other characteristics are more dominant in affecting the level of interest. The national identity matters for online seeking in European countries as users appear to pay more attention in online search to national politicians of their own countries than for supranational politicians of the EU (Pradel et al. 2021, see also chapter 4).

Another important determinant of how politicians and other groups are perceived and evaluated is their gender identity. Research has repeatedly shown that politicians are perceived and evaluated based on gender stereotypes, for example, female politicians as being perceived as more caring, being less competent and having less leadership skills compared to their male counterparts (McDermott 1998; Huddy and Terkildsen 1993). As a consequence, this can lead to unfavorable voting outcomes for female politicians when individuals perceive them in a gender-stereotypical way (Sanbonmatsu 2002; Bauer 2015).

While gender has a role in how politicians are seen and assessed, research suggests that people hold higher qualification requirements for female politicians (Bauer 2020) and follow up on them more. For example, individuals are generally searching for more information about female politicians and especially more competence-related information than for male

politicians (Ditonto, Hamilton and Redlawsk 2014). Thus, there seem to be significant gaps in information seeking for politicians depending on their gender. Importantly, several research suggests that the information that users would find in new media like search engines, the first place to go to get immediate information (Pradel 2021a; Bonart et al. 2019; Otterbacher, Bates and Clough 2017; Kay, Matuszek and Munson 2015), and media like television, newspapers or tweets are gender-biased (Haraldsson and Wängnerud 2018; Shor, van de Rijt and Fotouhi 2019; Van der Pas and Aaldering 2020; Hooghe, Jacobs and Claes 2015; Mertens et al. 2019).

However, different social identities such as gender, party affiliation and race along with their associated and entangled stereotypes might play a significant role in the perception of politicians. It becomes apparent that the previously described partisan stereotypes and gender stereotypes are intertwined, as there is an overlap of stereotypes about liberal politicians and female politicians, for example, by being evaluated mostly on a character-dimension such as caring. Recent contributions have stressed that gender effects can be conditional on parties' political ideology (Schneider and Bos 2016; Ditonto, Hamilton and Redlawsk 2014; Wagner, Gainous and Holman 2017; Bauer 2018; Pradel 2021a). For example, individuals were especially prone to search for competence-related information about female politicians when they were female too and Republican (Ditonto, Hamilton and Redlawsk 2014). Other new online information like Wikipedia's articles can also be conditionally biased by gender and party ideology (Pradel 2021a).

Knowing that information seeking and online information can be biased by different social groups, the question remaining is how individuals perceive politically biased information and how they get affected. First evidence suggests that biased information in search engines can affect the trust in the content but might also affect general trust in the media source, for example, in the case of hate speech and positively biased content about refugees in search engines (Pradel 2021b, see also chapter 3). The study also shows that it can lead to polarized attitudes between the extreme left and right and points to selective exposure in

online search among them. For instance, it leads to more hostile attitudes in individuals who identify as having a more extreme political right-wing identity, while it leads to more positive attitudes among those self-identifying as an extreme left-wing. Related to social identities, preexisting attitudes can impact the perception of biases. For example, a study experimentally showed that individuals with high levels of sexist attitudes were also less likely to recognize when image results in search engines were gender-biased (Otterbacher et al. 2018). But crucially, being confronted with gender-biased information seems to lead individuals to amplify stereotypes and perceive reality in a more stereotypical way (Kay, Matuszek and Munson 2015).

Search engine suggestions (also called search predictions, query suggestions, Google autocomplete) are a special case distinctive from other mass media outlets since they are influenced by user information. Thus, they also show the latent interest of Internet users. Search queries and search engine suggestions bring, therefore, a new innovative measurement of citizens' political-related (search) interests that are difficult to measure when asking citizens directly due to memory difficulties and social desirability (Pradel 2021*a*; Stephens-Davidowitz 2014).

The dissertation aims to shed light on both the existence of biases in political information in search engines and how biased political information affects political attitudes.

1.1.3   Research Gap and Research Question

Although search engines play an important role in political information search and are generally trusted, the existence of biased political information and its potential impact on political attitudes remain unknown. Most research on search engines has a computational or information science perspective (Kay, Matuszek and Munson 2015; Otterbacher, Bates and Clough 2017) and focuses less on specifically political information in search engines. In contrast, I will take a political science perspective and consider findings from political

communication research, information science and insights from social psychological research for analyzing the effects of biased political information in particular.

It is essential to consider new online platforms such as the Google search engine in political communication research and political science in general. People are exposed to and interact with political information on these new digital platforms. In the discipline, however, search engines have mainly been left out, which is surprising due to their relevance in everyday life and political information seeking. It has not been taken into account what role search engines play in political opinion formation either. Here, the thesis takes this as a starting point and tries to find out if i) biased political information in search engines exists in and across countries and ii) to what extent political biases can influence political attitudes.

The investigation of biased political information on these platforms and its effects is crucial because, as already mentioned earlier, citizens use them frequently when it comes to political information seeking and especially for seeking information about a new or unknown political actor (Dutton et al. 2017; Trevisan et al. 2018). Importantly, people also generally tend to trust them and perceive them as neutral (Pan et al. 2007; Schultheiß and Lewandowski 2021; Schultheiß, Sünkler and Lewandowski 2018; and Pradel 2021*b*, see also chapter 3).

1.2   Existence and Effects of Political Bias in Search Engines

1.2.1   *What We Know about the Existence of Algorithmic Bias*

An important contribution has been done by Friedman and Nissenbaum (1996) who acknowledge that computer systems including search engines can be systematically biased. They use the term "bias" "to refer to computer systems that systematically and unfairly discriminate against certain individuals or groups of individuals in favor of others. A system discriminates unfairly if it denies an opportunity or a good or if it assigns an undesirable outcome to an individual or group of individuals on grounds that are unreasonable or inappropriate"

(Friedman and Nissenbaum 1996).

Importantly, search engines can contain stereotypical and racist information for social groups, because users' input influences search engine content like search engine suggestions, which empirical research has repeatedly shown (e.g., Noble 2018; Kay, Matuszek and Munson 2015; Otterbacher, Bates and Clough 2017; Pradel 2021*a*). These inputs are prone to bias, as search queries are also influenced by the stereotypes and attitudes users hold. Most importantly, though, they can be amplified through the algorithmic nature and thus result in high levels of stereotypical and racist information in search engines. A substantive contribution done by Safiya Umoja Noble (2018) provided comprehensive and evidence-based insights into Google's discriminatory practices regarding stereotypes and racism, for example, by providing users with mainly pornography-related content when searching for women of color. There are plenty of examples that show that algorithms, in general, are prone to biased outcomes towards certain groups, for example, image recognition or connotation services, for example showing gender-biased connotations for politicians (Schwemmer et al. 2020). Here, also experimental evidence suggests that user inputs typically used as training data to create these services in an automated way are likely to be biased because of individuals holding group-based stereotypes (Otterbacher 2018; Otterbacher 2015). Thus, biases based on social group membership may also lie in the nature of several – especially algorithmically driven – search engine services like search engine images results and image connotations. Research found that Google shows stereotypical and negative information to users for some social groups (Bar-Ilan 2007; Bar-Ilan 2006; Baker and Potts 2013). For instance, research revealed that images in search engine image results mirror gender stereotypes (Otterbacher, Bates and Clough 2017; Kay, Matuszek and Munson 2015) and racism (Noble 2018). Even Google maps displayed racial slurs to users (Noble 2018).

Although research on this topic is scarce in the field of politics, studies point to racist searches for politicians, as in the case of Barack Obama (Davidson-Schmich 2011) and biased

search engine suggestions based on gender and party affiliation of politicians (Pradel 2021*a*).

The UN women campaign from 2013 (UN Women 2013) offers another illustrative example of biased information in Google. They showed original search engine suggestions for women containing gender stereotypical and negative information. As already pointed out before, search engine suggestions are a particular case as they are an algorithmic-based service that autocompletes search queries based on what other users have searched for about the same topic. Research has also pointed out that search engine suggestions could be used to measure latent stereotypes, attitudes and attention (or interest) users give, for example, to politicians and other social groups (Pradel 2021*a*; Baker and Potts 2013).

Research in this area remains still limited to the political science discipline, although biased information in search engines, as shown in the next chapter, can be persuasive and reinforce certain groups' political attitudes.

1.2.2   What We Know about the Effects of Algorithmic Bias

The development of algorithm-based services and their use encompasses many areas of society, from private life in the provision of information by search engines to supported decision-making in political institutions (Katzenbach and Ulbricht 2019; Spielkamp 2019). There have been cases where the use of such systems has subsequently been rendered illegal, but even if they are (still) legal, they could be ethically problematic, for example, in terms of biases (Franzke, Muis and Schäfer 2021). Search engines like Google Search, although predominantly algorithm-driven (Brin and Page 1998; Suvillian 2017; Introna and Nissenbaum 2000), are important in everyday life as well as in the political arena because individuals acquire immediate knowledge here. There has, however, been little research on them in terms of their potential impact in the case of political bias. Information produced algorithmically based on user input is, as shown earlier, likely to be biased toward certain social groups because individuals tend to stereotypes and biased attitudes (Allport 1958; Tajfel and

Turner 1979), and the algorithm learns these along. At the same time, research points to negative consequences of biased information in search engines, such as persuasive and possibly polarizing effects in attitudes.

Primary forms of biases are biases that relate to the structure of search engines, for example, through the ranking of search engine results, and those that relate to content biases, for instance, in the form of stereotypes and racism. Both structural biases and content biases in search engines can impact user attitudes and behavior. Still, this thesis focuses on content biases, i.e., biases in political information, and their impact on attitudes. The fact that biases in terms of structure do matter is shown by the emergence of search engine optimization (SEO) as an industry aimed at altering the position in which websites are displayed in search engines to gain more visitors (and customers) (Schultheiß and Lewandowski 2020). It is known in the industry and has been shown in research that only a few changes in the ranking positions in search engine results can generally make a massive difference for the likelihood of clicking on websites and seems to be widely unknown by users (Schultheiß and Lewandowski 2020). However, lower-ranked websites may contain different and valuable information than those ranked at the top (Schaer et al. 2016). Studies suggest, for instance, that ranking pro-politician websites in different orders can affect candidate preferences of particularly undecided voters (also called search engine manipulation effect) (e.g., Epstein and Robertson 2015; Epstein et al. 2017), but research is needed to determine whether it also applies to countries with other political systems like in Europe.

When it comes to biases in media content, we know from research that negative coverage and induced group threat when portraying social groups like refugees in traditional media like television and newspapers can reinforce stereotypes and political attitudes, can lead to hostility towards a group (Brader, Valentino and Suhay 2008; Eberl et al. 2018; Wirz et al. 2018) and change political attitudes (e.g., Valentino 1999; Czymara and Dochow 2018, see also chapter 3). However, we do not know how politically biased information in search engines

affect users. Here, the medium is systematically different. It is much more user-driven since users actively search for political (or other) topics they are interested in and get information recommended by the engine. This recommended and potentially biased information might be much more explicit than other media content and may affect individuals during the active information acquisition process. Crucially, the presented information implies that well-positioned results in search engines are the most relevant and trusted, and research argues that less experienced users might be even more affected by biased information and adopt stereotypical information, while others may react differently (Baker and Potts 2013). Furthermore, research revealed that individuals infer public opinion from media like news articles (Gunther 1998) and social media (e.g., Neubaum and Krämer 2017), according to the so-called persuasive press inference model (Gunther 1998). Thus, if the users implicitly know that previous searches on the same topic create search suggestions, they may even infer what other users think about the same topic in a stronger way. This may lead to even stronger reactions to the political biases (also compared to other media).

However, what we already know is that biased information in search engines could exaggerate stereotypical attitudes. Study results suggest that search engines that present occupations in a gender-stereotyped manner in image results cause participants to be less accurate, but more gender-stereotyped, in their perceptions of the real distribution of occupations (Kay, Matuszek and Munson 2015). Social identities and pre-existing attitudes are crucial in determining how biased information affects individuals. Those who are more prone to stereotypes, for instance, people with scoring high on sexist attitudes, may be less likely to recognize that systems are biased against groups (Otterbacher et al. 2018). Interestingly, this also seems to apply to the political sphere, where distorted political information can trigger polarized political attitudes: In an experiment as part of the dissertation, biased information in the form of hate speech towards refugees led to more hostile attitudes among those identifying themselves with the righter margin of the political spectrum. In contrast,

those identifying more with the left margin of the political spectrum got less restrictive in immigration and asylum policy attitudes (Pradel 2021*b*, see also chapter 3).

Biased political information in search engines could be especially harmful because users tend to generally trust them and perceive them as neutral (Pan et al. 2007; Schultheiß and Lewandowski 2021; Schultheiß, Sünkler and Lewandowski 2018), so they may also trust biased results. However, the second dissertation study suggests that when search engines are politically biased, for instance, in the form of negative or positive information about refugees, they are perceived as politicized and trust in them as a source and their content erodes (Pradel 2021*b*, see also chapter 3).

1.2.3   Social Identity Theory: Explaining Biases and Persuasive Effects

In my dissertation, I aim to provide insights into the extent of biases in political information in search engines and how biased political information can influence political attitudes. Particularly, I take the perspective that social identities matter for both the emergence of biased political information as well as its effects on individuals. Social identity theory (Tajfel et al. 1971; Tajfel and Turner 1979) provides the theoretical framework for the dissertation and is an important component of all studies.

The theory was built to explain intergroup behavior and conflict. It states that individuals have different social identities, which means that they belong to different social groups. The theory states that individuals are categorized in groups by others but also categorize themselves into groups, and these categorizations by themselves or others do not necessarily match. For example, vital social identities can be in the political context: their party identity (such as being a member of the center-right party CDU), their identity as party leader, or their gender identity. In different political and situational contexts, different identities or a combination of them can be salient and important for how citizens perceive, evaluate and ultimately behave toward political actors. Similarly, political actors themselves behave, as

deduced from the theory, based on their social identities and especially those that are salient in a situation. Accordingly, this also results in what citizens pay attention to in political actors and, thus, what they are interested in and seek online.

To better understand the theory and its arguments in the political context, an illustrating thought experiment may help (Pradel 2021a and chapter 2 for a more pronounced explanation). Imagine that a female politician is a member of the party The Greens in Germany. In certain situations, her gender identity could come to the fore, for example, when other politicians, the media or herself would initiate it (intentionally or unintentionally). Internet users could search specifically and check-up her background and competence, as the political profession has been strongly associated with masculinity for decades (Huddy and Terkildsen 1993). However, in the international arena, when holding, for example, a speech in another country, other social identities may be important. There, citizens may less be interested in her as a politician and would pay less attention to her in online search, or if so, perceive her more as a German representative with less focus on the gender identity or party membership. Thus, if they pay attention, they may focus on different aspects, such as having the national identity as a German.

To be clear, when being confronted with skewed political information, such as underlying political attitudes or a clear political direction, social identities such as the recipient's political ideology matter. When Internet users actively search for a salient political topic and the search engine recommends information with a conservative political bias, it is plausible that right-identifying individuals are affected differently than left-identifying ones. For instance, biased content recommended by a search engine triggers certain identity-based attitudes of right-leaning individuals. They may also feel validated in their attitudes (Baker and Potts 2013).

As outlined before, the Google algorithm uses previous search queries from users to formulate search suggestions on the same topic. Therefore, taking this theoretical perspective,

my main argument is that the social identities of social groups such as political actors influence what information individuals seek and, thus, the information the search engines, using their algorithm, provide. Moreover, I argue that they also influence how biased information affects individuals and their political attitudes.

1.3   Overview of Studies and Implications

1.3.1   Studies and Main Findings

The dissertation consists of three studies that complement each other and additively contribute to the subject political biases in search engines.

In the first study (chapter 2) with the title *"Biased Representation of Politicians in Google and Wikipedia Search? The Joint Effect of Party Identity, Gender Identity and Elections"*, I analyze the existence of biases by gender and party membership in the information about German members of the Bundestag in the Google search engine and their Wikipedia articles. Both information sources are relevant for citizens searching for political information, and thus, the investigation of potential biases in information is critical: Google is the first port of call to get information immediately, and Wikipedia results are listed at the top of search results, and users click most often on them when searching online (Dutton et al. 2017; Pradel 2021*a*). Additionally, I examine whether political events may impact the biases in political information. As outlined before, several strands of literature and theoretical considerations of the social identity theory (Tajfel et al. 1971; Tajfel and Turner 1979) highlight that both perceptions and evaluations of politicians and political communication about them may be biased, with the fundamental importance of salient social identities such as gender identity and political ideology. The study takes the stand that also these important social identities of political actors, their gender identity and political ideology, are crucial for the information seeking online. Google search predictions could be biased, which are approximately latent

interest in political actors as they are algorithmically produced based on prior Google users' searches on the same topic.

Contributions to the literature stress the importance of the party ideology of politicians for the perception of political actors (Hayes 2005; Bittner 2011; Bittner 2014). In particular, the perception is prone to differ depending on whether their ideology is more liberal or conservative, driven by the process of frequently talking about party issues that are then associated with them (i.e., partisan stereotypes). Liberal political leaders are more likely to be evaluated on a character dimension covering traits like "cares", "compassionate", "honest", while conservative leaders are more likely to be associated with traits on a competence dimension like "strong leadership", "competent", "determined" (Bittner 2011).

Further study findings explicate that the gender identity of political actors is also influential in the perception and evaluation of political actors (McDermott 1998; Huddy and Terkildsen 1993; Bauer 2015; Bauer 2020; Sanbonmatsu 2002) which implies that it should be significant for information search and thus search suggestions. Female and male political actors are perceived differently based on gender stereotypes, which can also lead to differences in how they are evaluated and what information is searched for them, and information users find in traditional and digital media. That also implies a study showing that participants seek more information for female politicians, particularly more competence-related information (Ditonto, Hamilton and Redlawsk 2014). The relevance of stereotypes for perception and content provision is echoed by studies on search engines, which repeatedly have shown perpetuated gender stereotypes and other group stereotypes like negative racial stereotypes in search engine results (Otterbacher, Bates and Clough 2017; Kay, Matuszek and Munson 2015; Baker and Potts 2013; Noble 2018; Bar-Ilan 2006). Though, as mentioned earlier, the interplay of different social identities is also imperative, notably gender identity and political ideology, because gender biases can vary by party membership and party ideology (Ditonto, Hamilton and Redlawsk 2014; Bauer 2018; Schneider and Bos 2016; Wagner, Gainous and Holman

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2017).

Therefore, to check whether the search suggestions for important social identities of politicians vary systematically, I analyzed the search suggestions of a period of one and a half years using automated text analysis and a self-developed dictionary. More precisely, I checked whether personal information, such as family status or body features, varies relative to information about their role as a politician, e.g., the party they affiliate to, their election program, or negotiations. There is a bias but only for the conservative parties CDU/CSU and the extreme right party AfD. There I found search suggestions for female political actors to be relatively more competence-related than personal compared to male political actors.

To examine the influence of political events, I looked at how biases change around an election. Here it becomes evident that biases in information can also change around crucial political events. The findings also echo other studies that describe a likely change in political information also strategically starting from politicians themselves around elections (see partisan trespassing strategies, e.g., Sides 2006; Hayes 2005), which can have different effects for women and men (Bauer 2019). Another important factor when studying online information search is Wikipedia, because, as mentioned, its articles have a very wide range since most users click on them in the search results. Thus, I also analyzed Wikipedia articles of the same political actors with the same dictionary approach. Here, I found more personal information than role-related information regarding female politicians from the conservative party CDU/CSU and the extreme right parties AfD than for male political actors. This first study shows that information in search engines can be biased and that it could lead to disadvantages if systematically different information is searched and provided for female and male politicians. It also highlights the need to promote investigation and monitoring of fairness in the provision of search engine suggestions. After all, it is also the first result that users see and could even amplify biased searches.

While I analyzed political biases in search engine suggestions in the first study, this study

is limited so far as it does not provide insight into how political biases may influence search engine users. Research on the effects of potential inherent political biases in search engines on political attitudes – which are mainly perceived as neutral and trusted – is also scarce. The second paper *"The Impact of Hate Speech in Search Engines on Political Attitudes – Evidence from an Online Experiment"* (chapter 3) sets out to address this research gap and adds thereby to the investigation of political biases and their impact. Following the social identity theory (Tajfel and Turner 1979), the study takes the view that social identities also matter for how information is processed and affect individuals and incorporates the role of critical social identities in the study, that is, the political ideology.

I used an online experiment to examine how hate speech compared to positive and neutral speech about refugees in search engines affects policy preferences and the general trust in the communication source as well as the specific content. Before conducing the experiment, I got an approval from the ethics commission of the Faculty of Management, Economics and Social Sciences at the University of Cologne, pre-registered and published a pre-analysis plan on EGAP[3]. In the online experiment, I randomly assigned participants to eight groups by using a 4 x 2 factorial design in which I varied both the tone of the expressions about refugees (control, positive, neutral, negative) as well as the source that provides participants with the content about refugees (search engine and politician). The analyses support the theory that the users' social identities have an impact on how political information affects their political attitudes, that is, whether individuals identify themselves as having a right- or left-wing ideological self-identification.

I found that all refugee-related information in search engine suggestions, either having hate speech, positive, and neutral tone, have no direct effect on immigration and asylum policy for all individuals to the same extent: it is striking that hate speech in search engine suggestions has a polarizing effect between strong left-wing and extreme right-wing individuals. Hate

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3. The pre-registration and the pre-analysis plan were published on April 19th 2020, both available on `http://egap.org/registration/6647`.

speech via search engines makes people with a more extreme right political ideology, as well as populists with a right political ideology, more antagonistic toward refugees. Interestingly, however, the attitudes between the extreme left and right are much closer in the positive search suggestions condition than in the other conditions with refugee-related content (i.e., negative and neutral). In this study, the results also show that search engines are typically more trusted than other potentially politically biased sources such as politicians. When the search content is favorably or negatively skewed, however, search engines are regarded as politicized. As a result, trust in pro-refugee and anti-refugee search predictions, as well as general trust in the search engine as a source of information, is eroding. I also explored the role of trust in refugee-related information in more detail and found effect heterogeneity: those who identify themselves as right-wing have a higher level of trust in the search engine's hate speech material about refugees than those with a left-wing self-identification. At the same time, people who have higher trust levels in hate speech are more averse to refugees in terms of immigration and asylum policies. While this study focuses on hate speech effects, it also tries to get a glimpse at online search behavior and selective exposure by political self-identification. Crucially, I found, in addition to the polarizing effect of hate speech, that people identified as right-wing are almost three times more likely to click on hate speech search suggestions than people self-identified as left-wing. To conclude here, left-right self-identification and trust play a vital role in how we perceive and engage with politically biased information in search engines. This discovery is concerning because it might mean that people with extreme political ideologies will tend to enter a filter bubble as they are susceptible to hate speech.

Both studies (chapter 2 and 3) emphasize on the existence and potential effects of biases, with the perspective that gender identity and left-right political identity are important social identities for online search, but the study of other political contexts is still lacking. When it comes to politics, not only national politicians matter. In particular, when the focus lies on foreign politics, research indicates that the media pays increased attention to foreign

political actors (see increasing personalization (Balmas and Sheafer 2013)). In the third study (chapter 4), *"Googling European Politicians: A Comparative Analysis of Latent Political Interest in Europe with Search Prediction Data,"* my co-authors Fabian Haak, Sven-Oliver Proksch, Philipp Schaer, and I took a cross-national perspective and looked at what other social identities can further explain the patterns in search engine suggestions. To analyze latent interest in European politicians within and comparatively across countries, we used a new approach: we analyzed the stability and similarity of search suggestions for European politicians in 10 European countries (i.e., Belgium, Czech Republic, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, United Kingdom), which approximately measure the search interest of users on a daily basis. We used an adapted version of the Jaccard similarity coefficient (Jaccard 1912) measuring stability over time and similarity across countries. This multi-country comparative analysis is so far not possible with other available Google query data like Google Trends, which does not allow comparing multiple politicians and countries (Scharkow and Vogelgesang 2011).

The results show that national identity is another essential component of search interest and biases in search engine suggestions in the European context. Here, search engine suggestions change more rapidly, which approximately indicates that search interest is diverse. Another intriguing question concerns whether supranational political actors receive attention in online search. Here, the findings tell us that besides higher volatilizing search suggestions for national politicians, search suggestions for top candidates (*Spitzenkandidaten*) of the European election 2019 have also been – compared to other political actors – much more volatile. The finding is noteworthy because it suggests that, while national identity is most crucial for latent search interest, visible supranational politicians can also attract higher levels of users' attention. Other findings comprise that search suggestions for those in a government party (vs. opposition) and politicians, as well as politicians with a party leader role (vs. cabinet politicians) and those with a female identity (vs. male), are more volatile

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over time, i.e., indicating higher latent interest.

The result on gender, in particular, also confirms what a prior study had found: female political actors drew greater search interest than male political actors (Ditonto, Hamilton and Redlawsk 2014). Anecdotal examples of Angela Merkel' search suggestions show in the study that they suddenly enormously change around critical political events related to Angela Merkel, i.e., their stability strongly decreases, pointing to people searching for new information. However, to systematically check whether we measure latent interest approximatively, we examine if the latent attention measure is also higher for politicians for whom we would expect greater attention: we compared the stability of search suggestions between nominated *Spitzenkandidaten* and not elected candidates and found that for political actors elected as *Spitzenkandidaten* search suggestions are statistically significantly lower than for non-elected ones and also in the time when we would expect it, i.e., around the European elections. It thus shows what we would expect, namely that these politicians received more attention in online searches across the countries on average.

We also conducted another analysis to check how similar the approximated search interest is between countries by comparing search suggestions translated into English between countries using the Jaccard similarity coefficient (Jaccard 1912).

Here we found that the search suggestions are more similar on average when the politicians are male, when they have a party leader function, and when their party is in government. They are increasingly less similar the further to the right the politicians' political party is ranked. When they are *Spitzenkandidaten*, the latent interest (i.e., search suggestions) is also less comparable throughout countries.

1.3.2 Implications and Future Work

The work has focused on studying political information and biases in search engines, especially search suggestions. The issue crosses numerous academic boundaries, and findings and studies

from several disciplines must be considered in order to account for the interplay of multiple elements in political online search. Therefore, besides the implications for the dissertation topic and generally to political science in a narrower sense, broader implications can be derived for other disciplines such as communication science, social psychology (to studies of the effects of bias), information science and computational social science. Besides the implications and relevance of the study results, I will also discuss the limitations of the work and derive recommendations and future research needs on the topic.

Along with the ongoing digitalization, search engines and online platforms have been increasingly used to search for political information. As outlined before, the first place to go for many people is online, to the Google website in particular, and type in the name of the political actor of interest to find out more about the person. However, while Google has the market power in online search, we do not know whether the information about political actors displayed in there may be systematically different depending on the political actors' characteristics. For example, search engines might display harmful or more private information for certain groups, such as female politicians. We also do not know how such bias in political information may affect individuals and their political attitudes.

For this reason, in this dissertation, I systematically analyzed whether there is bias in search engine information. Furthermore, I conducted an online experiment to study the possible effects of biased information. My co-authors and I have gathered and analyzed new political data that allows us to estimate approximately latent search attention in a novel way. In a comprehensive cross-country comparative study, we go beyond the national level and examine the latent interest across different European nations. Other research can follow our procedure and apply the same method to measure latent attention in political or other topics. This approach also enables the analysis of multiple nations with different languages while being cost-effective.

Thus, the thesis introduces two new measures that could be applied in future research

in political science and other disciplines for systematically studying political information and biases. The advantages of the gender bias measure (chapter 2, Pradel 2021b) are that researchers can also apply it to study gender biases in text from other media and compare it across platforms. I used it with my co-authors Armin Mertens, Ayjeren Rozyjumayeva and Jens Wäckerle to study gender biases in political communication on Twitter (Mertens et al. 2019). Additionally, other disciplines could use the measure to study personal information compared to professional to analyze gender biases for other professionals by adapting the dictionaries to another profession. The Jaccard stability measure (see chapter 3, Pradel et al. 2021) is a novel way to capture the latent attention of politicians in online search and allows to compare multiple politicians and countries. But, as mentioned before, it also has other research applications and could be used for any topic or search query.

Now we also know that information about politicians can be biased based on their party and gender identity (see chapter 2, Pradel 2021a), and that negative political information, in particular, can influence those who identify on the fringe of the political spectrum and amplify their opinions (see chapter 3, Pradel 2021b). As a result of the dissertation's findings, political actors should keep an eye on online data, especially in Google, and on which search suggestions are presented and which websites show up first when searching for information in search engines. The reason is that biased political information may affect political attitudes and evaluations of candidates, for example, when they activate gender stereotypes (e.g., Bauer 2015) or include hate speech as shown in the second study of the dissertation (see chapter 3, Pradel 2021b). It is also important because they may influence voting choices (Bauer 2015; Sanbonmatsu 2002; Epstein and Robertson 2015), especially for indecisive voters, and may even do so for those who are more often exposed to these biases; however, further proof of their vote-shifting potential in the European context is needed.

In terms of political fairness, it is critical for politicians to monitor information, political institutions and search engine companies to ensure that biased political material in search

engine suggestions is neither damaging nor disadvantageous to particular groups (as stressed in chapter 2, Pradel 2021*a*; see also Introna and Nissenbaum 2000).

In the context of the social identity theory, the dissertation studies focus on gender identity, political identity (party affiliation and self-perceived political ideology) and national identity in the investigation of political online search. It would also be necessary, for example, to consider other vital social identities such as race and ethnicity and intersectional effects, for example, with gender. On this topic, Safiya Umoja Noble (Noble 2018) has analyzed and presented striking findings on harmful biases like racist search results in Google. To investigate this in the future, I have created a large set of search queries on minorities and majority groups. The corresponding search suggestions from Google, DuckDuckGo and Bing have been collected daily in cooperation with Philipp Schaer. Among other things, I plan to investigate these data in the future (in cooperation) by linking biases about social groups in search engines and political attitudes. In particular, this could also be interesting as these search engines have different policies.

Nevertheless, it would be necessary in future research to analyze these results, but one must be careful and analyze search engines individually to derive better implications accordingly. Otherwise, for example, a strong bias in one search engine could influence the overall result, or biases in different directions could cancel each other out. Different biases are likely to emerge if there is a selection bias in the use of search engines. That is, if people with different characteristics and systematically different information interests tend to use specific search engines more often, the information created by the recommendation systems and inherent biases are likely to be different. A recent paper supports these considerations. They find different gender biases in image search results depending on the search engine (Makhortykh, Urman and Ulloa 2021). As outlined before, it is essential to put emphasis on studying Google because they are the most commonly used service, and research showed that it is possible to use their query data to predict attitudes and even political behavior (Arendt and

Fawzi 2019; Ginsberg et al. 2009; Stephens-Davidowitz 2014, see also chapter 4, Pradel et al. 2021).

One question remains: what could be done to effectively prevent negative consequences for democracy from political biases and hate speech in search engines? Indeed, I do not take the point of view that we should be in general against search engines and algorithmic services in everyday life. The former also has a democratizing potential by enabling, for example, individuals to inform themselves immediately and for free about politics. There are also examples where algorithms can even help fighting bias (e.g., Pierson et al. 2021). But I follow here Introna and Nissenbaum (2000) on their consideration that search engines are not neutral: they also shape politics and other social areas (they always also transport values), they are prone to bias and, consequently, should be improved. Hence, it follows that search engine developers, users and policymakers should be sensitized to the bias potential. As also already stressed by other researchers, one way to account for this is having standards and transparency about search engine algorithms (Introna and Nissenbaum 2000).

Raising user awareness could already help create understanding for the systems and potential biases, for example, through media literacy education promoting critical thinking and a more adequate evaluation of search engines and other online services (Schultheiß and Lewandowski 2021). Technical solutions could also be to make people aware of biases or make them think about the accuracy of the results. For the former, research showed that it minimizes persuasive effects in the context of politically biased search engine results (Epstein et al. 2017). However, it needs to be shown whether accuracy suggestions can help combat not only the spread of fake news but also the attitude amplifying effects they have through biased search engines (Pennycook et al. 2020). This remains still unclear; more research is urgently needed here.

To conclude, systematic research on search engines is urgently needed in political science and beyond the discipline. Finally, we need to put forward a plan for regulating search

engines and raising awareness for biases in political information in search engines among politicians, personnel building and maintaining these systems and their users.

1.3.3   Status of Studies and Contributions of Co-authors

The first article titled "Biased Representation of Politicians in Google and Wikipedia Search? The Joint Effect of Party Identity, Gender Identity and Elections" (chapter 2) is a single-authored article and published in the journal *Political Communication* (issue 4, volume 38: pages 447-478, available at: `https://doi.org/10.1080/10584609.2020.1793846`).

The second article with the title "The Impact of Hate Speech in Search Engines on Political Attitudes – Evidence from an Online Experiment" (chapter 3) is a single-authored article and has been submitted to the *Journal of Information Technology & Politics*. Before it was under review in the journal *Political Behavior* in which I received valuable feedback on the study.

The third study "Googling European Politicians: A Comparative Analysis of Latent Political Interest in Europe with Search Prediction Data" (chapter 4) is co-authored with Fabian Haak, Sven-Oliver Proksch, and Philipp Schaer and will be submitted to the journal *Political Communication* (or, e.g., *European Politics and Society*). All contributed to the study.

Franziska Pradel and Sven-Oliver Proksch conceptualized the research design and data collection. Franziska Pradel conducted the literature review, data management and analyses, wrote all chapters except the third chapter, presented the study at the research retreat organized by the Digital Society research program and the European Political Science Association 2021 conference (EPSA Virtual 2021) and revised the manuscript. Sven-Oliver Proksch commented, contributed to the literature review, especially in the second chapter, commented and gave feedback throughout the research process and on the manuscript and its revision. Fabian Haak and Philipp Schaer built and maintained the crawling system

for obtaining query suggestions in several countries, commented and gave feedback on the analyses and the whole manuscript. Fabian Haak further translated the query suggestions text into English and wrote the chapter "The Nature of Search Predictions."

Chapter 2

Biased Representation of Politicians in Google and Wikipedia Search? The Joint Effect of Party Identity, Gender Identity and Elections

Abstract

Web search engines have become an important and trusted source when people seek political information. Even though previous research suggests that information about politicians in traditional and new media can provide content that makes stereotypes based on gender and party, little is known about the presence of such bias in search engines, which function as information gatekeepers in the digital age. Using quantitative text analysis and human coding techniques on a novel data set of members of the German parliament, this study examines whether search engine suggestions, i.e., search predictions, for politicians differ with respect to personal and role-oriented information based on the gender and party of the politician. It also explores whether the search engine representation of politicians changes around elections. The study further compares gender and party differences in search engine results with corresponding Wikipedia articles of the same politicians, as users are most often redirected to Wikipedia from Google. The results suggest that politicians' representation in search engines and Wikipedia are structured by a joint effect of their gender and party identity. While Google suggestions provide less personal information about female politicians belonging to a right-wing party compared to their male counterparts, this relationship is not

observable for left-wing parties. Moreover, there are changes in gender biases around the election. In Wikipedia articles, politicians belonging to right-wing parties are represented with more personal information compared to politicians belonging to left ones, an effect which is even stronger for females.

2.1 Introduction

Web search engines nowadays serve as the primary gateway for voters to acquire political information. They are the most frequently used medium and first place to go, when people search for political information (Dutton et al. 2017). For example, over 80 percent of Internet users in France, Germany, Italy, Poland, Spain, the UK and the US use search engines to seek political information at least sometimes and a third uses them at least often (Dutton et al. 2017). In these countries, about 68 % of Internet users who voted in the last election rated online search as important to their voting decisions (Dutton et al. 2017). While search engines are frequently used for seeking information about politics and politicians and they have an impact on political outcomes, there remains a serious gap in the literature concerning how politicians are represented in their results. A better understanding of the potential presence of such bias is important, as voters use candidates' character traits like competence, leadership and honesty as information shortcuts to infer whether they will be good in office (Bittner 2011; Holian and Prysby 2014). The perception of politicians' character traits is particularly important as it influences vote choices and can be even more influential than political positions (Ditonto 2017; Holian and Prysby 2014).

One prominent line of research provided support for the argument that the general representation of candidates' traits is mainly driven by party membership and associated partisan stereotypes, which is incorporated in the voting decision-process (Bittner 2011). However, research on gender roles demonstrated that the representation of candidates and the traits associated with them are mainly built upon gender stereotypes. This leads to worse

evaluations of and voting outcomes for female candidates (Bauer 2015; Sanbonmatsu 2002).

Specifically, research on US politics (Hayes 2005; Goren 2007) and cross-national and longitudinal analyses (Bittner 2011) revealed that candidates belonging to conservative parties are generally evaluated as more competent (e.g., leadership, intelligent), while those belonging to liberal ones are mainly perceived as having more character (e.g., trustworthy, compassionate). These biases in representation of politicians' characters have been seen as a desirable component in democracies, as voters get a sense of their character and how politicians will behave in the future (e.g., Bittner 2011).

In contrast, another line of research focusing on gender roles and stereotypes takes the view that biases in representation are an undesirable component in democracies in that it highlights negative consequences for politicians who are portrayed with certain characteristics: female candidates are represented with stereotypical information and prejudices in the media such as newspapers (Kahn and Goldenberg 1991). Critically, the perception of female candidates with stereotypical feminine qualities can lead to unfavorable evaluations of the candidates due to perceived lacking qualities, such as leadership skills (e.g., see Bauer 2015). Overall, candidates' gender identity can have an impact on which information is provided about the candidate, which can in turn affect how citizens perceive and evaluate the candidate (Bauer 2015; Huddy and Terkildsen 1993; Kahn 1992).

In this study, I argue that the inconsistent findings and normative conclusions result from paying little attention to the interplay of party and gender identity and their association with the candidates' representation in the media. Since citizens nowadays mainly inform themselves about politicians online, I examine how politicians are represented in the most popular online players: Google and Wikipedia. I pay special attention to the interplay between party and gender stereotypes. More specifically, I look at search suggestions, that is, the results of the search engine searches that pop up when typing the name of a politician in the search field. Subsequently, I investigate Wikipedia articles about the politicians since

Google most often redirects to them when searching online for a politician. I build on the basic framework of the social identity theory for investigating the representation of politicians in search engines. Theoretical foundations of the social identity theory (Tajfel 1970; Tajfel and Turner 1979) articulate how the representation and perceptions of individuals are affected by various identities (i.e., categories and resulting stereotypes). These categorizations result from the membership to different social groups that are assigned by individuals themselves and by others and consequently influence the perception and evaluation of individuals (here politicians). Moreover, recent studies (e.g., Bauer 2018; Ditonto, Hamilton and Redlawsk 2014; Schneider and Bos 2016) revealed the importance of the fact that gender identity effects can vary depending on the party identity of politicians. For example, while for female Democratic candidates stereotypical feminine information has positive effects on their evaluation, female Republican candidates are evaluated less favorable (Bauer 2018).

The main goal of this study is, therefore, to analyze whether the information suggested by the search engine Google differs systematically by politicians' party membership and their gender. Is it mainly the politicians' partisanship, their gender, or a combination of both that drive the amount of personal and professional information in the search suggestions? Secondly, I will investigate whether the amount of personal and professional information suggested by Google varies around elections. It is insofar important to investigate it since Google is an important information gatekeeper in the digital age by structuring which additional information is suggested when voters seek information about politicians. The third goal is to dive deeper into candidates' representation in Wikipedia. Wikipedia is generally one of the top results, people are frequently redirected to it and people are exposed to the information on the website for more time. Therefore, my subsequent analyses shed light on the information that is provided in the content of Wikipedia articles about the politicians. I analyze the relative amounts of personal information and role information in both the content provided by the search engine suggestions and politicians' Wikipedia articles using automated text analysis

(i.e., dictionary-based analysis). The results show systematic gender differences, especially for right-wing politicians, which are also observable when the analyses take politicians' search popularity into account. While Google suggests relatively less personal information than role-related information for right-wing female politicians compared to males, the opposite is true for Wikipedia, which provides relatively more personal information. Contrary to the expectations, there are no structural gender differences for left-wing politicians. Overall, it is evident that the gender bias in online information is mainly determined by the interaction between gender and party identity. However, the results indicate that how the information is created on online platforms also plays a significant role. Google's proposed information on politicians tends to reflect the spontaneous and specific information interests of previous users. In contrast, on Wikipedia, the information provided about them tends to emerge through a conscious and controlled process of contributions from the writing community, the politicians themselves and their staff. Since the information creation process is fundamentally different on Google and Wikipedia, their biases are also different.

2.2 The Importance of Google and Wikipedia for the Impression Formation about Politicians

Most of the prominent line of research on the perception of candidates' character traits covers their representation in traditional media like newspapers, radio and television. However, in the digital age, voters seek political information that is embedded in a diverse media landscape. While they have access to the traditional media (i.e., radio and newspapers), a huge variety of information is accessible through new media (Dutton et al. 2017; Chadwick 2017): Wikipedia, YouTube, blogs of candidates or other bloggers, social media platforms like Twitter and Facebook, all offer the opportunity to form opinions about the candidates. At the same time, search engines manage the access to political information. They present the information in varying order and suggest additional information that is related to the

political information users are searching for. Google is particularly important for political information seeking. In fact, Google is the most used search engine globally, having the largest market share with 92.5 %, and is generally trusted (Edelman 2019).[1] But Google is not only the most used web search engine, it is in general the most visited website around the world.[2] Search engines like Google function as important information gatekeepers because they are often used for political information seeking (Dutton et al. 2017), especially as a fast source when searching for political events such as political gaffes (Trevisan et al. 2018), and they are generally trusted (Pan et al. 2007; Schultheiß, Sünkler and Lewandowski 2018).

The Edelman Trust Barometer (2019) showed that technology is the most trusted sector (78 %) and also found general trust in search (66 %) and search engine platforms. They are, together with traditional media, the two most trusted sources of general news and information. Furthermore, shedding the light on voices of authority, the government captures the lowest percentage share (35 %). Therefore, it is reasonable that voters rely on information gathered through search engines and other popular online platforms (Edelman 2019). Moreover, Sniderman and colleagues (1993) argue that voters use their general feeling or impression about the candidate to simplify the voting decision and particularly do it when they have only limited political knowledge. Research also shows that biased search results can have a significant impact on the preferences of undecided voters (Epstein and Robertson 2015).

Consequently, it is important to investigate how politicians are represented in new media platforms like search engines because they are the gatekeeper to information that is used to create an impression about the candidate. The subsequent analyses focus on Google suggestions for politicians. Google recommends users further information to complete the search request with their autocomplete function, the so-called search suggestions (also called

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1. The data has been obtained from the website `https://gs.statcounter.com/search-engine-market-share` (February 4, 2020).

2. The data has been obtained from the website `https://www.alexa.com/siteinfo/google.com` (February 4, 2020).

"search predictions"), when they type in letters into the search bar. Google suggests this information with an algorithm that uses prior search requests data by Google users on the search term (Noble 2018). Thus, when typing into the search bar a name of a politician further information appears that has been searched by Google users before. For example, Google suggests "Angela Merkel age" when searching for "Angela Merkel".

Importantly, online platforms that provide citizens with political information are rather interconnected. Google most often redirects to Wikipedia articles containing politicians' biographical information when searching for politicians (Dutton et al. 2017). For this reason, my further analyses examine how politicians are portrayed in their Wikipedia articles. Wikipedia is also an important source for information about politicians and other political information. While Google creates its search suggestions based on an algorithm that learns from user searches, Wikipedia is an active online platform with a user-contributed encyclopedia. As an open collaboration project, volunteers create and edit the Wikipedia content that reaches globally more than 500 million unique visitors per month. Wikipedia is under the top 10 most visited websites globally,[3] is similarly accurate like more traditional encyclopedias (Giles 2005) and even surpasses news in trust (Jordan 2014). Google leads by far most often to the website (62.3 %) and most often users go (back) to Google immediately after visiting Wikipedia (42.6 %).[4] Crucially, research revealed (Göbel and Munzert 2018) that the platform is an important advertising opportunity for politicians: they use Wikipedia strategically by contributing regularly, mostly by adding information, to their Wikipedia articles.

There are of course various sources for citizens to obtain political information and get an impression of politicians. But overall, the statistics and research mentioned above show

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3. This information is provided by Wikipedia on the website `https://en.wikipedia.org/wiki/Wikipedia` (February 4, 2020).

4. The data has been obtained from the website `https://www.alexa.com/siteinfo/wikipedia.org` (February 4, 2020).

that both Google and Wikipedia are important tools for citizens in their everyday life and especially in the search for political information, which are intuitively trusted and which can have an influence on political preferences. So the question that arises is whether politicians are similarly represented in these popular online platforms or whether systematic differences can be expected. Research suggests that the portrayal of politicians in search engines may be biased, because individuals categorize others into social groups (i.e. social identities) which are associated with stereotypes and prejudices leading individuals to behave differently (Tajfel 1970; Tajfel and Turner 1979). Thus, they may also search for different information based on the categorization. One of the most important identities of a politician is the party membership, that is, whether the politician's party is belonging to the left-wing or rather the right-wing political spectrum. Another important factor is the politicians' gender identity, when individuals focus on whether a politician is female or male. Consequently, individuals perceive and evaluate the politician differently. The social identity theory (Tajfel 1970; Tajfel and Turner 1979) also implies that not only citizens themselves, but also politicians behave differently, depending on the context and which of their identities is salient. Here, I assume that the information about politicians in search engine suggestions are shaped by their two main social identities and the resulting stereotypes: their party identity and gender identity. This is reasonable because candidates' identities may generally influence the politicians' perception and the behavior towards them, particularly the search behavior and the provided online content related to the politicians. This should then be displayed in the information provided by the two popular online platforms Google and Wikipedia. The next sections give, therefore, an overview of the expectations of the information provided by Google and Wikipedia, based on politicians' political identity, gender identity and their interacting effect.

2.2.1 Party Identity Affecting the Representation of Candidates

Nowadays, living in the digital age, citizens not only passively absorb information through traditional mass media, but they can actively search for specific information online (Trevisan et al. 2018). Citizens look for specific information online to get an impression about politicians. The most important player here is Google by being the most used website for getting an impression about politicians. Politicians today therefore have only limited influence on what information voters access. While they can influence the information that Wikipedia is providing about them, they have no control about what information voters seek for online in search engines. Triggered by certain social and traditional media content such as TV debates, or other events such as elections, offline discussions with acquaintances, citizens can have a specific information interest. For example, TV debates can lead to an increasing number of searches about the politicians (Trevisan et al. 2018). The link between search queries and representation in other media is also shown by the fact that search queries for politicians increase especially when they are not represented in more traditional media and citizens lack information about candidates (Trevisan et al. 2018; Dutton et al. 2017). But it is plausible that voters do not approach the information seeking in an unbiased way. Search behavior is rather influenced by underlying stereotypes and expectations based on them, which are influenced by the social identity of the politician (Ditonto, Hamilton and Redlawsk 2014; Ditonto 2019). As described above, two important types of categorization from which stereotypes are formed and which consequently influence search behavior are party and gender identity. First, we should examine what representation of politicians we can expect on the basis of the politician's party identity. Based on whether a politician is considered more right or left leaning, citizens have different underlying expectations that influence the information search. It is therefore plausible that citizens tend to maintain and try to confirm or check-up stereotypes by searching for party-stereotypical information.

One of the most prominent lines of empirical support for the importance of party member-

ship has been established by Hayes (2005). He showed that politicians' traits are perceived and evaluated in accordance to party-based stereotypes (partisan stereotypes). For example, candidates of liberal parties are evaluated as being more compassionate and having empathy, while conservative ones are evaluated as having stronger leadership and moral (Hayes 2005). Related research confirmed that the traits of candidates belonging to different parties are perceived differently and that this pattern remains across different time periods and country contexts (Bittner 2011). Candidates belonging to a conservative party were mainly evaluated on a competence dimension (e.g., strong leadership, intelligent), while those belonging to a left one were evaluated mainly on a character dimension (e.g., compassionate, cares). Based on the knowledge that left-wing politicians are perceived mainly on a character dimension rather than a competence dimension, and that party-related stereotypes shape the information search, it can be assumed that citizens look for relatively more personal rather than role-related information about left-wing politicians in order to get a better impression of their character. Thus, it can be derived that we find differences in the information search that lead subsequently to differences in the representation of left-wing and right-wing party politicians in search engines.

H1a: Search engine suggestions about candidates belonging to a left-wing party are represented with more personal information compared to candidates belonging to right-wing parties.

However, when politicians and their party are able to influence the provided online content about themselves, as they can by strategically editing their Wikipedia biographies (Göbel and Munzert 2018), the content bias may be different. Research indicates that voters have party-based stereotypes and that politicians can gain an electoral advantage if they act strategically based on those stereotypes. By aligning themselves with issues and traits that their opponents' party traditionally owns, politicians are able to to attract more voters (so-called trespassing strategies, see Hayes 2005; Sides 2006). Recent research also suggests that political actors are aware of party-based stereotypes held by voters and that it is beneficial for

them to edit the information on Wikipedia based on these stereotypes (Göbel and Munzert 2018). For example, center-left politician Thomas Oppermann's (SPD) Wikipedia article was edited to remove his former membership to a socialist youth organization, but his membership to a conservative party group was retained (Göbel and Munzert 2018). Thus, while voters have party-based expectations about politicians that matter for the electoral success and politicians are aware of them (Hayes 2005; Sides 2006), politicians can attract voters outside their traditional electorate by associating themselves with additional attributes traditionally associated with their opponent's party. Therefore, I expect to find more personal information in the Wikipedia articles of politicians belonging to right-wing parties than those belonging to left-wing parties, because it may give them the advantage to attract voters from other parties. The opposite relationship should therefore be observable for politicians belonging to left-wing parties.

H1b: Wikipedia articles about candidates belonging to left-wing parties are represented with less personal information compared to candidates belonging to right-wing parties.

As elaborated, it is reasonable to expect biases in the provided online information based on politicians' party identity. However, what role do important political events play? For the reasons set out below, it can be assumed that important political events such as elections influence the information needs of citizens, thereby changing the search for personal and role information on politicians. Thus, the resulting search suggestions and biases in information would change around elections. More precisely, during the electoral cycle, campaign organizers and the party are eager to build up a positive appearance of their candidates and voters are willing to use the perception of candidates' personal traits as an information shortcut (Bittner 2014). Moreover, Hayes (2005) argues that party-based stereotypical perception of candidates' traits are maintained particularly close to elections because candidates are more frequently communicating about party issues and then voters tend to associate some of them with their character. Petrocik (1996) and his work also suggests that the represented personal traits

vary with certain events like elections or other political events. Therefore, it is reasonable that especially the representation of candidates' attributes in media platforms is more driven by partisan stereotypes when the next election is close. Citizens may be particularly interested in party-stereotypical information (and search for that which would affect the subsequent search suggestions). This would indicate that around political events such as elections, more differences in the amount of personal information relative to role-related information appear in search suggestions in the pre-election period compared to the post-election period:

H2: Search engine suggestions about candidates display more differences in the relative amount of personal information between parties in the pre-election period compared to the post-election period.

Still, research also showed (McDermott 1998; Huddy and Terkildsen 1993; Sanbonmatsu 2002) that voters also use other characteristics of the candidate, especially gender, to build an impression and finally a voting decision. Thus, it is important to take a deeper look at the role of gender for content biases.

2.2.2   Gender Identity Affecting the Representation of Candidates

To understand the extent of gendered information about politicians and its consequences, it is essential to review related work covering gender biases in the representation of politicians in general, in search engines and other online information gatekeepers. This work focused particularly on gender and associated stereotypes as the main driver for biases in the representation or evaluation of candidates.

This prior research revealed negative consequences of gender biases by showing that gender stereotypes can lead to shifts and a gender gap in political attitudes (Bittner and Goodyear-Grant 2017) and result in less favorable perception of female politicians and their voting outcomes (Huddy and Terkildsen 1993; Bauer 2015). Ditonto, Hamilton and Redlawsk

(2014) showed that the gender of politicians indirectly impacts the voting choice through more competence- and compassion-related information search when the politician is female.

Recent work found that female politicians are generally perceived as less competent and this disparity is even stronger when they are opposing a competent candidate (Branton et al. 2018). Female politicians do suffer from being portrayed as less competent and can even be surpassed by a candidate who is not a member of the same party (Ditonto 2017).

This line of research has also demonstrated that female politicians can expect more negative evaluations after campaign attacks challenging feminine stereotypes and that this is particularly unfavorable for female democrats (Cassese and Holman 2018). Additionally, previous research has shown that male politicians gain more electoral support, when they also represent themselves with traits and issues strategically associated with the competing party (i.e. partisan trespassing), however, this is not true for female politicians (Bauer 2019).

Thus, prior research on gender biases and politicians has repeatedly shown the obstacles that female politicians have to face. Although research on gendered information in search engines – especially focused on politicians – is scarce, prior research related to information science revealed first insight into general existing biased information in search engines.[5] Research (Baker and Potts 2013) found that Google's suggestions – that pop up when entering letters into the search bar – reflect for some social groups (such as for LGBT and Black people) more negative stereotypes than for others. Noble (2018) discovered the existence of racism and sexism in Google search results and how the engine fosters it by for example suggesting racist search suggestions or showing racist and sexist images.

Similarly, Kay, Matuszek and Munson (2015) found that women are systematically under-represented in Google image results for occupations and that gender biases can exaggerate users' stereotypes. Otterbacher and colleagues (2017) found more images of men when

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5. Related work has been mainly focused on systematic gender differences in other online platforms such as biases in the representation on Wikipedia (Klein et al. 2016; Wagner et al. 2015; Zagovora, Flöck and Wagner 2017) and biases in the communication on Twitter (Evans 2016; Meeks 2016; Mertens et al. 2019).

searching in Microsoft Bing for stereotypical male traits such as "intelligent person" and more images of women when searching for stereotypical female traits like "sensitive person". Moreover, exploratory unsupervised analysis suggests that there may be also a gender bias in the representation of politicians in search engines (Bonart et al. 2019). Overall, this line of research has repeatedly supported the argument that search engines can reflect social biases like gender biased information about politicians and that this in turn can affect individuals and politics. Building on these findings, I expect that citizens mainly search for gender-stereotypical information for politicians in search engines, which is then reflected in Google search suggestions:

H3a: Search engine suggestions provide more personal information about female compared to male politicians.

I also expect to find relatively more personal information in Wikipedia biographies about female politicians. As mentioned above, the private life and gender-stereotypical information are generally in the spotlight when the politician is a woman. Therefore, more personal information is probably provided in their biographies. Female politicians themselves have an incentive to strategically provide more personal information than their male colleagues. As discussed, they also have to meet the expectations that are placed on them because they are politicians, and these expectations are mainly associated with masculinity (Huddy and Terkildsen 1993). However, unlike men, they must also meet the expectations that arise from the fact that they are women, otherwise it can lead to less favorable evaluations of female politicians (Bligh et al. 2012). This can be strategically done by providing information about their personal life. Overall, it can therefore be assumed that female politicians have a higher proportion of personal information in their articles than their male colleagues:

H3b: Wikipedia articles provide more personal information about female compared to male politicians.

The question that remains is whether this bias in Wikipedia article content is the same for all women, or if it varies depending on the politician's party identity.

2.2.3   The Conditional Effect of Party and Gender Identities

Social identity theory (Tajfel 1970; Tajfel and Turner 1979) makes a contribution to the current state of the research by explaining that politicians' behavior and the perception of their traits is affected by their membership not to one, but to several identity groups. In applying this general framework to the context of politicians' representation in Google and Wikipedia, it is plausible that the representation of candidates there is affected by both party and gender identities (and consequent stereotypes) and their interacting effects.

In general, women are more underrepresented in right-wing parties than in left-wing parties. In the right-wing parties FDP 22.5 %, the CDU/CSU 20.7 % and the AfD 11.0 % are women, while in the left-wing parties SPD 42.8 %, The Greens 58.2 % and The Left 53.6 % are women.[6] Research has pointed out that the politician's gender identity is in the focal point of attention – especially among conservative women – when there are proportionally few other women (Evans and Clark 2016; Ferree 2006; Wiliarty 2010). But not solely their gender identity is important. In terms of their social identities, both the political identity, that is, being a conservative politician, and the gender identity play a role. Because especially in conservative parties relatively few other women are represented, the gender of politicians comes to the fore. Right-wing parties such as the center-right party CDU/CSU stand for – and are perceived as having – a traditional understanding of the family and the role of women (Wiliarty 2010). As already mentioned, the characteristics associated with women are arranged on a character dimension. That is, they are perceived as caring, soft, harmonious, etc. For example, Angela Merkel was often portrayed as the mother of the nation (Mushaben 2017, p. 35). These more gender-stereotypical characteristics do not align

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6. The data has been obtained from the website `https://www.bundestag.de/abgeordnete/biografien/mdb_zahlen_19/frauen_maenner-529508` (February 11, 2020).

with the characteristics traditionally associated with politicians in general, but especially not with the characteristics that are typically associated with right-wing politicians (e.g., strong leadership roles, dominant, assertive) (see also Wagner, Gainous and Holman 2017; Manne 2017). This means that citizens may be more keen here to ensure that women are competent and meet the characteristics of right-wing parties that are important to the electorate. These characteristics are important in that they give the citizens a short cut or an impression of how the politician will behave in the future (e.g., Bittner 2011). In contrast, character traits associated with women tend to be more similar to those linked to the left-wing identity, where characteristics such as compassion play a more important role (Wagner, Gainous and Holman 2017; Hayes 2005). That is why there might be fewer differences between female or male left-wing politicians, unlike between conservative ones, when citizens seek information about them.

In short, while female politicians are generally less associated with traits traditionally associated with political leaders (Huddy and Terkildsen 1993), it is reasonable that voters require more information to ensure that female politicians align with the values of their party. This is in turn reflected in search engines suggestions. More precisely, it is plausible that the proposed relationship in *H1a* and *H1b* varies due to the interplay of partisanship and gender.

H4a: Search engine suggestions provide less personal information about female candidates compared to male candidates, when they belong to a right-wing party.

However, when politicians have the chance to make strategically contributions to the provided online content about themselves, as they regularly do in Wikipedia (Göbel and Munzert 2018), I expect more personal information for women belonging to right-wing parties than those belonging to left-wing parties. It may give them the advantage to attract voters from other parties and at the same time, gain the support of party supporters by showing them their agreement with traditional beliefs and gender stereotypes. By being a full-time working politician, female politicians automatically counteract the traditional (i.e. patriarchal) values

(Manne 2017). One argument could be that right-wing women have a greater interest in making their family life and gender roles salient by (implicitly) showing that they support the traditional values of the party and its supporters. This, however, may not be true for female left-wing politicians. The reason is as follows: it may be strategically worse for female left-wing politicians to make their gender and personal life very salient compared to female right-wing politicians, as they are already perceived by virtue of their left-wing party identity as being progressive. Rather than supporting traditional gender roles, they tend to be perceived as more liberal than males due to their gender identity (Huddy and Terkildsen 1993; Koch 2000; Manne 2017). Both combined, it might deter some center-left voters if female left-wing politicians appear too left and progressive. Specifically, it would happen because the progressiveness contradicts the traditional family and gender roles these voters have about women. Meanwhile, right-wing parties may have the advantage of being able to tap into additional voters who are located in the middle of the political spectrum and for whom it is important that the politician is a woman. Therefore, it is plausible that we can observe relatively more personal information for right-wing female politicians compared to their male counterparts.

H4b: Wikipedia articles provide more personal information about female candidates compared to male candidates, when they belong to a right-wing party.

Here, shedding light on the conditional effect of gender and party identity, it is also important to analyze whether and to what extent important political events play a role in representation biases. Once again, it is important to note that the need for information is also simultaneously reflected in the representation of politicians in search engines. I expect that the interest in information, and thus the search behavior, will be different in this phase, and based on its algorithm, Google will produce different suggestions. As a result, the gender biases in the search suggestions around important political events can differ from the regularly produced results. In the pre-electoral phase, I assume the searches are mainly made by

users searching for politicians for whom they would potentially vote. By contrast, in the post-electoral phase and in general, I assume that the searches for politicians are more likely to come from a diverse pool of voters who have a specific interest in information about the politicians, either based on general information interest or triggered by specific media posts, events or discussions.

It is especially important to get an impression of those candidates whom users are willing to vote for. Since it is important to get a first impression in the election phase, the interest in information could be related to the private life to get a short cut how the politicians would behave in office. Right-wing voters have generally more traditional values concerning the family and private lives (Schneider and Bos 2016) and they are especially important for right-wing populist parties such the German party AfD (Siim et al. 2016; Wiliarty 2010). While research shows that the family and the traditional role of women is very important for right-wing voters, we know that these issues are also stereotypical associated with female rather than male politicians (Schneider and Bos 2016). Personal information may get therefore more important before an election, when seeking information about female politicians belonging to right-wing parties.

H5: In the pre-electoral phase, search engine suggestions provide more personal information about female candidates compared to male candidates, when they belong to a right-wing party.

Table 2.1 gives an overview of all the hypotheses that have been introduced above.

Table 2.1: Overview of hypotheses

party bias	H1a:	Search engine suggestions about candidates belonging to a left-wing party are represented with more personal information compared to candidates belonging to right-wing parties.
	H1b:	Wikipedia articles about candidates belonging to left-wing parties are represented with less personal information compared to candidates belonging to right-wing parties.
party bias around elections	H2:	Search engine suggestions about candidates display more differences in the relative amount of personal information between parties in the pre-election period compared to the post-election period.
gender bias	H3a:	Search engine suggestions provide more personal information about female compared to male politicians.
	H3b:	Wikipedia articles provide more personal information about female compared to male politicians.
joint gender and party bias	H4a:	Search engine suggestions provide less personal information about female candidates compared to male candidates, when they belong to a right-wing party.
	H4b:	Wikipedia articles provide more personal information about female candidates compared to male candidates, when they belong to a right-wing party.
joint gender and party bias around elections	H5:	In the pre-electoral phase, search engine suggestions provide more personal information about female candidates compared to male candidates, when they belong to a right-wing party.

2.3 Detecting Party and Gender Identity-Based Biases

There are several applications of dictionary-based approaches for the analysis of political text (Slapin and Proksch 2008; Young and Soroka 2012; Lucas et al. 2015). However, using computer-automated text analysis is rare in the specific context of identifying gender bias and partisan bias in the representation of politicians in new media platforms such as search engines. Most of the research uses human coders to categorize the text as gender-stereotypical information (Baker and Potts 2013) or group-stereotypical information and hate speech (Asal and Harwood 2008; Bar-Ilan 2006).

Similar to Otterbacher and colleagues (Otterbacher, Bates and Clough 2017), I use LIWC dictionaries (LIWC: Linguistic Inquiry and Word Count). I construct a new bias measure based on LIWC dictionaries that are well established and have been repeatedly validated

(Tausczik and Pennebaker 2010) and cover a wide range of constructs. I use and extend them with an own dictionary created by human coding in order to detect gender and party biases in the representation of female candidates in search engines.

2.3.1   Measuring Representation: Personal versus Role Information

To capture the politicians' representation in Google and Wikipedia, I create a measure that compares the amount of personal relative to role-related information in text. Here, following the procedure of other text analysis (Proksch et al. 2019), I identify personal and role-related words in Google and Wikipedia by creating new dictionaries containing fixed set of terms. Similarly, I use the log ratio of the personal and role-related word counts:

$$personal \; vs. \; role \; bias = log \; (\frac{personal + 0.5}{role + 0.5}) \qquad (2.1)$$

I construct the new measure of bias (personal vs. role bias (2.1)) by using German LIWC dictionaries (Tausczik and Pennebaker, 2010) and human-coded suggestions of one time point. Specifically, the dimension "personal" identifies words that cover words related to the private life of politicians such as information about the family, relationships, hobbies, sexuality and body-related words. The words are identified with the LIWC dictionaries "family", "friends", "leisure", "body", "sexual" and human-coded information tapping other private information (see exemplary translations in Table 2.2, for a prior version of the measure see Mertens et al. 2019). The dimension "role" contains identified words that relate to their professional life and role as politician. To do this, I use the LIWC dictionary "work" and human-coded information that portray party names, organizations and political events. I will apply the measure above (2.1) to Google search and Wikipedia data by using the aforementioned dictionaries with the "personal" and "role" dimensions. The measure allows me to detect the amount of personal relative to role information in the textual data. The more positive

the resulting score, the more personal relative to political-role words have been identified in the text. The measure has the advantage that it can be also applied to other research investigating text in terms of gender and party differences in the representation of politicians.

Table 2.2: Constructing dictionaries for the information dimensions "personal" and "role"

Personal	Role
family (e.g., "children")	work (e.g., "project")
friends (e.g., "boyfriend")	parties (e.g., "cdu")
leisure (e.g., "beach")	organizations (e.g., "ministry")
body (e.g., "legs")	political events (e.g., "election")
sexual (e.g., "homosexual")	
other private information (e.g., "tattoo")	

2.3.2   Representation Data: Google Search and Wikipedia Data

I base my analysis on three data sets: two Google Search data sets and one Wikipedia Search data set, all extended with auxiliary data:

The first data set[7] is a new type of data that contains automatically collected Google search suggestions for political search requests, that is, words that pop up when entering the politicians' name into the search bar. The novel data enables scientists to analyze politicians' representation in search engines systematically. I use daily Google's search suggestions for 703 politicians of the German parliament (19th electoral term) after the election (24th September 2017, after 6:00 PM) until a recent day (16th of March 2019). For the analyses, the research focuses on suggestions obtained with the Google Autocomplete API[8] and the Google Chrome browser.

To investigate the role of elections for the average bias in the representation of politicians in Google search suggestions, the second data set ranges from three months before the election (24th of June 2017) to three months after the election (24th December 2017) for politicians of

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7. Replication   materials   are   available   on   the   website   `https://github.com/fpradel/biased_representation_of_politicians`.

8. The data has been collected with the API http://clients1.google.de/complete/search.

the 18th and 19th Bundestag. In total, it was possible to collect search suggestions for 937 politicians in both the pre-electoral and the post-electoral phase with on average 1000 search suggestions per politician in the total period. One variable indicates whether the search time was before or after the election, and another one indicates whether the politician was a member of the 18th Bundestag, 19th Bundestag or both. The data has also been gathered with the Google Autocomplete API and the Google Chrome browser.

The final data set comprises the content of Wikipedia articles about politicians of the German Bundestag (19th electoral term), the same 703 politicians as in the first Google data set. This data was gathered on the 28th January 2019 in order to analyze politicians' representation in an online platform users are most often redirected from Google (Dutton et al. 2017). The data set contains all text from the main article about each politician.

Finally, I extended all data sets with information about the electoral term, the position on the party list, gender and age provided by the "The Federal Returning Officer"[9] and the EveryPolitician data set[10]. Moreover, I use politicians' search popularity by gathering the average page views of their Wikipedia articles from the election (25th September 2017) to a recent time point (16th of March 2019) with the R package "pageviews" (Keyes and Lewis 2016). It is highly correlated with the number of search requests and can therefore be used as a proxy for informational interest in politicians (Shor, van de Rijt and Fotouhi 2019).

2.4   Results

I use multiple linear regressions to analyze potential biases in politicians' representation in Google by gender and party identity. Therefore, I test whether Google's search suggestions present more personal information for left-wing candidates compared to right-wing candidates (H1a) and for female compared to male candidates (H3a). Additionally, analyses provide

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9. The data set can be requested on the website `https://www.bundeswahlleiter.de/en/`.

10. The data set is has been obtained from the website `http://everypolitician.org/germany/`.

insight into whether the gender bias measured in this paper varies with the party membership (H4a). As described before, the higher the personal relative to role score, the more personal relative to role information have been identified in the politicians' search suggestions.

In a first step, we are looking only at the party identity of the politicians to predict personal relative to role information in search suggestions (see Model 1 in Table 2.3). In general, the model predicts a negative score for the personal relative to role representation for all parties. This indicates that Google shows on average more role-related compared to personal information for politicians of all parties. However, the relative amount of personal information is the highest for politicians of the center-right party FDP, the center-left The Greens and the left party The Left. This is followed by the center-right party CDU/CSU, the center-left party SPD and the lowest amount of personal relative to role information have politicians of the right-wing party AfD. Nevertheless, overall, there are no differences between parties in the amount of personal relative to role information in search suggestions. Compared to politicians of the center-right party CDU/CSU (reference category), the amount of personal relative to role information displayed in search suggestions for politicians of the other parties is not significant different. Thus, contradictory to the first hypothesis, there are no significant differences based on the party identity of the politician.

In the second step, I focused only on the gender identity of the politician to test whether there were any significant gender differences. The results indicate that there are overall no significant main differences between male an female politicians in the amount of personal relative to role information in Google suggestions. Therefore, the results show no support for the hypothesis H3a that expected a relative higher amount of personal information for female politicians.

In the third step, the model now also controls for the party identity of the politicians when we are looking at the effect of gender (see Model 3 in Table 2.3). Again, there are not significant differences in the amount of personal relative to role-related information based on

politicians' gender or party membership.

However, when adding the interaction between party and gender identity in a fourth step into the regression, a significant joint effect of gender and party is observable for the party AfD (see Model 4 in Table 2.3). Female politicians in the right-wing party AfD are portrayed with significantly less personal relative to role information compared to their male counterparts. This effect is also observed in the center-right party CDU/CSU, but not at significant levels. In other words, this shows that the gender effect varies with the party identity of politicians. It could be the case that citizens seek relatively more role-related information about female right-wing politicians than male right-wing politicians because they want to check their political expertise and positions. This pattern is similar to the results of a prior study (Ditonto, Hamilton and Redlawsk 2014), which found that individuals seek more competence-related information for female candidates than for male candidates.

In the final step, the model also controls for the party list position, which has a significant negative effect on personal relative to role-information in search suggestions (see Model 5 in Table 2.3). With increasing party list number, Google search suggestions contain less personal information relative to role information. Simply put, there is an overall trend that for politicians who are listed more on the top of a party list (i.e. the lower the party list number) more personal relative to role information shows up. The model shows that Google suggestions display significantly less personal relative to role-information for female compared to male politicians of the center-right party CDU/CSU. This gender bias is even larger in the suggestions of AfD politicians, with women being portrayed with much less personal relative to role information than their male counterparts.

However, when looking at the center-left government party SPD, female politicians are represented with significant more personal compared to role information in the search engine. The other two left-wing parties are also represented with more personal relative to role information, but this difference is not statistically significant. Also, the female politicians of the right-wing party FDP have more (but insignificant) personal relative to role information

compared to their male counterparts. The age of the politician had no effect in any of the models.

Overall, the findings suggest that the representation in Google suggestions is mainly driven by a combined effect of both, gender and party identity (see also Figure 2.1). Figure 2.1 summarizes the main findings: As before, the more personal relative to role words that are identified, the higher the personal relative role score in the figure. The predicted effects display more on the right of the figure, if Google suggestions contain more personal relative to role information. There is no general trend of gender identity and party identity observable (no support for H1a and H3a). It rather supports the assumption of an interaction effect of party and gender identity (H4a): depending on the political orientation of the party, the effect of politicians' gender is different. In other words, there is significantly less personal relative to role-related information for female politicians of right-wing parties – except the FDP – compared to their male counterparts. There is also tentative evidence that female politicians of the center-left party SPD are portrayed differently than males with more personal relative to role information compared to their male counterparts.

Robustness

Nevertheless, the question arises whether the findings hold when controlling for the general interest in the politician and the politician's role in the party. Therefore, I take into account the search popularity of politicians and interactions with party identity and gender identity (see Table 2.6 in the Appendix). In these models, I use the number of page views of each politician's Wikipedia article as proxy for the general search interest. Politicians were considered "popular" when they had a number of views above the median. The politicians' search popularity had no significant effect in any of the additional models and the prior presented results stayed robust. Being party leader had no significant effect on the personal relative to role score (see Table 2.6 in the Appendix).

Table 2.3: Examining the average representation of politicians in search engines

	Dependent variable: Personal relative to role representation				
	adding to the regression				
	Model 1: party identity	Model 2: gender identity	Model 3: party & gender identity	Model 4: party x gender identity	Model 5: list position
SPD	−0.067 (0.227)		−0.026 (0.230)	−0.317 (0.279)	−0.484 (0.298)
The Greens	0.310 (0.305)		0.385 (0.315)	0.329 (0.445)	−0.028 (0.456)
The Left	0.302 (0.302)		0.366 (0.308)	0.261 (0.419)	−0.162 (0.444)
FDP	0.375 (0.289)		0.381 (0.291)	0.176 (0.326)	−0.171 (0.345)
AfD	−0.252 (0.275)		−0.270 (0.276)	−0.031 (0.295)	−0.375 (0.316)
Female		−0.097 (0.181)	−0.192 (0.192)	−0.441 (0.348)	−0.749* (0.365)
Age			0.001 (0.008)	−0.001 (0.008)	−0.004 (0.009)
Party list position					−0.018* (0.008)
Female x SPD				0.828 (0.499)	1.030* (0.508)
Female x The Greens				0.250 (0.646)	0.701 (0.650)
Female x The Left				0.350 (0.635)	0.705 (0.644)
Female x FDP				0.916 (0.697)	1.210 (0.697)
Female x AfD				−2.284** (0.818)	−2.025* (0.813)
Constant	−1.167*** (0.141)	−1.083*** (0.101)	−1.159* (0.463)	−1.018* (0.464)	−0.423 (0.510)
Observations	703	703	703	703	632

Note: Reference categories = parties: CDU/CSU, Female: Male,*p<0.05; **p<0.01; ***p<0.001
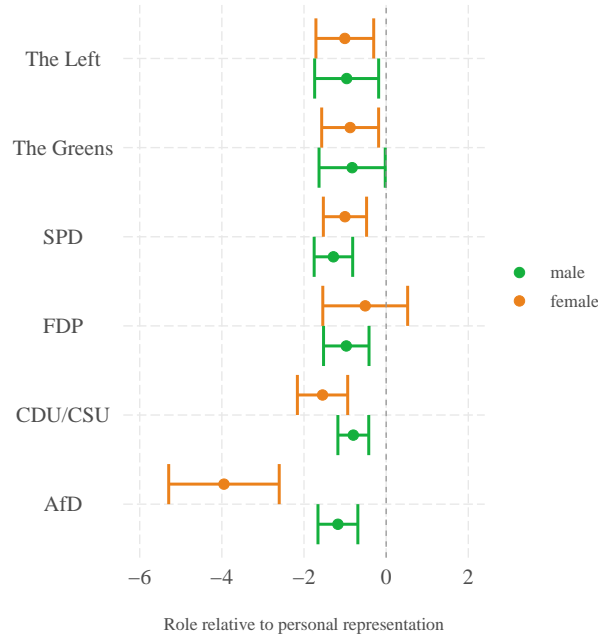
Figure 2.1: Predicted effects for personal-role information by gender and party identity of the politicians (ordered from left-wing to right-wing parties)

2.4.1 Search Engine Representation during Election Campaigns

Now, multiple linear regressions provide insight into whether the representation of politicians differs during the election campaign season. I test whether Google suggestions display more differences in the relative amount of personal information between parties in the pre-election period compared to the post-election period (H2). While the previous analysis of the average representation of politicians in Google tended to provide relatively more role-related information for female right-wing politicians, the information provided prior to an election may differ fundamentally. Therefore, it remains to be examined whether Google provides more personal relative to role information about female candidates in the pre-electoral phase compared to male candidates, when they belong to a right-wing party (H5). For investigating the hypotheses, I focus on the data set of Google suggestions for politicians being member of the German Bundestag 18 (2013-2017) and 19 (since 2017) (please see section 3.2. for more details).

First, I only look at the party identity and gender identity of the politicians and control for the electoral phase to predict personal relative to role information in Google search suggestions (see Model 1 in Table 2.4). While in this model the electoral phase does not show a significant effect on the provided Google information, it does show significant differences based on the party identity of the politicians. Google shows significantly less personal relative to role information for politicians of the left-wing party The Greens compared to the right-wing party CDU/CSU.

The second model additionally controls for the information whether politicians have been re-elected or are newcomers in the Bundestag (see Model 2 in Table 2.4). Politicians who are new in the Bundestag (Bundestag 19) are represented with significantly less personal relative to role-related information in Google suggestions compared to the ones that have been reelected (Bundestag 18 & 19) and the ones that left the German Bundestag 18 in 2017 (reference category).

Next, when also controlling for interaction effects between party identity and electoral phase in the third model, it becomes observable that Google suggestions change for some parties around elections (see Model 3 in Table 2.4). However, no specific pattern by party characteristics is apparent in the preliminary model. Politicians of the center-right party FDP are portrayed with significantly more personal information relative to role-related information before the election compared to after the election. Similarly, Google displays for the parties SPD, The Left and AfD more (but insignificant) personal relative to role information in the pre-election phase compared to the post-election phase. However, contrary to this, for the politicians of the center-right party CDU/CSU and the center-left party The Greens Google shows relatively less (but insignificant) personal information in the pre-election than in the post-election phase.

The fourth model applies the same model as before but additionally controls for whether a politician is a newcomer or has been reelected (see Model 4 in Table 2.4). The prior described

effects remain overall robust, except that the information provided for FDP politicians is not significantly different anymore from the information provided for the CDU/CSU.

The final model also adds an interaction of gender and electoral phase, which considers that an effect of the electoral phase on Google's suggested information can differ between female and male politicians (see Model 5 in Table 2.4). The result suggests that female politicians are represented in the pre-electoral phase with more personal relative to role information than their male counterparts, however, this effect is not significant. There is no support in any of the models for more differences in the personal relative to role score observable between left-wing and right-wing politicians, when looking at the suggestions in the pre-electoral phase compared to the post-electoral phase. Thus, the analyses fail to support the second hypothesis (H2).

Figure 2.2 summarizes the main findings visually by contrasting differences in Google's suggestions by gender, party and electoral phase. Same as before, effects that display more on the right of the figure indicate that Google suggests relatively more personal information as when the effect is displayed on the left of the figure. Interestingly, when comparing the pre-electoral with the post-electoral phase visually it becomes apparent that for some parties the gender bias is reversed after elections. This is structured by the left-right political orientation; the search suggestions display more (and of the FDP almost equal) personal relative to role information before the election for female politicians of the right-wing parties, i.e., of the CDU/CSU and AfD compared to their male counterparts, but after the election they display less. However, for females belonging to the left-wing parties The Left and the SPD, it is the opposite direction. The search suggestions display less personal-role information for females of The Left and almost equal amounts for females of the SPD before the election compared to males, but after the election they display more for female politicians. There is no observable pattern around the elections for the female politicians of The Greens. Female politicians of the party The Greens are represented in both phases with less personal relative

role information compared to males. There is, thus, tentative support for the hypothesis that search engine suggestions provide more personal information about female candidates in the pre-electoral phase compared to male candidates, when they belong to a right-wing party (H5).

Overall, the findings show that there are not more differences between the parties in the pre-electoral phase compared to the post-electoral phase in Google suggestions. However, there is tentative evidence that Google displays more personal information about female candidates in the pre-electoral phase compared to male candidates, when they belong to a right-wing party. The findings also suggest that search engine suggestions for politicians who are not in their first term in office do reflect more personal information rather than information about their role as politician compared to newcomers. This may indicate that individuals get more interested in their personal life – which is reflected in their searches and the subsequent search suggestions – the longer they are in office and probably in the general focal point. Looked at differently, individuals may be more interested and search for the role-related information for newcomers because they do not know much about them yet. As for career politicians, internet users probably already have that knowledge and are more interested in additional personal information. Hence, reelected politicians are represented with more personal information than those who are newly-elected.

Table 2.4: Examining the average representation of politicians in search engines around elections

	Dependent variable: Personal relative to role representation				
	adding to the regression				
	Model 1: party & gender identity	Model 2: newcomer	Model 3: party x electoral phase	Model 4: newcomer & party x electoral phase	Model 5: female x electoral phase
SPD	−0.221 (0.150)	−0.238 (0.150)	−0.391 (0.211)	−0.408 (0.210)	−0.398 (0.212)
The Greens	−0.482* (0.217)	−0.450* (0.217)	−0.145 (0.303)	−0.114 (0.303)	−0.097 (0.306)
The Left	−0.269 (0.206)	−0.180 (0.208)	−0.540 (0.288)	−0.451 (0.289)	−0.435 (0.292)
FDP	−0.248 (0.220)	0.180 (0.264)	−0.756* (0.311)	−0.328 (0.343)	−0.330 (0.343)
AfD	−0.114 (0.209)	0.315 (0.255)	−0.306 (0.295)	0.124 (0.329)	0.116 (0.329)
Female	0.069 (0.127)	0.087 (0.127)	0.069 (0.127)	0.087 (0.127)	0.034 (0.179)
Pre-electoral phase	−0.065 (0.115)	−0.065 (0.114)	−0.262 (0.184)	−0.262 (0.183)	−0.289 (0.194)
Bundestag 19		−0.381* (0.194)		−0.381* (0.193)	−0.381* (0.193)
Bundestag 18 & 19		0.191 (0.144)		0.191 (0.144)	0.191 (0.144)
SPD x Pre-electoral phase			0.340 (0.296)	0.339 (0.295)	0.319 (0.299)
The Greens x Pre-electoral phase			−0.672 (0.424)	−0.672 (0.423)	−0.707 (0.431)
The Left x Pre-electoral phase			0.541 (0.404)	0.541 (0.403)	0.509 (0.410)
FDP x Pre-electoral phase			1.016* (0.440)	1.016* (0.439)	1.019* (0.439)
AfD x Pre-electoral phase			0.383 (0.416)	0.383 (0.415)	0.398 (0.417)
Female x Pre-electoral phase					0.105 (0.253)
Constant	−1.130*** (0.113)	−1.181*** (0.148)	−1.031*** (0.134)	−1.082*** (0.164)	−1.069*** (0.167)
Observations	1,874	1,874	1,874	1,874	1,874

Note: Reference categories = parties: CDU/CSU, Female: Male, Pre-electoral phase: Post-electoral phase, Bundestag 18 & 19 and Bundestag 19: Bundestag 18, *p<0.05; **p<0.01; ***p<0.001
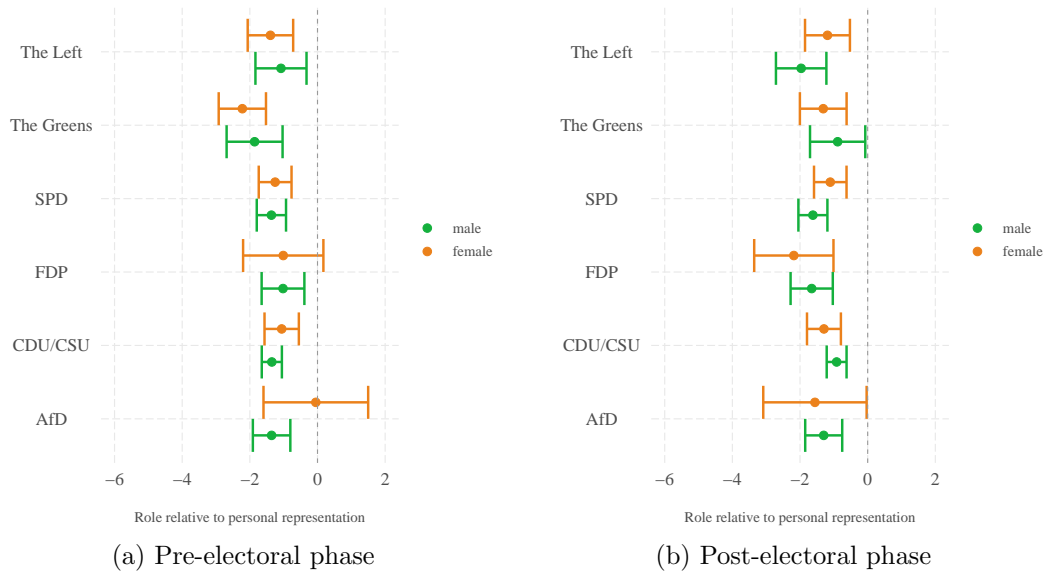
Figure 2.2: Predicted effects for personal-role information by gender and party identity around elections (ordered from left-wing to right-wing parties)

2.4.2 Representation of Politicians in Wikipedia Articles

Since users are most often redirected to Wikipedia articles when seeking online information in search engines, it is necessary to investigate their representation in there. Multiple linear regressions are applied to test whether Wikipedia articles about the politician contain more personal information when the politician is a woman and belongs to a right-wing party (H1b). Beside this, I analyze whether Wikipedia articles provide more personal information about female candidates compared to male candidates (H3b). Subsequent analyses also test for an interaction effect: whether politicians' Wikipedia articles display more personal information about female candidates compared to male candidates, when they belong to a right-wing party (H4b).

In the first model, the analysis focuses only on the party identity for predicting personal relative to role information (see Model 1 in Table 2.5). Providing support for the first hypothesis (H1b), politician's articles are represented with more personal compared to role-related information when they belong to a right-wing party. The CDU/CSU has the highest personal relative to role representation score, followed by the AfD and The Greens, and

finally The Left, SPD and FDP.

The second model sheds light only on the effect of gender to predict the information in Google without controlling for other variables such as party identity (see Model 2 in Table 2.5). No significant differences between male and female politicians are observable.

In the third model, however, I control for party identity, age and search popularity. There is a positive and significant effect for female politicians on the personal relative to role score (see Model 3 in Table 2.5). In other words, the analysis supports the hypothesis (H3b) that there is a general tendency for female politicians being represented with more personal relative to role-related information compared to their male counterparts. It should be noted that popularity is measured by the page views of politicians' biographies. Thus, search popularity is not the same as whether a politician is liked or generally well known but it rather reflects interest in information about them. It may also be the case that search popularity is high in the online world because not much is known yet about certain candidates (see e.g., Trevisan et al. 2018). Nevertheless, it is important to check for search popularity at this point, as research showed that popular biographies receive more edits than less popular ones (Göbel and Munzert 2018). The results of the models show that popular politicians on Wikipedia have relatively more (but insignificant) personal versus role-related information in their biographies. The age of the politician has no effect in any of the models.

In the fourth model, I take a deeper look into whether the gender effect varies with the party identity of the politicians, and I control for the party list position (see Model 4 in Table 2.5). Here, it becomes apparent that the effect of gender on the personal relative to role information is not same across all parties. There is a huge gender bias for the right-wing parties CDU/CSU and AfD in the amount of personal relative of role information. The right-wing female politicians are portrayed with relatively more personal information compared to their male counterparts. Thus, this trend provides support for the hypothesis that Wikipedia articles provide more personal information about female compared to male

politicians, when they belong to a right-wing party (H4b). Wikipedia articles of female politicians of the left-wing parties The Greens and SPD are also portrayed with relatively more personal information than their male counterparts, but this difference is less pronounced. However, there are almost no gender differences for politicians of the FDP, and the gender bias is reversed for The Left. For female politicians of The Left, Wikipedia displays relatively less personal information compared to their male counterparts.

In the fifth model, I also control for the interactions of search popularity with gender and party identity of the politicians (see Model 5 in Table 2.5). Politicians' search popularity does not have a significant effect on the amount of personal relative to role information in politicians' Wikipedia article. Popularity also does not predict the information in the Wikipedia articles for any of the single parties or for female politicians.

Figure 2.3 visualizes the effect of gender on the personal relative to role information on politicians' Wikipedia articles for all parties. It demonstrates that the right-wing parties AfD and CDU/CSU cluster together by having relatively more personal information in Wikipedia articles in comparison to the other parties, which is even stronger for female politicians. It shows again that female right-wing politicians – except those belonging to the party FDP – are represented with more personal relative to role information in Wikipedia articles compared to their male counterparts.

Overall, the results indicate that the representation in Wikipedia is structured by the party identity, gender identity and a combination of both.

Table 2.5: Examining the average representation of politicians in Wikipedia

	Dependent variable:				
	Personal relative to role representation				
	adding to the regression				
	Model 1:	Model 2:	Model 3: party & gender	Model 4:	Model 5: party x popularity &
	party identity	gender identity	identity & controls	party x gender identity	gender x popularity
SPD	−0.516***		−0.544***	−0.500***	−0.482***
	(0.060)		(0.061)	(0.080)	(0.096)
The Greens	−0.298***		−0.349***	−0.306*	−0.228
	(0.081)		(0.083)	(0.123)	(0.146)
The Left	−0.489***		−0.537***	−0.429***	−0.560***
	(0.080)		(0.081)	(0.120)	(0.148)
FDP	−0.561***		−0.549***	−0.525***	−0.550***
	(0.077)		(0.077)	(0.093)	(0.112)
AfD	−0.294***		−0.316***	−0.353***	−0.186
	(0.073)		(0.075)	(0.087)	(0.153)
Female		0.034	0.125*	0.261**	0.306**
		(0.051)	(0.051)	(0.099)	(0.114)
Party list position				−0.003	−0.003
				(0.002)	(0.002)
Age			−0.002	−0.001	−0.001
			(0.002)	(0.002)	(0.002)
Popular			0.088	0.069	0.121
			(0.046)	(0.049)	(0.094)
SPD x Popular					−0.046
					(0.131)
The Greens x Popular					−0.172
					(0.173)
The Left x Popular					0.235
					(0.171)
FDP x Popular					0.073
					(0.164)
AfD x Popular					−0.237
					(0.179)
Female x Popular					−0.094
					(0.107)
Female x SPD				−0.198	−0.197
				(0.137)	(0.138)
Female x The Greens				−0.218	−0.195
				(0.175)	(0.176)
Female x The Left				−0.373*	−0.359*
				(0.174)	(0.174)
Female x FDP				−0.301	−0.312
				(0.188)	(0.189)
Female x AfD				0.159	0.220
				(0.219)	(0.224)
Constant	−0.568***	−0.867***	2.766	1.466	1.282
	(0.037)	(0.029)	(4.386)	(4.622)	(4.676)
Observations	703	703	703	632	632

*Note:* Reference categories = parties: CDU/CSU, Female: Male, Popular: Unpopular, *p<0.05; **p<0.01; ***p<0.001
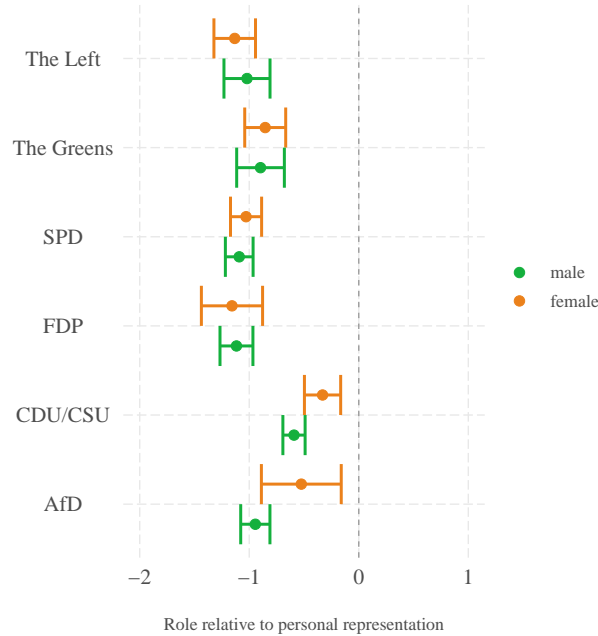
Figure 2.3: Predicted effects for personal-role information by gender and party identity (ordered from left-wing to right-wing parties)

2.5   Discussion and Conclusions

This study analyzed the role of gender and party (separately and together) in the representation of politicians in the search engine Google, which functions as an information gatekeeper when voters search for online information. Moreover, additional analyses provided insight into the role of elections and politicians' portrayal in Wikipedia articles since search engines most often redirect users to them. A huge number of voters trust and use Google and Wikipedia to get an impression about candidates. This makes it particularly problematic when the information provided varies systematically with the politicians' characteristics. Above all, the analyses have shown that the parties AfD and CDU/CSU cluster together in terms of the provided information and biases. There is a large difference in the portrayal of female and male candidates, with Google providing relatively less personal information about right-wing female politicians and, conversely, Wikipedia providing relatively more personal information about them compared to right-wing male politicians.

The observed bias in Google suggestions reflects biases in information seeking of voters. It mainly shows that there is a different interest in information on the part of the voters which is at the same time influenced by the politicians' party and gender. There seems to be a greater interest to search for female right-wing politicians' (AfD and CDU/CSU) role information compared to their male counterparts, but also compared to other left-wing politicians. It could indicate that voters are more interested in role-related information from female right-wing politicians, as they may be more likely to question and check their positions and political expertise, i.e., searches on the competence dimension (Ditonto, Hamilton and Redlawsk 2014).

However, political events seem to have an impact on the information that internet users find about politicians: the search suggestions are different three months before the elections compared to those three months after the election. Other information seems to be important when elections are close. The findings suggest that after the election the gender bias reverses for some parties. These changes in gender biased representation around elections seem to be affected by the left-right political orientation of the parties. While the search suggestions tend to display more personal relative to role information before the election for right-wing female politicians compared to their male counterparts, they display less after the election. It is plausible that voters are searching for information about those politicians they are generally willing to vote for. As other research also indicates (Schneider and Bos 2016; Siim et al. 2016; Wiliarty 2010), conservative voters may be especially interested in the family and private life of female politicians to check whether it is in line with their traditional beliefs and values. After the election, the more general population could mainly search for all kinds of politicians, which leads to other patterns of biases. Overall, the findings indicate that important political events have an impact on voters search behavior – so also on search biases – and this is reflected in the Google suggestions.

In contrast, the bias in Wikipedia reveals particularly that Wikipedia authors devote

more emphasis to providing voters with relatively more personal information about female right-wing politicians (AfD and CDU/CSU) compared to male politicians and female politicians of other parties. There is a slight overall trend of women being represented with more personal information. Interestingly, biographies of female politicians in The Left party display relatively less personal information. We know from previous research that politicians and their parties themselves use the platform to edit their biographies. Assuming that biographies are mainly edited by the politicians themselves (or their staff), it may indicate that women politicians are strategically trying to influence the impression of their person with more personal information. On the one hand, it could be used to strategically list information that is consistent with the ideal image of a woman among the voters. On the other hand, since traditional family roles and ideals play a major role in these parties, not only women politicians themselves have an interest in writing about these topics, but other users do too. The media often focuses on right-wing women's personal lives, but also the politicians themselves draw public attention to it. For example, far-right female politician Alice Weidel has discussed her own sexuality, and so has the media (e.g., Faiola 2017). The family life of the center-right CDU female politician Ursula von der Leyen also got the media's attention (e.g., Bennhold 2010; Oltermann 2019).

It is very interesting that on Wikipedia, right-wing female politicians are represented with more personal information compared to their male counterparts, while on Google they are represented with less. This uncovers that gender biases are mainly driven by an interaction of gender and party identity, but also the information creation process plays a major role. Google suggestions – reflecting search requests of voters – are less controlled in their creating process than Wikipedia. They reflect spontaneous information interests of users that may be triggered by discussions, other media posts (e.g., Facebook posts) and political events. The information creation process in Wikipedia is more conscious and a more controlled process through contributions by the writing community that also consists of politicians

themselves and their staff (Göbel and Munzert 2018). One has also to be aware here, that both Google suggestions and Wikipedia are not independent from each other, but are actually interconnected. While knowing that a great extent of Google searches redirect users to Wikipedia and a high percentage of users consult Google after visiting Wikipedia, it may also indicate that users could not find relevant role-information for female right-wing politicians in their biographies and thus explicitly search on Google for it. Future research could tap deeper into this question, for example by conducting experiments.

It is important to bear in mind the potential limitations of the study. Search engines and the websites they redirect to are only a part of a diverse media landscape. This research does not take into account other media forms such as television, radio and newspaper. To be sure, they also provide voters with information about candidates and impact the evaluation of them. However, Google is the most used and Wikipedia one of the ten most used websites globally. Google and Wikipedia searches are increasingly used in people's everyday life for fact-checking and are the gateway to online political information. Therefore, it is necessary to investigate whether there is biased information about politicians on these new media platforms and whether the information varies systematically with characteristics of the politician such as party membership and gender. It is also important to acknowledge that the representation of politicians can be also analyzed on the basis of other party characteristics than the left-right political spectrum, which could be an interesting aspect of future research. The research is also insofar limited that we can only guess how the biases emerge, since the production process of search engine suggestions is a black box.

Future research is also needed to investigate how these biases in search engines impact voters and how this bias compares to biased information coming from other information sources. In this context, it is also reasonable that especially frequent internet users are affected more from the portrayed stereotypical information because they are exposed to it repeatedly and a cognitive association of portrayed information and candidates' character may

be more likely. Subsequent scholarship can build on the findings presented here to examine how personal compared to role-related information impacts the users of an online platform and their information seeking. Just as negativity bias can attract more attention in news outlets (Soroka and McAdams 2015), this may be also true for personal information about politicians in online platforms (e.g., search engines and Wikipedia). Personal information may attract attention leading more users to click on it and spending time on the suggested personal information.

When identifying the bias in the portrayal of left-wing and right-wing female politicians, the question arises why we should care about the results? First, we may care about it in terms of fairness. These platforms are the most used online platforms to learn about candidates. If for some politicians mainly personal information is provided compared to others, and this differs mainly because of the politicians' characteristics like their gender, this can reinforce stereotypes. Second, it teaches us something about our own biases that we apply when we seek for information about politicians. Google learns and reflects the stereotypes that we apply when seeking for information. But it also teaches us about the biases of (Wikipedia) authors – including politicians and their staff – who write the biographies about politicians. When asking participants about their biases based on politicians' characteristics, these kind of biases are rather hard to detect. Individuals may be unaware of their biases or social desirability can lead participants answer dishonestly. Therefore, Wikipedia and Google offer a novel way to investigate biases. Third, it uncovers the importance of considering intersectionality in political science research, especially when focusing on biases. As we have seen in the analyses, there is a great chance of not identifying biases or getting wrong conclusions when solely looking at single characteristics and treat them as rather apart from each other when trying to predict an outcome. In less intersectional models, I would not have found differences between female and male politicians in Google suggestions and would not have found that the gender bias stands out for right-wing politicians.

However, what could help to solve the problem? One solution could be that information, especially information on politicians, is constantly monitored by people who are trained on the identification of biases. Voters could be made aware and sensitive about their own potential biases when they interact with online platforms. Additionally, this could involve also awareness and sensitivity of the biases that do inherent in online platforms voters seek political information. Future research should build upon the findings and investigate further the link between biases in political information and information processing by conducting experiments. In the case of algorithm-based biases, another solution could be to let the algorithm learn to avoid biases after they have been identified. In the case of active user-based biases like in Wikipedia, it may help to make Wikipedia authors including the politicians themselves aware and sensitive of their biases when they write the biographies of politicians. Politicians themselves could also pay more attention to popular online platforms and monitor whether they are equally represented as other politicians, especially in terms of the amount of personal compared to professional information.

To date, women are still insufficiently represented in politics worldwide (Paxton and Hughes 2015). This research showed that when women are in office, there are still differences between female and male politicians in the provided information in the popular online platforms Google and Wikipedia. When citizens search for information about politicians online, the amount of personal compared to professional information is different for female right-wing politicians compared to their male counterparts and female left-wing politicians. Gender biases in the amount of personal compared to role-related information in online platforms can influence the impression of politicians and thus, can lead to disadvantages for female politicians when they reinforce existing stereotypes and drop the perceived competence of women. Therefore, it remains crucial to investigate and monitor the portrayal of politicians and potential biases based on politicians' identities and their intersection, especially in new

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and underinvestigated online platforms.

2.6 Appendix

Table 2.6: Average representation of personal relative to role information: Additionally controlling for popularity and position on the party list

	Dependent variable:					
	Personal relative to role representation					
	adding to the regression					
	Model 1: party identity & popularity	Model 2: gender identity & popularity	Model 3: party x gender	Model 4: party x popularity & gender x popularity	Model 5: party list position	Model 6: party leader
SPD	−0.025 (0.231)	−0.318 (0.279)	−0.278 (0.279)	−0.278 (0.339)	−0.349 (0.356)	−0.358 (0.356)
The Greens	0.380 (0.315)	0.325 (0.445)	0.335 (0.445)	0.840 (0.530)	0.509 (0.541)	0.508 (0.540)
The Left	0.363 (0.309)	0.249 (0.420)	0.264 (0.420)	0.244 (0.525)	−0.060 (0.550)	−0.068 (0.550)
FDP	0.390 (0.292)	0.183 (0.326)	0.181 (0.326)	0.316 (0.396)	0.046 (0.416)	0.044 (0.416)
AfD	−0.305 (0.283)	−0.072 (0.302)	−0.029 (0.304)	0.270 (0.556)	−0.008 (0.568)	−0.020 (0.567)
Female	−0.200 (0.193)	−0.458 (0.349)	−0.661 (0.399)	−0.730 (0.409)	−1.083* (0.424)	−1.101** (0.423)
Age	0.001 (0.008)	−0.001 (0.008)	0.0005 (0.008)	−0.0002 (0.009)	−0.003 (0.009)	−0.003 (0.009)
Party list position					−0.017* (0.008)	−0.017* (0.008)
Popular	0.095 (0.173)	0.108 (0.172)	−0.015 (0.208)	0.173 (0.296)	0.290 (0.347)	0.314 (0.348)
Party leader						−0.964 (0.702)
Female x SPD		0.836 (0.499)	0.853 (0.499)	0.879 (0.502)	1.121* (0.513)	1.151* (0.513)
Female x The Greens		0.252 (0.647)	0.236 (0.647)	0.378 (0.652)	0.832 (0.655)	0.835 (0.655)
Female x The Left		0.370 (0.636)	0.375 (0.636)	0.417 (0.637)	0.786 (0.647)	0.801 (0.647)
Female x FDP		0.934 (0.698)	0.997 (0.700)	1.037 (0.703)	1.358 (0.702)	1.362 (0.702)
Female x AfD		−2.278** (0.818)	−2.409** (0.827)	−2.378** (0.834)	−2.118* (0.831)	−2.012* (0.834)
Female x Popular			0.394 (0.372)	0.469 (0.395)	0.522 (0.398)	0.517 (0.398)
SPD x Popular				−0.097 (0.463)	−0.343 (0.487)	−0.352 (0.486)
The Greens x Popular				−1.113 (0.631)	−1.163 (0.642)	−1.125 (0.642)
The Left x Popular				−0.005 (0.616)	−0.236 (0.633)	−0.199 (0.634)
FDP x Popular				−0.350 (0.594)	−0.524 (0.609)	−0.513 (0.608)
AfD x Popular				−0.469 (0.652)	−0.597 (0.667)	−0.601 (0.666)
Constant	−1.220* (0.477)	−1.086* (0.477)	−1.096* (0.477)	−1.138* (0.483)	−0.604 (0.539)	−0.627 (0.538)
Observations	703	703	703	703	632	632

Note: Reference categories = parties: CDU/CSU, Female: Male, Popular: Unpopular, Party leader: No party leader,
*p<0.05; **p<0.01; ***p<0.001

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Chapter 3

The Impact of Hate Speech in Search Engines on Political Attitudes – Evidence from an Online Experiment

Abstract

Based on an online experiment, I assess the effects of hate speech compared to positive and neutral speech about refugees in search engines on trust and policy preferences. The experiment varies both the tone of the suggestions (control, positive, neutral, negative) and the source of the suggestions (search engine and politician). The study provides insights into the polarizing potential of hate speech among individuals self-identifying at the left and right margins of the political spectrum. It is striking that there are fundamentally different effects of positively biased information, in which persons with such group identities are much closer in their attitudes than persons exposed to other refugee-related information. Furthermore, the study analyzes how the trust in the source and its content are affected by inherent political biases. Search engines are perceived as politicized when they are politically biased, and the general trust in the source and its content erodes and is similar to the level of a typical politicized source (i.e., a politician). The study proposes as a major explanation for these different effects that individuals having more extreme right political ideologies rather tend to adopt the underlying attitudes of the political bias, while they seem to lead to reactance (backfire/boomerang effect) and devaluation of the source for those having rather more extreme left political ideologies. These findings are particularly alarming because the study shows that people with a right-wing political ideology are almost three times more likely to click on hate speech suggestions than those with a left-wing political ideology. Thus, especially strong political group identity plays a crucial role in how politically biased information influences political attitudes and how individuals engage with it online.

3.1 Introduction

It is the 21st century. A digitally connected person is interested in the political topic of refugees and therefore actively searches information on the topic online. Like most human beings would do, the first place to go is a search engine to get immediate information about the topic at hand. An algorithm suggests the first pieces of information this person sees; they are, however, politically biased. Still, it remains a question how this person, with a political identity and a set of aligned pre-existing attitudes, would respond to the recommended biased information from this user-driven information source.

This study seeks to address this issue and emphasizes on the specific nature of the source of information. Research is vital because the presence of digital technologies, coupled with the potential lack of neutrality of algorithms, may lead to new forms of discrimination and social inequality. Search engines play an essential role in this issue because they are used ubiquitously, are highly trusted and perceived as neutral (Dutton et al. 2017; Edelman 2019; Pan et al. 2007; Schultheiß, Sünkler and Lewandowski 2018), but can also reflect biased and derogatory content: existing studies point to differences in the portrayal of certain groups, such as stereotypical, sexist, racist (Baker and Potts 2013; Noble 2018; Otterbacher, Bates and Clough 2017), or anti-Semitic content (Bar-Ilan 2006) in search engines. As the most visited websites globally (Pradel 2021a), search engine websites like Google play a crucial role in seeking immediate information about salient (political) topics while at the same time being gatekeepers to online information (Dutton et al. 2017).

Particularly, refugees have received media and public attention since the so-called "refugee crisis." Several studies have shown that group cues and negative sentiments in communication about immigrants both in media outlets (Brader, Valentino and Suhay 2008; Czymara and Dochow 2018; Eberl et al. 2018; Wirz et al. 2018) and from political elites (Newman et al. 2021) are prone to reinforce negative attitudes about refugees and immigration. Refugees have not only been frequently portrayed in the European press with narratives promoting

stigmatization, suspicion, hate speech, and hostility (Georgiou and Zaborowski 2017; Wigger, Yendell and Herbert 2021), they are also targeted in more extreme forms like hate speech when it comes to newer forms of mass media like social media posts and networking of hate users (Gagliardone et al. 2015; Mathew et al. 2019). Especially hate speech has far-reaching negative consequences, as it can discourage political participation (Special Eurobarometer 452 2016)[1], promote prejudices (Soral, Bilewicz and Winiewski 2018), hostility, and ultimately lead to violent acts against the derogated social group (Perry 2001; Waltman and Haas 2011; Waltman and Mattheis 2017). Research is nonetheless limited when it comes to new technologies – like search engines –, since they are used by Internet users to actively seek information. They are also fundamentally different in that they essentially recommend information to their users and are perceived as neutral, leading said users to intuitively place more trust in the results that are displayed most prominently (Edelman 2019; Pan et al. 2007; Schultheiß and Lewandowski 2021; Schultheiß, Sünkler and Lewandowski 2018). Hence, this study differs from prior research by taking a novel glance at whether a negative tone compared to positive and neutral tones about refugees in a widely used information source reinforces negative attitudes towards immigration and asylum policy. The study was carried out through an online experiment. Another main contribution is that this study will compare trust levels in search engines with a typically not neutral but politized perceived source, that is, a politician. This approach allows for digging deeper into whether the general trust in the search engine and its content is maintained when it contains politically biased information or it is perceived as politicized and trust erodes.

One of the most important findings is that hate speech can have a polarizing effect on individuals who ideologically identify on the left or right margins of the political spectrum. While, as the study shows, it may lead to more hostile attitudes toward asylum policy among

1. For example, 75 percent of European citizens who follow or participate in debates have experienced hate speech, and about 50 percent indicate that it makes them hesitate to participate in debates (Special Eurobarometer 452 2016).

individuals who have a political ideology that is more to the right, it can, conversely, backfire for individuals who have a political ideology that is more to the left margin and lead to more positive attitudes toward asylum policy. However, it is striking that there is no similar polarizing effect when it comes to positive tone about refugees in search engines; individuals even become closer in their attitudes. Attitudes from users with far-left political views become slightly more negative and attitudes from far-right participants remain the same. Thus, the results imply that different mechanisms in the information processing of search engine suggestions have a different effect based on the direction of the political bias: only hate speech seem to have the potential to trigger the political identity of self-categorized far-left and far-right participants, leading to a reinforcement of their pre-existing political attitudes and, consequently, polarization among them. A second finding is that search engines are more trusted than politicians, which underlines the importance of studying search engines and their influence on political attitudes.

These results are important and also have broader implications because they show that different directions of politically biased information can also have heterogeneous effects depending on the political group identity. I deduce that hate speech has a vast potential to trigger individuals with strong political group identities, leading to the polarization of attitudes. The main explanation I see here, which I will discuss further in the paper, is that different mechanisms apply to persons with solid left and right group identities. Persons with a strong right ideology seem to mirror the behavior of an authoritarian personality as they tend to adopt the bias of the search engine, which is generally perceived as neutral. Positively and negatively biased content provokes reactance in those with relatively strong left identity, this is particularly strong in the case of hate speech, which seems to cause stronger triggers and identity-based reactions for the left (and also right) group identity. However, strong leftists find also the medium politicized in the case of a positive bias, leading to resistance by developing an opposite attitude (a backfire or boomerang effect).

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Even though the effects might only last for a short time, those who are strongly interested in the topic would probably actively search for the topic more often. The overall effect might be more lasting given how often people search for this content. Additionally, explorative analyses show that individuals would also react more sensitively to biased political information when seeking it online, depending on their political ideology: that is, people with a right-wing political ideology are almost three times more likely to click on hate speech suggestions than those with a left-wing political ideology. Therefore, effects may manifest here more strongly.

3.2   Consequences of Hate Speech

Prior research supports the assumption that individuals use stereotypes and categorize individuals into different groups to simplify the information processing (Allport 1958; Tajfel 1970). This stereotyping can lead to intergroup bias and discrimination as individuals gain self-esteem by favoring people from their social group (in-group), i.e., people with similar characteristics to themselves, and by derogating people outside this group (out-group) (Billig and Tajfel 1973; Tajfel 1970; Tajfel and Turner 1979). As a result, individuals tend to see others of the group they identify with as positive and those outside the group as negative (Billig and Tajfel 1973). This study looks into the effects of hate speech on refugees – a form of derogation of an out-group – in the new media platform search engines. Hate speech and organized hate are increasingly observable in the online world; they derive their strength from the fact that hate is the most potent negative emotion for mobilizing people for derogation and violence towards an out-group (Fischer et al. 2018). Research and social media platforms like Twitter broadly define hate speech as hostility or promoting violence towards a social group and based on characteristics such as race, ethnicity, gender, religion (Gagliardone et al. 2015; Koltsova et al. 2017; Mathew et al. 2019; Waltman and Mattheis 2017). Hate speech can be distinguished from incivility, which is defined wider as all uncivil behavior, including milder forms such as name-calling and more extreme forms such as hate speech against a

social group (Papacharissi 2004; Ziegele, Koehler and Weber 2018).

Research on the effects of hate speech and incivility towards minorities in a society shows that hate speech attitudes can reinforce negative prejudices, aggressiveness and violence towards the minority group (Perry 2001; Waltman and Haas 2011; Waltman and Mattheis 2017). On the one hand, it can change the emotional status of recipients, for example, by leading to more enthusiasm (Kosmidis and Theocharis 2020). On the other hand, it can have devastating consequences for the minority group and the society because hate speech can lead to various negative consequences, such as negative psychological outcomes (e.g., depression (Bilewicz and Soral 2020), lower self-esteem (McCoy and Major 2003)), to work-related problems (Klaßen and Geschke 2019), political consequences (e.g., lower participation in debates (Special Eurobarometer 452 2016), political intolerance (Halperin, Canetti-Nisim and Hirsch-Hoefler 2009) and social consequences (e.g., lower willingness to donate to a refugee aid organization (Ziegele, Koehler and Weber 2018)). By promoting hostility against social groups, hate speech can lead to violent acts, for instance, the recent right-wing extremist act of terror in Hanau (Hoffman, Ware and Shapiro 2020) or the Pittsburgh synagogue shooting (Mathew et al. 2019; McIlroy-Young and Anderson 2019). As hate speech becomes increasingly prominent on online platforms, especially in recent years, the problem that hateful content can spread faster than ordinary content is also becoming apparent (Mathew et al. 2019).

Negative stereotypes about the out-group also play an important role in hate speech. Research found that priming of stereotypes or racial attitudes, even if only subtly, can impact political attitudes. It can lead to decreasing support for political candidates (Valentino 1999) and increased criticism about them (Pyszczynski et al. 2010). Moreover, priming stereotypes increase intergroup conflict (Hsueh, Yogeeswaran and Malinen 2015) and lead to more support for certain policies like punitive crime policy agenda (Gilliam and Iyengar 2000).

3.3 Hate Speech and Stereotypical Information in Search Engines

Search engines are a frequently used medium with a vast potential to confront users with prejudices and stereotypes as users' information and interests influence the information the engines display. For example, search suggestions (also called search predictions) – information that pops up when searching for a term in the search bar – reflect the search interests of prior users. How individuals search for information and thus, create content about social groups is likely to be influenced by stereotypes and prejudices. Research found that Google contains several sexist and racist search results, images, image-labeling and map locations (Noble 2018). For example, racial slurs redirected users to the White House during Obama's presidency and Google Photos categorized a photo of Blacks as "gorillas."

Other research indicates that search engines contained anti-Semitic (Bar-Ilan 2006), gender-stereotypical (Otterbacher, Bates and Clough 2017) and stereotypical and/or negative content for certain social groups (Baker and Potts 2013), as well as biased information about politicians (Pradel 2021a). Crucially, users having more stereotypes (i.e., gender stereotypes) about a group are also less likely to notice these biases (Otterbacher et al. 2018) and they even perceived the reality more stereotypically (Kay, Matuszek and Munson 2015).

As gatekeepers of information, search engines can play a crucial part when they confront individuals with hate speech about minorities since research showed that negative stimuli attract and affect individuals to a large extent (Soroka and McAdams 2015). Although Internet users resort to search engines frequently, prior research showed the existence of biases towards minority groups and suggested users' attraction to it; it remains unknown how they affect political attitudes. In this work, I focus on this gap and define hate speech generally as derogating, hostility-based language on features attributed to a social group as a whole (Koltsova et al. 2017), i.e., negative stereotypes towards refugees such as "refugees are criminals." I compare the effects of positive speech, neutral speech and a control. By positive speech, I mean correspondingly positive statements about the social group, and by

neutral speech, neutral expressions about the social group.

3.4 The Significance of Biased Content about Refugees in Germany

Germany offers a particularly good case to investigate the effects of hate speech, positive speech, and neutral speech about refugees in search engines. Since the so-called "refugee crisis," refugees and migration as a general topic have been the focus of public attention (Franzmann, Giebler and Poguntke 2020). It was the beginning of the rise of the right-wing populist party Alternative for Germany (AfD), which by comparison was strongly opposed to a culture of welcome and found support among parts of the population (Lees 2018; Mader and Schoen 2019). An increasing anti-Islamic mood could be observed, and there were public demonstrations by PEGIDA (Patriotic Europeans Against the Islamicisation of the Occident) and AfD against immigration from Syria and other countries (Welle 2017; Lees 2018).

In Germany and other European countries, refugees got media attention but often negatively, leading to negative attitudes towards immigration, negative stereotypes, and stigmatization (Czymara and Dochow 2018; Georgiou and Zaborowski 2017; Wigger, Yendell and Herbert 2021). For instance, after the Cologne assaults on New Year's Eve, the immigration coverage has led to increased negative portrayal and criminalization of male migrants (Wigger, Yendell and Herbert 2021). However, the electorate has been rather divided on immigration, i.e., the anti-Islamic and anti-migration mood of the electorate opposed other parts that were more pro-immigration (Franzmann, Giebler and Poguntke 2020). The relevance of the topic is particularly evident from the fact that since 2015 it has been mentioned by citizens as one of the most important problems in Germany (Forschungsgruppe Wahlen 2020). Thus, biased content on refugees in search engines is common and may impact the political attitudes of German citizens.

3.5 Expected Effects of Hate Speech on Political Attitudes

Building on the social identity theory and research on intergroup conflict (Tajfel 1970; Tajfel and Turner 1979), the study allows to examine how content with derogating – compared to positive and neutral – information about minority groups impacts preferences for political policies (i.e., immigration and asylum policies). The social identity theory (Tajfel 1970; Tajfel and Turner 1979) was proposed to explain intergroup behavior. According to the theory, individuals belong to different social groups, and individuals categorize themselves and are also categorized by others into social groups. The theory further assumes that individuals derive their self-esteem by enhancing their sentiment of belonging to a social group and by distancing themselves from out-group members. One proposition is that individuals favor members of their social group who share similar characteristics such as ethnicity and gender (in-group favoritism) and engage in derogating others (out-group derogation). The portrayal of immigrants in media content and especially a negative sentiment can lead to negative attitudes towards immigrants (Brader, Valentino and Suhay 2008; Czymara and Dochow 2018; Wirz et al. 2018). Moreover, research showed that hate speech could reinforce stereotypes, increase aggressiveness, and even lead to violence (Perry 2001; Waltman and Haas 2011; Waltman and Mattheis 2017). It is reasonable that individuals strengthen their attitudes when they are confronted with hate speech in search engines, as the search suggestions – which are generated by previous users' searches on this topic – imply the public opinion of search engine users on this issue and individuals may feel validated in their basic negative sentiment towards refugees (Baker and Potts 2013). Therefore, individuals may adopt a negative stereotypical attitude about out-group members. Based on these research findings, I hypothesize that individuals will become more critical toward immigration policy (H1a) and asylum policy (H1b) after being exposed to hate speech.

On the other hand, it is also plausible that hate speech is not always processed in the same way. Instead, I expect the participants' political ideology to be crucial for how they

process hate speech. While the general public opinion is rather opposed to refugees (Liebe et al. 2018), individuals with a leftist and more progressive political ideology tend to have less restrictive attitudes towards refugees and immigration policies. Therefore, it is plausible that they do not adopt negative stereotypes to the same extent. In particular, I expect the negative effect of hate speech on attitudes towards the policies weaker for individuals with a left political ideology. Research also showed that the effects and perception of incivility could vary with individuals' political ideology and partisanship (Costello et al. 2019; Kosmidis and Theocharis 2020). In other words, I hypothesize that individuals with a right-wing political ideology will become more negative about immigration (H2a) and asylum (H2b) policies than individuals with a left-wing political ideology when confronted with hate speech. Thus, I expect individuals to be influenced by hate speech towards a minority group to a different extent based on their self-identified political ideology.

Similarly, I expect that positive expressions related to the minority groups can be harmful by provoking a backfire effect (also called backlash or boomerang effect (Swire-Thompson, DeGutis and Lazer 2020)). There are mixed findings on whether a backfire effect exists. Some studies found such a backfire effect (e.g., Hart and Nisbet 2012; Nyhan and Reifler 2010) among subgroups like strong republicans who amplified their attitudes (e.g., Hart and Nisbet 2012), while others did not find an impact under theoretically favorable conditions (e.g., Guess and Coppock 2020). Worldviews deviating from one's own – for example, the worldview full of hate speech one might see in search suggestions – can be considered a threat. Research showed that strong threat primes can provoke coping strategies, that is, they reinforce preexisting meaning frames and attitudes (Bassett et al. 2015; Castano et al. 2011; Proulx and Major 2013; Rovenpor et al. 2016). For example, one study showed that a threat caused by a violent conflict lead participants to behave either prosocially or antisocially depending on their preexisting meaning frameworks (Rovenpor et al. 2016). Since I assume that the basic sentiment towards refugees is negative in German society, as outlined before,

positive expressions about refugees may provoke stress for individuals who have a rather critical attitude towards refugees that they need to cope with, which leads to the following hypotheses: positive expressions about refugees will lead to more negative attitudes towards immigration (H3a) and asylum policy (H3b). Once again, I expect the political ideology to be a crucial moderator. I hypothesize that positive expressions about a minority group provoke more stress, and thus, more need for coping strategies for individuals self-identifying at the "right" of the political spectrum. Thus, I expect that individuals do this by strengthening their preexisting attitudes. Hence, I hypothesize that the effect of positive expressions about refugees on immigration (H4a) and asylum policy (H4b) will be stronger for individuals having a self-identified right-wing political ideology.

Besides the political ideology, the source that provides individuals with hate speech may play an essential role in information processing. It may be central that search engines are generally perceived as neutral, and that their information is trusted. By comparing hate speech coming from search engines to another communication source (i.e., a politician), the relative importance of web technologies compared to humans as sources of hate speech can be estimated. A political actor may be perceived as less objective and less trustworthy than search engines as sources of communication. Research indicates that the technology sector and search engines are generally trusted, while there is a mistrust in politicians and the government (Edelman 2019). Other research showed that although individuals trust search engine results less than some years ago, users still tend to trust them (Joachims et al. 2017). Individuals may intuitively perceive the search engines as more neutral compared to a politician and trust their results. Thus, I expect that the content provided by a search engine will be more trusted than the same content provided by a politician (H5a).

To investigate these assumptions, I conduct an online experiment in which I prime participants in the experimental group with non-neutral (positive and negative) search engine suggestions and neutral suggestions and compare them with content that is not refugee-related

(control group). Furthermore, I analyze to what extent hate speech and positive speech in search engines influence trust in search engines and are perceived as politicized. To this end, I compare these trust effects with the same biased expressions when it comes from another vital communication source, i.e., a politician.

3.6   Design, Procedure and Measures

Before running the experiment, the ethic commission of the Faculty of Management, Economics and Social Sciences at the University of Cologne approved the study (approval number: 19020FP), which has been pre-registered on EGAP.[2]

I validated all presented expressions of the prime stimuli by human coders who rated a set of randomly presented expressions into either a neutral, negative or positive category.

Participants

1200 participants, including 607 women and 593 men, with a minimum age of 18 years have been recruited by an online panel (Lucid, 20.-24. April 2020). The platform is comparable to Amazon Mechanical Turk and provides reliable and valid data for online experiments (Coppock and McClellan 2019). Quotas have been applied so that the recruited participants are representative of German citizens in terms of gender, age and education. In addition, I included an attention test by asking participants to click on a particular category to have a test of data quality. Participants who did not answer correctly to the attention test have been excluded from the data analyses.

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2. The pre-registration and the pre-analysis plan were published on April 19th 2020, both available on `http://egap.org/registration/6647`.

Experimental Design and Measures

The experiment used a 4x2 (communication source: search engine vs. politician x tone: control content vs. neutral vs. positive vs. negative speech about refugees) between-subjects design. Individuals were told that they took part in a scientific study about actual topics in Germany and were asked to provide consent to participate. After answering questions about their sociodemographic information, they answered questions about their political ideology and populist attitudes. The reason is that based on social identity research (Chang, Chen and Krupka 2019; Tajfel 1970; Tajfel and Turner 1979), research on the backfire (or boomerang, backlash) effect and motivated reasoning (e.g., Hart and Nisbet 2012) and threat-related research (Bassett et al. 2015; Castano et al. 2011; Proulx and Major 2013), the political ideology – or similar political ideology-based attitudes (Rovenpor et al. 2016) – should be a vital moderator when the derogation of the minority group is salient. I used a left-right self-placement, which is commonly used in surveys in Germany (Breyer 2015). Moreover, the participants responded to the German version of the new populist attitudes scale (Silva et al. 2018), which has been summarized to a mean score (alpha=0.65). The respondents were then randomly assigned to one of the eight experimental groups with content related to a minority group (i.e., refugees).

To prime the tone of the information about refugees, they were randomly assigned to either negative, neutral or positive expressions about refugees or a control group without any expressions about refugees. The negative treatment group contained expressions such as "Refugees are a danger." The positive group contained expressions like "Refugees are peaceful," and the neutral one, expressions such as "Refugees are in Germany." All treatment groups included one expression being more neutral "Refugees are currently in the debate." This has been done to make the search suggestions appear more natural since the suggestions are mixed and rarely solely negative or positive. The translated expressions are shown in Table 3.1 (originally in German). The participants were asked to imagine that a search engine
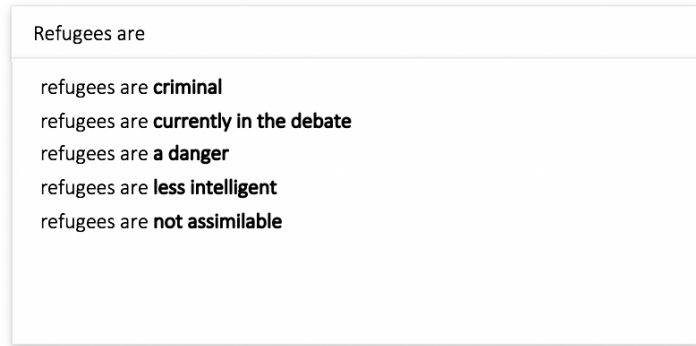
Figure 3.1: Experimental group: Hate speech provided by a search engine (translated from German)

– versus a politician in the other experimental groups – provided content related to a political topic. Figure 3.1 shows exemplarily the stimuli of hate speech in a search engine presented to one experimental group.

Table 3.1: Experimental groups: Hate speech, neutral and positive tone provided by a search engine (translated)

Hate speech	Neutral tone	Positive tone
Refugees are criminal	Refugees are in Germany	Refugees are peaceful
Refugees are currently in the debate	Refugees are currently in the debate	Refugees are currently in the debate
Refugees are a danger	Refugees are a group of people	Refugees are a cultural enrichment
Refugees are less intelligent	Refugees are diverse	Refugees are intelligent
Refugees are not assimilable	Refugees are in Europe	Refugees are assimilable

Half of the participants were randomly assigned to a search engine as a source for political information to prime the communication source. The expressions were introduced by "Please imagine that a known search engine suggests the following content related to refugees." The other participants were assigned to a hypothetical political candidate functioning as a communication source. Here, the expressions were introduced by "Please imagine that an elected person from the Bundestag addresses the following content related to refugees." Participants in the neutral experimental groups (not refugee-related) have been shown either "Please imagine that a known search engine is suggesting content related to a political topic"

or "Please imagine that an elected person from the Bundestag is addressing content related to a political topic" without further information. Then, they answered the questions of interest. More precisely, they indicated whether they trust the information and the communication source before they answered questions covering attitudes towards immigration policies (Jowell et al. 2007) and asylum policies (Prinz and Glöckner-Rist 2009) – both taken over from the European Social Survey (ESS). I summarized the items related to immigration policy to a mean index (alpha=0.9). The attitudes towards asylum policies have been summarized to a factor score (alpha=0.81). Finally, the click behavior of the participants has also been measured. The participants saw a randomized list of positive, neutral and negative search suggestions. They were asked which suggestion they would like to click on to see the corresponding search engine results.

To ensure data quality, I used two different kinds of manipulation checks. First, the treatment groups have been validated before the experiment by human coders who categorized all single expressions of the treatment groups (randomized) into either negative, positive or neutral. Second, participants rated on a scale how positive or negative the information about refugees was at the end of the online experiment.

Finally, all respondents were debriefed after the survey experiment, describing the aim of the study, and it was stressed out again that all scenarios were hypothetical and that statements such as "refugees are criminal" were fabricated and not true. Participants were also provided with contact details for further questions.

3.7   Results

The tests confirmed that the manipulation worked effectively, as the positive manipulations were rated as significantly more positive ($p<0.05$) and the negative ones as more negative ($p<0.001$) than neutral experimental conditions.

Attitudes towards Immigration and Asylum Policy

I used multiple linear regressions to analyze whether hate speech has any direct effects on attitudes about immigration and asylum policy. As expected, it becomes apparent that individuals who have a right-wing political ideology show significantly more restrictive attitudes towards immigration and asylum policy (see Figure 3.2 and Table 3.2). There is no effect of hate speech on immigration and asylum policy attitudes if looking only at all individuals (including moderates) with right-wing and left-wing ideologies. However, importantly, because backfire effects have "almost exclusively been found in either political or attitudinal subgroups" (Swire-Thompson, DeGutis and Lazer 2020), for example, for those with strong beliefs on the issue or when it is strongly connected with the identity (Flynn, Nyhan and Reifler 2017; Lewandowsky et al. 2012; Nyhan and Reifler 2010), further explorative analyses looked explicitly at individuals with strong political ideologies. I used theoretically meaningful breaks in the ideological spectrum (on the ideological 10-point self-placement ≤ 3 and ≥ 8). The analyses suggest that individuals with an extreme-right ideology, i.e., those who position themselves at the margins in the ideological 10-point self-placement (≥ 8), become significantly more hostile in terms of asylum policy when they are confronted with hate speech. They are also becoming more restrictive towards immigration policy, yet the effect in this case is nonsignificant. Critically, the distance between individuals with left and right ideologies is larger when all are confronted with hateful search suggestions about refugees. The polarization regarding immigration and asylum policy attitudes is particularly observable between the rather extreme left (on the ideological 10-point self-placement ≤ 3) and the extreme right (on the ideological 10-point self-placement ≥ 8). Individuals with extreme left-wing ideology get less restrictive attitudes, while those with a rather extreme right-wing ideology become more restrictive towards asylum policy. Crucially, also neutral suggestions about refugees – including statements such as that refugees are in Germany – make extreme right individuals more restrictive towards immigration and asylum policy as to

when they are confronted with positive or no content about refugees.

Table 3.2: Examining attitudes towards immigration and asylum policy for individuals being exposed to hate speech, positive speech and neutral speech about refugees in search engines

	Dependent variable:			
	By Political Ideology		By Extreme Political Ideology	
	Immigration Attitudes	Asylum Attitudes	Immigration Attitudes	Asylum Attitudes
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
Negative tone	−0.053	−0.256	0.161	−0.108
	(0.147)	(0.205)	(0.181)	(0.265)
Neutral tone	0.127	0.053	0.348*	0.303
	(0.144)	(0.201)	(0.168)	(0.246)
Positive tone	0.131	0.119	0.401*	0.414
	(0.147)	(0.205)	(0.181)	(0.265)
Right (Ref. Left)	0.645***	0.582**		
	(0.131)	(0.183)		
Negative x Right	0.144	0.386		
	(0.194)	(0.271)		
Neutral x Right	−0.080	−0.060		
	(0.190)	(0.266)		
Positive x Right	−0.115	−0.100		
	(0.193)	(0.270)		
Extreme Right (Ref. Extreme Left)			0.917***	0.711*
			(0.237)	(0.348)
Negative x Extreme Right			0.307	1.088*
			(0.317)	(0.465)
Neutral x Extreme Right			0.456	0.699
			(0.404)	(0.592)
Positive x Extreme Right			−0.216	−0.176
			(0.332)	(0.488)
Constant	1.843***	−0.394**	1.629***	−0.618***
	(0.094)	(0.132)	(0.119)	(0.174)
Observations	422	422	163	163
Note:			*p<0.05; **p<0.01; ***p<0.001	
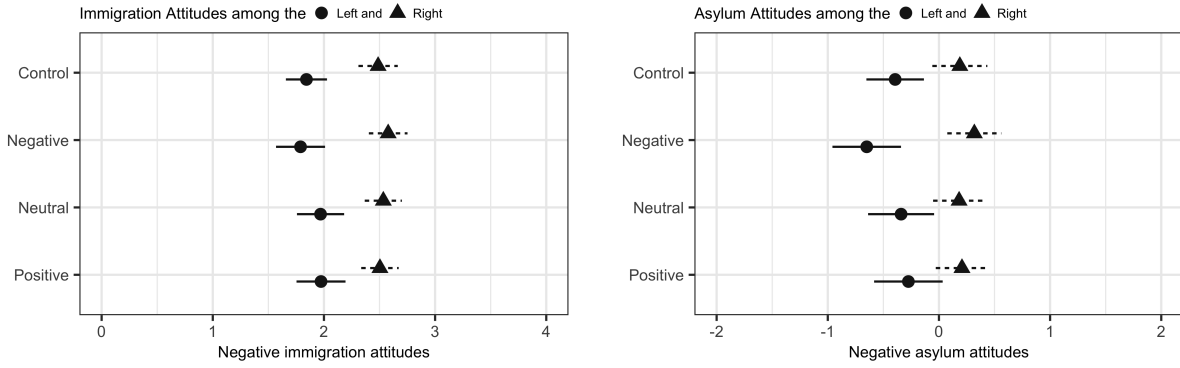
(a) Hate Speech Compared to Other Tone Effects by Political Ideologies
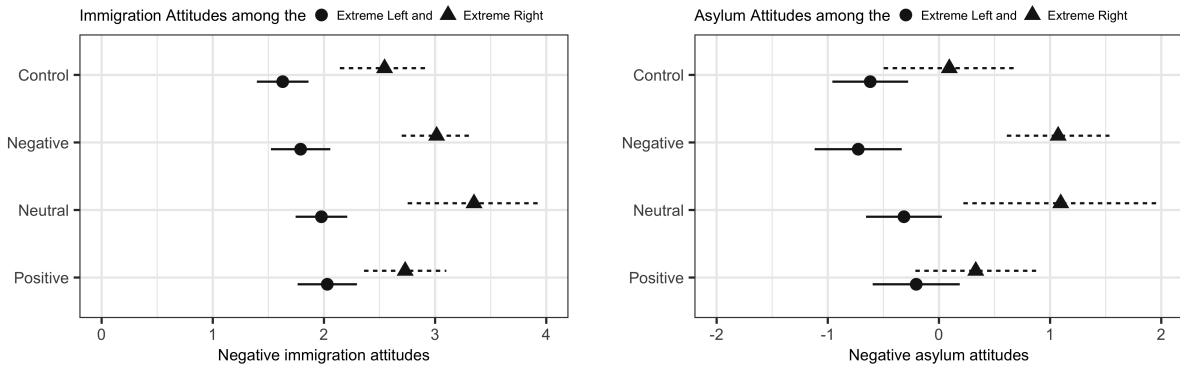
(b) Hate Speech Compared to Other Tone Effects by Extreme Political Ideologies

Figure 3.2: Predicted scores for hate speech, positive, neutral tone and control on attitudes towards immigration policy

Populist attitudes may enhance the effect of hate speech for individuals with right-wing ideologies. Therefore, the effects of hate speech suggestions, positive suggestions, and neutral suggestions are explored separately and displayed in Figure 3.3. The figure shows that hate speech provokes more hostile attitudes towards refugees for individuals with a right political ideology who are also populists.
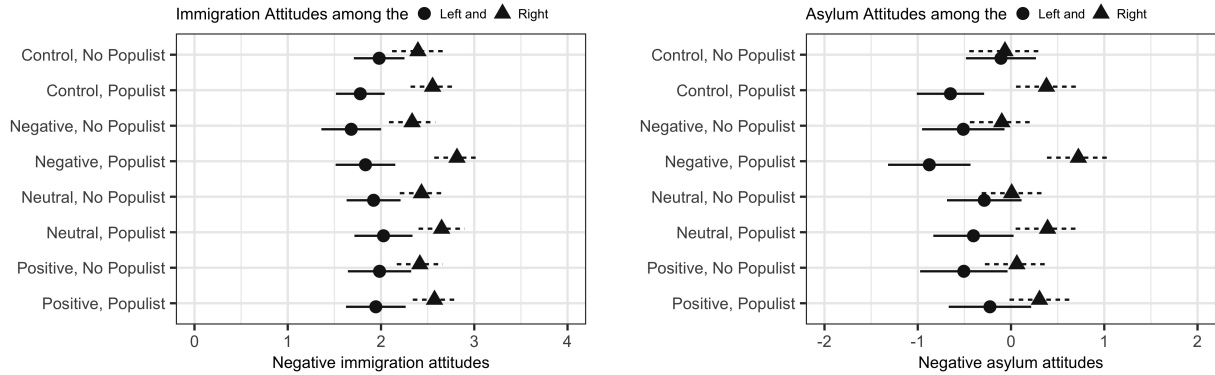
Figure 3.3: Predicted effects of political ideology and populist attitudes on attitudes towards immigration and asylum policy

Trust in the Content and in the Communication Source

Next, I used multiple linear regressions to analyze whether the participants trust more the content provided by a search engine or the content provided by a politician, the latter being a popular communication source and typically perceived as politicized (see Figure 3.4 and Table 3.3). Overall, it revealed that participants generally trust most the content provided by search engines and politicians when it contains neutral statements about refugees and neutral content about a general political topic. They trust the content significantly less if it contains positive statements about refugees, and they rather mistrust negative content about refugees. Remarkably, as expected, the individuals seem to trust search engines to a large extent and the general trust in the communication source (when having no politically biased information) is much higher for the search engine than for politicians.

If the information has a strong political bias either positive or negative towards refugees, however, individuals perceive it as politicized, and their content as less credible. In this case, general trust in search engines erodes to a similar degree as the one in politicians. Interestingly, this finding on trust in search engines reflects the results of a recent study (Ognyanova et al. 2020) on exposure to misinformation and trust in mainstream media in general, which found that trust in mainstream media declines over time when online users

were exposed to tracked online misinformation.

Table 3.3: Examining trust in the content and general trust in the communication source for individuals being exposed to hate speech, positive and neutral content about refugees

| | Dependent variable: | | | |
| | Trust in the Content | | General Trust in the Source | |
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
Negative tone	−1.661***	−1.658***	−0.383*	−0.134
	(0.202)	(0.289)	(0.188)	(0.264)
Neutral tone	0.271	0.344	0.084	−0.086
	(0.203)	(0.288)	(0.189)	(0.263)
Positive tone	−0.611**	−0.409	−0.374*	0.007
	(0.203)	(0.289)	(0.189)	(0.264)
Search engine		0.147		0.921***
(Ref. Politician)		(0.287)		(0.262)
Negative x Search engine		−0.008		−0.497
		(0.405)		(0.370)
Neutral x Search engine		−0.143		0.372
		(0.407)		(0.372)
Positive x Search engine		−0.402		−0.753*
		(0.407)		(0.372)
Constant	5.638***	5.564***	5.492***	5.027***
	(0.143)	(0.204)	(0.133)	(0.187)
Observations	1,200	1,200	1,200	1,200

Note: *p<0.05; **p<0.01; ***p<0.001

(a) Trust in the Content   (b) Trust in the Communication Source
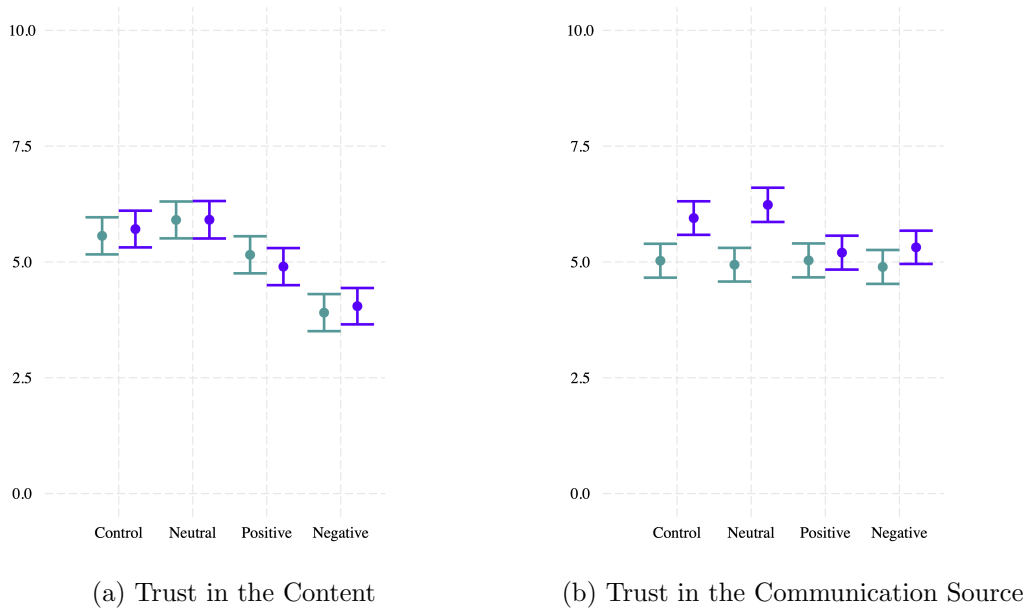
Figure 3.4: Predicted effects for trust in the content and general trust in the communication source for the experimental treatments **search engine** (vs. **politician**) and hate speech (vs. neutral, positive tone) and their interactions

The Relation between Trust and Immigration and Asylum Attitudes

Trust in the search engine plays a significant role, and recent research suggests that an individual's political ideology moderates political trust by showing that only conservative US citizens increased their trust in the US government while it was decreased for strong liberals when being exposed to online misinformation (Ognyanova et al. 2020). The political ideology may also play a role regarding trust in search engine content. Therefore, a closer look was taken at the trust in the content to examine whether it varies with the participants' political ideology (see Figure 3.5 and Table 3.4). It becomes apparent that hate speech is trusted least. However, the trust in it is significantly higher among individuals with a right (and extreme right) political ideology than those with a left (and extreme left) ideology. Knowing that the political ideology affects trust in the content about refugees, I analyzed whether trust in the content affects how hate speech about refugees is processed. Those who trust the hate

speech content are more restrictive towards immigration and asylum policy (see Figure 3.5, Figure 3.6 and Table 3.4). Those who trust positive speech about refugees are significantly less restrictive towards immigration and asylum policy than individuals who do not trust the content.

(a) Trust by Political Ideology

(b) Trust by Extreme Political Ideology
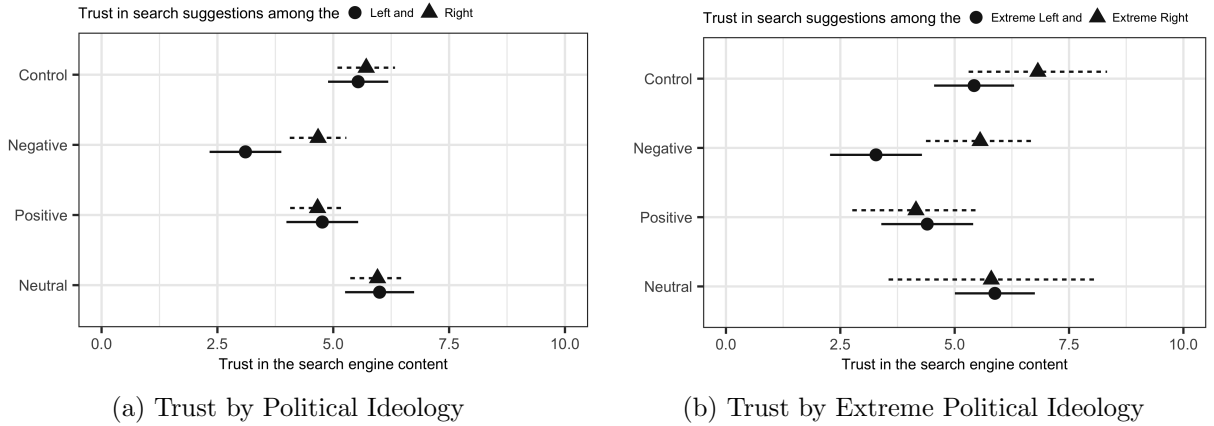
Figure 3.5: Predicted scores for hate speech, positive, neutral tone and control on trust in search engine content

(a) Immigration Attitudes
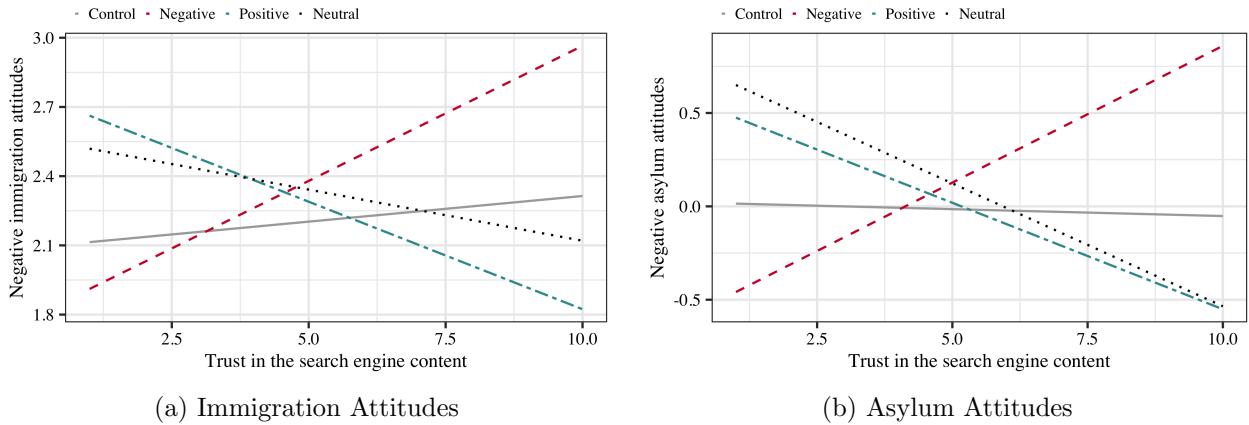
(b) Asylum Attitudes

Figure 3.6: Predicted scores for trust in -negative, ··neutral and -positive search suggestions about refugees and -control on immigration and asylum attitudes

Table 3.4: Examining trust in search suggestions and attitudes towards immigration and asylum policy for individuals who trust in the content

	Dependent variable:			
	Trust in Search Suggestions		Immigration Attitudes	Asylum Attitudes
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
Negative tone	−2.432***	−2.144**	−0.298	−0.627*
	(0.515)	(0.679)	(0.207)	(0.272)
Neutral tone	0.463	0.455	0.472	0.759*
	(0.504)	(0.631)	(0.251)	(0.330)
Positive tone	−0.774	−1.024	0.663**	0.567
	(0.515)	(0.679)	(0.220)	(0.289)
Right (Ref. Left)	0.175			
	(0.458)			
Negative x Right	1.392*			
	(0.681)			
Neutral x Right	−0.220			
	(0.667)			
Positive x Right	−0.276			
	(0.676)			
Extreme Right		1.394		
		(0.892)		
Negative x Extreme Right		0.882		
		(1.193)		
Neutral x Extreme Right		−1.473		
		(1.519)		
Positive x Extreme Right		−1.640		
		(1.250)		
Trust			0.022	−0.007
			(0.030)	(0.039)
Negative x Trust			0.095**	0.154**
			(0.036)	(0.048)
Neutral x Trust			−0.067	−0.124*
			(0.041)	(0.053)
Positive x Trust			−0.115**	−0.107*
			(0.038)	(0.049)
Constant	5.537***	5.424***	2.092***	0.022
	(0.331)	(0.446)	(0.179)	(0.235)
Observations	422	163	602	602

Note: *p<0.05; **p<0.01; ***p<0.001

Clicks on Hate Speech and Positive Speech

Finally, to get a glimpse at how crucial political group identities are entangled with political online behavior, I conducted a single logistic regression to explore clicks on negative search suggestions about refugees compared to neutral and positive suggestions (see Figure 3.7 and Table 3.5). The results indicate that individuals' political ideology significantly predicts the likelihood of clicking on a hate speech search suggestion or a positive search suggestion. Having a right-wing political ideology versus having a left-wing political ideology significantly increases the log odds of clicking on a negative search suggestion. Accordingly, having a right-wing political ideology versus having a left-wing political ideology decreases the log odds of clicking on positive search suggestions significantly. The probability of clicking on negative search suggestions is almost three times as high for the users with a right-wing ideology than for those with a left one (see Figure 3.7). Leftists are about twice as likely to click on positive search engine suggestions. One problematic finding is that, in particular, individuals with an extreme right political ideology are becoming more hostile in their attitudes when being exposed to hate speech. Taken together, if they actively expose themselves much more to this information, effects may get pronounced (i.e., through information repetition (Fazio et al. 2015; Swire-Thompson, DeGutis and Lazer 2020)). At the same time, research indicates that conservatives are more likely to support conspiracy theories (van der Linden et al. 2020). Thus, the search engine may also be a gatekeeper for hate speech, including conspiracy theories that they are more likely to endorse.

Table 3.5: Logistic regression results for clicks on hate speech suggestions and positive search suggestions

		Dependent variable:	
		Hate Clicks	Positive Clicks
		(1)	(2)
Right		1.329***	−1.080***
		(0.185)	(0.161)
Constant		−1.841***	−0.373***
		(0.159)	(0.111)
Observations		811	811
Note:		*p<0.05; **p<0.01; ***p<0.001	

(a) Hate Clicks

(b) Positive Clicks
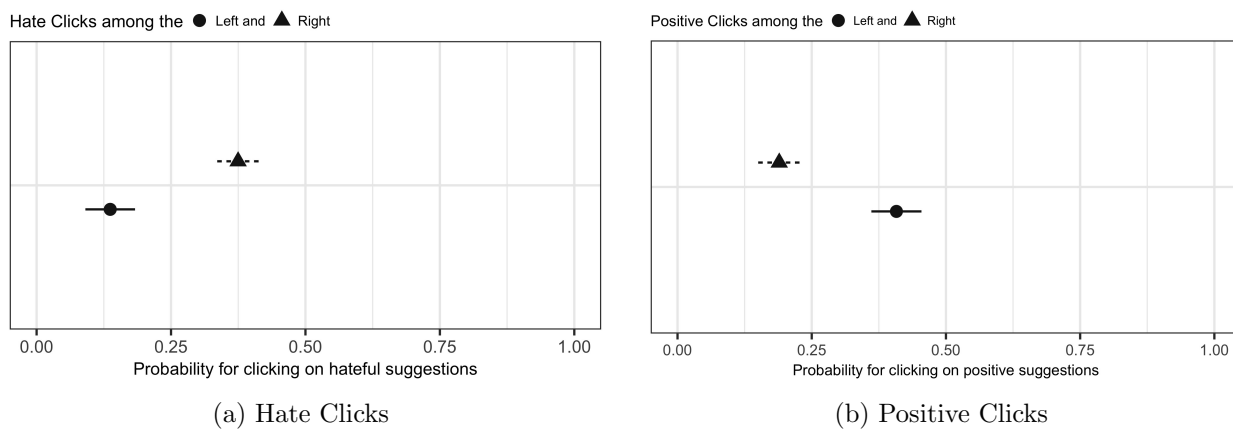
Figure 3.7: By political ideologies: Probabilities for clicking on hateful suggestions and positive suggestions in search engines

3.8   Discussion and Conclusion

The results show that trust in search engines is very high and is generally higher than politicians in general, which are popular communication sources when it comes to refugees and immigration and asylum policy. The search engine, however, is perceived as politicalized when the content is negatively or positively biased. In these cases, general trust declines to a level comparable to general trust in politicians and trust in the content erodes. However, individuals with a right-wing political ideology have significantly more trust in hate speech content than those with a left-wing ideology. Moreover, trust in hate speech is associated with higher hostility towards refugees, that is, being more restrictive in terms of immigration and asylum policy. Importantly, those with a populist right or an extreme right political ideology reinforced their hostile attitude towards refugees and supportive actions after being exposed to hate speech in search engines. This could indicate that negative content about refugees triggers these individuals' negative opinions that are aligned with their political group identity (e.g., criminal; asylum fraud), which is generally reflected in reinforced restrictive attitudes towards asylum policy.

Political ideologies also play a significant role in how individuals interact with hatred and positive expressions about refugees. Individuals with a right-wing political ideology were almost three times more likely to click on hate speech than individuals with a left-wing ideology. In contrast, left-wing individuals were more likely to click on positive suggestions about refugees in order to see the related search results.

The study further indicates how polarized the society in Germany is in general when it comes to politics and refugees. It should also be examined more closely in future research to what extent current political issues can divide society and potentially lead to radicalization and conflict. This has been demonstrated not least by the recent developments on the COVID 19 pandemic, where there were also divided opinions and a shift from health experts and politicians towards conspiracy theories (News 2020; Brennen et al. 2020; McDonald-Gibson

2020). In the digital age, it is not only crucial for the society to investigate biases in search engines. It is also worthwhile for search engine providers like Google to pay attention to biases in search engine content. The results have shown that the general confidence in search engines is the highest for neutral content, however, they too can lead to hostile attitudes towards refugees (probably induced by perceived group threat). It could also be useful to deliberate whether search suggestions should appear at all with regards to social groups. This is particularly important in light of the hate enhancing potential of hate speech and the recent increase in xenophobia (Decker and Brähler 2018).

To conclude, hate speech can lead to more restrictive attitudes towards asylum policy when individuals have a strong right-wing political ideology. That is why particular caution is needed when providing information on a political issue. In particular, technologies that are perceived as neutral play a major role here, as it has been shown that they are by far more trusted and can play a role in reinforcing political attitudes. The nature of the communication source and search engines are still an under-researched topic, although they are part of our everyday life and are the most used platform to search for information. Critically, individuals with a right-wing political ideology were also more likely to click on hate speech search suggestions and less likely to click on positive ones than those with a left-wing political ideology. This is particularly appalling since hate speech leads to more hostile attitudes towards refugees among the extremes of this group. Once people take the path towards hate speech, this could be the start of them getting caught in a filter bubble and confronting themselves mainly with selected negative information.

While hate speech leads to a so-called boomerang effect for individuals with an extreme left ideology, that is, becoming less restrictive in terms of asylum policy, it is striking that a similar effect is also becoming apparent when they are confronted with a positive bias. Similarly, but less pronounced as in the case of hate speech, the trust in the source and the content are degraded and extreme left individuals tend to become slightly more restrictive, a pattern that

is similarly described in the reactance theory (Steindl et al. 2015). Persuasive intents can lead to a boomerang or backfire effect when individuals perceive them as threatening their freedom and behavioral options. However, a distinct mechanism seems to apply to individuals who self-identify as having a more extreme right political identity, who seem to adopt the politically biased information that may mirror more a pattern described for authoritarian personalities (Sibley and Duckitt 2008). Thus, this study has also broader implications: it shows that depending on the political group identity, different mechanisms may apply, and individuals may be affected differently by biased information in search engines or other recommendation systems. Future research could investigate deeper and test these potential mechanisms when it comes to politically biased information in other online media outlets.

Different communication sources and the interaction with different social identities, such as political ideologies, should be considered in future research on information processing and opinion formation. This is even more important because, as shown here, it could lead to a polarization of society and extremism. In view of the recent and alarming right-wing terrorist attacks like the shootings in Hanau (Hoffman, Ware and Shapiro 2020), the need to counteract information structures that promote xenophobia is once again becoming apparent. It is evident that extreme right-wing individuals become more hostile towards refugees when they are confronted with negative content in search engines, and they may turn to fake news and conspiracy theories as they tend to trust the content. The study suggests that we need to develop a strategy to combat hate speech while also focusing on the role of trust for engaging with negative content about minority groups that are already vulnerable and disadvantaged.

Chapter 4

Googling European Politicians: A Comparative Analysis of Latent Political Interest in Europe with Search Prediction Data

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Abstract

Search engines are commonly used for online political information seeking globally, yet it remains unclear how political search predictions that reflect the latent interest of Internet users vary across countries and over time. We provide the first systematic analysis of search predictions for European and national politicians in online search. Search predictions are the first information users see when searching for information in the Google search bar, automatically completed information by the Google algorithm based on previous searches on the same topic. This allows us to estimate the latent interest of online users in European politicians by analyzing collected Google search predictions in ten countries for European party leaders, *Spitzenkandidaten* in the 2019 EP election, and cabinet members. We find that Google search predictions are less stable over time in the politicians' country of origin, when the politicians hold a supranational role and being female, indicating more diverse interest for these politicians across countries. Moreover, search predictions are more similar across countries for political leaders and male politicians. We conclude with a discussion of possible future directions for studying the information-seeking about European politicians in online search.

4.1 Introduction

The past decade has witnessed a strong increase in the politicization of the European Union in domestic politics as well as a rise in digitalization and online political information seeking. Prior studies have addressed this emerging digital European public sphere[1] (Rivas-de Roca and García-Gordillo 2021), however little is known on the cross-national aspects of online political information seeking related to EU issues and European politicians. Our study is the first to bridge the analysis of European politics and political online search. Analyzing how the level of latent interest in politicians varies over time and across countries, here measured with Google search predictions (also called query suggestions, search suggestions, Google autocomplete), can help understand drivers of political knowledge gathering and politicization in Europe.

The interest in political issues and politicians in Europe can also be significant for the community between European countries. Studies have consistently stressed that there is a political communication gap in the EU (e.g., Marquart et al. 2019), the filling of which would be essential for the exchange and debate with EU citizens (Rivas-de Roca and García-Gordillo 2021). While most of the prior research focuses on mass-mediated communication, specifically on newspaper coverage (Mancini and Mazzoni 2015; Hutter and Kriesi 2019), several scholars point to the relevance of examining digital platforms as an arena for EU politicization (Rivas-de Roca and García-Gordillo 2021; Bennett, Lang and Segerberg 2014; Risse 2014).

Research suggests that search query data can be used to predict issue salience (Scharkow and Vogelgesang 2011; Mellon 2014; Swearingen and Ripberger 2014), attitudes (Preis et al. 2012; Pelc 2013) and behavior (Arendt and Fawzi 2019; Stephens-Davidowitz 2014; Ginsberg et al. 2009; Prado-Román, Gómez-Martínez and Orden-Cruz 2021). In this study, we compare

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1. Scholars define the European public sphere broadly as "a potential space that can promote the joint debate between EU politicians and citizens (Torres López & Naïr, 2013)." (Rivas-de Roca and García-Gordillo 2021.

political search predictions across borders to estimate latent interest in the European political elite in a novel way. Search predictions are the information users see when searching for information in the Google search bar, automatically completed by the Google algorithm. They approximately show latent interest in politicians because they are based on previous searches on the same topic, making a multiple-country comparative analysis of latent interest possible (unlike other available data like Google Trends data (Scharkow and Vogelgesang 2011)). Therefore, we use here a new dataset on Google search predictions for European politicians and political issues, collected with proxies simulating different geolocations in Belgium, Czech Republic, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, United Kingdom, and, the United States. We focus here on the search predictions in ten European countries that allow us to examine and compare latent political interest approximated with the stability of Google search predictions for politicians over time and similarity across European countries. We test several determinants for explaining the stability of search predictions for politicians within countries and the differences across countries.

Our findings suggest that gender, political role, government party, and country of origin of politicians substantially impact the search predictions shown to online users. Search predictions are less stable over time in the politician's country of origin, when the politician holds a supranational political role, and when they are female. This finding may indicate that internet users pay more attention to these politicians and search for more diverse information online, resulting in less stable search predictions for them over time.

4.2   Political Information and Interest in Europe

4.2.1   Political Information in Online Communication

The emergence of the internet and the increasing digitalization went hand in hand with free, easier, and faster access to political information. The ability of citizens who are interested in

politics to access political information freely at any time online is unprecedented (Bimber 2003; Swanson 2003; Jungherr, Rivero and Gayo-Avello 2020; Stockemer 2018). The emergence of 24 hours news channels (Rosenberg and Feldman 2008) and the active role of internet users allow political information, positive and negative, to spread fast and to enable users to immediately react to it, for example, on social media platforms (e.g., Mathew et al. 2019; Neudert, Howard and Kollanyi 2019). Search engines play an important role for people who want to inform themselves about political issues and politicians (Trevisan et al. 2018; Pradel 2021*a*): they constitute the first place to go to get immediate information (Dutton et al. 2017).

There is an interconnection between both different online platforms as well as between them and traditional media (Chadwick 2017). For instance, politicians and political events receive public attention both on social media platforms and in traditional media like newspapers (Jungherr, Rivero and Gayo-Avello 2020), and both can reciprocally influence visibility (Kruikemeier, Gattermann and Vliegenthart 2018). Seeing an unknown politician or a political event like political gaffes on television or social media can trigger individuals to go online and search for the event in a search engine like Google (Trevisan et al. 2018).

A search engine has a natural gatekeeper function, that is, a high impact on which political information users see. The websites that are ranked on the top of the search results also tend to get the most visits (Dutton et al. 2017). While there is no conclusive evidence yet as to whether search engine results affect voting decisions in Europe, some experimental evidence suggests that when politicians are ranked higher in search engine results they are more likely to be favoured by undecided voters, an effect that is also called the search engine manipulation effect (Epstein and Robertson 2015).

Out of all available search engines, Google is the most popular search engine in Europe with a 93% market share.[2] An important technical feature of search engines are so-called

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2. The data has been obtained from the website https://gs.statcounter.com/search-engine-market-share/ (April 2021).

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search predictions, which is predictive text that is automatically displayed as autocompletion when typing in words in the search bar. For instance, when searching for a politician, a search engine might suggest an autocompletion to Wikipedia, event-related terms, or words related to the private or public life of the politician. It is also the first information users see when searching online in search engines like Google. However, the search predictions can be systematically biased based on the politicians' characteristics like gender and party (Pradel 2021*a*; Bonart et al. 2019), just as other political information on online platforms such as Twitter (Mertens et al. 2019) and Wikipedia can be systematically biased (Pradel 2021*a*).

4.2.2   Interest in European Politics across Borders

With an increasing policy-making role of the European Union and repeated common crises in Europe, including the financial crisis, the refugee crisis, the climate crisis, and the Corona pandemic, more and more public attention is dedicated to events of pan-European consequences. At the same time, European integration has become politicized across Europe. New challenger parties on the left and on the right mobilize the electorate around this new transnational cleavage (Hobolt and de Vries 2015; Hooghe and Marks 2018). While the European elections had previously been described as "second-order elections" (Reif and Schmitt 1980) due to low voter turnout and the success of extreme parties, a reversal in turnout in the 2019 elections and the nomination of *Spitzenkandidaten* during the European election campaign have installed a much stronger European element into European election campaigns (Schmitt et al. 2020). However, the presentation of *Spitzenkandidaten* differed between countries, and they received low media attention in European countries, for example, in British, French, and German newspapers during the campaign 2014 (Schulze 2016).

In studies on political personalization, it has been argued that most people obtain their information on international politics through mass media and the way they report consequently influences public opinion about other countries (Balmas and Sheafer 2013). The relationship

between states can ultimately be influenced by an understanding of countries and people, and even the perceived legitimacy of countries (Balmas and Sheafer 2013). Yet, investigating the news coverage of European politicians is rather complex, as Europe is characterized by having heterogeneous media systems, and citizens do not get their information from a single source (Hallin and Mancini 2004). Furthermore, different media user profiles ranging from news minimalist to hyper news consumer could be identified, which influence political knowledge but have different frequencies in European countries (Castro et al. 2021).

Despite the increasing politicization of Europe, studies show that EU politics and politicians are relatively underrepresented in the European media, such as in television news (Peter and de Vreese 2004). However, the visibility of EU politics and officials is higher around EU summits and in countries with higher satisfaction in democracy (Peter and de Vreese 2004). An important contribution to research on the representation of foreign leaders has been made by Balmas and Sheafer (2013), who focus on six democracies, i.e., Canada, Germany, France, Italy, the United Kingdom, and the United States. One key finding is that not only media coverage of national politics (Balmas et al. 2014; Adam and Maier 2010) but also foreign politics (Balmas and Sheafer 2013) is becoming increasingly personalized in the West. This implies that the media increasingly focuses on foreign political leaders' individual personalities rather than on the nations as such (Balmas and Sheafer 2013). When the media reports on foreign political leaders, however, they are predominantly portrayed negatively (e.g., Balmas 2017).

This raises the question of how users learn information about European politicians across Europe on the basis of search engines. We attempt to answer the question by systematically analyzing the stability and cross-national similarity of Google search predictions that we collected in the countries Belgium, Czech Republic, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, and United Kingdom over a two-year period which includes the European election campaign in 2019. While our research on European politicians in online

search is exploratory, and to our knowledge, there is no research on this topic yet, we have some general expectations that we would like to test.

4.2.3 Expectations Regarding the Stability of Search Predictions

The literature review has stressed that citizens pay more attention to national politicians. We therefore expect more diverse online information searches for these politicians and, therefore, less stable search predictions over time as we assume that previous searches influence their content. *Accordingly, we hypothesize that search predictions for politicians are less stable when the search for politicians is carried out in their country of origin (H1).*

Political ideology may further affect the stability of search predictions. As more extreme parties that challenge the established party system seek more attention in the electorate, we may hypothesize that internet users are also more likely to search for specific events surrounding the political strategies of extreme parties. *Therefore, we hypothesize that centrist parties predictions are more stable than those of extreme parties (H2).* Accordingly, we include left-right ideology from the Chapel Hill expert survey (Bakker et al. 2019) as well as a squared ideology term into our model to capture policy extremity.

The attention paid to politicians may also vary with their political role. Cabinet members, as the most senior government members, are often in the news, but party leaders may also receive frequent media coverage. Therefore, more diverse search predictions might emerge for them. As research has shown that the news coverage and interest about *Spitzenkandidaten* remained rather low during election campaigns (Schulze 2016), we expect that the stability is the lowest when the politicians have a political leader role: *We hypothesize that the stability of search predictions is lower for party leaders compared to Spitzenkandidaten and members of the national cabinet (H3).* We further explore the role of gender. Platforms including Google search predictions can show biased political information based on politicians' gender (Pradel 2021a). Specifically, voters' information-seeking varies by politicians' gender with,

for instance, more competence-related information searches when the politician is female (Ditonto, Hamilton and Redlawsk 2014). As this study revealed that individuals seek more information about female politicians by using an experiment, it might be the case that Internet users also seek more information in search engines about female politicians. This higher interest might lead to higher volatility in search predictions for female politicians, or put differently, relative more stable search predictions for male politicians. Therefore, we test whether the stability of search predictions varies by politicians' gender in the European arena: *We expect that search predictions for male politicians are more stable than those for female politicians (H4).*

Another more systemic determinant for more diverse search predictions might be the salience of the EU issue in the country where the search takes place. If the EU is politicized, there may be more interest in other European politicians within the countries, which impacts the search predictions. *We hypothesize that the search predictions are less stable the higher the EU salience (H5).* Finally, we also assume that the government status of the politician plays a major role. Citizens seek more diverse information about politicians over time when they are in the government party, as they influence citizens more by determining policy. *Accordingly, we expect that the search predictions are less stable for politicians in the government party than those in the opposition party (H6).*

4.2.4   Expectations Regarding the Similarity across Countries

In addition to examining stability over time, we explore how much search predictions vary cross-nationally. We expect that mainstream centrist parties are more likely to have similar search predictions than extreme parties across countries, as politicians from extreme parties should also have a higher volatility within their country. *Therefore, we hypothesize that the predictions for centrist politicians are more similar across countries than those belonging to extreme parties (H7).* As before, we capture this relationship with two variables: left-

right ideology and its squared term. Moreover, we expect that the similarity of the search predictions varies with the politician's role. It might be the case that the search predictions for European-wide *Spitzenkandidaten* are more similar compared to national party leaders and members of the cabinet because they are supranational actors, and there might be a common perception and interest in them. *We hypothesize that the similarity of search predictions across countries is higher for Spitzenkandidaten than party leaders and members of the national cabinet (H8).*

As before, we expect the gender of the politician to play a significant role when explaining the cross-national similarity of search predictions. We expect that the information searches are more similar across countries for male politicians, because different gender stereotypes for women across countries could affect the search behavior. *Thus, we expect that the search predictions are more similar across countries for male politicians than for female politicians (H9).* Finally, it might be the case that being in the government party also influences the similarity of search predictions as these politicians have a considerable impact on policies and thus might receive more attention. Searches for members of government parties may therefore be more context-specific and should differ more across countries. *Accordingly, we hypothesize that being in the government party decreases the similarity of search predictions (H10).*

The following section gives more detailed information about the nature of search predictions and what we know about how they are produced.

4.3   The Nature of Search Predictions

Undeniably, search engines provide the most effective approach to finding information online. Studies suggest that search engines are perceived as trustworthy sources of information on many topics, including political information (Ray 2020; Edelman 2019). Search predictions (also called query suggestions, search suggestions, Google autocomplete), the list of predictive completions provided by search engines during the input of a search query, play a crucial role

in what people search for (Niu and Kelly 2014).

Search engine providers keep the exact mechanisms behind autocomplete feature obscure, however, the main principles behind them are known. As stated by Google, predictions are based primarily on users' previous searches on the same topic in a similar location (Google 2021*a*; Sullivan 2018). In our dataset, information on location of search and language are send along with the search term via HTTP request.

Google stated that potentially harmful, defaming or unwanted predictions are filtered based on auto-complete policies (Google, 2021*a*). Nevertheless, neither how exactly search predictions are filtered, nor whether this happens automatically or by removal request (c.f., Google 2021*b*) is not known. Due to the dependency on trends in searches both temporally and spatially, search predictions can be seen as indicators for what people search for. Wang et al. (2018) have shown, that search predictions can be manipulated by deliberately submitting searches. Therefore, we can assume that search predictions are approximational representation of peoples' information needs.

4.4   Online Search Data and Measures

We collected search predictions for selected politicians between the beginning of 2019 (18th of January 2019) until the end of 2020 (18th of December 2020).[3] Our sample of politicians includes 793 politicians that consist of 14 *Spitzenkandidaten* and non-elected candidates of the European election 2019, 261 politicians with a political leader role and 518 members of the national cabinets.[4]

We used proxies in different European countries pretending to search for the EU-related

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3. Twice per day a specialized web crawler has been collecting query predictions by HTTP request from Google's auto-complete API. The returned lists of search predictions are stored along with the corresponding search terms in a SQL database. The data set consists of more than 111,000 distinct search predictions (June 2021) to 2,925 search terms related to politicians, political parties and to Brexit. All data has a combined size of about 40 gigabytes. In this paper, we will focus on politicians.

4. The information has been mostly derived from lists on Wikipedia, for instance, `https:// en.wikipedia.org/wiki/Cabinet_of_Germany`.

Table 4.1: Exemplary search predictions for Angela Merkel in Germany

Search predictions in Germany	Date
young, curriculum vitae, husband, news, size, kassel, formerly, salary, profile	2019-01-18
young, salary, curriculum vitae, apartment, news, size, assets, profile, formerly	2019-02-01
...	...
children, age, harvard, mother, salary, husband, young, apartment, assets	2019-06-06
trembles, national anthem, sick, children, age, salary, parkinson, trembling, today	2019-06-20

Note: The search predictions have been translated by the authors.

terms in various European countries, i.e., in Belgium, Czech Republic, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, United Kingdom. We demonstrate our approach using the German chancellor Angela Merkel as an example. The first search predictions collected about Angela Merkel in Germany in our data set are "young", "curriculum vitae", "husband", "news", "size", "kassel", "formerly", "salary", and "profile" (translated from German, see Table 4.1).

4.4.1 Measuring Stability of Search Predictions

To measure the stability of search predictions over time, we use the Jaccard similarity coefficient (Jaccard 1912) (Equation 4.1)[5]. The coefficient varies between 0 and 1. While 0 indicates no overlap of the search predictions, 1 indicates that they are identical.

$$Jaccard(A,B) = \frac{|A \cap B|}{|A \cup B|} = \frac{|A \cap B|}{|A| + |B| - |A \cap B|} \tag{4.1}$$

While we collect daily search predictions for each politicians, for our analysis, we aggregated all daily search predictions to a two-week level. We chose this time period as it allows us to capture potential changes in search predictions. If the time period is too short, changes are hardly detectable because it takes time until they actually show up in the search predictions. We utilized the Jaccard coefficient to reveal the stability of search predictions in

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5. For applications, please see also for example Hannak et al. (2013), Laufer et al. (2015) and Gieck et al. (2016).

the chosen countries and calculated the similarity between the search predictions' list at a time period (t) with the predictions of the previous period ($t-1$) (see Equation 4.2).

$$Jaccard\ Stability(A_t, A_{t-1}) = \frac{|A_t \cap A_{t-1}|}{|A_t \cup A_{t-1}|} \qquad (4.2)$$

For example, the Jaccard stability between the first observations from the 18th of January 2019 and predictions for Angela Merkel that were collected 14 days later on the 1st of February (see Table 4.1) is 0.636. In contrast, the Jaccard stability between the search predictions of the 6th of June 2019 and 14 days later of the 20th of June 2019 – a date when the first time predictions related to her trembling at a public event appear – is 0.2. The event had been covered by national and international news (e.g. Der Spiegel 2019; Die Welt 2019; Le Figaro 2019; El Mundo 2019; BBC 2019).

Figure 4.1 shows the calculated stability of search predictions for Angela Merkel in Germany measured with the Jaccard stability measure (see equation 4.2) over time. The plot shows that there are major drops in the stability score around June 2019 and March 2020, which are related to important political events. In June 2019, the search predictions changed primarily because of new predictions connected to her public speech and awarded honorary doctoral degree at Havard (Die Bundesregierung 2019; Pazzanese 2019) and the widely popular event of her trembling in public (BBC 2019). The next significant change in search predictions happened in March 2020 and related to her nationwide TV address calling on to help to combat Covid-19 and taking the measures seriously in the TV speech (Jones 2020). Subsequently, the search predictions for Angela Merkel mirror interests in Covid-19 and related policies. Looking at the case of Angela Merkel shows that the stability of search predictions is influenced by the public attention paid to her through major political events.

As Figure 4.2 shows, the average Jaccard stability of search predictions for Angela Merkel varies strongly across countries. For example, the predictions for Angela Merkel are least
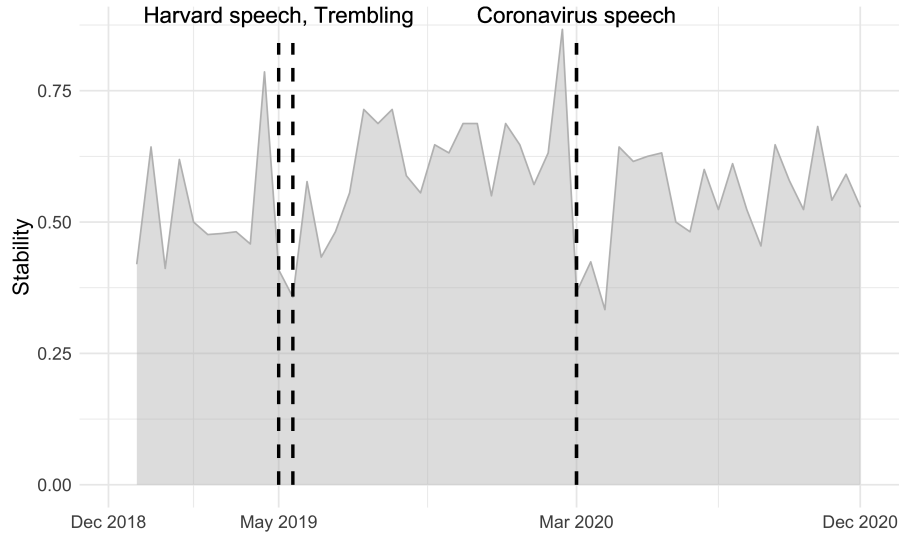
Figure 4.1: Stability of search predictions (Jaccard Stability) for Angela Merkel over time in Germany

stable in Germany, her country of origin, followed by Great Britain. The stability is much lower (0.572 Germany, 0.594 Great Britain) compared to the other countries (about 0.675). It might be the case that in Germany and Great Britain, internet users are more likely to monitor news around Angela Merkel and thus, make more variable search queries. Another reason could be that Angela Merkel is more covered in the news, which triggers different search requests over time. This is then reflected in the higher volatility in search predictions.

4.4.2 Measuring Similarity across Countries

Since the politicians' search predictions approximately show what people have searched about them, we can explore how similar the interests are across countries and which factors can help to explain the similarities. We translated all search predictions with Google Translate to analyze the similarity of search predictions for politicians across countries.

Table 4.2 shows the search predictions for our illustrative case of Angela Merkel on the 20th of June 2019. As already mentioned, this date was close to the internationally covered event of her publicly trembling. However, also information of national interest appears at
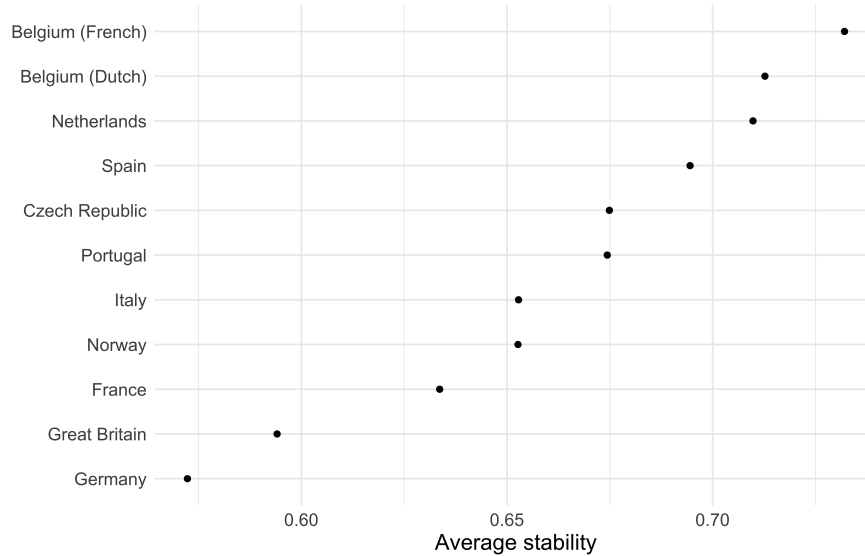
Figure 4.2: Average stability of search predictions (Jaccard Stability) for Angela Merkel over time across countries

this time point. For example, in Portugal, the search suggestion of "madeira" might refer to a deadly bus crash in April 2019 mainly involving German tourists, for which Angela Merkel issued a statement with condolences (Schuetze 2019).

Table 4.2: Exemplary search predictions for Angela Merkel across countries

Search predictions	Country
trembles, national anthem, sick, children, age, salary, parkinson, trembling, today	Germany
lyrics, gestapo lyrics, divorced, clothing, wikipedia, young, wiki, twitter, stops	Belgium (Dutch)
young, age, sick, trembling, faint, twitter, video, biography, husband	France
twitter, party, children, age, wiki, wikipedia, madeira, ulrich merkel, biography	Portugal

Note: Search predictions of the 20th of June 2019 (translated by the authors).

Here, we examined the Jaccard similarity coefficient of two lists of weekly aggregated search predictions of two countries A and B for each time period (t) (see Equation 4.3).[6] We compared the search predictions collected in the politicians' country of origin with those collected for the same politician in other countries.[7] For example, we calculated the similarity

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6. In doing so, we follow the procedure of Laufer et al. (2015) using the Jaccard similarity to analyze Wikipedia articles of the culinary domain to capture similarities of European food cultures.

7. We calculated the similarity of each two data sets of search predictions by using functional programming

of all displayed search predictions for Angela Merkel in Germany with those in Belgium in the same time period.

$$Jaccard(A_t B_t) = \frac{|A_t \cap B_t|}{|A_t \cup B_t|} \tag{4.3}$$

The Jaccard similarities of the search predictions shown in Table 4.2 are the following: The similarity coefficient between the search predictions about Angela Merkel in Germany and Belgium (in Dutch) is 0, while the one between Germany and France is 0.2, and between Germany and Portugal is 0.125.

4.5   Explaining the Stability of Search Predictions

We included the politician's variable gender and politicians' party ideology into our model for predicting the Jaccard stability of politicians' search predictions. We measure left-right ideology, ranging from 0 ("Extreme left") to 10 ("Extreme right"), using the party of the politicians from the 2019 CHES expert survey on political parties (Bakker et al. 2019). Moreover, we used the information whether the search took place in the politicians' country of origin or not as a dummy variable. We also predict the stability with the political role of the politicians, i.e., whether the politician is part of a national cabinet, has the role of a party leader, or has been a so-called *Spitzenkandidat* in the 2019 European Parliament election. Government party is a variable, coded as 0 when the politician is in the opposition and 1 if the politician was in the government party for the entire observation period. For politicians whose parties switched government status, the variable has a value reflecting the share of the observation period when the party was in government. For example, the value is 0.8 if a politician's party was in government for 80% of the time during the entire observation period.

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in R: We created a function covering the calculation of the Jaccard coefficient and used the function map2 of the package purrr (Henry and Wickham 2019) to apply the Jaccard similarity measure (see Equation 4.3) to two vectors containing the sets of search predictions.

We included the general politicization of European integration in the countries where the Google search took place by calculating the country-specific EU salience (see Equation 4.4) based on data from the 2019 CHES expert survey on political parties (Bakker et al. 2019). The measure accounts for the diverse party landscape, particularly in terms of the importance of the EU within countries, by weighting the average EU salience of a party (i) by the party's vote share (i) (in the last national election).

$$EU\,Salience = \sum_{i=1}^{n} EU\,salience_i \cdot votes_i \tag{4.4}$$

We used multiple linear regression analysis to predict the stability of search predictions per politician within European countries. Table 4.3 shows the results.[8] If the country of search matches the politician's country of origin, search predictions are more unstable or, in other words, more volatile than if there was no match. This result suggests that internet users search for more diverse information and receive more diverse predictions over time in the politicians' country of origin. We find a negative but insignificant effect of politicians' political ideology and the stability of search predictions. While there is a negative tendency implying that the search predictions are slightly more volatile the more on the right a politician's party is categorized, we cannot make any meaningful conclusions regarding this association because the negative effect is rather small and nonsignificant.

Search predictions for male politicians are significantly more stable than those for female politicians. This may point to internet users that search on average for more diverse information over time when a politician is female rather than male. The finding is in line with our expectations. It also echoes the results of an experiment that found that participants seek more information in total and, for example, more competence-related information about female than male candidates (Ditonto, Hamilton and Redlawsk 2014). The role of politicians

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8. We refrain from having time-fixed effects because we want to measure time difference. We refrain to use politicians-fixed effects because we want to measure the associations with politicians' characteristics.

Table 4.3: Multiple linear regression of the average stability of politicians' search predictions

	Dependent variable:			
	Average stability of search predictions over time			
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
Search in country of origin	−0.139***	−0.139***	−0.139***	−0.139***
	(0.005)	(0.005)	(0.005)	(0.005)
Left-Right ideology			−0.001	0.001
			(0.0005)	(0.003)
Left-Right ideology (squared)				−0.0002
				(0.0002)
Party leader position (Reference: Cabinet)	−0.005*	−0.005*	−0.009***	−0.009***
	(0.002)	(0.002)	(0.002)	(0.002)
Spitzenkandidat (Reference: Cabinet)	−0.070***	−0.070***	−0.071***	−0.071***
	(0.009)	(0.009)	(0.009)	(0.009)
Male (Reference: Female)	0.010***	0.010***	0.012***	0.013***
	(0.002)	(0.002)	(0.002)	(0.002)
EU salience		−0.001	−0.001	−0.001
		(0.0004)	(0.0004)	(0.0004)
Government party	−0.016***	−0.016***	−0.017***	−0.017***
	(0.002)	(0.002)	(0.003)	(0.003)
Constant	0.864***	0.868***	0.872***	0.868***
	(0.003)	(0.004)	(0.005)	(0.007)
Observations	6,721	6,721	6,402	6,402
R^2	0.133	0.133	0.137	0.137
Adjusted R^2	0.132	0.132	0.136	0.136
Note:			*p<0.05; **p<0.01; ***p<0.001	

also plays a role in the stability of search predictions over time: search predictions for politicians who have a leading role are significantly less stable than those for politicians of national cabinets. At the same time, search predictions for *Spitzenkandidaten* of the 2019 European election are also significantly less stable and change more over time than those for politicians in the national cabinet and for party leaders. The average EU salience of the search country is negatively associated with the stability of search predictions, but the effect is not significant. Finally, when the politicians belong to government parties, the search predictions are significantly less stable than when they are in the opposition.

4.6   Further Tests of Latent Political Interest

To further test whether search predictions can be used as a latent measure of user attention paid to politicians, we also tested the stability measure's construct validity. The previous shown illustrative examples for Angela Merkel have been shown what we would expect. Significant interest in new events related to the politicians resulted in new search predictions appearing in connection with the events. We systematically tested whether search predictions changed more for European politicians whom the European political parties elected as lead candidates or so-called *Spitzenkandidaten* – and who were put more in the spotlight – than those who were not elected. Comparing the stability scores of both shows that the search predictions were on average significantly lower across countries for the elected lead candidates (see Table 4.4). Looking at how the stability scores (average across countries) develop over time makes apparent that the stability scores are notably lower for elected *Spitzenkandidaten* than non-elected ones around the European election 2019, while later nearly no differences are observable (see Figure 4.3).

Table 4.4: Linear regression analysis results of the average stability of search predictions for elected and non-elected Spitzenkandidaten

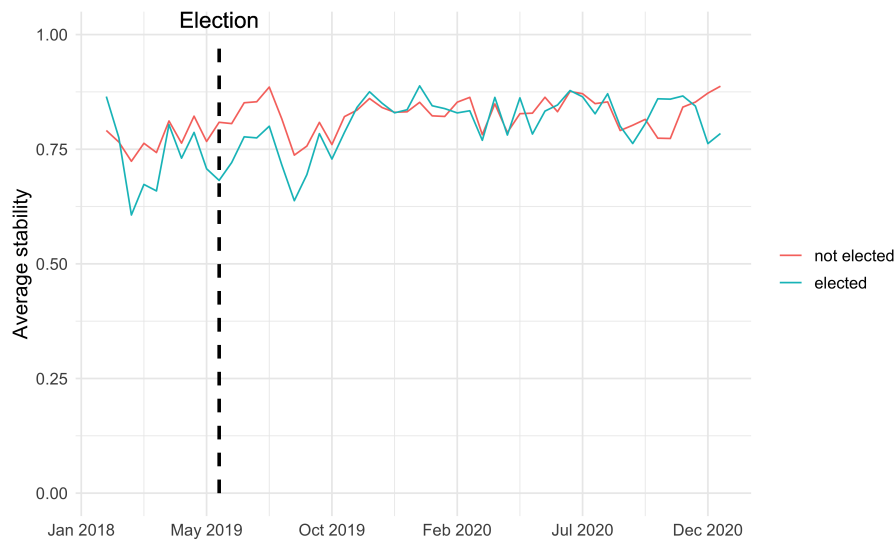|	Dependent variable:
	Stability of search predictions
Elected Spitzenkandidaten (Ref. Not elected)	-0.021^{**} (0.008)
Constant	0.822^{***} (0.005)
Observations	614
R^2	0.011
Adjusted R^2	0.009
Note:	*p$<$0.05; **p$<$0.01; ***p$<$0.001

Figure 4.3: Average stability of search predictions (Jaccard Stability) across countries for elected and non-elected Spitzenkandidaten

4.7 Variation in Search Predictions across Countries

Table 4.5 displays the results of our analysis that predicts the average similarity between the politicians' country of origin and foreign countries. The search predictions have significantly greater similarity to those of other countries when they are about male politicians compared to when they are about female politicians. The more right the politicians were classified in terms of their political ideology, the significantly lower was the similarity in search predictions with other countries (see Model 2). We also added political ideology as a squared variable in Model 3. However, both political ideology and squared political ideology were not significant. This finding suggests that Model 2 is the correct one which included only a linear term of left-right ideology and implies: the more right a politician is categorized on the right of the political spectrum, the less similar are the search predictions across countries.

Contrary to our expectations, for *Spitzenkandidaten* in the 2019 European election, the search predictions show the least similarity with other countries compared to when they held another political role. We hypothesized that the search predictions are more similar across countries for them than national party leaders and cabinet members. The idea was that there might be a common perception and interest in them due to their supranational role. However, the search predictions were significantly more similar between countries for party leaders, followed by cabinet members, and least comparable for *Spitzenkadidaten*. When politicians were in the government during the observation period, search predictions were also significantly more similar across countries than when politicians were in the opposition.

Table 4.5: Multiple linear regression results of the similarity of politicians' search predictions between countries

	Dependent variable:		
	Average similarity of search predictions		
	(Model 1)	(Model 2)	(Model 3)
Left-Right ideology		-0.009^{***}	0.003
		(0.003)	(0.015)
Left-Right ideology (squared)			-0.001
			(0.001)
Party leader position	0.085^{***}	0.083^{***}	0.083^{***}
	(0.014)	(0.014)	(0.014)
Spitzenkandidat	-0.096^{**}	-0.096^{**}	-0.096^{**}
	(0.032)	(0.032)	(0.032)
Male (Reference: Female)	0.030^{**}	0.035^{**}	0.035^{**}
	(0.011)	(0.011)	(0.011)
Government party	0.041^{**}	0.051^{***}	0.045^{**}
	(0.015)	(0.015)	(0.017)
Constant	0.319^{***}	0.354^{***}	0.331^{***}
	(0.017)	(0.021)	(0.035)
Observations	2,867	2,814	2,814
R^2	0.026	0.029	0.030
Adjusted R^2	0.024	0.028	0.027
Note:			*p<0.05; **p<0.01; ***p<0.001

4.8   Discussion and Conclusion

The results suggest that politicians' gender, political role, government party, and country of origin influence latent interest in politicians in online search approximated with the search predictions that are displayed when searching for them in the Google search engine. More specifically, we found that search predictions were significantly more unstable over time when the search took place in the politicians' country of origin, when the role was important for the EU, as in the case of *Spitzenkandidaten*, and when politicians had a female gender identity. We found that government party, having a political leader role, and a male gender identity were positively associated with a higher average similarity in search predictions between countries. However, search predictions were significantly less similar on average between countries when the politicians' party was classified more on the right of the political spectrum and when politicians were *Spitzenkandidaten* than when they were in the national cabinet.

The results may suggest that depending mainly on the politician's role, the politician's proximity to the nation, and individual characteristics of the politician such as being female, more diverse information is searched over time, which leads to lower stability scores. Interestingly, the comparably higher volatility in search predictions for *Spitzenkandidaten* influenced by search behavior is consistent with the finding that the EU is increasingly politicized (e.g., Scherpereel, Wohlgemuth and Schmelzinger 2017; Hutter and Kriesi 2019), as users appear to seek more diverse information about them over time. However, there is a consensus that the EU is still relatively distant to EU citizens (Rivas-de Roca and García-Gordillo 2021) and the politicization in the EU is rather low (Schneider 2018; Rivas-de Roca and García-Gordillo 2021). Our analyses have shown that overall the stability of search predictions is relatively high compared to the previous weeks. Still, the predictions are relatively more volatile when politicians are from the same country. This may indicate that the EU matters, but that there is more (diverse) interest in national politicians and issues. Thus, the national identity plays a more significant role in determining the attention users pay to politicians. Additionally, our

analyses revealed that search predictions for European politicians were most similar across countries if politicians held a leadership role, and less similar if they were cabinet members and least similar if they were *Spitzenkandidaten*; further, they were less similar the more their party was classified on the right side of the political spectrum. The comparatively lower similarity in search predictions content for *Spitzenkandidaten* and politicians with a right political ideology may point to heterogeneous news coverage of these politicians across countries that potentially caused different interests and search queries. This is also in line with a study indicating a heterogeneous presentation of *Spitzenkandidaten* in Europe (Schulze 2016). Future research should tap more into the similarity of news coverage across Europe and the link to online information searches. Moreover, while we have concentrated on similarity within and across countries, we have not characterized the qualitative changes in search engine predictions, which constitutes another fruitful avenue for future investigation.

Finally, we agree with Rivas-de-Roca and García-Gordillo (2021) that it is essential to study online platforms as an arena for EU politicization. Building on this, we propose that search engines like Google are especially relevant here regarding information seeking. They are, for many people, the first place to go for getting information about new or unknown politicians (Dutton et al. 2017). At the same time, they have a gatekeeping function by structuring the access to online content (news, social media, etc.). Moreover, online searches for national and European politicians and issues can be triggered by offline and online content. Future work should dig deeper into the importance of Google's search engine for opinion formation about European politics. For example, selective exposure to online information could be explored in future work by analyzing web browsing data of European citizens. Additionally, scholars could study the most important websites in the online European public sphere by investigating the websites that pop up in Google search results when searching for national and European politics in different countries. Online experiments could be further used to study more profoundly selective exposure and factors that might shape it, like citizens'

political ideology.

Chapter 5
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