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Computational Methods to Study Political Discontent: From Surveys to Web Tracking

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Abstract

Panel and online surveys have long been the predominant methodologies for studying political behavior and public opinion. However, recently emerging data sources, such as digital trace data, have been enhancing the field by making political phenomena more explainable. However, the extent to which digital trace data and machine learning algorithms can advance social science, and whether they will become primary research methods, remains uncertain. This Ph.D. thesis seeks to contribute to our understanding of these questions by examining the role of traditional methods, such as surveys, along with newer research methods, such as web tracking and machine learning, to study political discontent. The thesis comprises five papers that utilize surveys, survey experiments, and web tracking data to study use cases of political discontent: protest participation, populist attitudes and online news consumption, policy preferences of radical-right voters, and negative campaigning. The findings indicate that, despite the impressive scale of web tracking data, it alone is limited when tasked with uncovering significant patterns and mechanisms in protest behavior or populist attitudes. This limitation underscores the continued relevance of surveys as a competitive methodology to explore decision-making behind radical-right voters, populist attitudes, or protest participation. However, relying solely on panel surveys also has its own limitations, providing an overly generalized perspective on what drives political discontent. More nuanced insights emerge when survey data is combined with web tracking or when surveys are modified into survey experiments. Based on five papers, the thesis offers an analysis of the advantages and limitations of each research method and discusses opportunities for future research and advances in the field. The comprehensive examination highlights the strengths and weaknesses of traditional methods such as surveys and innovative approaches such as web tracking and machine learning, providing insights into how these methodologies can be effectively integrated to study social unrest, protests, or political movements, including populism. The discussion also identifies potential directions for future research, highlighting the need for a balanced approach that leverages the strengths of both traditional and emerging data sources to advance the study of political behavior and attitudes.

Zusammenfassung

Panel- und Online-Umfragen waren die vorherrschenden Methoden zur Untersuchung politischen Verhaltens und der öffentlichen Meinung. Aufkommende Datenquellen, wie digitale Spurdaten, bereichern das Feld, indem sie politische Phänomene erklärbarer machen. Es bleibt jedoch ungewiss, inwieweit digitale Spurdaten und maschinelles Lernen die Sozialwissenschaften voranbringen können und ob sie zu primären Forschungsmethoden werden. Diese Dissertation untersucht die Rolle traditioneller Methoden, wie Umfragen, und neuer Forschungsmethoden, wie Web-Tracking und maschinelles Lernen, bei der Untersuchung politischen Unmuts. Die Dissertation umfasst fünf Arbeiten, die Umfragen, Umfrageexperimente und Web-Tracking-Daten nutzen, um Anwendungsfälle politischen Unmuts zu untersuchen: Protestteilnahme, populistische Einstellungen und Online-Nachrichtenkonsum, politische Präferenzen von Wählern der radikalen Rechten und negative Wahlkampfstrategien. Die Ergebnisse zeigen, dass trotz des beeindruckenden Umfangs von Web-Tracking-Daten diese allein nur begrenzt in der Lage sind, signifikante Muster und Mechanismen im Protestverhalten oder bei populistischen Einstellungen aufzudecken. Diese Einschränkung unterstreicht die fortwährende Relevanz von Umfragen als wettbewerbsfähige Methode, um die Entscheidungsprozesse hinter Wählern der radikalen Rechten, populistischen Einstellungen oder Protestteilnahme zu erforschen. Allerdings hat auch die ausschließliche Nutzung von Panel-Umfragen ihre Grenzen, da sie eine zu stark verallgemeinerte Perspektive darauf bietet, was politischen Unmut antreibt. Nuanciertere Erkenntnisse entstehen, wenn Umfragedaten mit Web-Tracking kombiniert oder Umfragen in Umfrageexperimente umgewandelt werden. Auf der Grundlage von fünf Arbeiten bietet die Dissertation eine Analyse der Vor- und Nachteile jeder Forschungsmethode und erörtert Möglichkeiten für zukünftige Forschung und Fortschritte auf diesem Gebiet. Die umfassende Untersuchung beleuchtet die Stärken und Schwächen traditioneller Methoden wie Umfragen sowie innovativer Ansätze wie Web-Tracking und maschinelles Lernen und bietet Einblicke, wie diese Methoden effektiv integriert werden können, um soziale Unruhen, Proteste oder politische Bewegungen, einschließlich des Populismus, zu untersuchen. Die Diskussion identifiziert auch mögliche Richtungen für zukünftige Forschung und betont die Notwendigkeit eines ausgewogenen Ansatzes, der die Stärken sowohl traditioneller als auch aufkommender Datenquellen nutzt, um das Studium politischen Verhaltens und politischer Einstellungen voranzutreiben.

Publications

Table 1.: Peer-reviewed publication basis of this dissertation.

No.	Year	Authors	Paper	Journal
1.	2021	**Nora Kirkizh**, Olessia Koltsova	Online New and Protest Participation in a Political Context: Evidence from Self-Reported Cross-Section Data	Social Media + Society, January-March 2021: 1–10, doi: 10.1177/2056305120984456
2.	2022	**Nora Kirkizh**, Sebastian Stier, Caterina Froio	Issue trade-offs and the politics of representation: Experimental evidence from four European democracies	European Journal of Political Research, doi: 10.1111/1475-6765.12558
3.	2024	**Nora Kirkizh**, Roberto Ulloa, Sebastian Stier, Jürgen Pfeffer	Predicting Political Attitudes from Web Tracking Data: a Machine Learning Approach	Journal of Information Technology and Politics, doi: 10.1080/19331681.2024.2316679

Table 3.: Other peer-reviewed publications in this dissertation.

No.	Year	Authors	Paper	Journal
4.	2020	Sebastian Stier, **Nora Kirkizh**, Caterina Froio, Ralph Schroeder	Populist Attitudes and Selective Exposure to Online News: A Cross-Country Analysis Combining Web Tracking and Surveys	The International Journal of Press/Politics, 25(3): 426–446, doi: 10.1177/1940161220907018
5.	2024	Sebastian Stier, Corinna Oschatz, Bernhard Clemm von Hohenberg, Jürgen Maier, Alessandro Nai, **Nora Kirkizh**	When Do Candidates "Go Negative"? A Conjoint Analysis to Unpack the Mechanisms of Negative Campaigning	*Under review*, Preprint is available on SocArXiv, doi: doi.org/10.31235/osf.io/tvmf9

Contents

Chapter 1.

Introduction

1.1. Background and motivation

Development of data sources in social science is strongly connected with advances in technologies. I began my PhD journey with a paper inspired by the Arab Spring in the 2010s and the role of social media during the uprising that swept that region. The Arab Spring was a series of anti-government protests, uprisings, and armed rebellions that spread across much of the Arab world in the early 2010s. It began in Tunisia in December 2010, following the self-immolation of Mohamed Bouazizi, a street vendor protesting police corruption and ill-treatment. This event sparked widespread protests, leading to the ousting of President Zine El Abidine Ben Ali in January 2011. The movement quickly spread to other countries, including Egypt, Libya, Syria, Yemen, and Bahrain, and resulted in varying degrees of civil unrest, regime changes, and civil wars.

Although not the only factor, social media and media in general played an integral role in the Arab Spring by mobilizing the public and disseminating news that mobilized crowds across the countries. Platforms like Facebook, Twitter, and YouTube were used by activists to share information, coordinate demonstrations, and broadcast events to a global audience in real time. These tools helped bypass state-controlled media, spread awareness of government abuses, and galvanized international support. Social media enabled the rapid dissemination of videos and images of protests and the ensuing crackdowns, which fueled the movement's momentum by inspiring similar actions across the region. It also allowed for the creation of virtual networks of solidarity by connecting activists within and between countries, thus amplifying the reach and impact of the uprisings.

I was interested in the role of media usage in protest participation across nations, whether there is any correlation between media consumption and protest participation globally. One of the most prominent methodology to ask questions on country level is surveys offered by established survey panels. In a coauthored Paper 1, I explore if media consumption is connected to protest participation in 49 countries between 2010 and 2014 as well as limitations of survey panel data. I found that although significant the findings were high level, variables in the regression models are endogenous and established connection lacked nuances. Panel survey could clearly offer a valuable insight as a secondary research but I wanted to move forward to more advanced survey methodology

that could allow for causal inference to answer a more narrow question.

When the rise of the far-right and populist movement swept Europe, I was already engaged in research on how survey experiments can answer questions on policy preferences, which was indirectly connected to political discontent and protests. Since 2019, populist movements in Europe have continued to exert significant influence on the political landscape. These movements, characterized by their anti-establishment rhetoric and nationalist sentiments, have gained traction in various countries, including Italy, France, Hungary, and Poland. In Italy, the Five Star Movement and the League have challenged traditional parties, while in France, Marine Le Pen's National Rally has remained a formidable force. Hungary's Prime Minister Viktor Orbán has used a strong populist agenda to consolidate power, and Poland's Law and Justice Party has similarly pursued nationalist policies. These movements tend to emphasize sovereignty, strict immigration controls, and skepticism towards the European Union, reflecting a broader discontentment with globalization and traditional political elites.

I was interested in investigating how to measure policy preferences in order to more accurately identify public potential to protest as a result of disagreement with government policies. The rise of far-right and populism, however, appeared to be a much more suitable subject to apply conjoint survey experiment methodology. I was interested in studying policy preferences of politically discontented groups. As a result, far-right voters and the attendant rise of populism were ideal subjects. My next coauthored work, paper 3, explores the functionality of conjoint survey experiments to answer question of policy preferences by party affiliation. Conjoint experiments offer the ability to handle the multi-dimensionality of choice making and preferences in general while also measuring the causal effect of each feature on the voter's choice. I also went further by looking at more nuanced voting behavior of far-right voters by comparing their willingness to trade-off policy proposals in comparison to trade-offs made by more central and left voters.

Another subject that I wanted to explore was the utilization of conjoint experiments to investigate political campaigning. In the years preceding my research, political campaign strategies turned significantly more negative in some European countries compared to previous elections. Negative campaigning also increased along with the rise of populist movements and more extreme political ideologies in both directions, left and right, as well as its affective polarization. Together with coauthors, I designed a conjoint survey experiment to identify what features of opponents increase the likelihood of an attack in political debates. Conjoint survey experiments fit this type of study perfectly by capturing the nuances of decision-making during a political campaign. It was also a unique study because researchers rarely have access to actual politicians to ask them to participate in a survey experiment. In addition, a survey experiment is a more comfortable and more accurate research method for working with politicians since the results cannot be disaggregated. Moreover, both conjoint experiments were pre-registered, which makes the analysis more convincing because we were testing specific hypotheses.

Although surveys and survey experiments could potentially offer more high level insights and nuanced decision-making respectively, I was not satisfied with either method because of the fundamental limitation of surveys as self-reported data, which means it is relies on the subjective perceptions and opinions of respondents. There is a body of literature[1] that shows the evidence of biases in survey data. These biases in survey data can arise from several sources and significantly impact the validity and reliability of the results. First, selection bias occurs when the survey sample is not representative of the target population, often due to non-random sampling methods or non-response from particular groups. Secondly, measurement bias results from poorly designed survey questions, which leads respondents to answer in a certain way or simply produces a misunderstanding of the questions. Additionally, social desirability bias occurs when respondents give answers they believe are more socially acceptable in the place of their true feelings or behaviors. Finally, recall bias can occur in surveys that rely on respondents' memory, leading to inaccurate or incomplete responses. These biases can distort findings, leading to erroneous conclusions and misinformed decisions based on the survey data.

I preferred to use observational data to avoid these biases by acquire a more direct measure of behavioral and attitudinal metrics such as media consumption and political attitudes. In Paper 4, together with coauthors, I use web tracking data to measure media consumption and use this data in a regression model to explore whether it is associated with populist attitudes. Web tracking data became a increasingly popular data type to answer questions that surveys could not answer or, if they did, only with significant draw backs. The measure of media consumption based on web tracking data allows the researcher to unobtrusively track which online news web sites respondents visit every day, for how long, and how many pages.

I then decided to extend this approach a step further and use this data not simply to measure media consumption but also to evaluate political attitudes in general. The rise of populism and far-right politics made me curious if voters from different ideologies, specifically extreme ideologies, have distinctive life style choices that can be connected to attitudes towards democracy, certain political institutions (like elections and the European Union), as well as immigration and climate change policies among others.

Does an increase of political polarization make users' political preferences more identifiable from digital trace data? Political polarization can potentially make voters more identifiable from just a few attributes. Anecdotal evidence suggests that Democrats and Republicans display different tastes in food, music, and even ways of life. For example, in a somewhat unexpected correlation, citizens in financial dept are more likely to support radical-right parties, and visits to untrustworthy websites are associated with populist attitudes. It follows that political polarization can potentially make voters' political attitudes identifiable from just a few attributes of their life-style.

Anticipating an increase of misinformation and polarization prior the US presidential

1. Please, see a literature review in Sniderman (2018).

election in 2020, Google[2] and Facebook[3] significantly altered their political ad policies to avoid displaying political ads with 'demonstrably' false information and microtargeting while Twitter banned political ads from its platform.[4] However, political parties or other interest groups can still use alternative strategies to reach their electorate by means of targeting users based on the users' subscriptions for YouTube channels or Facebook public pages. Research shows that using Facebook likes, models can predict whether a user is Democrat or Republican (Kosinski et al., 2013), or even their vote choice (Cerina and Duch, 2020). Further, visits to untrustworthy websites can predict people's populist attitudes (Stier et al., 2020b) and/or party affiliation (Guess et al., 2020). The availability of data and ability to model it in order to infer individual's positions on issues has resulted in political campaigns spending for mid-term elections in 2020 to reach $5 billion, the largest in the history of the US, even exceeding the presidential election in 2016. Data brokers that track users and match their purchasing histories with voter registration information can receive upwards of $3 million from a single campaign.[5] For political parties, voters that have not yet voted but share particular attitudes towards specific policies are a valuable untapped resource.

The paper was also inspired by a new wave of predictive modeling in computational social science research, particularly political science research. The paper offers an ML application to investigate the political attitudes measured with surveys by relying on a predictability framework rather than on an explanatory framework. With the increase of available data, predictive ML models are becoming increasingly desirable. Predictive ML models can handle a large amount of data to infer large-scale patterns (Leist et al., 2022) faster and more efficient that explanatory models. ML approach can also rank variables by importance and by predictive power in models with a larger number of dimensions or covariates than common explanatory models (Yarkoni and Westfall, 2017).

1.2. Research questions & Objectives

To study political discontent, researchers utilize a range of qualitative and quantitative methodologies, including qualitative interviews, content analysis, case studies, surveys, survey experiments, and more recently, methodologies based on digital trace data and machine learning (ML) algorithms. Qualitative interviews, content analysis, and case studies provide in-depth insights into the individual experiences and perceptions underlying political dissatisfaction. These methods help researchers understand the narratives and rhetoric that shape and reflect discontent, offering detailed contextual analysis and helping to identify causal mechanisms. Meanwhile, quantitative methods, such as sur-

2. https://blog.google/technology/ads/update-our-political-ads-policy

3. https://about.fb.com/news/2020/01/political-ads/

4. https://business.twitter.com/en/help/ads-policies/prohibited-content-policies/political-content.html

5. https://www.cnet.com/news/how-your-personal-data-is-used-to-create-a-perfect-midterm-election-ad/

veys, are frequently employed to gauge public dissatisfaction, measure attitudes toward political institutions, and identify which demographics correlate with political discontent on a larger scale, thereby enabling researchers to infer externally valid findings. These methodologies often complement each other, combining quantitative breadth with qualitative depth to offer a comprehensive understanding of political discontent.

However, with advancements in data collection tools and ML algorithms within social science, quantitative methodologies have opened new opportunities for research. Specifically, integrating traditional surveys with experimental methodologies, digital trace data, and ML techniques paves the way for innovative approaches to studying political discontent, often leading to new findings.

This thesis focuses on surveys, survey experiments, and web tracking to study political discontent. Therefore, my first research question is the following:

RQ1: What is the strength of surveys in studying political discontent when there are new data sources like web tracking and experiments?

Surveys play a crucial role in political science by providing the empirical data that helps researchers better understand public opinion, voting behavior, and the sociopolitical landscape. They offer insights into citizens' attitudes, preferences, and priorities, while enabling scholars to analyze trends across time and different demographics. Surveys contribute to the development and testing of theories about political behavior and institutional functioning and are instrumental in gauging the effectiveness of policies and the impact of political campaigns. By systematically collecting and analyzing responses, surveys help political scientists make informed conclusions about the broad-scale dynamics of political systems and the relationship between the public and their governments. However, surveys have limitations such as self-reported bias, absence of causal inference, and the survey findings can be too high-level and missing nuances. Therefore, surveys need to be complemented with other methodologies. My first research question is the following:

RQ2: What is the middle ground solution for survey limitations?

Survey experiments can help address issues of self-reported bias in surveys and the lack of causal inference for certain types of questions in research on political populism. For instance, because populism involves multi-dimensional decision-making and tradeoffs, researchers has introduced conjoint survey experiments to handle the complexities of populist electoral behavior. Consequently, conjoint survey experiments have become increasingly popular in studies of electoral politics.

RQ3: Can web tracking replace surveys, specifically within the study of populism?

Web tracking data is becoming more prevalent in political science especially with the development of ML algorithms that are able to process large amounts of data. Web tracking is especially popular in studies of electoral politics. But do populism studies or studies of political discontent benefit from the capabilities of web tracking data?

Importantly, in this PhD thesis I do not test mechanisms that can be behind the link between *political attitudes and online behavior*, media and protest participation or

media and populism. For example, I am strictly interested in the predictive power of online behavior concerning political attitudes in Paper 3, and in Paper 4 I establish an association between media and populist attitudes. Further, Paper 1 aims to study the association between media and protest participation.

Both papers with conjoint survey experiments (Papers 2 and 5) are confirming a hypothesis about political behavior of radical-right voters or politicians rather then explaining that behavior. One of the reasons for this theoretical strategy is that establishing mechanisms based on online behavioral data or surveys is challenging. I touch upon these mechanisms in the Discussion: why mechanisms are difficult to study but should be the next step for social science given the growth of descriptive data such as digital trace or web tracking data.

RQ4: Can combining surveys with web tracking data improve research in political discontent?

Surveys are invaluable for preliminary research and exploring broad public opinion, offering insights into general attitudes and perceptions across diverse populations. They are particularly useful for establishing foundational knowledge and testing hypotheses in the early stages of research. However, surveys often rely on self-reported data, which can be subject to biases and may not accurately capture actual behaviors or decision-making processes.

On the other hand, web tracking data provides a vast amount of behavioral data, offering a more granular and externally valid perspective. This data can reveal patterns and behaviors that might be difficult to detect through self-reported surveys. For instance, web tracking can uncover the specific online activities, media consumption habits, and digital footprints that individuals leave behind, offering a more accurate picture of their behavior in real time. However, web tracking data can be noisy and unstructured, requiring sophisticated methods to filter, analyze, and interpret it meaningfully. The question then arises: can combining surveys with web tracking data enhance research on political discontent?

RQ5: In the role of big data and large language models (LLM), what is the role of surveys?

Digital trace data and advanced ML algorithms are able to answer questions without conducting an online survey, and LLMs goes even further. For example, Brand et al., 2023 shows that ChatGPT's responses are very close to actual public opinion. This capability also relates to conjoint survey experiments — ChatGPT was able to identify product profiles that would be an optimal choice of the general public if the conjoint was offered to the general public.

Nevertheless, there is a demand in social science for a high-quality descriptive data and research. Journal of Quantitative Description: Digital Media[6] was found by scholars suggesting that surveys, digital trace data and other more traditional data sources can be valuable by providing descriptive high level evidence prior to investigating further

6. https://journalqd.org/

nuances, causal relationships, and explanations that are offered by web tracking, survey experiments, or LLM. Can digital trace data and machine learning algorithms be employed further for preliminary descriptive research as well or surveys are still a powerful tool to learn about individuals' opinions and attitudes?

To answer the stated research questions, this thesis seeks to achieve three main research objectives:

Objective 1: Determine The Role of Panel Surveys for Studying Political Protests.
To investigate the strengths and weaknesses of surveys, as well as the value they bring to studying political discontent. Specifically, to examine the benefits of panel cross-sectional data and identify the questions it is best suited to answer.

Objective 2: Assess Survey Experiments as a Methodology to Measure Policy Preferences of Radical-Right Voters.
To investigate how survey experiments can compensate for the limitations of panel surveys and what type of questions within the study of political discontent can be answered with survey experiments.

Objective 3: Combining Web Tracking Data with Surveys to Advance Studying Populist Attitudes.
To investigate the strength of web tracking data compared to surveys. To understand how new types of data sources and the availability of large amounts of data about voters' behavior shape research on political discontent.

The thesis has the following structure. First, I offer a theoretical background and literature review in Chapter 2 to introduce the scope and theoretical basis of this thesis as well as identifying notable studies in my chosen area of study, specifically, political participation, political attitudes, media, and politics. Chapter 3 offers an overview of the data and research methodologies that I am focusing on in the published papers. The overview focuses on two main data types, self-reported and observational data, as well as three main methodologies, surveys, survey experiments, and web tracking data, for which I also identify the applications and limitations offered for each research methodology. The next chapter consists of my peer reviewed articles, which are the basis of this dissertation:

Paper 1: — "Online News and Protest Participation in a Political Context: Evidence from Self-Reported Cross-Sectional Data" explores the association between online news consumption and protest participation in 48 countries in 2010-2014 by utilizing panel data from the World Values Survey. The paper is the first step of my PhD journey, when I decided to focus on research methodology to study the politics of discontent and it subsequently became an important starting point for this dissertation.

Paper 2: — "Issue Trade-Off and the Politics of Representation: Experimental Evidence from Four European Democracies" explores electoral behavior in an experimental setting to answer questions of whether politically discontented radical right voters are anomalous or if they are comparable to either mainstream or ideologically left voters

when selecting a candidate based on their policy proposals. The paper utilizes conjoint survey experiments from four European democracies (France, Germany, Italy, and Spain).

Paper 3 — "Predicting Political Attitudes from Web Tracking Data: a Machine Learning Approach", the most significant paper of this thesis tests the ability of web tracking data to advance the effectiveness of predictions of political attitudes. Political attitudes, including populist attitudes, are measured with surveys and used as the ground truth for web tracking data. Web tracking data consists of web site visits made by 1,000 German users over three months of tracking period and classified into specific topics.

Paper 4 — "Populist Attitudes and Selective Exposure to Online News: A Cross-Country Analysis Combining Web Tracking and Surveys", a large-scale study uncovering online media consumption patterns of voters with populist attitudes in France, Germany, Italy, Spain, the United Kingdom, and the United States by utilizing survey and web tracking. Online news consumption is measured with web tracking data, which makes it less biased, and populist attitudes are measured with surveys based on established survey panels.

Paper 5 — "When Do Candidates 'Go negative'"? A Conjoint Analysis to Unpack the Mechanisms of Negative Campaigning" simulates scenarios of political campaigning to identify what drives candidates to attack their opponents. The paper utilizes conjoint survey experiments with 800 candidates in German state elections.

1.3. Significance & Contribution

This thesis offers the road map of my computational social science methods from classical regression modeling with panel surveys to analysing web browsing behavior based on web tracking data. The papers that are the basis of this thesis show that classical survey methodology can be advanced with digital trace data such as web tracking data to better study political protests, policy preferences, political campaigns, and political attitudes specifically, and political behavior in general. While survey data allows for the measurement of complex political concepts such as attitudes, web tracking data can reveal concrete behavioral life-style or daily decision making, which can explain vote choice or the formation of political attitudes.

However, web tracking along is still limited and unable to offer a completer alternative for the competing measurement of political attitudes, policy preferences or protest participation. Paper 3 shows that the methodological equilibrium allows for the enhancement of surveys with web tracking data, which sets a new direction for future research in the field of political behavior. Surveys can play a role as the source of the ground truth and benchmarking and validations of web tracking based measurements.

However, there are several important types of questions that can be better answered with survey experiments. In this case, survey experiments can advance survey research. Survey experiments are able to uncover nuances in voters' decision-making and mecha-

nisms, namely why voters decide to switch parties or participate in a protest. Survey experiments are also able to offer causal relationships between variables of interest. Unlike panel surveys, where variables are endogenous, survey experiments can reveal which variable specifically affect the other and which variable is the cause of the observed effect.

From a policy making perspective, Paper 3 and Paper 4 show that a significant caveat in the development of research based on web tracking. Access to a large amount of web tracking data places users' online privacy at risk. Sensitive information about users' political attitudes can be revealed from users' browsing histories suggesting ads distributors like Google to be aware of political actors that aim at voters who are visiting specific websites. Essentially, political parties or candidates can target voters without directly asking about their attitudes towards specific policies. Second, from a normative prospective, this thesis point to a possibility of the web tracking data revealing information that make manipulation of voters easier which can be potentially harmful for democracy. Third, the fact that radical-right voters are more distinguishable from median or left voters signifies that political polarization goes beyond political news consumption. Hence, web tracking data potentially can be used as a measure of dynamic polarization at scale. Finally, from methodological perspective, in this paper we introduce an approach on how to draw classification from URLs and that measure of peoples' attitudes based on web tracking data is compatible to self-reported attitudes.

Chapter 2.

Scope & Theoretical Background

This dissertation comprises five papers that utilize surveys, survey experiments, and web tracking data to explore political discontent. Each paper addresses a distinct topic: protest participation, populist attitudes, radical-right voters, and negative campaigning. Below, I outline the theoretical frameworks underpinning each study. Paper 1 explores protest participation, Paper 2 investigates the policy preferences of radical right voters, Paper 3 examines political attitudes using big data, Paper 4 studies populist attitudes, and Paper 5 analyzes the factors driving negative campaigning.

Political discontent arises when citizens feel dissatisfaction with their political system, government, or leadership (Cohen, 2020). This discontent can be triggered by a variety of factors, including perceived corruption, where people believe their leaders are engaging in unethical behavior or misusing public funds for personal gain (Sanz et al., 2022). Economic inequality and social injustice can also contribute significantly, as individuals or groups may come to believe that the system is unfair, providing unequal access to opportunities and resources (Albanese et al., 2022). Additionally, a lack of representation can lead to discontent, particularly when people feel their voices are not being heard, their interests are neglected, or their needs are unmet by elected officials (Schulte-Cloos and Leininger, 2022).

Policy disagreements can also fuel discontent, particularly when citizens oppose specific government policies related to economic reforms, healthcare, education, or immigration (Macdonald, 2021). Economic hardship, characterized by high unemployment rates, inflation, or other economic challenges, exacerbates a sense of dissatisfaction towards political leadership and their handling of the economy. Additionally, violations of civil liberties and human rights can be critical factors; when individuals perceive their freedoms are being threatened or undermined by the government, political discontent often intensifies (Tomz and Weeks, 2020). A general dissatisfaction with government performance in terms of it efficiency, effectiveness, and responsiveness can also contribute to political discontent. Furthermore, political scandals involving leaders or institutions can erode public trust and heighten dissatisfaction (Poertner and Zhang, 2024).

The implications of political discontent are significant, often leading to public protests, political movements, and a declining trust in political institutions (Keefer et al., 2021). These manifestations of discontent can destabilize governments, result in changes in political leadership, and even spark revolutionary movements, driving demands for political

reform and greater accountability in governance (Leuschner and Hellmeier, 2024).

This dissertation specifically focuses on two types of political discontent: protest (Paper 1) and electoral discontent as it manifests through populism in Europe (Paper 4). Notably, in this dissertation, populism and populist movements serve as a motivation to study electoral discontent among radical right voters (Paper 2). Paper 5 examines the politics of negative campaigning among political elites. This study offers a new perspective on how political discontent can manifest among political elites. The dissertation concludes with a paper that studies political attitudes in general (Paper 3), investigating the lifestyle choices and online browsing behavior of populist voters and those with authoritarian attitudes to determine whether they differ from mainstream voters.

2.1. Political participation

Political participation refers to any action taken by individuals or groups to influence government decisions or policies (Milbrath and Goel, 1965). This includes traditional activities like voting in elections or running for office, as well as participating in protests, engaging in online advocacy, or joining political organizations (Milbrath, 1981; Van Deth, 2014). These actions allow either individuals or groups to express their opinions, advocate for change, and contribute to the political landscape of their communities or countries (Ikeda et al., 2008; Kriesi, 2013; Vrablikova, 2014). This thesis specifically focuses on political participation in the context of political discontent or social unrest. Throughout my papers I studied research methodology as it applies to protest participation and radical-right voters' electoral behavior. This approach is particularly evident in Paper 1 and Paper 4 respectively. Below, I outline the scope of these papers and describe what I learned about how surveys perform in studies of political protests and whether survey experiments improve classical surveys when a research question touches upon protest voting.

2.1.1. Protest participation

This thesis investigates the drivers of political participation with a particular emphasis on political protests. Protest participation involves individuals or groups actively engaging in public demonstrations, marches, rallies, or other collective actions aimed at expressing dissent, advocating for specific causes, or raising awareness about social, political, or environmental issues (Meyer, 2004; Campbell, 2013). Participation in protests allows people to publicly voice their opinions, challenge existing policies or practices, and demand change or reform. It typically involves organizing or joining gatherings where participants use various means, such as chants, signs, speeches, or symbolic gestures, to convey their desired messages and, whether directly or indirectly, influence public discourse or policy-making processes (Vassallo, 2018). Protest participation can occur in response to specific events, ongoing societal issues, or as part of broader social move-

ments that seek a systemic transformation or justice on a particular issue (Krastev, 2014; Mössner and Romero Renau, 2015). Studying the factors that influence participation in protests is crucial, since these events often influence elections and have the potential to transform entire political systems (Bursztyn et al., 2021).

Forms of protests vary significantly depending upon the political regime within which they arise. For example, in comparison to democratic countries, protest participation in authoritarian regimes is heavily influenced by the level of repression and control exerted by the state. In more oppressive regimes, protests are often driven underground, which forces them to rely on covert communications and organizational structures to evade surveillance and crackdowns. Technology, particularly social media and encrypted messaging, has become a vital tool for circumventing state control, allowing activists to mobilize, coordinate, and disseminate information quickly and securely. However, in turn, regimes also adapt by employing sophisticated surveillance, censorship, and misinformation tactics to undermine and control dissent. Thus, the dynamics of protest participation in political regimes involve a continuous struggle between activist innovation and state repression.

Paper 1 was inspired by the Arab Spring, a wave of anti-government protests, uprisings, and armed rebellions that swept through much of the Arab world in the early 2010s. It started in Tunisia in December 2010, triggered by the self-immolation of Mohamed Bouazizi, a street vendor protesting against police corruption and mistreatment. This incident evoked widespread protests, leading to the overthrow of President Zine El Abidine Ben Ali in January 2011. The movement quickly spread to other countries, including Egypt, Libya, Syria, Yemen, and Bahrain, resulting in varying levels of civil unrest, regime changes, and civil wars.

It was evident that online media consumption and particularly social media, played an integral role in mobilizing the public during the Arab Spring protests (Allagui and Kuebler, 2011; Robertson, 2013; Aouragh and Alexander, 2011). Platforms like Facebook and Twitter enabled real-time coordination and information dissemination, while citizen journalism through smartphones documented events and bypassed state-controlled media. Encrypted messaging and anonymous accounts provided safety for activists, and the international media provided global support. Despite facing challenges such as government surveillance, internet shutdowns, and misinformation campaigns, technology facilitated unprecedented levels of participation, global solidarity, and support, in order to significantly shape the course and impact of the protests.

Paper 1 investigates the impact of online news consumption on protest behavior within a political context, providing new empirical insights that distinguish online news consumption from more generalized social media or internet use. The study highlights a positive correlation between an exposure to online news and participation in demonstrations across various countries, with findings emphasizing its significance even in autocratic regimes. This marks a departure from previous studies focusing on social media or generalized internet usage, underscoring the universal influence of online news on protest

engagement, especially when combined with preexisting political interest. The findings reveal that while online news consumption and political interest independently influence protest participation, their combined effect is synergistic, reinforcing each other to a greater extent.

Furthermore, the research uncovers nuanced patterns regarding the influence of online news consumption based on political contexts. Contrary to initial hypotheses, the impact of online news consumption is strongest in autocracies and weakest in transitional regimes, prompting the need for deeper theoretical interpretations and further cross-country surveys to accurately capture the nuances of protest participation. Although the overall impact of online news on protest participation is modest, the study highlights a need for more nuanced research into different types of political information obtained through the internet and their varying effects on protest behavior. Additionally, the study hints at the complex interplay between online news consumption, social networks, and offline protest participation, calling for a differentiated approach to understanding how online news translates into tangible protest actions.

The research also points to potential avenues for future exploration, such as examining the role of news flows in rural versus urban areas and investigating how online news consumption influences protest behavior indirectly via interpersonal communication channels. These insights pave the way for a more comprehensive understanding of the intricate dynamics between online information consumption, social networks, and political activism, shedding light on the multifaceted nature of protest participation in contemporary digital societies.

2.1.2. Electoral behavior of populist radical right voters

Another focus of my research surrounding political discontent is related to recognizing populism as a form of protesting by the "real people" against the elites. Specifically, Paper 2 studies the policy preferences of voters of populist radical right parties.

Populist radical right (PRR) voters typically support parties or candidates who combine populism with nationalist, anti-immigration, and anti-establishment agendas. These voters often feel economically marginalized due to globalization and deindustrialization, believing traditional parties have failed to address their concerns. They have a strong sense of national identity and see immigration and multiculturalism as threats to their cultural values. PRR voters tend to feel politically alienated from mainstream institutions, which they perceive as corrupt and elitist. They prefer strong, decisive leadership prioritizing law and order, and often hold conservative views on social issues like same-sex marriage and traditional family values.

Demographically, PRR voters are often older, less educated, and more likely to live in rural or less urbanized areas, though all of these factors can still vary by country. While traditionally associated with working-class voters, PRR support has also grown among economically insecure middle-class segments. Examples of PRR parties include the National Rally in France and the Sweden Democrats in Sweden, and representative

leaders include Donald Trump in the United States and Jair Bolsonaro in Brazil, who have garnered support by emphasizing anti-immigration stances, distrust of the political establishment, and conservative social values. These characteristics reflect the complex nature of PRR voters, who are driven by both economic and cultural anxieties in a rapidly changing world.

Overall, there is a very rich literature discussing the reasons why people vote for radical-right populist parties (Arzheimer, 2018; Rooduijn, 2018a). In general, scholars emphasize three core characteristics of these parties: nativism, authoritarianism and anti-elitism (Mudde, 2007). Thus it can be argued that voters support populist radical right parties because they believe that their personal policy preferences are in line with these core positions discourses. This approach, in which voters of populist radical right parties primarily base their choice on ideological considerations, is broadly in-line with voters of other political parties.

Paper 2 is motivated by the changes in European multiparty systems and political representation. Factors such as the decline in party loyalty, the rise of radical populist parties, and evolving political divisions have blurred the traditional lines of political conflict and challenged established models of voting behavior. This complexity is even more pronounced for cross-pressured voters, who must balance various issue preferences, necessitating a deeper understanding of the trade-offs and compromises involved in voting decisions.

To address this complexity, recent research has adopted an issue-centered approach to explore how voters navigate competing issue preferences and make trade-offs. By comparing the behavior of voters across different political ideologies, such as those supporting radical left and right parties versus mainstream party supporters, Paper 2 provides insights into how different groups prioritize and compromise on key issues like redistribution, immigration, climate change, and EU integration.

More recently, researchers have started to use experimental designs to study issue dynamics in voters' preferences. This approach allows researchers to model the causal effects of issue preferences on vote choice (Horiuchi et al., 2020), while also examining trade-offs between voters' issue preferences more precisely. These innovative experimental designs help clarify which issues are most valued by voters when supporting a candidate (Chou et al., 2021; Graham and Svolik, 2020; Hanretty et al., 2020). Related conjoint experimental studies investigated anti-immigrant attitudes in the wake of Brexit (Schwartz et al., 2020) or the effects of restrictive policies on immigration (Duch et al., 2020). Neuner and Wratil (2020) conducted a conjoint experiment to study the electoral choices of voters with populist attitudes. The authors find that among German voters, anti-EU and anti-globalization positions decrease the electoral viability of candidates, whereas restrictive immigration and higher taxes on the rich increase candidates chances of receiving support. While their study does not focus on differences between radical left and right voters, robustness tests showed that *AfD* voters preferred restrictive immigration policies and *Die Linke* voters favored redistributive measures, whereas both were

not receptive for anti-elitist messages. Most closely related to our work is the conjoint study of Chou et al. (2021) who designed candidate profiles with German party labels to investigate vote switching of radical right party supporters depending upon their issue preferences. The study found that *AfD* voters are willing to vote for mainstream parties that propose a complete stop of immigration. However, they also show that such accommodation strategies also lead to losses among the core voters of mainstream parties. In sum, while many studies have contributed to research surrounding far right voter's preferences on particular policy positions, no existing study has experimentally compared the persistence of issue preferences of radical left and radical right populist electorates across countries.

Analyses of policy preferences among populist radical right voters based on conjoint survey experiments, reveal that these voters are less willing to make trade-offs on their core issues when compared to radical left voters or mainstream party voters. For instance, immigration is a single issue of paramount importance for populist radical right voters, especially in Germany. Survey experiments have shown that these voters are willing to sacrifice many other issues as long as their core concerns about immigration are addressed. Extrapolating from this degree of emphasis placed upon a single issue, they might overlook policies proposed by parties on climate change, income redistribution, electoral laws, or protecting democratic political institutions. As long as the immigration issue is resolved, they are willing to concede on other matters.

This myopic approach to policy preferences could be detrimental to democracy in the long term, as some political parties could exploit this single-issue voter behavior to pass laws that satisfy only one demand of their electorate, potentially harming democratic principles. The paper clearly demonstrates that this uncompromising electoral behavior is a specific feature of populist radical right voters. However, it remains unclear why these voters exhibit such behavior. What is clearly established is that political discontent can manifest as uncompromising voting behavior, which has significant implications for democracies. These insights also underscore the intricate dynamics shaping contemporary democratic landscapes in Europe.

2.2. Populism and political attitudes

Papers 2 and 4 continue studying political discontent by investigating the drivers and predictability of populist attitudes. Political attitudes refer to individuals' beliefs, values, opinions, and feelings regarding political issues, ideologies, institutions, and actors (Feldman, 2003). However, it is essential to first address why political attitudes are essential to study. Attitudes in general play a crucial role in shaping how people perceive and engage with politics, influencing their behaviors, decisions, and interactions within the political sphere (Quintelier and Van Deth, 2014). Understanding political attitudes is essential for analyzing public opinion, electoral behavior, policy debates, and political mobilization (Clarke and Acock, 1989; Nelson, 2004). To better define this term, po-

litical attitudes can include a wide range of perspectives and positions, from liberal to conservative, progressive to traditional, authoritarian to democratic among others (K. B. Smith et al., 2011; Jost et al., 2009). These attitudes are based on beliefs with which individuals approach political issues. They are often influenced by various factors such as socialization, education, media exposure, personal experiences, and cultural backgrounds (K. Smith et al., 2012). By examining the nuances and variations in political attitudes, researchers, policymakers, and political actors can gain insights into citizens' values, concerns, priorities, and aspirations, informing democratic processes, governance decisions, and political campaigns (Mutz, 1992; Bachner and Hill, 2014).

Political attitudes can manifest in different ways, including support or opposition toward specific policies, parties, candidates, or political leaders. For example, someone may hold liberal attitudes supporting policies such as environmental protection, social welfare programs, or civil rights, while another individual with conservative attitudes may prioritize fiscal responsibility, national security, or traditional values (Hatemi et al., 2011; Leong et al., 2020). These attitudes can also extend beyond particular policy positions to broader ideological frameworks, such as one's attitude towards the ideologies of liberalism, conservatism, socialism, or populism, which shape individuals' overall political outlook and preferences (Kessler and Freeman, 2005).

Additionally, attitudes provide particularly valuable insight into the political climate, because they tend to be much more stable than opinions, and they are harder to shift (Krosnick, 1991), which makes them a good predictor of individuals' political ideology or even vote choice. For instance, in Europe, anti-immigration attitudes predict a voter's likelihood to support radical-right parties (Rooduijn, 2018b), while attitudes towards climate change policies are associated with voting for green parties (Harteveld et al., 2017-06). Research also demonstrates that people who have never voted often rely on their political attitudes when voting (Arcuri et al., 2008). Hence, political parties or candidates often appeal to voters' political attitudes when drafting their policy platforms. This makes identifying political attitudes especially desirable for political parties or candidates, in spite of the challenges placed by individuals who prefer to keep their attitudes towards, for instance, immigration or foreign workers, to remain private.

2.2.1. Populist attitudes

There has been a significant rise in populist discontentment throughout Western democracies. In Europe, this shift has manifested through the growing support for both radical right and radical left populist parties. As these parties become more integrated into the party systems, interest in the populist phenomenon has been renewed, along with a desire to understand the characteristics and preferences of the constituencies supporting these populist parties.

Scholars have proposed various theories about how the electorates of populist parties converge and diverge, particularly in terms of their socio-demographic characteristics and issue preferences (Rooduijn, 2018b). Individual-level studies focusing on issue pref-

erences have identified both distinct and shared patterns in the preferences of radical left and radical right electorates. While both groups are driven by dissatisfaction with the functioning of representative democracy (Kaltwasser and Van Hauwaert, 2020), they differ on issues such as immigration and redistribution (Akkerman et al., 2017; Rama and Cordero, 2018).

Research on the electorates of populist parties – including their socio-demographic characteristics and preferred issues – is relatively recent, at least when compared to the vast existing literature on the proper definition of populism and on the supply-side of populism.[1] However, as both radical right and radical left parties have made their appearance in Western democracies and experienced changing electoral fortunes, a growing number of studies has sought to map out the similarities and differences between their constituencies in an attempt to disentangle the linkage between voters' preferences and different forms of populism.

While it is not possible to account for all studies that have tried to define populism, today three main definitions exist (Mudde and Kaltwasser, 2017). The three main systems of defining populism include: scholars who see populism as a phenomenon that is too heterogeneous to be categorized (Ionescu and Gellner, 1969), those that understand populism primarily as a political style rather than set of ideologies (De Vreese et al., 2018; Moffitt, 2016; Canovan, 1999; Laclau, 2005) and those who define it as a thin-centered ideology (Mudde and Kaltwasser, 2012).

Without attempting to close this debate here, Paper 2 follows the last perspective: by considering populism as a "thin-centered" ideology, it is possible to conceive that populism can be informed by other "thicker" ideologies, thus shedding light on the broad variety of populism in its right-wing and left-wing forms as well as on possible trade-offs between the backbone of populism (anti-elitism) and other worldviews (Zaslove, 2008). This definition is also useful for empirical studies, as it allows to measure the presence or absence of populism in the manifestos and campaigns of political parties (Rooduijn et al., 2014; Meijers and Zaslove, 2020), in political communication (De Vreese et al., 2018) and in the attitudes and preferences of citizens (Akkerman et al., 2014; Van Hauwaert and Van Kessel, 2018).

The definition of populism as a thin-centered ideology encompasses a Manichean vision of society and politics pitting the "pure" people against "corrupt elites" (Mudde and Kaltwasser, 2012; Hawkins and Kaltwasser, 2017) In the words of Cas Mudde, populism is a thin-centered ideology endorsing the set of ideas that society is ultimately separated into two homogeneous and antagonistic groups, "the pure people" versus "the corrupt elite", and which argues that politics should be an expression of the *volonté générale* (general will) of the people (Mudde and Kaltwasser, 2018). If these elements constitute the backbone of populism, it must also be anchored to other worldviews. In the literature, the main focus is on three different forms of populism: radical-right, radical-left and liberal populism (Zaslove, 2008). In this dissertation, we limit the focus to the first two

1. Please, see for an overview Rooduijn (2019).

types given their prominence in contemporary European politics (Rovny and Polk, 2020; Costello et al., 2020).

In general, studies that have focused on voters of populist parties following an individual-level approach have found differences and similarities between the electorates of radical right and radical left populist parties, suggesting that different motivations inform opposition to globalization and to political elites (Kriesi et al., 2012). Survey-based studies show that voters of radical right and radical left parties predominantly focus on a narrow set of issues – notably fears related to immigration and European integration (Ivarsflaten, 2008; Lubbers and Coenders, 2017; Stockemer et al., 2020; Rooduijn, 2018a), distrust of the political system (Rooduijn, 2018a) and concerns about the economy (Ramiro and Gomez, 2017; Visser et al., 2014; Gomez et al., 2016). Other scholars who have studied the interrelationship between issue preferences and populist attitudes confirmed these patterns (e.g., Van Hauwaert and Van Kessel, 2018). In a study using data from a German 2017 post-election survey, Loew and Faas (2019) found that issue preferences are strong determinants of the radical left and right vote, yet those populist attitudes play a larger role for voters with moderate policy concerns.

The approach to populism as a thin-centered ideology allows for the study of this phenomenon empirically by looking at the demand side of populism through voters' preferences. Existing literature on why people vote for populist parties highlights that one important reason is the agreement with feelings of anti-elitism and sense of detachment from ongoing democratic processes. This suggests that populist positions can be understood as a means of criticizing the power concentration in the hands of a few (Ivaldi et al., 2017; Van Hauwaert and Van Kessel, 2018; Belanger and Aarts, 2006; Rooduijn, 2018a). The paper argues that this explanation applies to both voters of radical right and radical left parties.

2.2.2. Predicting political attitudes

Populist voters have specific electoral preferences, but do they also have distinct lifestyle choices or web browsing behavior patterns that can be identified and distinguished from mainstream or left-wing voters? Paper 4 investigates the political attitudes associated with specific browsing behaviors. It explores whether the lifestyle choices of populist radical right voters differ from those of mainstream or left-wing voters. Does the ideological divide extend beyond news preferences? This raises the question of whether political polarization extends beyond news consumption preferences.

In Paper 3, I use web tracking data from 1,000 German voters to examine their browsing behavior, website choices, and visits, in order to to determine if there is a connection between these choices and voters' political attitudes. Previously, I outlined the importance of studying political attitudes. But why is identifying these political attitudes through web tracking data important?

The implication of this study is that by identifying political objectives based on web browsing behavior and web tracking data, we can associate certain online behavioral

patterns with ideological and voting preferences. This insight provides political parties and other interest groups with a clearer picture of which areas and demographics should be targeted with political ads and informational campaigns. There is also a methodological implication: can web tracking data be used to measure political attitudes, or are surveys still the most reliable method?

The theoretical basis of Paper 3 is that political attitudes are linked to personality traits and personality traits shape online behavior. In establishing the *"personality traits – political attitudes"* link, I build on theory and evidence from Gerber et al. (2010) and Fatke (2017) that personality traits are associated with political attitudes and can be just as strong of a predictor of ideology as income and education. For example, anti-immigration attitudes can be linked to a lack of compassion (Klimecki et al., 2020), negative attitudes towards climate change policies, and support of authoritarian policies to deal with a crime is associated with a low level of generalized trust (Gauchat, 2018; Lo Iacono, 2019). Bakker et al., 2021 studied voters with populist inclinations and found that populist voters display lower agreeableness than mainstream party voters. Ackermann et al., 2018, drew on electoral data from Switzerland to confirm a negative relationship between agreeableness and openness and the decision to vote for the radical right.

For establishing the next step of this logical chain, the *"personality traits – online behavior"* link, the paper relies on existing literature that shows the reflection of personality traits in browsing behavior (Lambiotte and Kosinski, 2014), website choices or social media usage (Settanni et al., 2018; Kosinski et al., 2013). Patterns of Facebook usage, such as the number of friends, followed groups, or published photos, can predict personality traits like openness, extraversion, and agreeableness, among others (Evans et al., 2008; Golbeck et al., 2011; Bachrach et al., 2012). Kosinski et al. (2012) and Nave et al. (2018) demonstrate that even self-reported website choices can predict personality traits. For instance, a high level of emotionality correlates with visits to websites related to sports, while a calm personality is associated with photography. Observational data also supports this finding: Facebook likes showed that domain choices, reported by respondents in surveys, are robust in predicting people's personalities (Kosinski et al., 2014). Stachl et al. (2020) went further testing these correlations. The authors collected data from smartphones to predict personalities. They found, for instance, that phone activity correlates with extraversion and music apps with openness.

Having established a link between personality traits and political attitudes, as well as between personality traits and online behavior, I can also suggest a link between political attitudes and online behavior. Paper 3 shows that political attitudes can be moderately predicted from website choices. For example, while populist attitudes could not be identified from web tracking data, authoritarian attitudes toward democracy were moderately detectable based on website choices. Interestingly, interest in politics was confidently identified from web tracking data.

Political attitudes such as populist leanings, attitudes toward democracy and interest

in politics — could be predicted through web tracking with varying degrees of precision. This predictive potential indicates that the performance of machine learning models depends, to some extent, on how well political attitudes are measured in the first place. For example, interest in politics can be measured by the political content that users or voters visit online, while populist attitudes still have somewhat vague and less concrete measures outside survey-based methods.

For example, the public attitudes often measured by surveys include support for income redistribution, taxing big corporations, clear opposition to political elites, low trust in political elites, and a refusal to provide social benefits to immigrants. It is challenging to detect specific patterns that could be associated with these attitudes. What websites could signify that someone is against political elites other than visiting highly attentive online news websites or clearly populist radical right media? Paper 3 demonstrates that web tracking data is still limited in its ability to predict political attitudes. As a result, survey methodology remains the most reliable approach for measuring attitudes, except for those that can be gauged through online news consumption.

2.3. Online news consumption

Online and traditional media play a crucial role in shaping political landscapes by influencing public opinion, framing political issues, and setting the agenda for public discourse (Herbst, 2001; Strömberg, 2015; McCombs and Valenzuela, 2020). Through news coverage, editorial pieces, and political commentary, media outlets highlight specific topics, prioritize certain events, and provide interpretive frameworks that shape how the public perceives political issues (Dunaway and Graber, 2022). This agenda-setting function means that media can bring attention to particular problems or narratives, potentially swaying public opinion and influencing the priorities of politicians and policymakers (Tan and Weaver, 2009; McCombs and Valenzuela, 2020). For instance, extensive media coverage of social issues like healthcare, immigration, or climate change can elevate these topics to the forefront of political debates and election campaigns, compelling politicians to address them (Strömberg, 2001; Kepplinger, 2008).

Media play an especially crucial role in facilitating political discontent when the government fails to provide security, to support economic growth, or adequately fulfill other aspects of the public's expectations. Overall, media serve as critical intermediaries between the government and the public, providing a platform for political communication, debate, and scrutiny (Gehlbach and Sonin, 2014; Arceneaux et al., 2016). Politicians and political parties utilize media channels to disseminate their messages, rally support, and engage with constituents (Sevenans, 2018), while the public monitors and assess governmental performance through media coverage.

In this PhD dissertation I offer two papers studying the role of media in political discontent. My papers specifically focus on the media's relationship with protest participation and populist attitudes. In Paper 1, I examine the association between online

news consumption and protest participation. I measure online news consumption and protest participation using surveys, building my investigation through data drawn from the established World Values Survey panel, which provides survey data from multiple nations. For this paper, I use survey data from 49 countries. These countries range from western democracies, hybrid regimes, to post-authoritarian regimes. This variety of political contexts allows for a more complete to examination into how protest participation intensity varies across political regimes. Online news consumption also varies since internet coverage is more developed in some countries than in others. However, in the context of political discontent, I argue that online news consumption is more strongly associated with political protest and general protest participation in countries where online news consumption is still a new phenomenon and a new source of information. However, varying affects of online news is not limited to the relative novelty of online new access, as the political context also is significant. The analysis of the panel data showed that the effect of online news consumption is strongest in autocracies and weakest in transitional regimes, contradicting my earlier hypothesis. Survey data does not allow for testing mechanisms of why protest participation is associated with higher online news consumption in authoritarian regimes.

In Paper 4, jointly with coauthors, I studied the relationship between populism and media consumption, focusing on how individuals with populist attitudes engage in selective exposure to different types of online news.

The analysis incorporates theoretical frameworks that link populist attitudes to media consumption patterns, while acknowledging the diverse landscape of digital media where traditional news sources compete with digital-born outlets and social media platforms. Hypotheses are formulated to test the relationship between populist attitudes and an individual's exposure to various news types. My initial hypotheses propose that individuals with stronger populist leanings will demonstrate less exposure to legacy press and public service media but more exposure to tabloid press and hyper-partisan news. The study also considers country-level variations in media systems and political contexts across six Western democracies, in order to better understand how these factors influence selective exposure among citizens with populist attitudes.

The study contributes to ongoing debates regarding the impact of populism on democracy, particularly in the context of media consumption. It addresses the question of whether citizens with populist attitudes exhibit selective exposure when consuming online news, and considers both the demand side (individual attitudes influencing media choices) and the supply side (types of news sources available). The research questions explore how populist attitudes influence exposure to different news types such as legacy press, public broadcasters, tabloid press, and hyper-partisan news sources.

2.4. Summary

The thesis examines political protest participation, highlighting its importance in expressing dissent, advocating for causes, and raising awareness about issues. Paper 1 notes that protest participation varies significantly by political regime, with authoritarian regimes often pushing protests underground. Social media and encrypted messaging play crucial roles in organizing and mobilizing protests, despite state repression tactics. Paper 1 of the thesis draws inspiration from the Arab Spring, exploring the impact of online news consumption on protest behavior and demonstrating its significant role in mobilizing public participation in both autocratic and democratic contexts.

The second part of the thesis focuses on the electoral behavior of populist radical right (PRR) voters, who support parties with nationalist, anti-immigration, and anti-establishment agendas. Paper 2 explores the policy preferences of these voters, highlighting their strong focus on immigration issues over other policies. This uncompromising stance has significant implications for democracy, as it can lead to single-issue voting behavior that political parties might exploit. This part of my thesis suggests a need for deeper research into the dynamics between online news consumption, social networks, and political activism, particularly in understanding how digital media shapes political participation and attitudes.

Populist attitudes have gained significant attention due to the rise of populist parties on both the right and left in Western democracies. These attitudes reflect dissatisfaction with representative democracy but differ on issues such as immigration and income redistribution. Research on populist electorates highlights both similarities and differences between radical right and left voters, with a common focus on anti-elitism and distrust of political systems.

Paper 3 explores the link between political attitudes and online behavior by using web tracking data to predict these attitudes. The study establishes connections between personality traits and political attitudes, as well as between personality traits and online behavior. It demonstrates how political attitudes can be moderately predicted from website choices, with interest in politics being the most confidently identifiable. However, web tracking data still has limitations in predicting specific political attitudes compared to traditional survey methods. The research suggests that while online behavior can provide some insights into political attitudes, surveys remain the most reliable approach for measuring these attitudes.

Media, both online and traditional, play a vital role in shaping political landscapes by influencing public opinion, framing political issues, and setting the agenda for public discourse. Media outlets highlight specific topics, prioritize events, and provide interpretive frameworks that shape public perception. This agenda-setting function can bring attention to particular problems or narratives, potentially swaying public opinion and influencing political priorities.

This PhD dissertation includes two papers studying the role of media in political

discontent, focusing on protest participation and populist attitudes. Paper 1 examines the relationship between online news consumption and protest participation, using data from the World Values Survey panel across 49 countries. The analysis reveals that online news consumption is more strongly associated with protest participation in autocracies than in transitional regimes. Paper 4 investigates the link between populism and media consumption, exploring how individuals with populist attitudes selectively expose themselves to different types of online news. The study finds that those with stronger populist leanings tend to prefer tabloid and hyper-partisan news sources over legacy press and public service media. These insights contribute to ongoing debates on the impact of populism on democracy, particularly in the context of media consumption.

Chapter 3.

Data & Methods

3.1. Types of data in computational social science

In political science, there are two prevalent types of data are **self-reported data** and **observational data**. Below, I offer a brief overview of these two data types from a methodological perspective, highlighting their advantages, limitations, and applications. Additionally, I will discuss **data obtained from causal inference studies**, which can encompass both self-reported and observational data.

3.1.1. Self-reported data

Self-reported data implies that the data is generated based on reports from the object of study themselves. This type of data is typically collected through surveys, interviews, or other direct forms of inquiry, where respondents are asked to provide information about themselves, their beliefs, or their actions (Gonyea, 2005). For example, researchers might ask individuals to rate their satisfaction with a political leader (Newman, 2003), report their voting behavior in an election (Leigh, 2005), or express their opinions on various policy issues (Gilens, 2001). The reliance on self-reported data requires a degree of trust in the respondents' accuracy and honesty in reporting their experiences and attitudes. Researchers carefully design survey questions to acquire meaningful responses and consider potential biases. For example, social desirability bias, where respondents may provide answers they perceive as socially acceptable rather than reflecting their true beliefs or behaviors (Krumpal, 2013).

Self-reported data determines research design and methodology that researchers use in their studies. If a study uses self-reported data, it will be utilizing survey methodology. It could be executed with a single wave or multiple wave surveys to account for temporal effects (Lum et al., 2023) or cross-sectional survey to account for contextual effects (Inglehart and Welzel, 2004).

Overall, self-reported data provide direct insights into individuals' subjective experiences and perceptions, allowing researchers to explore complex psychological and attitudinal phenomena. However, they are subject to biases and limitations, such as memory errors or response bias, which can affect the accuracy and reliability of the data (Rosenman et al., 2011).

3.1.2. Observational data

Observational data is collected from respondents unobtrusively without significant involvement of the objects of study into active data generation. Instead of relying on individuals' self-reports, observational data capture behavior or phenomena as they naturally occur in real-world settings. With development of the internet industry, many researchers utilize observational data available online for their studies. In political science, observational data can include a wide range of sources. For example, researchers might analyze patterns of voter turnout using official election records (Ghitza and Gelman, 2020), track public opinion on social media platforms through text analysis (Murphy et al., 2014), or examine patterns of online news consumption using web tracking data (Praet et al., 2021). This kind of data can be collected through web tracking mechanisms such as cookies, and log files. These tools record users' browsing behaviors, including the websites they visit, the pages they view, the duration of their visits, and their interactions with online content (Hohenberg et al., 2024a). Political scientists also can analyze web tracking data to understand patterns of information consumption related to political news (Guess et al., 2020), policy issues (Pu Yan and Stier, 2022) among others.

Web tracking data also offers data on search engine queries (Urman and Makhortykh, 2023), social media (Barbera et al., 2019), and forums like Reddit (Amaya et al., 2021). Analysis of search trends and keywords can reveal public interest in political topics, policy issues concerns, and emerging trends in political discourse (Scharkow and Vogelgesang, 2011). Researchers can use tools like Google Trends to explore patterns in search queries related to elections, policy debates, political events, and public figures (Mellon, 2013). Observational data from social media platforms generates digital trace data through users' interactions, posts, comments, shares, and likes (Kosinski et al., 2013). Researchers can use social media monitoring tools and APIs (Application Programming Interfaces) to collect and analyze data from platforms like X (former Twitter), Facebook, Instagram, and YouTube (Tucker et al., 2018). This data can provide insights into public sentiment, political discussions, engagement with political content, and the spread of political misinformation or propaganda (Allcott et al., 2019). Finally, individuals leave other digital footprints such as comments on forums (Wright and Street, 2007), participation in online polls (Hargittai and Karaoglu, 2018), and engagement with political advertisements contribute to observational data (Fowler et al., 2021b). Mining and analyzing these digital footprints can provide insights into public opinion, attitudes towards political candidates or parties, and the impact of digital campaigning strategies on voter behavior (Zhuravskaya et al., 2020).

Availability web tracking data to third parties, however, raises ethical and privacy concerns. Researchers usually follow ethical guidelines, obtain necessary permissions, anonymize data where appropriate, and protect user privacy and confidentiality when working with observational data from online sources (Englehardt et al., 2015). Another limitation of observational data is potential confounding variables or sources of bias

when interpreting the results. Some observational data sources can still be visible to individuals and therefore potentially alter their behavior (e.g., social media behavior in authoritarian countries). When individuals opt in to a web tracking panel, they are aware that their online browsing history is collected for further research or their web browsing behavior is tracked (Hohenberg et al., 2024b).

3.1.3. Causal Inference

In recent years, there has been a growing interest in causal inference within political science research. Causal inference methods can be used with both of types of data self-reported and observational data. Experimental interventions, once primarily conducted in traditional settings, have gained prominence in online environments. This includes online field experiments, where interventions are implemented in digital platforms to observe their effects on political behavior and attitudes (Shmargad and Klar, 2019). Additionally, quasi-experimental designs, such as natural experiments, are increasingly being employed in online contexts to study causal relationships (Blackwell, 2013). Moreover, online surveys is a popular tool for conducting survey experiments in political science (Mutz and Kim, 2020). Survey experiments involve manipulating survey conditions or question wordings to observe their effects on respondent behavior or attitudes. Among these, conjoint survey experiments have gained popularity as a methodology to study policy preferences and electoral politics. By presenting respondents with hypothetical scenarios composed of different attribute levels, conjoint experiments provide insights into the relative importance of various policy attributes and their impact on voter decision-making (Hainmueller and Daniel J. Hopkins, 2014).

Overall, the application of causal inference methods in political science includes both experimental and observational data, with a particular emphasis on online setting (Imbens, 2024; Gangl, 2010). This trend reflects the increasing importance of digital platforms and methodologies in studying political behavior, policy preferences, and electoral politics.

3.2. Surveys

Survey methodology consists of a diverse range of data collection techniques used across various fields of research. Survey data can be acquired from multiple sources, including established survey panels, online surveys facilitated by academic or private panel providers (e.g., market research firms). In addition to these more common methods, scholars utilize survey experiments to gather data, often conducted online and occasionally integrated within broader survey frameworks. This introduction provides an overview of survey methodologies, highlighting its common usage in political science.

3.2.1. Established survey panels

Established survey panels provide longitudinal and cross-country population-based data, which is stored from various survey waves as open-source material accessible to academics for free. These panels typically survey groups of individuals who have agreed to participate in surveys on a regular basis. Alternatively, they may involve different respondents, provided the sample remains comparable. Managed by market research companies, academic institutions, or other organizations interested in specific demographics or target populations, these panels offer a valuable resource for data collection. To encourage participation, panelists often receive incentives such as cash, gift cards, or rewards points.

Such panels are frequently utilized for longitudinal studies or tracking changes in attitudes and behaviors over time (Silver and Dowley, 2000). With many panels being maintained for over a decade, they have established a reputation for providing high-quality survey data, particularly useful in studying political behavior and attitudes (Jowell et al., 2007). Furthermore, most established survey panels conduct surveys across multiple countries, enabling researchers to explore different political and cultural contexts and assess the robustness of their findings (Inglehart et al., 2000).

The most prominent survey panels in European comparative politics are European Social Survey (ESS)[1], European Values Study (EVS)[2], the Eurobarometer[3], and World Values Survey (WVS)[4]. ESS is a longitudinal cross-national survey that collects data on social and political attitudes, political behaviors, and values in European countries. It covers a wide range of topics, including politics, social cohesion, and well-being. EVS offers survey questions on social values, beliefs, and attitudes across European countries, covering a wide range of topics such as religion, politics, family, and economy. The Eurobarometer is a series of public opinion surveys conducted regularly for the European Commission. It covers a wide range of topics related to the European Union, including attitudes towards the EU, European integration, socio-economic issues, and public policy. The Eurobarometer surveys are conducted across the EU member states and sometimes in candidate countries or other partner countries. The WVS is a global research project that investigates social beliefs, values, and attitudes across more than 90 countries. It has conducted multiple waves of surveys since 1981, covering topics such as religion, politics, family, work, and societal norms. The WVS provides a cross-cultural understanding of changing values and their impact on societies worldwide.

Application

Established survey panels are used in political science research in several ways: (1) Established survey panels often facilitate **longitudinal studies**, allowing researchers to

1. https://www.europeansocialsurvey.org/
2. https://europeanvaluesstudy.eu/
3. https://europa.eu/eurobarometer/screen/home
4. https://www.worldvaluessurvey.org/wvs.jsp

track changes in political attitudes and behaviors over time with multiple survey waves (Van Oorschot and Finsveen, 2009). Because multi-wave surveys offer a "close to random" sample of respondents and even without surveying the same panelists, surveys like WVS allow to analyze trends, trajectories, and the stability of political attitudes and behaviors across time (Fairbrother, 2014). (2) EVS, ESS, WVS, the Eurobarometer operate across multiple countries, which enable **comparative analysis**. Researchers can compare political attitudes, public opinion on institutions, and behaviors across countries or regions to identify similarities, differences, and patterns in political dynamics (Davidov, 2008). (3) Survey programs such as European Elections Study are utilized to study **voter behavior**, propensity to vote and electoral preferences in political science. Electoral behavior surveys allow to examine factors influencing voting decisions, party identification, candidate evaluation, and turnout in elections at national levels of government (Schmitt et al., 2009). Finally, (4) established survey panels are common instruments in studying **public opinion** on political issues, policies, and elites. Each established survey panel includes a block of questions measuring support for specific policies or political parties, and analyze the factors that shape public opinion (Quaranta, 2018).

Limitations

Despite many advantages such as accessibility, lower costs, longitudinal and multi-context data, established survey panels have limitations. **This panels are not timed for a specific political event** therefore researchers are limited in the choice of political events they can study with this data. In addition, the topic in this survey panels can be broad and lack specifics and nuances that research could achieve by conducting their own online surveys. And, as any other surveys, established panels suffer from **response bias**, where respondents may provide inaccurate or biased responses due to social desirability bias, where they tailor their answers to conform to societal norms or expectations (Agerberg, 2022). Additionally, response bias can occur if certain groups of people are more likely to respond to surveys than others, leading to skewed or unrepresentative data. This is especially an issue because established survey panels has notoriously low response rate (Lyness and Brumit Kropf, 2007). Another type of bias that is inherent to this kind of surveys is **measurement error**, which can arise from question wording, response options, or respondent interpretation. Poorly worded questions, ambiguous response categories, or leading phrasing can compromise the validity and reliability of survey data (Billiet and Matsuo, 2012). Finally, panel cross-sectional surveys are limited in their ability to capture complex phenomena or nuanced experiences. Certain topics, such as emotions, mechanisms, motivations, or deeply held beliefs, may be difficult to measure accurately through survey instruments alone, requiring complementary methods for in-depth exploration.

Nevertheless, established survey panels facilitate political science research by providing researchers with access to granular high-quality data on political attitudes, behaviors,

and opinions. They enable empirical research, theory testing, and evidence-based policy-making in various subfields of political science, including comparative politics, political behavior, public opinion, and political institutions.

3.2.2. Online surveys

Academic research utilized online experiments due to costs and time it consumes. Online surveys are provided by online platforms owned by private companies to conduct surveys. These companies typically have access to large pools of potential respondents who have opted into their panels. Researchers can specify their target demographics and other criteria, and the panel provider facilitates the distribution of the survey to eligible participants (Atkeson and Alvarez, 2018). This method offers convenience and scalability, as surveys can reach a large and diverse audience quickly. Unlike established longitudinal survey panels, online survey data contain self-selection bias. Therefore, scholars often use weighting to ensure that the sample is representative of the target population (Kreuter et al., 2009; Khazaal et al., 2014).

Online surveys offer several advantages for academic research: cost-effectiveness, convenience, accessibility to diverse populations, and real-time data collection and analysis (Wright, 2017). This makes this data collection method very popular in political science. Researchers can design and distribute online surveys using various survey platforms or software, tailor survey questions to their research objectives, and reach targeted demographic groups or populations of interest. Academic researchers utilize online surveys to collect data on a wide range of topics, including political attitudes, voting behavior, public opinion, policy preferences, and political participation (Weisberg et al., 1996). Online surveys are an especially popular data collection method, when a survey needs to be timed for a specific political even such as elections or protests.

Application

Since online surveys can be fielded quickly and timed for a specific political event, they are often used to study public opinion on political issues, candidates, parties, and government policies. Online surveys can gauge which political issues are most salient to the public at a given time. By asking respondents to rank or rate the importance of various issues (e.g., healthcare, the economy, immigration, etc.), researchers can identify the top concerns of voters (Ansolabehere and Puy, 2018). Surveys can also help to assess policy preferences regarding specific policy proposals from the government or political parties. Additionally, online surveys allow to measure public approval ratings of political leaders, including presidents, prime ministers, governors, and mayors (Newport and Saad, 2021). By regularly assessing approval ratings, researchers can track changes in public sentiment towards political figures over time. Additionally, survey conducted over time allow researchers to gauge the strength of support for political parties and assess trends in party loyalty among voters. Online surveys are also often used for polling, which

provide insight into public sentiment on contentious issues and inform public discussions and debates (Margolis, 1984).

Another large subfield that is extensively using online surveys is political behavior (Karp and Lühiste, 2016). Specifically, researchers study voting behavior and electoral preferences in elections at the local, national, or international levels using carefully timed online surveys. For example, pre-election surveys are conducted to assess voter preferences and intentions. Researchers ask respondents about their likelihood of voting, preferred candidates or parties, and key issues influencing their voting decisions. Hence, pre-election surveys can provide valuable insights into the electoral landscape and help predict election outcomes (Barber et al., 2014).

One more area of interest of this PhD thesis is political participation, which benefits from accessibility and affordability of online surveys. By using online surveys, researchers are able to study engagement in civic activities, protest movements, or online activism. Online surveys assess the extent of political participation by measuring respondents' involvement in voting, volunteering for political campaigns, or protests (Persson and Solevid, 2014). By quantifying participation levels, researchers can analyze trends and patterns in political engagement over time.

Online survey can also facilitate research for assessing social mobilization potential, how effective political organizations, advocacy groups, and social movements are in encouraging political participation (Sciarini and Goldberg, 2016). By using online surveys, researchers examine the impact of campaign outreach, community organizing, and mobilization strategies on individuals' likelihood to engage in civic activities or join protest movements. Moreover, survey findings inform policy decisions, advocacy efforts, and community organizing initiatives aimed at increasing political participation and civic engagement to promote a more engaged and participatory democracy (Brehm, 2009).

Online surveys can also measure political attitudes and policy preferences. Researchers design a survey to capture attitudes towards most salient political issues, which in tern can potentially predict or determine their policy preferences. In online surveys, respondents are asked to agree or disagree with some statements reflecting attitude towards immigrants, income redistribution, environmental policies, as well as democratic institutions (Kustov et al., 2021). Questions can also ask about satisfaction with the functioning of democratic processes, the responsiveness of government to citizen needs, and perceptions of political accountability and transparency as well as political knowledge (Kleinberg, 2022).

A large industry of online survey research revolves around political polarization and ideological divisions within societies, especially in the United States. Researchers assess attitudes towards political parties, ideological positions, and policy preferences, shedding light on the extent of polarization and its implications for democratic governance (Levin et al., 2021). In the European Union, online surveys are popular instrument to explore attitudes towards populist movements and leaders. Researchers investigate support for populist rhetoric, anti-establishment sentiments, and distrust of traditional

political institutions, providing insights into the rise of populist politics and its impact on democratic norms and practices (Geurkink et al., 2020).

Another significant area of interest in this PhD thesis is media consumption. Online surveys offer a valuable tool for examining patterns of media consumption and information-seeking behavior related to politics. Through these surveys, researchers can assess the sources of political information that individuals access, their trust in various media outlets, and their susceptibility to misinformation and propaganda. Data gathered through online surveys include individuals' media consumption habits, such as the types of media they use (e.g., television, radio, newspapers, social media), the frequency and duration of their media engagement, and the platforms or devices they utilize to access content (e.g., smartphones, computers, tablets) (Konitzer et al., 2021).

These surveys also allow researchers to analyze the size and demographic characteristics of audiences for different media outlets, including television programs, radio stations, newspapers, websites, and social media platforms. This information provides valuable insights for studies on media effects on political behavior (Kalogeropoulos, 2018). Furthermore, online surveys help assess public trust and credibility in various media sources, allowing researchers to measure individuals' perceptions of the reliability, accuracy, and fairness of news organizations, journalists, and media platforms. These surveys explore the factors that influence trust in the media, contributing to a deeper understanding of media dynamics (Kalogeropoulos et al., 2019; Vermeer et al., 2022).

Limitations

Online surveys rely on non-random samples, which can introduce **sampling bias** (Cassese et al., 2013; Bell and Gift, 2023). If the sample is not representative of the population of interest, the survey results may not accurately reflect the attitudes, opinions, or behaviors of the broader population (Walgrave et al., 2016). Online survey findings may not be generalizable beyond the specific context or population studied (Kenett et al., 2018). Results obtained from one sample or setting may not apply to other populations or contexts, **limiting the external validity** of survey research.

Online surveys also may not fully capture the complexities of social and cultural contexts, leading to misinterpretation or oversimplification of respondents' attitudes or behaviors. Cultural differences in language, values, and norms can affect how survey questions are understood and interpreted by respondents.

Additionally, online surveys provide a snapshot of attitudes, opinions, or behaviors at a specific point in time, but they may not capture changes or fluctuations over time. Longitudinal studies can address this limitation to some extent, but surveys are limited in their ability to capture dynamic processes and temporal trends (Hug, 2003).

Finally, online surveys are susceptible to self-selection bias, where individuals who choose to participate may differ systematically from those who do not. This bias can affect the representativeness and reliability of online survey data (Blasius and Brandt, 2010).

3.2.3. Survey experiments

Survey experiments involve incorporating experimental design into the survey design to test hypotheses or causal relationships (Sniderman, 2018). This could involve randomizing different versions of the survey questionnaire to different groups of respondents to measure the effect of different question wording or formatting on responses. Survey experiments allow researchers to draw causal inferences and better understand the underlying mechanisms driving survey responses (Acharya et al., 2018). However, they require more careful planning and analysis compared to traditional survey methods.

Methodology

In survey experiments, participants are randomly assigned to different experimental conditions or treatment groups. This randomization ensures that any observed differences between groups can be attributed to the experimental manipulation rather than pre-existing differences among participants (Sniderman and Druckman, 2011). Researchers manipulate one or more independent variables (e.g., question wording, information provided, framing) in the survey instrument to create different experimental treatments. These manipulations are designed to test hypotheses about causal relationships between variables of interest. In addition to treatment groups, survey experiments often include a control group that receives no experimental manipulation or receives a placebo treatment. The control group serves as a baseline for comparison, allowing researchers to assess the effects of the experimental treatment relative to no treatment. Researchers measure the effects of the experimental manipulation on dependent variables (e.g., respondent attitudes, behaviors, perceptions) through survey responses or behavioral outcomes (Kosmidis and Theocharis, 2020; Zhirkov, 2022).

A special case of survey experiments are conjoint experiments, also known as conjoint analysis or discrete choice experiments (Bansak et al., 2021). Conjoints are a research methodology used in political science and other social sciences to study how individuals make decisions when presented with multiple attributes or features that vary simultaneously (Leeper et al., 2020). Conjoint experiments simulate real-world decision-making scenarios by presenting respondents with hypothetical alternatives composed of different attribute levels, and then measuring their preferences or choices among these alternatives.

Conjoint experiments involve manipulating multiple attributes or features of hypothetical alternatives that are relevant to the decision-making process. These attributes can represent policy options, candidate characteristics, political platforms, or other factors of interest in political science research (Christensen and Saikkonen, 2022). Each attribute in the conjoint experiment consists of multiple levels or values. For example, in a study on candidate evaluation, attributes might include political ideology (e.g., liberal, conservative) (Kirkland and Coppock, 2018) or policy positions (e.g., stance on healthcare, immigration) (Hainmueller and Daniel J Hopkins, 2015; Scott F Abramson

et al., 2022a).

Researchers design the conjoint experiment by creating hypothetical alternatives that vary systematically across the selected attributes and levels. This design allows for the estimation of the relative importance of different attributes and the evaluation of how changes in attribute levels influence respondent preferences or choices. Participants in the conjoint experiment are presented with choice tasks where they are asked to evaluate and make choices among alternative scenarios consists of different attribute levels. By systematically varying attribute levels across choice tasks, researchers can infer respondents' preferences and trade-offs among different attributes (Scott F. Abramson et al., 2022b). The data collected from the conjoint experiment are analyzed using statistical models such as linear models, multinomial logit or hierarchical Bayesian models (Egami and Imai, 2018). These models estimate the relative importance of each attribute and the utility or preference weights associated with different levels of each attribute.

Applications

Survey experiments are often used in political science to study various aspects of political behavior. For example, voter decision-making, candidate evaluations, or political participation (Horiuchi et al., 2020). By manipulating factors such as candidate characteristics, campaign messages, or policy information, researchers aim to understand the effects of these factors on voters' behavior (Christensen, 2020). Essentially, survey experiments are used to investigate how different frames or presentations of information affect public opinion on political issues or policies.

Another common application of survey experiments is testing hypotheses about the impact of framing effects, media coverage, or persuasive messaging on public attitudes and policy preferences (Mukerjee and Yang, 2021). Researchers manipulate factors such as policy information, messaging strategies, or communication channels to assess their impact on public perceptions, support for policies, or policy outcomes (Bowen et al., 2023). As a part of testing media effects, survey experiments are used to assess the effectiveness of political campaign strategies, including advertising messages, candidate appeals, or campaign tactics (Dai and Kustov, 2022).

Limitations

Although survey experiments are useful instruments for understanding causal relationships between variables, they come with several limitations. The major issues are sample bias, including non-representative samples and self-selection bias, which limit the generalizability of findings. Additionally, there are measurement issues such as response bias, question wording effects, and order effects can introduce significant biases in results. Survey experiments also lack the real-world context (Hainmueller et al., 2015) and can be conducted in artificial settings, which limits external validity and the ability to apply findings to real-life situations (Barabas and Jerit, 2010). Internal validity can also be

compromised by confounding variables and manipulation check failures (Mummolo and Peterson, 2019). Moreover, data analysis in survey experiments can be complex, requiring sophisticated techniques to address various biases and interpret nuanced findings accurately. Simplified scenarios used in surveys may lead to oversimplified conclusions, failing to capture the full spectrum of the phenomena being studied. Finally, ethical considerations, such as the use of deception and ensuring informed consent, present further challenges.

3.3. Web tracking

3.3.1. Methodology

Web tracking data is collected via tracking users browsing histories and administered by private market research firms or academic institutions. Usually, web tracking panel consists of respondents who regularly respond to surveys. Tracking companies invite respondents to install the tracking tools or plug-ins on their browsers and smartphones for a financial incentive. Because of high level of sensitivity of this data collection method, tracking companies comply with data protection regulations such as the General Data Protection Regulation (GDPR) in the European Union (Papadogiannakis et al., 2021). Moreover, panelists have control and transparency over their data. Participants have the possibility to pause the tracking tools at any time. The tracking tools would then be interrupted for 15 minutes. The tracking plug-in monitors users' browsing activities, such as the websites they visit, the pages they view, the time they spend on these pages, and their interactions with online content (Hohenberg et al., 2024a).

However, despite being observational, this type of data still has some limitations. Panelists can always pause the tracking if they do not want to share sensitive information they disclose when browsing on the Internet. For example, when they make financial transactions or visiting websites that are related to socially undesirable activities. The data is also has limited access to mobile browsing due to technical restrictions imposed by phone providers and operational system like Apple OS or Android. Finally, the respondents are in general aware of tracking and hence can alter their browsing behavior.

When political scientists embark on the journey of web tracking data analysis, they should perform a few quality control checks. In a collaborative Paper 4, I assessed the quality of web tracking data by comparing the behavioral patterns and privacy attitudes of the panel I used with more established once.

I use the web browsing histories of participants recruited by Netquest, a market research firm, which maintains online access panels in Germany and other countries. Netquest utilizes algorithms to anonymize personally identifiable information, ensuring privacy. In the paper, I focused on the web browsing activities of 1,003 individuals residing in Germany between mid-March and mid-June 2019. My focus was primarily on desktop users because desktop tracking provides more detailed data, allowing for a

precise measurement of variable of interest. On desktop devices, I retrieve full URLs, whereas on Apple smartphones, only the domain and duration were recorded. The dataset includes anonymized IDs, visited URLs, domains, and the time spent on each web page. I observed a total of 19,026,887 URLs from 96,093 unique domains, with an average of 18,000 URL visits per participant. Paper 3 specifically touches upon cumulative web browsing behavior to understand user actions, popular content, and navigation patterns therefore generalizability was crucial.

To ensure generalizability to the extend possible, together with coauthors I conducted tests to assess the representativeness of our collected data concerning the behavior of the general population. Given that our panelists were aware of being tracked, they might have adjusted their behavior accordingly. For instance, they could have increased visits to news websites to stay informed about political matters, or they might have become more cautious in revealing their political interests and preferences. Hence, to validate the data, I compared the visits made by the panelists to media websites with ground truth data obtained from the "Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern e.V." (IVW), which is an audit bureau of media circulation in Germany. The correlation between the ranking of news sites visited by our German tracking panelists and the IVW data is notably strong ($p = 0.73$). These assessments bolstered our confidence in the accuracy of our tracking data, indicating that it offers a reasonably accurate depiction of the websites visited by internet users in Germany.

In addition, I evaluate the extent to which tracking panelists' privacy attitudes diverge from panelists who participate in surveys but do not have tracking tools installed. To identify a potential "opt-in bias", I implemented the same privacy attitude battery in a sample of German participants drawn from the regular online access panel of the market research company without web tracking. In total, I sampled 1,000 participants and matched German population margins for gender, age, and education. Respondents have been presented with the following statements and asked about their (dis)agreement on a five-point scale: "Personalized advertising makes me afraid"; "I am concerned about how much data there is about me on the Internet"; and "My privacy on the Internet does not matter to me." I observed minor differences in the privacy attitudes of online panelists with and without web tracking technology installed, which brings the results of this paper closer to generalizability.

Furthermore, I assessed the divergence in privacy attitudes between tracking panelists and participants who engage in surveys but do not have tracking tools installed. To investigate potential "opt-in bias," I administered the same privacy attitude questionnaire to a sample of German participants drawn from the standard online access panel of the market research company, excluding web tracking features. I selected 1,000 participants, matching gender, age, and education to align with German population demographics. Participants were presented with statements reflecting privacy issues and concerns. The results of this comparison are also highlighting minor differences in privacy attitudes between online panelists with and without web tracking technology. These findings further

contributed to the generalizability of the results presented in Paper 3.

3.3.2. Combining surveys and web tracking data

Combining web tracking data and surveys can help gaining the link between user online behavior and attitudes, which is hard to measure online (Munzert et al., 2024). Web tracking data is passive data about web sites the user visits, how many times and how long they stay on a single page.[5] Surveys, on the other hand, gather self-reported data directly from users through structured questions. Additionally, surveys can capture user demographics, preferences, opinions, satisfaction levels, and other subjective information. Combining these types of data makes the research more nuanced and multidimensional and therefore is able to unpack unobservable links between online behavior and offline behavior.

Web tracking captures the web site respondents visit and surveys capture attitudinal and opinion-based data, revealing mechanisms of why users engage in specific behaviors, their motivations, and preferences. By combining behavioral and attitudinal data in my research I aimed for gaining a more holistic understanding of user behavior and decision-making processes.[6]

Although not used in my research, there are two more benefits of combining of survey and web tracking data. It is more nuanced segmentation and longitudinal analysis. By integrating web tracking data (e.g., user behavior segments based on browsing patterns) with survey responses (e.g., demographic segments, preferences), researchers can create nuanced user segments for targeted analysis (Stier et al., 2020). This segmentation helps identify patterns, trends, and preferences among different user groups. Insights from combined data can inform researchers about policy agenda, unemployment status, and policy preferences indicators. Combining longitudinal web tracking data (e.g., trends over time) with periodic surveys allows researchers to track changes in user behavior, preferences, and attitudes over time. This longitudinal approach helps identify trends, seasonal effects, and evolving user needs as well as robustness of the findings.

In my work, I combined web tracking data with surveys to learn how media consumption is linked to populist attitudes. Traditional survey-based approaches, which rely on self-reported media consumption, are prone to biases and recall limitations (Andrew Guess and Tucker, 2019). This often leads to an overrepresentation of socially desirable

5. One type of web tracking data, which I do not cover in my research, is browsing patterns (click behavior, time spent on pages, and navigation paths). This data offers detailed insights into user engagement with digital content, website usability, and conversion metrics, which rather related to user experience (UX) research rather than to political science research. However, there are studies that focus on predicting health conditions based on browsing patterns (Bach and Wenz, 2020).

6. Other research studies used combining web tracking data with survey responses to validate findings based on surveys only. For example, if web tracking data shows a high number of visits to a specific web page, survey questions can be used not only to understand the mechanisms behind those frequent visits and why users are visiting those pages but also validate what is already known such as survey-based measures of media consumption (Andrew Guess and Tucker, 2019).

activities, such as consuming high-quality news. Additionally, these surveys tend to have a limited scope, potentially missing less popular sources favored by individuals critical of mainstream media.

To address these issues, together with coauthors I used more precise methods like web tracking data, which records actual website visits. Web tracking provides detailed insights into user behavior and audience networks but lacks individual-level attributes and political attitudes. The challenge is to link web tracking data with survey data to gain a nuanced understanding of media consumption patterns, especially regarding political topics like populism, which is hard to measure in the first place.

In a coauthored paper, I introduce an improved research design that combines surveys with "passive" web browsing tracking. This method aims to reduce self-report biases and offer a comprehensive view of individual attributes and predispositions. Additionally, by analyzing web browsing data across multiple countries, which is also available in the paper, the study enhanced the understanding of selective exposure across different media landscapes and political attitudes, extending beyond specific contexts like the U.S. presidential election.

When working with web tracking data to measure media consumption, I faced significant challenges due to the large sets of unstructured data produced by web tracking techniques. Unlike traditional media formats like newspaper articles, which are more straightforward for content analysis, online data requires more complex approaches. Most studies on news consumption using passive tracking data focus on the domain level (e.g., www.nytimes.com) rather than the content of individual articles. This method, while practical, has limitations as it does not allow researchers to determine which specific articles or what proportion of site visits are related to politics. Visitors to commercial broadcasters are less frequently exposed to political content compared to those visiting mainstream press, tabloid press, public broadcasting, and hyperpartisan news sites. Moreover, measuring the actual share of political content seen on social media platforms like Facebook and X is impossible for external researchers without access to individual news feeds. Therefore, these social networking sites are excluded from the analysis. By coding domains instead of individual articles, in the paper, coauthors and I acknowledge its limitation in not capturing the specific political content viewed by users.

3.3.3. Web tracking data and machine learning

Machine learning (ML) techniques can be used to process web tracking data, which can help to extract behavioral metrics and learn about voters' political behavior and attitudes (Grimmer et al., 2021). ML requires many features to make predictions or classifications and therefore can handle multi-dimensionality of web tracking data. Specifically, from web tracking data, domain level visits can be extracted for feature engineering and further deployment in ML models.

Techniques like feature importance ranking, correlation analysis, and dimensionality reduction (e.g., PCA) can be used to select or transform features and therefore obtain

meaningful societal insights (Balaji et al., 2021). In particular, ML methods can be used with web tracking data for (1) electoral politics to answer questions on how visits to specific domains is correlated with voting for a specific political party, what web sites voters visit before and after the elections and whether this can predict election outcome (Grimaldi et al., 2020), (2) for public opinion to answer questions on issue prioritization (Di Cocco and Monechi, 2022), (3) to investigate how media affect voting or issue salience (4) for political polarization and social media studies (Möller et al., 2020), (5) and, finally, to handle web tracking data for political campaigning and advocacy groups, where main objectives to examine the effect of campaign messages and public engagement (Fowler et al., 2021a).

There are two main approaches in ML, supervised and unsupervised learning among others (see a literature review in Alloghani et al., 2020). In supervised learning, historical web tracking data with labeled outcomes (e.g., user conversions, click-through rates, user segmentation) can be used to train predictive models (Burkart and Huber, 2021). Common supervised learning algorithms include decision trees, random forests, logistic regression, and gradient boosting models. Unsupervised learning techniques can be applied to uncover patterns, clusters, or anomalies in web tracking data without labeled or human-processed data (Jo, 2021). Clustering algorithms like k-means clustering, hierarchical clustering, or anomaly detection methods can identify user behavior patterns or segment users based on their interactions.

In social science, however, unsupervized learning is less common than supervised learning due to complexity of societal metrics and theoretical concepts. Patterns identified by unsupervised learning algorithms can be a product of spurious correlation or randomness while supervised learning is relying on the input from researchers and theoretical implications to guide the algorithm (Waggoner, 2020).

In my research, I focused on supervised learning approach, where I used an existing database of domain topics, which allowed for guided classification of website domains to predict political attitudes. The study utilized Webshrinker, an online service that categorizes website domains, to group domains from web tracking data collected from German participants. These domains were categorized into groups, including sports, blogs, dating, gambling, social media, travel, news, games, and health. Each identified category is used as a feature in the model for predicting political attitudes.

The analysis of its performance allowed to conclude that the model predicted interest in politics and attitudes toward democratic systems. Additionally, the analysis showed that interest in politics is linked to specific website visits, while trust in political institutions is more abstract and not associated with specific sites. The study also used variable importance method to explore what model features impacting the prediction of political attitudes. It found that general-purpose and consumption websites (e.g., business, shopping, real estate, finance) and media and communication websites play significant roles.

However, these are rather high level findings and does not offer mechanisms and

explanation why general-purpose websites have impact in the predicting model. This is where machine learning has limitations: ML algorithms allow to process large amount of data and is able to structure and classify data quickly but it faces a limitation, where the output needs theoretical underpinnings.

Nevertheless, in the paper 3, I suggest an interpretation that general-purpose and consumption websites suggest predictive patterns for issue-related and populist attitudes, possibly due to their links to social and economic factors. Media websites correlate with attitudes toward democracy, challenging the notion that media have limited effects on political behavior and highlighting the potential of ML models in this research. Entertainment and lifestyle websites did not strongly predict political attitudes, contradicting hypotheses that link economic frustration and populist attitudes. However, this further emphasizes the need for follow-up exploration of web tracking data and website domains to understand the mechanisms driving these predictions.

Because web tracking data consists of noise and website domains that are hard to classify, the model performance should always be tested. After training ML models on domain categories, together with coauthors I evaluated it using cross-validation. I also improved ML models iteratively by tuning hyperparameters, experimenting with different algorithms.

One of the main contributions of this paper is that it expands the political science literature by exploring the methodology and application of predictive modeling within the field of political science. It introduces an algorithm that combines web tracking and survey data for predictive modeling. The paper highlights the difficulty of identifying political attitudes from web tracking data. It presents two key implications. When analyzing attitudes on a latent left-right ideology scale, no observable differences in website visits were found among respondents with differing views on immigration or climate change policies. This supports the findings of Praet et al., 2021, suggesting that political polarization is not reflected in lifestyle choices but is limited to partisan news preferences. In contrast to Kosinski et al., 2013, which demonstrated that Facebook likes could be used to measure users' personality traits, this study's advanced ML models only found suggestive signals about individual attitudes based on website visit patterns. This implies that surveys remain the most reliable method for measuring attitudes.

One of the motivations for this paper was exploring if availability web tracking data and advanced ML algorithm should make us concerned about data privacy. When using web tracking data for ML, researchers and organizations ensure compliance with data privacy regulations (e.g., GDPR, CCPA). Additionally, researchers obtain user consent, ensure that the data is anonymized and encrypted, and handled securely overall to protect user privacy.

However, Paper 3 reveals that despite the vast amount of available data, only limited information related to political attitudes can be derived from individuals' browsing histories. Therefore, contrary to recent developments in digital privacy policies, my findings do not support the assumption that sensitive political information can be extracted

from digital trace data. This challenges the notion that such data could be used by advertising distributors like Google or by politicians for political microtargeting.

3.4. Summary

Self-reported data, gathered through surveys and interviews, relies on individuals' accuracy in reporting their beliefs and actions, providing many insights but susceptible to biases like social desirability bias. Observational data, collected unobtrusively from sources such as web tracking and social media, captures natural behavior and offers a rich dataset for political research, though ethical considerations around privacy are crucial. Increasingly, political science employs causal inference methods, including experimental and quasi-experimental designs, in both self-reported and observational data, leveraging online platforms to study political behavior and attitudes. These methods, such as conjoint survey experiments, allow researchers to manipulate variables and observe effects, offering nuanced understanding of policy preferences and electoral decisions.

This thesis focuses on surveys (panel data, online surveys, and survey experiments) and web tracking data (including in combination with surveys) as a primary data collection methods. Survey methodology includes diverse data collection techniques like established survey panels and online surveys, widely used in political science to study attitudes, behaviors, and public opinion. Established panels, such as the European Social Survey and World Values Survey, offer longitudinal and cross-country data, allowing for in-depth analysis of political dynamics over time and different contexts, though they face limitations like response bias and broad topic coverage. Online surveys, facilitated by private companies, are cost-effective, scalable, and useful for timely political studies but can suffer from self-selection bias and may not capture complex social contexts. Survey experiments, including conjoint experiments, manipulate variables within surveys to test causal relationships and hypotheses, offering valuable insights despite challenges like sample bias and lack of real-world context. Overall, these methodologies are crucial for political science, providing empirical data for understanding political behavior, public opinion, and media consumption.

Surveys ata can be advanced with web tracking data, which is collected by market research firms through tracking tools installed on users' browsers and smartphones. Web tracking data offers detailed insights into browsing activities, such as website visits. This data collection, compliant with regulations like GDPR, allows users to control their data by pausing tracking tools. Despite being observational, web tracking data has limitations, such as the ability to pause tracking during sensitive activities, limited mobile browsing access, and potential behavioral changes due to user awareness of tracking. Political scientists use this data to analyze media consumption patterns and their link to political attitudes, combining it with survey data for a comprehensive understanding. Paper 4 compares Netquest's web tracking data in Germany with survey responses to validate media consumption patterns and explore privacy attitudes.

Machine learning techniques further enhance the analysis by predicting political attitudes based on categorized website visits, although surveys remain essential for capturing nuanced political opinions. Paper 3 emphasizes the importance of ethical considerations and data privacy in handling web tracking data.

Chapter 4.

Discussion

4.1. Comparative analysis of findings

This thesis centers on computational methods for studying political discontent. In the Introduction, I proposed four research questions (RQ) aimed at investigating the role of survey methodologies and survey data in understanding political discontent. Additionally, I explored how new data sources, such as tracking data combined with machine learning algorithms, can further advance research on political protests, populism, electoral behavior, populist attitudes, and negative campaigning.

The first research question (RQ1) examines the role of survey data and surveys in general, particularly in light of new data sources available in political science, such as digital trace data, and the emergence of tools to collect large volumes of data. Paper 1 demonstrates that surveys remain powerful instruments for gathering public opinion and attitudes across different political regimes and contexts. Specifically, panel surveys are valuable for providing a comprehensive picture of political attitudes and public opinion in various contexts and during significant political events. However, self-reported data may carry biases, and survey data can be limited in establishing causal relationships between variables. Paper 1 highlights the connection between online news consumption and protest participation, yet the direction of causality remains unclear. To address this, I employed regression modeling to control for other factors and isolate the effect of online news consumption on protest participation. While this approach does not establish causality definitively, it provides a clearer understanding of the impact of online news consumption on participation. Thus, surveys continue to be valuable instruments for understanding general public opinion trends. However, the researchers should acknowledge the limitations of surveys and use them rather for research notes or as a preliminary research instruments that would support further investigation of the question of interest.

In Paper 2, I addressed the research question posed in research question 2 (RQ2), where I sought to explore a middle-ground solution for the limitations of surveys. Since surveys inherently struggle to establish causal relationships between variables, I examined what instruments could enhance their effectiveness. In the context of political discontent, establishing causal relationships is crucial, particularly during political protests or populist movements. It is important to understand the decision-making mechanisms of the electorate, such as why radical right voters support populist radical right parties,

how they make these decisions, and what motivates them.

While traditional surveys, such as panel or online surveys, can quickly test hypotheses and serve as preliminary research tools, they are insufficient on their own. Survey experiments, particularly conjoint survey experiments, elevate the capabilities of surveys. In Paper 2, I demonstrate how conjoint survey experiments can be used to disentangle the multidimensional decision-making process in populist radical right voting. These experiments provide insights into the causal effects of specific policy proposals on voting behavior. Importantly, all the conjoint survey experiments in Paper 2 are based on preliminary survey research, which informs the design of policy proposals and allows for the testing of their effects on voter choice.

One significant limitation of conjoint experiments is their reliance on hypothetical scenarios, effectively simulating elections. To address this, Paper 2 includes multiple conjoint experiments conducted in different political contexts, thereby enhancing the external validity of the findings. The next step would be to establish a pipeline for conducting survey experiments in a dynamic setting, allowing for repeated experiments throughout the year or over multiple years. This approach would capture time-series data and validate the findings over time.

In research question 3 (RQ3), I posit a question if web tracking methodology can replace surveys in studies of protests, populism or radical-right politics. Paper 3 and 4 offer a clear answer. Although providing large and rich amounts of data from web browsing histories, digital trace data has a limited capability to replace surveys and can be more valuable if used in tandem with self-reported data.

Indeed, observational data generated by users on social media, through web browsing or other digital trace data provides numerous opportunities for political scientists to study online political behavior, public opinion dynamics, digital activism, and the impact of digital technologies on democratic processes. In Paper 3, I suggest an approach to study political attitudes with web tracking data, which potentially may allow to measure political attitudes without surveys. Hence, by leveraging advanced data analytics techniques and adhering to ethical standards, researchers can harness the power of observational web tracking data to gain insights into the politics of discontent.

Nevertheless, combining web tracking data with surveys, as in Paper 4, allows researchers and organizations to gain a deeper understanding of user behavior, preferences, and experiences in digital environments. This integrated approach enables scholars to study protests and other topics in political discontent in more nuance on a larger scale.

Paper 3 and 4 also showed that working with web tracking data posit technical challenges such as complex data cleaning and data validation. Specifically, in Paper 3 I had to undertake a complex data processing approach to classify millions of URLs by using an external source of pre-classified domains. In Paper 4, together with coauthors I show that web tracking data can help to measure media consumption, it was still required to validate the data with the established data sources in Germany to ensure that the behavior of the used web tracking panel in the paper is compatible with the general

population.

Nevertheless, despite technical challenges, measuring media consumption through web tracking data and combining it with surveys provides valuable insights into broader patterns of news consumption across various news sources and its link to populist attitudes. Web tracking data offers a more nuanced measure of news consumption, free from measurement error and respondent biases. At the time of publication, Paper 4 was one of the first attempts to measure media consumption on a large scale, involving multiple countries and linking it to survey data measuring political attitudes.

However, it is crucial to handle web tracking data ethically, ensure data privacy, and use appropriate analytical techniques when working with sensitive data such as political views and preferences. Web tracking data raises significant privacy concerns, particularly around the invasion of privacy through the collection of personal data and behavioral profiling without explicit user consent. This data can lead to security risks, such as breaches that expose sensitive information, and the lack of transparency and control over how data is stored and shared exacerbates these risks. These concerns underscore the need in academia and industry for stronger transparency, user control, and potentially regulations.

In research question 4 (RQ4), I propose examining the evolution of survey methodology, particularly how it adapts by integrating experimental designs and digital trace data, ensuring its continued relevance in research generally, and in the study of political discontent specifically. Papers 3 and 4 demonstrate that validation can be achieved using web tracking data and digital trace data. Surveys remain a primary method for validating scraped data, gauging public opinion on specific political preferences, and understanding attitudes toward political issues. In Paper 3, I attempted to rely solely on web tracking data. However, the findings clearly indicate that surveys are essential as a benchmark, a control source, and a means of collecting human-generated data. These papers highlight that combining the strengths of surveys with digital trace data is effective in studying populist attitudes and radical right behavior. Paper 4 further illustrates that integrating web tracking data with surveys as a primary methodology provides a more nuanced and precise measure of media consumption and other quantifiable concepts in the politics of discontent.

In Research Question 5 (RQ5), I suggest exploring survey methodologies and digital trace data in the context of generative AI, a rapidly advancing field that is capturing the attention of academics and research groups at universities. While the impact of generative AI and large language models on social science research is still uncertain, early studies suggest that these models can aggregate information available online and respond to questions based on current public sentiment. Tools like ChatGPT, which can answer questions as if they were human and even participate in conjoint survey experiments, selecting products that align with public benefit, pose a potential challenge to traditional survey methodologies and research that combines surveys with digital trace data. However, large language models are still limited by the nature of the text data

they process. They often focus on past events and struggle to capture fast-moving, dynamic developments. Therefore, human-generated data remains irreplaceable, especially for studying protest movements, populist movements, and other forms of political discontent.

4.2. Implications and contribution

The implications of these findings span several dimensions: methodological, practical for further research, and ethical. Methodologically, the primary implication lies in the importance of combining digital trace data with more conventional survey instruments. This approach helps validate findings derived from large datasets, machine learning, pattern recognition, and automated behavioral modeling. This is particularly relevant in research on political discontent, where voter behavior, electoral decisions, and political protesting involve complex decision-making processes.

The implications of Paper 1 suggest that while relying solely on survey data can provide a valuable overview of public opinion across various political contexts and cultures, it is limited in establishing causal relationships between variables. Paper 2 advances this by introducing an experimental setting to survey research, allowing for a more precise understanding of decision-making patterns. This approach offers greater clarity on what drives radical right behavior and how radical right voters differ from mainstream or left-leaning voters. Conjoint survey experiments, as demonstrated in this paper, are particularly effective in establishing causal mechanisms between candidate choice and the factors that drive that choice.

Similarly, Paper 5 contributes to the understanding of individual electoral behavior by showing how survey experiments can reveal complex, multidimensional decision-making processes among political elites. Paper 3, which relies solely on web tracking data, tests the limits of this data and demonstrates that, despite its power, it still benefits from being supplemented with survey data. Paper 4 illustrates that combining these two data sources—surveys and web tracking—can further enhance research on populism, providing more nuanced and robust findings.

This thesis also underscores the ethical implications of research based on online digital trace data. Academia, for the most part, operates as an unregulated field of research. However, some institutions have established review boards to ensure ethical practices, particularly regarding the publication and accessibility of online digital trace data or web tracking data. It is crucial to ensure that such data is not made accessible to interest groups, especially political entities that might exploit it. The predictability of sensitive data, such as political ideology or policy preferences, raises significant ethical concerns. Without regulations, the availability of web tracking data can lead to significant risks, including discrimination through targeted advertising or price manipulation, the erosion of online anonymity, the stifling of free expression, and the potential for unfair treatment. Therefore, it is essential to establish safeguards to prevent misuse and protect the privacy

of individuals whose data is being analyzed.

4.3. Future research directions

This doctoral thesis comprises five papers that utilize surveys, survey experiments, web tracking data, and machine learning algorithms to explore political discontent. While these papers cover major methodologies in political science, they also highlight several opportunities for future research.

First, to better study political protests, surveys should be more dynamic. Research involving repeated surveys conducted before, during, and after protests could provide a more comprehensive and robust understanding of the causes of political discontent and the drivers of political unrest. This approach should also be applied to survey experiments and web tracking data. Overall, time-series data offers a valuable method for validating findings and conducting robustness checks, which many studies on political discontent could benefit from.

Another promising research direction involves the need for more advanced tools for processing large datasets, particularly in the context of web tracking data. The lack of standardized web scraping tools and best practices for handling vast amounts of data can result in findings that are noisy and difficult to interpret. In general, web tracking data moves research toward predictive modeling rather than mere explanation. However, the study of challenging-to-predict phenomena, such as protest participation or radical right voting behavior based on digital trace data, remains a largely unexplored area in political science.

Additionally, a deeper analysis of URLs and the actual content seen by participants is needed. Applying word segmentation to this data gives more details on what exactly users saw while visiting a specific domain and how these more fine-grained measures relate to political attitudes. Furthermore, with larger samples, better representation of URLs beyond just domains, alternative continuous measures of populist attitudes and media consumption, and various model specifications, including more extensive hyperparameter configurations, we expect our findings to become more accurate and robust. Our findings might also change over time, so we provide the algorithm for future research replication.

Finally, while all five papers address questions about how radical right voters make decisions, who participates in political protests, what influences political participation, and what predicts political attitudes and the drivers of negative political campaigns, they do not delve into the underlying mechanisms. For instance, why is online news consumption associated with political protest participation? Why do radical right voters exhibit distinctive candidate selection behaviors, often driven by single issues? Why are the political attitudes of radical right voters more predictable from web tracking data compared to those of mainstream voters? About mechanisms: For example, theoretically, hotel and flight booking platforms can be a proxy of cosmopolitan or, exactly

opposite, nationalist orientations because it is important where exactly the respondent travels; visits to gambling websites can be because respondent has extra budget or, the opposite, lack of financial flexibility; visits to job search websites may be a sign of unemployed status or, the opposite, it could be a routine procedure for a professional to stay sharp in the profession; real estate websites might be visited by tenants as well as by owners. Consequently, our article rather focuses on methodological advantages of web tracking data for predicting political attitudes, which may facilitate further studies that are using web tracking data, including the study of mechanisms. Studying these mechanisms represents another significant avenue for future research, offering insights into why specific patterns in political discontent emerge.

Chapter 5.

Conclusion

This doctoral thesis presents an analysis of computational methods, ranging from surveys to web tracking, for studying political discontent such as protests and populism. The research demonstrates that political discontent manifests in various forms, from specific political behaviors like protest participation to more vaguely defined attitudes such as populist sentiments. Consequently, the choice of methodology becomes crucial in unraveling the complex factors that drive both political discontent and how dissatisfied citizens make electoral decisions.

The first key finding is that even large-scale survey panel data, combined with advanced regression modeling, can only offer a high-level, non-causal relationship between protest participation and its drivers. One potential solution is to adopt a more focused approach, investigating voter discontentment on a granular level but still at a large scale. This thesis demonstrates that meticulously designed survey experiments conducted across multiple countries can strike that aforementioned balance between granular precision and breadth of scope, by acting as powerful research design for testing specific aspects of electoral behavior among discontented voters. These experiments effectively isolated the single-issue voter behavior typical of radical-right supporters — a finding that was both surprising and significant.

However, while survey experiments are invaluable, they are still not a one-size-fits-all methodological solution capable of addressing the full range of research questions surrounding political discontent. In certain circumstances, they can be too slow to design and lack external validity. To address these limitations, this thesis includes two papers that apply web tracking data and machine learning (ML) to the study of discontented voters. However, the most sophisticated ML algorithms were only moderately successful in predicting common voter attitudes even based on rich web browsing histories. However, using web tracking data to measure behavioral metrics offers a more effective solution, as it avoids the biases inherent in self-reported data and delivers more convincing findings in the political discontent literature.

While utilizing new methodological tools, this thesis cautions against overoptimism when novel data sources like web tracking and predictive modeling with ML algorithms become more accessible. While these new approaches hold great promise, they should not be seen as a silver bullet that can solve all the challenges inherent in social science research methods.

In conclusion, my dissertation underscores the need for specificity in research questions and the value of a diverse methodological toolkit. While new techniques like web tracking and machine learning offer exciting possibilities, they cannot wholly replace traditional methods like surveys, which are still essential for capturing human opinions and attitudes. My research demonstrates that combining methodologies, rather than committing to one, leads to more robust and nuanced findings.

Bibliography

Abramson, Scott F, Ko1.85mmcak, Korhan, and Magazinnik, Asya. 2022a. "What do we learn about voter preferences from conjoint experiments?" *American Journal of Political Science* 66 (4): 1008–1020.

Abramson, Scott F., Kocak, Korhan, and Magazinnik, Asya. 2022b. "What Do We Learn about Voter Preferences from Conjoint Experiments?" *American Journal of Political Science* 66 (4): 1008–1020. https://doi.org/https://doi.org/10.1111/ajps.12714. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/ajps.12714. https://onlinelibrary.wiley.com/doi/abs/10.1111/ajps.12714.

Acharya, Avidit, Blackwell, Matthew, and Sen, Maya. 2018. "Analyzing causal mechanisms in survey experiments." *Political Analysis* 26 (4): 357–378.

Ackermann, Kathrin, Zampieri, Eros, and Freitag, Markus. 2018. "Personality and Voting for a Right-Wing Populist Party – Evidence from Switzerland." *Swiss Political Science Review* 24 (4): 545–564. https://doi.org/https://doi.org/10.1111/spsr.12330.

Agerberg, Mattias. 2022. "Corrupted estimates? Response bias in citizen surveys on corruption." *Political Behavior* 44 (2): 653–678.

Akkerman, Agnes, Mudde, Cas, and Zaslove, Andrej. 2014. "How Populist Are the People? Measuring Populist Attitudes in Voters." *Comparative Political Studies* 47 (9): 1324–1353. https://doi.org/10.1177/0010414013512600.

Akkerman, Agnes, Zaslove, Andrej, and Spruyt, Bram. 2017. "'We the people' or 'we the peoples'? A comparison of support for the populist radical right and populist radical left in the Netherlands." *Swiss Political Science Review* 23 (4): 377–403.

Albanese, Giuseppe, Barone, Guglielmo, and De Blasio, Guido. 2022. "Populist voting and losers' discontent: Does redistribution matter?" *European Economic Review* 141:104000.

Allagui, Ilhem and Kuebler, Johanne. 2011. "The Arab Spring and the role of ICTs—introduction." *International Journal of Communication* 5:8.

Allcott, Hunt, Gentzkow, Matthew, and Yu, Chuan. 2019. "Trends in the diffusion of misinformation on social media." *Research & Politics* 6 (2): 2053168019848554. https://doi.org/10.1177/2053168019848554.

Alloghani, Mohamed, Al-Jumeily, Dhiya, Mustafina, Jamila, Hussain, Abir, and Aljaaf, Ahmed J. 2020. "A systematic review on supervised and unsupervised machine learning algorithms for data science." *Supervised and unsupervised learning for data science,* 3–21.

Amaya, Ashley, Bach, Ruben, Keusch, Florian, and Kreuter, Frauke. 2021. "New Data Sources in Social Science Research: Things to Know Before Working With Reddit Data." *Social Science Computer Review* 39 (5): 943–960. https://doi.org/10.1177/0894439319893305. https://doi.org/10.1177/0894439319893305.

Andrew Guess, Jonathan Nagler, Kevin Munger and Tucker, Joshua. 2019. "How Accurate Are Survey Responses on Social Media and Politics?" *Political Communication* 36 (2): 241–258. https://doi.org/10.1080/10584609.2018.1504840.

Ansolabehere, Stephen and Puy, M Socorro. 2018. "Measuring issue-salience in voters' preferences." *Electoral Studies* 51:103–114.

Aouragh, Miriyam and Alexander, Anne. 2011. "The Arab spring— the Egyptian experience: Sense and nonsense of the internet revolution." *International Journal of communication* 5:15.

Arceneaux, Kevin, Johnson, Martin, Lindstädt, René, and Vander Wielen, Ryan J. 2016. "The influence of news media on political elites: Investigating strategic responsiveness in Congress." *American Journal of Political Science* 60 (1): 5–29.

Arcuri, Luciano, Castelli, Luigi, Galdi, Silvia, Zogmaister, Cristina, and Amadori, Alessandro. 2008. "Predicting the Vote: Implicit Attitudes as Predictors of the Future Behavior of Decided and Undecided Voters." *Political Psychology* 29 (3). https://doi.org/10.1111/j.1467-9221.2008.00635.x.

Arzheimer, Kai. 2018. "Explaining Electoral Support for the Radical Right." In *The Oxford Handbook of the Radical Right,* edited by Jens Rydgren, 143–165. Oxford, UK: Oxford University Press.

Atkeson, Lonna Rae and Alvarez, R. Michael. 2018. "1Introduction to Polling and Survey Methods." In *The Oxford Handbook of Polling and Survey Methods.* Oxford University Press. ISBN: 9780190213299. https://doi.org/10.1093/oxfordhb/9780190213299.013.34.

Bach, Ruben L and Wenz, Alexander. 2020. "Studying health-related internet and mobile device use using web logs and smartphone records." *PloS one* 15 (6): e0234663.

Bachner, Jennifer and Hill, Kathy Wagner. 2014. "Advances in public opinion and policy attitudes research." *Policy Studies Journal* 42:S51–S70.

Bachrach, Yoram, Kosinski, Michal, Graepel, Thore, Kohli, Pushmeet, and Stillwell, David. 2012. "Personality and Patterns of Facebook Usage." In *Proceedings of the 4th Annual ACM Web Science Conference,* 24–32. WebSci '12. Evanston, Illinois: Association for Computing Machinery. ISBN: 9781450312288. https://doi.org/10.1145/2380718.2380722.

Bakker, Bert N., Schumacher, Gijs, and Rooduijn, Matthijs. 2021. "The Populist Appeal: Personality and Antiestablishment Communication." *The Journal of Politics* 83 (2): 589–601. https://doi.org/10.1086/710014.

Balaji, TK, Annavarapu, Chandra Sekhara Rao, and Bablani, Annushree. 2021. "Machine learning algorithms for social media analysis: A survey." *Computer Science Review* 40:100395.

Bansak, Kirk, Hainmueller, Jens, Hopkins, Daniel J, Yamamoto, Teppei, Druckman, James N, and Green, Donald P. 2021. "Conjoint survey experiments." *Advances in experimental political science* 19:19–41.

Barabas, Jason and Jerit, Jennifer. 2010. "Are survey experiments externally valid?" *American Political Science Review* 104 (2): 226–242.

Barber, Michael J, Mann, Christopher B, Monson, J Quin, and Patterson, Kelly D. 2014. "Online polls and registration-based sampling: A new method for pre-election polling." *Political Analysis* 22 (3): 321–335.

Barbera, Pablo, Casas, Andreu, Nagler, Jonathan, EGgan, Patrick J., Bonneau, Richard, Jost, John T., and Tucker, Joshua A. 2019. "Who Leads? Who Follows? Measuring Issue Attention and Agenda Setting by Legislators and the Mass Public Using Social Media Data." *American Political Science Review* 113 (4): 883–901. https://doi.org/10.1017/S0003055419000352.

Belanger, Eric and Aarts, Kees. 2006. "Explaining the rise of the LPF: Issues, discontent, and the 2002 Dutch election." *Acta Politica* 41 (1): 4–20.

Bell, Andrew M and Gift, Thomas. 2023. "Fraud in online surveys: evidence from a nonprobability, subpopulation sample." *Journal of Experimental Political Science* 10 (1): 148–153.

Billiet, Jaak and Matsuo, Hideko. 2012. "Non-response and measurement error." *Handbook of survey methodology for the social sciences,* 149–178.

Blackwell, Matthew. 2013. "A Framework for Dynamic Causal Inference in Political Science." *American Journal of Political Science* 57 (2): 504–520. https://doi.org/https://doi.org/10.1111/j.1540-5907.2012.00626.x.

Blasius, Jörg and Brandt, Maurice. 2010. "Representativeness in online surveys through stratified samples." *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique* 107 (1): 5–21.

Bowen, Tyler, Goldfien, Michael A, and Graham, Matthew H. 2023. "Public opinion and nuclear use: Evidence from factorial experiments." *The Journal of Politics* 85 (1): 345–350.

Brand, James, Israeli, Ayelet, and Ngwe, Donald. 2023. "Using GPT for Market Research." *Harvard Business School Marketing Unit, Available at SSRN,* no. No. 23-062, https://doi.org/http://dx.doi.org/10.2139/ssrn.4395751.

Brehm, John O. 2009. *The phantom respondents: Opinion surveys and political representation.* University of Michigan Press.

Burkart, Nadia and Huber, Marco F. 2021. "A survey on the explainability of supervised machine learning." *Journal of Artificial Intelligence Research* 70:245–317.

Bursztyn, Leonardo, Cantoni, Davide, Yang, David Y, Yuchtman, Noam, and Zhang, Y Jane. 2021. "Persistent political engagement: Social interactions and the dynamics of protest movements." *American Economic Review: Insights* 3 (2): 233–250.

Campbell, David E. 2013. "Social networks and political participation." *Annual Review of Political Science* 16:33–48.

Canovan, Margaret. 1999. "Trust the people! Populism and the two faces of democracy." *Political Studies* 47 (1): 2–16.

Cassese, Erin C, Huddy, Leonie, Hartman, Todd K, Mason, Lilliana, and Weber, Christopher R. 2013. "Socially mediated Internet surveys: Recruiting participants for online experiments." *PS: Political Science & Politics* 46 (4): 775–784.

Cerina, Roberto and Duch, Raymond. 2020. "Measuring public opinion via digital footprints." To appear, *International Journal of Forecasting,* https://doi.org/10.1016/j.ijforecast.2019.10.004.

Chou, Winston, Dancygier, Rafaela, Egami, Naoki, and Jamal, Amaney A. 2021. "Competing for Loyalists? How Party Positioning Affects Populist Radical Right Voting." *Comparative Political Studies* 54 (12): 2226–2260. https://doi.org/10.1177/0010414021997166.

Christensen, Henrik Serup. 2020. "How citizens evaluate participatory processes: A conjoint analysis." *European Political Science Review* 12 (2): 239–253.

Christensen, Henrik Serup and Saikkonen, Inga A-L. 2022. "The lure of populism: A conjoint experiment examining the interplay between demand and supply side factors." *Political Research Exchange* 4 (1): 2109493.

Clarke, Harold D and Acock, Alan C. 1989. "National elections and political attitudes: The case of political efficacy." *British Journal of Political Science* 19 (4): 551–562.

Cohen, Denis. 2020. "Between strategy and protest: How policy demand, political dissatisfaction and strategic incentives matter for far-right voting." *Political Science Research and Methods* 8 (4): 662–676.

Costello, Rory, Toshkov, Dimiter, Bos, Barend, and Krouwel, André. 2020. "Congruence between voters and parties: The role of party-level issue salience." *European Journal of Political Research,* https://doi.org/10.1111/1475-6765.12388.

Dai, Yaoyao and Kustov, Alexander. 2022. "The (in) effectiveness of populist rhetoric: a conjoint experiment of campaign messaging." *Political Science Research and Methods,* 1–8.

Davidov, Eldad. 2008. "A cross-country and cross-time comparison of the human values measurements with the second round of the European Social Survey." In *Survey research methods,* 2:33–46. 1. European Survey Research Association.

De Vreese, Claes H, Esser, Frank, Aalberg, Toril, Reinemann, Carsten, and Stanyer, James. 2018. "Populism as an expression of political communication content and style: A new perspective." *The International Journal of Press/Politics* 23 (4): 423–438.

Di Cocco, Jessica and Monechi, Bernardo. 2022. "How populist are parties? Measuring degrees of populism in party manifestos using supervised machine learning." *Political Analysis* 30 (3): 311–327.

Duch, Raymond M., Laroze, Denise, Reinprecht, Constantin, and Robinson, Thomas S. 2020. "Nativist policy: The comparative effects of Trumpian politics on migration decisions." *Political Science Research and Methods,* https://doi.org/10.1017/psrm.2020.33.

Dunaway, Johanna and Graber, Doris A. 2022. *Mass media and American politics.* Cq Press.

Egami, Naoki and Imai, Kosuke. 2018. "Causal interaction in factorial experiments: Application to conjoint analysis." *Journal of the American Statistical Association.*

Englehardt, Steven, Reisman, Dillon, Eubank, Christian, Zimmerman, Peter, Mayer, Jonathan, Narayanan, Arvind, and Felten, Edward W. 2015. "Cookies That Give You Away: The Surveillance Implications of Web Tracking." In *Proceedings of the 24th International Conference on World Wide Web,* 289–299. WWW '15. Florence, Italy: International World Wide Web Conferences Steering Committee. ISBN: 9781450334693. https://doi.org/10.1145/2736277.2741679.

Evans, D. C., Gosling, S., and Carroll, A. 2008. "What Elements of an Online Social Networking Profile Predict Target-Rater Agreement in Personality Impressions?" In *ICWSM.*

Fairbrother, Malcolm. 2014. "Two multilevel modeling techniques for analyzing comparative longitudinal survey datasets." *Political Science Research and Methods* 2 (1): 119–140.

Fatke, Matthias. 2017. "Personality Traits and Political Ideology: A First Global Assessment." *Political Psychology* 38 (5): 881–899. https://doi.org/10.1111/pops.12347.

Feldman, Stanley. 2003. "Values, ideology, and the structure of political attitudes."

Fowler, Erika Franklin, Franz, Michael M, Martin, Gregory J, Peskowitz, Zachary, and Ridout, Travis N. 2021a. "Political advertising online and offline." *American Political Science Review* 115 (1): 130–149.

———. 2021b. "Political Advertising Online and Offline." *American Political Science Review* 115 (1): 130–149. https://doi.org/10.1017/S0003055420000696.

Gangl, Markus. 2010. "Causal Inference in Sociological Research." *Annual Review of Sociology* 36 (Volume 36, 2010): 21–47. https://doi.org/https://doi.org/10.1146/annurev.soc.012809.102702. https://www.annualreviews.org/content/journals/10.1146/annurev.soc.012809.102702.

Gauchat, Gordon. 2018. "Trust in climate scientists." *Nature Climate Change* 8 (6): 458–459. https://doi.org/10.1038/s41558-018-0147-4.

Gehlbach, Scott and Sonin, Konstantin. 2014. "Government control of the media." *Journal of public Economics* 118:163–171.

Gerber, Alan S., Huber, Gregory A., Doherty, David, and Dowling, Conor M. 2010. "Personality and Political Attitudes: Relationships across Issue Domains and Political Contexts." *American Political Science Review* 104 (1). https://doi.org/10.1017/S0003055410000031.

Geurkink, Bram, Zaslove, Andrej, Sluiter, Roderick, and Jacobs, Kristof. 2020. "Populist attitudes, political trust, and external political efficacy: Old wine in new bottles?" *Political Studies* 68 (1): 247–267.

Ghitza, Yair and Gelman, Andrew. 2020. "Voter Registration Databases and MRP: Toward the Use of Large-Scale Databases in Public Opinion Research." *Political Analysis* 28 (4): 507–531. https://doi.org/10.1017/pan.2020.3.

Gilens, Martin. 2001. "Political Ignorance and Collective Policy Preferences." *American Political Science Review* 95 (2): 379–396. https://doi.org/10.1017/S0003055401002222.

Golbeck, Jennifer, Robles, Cristina, and Turner, Karen. 2011. "Predicting Personality with Social Media." In *CHI '11 Extended Abstracts on Human Factors in Computing Systems,* 253–262. CHI EA '11. Vancouver, BC, Canada: Association for Computing Machinery. ISBN: 9781450302685. https://doi.org/10.1145/1979742.1979614.

Gomez, Raul, Morales, Laura, and Ramiro, Luis. 2016. "Varieties of radicalism: Examining the diversity of radical left parties and voters in Western Europe." *West European Politics* 39 (2): 351–379. https://doi.org/10.1080/01402382.2015.1064245.

Gonyea, Robert M. 2005. "Self-reported data in institutional research: Review and recommendations." *New Directions for Institutional Research* 2005 (127): 73–89. https://doi.org/https://doi.org/10.1002/ir.156. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/ir.156. https://onlinelibrary.wiley.com/doi/abs/10.1002/ir.156.

Graham, Matthew H. and Svolik, Milan W. 2020. "Democracy in America? Partisanship, Polarization, and the Robustness of Support for Democracy in the United States." *American Political Science Review* 114 (2): 392–409. https://doi.org/10.1017/S0003055420000052.

Grimaldi, Didier, Cely, Javier Diaz, and Arboleda, Hugo. 2020. "Inferring the votes in a new political landscape: The case of the 2019 Spanish Presidential elections." *Journal of Big Data* 7 (1): 58.

Grimmer, Justin, Roberts, Margaret E, and Stewart, Brandon M. 2021. "Machine learning for social science: An agnostic approach." *Annual Review of Political Science* 24 (1): 395–419.

Guess, Andrew M., Nyhan, Brendan, and Reifler, Jason. 2020. "Exposure to untrustworthy websites in the 2016 US election." *Nature Human Behaviour* 4 (5): 472–480. https://doi.org/10.1038/s41562-020-0833-x.

Hainmueller, Jens, Hangartner, Dominik, and Yamamoto, Teppei. 2015. "Validating vignette and conjoint survey experiments against real-world behavior." *Proceedings of the National Academy of Sciences* 112 (8): 2395–2400.

Hainmueller, Jens and Hopkins, Daniel J. 2015. "The hidden American immigration consensus: A conjoint analysis of attitudes toward immigrants." *American journal of political science* 59 (3): 529–548.

———. 2014. "Public Attitudes Toward Immigration." *Annual Review of Political Science* 17 (1): 225–249. https://doi.org/10.1146/annurev-polisci-102512-194818.

Hanretty, Chris, Lauderdale, Benjamin E., and Vivyan, Nick. 2020. "A Choice-Based Measure of Issue Importance in the Electorate." *American Journal of Political Science* 64 (3): 519–535. https://doi.org/https://doi.org/10.1111/ajps.12470.

Hargittai, Eszter and Karaoglu, Gokce. 2018. "Biases of Online Political Polls: Who Participates?" *Socius* 4:2378023118791080. https://doi.org/10.1177/2378023118791080.

Harteveld, Eelco, Kokkonen, Andrej, and Dahlberg, Stefan. 2017-06. "Adapting to party lines: the effect of party affiliation on attitudes to immigration." *West European Politics* 40, no. 6 (). https://doi.org/10.1080/01402382.2017.1328889.

Hatemi, Peter K, Gillespie, Nathan A, Eaves, Lindon J, Maher, Brion S, Webb, Bradley T, Heath, Andrew C, Medland, Sarah E, Smyth, David C, Beeby, Harry N, Gordon, Scott D, et al. 2011. "A genome-wide analysis of liberal and conservative political attitudes." *The Journal of Politics* 73 (1): 271–285.

Hawkins, Kirk A. and Kaltwasser, Cristóbal Rovira. 2017. "The ideational approach to populism." *Latin American Research Review* 52 (4): 513–528.

Herbst, Susan. 2001. "Public opinion infrastructures: Meanings, measures, media." *Political Communication* 18 (4): 451–464.

Hohenberg, Bernhard Clemm von, Stier, Sebastian, Cardenal, Ana S., Guess, Andrew M., Menchen-Trevino, Ericka, and Wojcieszak, Magdalena. 2024a. "Analysis of Web Browsing Data: A Guide." *Social Science Computer Review,* https://doi.org/https://doi.org/10.1177/08944393241227868.

———. 2024b. "Analysis of Web Browsing Data: A Guide." *Social Science Computer Review* 0 (0): 08944393241227868. https://doi.org/10.1177/08944393241227868.

Horiuchi, Yusaku, Smith, Daniel M, and Yamamoto, Teppei. 2020. "Identifying voter preferences for politicians' personal attributes: A conjoint experiment in Japan." *Political Science Research and Methods* 8 (1): 75–91. https://doi.org/10.1017/psrm.2018.26.

Hug, Simon. 2003. "Selection bias in comparative research: The case of incomplete data sets." *Political Analysis* 11 (3): 255–274.

Ikeda, Ken'ichi, Kobayashi, Tetsuro, and Hoshimoto, Maasa. 2008. "Does political participation make a difference? The relationship between political choice, civic engagement and political efficacy." *Electoral Studies* 27 (1): 77–88.

Imbens, Guido W. 2024. "Causal Inference in the Social Sciences." *Annual Review of Statistics and Its Application* 11 (Volume 11, 2024): 123–152. https://doi.org/https://doi.org/10.1146/annurev-statistics-033121-114601. https://www.annualreviews.org/content/journals/10.1146/annurev-statistics-033121-114601.

Inglehart, Ronald, Basanez, Miguel, Diez-Medrano, Jaime, Halman, Loek, and Luijkx, Ruud. 2000. "World values surveys and European values surveys, 1981-1984, 1990-1993, and 1995-1997." *Ann Arbor-Michigan, Institute for Social Research, ICPSR version.*

Inglehart, Ronald F. and Welzel, Christian. 2004. "What Insights Can Multi-Country Surveys Provide About People and Societies?" *Available at SSRN,* https://doi.org/http://dx.doi.org/10.2139/ssrn.2391770. https://ssrn.com/abstract=2391770.

Ionescu, Ghița and Gellner, Ernest. 1969. *Populism: Tts meaning and national characteristics.* Macmillan.

Ivaldi, Gilles, Lanzone, Maria Elisabetta, and Woods, Dwayne. 2017. "Varieties of Populism across a Left-Right Spectrum: The Case of the Front National, the Northern League, Podemos and Five Star Movement." *Swiss Political Science Review* 23 (4): 354–376.

Ivarsflaten, Elisabeth. 2008. "What unites right-wing populists in Western Europe? Re-examining grievance mobilization models in seven successful cases." *Comparative Political Studies* 41 (1): 3–23.

Jo, Taeho. 2021. "Machine learning foundations." *Machine Learning Foundations. Springer Nature Switzerland AG. https://doi. org/10.1007/978-3-030-65900-4.*

Jost, John T, Federico, Christopher M, and Napier, Jaime L. 2009. "Political ideology: Its structure, functions, and elective affinities." *Annual review of psychology* 60:307–337.

Jowell, Roger, Roberts, Caroline, Fitzgerald, Rory, and Eva, Gillian. 2007. *Measuring attitudes cross-nationally: Lessons from the European Social Survey.* Sage.

Kalogeropoulos, Antonis. 2018. "Online news video consumption: A comparison of six countries." *Digital journalism* 6 (5): 651–665.

Kalogeropoulos, Antonis, Suiter, Jane, Udris, Linards, and Eisenegger, Mark. 2019. "News media trust and news consumption: Factors related to trust in news in 35 countries." *International journal of communication* 13:22.

Kaltwasser, Cristóbal Rovira and Van Hauwaert, Steven M. 2020. "The populist citizen: Empirical evidence from Europe and Latin America." *European Political Science Review* 12 (1): 1–18.

Karp, Jeffrey A and Lühiste, Maarja. 2016. "Explaining political engagement with online panels: Comparing the British and American election studies." *Public Opinion Quarterly* 80 (3): 666–693.

Keefer, Philip, Scartascini, Carlos, and Vlaicu, Razvan. 2021. "Trust, populism, and the quality of government." *The Oxford Handbook of the Quality of Government,* 249.

Kenett, Ron S, Pfeffermann, Danny, and Steinberg, David M. 2018. "Election polls—a survey, a critique, and proposals." *Annual Review of Statistics and Its Application* 5:1–24.

Kepplinger, Hans Matthias. 2008. "Effects of the news media on public opinion." *The SAGE handbook of public opinion research,* 192–204.

Kessler, Alan E and Freeman, Gary P. 2005. "Support for extreme right-wing parties in Western Europe: individual attributes, political attitudes, and national context." *Comparative European Politics* 3:261–288.

Khazaal, Yasser, Singer, Mathias van, Chatton, Anne, Achab, Sophia, Zullino, Daniele, Rothen, Stephane, Khan, Riaz, Billieux, Joel, and Thorens, Gabriel. 2014. "Does Self-Selection Affect Samples' Representativeness in Online Surveys? An Investigation in Online Video Game Research." *J Med Internet Res* 16 (7): e164. ISSN: 1438-8871. https://doi.org/10.2196/jmir.2759. http://www.ncbi.nlm.nih.gov/pubmed/25001007.

Kirkland, Patricia A and Coppock, Alexander. 2018. "Candidate choice without party labels: New insights from conjoint survey experiments." *Political Behavior* 40:571–591.

Kleinberg, Mona S. 2022. "Measuring political knowledge in online surveys: How question design can improve measures." *Public Opinion Quarterly* 86 (3): 736–747.

Klimecki, Olga M., Vétois, Matthieu, and Sander, David. 2020. "The impact of empathy and perspective-taking instructions on proponents and opponents of immigration." *Humanities and Social Sciences Communications* 7 (1): 91. https://doi.org/10.1057/s41599-020-00581-0.

Konitzer, Tobias, Allen, Jennifer, Eckman, Stephanie, Howland, Baird, Mobius, Markus, Rothschild, David, and Watts, Duncan J. 2021. "Comparing estimates of news consumption from survey and passively collected behavioral data." *Public Opinion Quarterly* 85 (S1): 347–370.

Kosinski, Michal, Bachrach, Yoram, Kohli, Pushmeet, Stillwell, David, and Graepel, Thore. 2014. "Manifestations of user personality in website choice and behaviour on online social networks." *Mach Learn* 95 (3). https://doi.org/10.1007/s10994-013-5415-y.

Kosinski, Michal, Stillwell, David, and Graepel, Thore. 2013. "Private traits and attributes are predictable from digital records of human behavior." *Proceedings of the National Academy of Sciences of the United States of America* 110 (15). https://doi.org/10.1073/pnas.1218772110.

Kosinski, Michal, Stillwell, David, Kohli, Pushmeet, Bachrach, Yoram, and Graepel, Thore. 2012. "Personality and Website Choice." *ACM Web Sciences 2012,* https://www.microsoft.com/en-us/research/publication/personality-and-website-choice/.

Kosmidis, Spyros and Theocharis, Yannis. 2020. "Can Social Media Incivility Induce Enthusiasm?: Evidence from Survey Experiments." *Public Opinion Quarterly* 84 (S1): 284–308. https://doi.org/10.1093/poq/nfaa014.

Krastev, Ivan. 2014. "From politics to protest." *J. Democracy* 25:5.

Kreuter, Frauke, Presser, Stanley, and Tourangeau, Roger. 2009. "Social Desirability Bias in CATI, IVR, and Web Surveys: The Effects of Mode and Question Sensitivity." *Public Opinion Quarterly* 72 (5): 847–865. ISSN: 0033-362X. https://doi.org/10.1093/poq/nfn063. eprint: https://academic.oup.com/poq/article-pdf/72/5/847/5188667/nfn063.pdf. https://doi.org/10.1093/poq/nfn063.

Kriesi, Hanspeter. 2013. "Political mobilisation, political participation and the power of the vote." In *European Politics,* 147–168. Routledge.

Kriesi, Hanspeter, Grande, Edgar, Dolezal, Martin, Helbling, Marc, Höglinger, Dominic, Hutter, Swen, and Wüest, Bruno. 2012. *Political conflict in western Europe.* Cambridge, UK: Cambridge University Press.

Krosnick, Jon A. 1991. "The Stability of Political Preferences: Comparisons of Symbolic and Nonsymbolic Attitudes." *American Journal of Political Science* 35 (3): 547–576. ISSN: 00925853, 15405907. http://www.jstor.org/stable/2111553.

Krumpal, Ivar. 2013. "Determinants of social desirability bias in sensitive surveys: a literature review." *Quality and Quantity* 47 (4). https://doi.org/10.1007/s11135-011-9640-9. https://doi.org/10.1007/s11135-011-9640-9.

Kustov, Alexander, Laaker, Dillon, and Reller, Cassidy. 2021. "The stability of immigration attitudes: Evidence and implications." *The Journal of Politics* 83 (4): 1478–1494.

Laclau, Ernesto. 2005. *On populist reason.* Verso.

Lambiotte, R. and Kosinski, M. 2014. "Tracking the Digital Footprints of Personality." *Proceedings of the IEEE* 102 (12): 1934–1939. https://doi.org/10.1109/JPROC.2014.2359054.

Leeper, Thomas J, Hobolt, Sara B, and Tilley, James. 2020. "Measuring subgroup preferences in conjoint experiments." *Political Analysis* 28 (2): 207–221.

Leigh, Andrew. 2005. "Economic Voting and Electoral Behavior: How Do Individual, Local, and National Factors Affect the Partisan Choice." *Economics & Politics* 17 (2): 265–296. https://doi.org/https://doi.org/10.1111/j.1468-0343.2005.00154.x.

Leist, Anja K., Klee, Matthias, Kim, Jung Hyun, Rehkopf, David H., Bordas, Stéphane P. A., Muniz-Terrera, Graciela, and Wade, Sara. 2022. "Mapping of machine learning approaches for description, prediction, and causal inference in the social and health sciences." *Science Advances* 8 (42): eabk1942. https://doi.org/10.1126/sciadv.abk1942.

Leong, Yuan Chang, Chen, Janice, Willer, Robb, and Zaki, Jamil. 2020. "Conservative and liberal attitudes drive polarized neural responses to political content." *Proceedings of the National Academy of Sciences* 117 (44): 27731–27739.

Leuschner, Elena and Hellmeier, Sebastian. 2024. "State Concessions and Protest Mobilization in Authoritarian Regimes." *Comparative Political Studies* 57 (1): 3–31.

Levin, Simon A, Milner, Helen V, and Perrings, Charles. 2021. *The dynamics of political polarization,* 50.

Lo Iacono, Sergio. 2019. "Law-breaking, fairness, and generalized trust: The mediating role of trust in institutions." *PLOS ONE* 14 (8): 1–14. https://doi.org/10.1371/journal.pone.0220160.

Loew, Nicole and Faas, Thorsten. 2019. "Between Thin- and Host-ideologies: How Populist Attitudes Interact with Policy Preferences in Shaping Voting Behaviour." *Representation* 55 (4): 493–511. https://doi.org/10.1080/00344893.2019.1643772.

Lubbers, Marcel and Coenders, Marcel. 2017. "Nationalistic attitudes and voting for the radical right in Europe." *European Union Politics* 18 (1): 98–118. https://doi.org/10.1177/1465116516678932.

Lum, Cynthia, Maupin, Carl, and Stoltz, Megan. 2023. "The Supply and Demand Shifts in Policing at the Start of the Pandemic: A National Multi-Wave Survey of the Impacts of COVID-19 on American Law Enforcement." *Police Quarterly* 26 (4): 495–519. https://doi.org/10.1177/10986111221148217. https://doi.org/10.1177/10986111221148217.

Lyness, Karen S and Brumit Kropf, Marcia. 2007. "Cultural values and potential nonresponse bias: A multilevel examination of cross-national differences in mail survey response rates." *Organizational Research Methods* 10 (2): 210–224.

Macdonald, David. 2021. "Political trust and support for immigration in the American mass public." *British Journal of Political Science* 51 (4): 1402–1420.

Margolis, Michael. 1984. "Public Opinion, Polling, and Political Behavior." *The Annals of the American Academy of Political and Social Science* 472 (1): 61–71.

McCombs, Maxwell and Valenzuela, Sebastian. 2020. *Setting the agenda: Mass media and public opinion.* John Wiley & Sons.

Meijers, Maurits J and Zaslove, Andrej. 2020. "Measuring populism in political parties: appraisal of a new approach." *Comparative Political Studies,* 0010414020938081.

Mellon, Jonathan. 2013. "Where and When Can We Use Google Trends to Measure Issue Salience?" *PS: Political Science & Politics* 46 (2): 280–290. https://doi.org/10.1017/S1049096513000279.

Meyer, David S. 2004. "Protest and political opportunities." *Annu. Rev. Sociol.* 30:125–145.

Milbrath, Lester W. 1981. "Political participation." In *The Handbook of Political Behavior: Volume 4,* 197–240. Springer.

Milbrath, Lester W and Goel, M Lal. 1965. *Political participation.* Vol. 81. Springer.

Moffitt, Benjamin. 2016. *The global rise of populism: Performance, political style, and representation.* Stanford University Press.

Möller, Judith, Van De Velde, Robbert Nicolai, Merten, Lisa, and Puschmann, Cornelius. 2020. "Explaining online news engagement based on browsing behavior: Creatures of habit?" *Social Science Computer Review* 38 (5): 616–632.

Mössner, Samuel and Romero Renau, Luis del. 2015. "What Makes a Protest (Not) Happen? The Fragmented Landscape of Post-Political Conflict Culture." In *Planning and Conflict,* 63–78. Routledge.

Mudde, Cas. 2007. *Populist radical right parties in Europe.* Cambridge, UK: Cambridge University Press.

Mudde, Cas and Kaltwasser, Cristóbal Rovira. 2012. *Populism in Europe and the Americas: Threat or corrective for democracy?* Cambridge University Press.

———. 2017. *Populism: A very short introduction.* Oxford University Press.

———. 2018. "Studying Populism in Comparative Perspective: Reflections on the Contemporary and Future Research Agenda." *Comparative Political Studies,* https://doi.org/10.1177/0010414018789490.

Mukerjee, Subhayan and Yang, Tian. 2021. "Choosing to avoid? A conjoint experimental study to understand selective exposure and avoidance on social media." *Political Communication* 38 (3): 222–240.

Mummolo, Jonathan and Peterson, Erik. 2019. "Demand effects in survey experiments: An empirical assessment." *American Political Science Review* 113 (2): 517–529.

Munzert, Simon, Ramirez-Ruiz, Sebastian, Barberá, Pablo, Guess, Andrew M, and Yang, JungHwan. 2024. "Who's cheating on your survey? A detection approach with digital trace data." *Political Science Research and Methods* 12 (2): 390–398.

Murphy, Joe, Link, Michael W., Childs, Jennifer Hunter, Tesfaye, Casey Langer, Dean, Elizabeth, Stern, Michael, Pasek, Josh, Cohen, Jon, Callegaro, Mario, and Harwood, Paul. 2014. "Social Media in Public Opinion Research: Executive Summary of the Aapor Task Force on Emerging Technologies in Public Opinion Research." *Public Opinion Quarterly* 78 (4): 788–794. ISSN: 0033-362X. https://doi.org/10.1093/poq/nfu053.

Mutz, Diana C. 1992. "Impersonal influence: Effects of representations of public opinion on political attitudes." *Political Behavior* 14:89–122.

Mutz, Diana C. and Kim, Eunji. 2020. *The Progress and Pitfalls of Using Survey Experiments in Political Science.* https://doi.org/10.1093/acrefore/9780190228637.013.929.

Nave, Gideon, Minxha, Juri, Greenberg, David M., Kosinski, Michal, Stillwell, David, and Rentfrow, Jason. 2018. "Musical Preferences Predict Personality: Evidence From Active Listening and Facebook Likes." *Psychological Science* 29 (7): 1145–1158. https://doi.org/10.1177/0956797618761659.

Nelson, Thomas E. 2004. "Policy goals, public rhetoric, and political attitudes." *The Journal of Politics* 66 (2): 581–605.

Neuner, Fabian G. and Wratil, Christopher. 2020. "The Populist Marketplace: Unpacking the Role of "Thin" and "Thick" Ideology." *Political Behavior,* https://doi.org/10.1007/s11109-020-09629-y.

Newman, Brian. 2003. "Integrity and Presidential Approval, 1980-2000." *Public Opinion Quarterly* 67 (3): 335–367. https://doi.org/10.1086/377242. https://doi.org/10.1086/377242.

Newport, Frank and Saad, Lydia. 2021. "Presidential job approval." *Public Opinion Quarterly* 85 (1): 223–241.

Papadogiannakis, Emmanouil, Papadopoulos, Panagiotis, Kourtellis, Nicolas, and Markatos, Evangelos P. 2021. "User tracking in the post-cookie era: How websites bypass gdpr consent to track users." In *Proceedings of the web conference 2021,* 2130–2141.

Persson, Mikael and Solevid, Maria. 2014. "Measuring political participation—Testing social desirability bias in a web-survey experiment." *International Journal of Public Opinion Research* 26 (1): 98–112.

Poertner, Mathias and Zhang, Nan. 2024. "The effects of combating corruption on institutional trust and political engagement: Evidence from Latin America." *Political Science Research and Methods* 12 (3): 633–642.

Praet, Stiene, Guess, Andrew M., Tucker, Joshua A., Bonneau, Richard, and Nagler, Jonathan. 2021. "What's Not to Like? Facebook Page Likes Reveal Limited Polarization in Lifestyle Preferences." *Political Communication* 0 (0): 1–28. https://doi.org/10.1080/10584609.2021.1994066.

Pu Yan, Ralph Schroeder and Stier, Sebastian. 2022. "Is there a link between climate change scepticism and populism? An analysis of web tracking and survey data from Europe and the US." *Information, Communication & Society* 25 (10): 1400–1439. https://doi.org/10.1080/1369118X.2020.1864005.

Quaranta, Mario. 2018. "How citizens evaluate democracy: an assessment using the European Social Survey." *European Political Science Review* 10 (2): 191–217.

Quintelier, Ellen and Van Deth, Jan W. 2014. "Supporting democracy: Political participation and political attitudes. Exploring causality using panel data." *Political studies* 62 (1_suppl): 153–171.

Rama, José and Cordero, Guillermo. 2018. "Who are the losers of the economic crisis? Explaining the vote for rightwing populist parties in Europe after the Great Recession." *Revista Española de Ciencia Política* 48:13–43. https://doi.org/10.21308/recp.48.01.

Ramiro, Luis and Gomez, Raul. 2017. "Radical-left populism during the great recession: Podemos and its competition with the established radical left." *Political Studies* 65 (1_suppl): 108–126.

Robertson, Alexa. 2013. "Connecting in Crisis: "Old" and "New" Media and the Arab Spring." *The International Journal of Press/Politics* 18 (3): 325–341.

Rooduijn, Matthijs. 2018a. "What unites the voter bases of populist parties? Comparing the electorates of 15 populist parties." *European Political Science Review* 10 (3): 351–368. https://doi.org/10.1017/S1755773917000145.

———. 2018b. "What unites the voter bases of populist parties? Comparing the electorates of 15 populist parties." *European Political Science Review* 10 (3): 351–368. https://doi.org/10.1017/S1755773917000145.

———. 2019. "State of the field: How to study populism and adjacent topics? A plea for both more and less focus." *European Journal of Political Research* 58 (1): 362–372. https://doi.org/10.1111/1475-6765.12314.

Rooduijn, Matthijs, De Lange, Sarah L, and Van der Brug, Wouter. 2014. "A populist Zeitgeist? Programmatic contagion by populist parties in Western Europe." *Party Politics* 20 (4): 563–575. https://doi.org/10.1177/1354068811436065.

Rosenman, Robert, Tennekoon, Vidhura, and Hill, Laura G. 2011. "Measuring bias in self-reported data." *International Journal of Behavioural and Healthcare Research* 2 (4): 320–332. https://doi.org/10.1504/IJBHR.2011.043414.

Rovny, Jan and Polk, Jonathan. 2020. "Still blurry? Economic salience, position and voting for radical right parties in Western Europe." *European Journal of Political Research* 59 (2): 248–268.

Sanz, Carlos, Solé-Ollé, Albert, and Sorribas-Navarro, Pilar. 2022. "Betrayed by the elites: How corruption amplifies the political effects of recessions." *Comparative Political Studies* 55 (7): 1095–1129.

Scharkow, Michael and Vogelgesang, Jens. 2011. "Measuring the Public Agenda using Search Engine Queries." *International Journal of Public Opinion Research* 23 (1): 104–113. https://doi.org/10.1093/ijpor/edq048. https://doi.org/10.1093/ijpor/edq048.

Schmitt, Hermann, Bartolini, Stefano, Van Der Brug, Wouter, Van Der Eijk, Cees, Franklin, Mark, Fuchs, Dieter, Toka, Gabor, Marsh, Michael, and Thomassen, Jacques. 2009. "European election study 2004." *Design, Data Description and Documentation.*

Schulte-Cloos, Julia and Leininger, Arndt. 2022. "Electoral participation, political disaffection, and the rise of the populist radical right." *Party Politics* 28 (3): 431–443.

Schwartz, Cassilde, Simon, Miranda, Hudson, David, and van-Heerde-Hudson, Jennifer. 2020. "A Populist Paradox? How Brexit Softened Anti-Immigrant Attitudes." *British Journal of Political Science,* https://doi.org/10.1017/S0007123419000656.

Sciarini, Pascal and Goldberg, Andreas C. 2016. "Turnout bias in postelection surveys: political involvement, survey participation, and vote overreporting." *Journal of Survey Statistics and Methodology* 4 (1): 110–137.

Settanni, Michele, Azucar, Danny, and Marengo, Davide. 2018. "Predicting Individual Characteristics from Digital Traces on Social Media: A Meta-Analysis." PMID: 29624439, *Cyberpsychology, Behavior, and Social Networking* 21 (4): 217–228. https://doi.org/10.1089/cyber.2017.0384.

Sevenans, Julie. 2018. "How mass media attract political elites' attention." *European Journal of Political Research* 57 (1): 153–170.

Shmargad, Yotam and Klar, Samara. 2019. *Using Online Experiments to Study Political Decision Making.* https://doi.org/10.1093/acrefore/9780190228637.013.924.

Silver, Brian D. and Dowley, Kathleen M. 2000. "Measuring Political Culture in Multiethnic Societies: Reaggregating the World Values Survey." *Comparative Political Studies* 33 (4): 517–550. https://doi.org/10.1177/0010414000033004004.

Smith, Kevin, Alford, John R, Hatemi, Peter K, Eaves, Lindon J, Funk, Carolyn, and Hibbing, John R. 2012. "Biology, ideology, and epistemology: How do we know political attitudes are inherited and why should we care?" *American journal of political science* 56 (1): 17–33.

Smith, Kevin B, Oxley, Douglas R, Hibbing, Matthew V, Alford, John R, and Hibbing, John R. 2011. "Linking genetics and political attitudes: Reconceptualizing political ideology." *Political Psychology* 32 (3): 369–397.

Sniderman, Paul M. 2018. "Some advances in the design of survey experiments." *Annual Review of Political Science* 21:259–275.

Sniderman, Paul M and Druckman, JN. 2011. "The logic and design of the survey experiment." *Cambridge handbook of experimental political science,* no. Part I, 102–114.

Stachl, Clemens, Au, Quay, Schoedel, Ramona, Gosling, Samuel D., Harari, Gabriella M., Buschek, Daniel, Völkel, Sarah Theres, et al. 2020. "Predicting personality from patterns of behavior collected with smartphones." *Proceedings of the National Academy of Sciences* 117 (30): 17680–17687. ISSN: 0027-8424. https://doi.org/10.1073/pnas.1920484117.

Stier, Sebastian, Breuer, Johannes, Siegers, Pascal, and Thorson, Kjerstin. 2020. *Integrating survey data and digital trace data: Key issues in developing an emerging field,* 5.

Stier, Sebastian, Kirkizh, Nora, Froio, Caterina, and Schroeder, Ralph. 2020b. "Populist Attitudes and Selective Exposure to Online News: A Cross-Country Analysis Combining Web Tracking and Surveys." *The International Journal of Press/Politics* 25 (3): 426–446. https://doi.org/10.1177/1940161220907018.

Stockemer, Daniel, Halikiopoulou, Daphne, and Vlandas, Tim. 2020. "'Birds of a feather'? Assessing the prevalence of anti-immigration attitudes among the far right electorate." *Journal of Ethnic and Migration Studies,* 1–27. https://doi.org/10.1080/1369183X.2020.1770063.

Strömberg, David. 2001. "Mass media and public policy." *European economic review* 45 (4-6): 652–663.

———. 2015. "Media and politics." *economics* 7 (1): 173–205.

Tan, Yue and Weaver, David H. 2009. "Local media, public opinion, and state legislative policies: Agenda setting at the state level." *The International Journal of Press/Politics* 14 (4): 454–476.

Tomz, Michael R and Weeks, Jessica LP. 2020. "Human rights and public support for war." *The Journal of politics* 82 (1): 182–194.

Tucker, Joshua Aaron, Guess, Andrew, Barbera, Pablo, Vaccari, Cristian, Siegel, Alexandra, Siegel, Alexandra, Sanovich, Sergey, Stukal, Denis, and Nyhan, Brendan. 2018. "Social Media, Political Polarization, and Political Disinformation: A Review of the Scientific Literature." *Available at SSRN:* https://doi.org/https://ssrn.com/abstract=3144139.

Urman, Aleksandra and Makhortykh, Mykola. 2023. "You are how (and where) you search? Comparative analysis of web search behavior using web tracking data." *Journal of Computational Social Science* 6 (2): 741–756. https://doi.org/10.1007/s42001-023-00208-9.

Van Deth, Jan W. 2014. "A conceptual map of political participation." *Acta politica* 49:349–367.

Van Hauwaert, Steven M. and Van Kessel, Stijn. 2018. "Beyond protest and discontent: A cross-national analysis of the effect of populist attitudes and issue positions on populist party support." *European Journal of Political Research* 57 (1): 68–92. https://doi.org/10.1111/1475-6765.12216.

Van Oorschot, Wim and Finsveen, Ellen. 2009. "The welfare state and social capital inequality: An empirical exploration using longitudinal European/World Values Study data from 13 Western welfare states." *European Societies* 11 (2): 189–210.

Vassallo, Francesca. 2018. "The evolution of protest research: Measures and approaches." *PS: Political Science & Politics* 51 (1): 67–72.

Vermeer, Susan, Kruikemeier, Sanne, Trilling, Damian, and De Vreese, Claes. 2022. "Using panel data to study political interest, news media trust, and news media use in the early stages of the COVID-19 pandemic." *Journalism Studies* 23 (5-6): 740–760.

Visser, Mark, Lubbers, Marcel, Kraaykamp, Gerbert, and Jaspers, Eva. 2014. "Support for radical left ideologies in Europe." *European Journal of Political Research* 53 (3): 541–558. https://doi.org/10.1111/1475-6765.12048.

Vrablikova, Katerina. 2014. "How context matters? Mobilization, political opportunity structures, and nonelectoral political participation in old and new democracies." *Comparative Political Studies* 47 (2): 203–229.

Waggoner, Philip D. 2020. *Unsupervised machine learning for clustering in political and social research.* Cambridge University Press.

Walgrave, Stefaan, Wouters, Ruud, and Ketelaars, Pauline. 2016. "Response problems in the protest survey design: evidence from fifty-one protest events in seven countries." *Mobilization: An International Quarterly* 21 (1): 83–104.

Weisberg, Herbert F., Krosnick, Jon A., and Bowen, Bruce D. 1996. *An introduction to survey research, polling, and data analysis.* Sage Publications. ISBN: 9780803974029.

Wright, Kevin B. 2017. "Researching Internet-Based Populations: Advantages and Disadvantages of Online Survey Research, Online Questionnaire Authoring Software Packages, and Web Survey Services." *Journal of Computer-Mediated Communication* 10 (3): JCMC1034. ISSN: 1083-6101. https://doi.org/10.1111/j.1083-6101.2005.tb00259.x. https://doi.org/10.1111/j.1083-6101.2005.tb00259.x.

Wright, Scott and Street, John. 2007. "Democracy, deliberation and design: the case of online discussion forums." *New Media & Society* 9 (5): 849–869. https://doi.org/10.1177/1461444807081230.

Yarkoni, Tal and Westfall, Jacob. 2017. "Choosing Prediction Over Explanation in Psychology: Lessons From Machine Learning." *Perspectives on Psychological Science* 12 (6): 1100–1122. https://doi.org/10.1177/1745691617693393.

Zaslove, Andrej. 2008. "Here to stay? Populism as a new party type." *European Review* 16 (3): 319–336. https://doi.org/10.1017/S1062798708000288.

Zhirkov, Kirill. 2022. "Estimating and using individual marginal component effects from conjoint experiments." *Political Analysis* 30 (2): 236–249.

Zhuravskaya, Ekaterina, Petrova, Maria, and Enikolopov, Ruben. 2020. "Political Effects of the Internet and Social Media." *Annual Review of Economics* 12:415–438. https://doi.org/https://doi.org/10.1146/annurev-economics-081919-050239.

Appendix

Appendix A.

Paper 1: Online News and Protest Participation in a Political Context: Evidence from Self-Reported Cross-Section Data

Authors

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Abstract

Availability of alternative information through social media, in particular, and digital media, in general, is often said to induce social discontent, especially in states where traditional media are under government control. But does this relation really exist, and is it generalizable? This article explores the relationship between self-reported online news consumption and protest participation across 48 nations in 2010–2014. Based on multilevel regression models and simulations, the analysis provides evidence that those respondents who reported that they had attended a protest at least once read news online daily or weekly. The study also shows that the magnitude of the effect varies depending on the political context: surprisingly, despite supposedly unlimited control of offline and online media, autocratic countries demonstrated higher effects of online news than transitional regimes, where the Internet media are relatively uninhibited.

Contribution of thesis author

My contributions to the paper encompasses literature review, developing research design, and data analysis.

SI: Dissent, Russia and Belarus

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Online News and Protest Participation in a Political Context: Evidence from Self-Reported Cross-Sectional Data

Nora Kirkizh[1] and Olessia Koltsova[2]

Abstract

Availability of alternative information through social media, in particular, and digital media, in general, is often said to induce social discontent, especially in states where traditional media are under government control. But does this relation really exist, and is it generalizable? This article explores the relationship between self-reported online news consumption and protest participation across 48 nations in 2010–2014. Based on multilevel regression models and simulations, the analysis provides evidence that those respondents who reported that they had attended a protest at least once read news online daily or weekly. The study also shows that the magnitude of the effect varies depending on the political context: surprisingly, despite supposedly unlimited control of offline and online media, autocratic countries demonstrated higher effects of online news than transitional regimes, where the Internet media are relatively uninhibited.

Keywords

online news, protest participation, democracy

Introduction

The Internet and especially social media have been described as one of the principal factors influencing political participation since it reduced the costs for both access to alternative information (Garrett, 2006; Howard, 2011) and coordination (Castells, 2012; Earl & Kimport, 2013). In authoritarian societies, alternative information may be obtained solely from online sources, and increasingly it occurs through social media (Reuter & Szakonyi, 2015). Availability of such information is thought to contribute to the rise of political awareness of societal problems and grievances (Reuter & Szakonyi, 2015) as well as to social discontent (Hollyer et al., 2015; Howard, 2011; Kalathil & Boas, 2003)—two processes that ultimately affect government evaluation and policy support (Tang & Huhe, 2014). Political knowledge in turn has been said to give rise to political participation, notably to its protest forms (Meirowitz & Tucker, 2013) that are believed to be able to influence political unrest or even overthrow entire regimes (Hollyer et al., 2015). However, the scale and the universality of this connection have not yet been fully assessed. Thus, some researchers have questioned the democratizing role of the Internet in general (Morozov, 2011), the "alternative" character of social media as an aggregated category (Reuter & Szakonyi, 2015), and the link between non-differentiated political knowledge and protests (Little, 2015) and between alternative news and protests (Kaufhold et al., 2010). Evidence both for and against the relationship between online news, alternative political knowledge, and contentious political participation/protest has so far been fragmentary, with some scholars conceding the necessity of better data and analysis (Boulianne, 2009; Farrell, 2012). This article examines the first and the last components of this triad by providing empirical evidence of a positive and robust relationship between online news consumption and protest activity across a variety of nations. To show that online news consumption contributes to an increase in protest participation, this article deploys a multilevel model on self-reported data across 48 countries between 2010 and 2014. We also report marginal effects of online news consumption on protest participation and the level of uncertainty of the estimation that is not often presented in studies on political communication.

This article also seeks to explain the variance in the strength of the online news effect between the countries using the existing research outlined further below. Specifically, we

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hypothesize that access to alternative information via the Internet might be an especially important factor of protest participation in situations where online news is the only source of that information while traditional media are loyal to the government. Thus, the link between online news exposure and protest behavior might be expected to be the strongest in countries where all media, except the Internet, are controlled by the government because of the largest level of discrepancy between traditional and new media. This is most likely to occur in transitional democracies, or anocracies, that combine autocratic features with democratic ones. Compared to that, this link might be expected to be weaker in democracies where such discrepancies are presumably not that large, and even weaker in complete autocracies where all media are fully controlled and no criticism is available. This study tests this hypothesis by embedding macro-level factors that indicate economic, political, and social development of countries.

The rest of the article is structured as follows. The next section provides a brief overview of existing research highlighting that scholars rarely distinguish between online news consumption and the use of the Internet, social media, and other information and communications technologies (ICTs) in general, an oversight which in turn might affect the precision results in earlier analysis of the issue. Next, we present our argument explaining why testing the relationship between protest and online news consumption specifically is important. We derive three testable predictions on both individual and macro level, specifying regime type and economic development across 48 nations. In the last sections, we formulate our hypotheses and present the results for each of them, focusing on the quantity of interest (expected values and first difference) that allows us to estimate the marginal effects and the level of uncertainty of our estimation. We conclude with a discussion and interpretation of our results, and outline directions for further research.

Revising the Relationship between Online Media and Social Unrest

When looking at the effects of the Internet, scholars often imply the influence either of social media use as a whole (Tufekci & Wilson, 2012; Wolfsfeld et al., 2013) or even of the Internet use in general (Breuer et al., 2014; Howard, 2011). As a result, the effects of *online news consumption* specifically have not been widely studied, at least not in the cross-country perspective. Similarly, protests are often included into the concept of political participation and studied jointly (Brundidge et al., 2014), but no large-scale research has been made on the relation of online news consumption to protest participation specifically.

Meanwhile, not every political action is contentious nor is every protest political (it can equally be perceived by participants as social or economic). That is why research focused on generalized political participation cannot contribute to a complete understanding of the subversive power of the Internet or social media across a broad range of societal issues. Simultaneously, one can expect that the effect of online news consumption on protests might differ from that of other forms of Internet use such as social networking, gaming, or shopping.

However, as mentioned above, the specific relationship between *online news* and *protest participation* has not been a focus of the existing research, although relationships between other similar phenomena have got attention from researchers. There are many studies of social media effects on political participation (Koltsova & Kirkizh, 2016; Theocharis & Lowe, 2016) and even on protests (Enikolopov et al., 2020; Tufekci & Wilson, 2012), while online news are rather ignored. Other studies address the relation of news media and political knowledge (Coffé, 2017; Kenski & Stroud, 2006; Reuter & Szakonyi, 2015) or political participation (Brundidge et al., 2014; Ladd & Lenz, 2009; Vissers et al., 2012; Wojcieszak et al., 2016), but not protests. At the same time, formal models that seek to explain the mechanism of a protest's onset and regime survival (Kricheli et al., 2011; Little, 2015; Meirowitz & Tucker, 2013) account for information signals, but do not include online news. Similarly, empirical research that focuses on explanation and prediction of protest participation with a multitude of factors does not specifically address online news (Bernhagen & Marsh, 2007; Dalton et al., 2010; Schlussman & Soule, 2005; Welzel & Deutsch, 2012).

This seems to be a serious gap. In a meta-analysis of studies devoted to the Internet and political engagement, Boulianne (2009) finds that the effects of the Internet happen to be larger when the Internet use is measured as online news consumption. However, of the 38 reviewed papers, only 8 address online news, while protests are only very marginally mentioned in one of those 8 papers. A vast majority of studies in Boulianne's review and beyond find the studied relationships to be positive, with a few exceptions (Theocharis & Lowe, 2016; Wolfsfeld et al., 2013). However, Boulianne's review also suggests that many of these studies lack methodological rigor. Echoing Farrell (2012), Boulianne calls for more nuanced research of the relationships between specific types of Internet use and specific civic and political activities. Similarly, Wolfsfeld et al. (2013) acknowledge the lack of comparative research and argue that the impact of the Internet on protest may vary depending on political context in general, and political regime in particular.

To the best of our knowledge, the only paper that addresses both online news and protests is the research of the youth protests in Chile by Valenzuela et al. (2012); they find that protest participation is positively related to general online news consumption and to using Facebook for news in particular, among other factors. This work belongs to the vast majority of papers devoted to a single country or even a single protest. Available cross-country comparisons of protest behavior do not include the Internet (Dalton et al., 2010; Welzel & Deutsch, 2012), are devoted to a very narrow set of countries (Wolfsfeld et al., 2013), or both (Bernhagen & Marsh, 2007).

In the meantime, as also mentioned in the introduction, some studies claim that the independent information that online media are able to provide can increase citizens' awareness of current societal problems. Kalathil and Boas (2003, p. 136) and Howard (2011, pp. 108–112) suggest that online access to previously hidden political, social, or economic news can raise general discontent among the public. The Internet in general is often perceived as an alternative information source, although the picture might, in fact, be more complex. For instance, Reuter and Szakonyi (2015) find that in Russia, the usage of international social networks such as Twitter and Facebook increased the awareness about electoral fraud, while the usage of domestic VKontakte and Odnoklassniki did not. The degree to which the Internet constitutes an alternative to other forms of media may also vary depending on the political regime. Petrova (2008) finds that paradoxically the number of Internet users per capita is negatively correlated with press freedom over a sample of about 90 countries. However, in democracies the relation is reversed, while in autocracies it is also positive, but insignificant. This leaves us to suppose that an exceptionally strong negative relation is found in transitional regimes, in which citizens have an opportunity to turn to the Internet while regular media are tightly controlled. Lorentzen (2014) argues that some autocratic regimes have to tighten control over traditional media when they cannot effectively control all alternative sources, such as the Internet. The authors claim that regimes can be very effective in regulating the safe level of media freedom; however, we might suppose that transitional regimes might also face a situation when tightening control over the regular media coupled with inability to control the Internet would lead to maximal discrepancy between their content. This in turn might lead to higher levels of protest activity, and thus news consumption would be most closely related to protest participation in transitional regimes compared to both democracies and autocracies. In the latter, all sources of information would be effectively controlled; in democracies, both old media and the Internet would be equally inclined to report critical information.

Theory and Hypotheses

In this article, we suggest that exposure to online news contributes to the likelihood of protest participation of an individual because, compared to traditional news sources, this medium is more likely to provide alternative and perhaps even subversive information about the society. We build on the above-mentioned work of Howard (2011) and Kalathil and Boas (2003) who claimed that online access to political, social, or economic news in countries such as Egypt and China, where previously it was concealed, could raise general discontent and create strong incentives for social unrest. In addition, as found out by Hollyer et al. (2015), the availability of economic information in non-democratic societies could destabilize both transitional and consolidated autocratic regimes. The most plausible mechanism of emergence of alternative news online is based on the access of multiple individual and sometimes anonymized users to news production: they bring news about events they have either eye-witnessed or taken from international sources into their national social media environments, after which this news gets a chance to go viral and to force more "regular" online media to react and push it further. Based on this, we derive that the main hypothesis of this article is that protest participation to some extent is associated with higher online news consumption:

> *Hypothesis 1a*: The more the citizens are exposed to online news, the higher the probability of their participation in protests.

This effect might be biased due to the problem of self-selection (Prior, 2007, pp. 94–101, 2013; Knobloch-Westerwick & Johnson, 2014): citizens interested in politics might choose higher involvement in information flows. Thus, protest participation could in fact be caused by interest in politics, but not by news consumption. However, if the latter has its own influence, non-politically interested news consumers would be still more inclined to protest than non-consumers, and furthermore, those who are both politically interested and consume online news would be most of all inclined to protest. Thus, interest in politics and online news consumption would interact. To test this proposition, we derive the following sub-hypothesis:

> *Hypothesis 1b*: Individuals interested in politics and online news will be more likely to participate in protests than individuals who are interested in politics but are not exposed to online news.

Finally, drawing on the theoretical underpinnings of the first hypothesis, we expect that the political regime might affect an individual's online news consumption, thus determining the magnitude of its effect on protest participation. Specifically, in consolidated democracies, individuals might receive news online from the same media companies that had dominated the market before the emergence of the Internet, and additionally both offline and online media enjoy a visible and comparable degree of press freedom. The implication is that the effect of online news consumption on protests will correlate with traditional media and will not be particularly strong. On the contrary, in fragile democracies, the governments usually effectively control offline media since pre-Internet times, while they fail to enforce their control over the Internet, and especially over social media, as effectively (Bodrunova & Litvinenko, 2013; Howard, 2011). Hence, in those societies, the discrepancy between the offline and online news will be maximal, which is why we expect to observe the strongest association between protest participation and online news consumption. By contrast, consolidated autocracies control all media markets including online outlets (Coffé, 2017; Lorentzen, 2014). Therefore, individuals are less likely

to obtain any alternative information, and the analysis might show no or little evidence that protest activity is associated with online news consumption. Accordingly, we derive the following hypothesis:

> *Hypothesis 2*: Compared to consolidated democracies and even more to autocracies, the magnitude of the effect of online news on protest participation is greater in transitional regimes where all media, except the Internet, are expected to be controlled.

Data and Measurements

To test our hypotheses, we draw on the international database, the World Values Survey (WVS),[1] sixth wave. Because of our theoretical setup, we used WVS data for 2010–2014, the time when the Internet was available in all countries included in our sample. That is, the choice of time was a function of the Internet penetration in the countries. The unit of analysis is individuals (around 68,000 observations)—hence individual level—and countries—aggregated level (for information on countries, see Table A8 in the Online Appendix).

Dependent Variable: Protest Participation

We define *Protest Participation* of individuals as their answers to the question of WVS, on whether they have recently participated in peaceful political demonstrations: 1—if an individual reported recent attendance of a demonstration, and 0—otherwise.[2] We extracted this variable from the cross-table of two related variables: a question on protest participation at any time and a question on recent participation among any-time participants. Thus, the independent variable opposes both non-participants and long-ago participants (0) to recent participants (1). As can be seen from the question wording, we do not distinguish between political protest and social or economic protests. We assume that any protest may change political regimes or decisions of national/local governments; therefore, we define it as a political action (Lipsky, 1968). We use the WVS question related to peaceful demonstrations only because the question about illegal uprisings might have not received reliable answers due to potential legal repercussions. In addition, the frequency of protest participation might differ across nations; therefore, we also apply random effects (i.e., "multilevel" model) to account for this heterogeneity across individuals and countries. Figure 1 and Figure A1 in the Online Appendix show the share of protesters in every country where the question was asked. As expected, the number of citizens participating in protests will not be large in some states both due to the rarity of protests themselves and as a result of the potentially costly repercussions of participation in these activities.

Independent Variable: Online News

Based on our testable implications derived above, we include a variable Online News in our analysis. WVS has a direct question regarding online news consumption, asking respondents to report whether they use the Internet to obtain the news about their country or the world: 1—yes, and 0—otherwise.[3] Figure 1 shows the share of online news consumers in every country, where the question was asked. The variable can potentially account for reading online news on news websites such as The New York Times and Google News, as well as on social media: indirect evidence from the United States demonstrates that according to public surveys of Pew Research Center in 2012, more than 49% of American adults read the news via social media such as Facebook and Twitter.

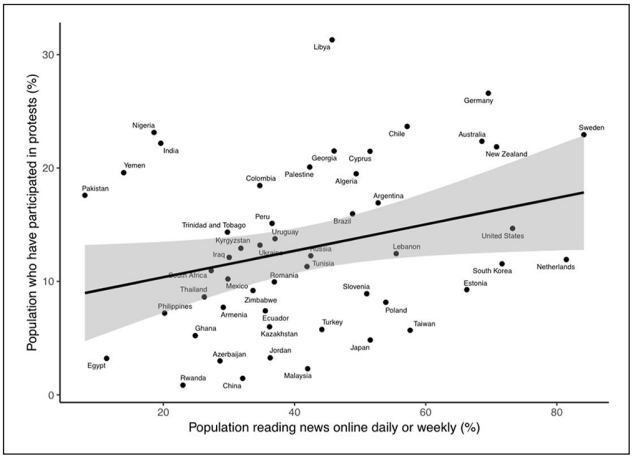

Figure 1. Percentage of respondents who reported that they read news online daily or weekly, and percentage of respondents who reported that they participated in a protest at least once. Source: Inglehart et al. (2014).

As mentioned above, the significance of the effect of online news on protest participation might be the effect of political interest of individuals: those interested in politics might be more likely to read news. If otherwise, interest in politics and news consumption should interact. To deal with this, and by extension to test Hypothesis 1a, we combine the variable *Online News* with the variable *Interest in Politics* (see Table A3 in the Online Appendix for details on variable coding). Thereby, the combined variable *Online News × Interest in Politics* includes the following categories: 0—not interested in politics and do not read online news, 1—interested in politics and do not read online news, 2—not interested in politics and read online news, and 3—interested in politics and read online news.

Control Variables

Individual-Level Variables. We relied on theory and previous research to select control variables (e.g., Koltsova & Kirkizh, 2016; Welzel & Deutsch, 2012). Only those that were significant in a large set of preliminary regression models were left for the final regression analysis: *Membership* as an index of active/inactive membership in political parties, charity organizations, environmental organizations, and professional associations (from 0—not a member to 2—active member);

Friends as a source of news (1—receive the news about the country or the world from friends, and 0—otherwise); *Employment* status (1—employed, 0— otherwise); *Education* (from 1—no formal education to 9—education level with a degree); and *Gender* (1—male, 2—female). For robustness checks, we also created a model that included the media other than the Internet: *Newspapers* (1—read the news, 0—otherwise), *Radio* (1—listen to the news, 0—otherwise), and *TV* (1—watch the news, 0—otherwise). We include these variables because in some less developed countries in our sample traditional media may exert stronger influence on public opinion than online media. The use of friends as news sources is also conceptually important: in some countries, they may be the only sources of alternative news at all.

Aggregated-Level Variables. For the country-level analysis that Hypothesis 2 implies, we included two substantial variables that according to the existing research have strong explanatory power (Bueno De Mesquita & Root, 2000, pp. 197–204; Doucouliagos & Ulubasoglu, 2008; Treier & Jackman, 2008:): *GDP* per capita from the World Bank data and political regime based on the scale of the Polity IV project (Marshall et al., 2016). With the latter variable, we follow Polity IV three-item classification of regimes offered on top of its 20-point scale: this is done to make the possible effect sounder. As a result, we form a three-category variable *Regime*, where 1—democracy (+6 to +10), 2—anocracy (−5 to +5) or transitional regime, and 3—autocracy (−10 to −6). Based on Polity IV classification, countries in transitional states perform traits of both democratic and autocratic regimes in relation to a number of core regime components, such as executive recruitment or executive autonomy constraints. Of special importance for us is the Polity IV *Political Competition and Opposition* component that involves the suppression of oppositional media in transitional regimes and the absence of the former in consolidated autocracies. As the Internet is technically harder to control than traditional media, we expect the effect of online news on protests to be stronger in transitional regimes where we assume to find relatively free online outlets but censored traditional offline media (Hypothesis 2). For testing the hypothesis, we divided the sample into three groups of countries by *Regime* and applied pooled regression models with all of the aforementioned individual-level variables to each of the three groups since the number of observations is sufficient for such a division. We thus obtained three separate models for individuals from democracies, transitional regimes, and autocracies, respectively.

Results

The Effect of Online News

The probability that an individual i in a country j answers that he or she participated in a protest is represented as a function of individual-level and country-level characteristics. In the first hypothesis, we suggest that the probability of protest participation is associated with online news consumption on average across all countries. Since the dependent variable has Bernoulli distribution, we apply the formula for a logit model

$$\pi_{ij} = [1 + exp(-\chi_{ij}\beta)]^{-1} \quad (1)$$

where

$$\chi_{ij}\beta = \alpha_j + \beta_1 News + \beta_{1i} Controls \quad (2)$$

for individual $i = 1, \ldots, n$ in country $j = 1, \ldots, J$. Equation (2) shows that *Online News* and *Controls* are individual-level covariates, and α_j represents a country-level random effect that allows *Online News* to vary across countries. For robustness, we include a covariate *Regime* to see whether there is heterogeneity across political regimes. Thereby, we set α_j in the following way

$$\alpha_j = \gamma_1 Regime, \sigma_\alpha^2 \quad (3)$$

In the interpretation of coefficients, our primary quantity of interest is the first difference (FD), which represents how the probability of protest participation changes as an explanatory variable moves from one substantively meaningful value to another (King et al., 2000).

According to Hypothesis 1a, *Protest Participation* is expected to be positively associated with *Online News.* Thus, the effect of *Online News* should be positive and one or two standard errors should be greater than zero. Table 1 Model 1 shows the results. Figure 2 illustrates the marginal effect of *Online News* for all countries: given an average shift from a category "Do not read online news" to "Read online news," the probability of protest participation increases by 1.8 percentage points (95% confidence interval [CI] = [0.01, 0.02]), almost doubling the effect. The effect remains positive and significant when we control for political *Regime* (Model 2), *GDP* per capita (Model 3), and variation of the effect across countries, namely, random effect of *Online News* as we predicted (Model 4).[4] To compare the effect of online news with news from other types of media, we include variables *Newspapers, Radio*, and *TV* into one of the models. Model 9 presents the results: *Online News* has a larger effect than *Newspapers*, while the coefficients of *Radio* and *TV* are not significant.[5]

The Effect of Interest in Politics

Hypothesis 1b states that the positive relationship between protest participation and an individual's interest in politics will be confined by online news consumption. In other words, we expect to observe a stronger positive relationship between protest participation and interest in politics of a respondent given that he or she reads online news. The hypothesis can be written as

Table 1. Regression Results for Hypotheses 1 and 2 with Different Sets of Controls and Other Robustness Checks.

Dependent variable									
Protest participation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Online news	0.408***	0.398***	0.402***	0.411***	0.322***	0.344***	0.299***	0.554***	0.386***
	(0.033)	(0.034)	(0.034)	(0.070)	(0.050)	(0.042)	(0.069)	(0.102)	(0.034)
		Controlling for political regime	Controlling for GDP per capita	Controlling for political regime	Controlling for self-selection	Only democracies	Only transitional regimes	Only Autocracies	Controlling for newspapers, TV, and radio
N	67,841	65,981	65,981	65,981	65,981	41,451	15,488	7,861	65,981
Country effect	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Random effect	No	No	No	Online news	No	–	–	–	No
Country	48	48	48	48	48	–	–	–	48
Log likelihood	–18,478.00	–17,797.96	–17,693.47	–17,749.88	–17,795.82	–11,714.06	–4,031.15	–1,589.17	–17,688.40

GDP: gross domestic product.

Note. Models in this table are presented in reduced form. For extended versions of models, see Table A1, A2, A3–A7, and A9 in the Online Appendix. Covariates in Models 1–4 and 6–7: interest in politics, communications with friends, membership in social organizations, employment status, gender, and education. Covariates in Model 5 are the same as in Model 2, and the following categories of individuals—who "read online news and interested in politics," "interested in politics but do not read online news," "not interested in politics and do not read online news," and "not interested in politics but read online news"—are predictors of interest whose coefficients we report. Apart from controls mentioned above, every model includes variables that we specify under each coefficient according to our theoretical framework.

Level of significance: ***$p < .01$.

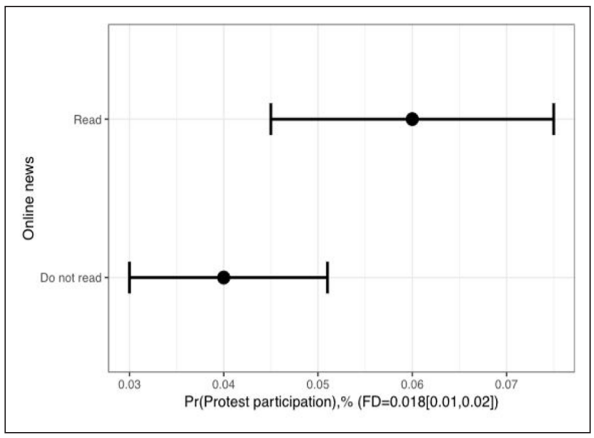

Figure 2. Marginal effects of online news for all countries.

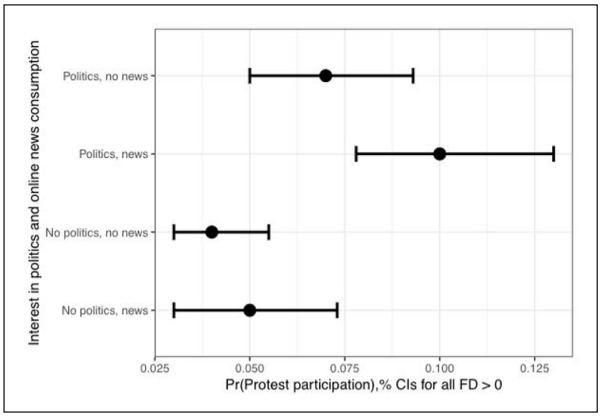

Figure 3. Marginal effects of online news combined with interest in politics for all countries.

$$\chi_{ij}\beta = \alpha_j + \beta_{1i}Politics + (\gamma_{1i} + \gamma_{2i}Politics)News + \beta_{2i}Controls \quad (4)$$

where α_j is also a group predictor for every country. Equation (4) also includes the interaction term that we model through a combination of variables *Online News* and *Interest in Politics*. Due to the nature of these two variables, the resulting variable is not linear, but nominal. Equation (4) defines that the effect of *Interest in Politics* on *Protest Participation* is conditioned on *Online News*. Figure 3 shows that the interest both in politics and in online news demonstrates the largest effect. In particular, this effect is more pronounced than that of interest in politics when not combined with exposure to online news: on average, the probability of protest participation increases by 3 percentage points (95% CI = [0.021, 0.039]) when shifting from the latter to the former. Interestingly, the effect of belonging to the category "interested in politics but do not read online news" is larger than the effect of belonging to those who are "not interested in politics but read online news." A move from one to the other results in the decrease in protest probability by 1 percentage point (95% CI = [0.007, 0.013]). Finally, moving from the category "no politics and no online news" to "not interested in politics but read online news" leads to a 2 percentage point increase in the probability of protest participation (95% CI = [0.012, 0.023]). Overall, the variable *Interest in Politics* × *Online News* demonstrates that news consumption is quite strongly associated with the interest in politics. However, the results show that individuals who read online news but are not interested in politics are more likely to participate in protest than those who are both not exposed to online news and politics. Hence, the effect of online news is significant for all consumers and not restricted to those who are already predisposed to political participation (Model 5).

Effect of Political Regime

As we pointed out earlier, media consumption differs across political regimes because of local law, policies, and political and civil liberties. Hence, the impact of online news on protest participation might change depending on a country and its political climate. Based on this theoretical consideration, we test the second hypothesis that has a form of a model with the individual level only

$$\chi_{i,Democracy}\beta = \beta_{1i}News + \beta_{1i}Controls \quad (5)$$

$$\chi_{iTransitional}\beta = \beta_{1i}News + \beta_{1i}Controls \quad (6)$$

$$\chi_{i,Autocracy}\beta = \beta_{1i}News + \beta_{1i}Controls \quad (7)$$

We exclude country-level predictors because the subsamples we use include too few countries: 30 democracies (Polity IV score +6 to +10), 12 transitional regimes (−5 to +5), and 5 autocracies (−10 to −6). Models 6–8 in Table 1 illustrate the results (for table with countries and full version of tables with regression results, see in Online Appendix). The effect of online news consumption on protest participation is still positive and significant although its values vary across political regimes. In particular, *Online News* had the largest magnitude of effect in autocracies rather than in transitional regimes contrary to what had been expected.

Conclusion

In this article, we have demonstrated that distinguishing online news consumption from general social media use and from general Internet use by plugging it into a political context provides new empirical evidence on the debated role of the Internet in protest behavior. The exposure to online news is positively associated with participation in demonstrations across all countries on an individual level, and especially in autocracies on an aggregated level of analysis. We therefore demonstrate the universal character of Internet influence on protests with the focus

specifically on online news exposure, in contrast to most other studies which focused on social media or on generalized Internet use in separate countries. Our result is stable when a large number of country-level and individual-level control variables are added. Online news exposure turns out to be more important than reading newspapers, which has been traditionally associated with critically thinking audiences, which marks the shift of such audiences from print to online media. The effect of online news consumption is weaker than that of interest in politics; however, none of them is fully caused by the other, and when combined together they reinforce each other and push individuals toward protest participation with a greater power than when they occur separately.

In addition, we find that the effect of online news consumption is strongest in autocracies and weakest in transitional regimes, a finding which goes against one of our hypotheses. This result demands further research: first, it is necessary to test the significance of the difference between these effects, and second, a theoretical interpretation is needed. Different country groupings may yield somewhat different results in the future; however, in any case, the assumption of transitional regimes being the most vulnerable to online news influence does not hold. Another direction for future research is conducting cross-country surveys specifically aimed at capturing protest participation, with protesters being oversampled to overcome the rare-event effect. Such surveys will be more suited for testing various relevant hypotheses, in particular those about explanations of country variance.

Furthermore, although we find that the effect of online news is significant and has the same direction in all countries, its overall magnitude is modest. This is consistent with the observation of Boulianne (2009) made in her meta-analysis of similar papers, but it nevertheless gives rise to further doubts and reflections. First, this counterintuitive result may indicate the need for a more nuanced research of different types of news obtained through the Internet. As different social media platforms have different effects on political knowledge (Reuter & Szakonyi, 2015), different types of political information, too, may affect protest behavior differently. As Little (2015) claims in his formal model, if the obtained information reveals low levels of protest support, whether true or false, it may in fact discourage protest participation. Similarly, Brundidge et al. (2014) find that only pro-attitudinal news encourages political engagement, while counterattitudinal news does not, meaning that encouragement happens only if the political positions of the news item's author and the reader coincide. The importance of knowledge about the number of like-minded people and the level of protest support has been, in fact, underlined in many theoretical and empirical, albeit non-news-centered works (Castells, 2012; Earl & Kimport, 2013). Thus, the situation calls for a differentiated approach to news content when predicting protests.

Second, as online news consumption does not take place in vacuum, it may affect protest participation in a more complex way than directly galvanizing readers into action, while non-readers stay at home. Koltsova and Selivanova (2019) find that more active and more numerous online communities of the same social movement are associated with much higher offline turnout to contentious actions in respective neighborhoods, but, paradoxically, offline protesters are not necessarily those who are most involved in online communities. Two other findings complement this study to lead us to further interpretations. First, as we find in this research, getting news from friends affects protest participation with nearly the same magnitude as online news reading. Second, Schlussman and Soule (2005) found that the best predictor of protest participation is in fact being asked to participate. From this, we can assume that online news can transfer into protest participation in a two-step manner outlined by Lazarsfeld and his colleagues (Katz & Lazarsfeld, 1955) back in the mid-20th century: from online news readers to their non-reading friends via face-to-face contact or via other forms of interpersonal communication (e.g., mobile phones). This effect may have obscured the true significance of online news consumption for protests in our research, as well as significance of other forms of online behavior addressed in other studies. As this effect might be expected to be stronger in small and tightly connected neighborhoods, such as rural communities, our last suggestion for further research would be to attempt examining the relationship between news flows and protest participation separately in rural and urban areas.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. World Values Survey (WVS) has been exploring people's values and beliefs across over the past decades. The database provides survey data from 1981 to 2014, which constitutes six

waves. Each wave covers from 10 to 100 countries (over 1,000 cases for each) and includes from 100 to 400 variables.
2. All questions from WVS and recorded variables that we used in this article are described in Online Appendix.
3. WVS also provides a question for email as a news source that we do use in our analysis. Interestingly, users do not watch online news on the Internet, according to the Digital News Report published by the Reuters Institute on Digitalnewsreport.org.
4. Note that we did not report results for a model with Age included as the variable, which did not provide significant coefficient.
5. We exclude GDP per capita from further analysis for other hypotheses as its coefficient was not significant.

References

Bernhagen, P., & Marsh, M. (2007). Voting and protesting: Explaining citizen participation in old and new European democracies. *Democratization*, *14*(1), 44–72.

Bodrunova, S. S., & Litvinenko, A. A. (2013). New media and the political protest: The formation of a public counter-sphere in Russia, 2008–12. In A. Makarychev & A. Mommen (Eds.), *Russia's changing economic and political regimes: The Putin years and afterwards* (pp. 29–66). Routledge.

Boulianne, S. (2009). Does Internet use affect engagement? A meta-analysis of research. *Political Communication*, *26*(2), 193–211.

Breuer, A., Todd, L., & Farquhar, D. (2014). Social media and protest mobilization: Evidence from the Tunisian revolution. *Democratization*, *103*(3), 201–220.

Brundidge, J., Garrett, K. R., Rojas, H., & de Zúñiga, H. G. (2014). Political participation and ideological news online: Differential gains and differential losses in a presidential election cycle. *Mass Communication and Society*, *17*, 464–486.

Bueno De Mesquita, B., & Root, H. L. (2000). *Governing for prosperity*. Yale University Press.

Castells, M. (2012). *Networks of outrage and hope: Social movements in the Internet age*. Polity Press.

Coffé, H. (2017). Citizens' media use and the accuracy of their perceptions of electoral integrity. *International Political Science Review*, *38*(3), 281–297.

Dalton, R., van Sickle, A., & Weldon, S. (2010). The individual-institutional nexus of protest behaviour. *British Journal of Political Science*, *40*(1), 51–73.

Doucouliagos, H., & Ulubasoglu, M. (2008). Democracy and economic growth: A meta-analysis. *American Journal of Political Science*, *52*(1), 61–83.

Earl, J., & Kimport, K. (2013). *Digitally enabled social change: Activism in the Internet age* (Reprint ed.). MIT Press.

Enikolopov, R., Makarin, A., & Petrova, M. (2020). Social media and protest participation: Evidence from Russia. *Econometrica*, *88*(4), 1479–1514.

Farrell, H. (2012). The consequences of the Internet for politics. *Annual Review of Political Science*, *15*, 35–52.

Garrett, R. K. (2006). Protest in an information society: A review of literature on social movements and new ICTs. *Information, Communication and Society*, *9*(2), 202–224.

Hollyer, R. J., Rosendorff, P. B., & Vreeland, J. R. (2015). Transparency, protest, and autocratic instability. *American Political Science Review*, *109*(4), 764–784.

Howard, P. (2011). *Digital origins of dictatorship and democracy: Information technology and political Islam*. Oxford University Press.

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizlova, K., Diez-Medrano, J., . . . & Puranen, B. (Eds.) (2014). World Values Survey: Round Six – Country-Pooled Datafile Version: www.worldvaluessurvey.org/WVSDocumentationWV6.jsp. Madrid: JD Systems Institute.

Kalathil, S., & Boas, T. C. (2003). *Open networks, closed regimes: The impact of the Internet on authoritarian rule*. Carnegie Endowment for International Peace.

Katz, E., & Lazarsfeld, P. F. (1955). *Personal influence: The part played by people in the flow of mass communications*. Free Press.

Kaufhold, K., Valenzuela, S., & de Zúñiga, H. G. (2010). Citizen journalism and democracy: How user-generated news use relates to political knowledge and participation. *Journalism and Mass Communication Quarterly*, *87*(3-4), 515–529.

Kenski, K., & Stroud, N. J. (2006). Connections between Internet use and political efficacy, knowledge, and participation. *Journal of Broadcasting and Electronic Media*, *50*(2), 173–192.

King, G., Tomz, M., & Wittenberg, J. (2000). Making the most of statistical analyses: Improving interpretation and presentation. *American Journal of Political Science*, *44*:, 341–355.

Knobloch-Westerwick, S., & Johnson, B. (2014). Selective exposure for better or worse: Its mediating role for online news' impact on political participation. *Journal of Computer Mediated Communication*, *19*(2), 184–196.

Koltsova, O. Y., & Kirkizh, N. (2016). The effect of the Internet on protests. *Politia*, (1C), 90–110.

Koltsova, O. Y., & Selivanova, G. (2019). Explaining offline participation in social movement with online data: The case of observers for fair elections. *Mobilization: An International Quarterly*, *24*(1), 77–94.

Kricheli, R., Livne, Y., & Magaloni, B. (2011). Taking to the streets: Theory and evidence on protests under authoritarianism. APSA 2010 Annual Meeting Paper. https://ssrn.com/abstract=1642040

Ladd, M. J., & Lenz, G. S. (2009). Exploiting a rare communication shift to document the persuasive power of the news media. *American Journal of Political Science*, *53*(2), 394–410.

Lipsky, M. (1968). Protest as a political resource. *American Political Science Review*, *62*(4), 1144–1158.

Little, T. A. (2015). Communication technology and protest. *Journal of Politics*, *78*(1), 152–166.

Lorentzen, P. (2014). China's strategic censorship. *American Journal of Political Science*, *58*(2), 402–414.

Marshall, G. M., Gurr, T. R., & Jaggers, K. (2016). *Polity™ IV project: Political regime characteristics and transitions, 1800-2015: Dataset users' manual*. Center for Systemic Peace and Societal-Systems Research. http://www.systemicpeace.org/inscr/p4manualv2016.pdf

Meirowitz, A., & Tucker, J. (2013). People power or a one-shot deal? A dynamic model of protest. *American Journal of Political Science*, *57*(2), 478–490.

Morozov, E. (2011). *The net delusion: The dark side of Internet freedom*. Public Affairs.

Petrova, M. (2008). Income inequality and media capture. *Journal of Public Economics*, *92*(1–2), 183–212.

Prior, M. (2007). *Post-broadcast democracy: How media choice increases inequality in political involvement and polarizes elections*. Cambridge University.

Reuter, J. O., & Szakonyi, D. (2015). Online social media and political awareness in authoritarian regimes. *British Journal of Political Science*, *45*(1), 29–51.

Schlussman, A., & Soule, S. A. (2005). Process and protest: Accounting for individual protest participation. *Social Forces*, *84*(2), 1083–1108.

Tang, M., & Huhe, N. (2014). Alternative framing: The effect of the Internet on political support in authoritarian China. *International Political Science Review*, *35*(5), 559–576.

Theocharis, Y., & Lowe, W. (2016). Does Facebook increase political participation? Evidence from a field experiment. *Information, Communication and Society*, *19*(10), 1465–1486.

Treier, S., & Jackman, S. (2008). Democracy as a latent variable. *American Journal of Political Science*, *52*(1), 201–217.

Tufekci, Z., & Wilson, C. (2012). Social media and the decision to participate in political protest: Observations from Tahrir square. *Journal of Communication*, *62*(2), 363–379.

Valenzuela, S., Arriagada, A., & Scherman, A. (2012). The social media basis of youth protest behavior: The case of Chile. *Journal of Communication*, *62*, 299–314.

Vissers, S., Hooghe, M., Stolle, D., & Maheo, V.-A. (2012). The impact of mobilization media on off-line and online participation: Are mobilization effects medium-specific? *Social Science Computer Review*, *30*(2), 152–169.

Welzel, C., & Deutsch, F. (2012). Emancipative values and non-violent protest: The importance of ecological effects. *British Journal of Political Science*, *42*(2), 465–479.

Wojcieszak, M., Bimber, B., Feldman, L., & Stroud, N. J. (2016). Partisan news and political participation: Exploring mediated relationships. *Political Communication*, *33*(2), 241–260.

Wolfsfeld, G., Segev, E., & Sheafer, T. (2013). Social media and the Arab Spring: Politics comes first. *International Journal of Press/Politics*, *18*(2), 115–137.

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Appendix B.

Paper 2: Issue Trade-Off and the Politics of Representation: Experimental Evidence from Four European Democracies

Authors

Nora Kirkizh, Sebastian Stier, Caterina Froio

In

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Abstract

The politics of representation has become increasingly complex in recent years. Amid weakening traditional political cleavages, the emergence of new political divides and mounting anti-elitism that have helped the rise of radical populist parties, voters face significant cross-pressures when casting their ballots. Despite a wealth of studies on the role of issue preferences in voting behaviour, there are still many unknowns when it comes to understanding how voters trade off competing issue preferences against each other. Studying issue trade-offs is also important against the backdrop of the well-documented preferences of radical left and right voters for redistribution and restrictive immigration policies, respectively. To investigate the strength of issue preferences among radical left, radical right and mainstream party voters and the willingness to compromise on their most important issues, we conducted a conjoint survey experiment with 2,000 participants in France, Germany, Italy and Spain. The voting scenario in the experiment featured proposals on salient political issues and different (non)populist stances on political representation. The results from the cross-country study, as well as a large replication study with a sample of 4,000 German respondents, show that voters of radical right parties are willing to accept large trade-offs regarding their other issue preferences as long as their preference for restrictive immigration policies is fulfilled. Differently, radical left, Green and mainstream party voters have a more variegated range of issue

preferences, some of them so strong that they are not traded off for their preferred redistribution and European Union integration positions, respectively. The findings shed light on trade-offs related to emerging issues such as climate change and the distinct logics behind support for radical parties. They also have implications for the electoral prospects of mainstream and radical parties when trying to reposition themselves in the diversifying issue space of contemporary democracies. As such, understanding how voters navigate issue cross-pressures helps to explain the broader dynamics that are (re)configuring political conflict and voting behaviour in Europe.

Contribution of thesis author

My contributions to the paper encompasses formulating hypothesis and theory, designing conjoint experiments, data processing, and data analysis.

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Issue trade-offs and the politics of representation: Experimental evidence from four European democracies

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Abstract. The politics of representation has become increasingly complex in recent years. Amid weakening traditional political cleavages, the emergence of new political divides and mounting anti-elitism that have helped the rise of radical populist parties, voters face significant cross-pressures when casting their ballots. Despite a wealth of studies on the role of issue preferences in voting behaviour, there are still many unknowns when it comes to understanding how voters trade off competing issue preferences against each other. Studying issue trade-offs is also important against the backdrop of the well-documented preferences of radical left and right voters for redistribution and restrictive immigration policies, respectively. To investigate the strength of issue preferences among radical left, radical right and mainstream party voters and the willingness to compromise on their most important issues, we conducted a conjoint survey experiment with 2,000 participants in France, Germany, Italy and Spain. The voting scenario in the experiment featured proposals on salient political issues and different (non)populist stances on political representation. The results from the cross-country study, as well as a large replication study with a sample of 4,000 German respondents, show that voters of radical right parties are willing to accept large trade-offs regarding their other issue preferences as long as their preference for restrictive immigration policies is fulfilled. Differently, radical left, Green and mainstream party voters have a more variegated range of issue preferences, some of them so strong that they are not traded off for their preferred redistribution and European Union integration positions, respectively. The findings shed light on trade-offs related to emerging issues such as climate change and the distinct logics behind support for radical parties. They also have implications for the electoral prospects of mainstream and radical parties when trying to reposition themselves in the diversifying issue space of contemporary democracies. As such, understanding how voters navigate issue cross-pressures helps to explain the broader dynamics that are (re)configuring political conflict and voting behaviour in Europe.

Keywords: cleavages; issue trade-offs; radical right parties; radical left parties; survey experiment

Introduction

Individuals vote for political parties that represent them. This is at least what one can expect assuming that voting decisions are straightforward. However, the politics of representation is becoming more complex, at least in European multiparty systems where the diversity of party options and the variety of issue interests make individuals' voting choices increasingly difficult. The historical decline of party identification (Dalton & Wattenberg, 2002; Mair, 1989), together with the reconfiguration of the Rokkanian political cleavages and the emergence of radical populist parties (Mudde & Kaltwasser, 2012) contribute to make voting choices progressively less structured along the classic lines of political conflict (Hutter & Kriesi, 2019), putting traditional models of voting behaviour under strain. In this post-Rokkanian context, a voter who holds policy preferences across various issues can be pushed in different political directions because she can

value some issues more than others when casting her ballot (Chou et al., 2021). At times in which European party systems are undergoing major transformations, how do cross-pressured voters weigh different, at times conflicting, issue preferences? What are the issues on which voters are likely to compromise? And are there differences between voters of radical and mainstream parties in terms of the issue trade-offs they are willing to make?

The relevance of issue-cross pressures in voting decisions has been acknowledged before (He, 2016; Lefkofridi et al., 2014) but empirical findings on how citizens navigate competing issue preferences remain sparse. In fact, despite a wealth of single-country or comparative studies on electoral behaviour (Arzheimer, 2018; Rooduijn, 2018; Steiner & Hillen, 2021), the primarily survey-based evidence makes it hard to study issue-cross pressures, for at least two reasons. First, while available survey batteries offer insights on preferences concerning multiple issues independently, we cannot infer how respondents trade off their issue preferences *against each other* to satisfy their most important one. And second, surveys do not allow for drawing causal inferences about which issue preferences ultimately drive vote choices.

This paper employs an issue-centred research design that allows us to identify the conditions under which voters are (un)willing to trade off some preferences for others. We compare the behaviour of radical left and radical right voters who are known to have peculiar preferences on the issues of redistribution and immigration, respectively, with voters of mainstream parties. Specifically, we conducted conjoint experiments in France, Germany, Italy and Spain, where different types of radical parties have broken through. Participants were asked to choose between two hypothetical candidates in the next national parliamentary election who present diverging proposals on salient political issues and different stances on political representation. Randomizing the candidates' proposals on issues allowed us to identify the causal effect of each issue position on candidate choice. We avoided the confounding influence of party cues on issue trade-offs by not assigning party labels to candidates and taking information on party attachment from surveys run months before the experiment. As a validation of the results, we again implemented the same experimental setup almost 2 years later using a large German sample selection according to population margins.

The findings from all studies samples consistently show that voters of radical right parties are less likely to compromise on their most important issue. As a consequence, radical right voters are willing to accept even large trade-offs regarding undesirable proposals on climate change and European Union (EU) integration in order to achieve restrictive immigration policies. Differently, radical left voters have less skewed issue orientations: they have strong preferences on redistributive policies but are still less likely to accept candidates that additionally propose undesirable issue proposals, for example, climate denialist stances. Taken together, the study contributes to understanding long-term prospects for vote choices and the reconfiguration of politics in Europe, revealing complex patterns of issue (de)alignment of voters in contemporary democracies.

Political cleavages, issue-cross pressures and individuals' vote choices

The politics of representation is becoming increasingly multidimensional, at least in political systems where a variety of issue interests and political parties make individual vote choices more difficult. In this regard, an impressive body of research has examined the factors determining voting choices. Yet, despite recent advances (He, 2016; Lefkofridi et al., 2014; Steiner & Hillen,

2021), only scarce attention has been paid to measuring and examining the consequences of issue-cross pressures that relate to 'inconsistencies among individuals' attitudes towards various political objects' (He, 2016, p. 364). Our goal is to address this gap, shedding light on the impact of issue-cross pressures on vote choices and to examine the mechanisms of how voters of different party families trade off various issue preferences against each other.

The relevance of different kinds of cross-pressures in voting decisions has been the focus of three major research schools. To begin with, the sociological model of voting behaviour proposed by Lazarsfeld et al. (1944) and colleagues at Columbia University contended that individuals' vote choices were heavily influenced by demographic characteristics and that belonging to a social group would be the predominant factor in determining voting decisions. In follow-up studies, they acknowledged the possibility of issue-cross pressures as they found some inconsistencies between policy preferences related to demographic indicators and those emerging from the characteristics associated with the groups to which individuals belong (Berelson et al., 1954). In their interpretation, these tensions would make individual voting decisions more difficult as they need to trade off some concerns over others.

A second major contribution to the study of vote choices came from the socio-psychological model of voting behaviour, initiated at the University of Michigan (Campbell et al., 1960). These scholars assumed that party identification was central in informing voting decisions. Still, Campbell and colleagues also provided the theoretical tools to account for issue-cross pressures as they clarified that partisanship is not a factor that determines unambiguously how individuals will cast their ballots. Rather, it has to be understood as a 'filter' through which voters appreciate what is favourable to the orientation of the party and ignore (or value less) what is considered unfavourable. In other words, partisanship functions as an instrument to 'decipher' electoral campaigns and candidates' proposals.

Further theoretical elaboration came from the macro-sociological approach that understood Western European party systems as reflecting historical divisions originating in national revolutions (Lipset & Rokkan, 1967). Starting from the 1970s, the 'defreezing' of traditional political cleavages (Inglehart, 1971) contributed to the decreasing role of party identification in voting decisions (Dalton & Welzel, 2014). At the same time, these transformations of the political space have accompanied the emergence of novel parties in European party systems, notably Green parties and radical populist parties, increasing the diversity of available options and making voting choices even more complex (Ignazi, 1992). Scholars suggest that in this post-Rokkanian political space, voting choices are increasingly determined by two main socio-political divides: an economic and a cultural one that may also create contradictory policy preferences (Hutter & Kriesi, 2019; Kriesi et al., 2012; Rovny & Polk, 2020).

While the specific issues of economic competition may vary from election to election, at a more abstract level, political competition on the economy tends to include debates about pro-state and pro-market positions (Castles et al., 1997; Traber et al., 2018). Specifically, this emergent economic divide opposes the advocates of a more interventionist state in regulating the economy, promoting social policies and setting taxation levels to those who call for a more limited role of governments (Dalton, 2018; Kitschelt, 1994). Another core political divide in contemporary European societies involves issues underlying a cultural cleavage. Central in these debates are newer issues associated with globalization, notably EU integration, immigration and, more recently, climate change (Hooghe & Marks, 2018; Kriesi et al., 2012; Treib, 2021). The transformation of the political space provides critical opportunities for both mainstream and radical parties that try to take up evolving

preferences and values, (re)positioning themselves along these conflict lines. So far, cultural issues appear to be most central in explaining the vote for populist radical right parties but not for radical left or mainstream parties (Arzheimer, 2018; Rooduijn, 2018).

The literature on the drivers of voting behaviour helps understanding that voting decisions are far from being straightforward. They are mediated by multiple, at times conflictual, individual issue preferences that cut across established and newer political cleavages. Still, available knowledge tends to overlook that as a response to partisan dealignment and changing lines of political conflict, cross-pressured individuals must and do trade off issues in formulating voting decisions. In line with the notions of 'cross-cutting cleavages' (Rokkan, 1967), 'cross-cutting pressures' (Berelson et al., 1954) or 'issue cross-pressures' (He, 2016), a voter's congruence with a candidate's proposals on redistribution can be counteracted by a candidate's incongruent positions on immigration. Therefore, in most voting scenarios, the same voter has to trade off several more or less important preferences against each other to see her favourite one fulfilled.

More recently, researchers have started to use experimental designs to study the causal effects of voters' issue preferences on vote choice (Chou et al., 2021; Graham & Svolik, 2020; Hanretty et al., 2020; Neuner & Wratil, 2022). Most closely related to our work are several conjoint studies with related, yet distinct, research questions. Chou et al. (2021) designed candidate profiles with German party labels to investigate vote switching of radical right party supporters conditional on their issue preferences. The study found that *AfD* voters are willing to vote for mainstream parties that propose a complete stop of immigration. However, they also show that such an accommodation strategy alienates the core voters of mainstream parties. Another study of the Germany context investigated the electoral effects of 'thin' populist stances of candidates versus 'thicker' populist issue bundles. The authors identify differences in voters' issue priorities depending on individual levels of populist attitudes, but that anti-immigrant and pro-redistribution positions increase the appeal of German candidates, on average (Neuner & Wratil, 2022). Finally, Franchino and Zucchini (2015) used student samples to study the importance of valence issues in vote choices.

In sum, to the best of our knowledge, no existing study has experimentally compared the willingness to trade off different issue preferences among radical left, radical right and mainstream party voters across multiple countries. To address this gap, we designed a candidate conjoint experiment with respondents from France, Germany, Italy and Spain, including the most salient contemporary issues as well as an attribute capturing populist stances of candidates. In the next section, we formulate expectations about the drivers of issue trade-offs in vote choices for different groups of voters.

Hypotheses: How issue trade-offs shape vote choices

In our understanding, issue preferences cross-cut a bundle of distinct issues that may generate conflict in voting decisions. To resolve these conflicts, voters have to make issue trade-offs depending on the intensity of their specific preferences. In other words, when a candidate proposes the most desirable solution, voters will have to also accept less desirable proposals – at least to some extent. For example, voters who attach a high value to redistribution may be willing to compromise on EU integration and immigration as long as their redistribution preference is fulfilled. This theoretical framework has a high external validity, as a perfect party-voter congruence can only rarely be observed empirically (Costello et al., 2020; Steiner & Hillen, 2021; Traber et al., 2018). The literature on political parties helps identifying relevant overlapping

or contrasting issue preferences, informing how voters of different party families approach issue trade-offs.

Differently from voters of mainstream parties, which we understand as non-radical 'traditional' party families ranging from Green parties to conservatives, radical electorates have been shown to share dissatisfaction with the functioning of government, and express lower trust in political institutions. This more adversarial approach to conventional politics can be expected to yield major differences in issue trade-offs between voters of mainstream and radical parties (Van Hauwaert & Van Kessel, 2018). Radical voters, in fact, may have stronger preferences on specific questions they regard as underrepresented in mainstream party politics and may be less ready than their non-radical counterparts to trade off these. Accordingly, we expect that

H1: Voters of mainstream parties are willing to accept larger trade-offs regarding their most important issue preference than voters of radical left and radical right parties.

Beyond preferences about conventional politics, more specific campaigns associated with radical right and radical left parties can be expected to inform issue trade-offs. Various studies show that vote choices for radical right parties are primarily motivated by preferences on immigration (Arzheimer, 2018; Halikiopoulou & Vlandas, 2020; Van Hauwaert & Van Kessel, 2018). This does not mean that a prototypical voter of the radical right is only concerned about immigration, but it means that this voter has stronger political preferences for the anti-immigrant claims that feature prominently in the campaigns of these parties (Halikiopoulou, 2019; Mudde, 2007). We expect that radical right voters' resolute preferences over immigration might thus make them regard other issue preferences as less desirable or important.

H2: Voters of radical right parties are willing to accept large trade-offs regarding their other issue preferences as long as their preference for restrictive immigration policies is fulfilled.

It has also been shown that radical left electorates hold peculiar preferences over specific issues. While differences between mainstream left and right parties have become more blurred over time, radical left parties continue to campaign and appeal to voters who are primarily concerned about the skewed socioeconomic structure of contemporary capitalism (March, 2012) and to call for a reduction of inequalities through redistribution, state subsidies and other major changes in economic and power structures (Ramiro & Gomez, 2017; Rooduijn, 2018). In sum, one may expect that voters of radical left parties hold stronger preferences for redistribution and are ready to trade off other issues considered as less important.

H3: Voters of radical left parties are willing to accept large trade-offs regarding their other issue preferences as long as their preference for redistributive policies is fulfilled.

Assuming that radical left or right voters have rather peculiar tendencies when it comes to accepting trade-offs in their issue preferences, it is an intriguing question whether they differ in their desire to have their strongest preference fulfilled. While there is evidence that radical left and radical right electorates have different preferences about pluralism in society (Rooduijn et al., 2017), such as minorities' rights, other studies show that both groups tend to have strong preferences for opposition to globalization and EU integration (Visser et al., 2014), even if scholars identify different types of nationalism that inform these positions (Halikiopoulou et al., 2012).

Another issue where there may be more common ground than assumed in the previous hypotheses is redistribution. While radical right parties display and appeal to voters who hold more blurred positions on redistribution (Rovny & Polk, 2020), they still promise consumptive social policies while deemphasizing social investment policies (Enggist & Pinggera, 2022). A substantial share of so-called 'left authoritarians' without proper party representation (Lefkofridi et al., 2014; Steiner & Hillen, 2021) also speaks for similarities, or at least smaller issue trade-offs that radical left and radical right voters might be willing to accept for one specific issue. The group of radical left voters should have become even more cross-pressured with the advent of post-materialist issues such as climate change that are salient in the platforms of left parties (Farstad, 2018).

In sum, previous literature has identified contradictory trends when it comes to the relative weight of different issues in the preference order of radical left and right voters. After all, it might be that these voter groups feel more cross-pressured beyond their primary orientation towards redistribution and immigration, respectively. To accommodate for unresolved puzzles in the literature, we formulate additional open questions for the analysis: What are the issues important to radical left and right voters besides redistribution and immigration, respectively? Are there differences between radical left and radical right voters in their willingness to compromise on their most important issue preference?

Data and methods

Sample

To test our hypotheses on issue trade-offs and the differential reactions of voters of radical and mainstream parties, we needed to collect information about study participants' party attachment. While our survey experiment investigates candidate choice in national parliamentary elections, we identified supporters of different party families based on original surveys conducted during the 2019 European Parliament (EP) election, several months before the experiments took place. This two-step sampling frame allowed us to avoid asking participants about their party identification or previous voting behaviour in the immediate context of the experiment. Enquiring about party affiliation in such a setting might result in biases, either in the survey responses when asked post-treatment or experimental behaviour when asked pre-treatment.

In the first recruitment stage, we conducted online surveys as part of a bigger project in France, Germany, Italy and Spain 1 month before and immediately after the 2019 EP election that took place from 23 to 26 May 2019. These countries have been selected because they host both radical right (*AfD*, *FN/RN*, *Lega*, *Vox*) and radical left parties (*Die Linke*, *La France Insoumise*, *Podemos*, *Potere al Popolo*). We selected 6,374 respondents as quota samples from online access panels maintained by the market research firm *Netquest*. While the demographic composition came close to general population margins, the recruitment into the online access panel was not probability based. Additionally, our study contained a module including an incentivized tracking of web browsing behaviour. Therefore, the set of study participants has to be regarded as a convenience sample. However, the sample serves our purposes well, as we used the larger pool of respondents to identify a relevant subset of participants for our survey experiments.

In the second recruitment stage, we aimed to maximize participation of voters of radical right parties in the experiment and invited a set of radical left and mainstream party voters as the control group of equal size, with party classifications taken from PopuList and ParlGov (Döring &

Manow, 2019; Rooduijn et al., 2019) (a flowchart of the sampling process can be found in Online Appendix Section A1). To determine the party attachment of participants, we used the following criteria: (1) party identification (pre-election survey), (2) intention to vote for a party in the 2019 EP election (pre-election survey), (3) voted for a party in the 2019 EP election (post-election survey), (4) voted for a party in the previous national parliamentary election (in France, presidential election) or (5) party identification (post-treatment question in the experimental survey). While the final set of respondents did not necessarily vote for a given party in recent elections, they at least considered doing so and/or identified with one. Voters of Christian democratic, Conservative, Green/Ecologist, Liberal and Social democratic parties (Döring & Manow, 2019) were grouped together as the comparison group of mainstream voters (e.g., voters of *La République En Marche!*, *Les Républicains* in France, *CDU/CSU*, *SPD*, *Grüne* in Germany, *+Europa/Radicali*, *Partito Democratico (PD)* in Italy, *PP*, *PSOE* in Spain, along with smaller parties (see Table A5 in the Online Appendix). In cases where the party differed across an individual's survey responses, we prioritized the party identification response, which is the strongest signal of a partisan identity. Online Appendix Section A6.3 contains robustness tests for respondents with consistent and inconsistent party preferences.

In total, we invited 2,867 persons to take part in a conjoint survey experiment (Hainmueller et al., 2014), in which 1,951 respondents participated (see Online Appendix Section 1 for a description of the sample).[1] The experiment was in the field from 16 to 27 March 2020.[2] After the experiment, we also asked respondents about their party identification again. Comparing party identification responses in May 2019 and their responses post-treatment in the experimental survey in March 2020 reveals considerable stability: the party family remained unchanged for 82 per cent of respondents who reported having a party identification in both surveys.

To assess the robustness of our results, we reran the exact same experiment with another sample almost 2 years later in January 2022. We drew 4,016 German participants from the online access panel of *respondi* based on German population margins (see the sample composition in Online Appendix Section A8). A power analysis using the *R* package *cjpowR* (Schuessler & Freitag, 2020) demonstrates that the sample size provides sufficient statistical power for all subgroups (Online Appendix Section A9), including radical left voters that are underrepresented in the cross-country sample.

Survey experiment design

This study uses choice-based conjoint experiments that allow to identify voters' issue preferences in a multidimensional setting (Hainmueller et al., 2014). The survey experiment consisted of eight tasks (or screens), where participants were asked to choose between two hypothetical candidates who are running in the next national parliamentary election. Every candidate had five attributes with three randomized levels that each represent a different issue proposal. The attribute order was randomized for every respondent once at the beginning of the survey experiment.

By asking voters to choose their preferred candidate among two options we can assess the causal effects of each issue proposal on vote choices. Importantly, unlike traditional surveys, 'forced' choice-based survey experiments immerse a voter into a multidimensional issue environment where she is cross-pressured and has to trade off her issue preferences and eventually choose only one candidate, thereby revealing the relative preference for each issue proposal. Every candidate profile had a neutral label 'Candidate 1' or 'Candidate 2'. We avoided

gender-sensitive variants of 'candidate' (e.g., 'Kandidat*in' in German) as radical right voters might regard such labels as 'gender mainstreaming' which might affect response behaviour. We also did not assign party labels to candidate profiles. While we acknowledge that scenarios where voters will participate in elections without party cues are unrealistic, nevertheless, testing our hypotheses requires candidate profiles without party labels, as the literature shows that partisanship clearly affects vote choices (Kirkland & Coppock, 2018; Franchino & Zucchini, 2015; Hainmueller et al., 2014; Neuner & Wratil, 2022) and that issue preferences are confounded by party preferences and issue ownership (Campbell et al., 1960; Franchino & Zucchini, 2015, p. 224; Kirkland & Coppock, 2018, p. 573). Therefore, in our study, we aim to isolate voters' issue preferences from party cues as much as possible by not using party labels. The setup of the conjoint survey experiment including screenshots is described in Online Appendix Section A3.

Attributes and levels

The substantive goal of the experiment was to provide a realistic representation of the most salient contemporary issues across all party families that are reconfiguring political conflict in Europe (Kriesi et al., 2012). To create a list of relevant issues (or *attributes*) on which candidates present a specific proposal (*levels*), we did extensive research incorporating information from the demand side (voters) and supply side (political parties). As the point of departure, we analysed the most important problem perceptions ('MIP', using the standard Eurobarometer issue battery) of radical right and radical left voters in our own surveys. We studied in detail the party manifestos for the 2019 EP election and recent national elections to empirically identify the most important issues and associated issue positions (Online Appendix Section A4.2). We also downloaded 121,108 Facebook posts posted by the biggest national parties in 2019 to verify that the chosen issues were also salient in party communication (Online Appendix Section 4.3). Finally, we consulted with 11 experts on populism and party politics at various stages of the design of the experiment to create levels (issue proposals) that were applicable across countries.

Of the surveyed issue categories, living costs, unemployment and the economy were salient in our sample and also in parallel Eurobarometer surveys of the general population (Online Appendix Section A4.1). *Immigration* was by avfar the most important perceived problem for radical right voters, whereas social security and the environment ('The environment, climate and energy issues') stood out more clearly among radical left voters. In the survey, we also asked for free-text descriptions describing the chosen most important problem briefly so that we better understand how respondents interpret political issues. The issue descriptions provided by respondents indicate that their concerns boiled down to personal economic fears and not being able to cover the costs of daily life (see word clouds in Online Appendix Figure A6). Therefore, as a construct capturing preferences regarding *redistribution*, we tapped into a traditional survey question on the role of the state in the economy (interventionist vs. non-interventionist) but tailored it towards subsidies on staples and housing that would directly reduce living costs. Accordingly, the item should not just capture radical left voters' well-documented preference for state intervention in social policies but also radical right voters' consumption-oriented demands towards the welfare state (Enggist & Pinggera, 2022). In addition, we included positions on the *European Union* that have become entangled in an 'emerging centre-periphery cleavage' (Treib, 2021, p. 175) driven by Eurosceptic populist parties, and *Climate change*, an increasingly salient issue in European democracies (Farstad, 2018), most notably after the emergence of the movement

Table 1. Attributes and levels (proposals) in the conjoint survey experiment

Attributes	Levels for Candidate 1 and Candidate 2	Theoretical concept
Immigration	Introduce controls at [country's] border to prevent illegal immigration Keep current immigration policy Remove restrictions on immigration	Closed state Status quo (SQ) Open state
Redistribution	Individuals instead of the state should provide for their staples and housing Keep targeted state subsidies on staples and housing The state should increase subsidies on staples and housing	Non-interventionist state SQ Interventionist state
European Union	Leave the common currency Euro Keep the EU institutions like they are Weaken the veto rights of EU member states to empower the EU	Oppose EU integration SQ Support EU integration
Climate	There is no need to reduce CO_2 emissions Introduce a CO_2 tax for corporations Introduce a CO_2 tax for corporations and citizens	Climate change denial SQ/impersonal measure Universal measure
Reason for running	Because corrupt elites don't represent the real people To participate in policy making To continue to serve the government	Populist SQ/neutral Mainstream

Fridays for Future.[3] Finally, in order to capture preferences for a populist stance towards political representation, we included a *Reason for running* item, adjusted from the conjoint study of Chou et al. (2021).[4]

The final list of attributes and levels can be found in Table 1. Although we focus on radical right and radical left voters, we still wanted to compare their voting behaviour to voters of mainstream parties. Thus, we drew policy proposals from across the ideological spectrum (Online Appendix Section A4.2). We constructed attribute levels as follows: the first level is a right/authoritarian/nationalist policy proposal, the middle category is the status quo, and the third level is a left/liberal proposal, either in terms of economic or GAL-TAN issues. Choosing a similar number of levels for each attribute makes it possible to compare the relative importance of issue proposals across and within attributes.

Results

For reporting the key findings of the conjoint analysis, we used marginal means (MMs) as our estimand (Leeper et al., 2020), which has a straightforward interpretation as probabilities with binary outcome variables such as ours – the choice of a candidate. A MM of 0 means that respondents chose a particular profile feature with zero probability, a MM of 1 means the candidate profile with that feature was always chosen, ignoring all other features. Instead of a reference category, we chose a 0.5 probability to indicate that the feature was not significant for respondents in their choice of a candidate profile. We obtained MMs from simple ordinary least squares regression models. Because the features (levels) of candidate profiles were randomized, the effect of every feature on candidate choice in the conjoint experiment can be causally interpreted. We designed the levels in the conjoint experiment in a way that allowed for a complete randomization, meaning that a candidate profile could take any attribute combination

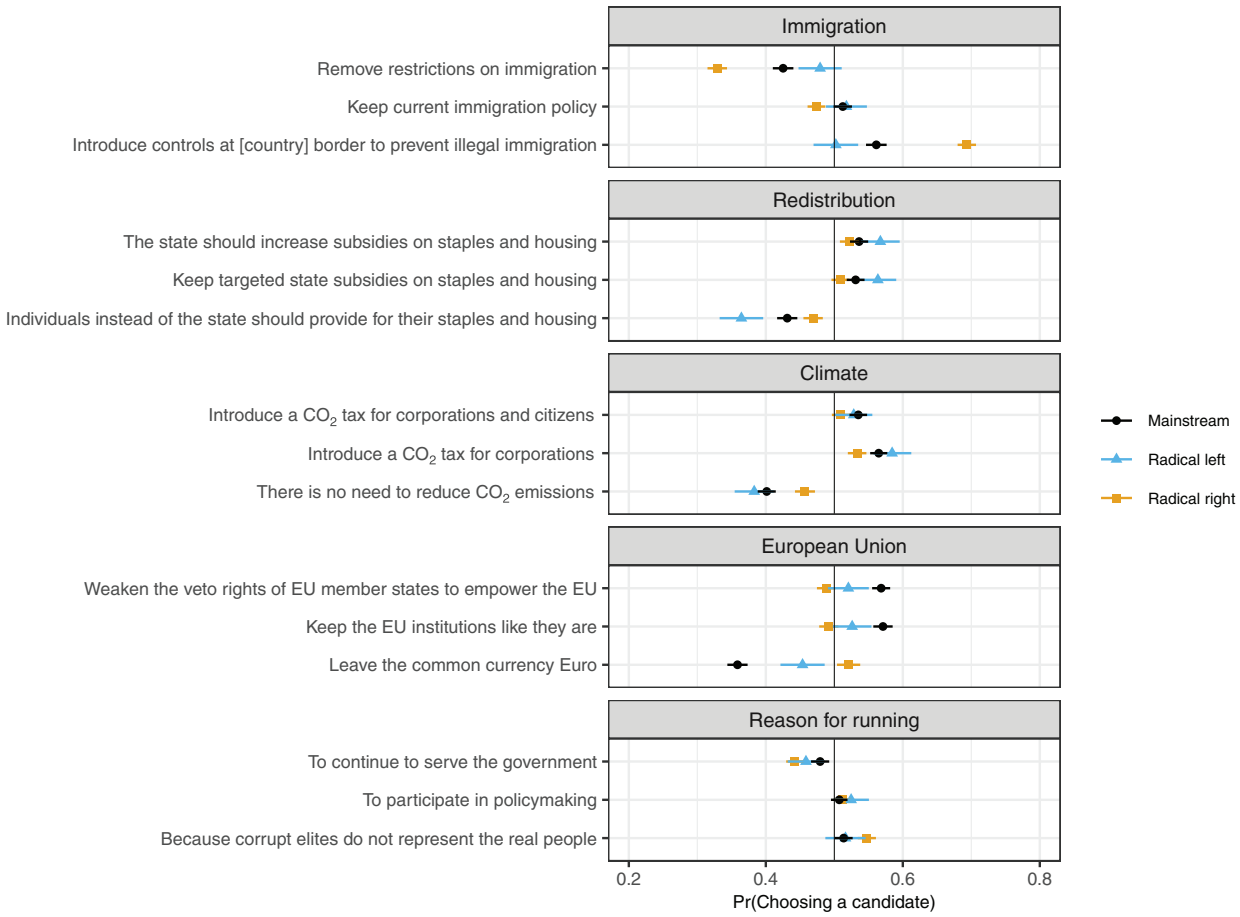

Figure 1. The effect of candidates' issue proposals on candidate choice in the conjoint survey experiment for radical left, radical right and mainstream party voters. Error bars represent 95 per cent confidence intervals. [Colour figure can be viewed at wileyonlinelibrary.com]

and every feature had the same probability to appear in a profile. All analyses were performed in *R*, version 4.2.1. Replication materials including data and *R* scripts are available on OSF: https://doi.org/10.17605/OSF.IO/8P54D

Identifying issue preferences among different groups of voters

To test our hypotheses, we first needed to examine if radical right, radical left and mainstream voters have a dominant issue preference. We plotted the results in Figure 1 and also included the numerical outputs from the regressions in the Online Appendix Tables A7– A9. Consistent with the literature, our experimental evidence shows that radical right voters respond strongly to the immigration issue, radical left voters to the redistribution issue. Meanwhile, the unifying issue for the diverse group of mainstream voters is the EU.

Three patterns stand out in Figure 1. First, in contrast to radical right voters who respond to the introduction of border controls (positively) and removing restrictions (negatively) with the same strength, the preferences of radical left and mainstream voters are more lopsided. They are more likely to *reject* proposals than to enthusiastically support proposals on their most important issue. Specifically, radical left voters only moderately supported candidates proposing to increase subsidies on staples and housing or keep the status quo but strongly oppose candidates

who promote economic self-sufficiency. Similarly, mainstream voters moderately supported empowering the EU through weakening the veto rights of EU member states (a proposal found in party programmes of many mainstream parties, see Online Appendix Section A4.2) but strongly opposed candidates proposing to leave the Eurozone.

Second, there is barely a candidate for the second most important issue of radical right voters, while radical left and mainstream voters were also concerned about climate change besides income redistribution or the EU, respectively. Both groups were firmly against ignoring the problem of rising CO_2 emissions, a proposal even radical right voters rejected.[5] There were few similarities between the two radical poles in the electorate and no evidence for left authoritarians who might appreciate redistribute policies and anti-immigration rhetoric at the same time (Lefkofridi et al., 2014).

Third, with 'Reason for running', we were aiming to signal to respondents a candidate's stance on political representation. All three groups of voters punished candidates running for a seat to continue to serve the government and ignored the neutral reason to participate in policy making. If a candidate was running for a seat to combat the corrupt elite and represent the real people, radical right voters' response to this anti-elitist candidate was more positive than the response of radical left or mainstream party voters. Taken together, the findings are only partially consistent with the literature (Van Hauwaert & Van Kessel, 2018), where radical right and left voters prefer anti-elitist candidates. This suggests that, on average, voters of all three party families were not satisfied with the current government but that only radical right voters endorsed anti-elitist stances. Overall, however, our multidimensional survey experiment demonstrates that in the presence of salient issues like immigration or redistribution, radical left and radical right voters did not put much weight on candidates' populist features.

Cross-pressured voters and issue trade-offs

We use the results of Figure 1 to test our hypotheses on issue trade-offs among radical left, radical right and mainstream party voters. We specifically zoom in on the choices of each group under the condition that they were offered their most preferred issue proposal – restricting immigration for radical right voters, increasing subsidies for radical left voters and empowering the EU for mainstream party voters.[6] This empirical strategy allows us to observe to what extent voters with strong issue preferences are willing to compromise (trade-off) to have their most (desirable issue proposal fulfilled.

Radical right voters. Since the results of the pooled conjoint analysis showed that a restrictive immigration policy was most preferred by radical right voters (Figure 1), we reran the analysis for each issue position on immigration individually. In other words, we obtained the effects of issue proposals on respondents' vote choices holding immigration policy constant. Figure 2 shows that radical right voters were consistent in their behaviour. As all coefficients are clearly on the right-hand side of the 0.5 probability threshold, the approval of candidates with restrictive immigration policies increased regardless of their at times undesirable proposals on other issues such as climate change or the EU. Conversely, radical right voters punished candidates who wanted to remove restrictions on immigration despite the presence of other issue proposals that radical right voters embraced in the pooled analysis.

Radical left voters. Figure 3 reports the results for radical left voters grouped by candidate proposals on redistribution. When candidates proposed an interventionist approach to subsidies,

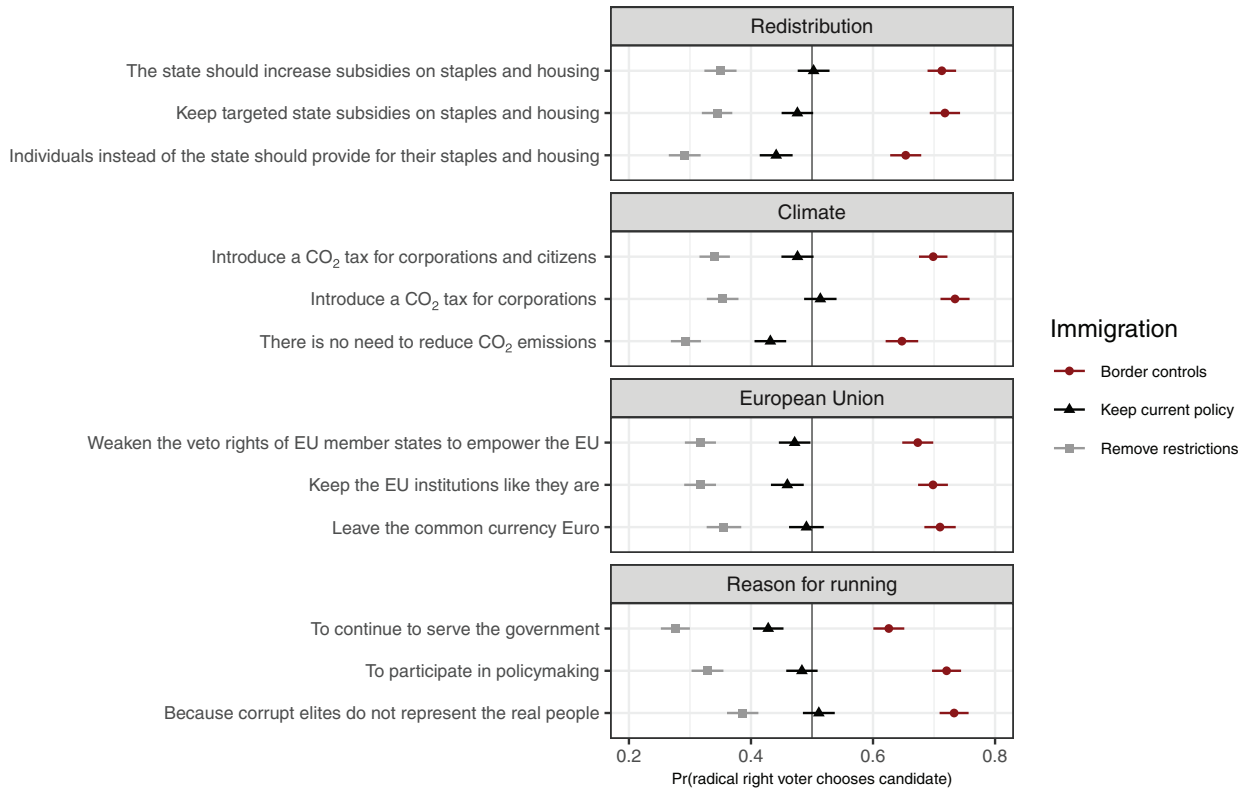

Figure 2. The effect of issue proposals on candidate choice among radical right voters holding *candidates' proposals on immigration constant*: border controls, status quo or removing restrictions. Error bars represent 95 per cent confidence intervals. [Colour figure can be viewed at wileyonlinelibrary.com]

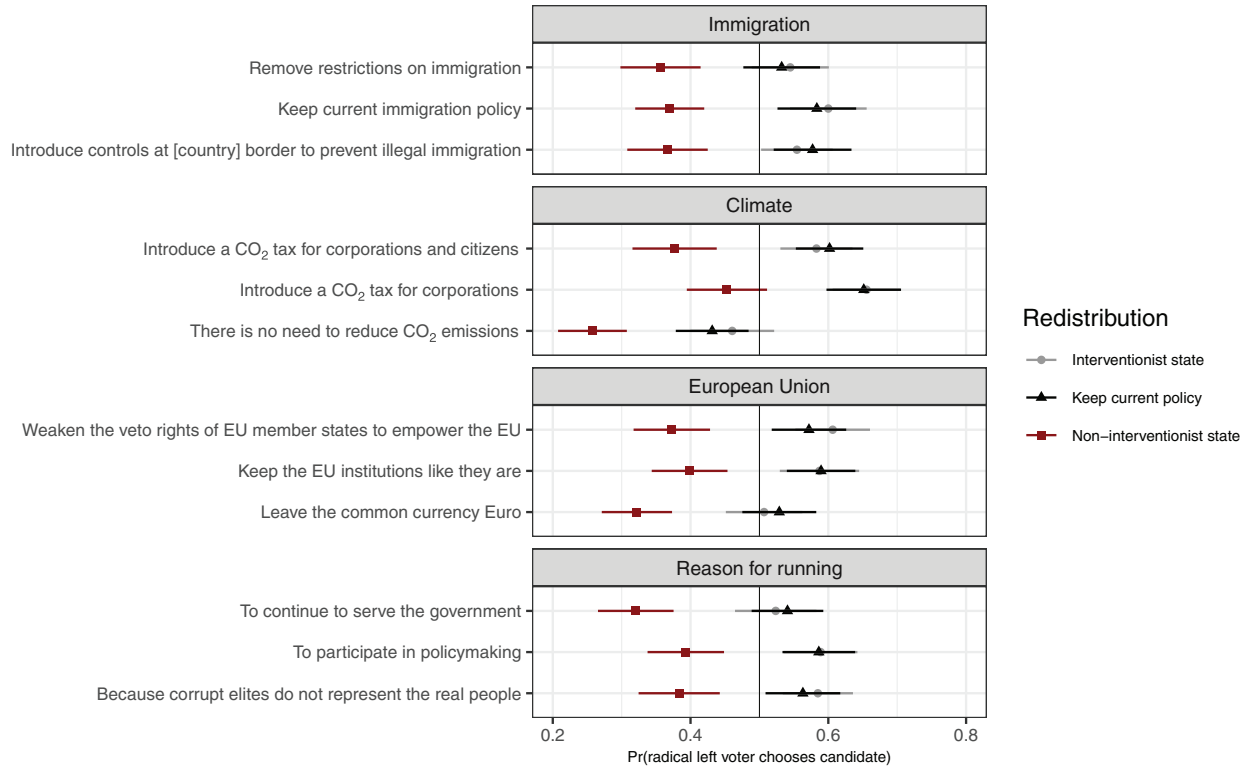

Figure 3. The effect of issue proposals on candidate choice among radical left voters holding *candidates' proposals on redistribution constant*. Error bars represent 95 per cent confidence intervals. [Colour figure can be viewed at wileyonlinelibrary.com]

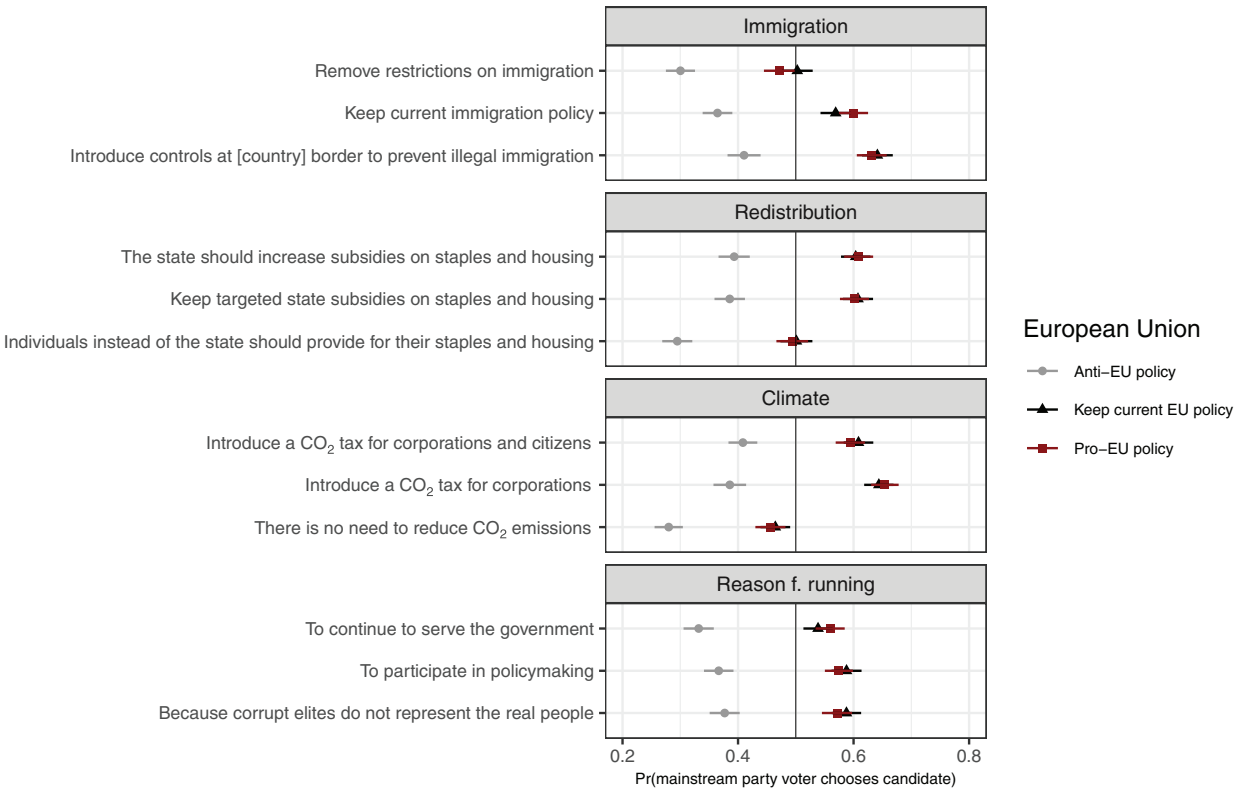

Figure 4. The effect of issue proposals on candidate choice among mainstream voters holding *candidates' proposals on the EU constant*. Error bars represent 95 per cent confidence intervals. [Colour figure can be viewed at wileyonlinelibrary.com]

radical left voters mostly continued rewarding them. Yet the relative effect sizes were only moderate and almost identical to the coefficients of keeping the status quo. Some effects were even insignificant, meaning that some alternative issue proposals were of similar importance for radical left voters. More consistently, candidates who proposed non-redistributive policies were punished: all effects of other issues are on the left-hand (negative) side of the 0.5 probability threshold, with the sole exception being taxes on corporations for their CO_2 emissions. Overall, (dis)like of different redistribution policies played a less central role in vote choices of radical left voters compared to the consistently strong orientation of radical right voters towards immigration.

Mainstream party voters. Similar to radical left voters' balanced preferences over redistribution but unlike radical right voters skewed preferences, mainstream voters did not reward issue proposals for deeper European integration significantly more than keeping the status quo (Figure 4). However, mainstream voters consistently punished candidates proposing the anti-EU policy of leaving the Eurozone.

Comparing differences in issue trade-offs

To more systematically test our hypotheses, we subtracted the effect sizes for every issue position in the pooled regression model (Figure 1) from the effects in Figures 2–4. As in the previous analysis, we again focus on the most preferred issue proposal for each group. Figure 5 presents a formal comparison of results, with the dashed vertical line representing the mean difference for radical right voters.

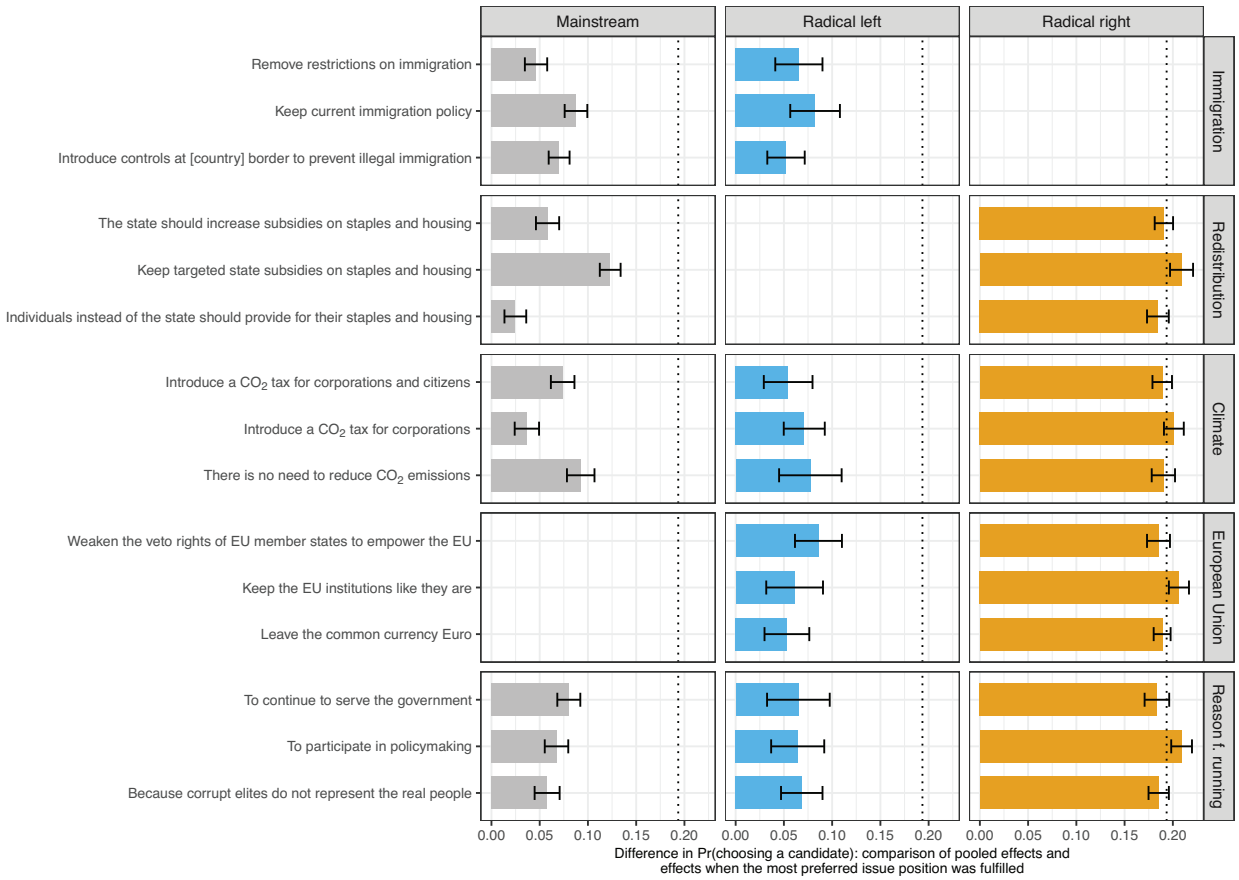

Figure 5. Difference in effect sizes for other issue proposals when the most desirable issue proposal among radical left, right and mainstream voters was shown. Error bars represent 95 per cent confidence intervals. The dashed vertical line shows the mean change for radical right voters. [Colour figure can be viewed at wileyonlinelibrary.com]

Overall, the bars demonstrate that in the scenarios when the most preferred issue position was fulfilled by a candidate, respondents were also willing to accept other issue positions. For instance, mainstream party voters were much more likely to choose the status quo for redistribution under the condition that the EU issue is addressed in line with their preference. However, the most striking finding pertains to radical right voters: their strong preference for restricting immigration made them bear even positions that fundamentally ran counter to their overall preferences (Figure 1). Importantly, in contrast to mainstream party and radical left voters, there is no noteworthy variation between issues, meaning that the preference order of radical right voters is much more lopsided towards a single-issue preference.

But what about the *least preferred* instead of the most preferred issue proposal? After all, Figure 1 revealed an asymmetric reaction of radical left and mainstream party voters: *ceteris paribus*, they tended to reject certain issue positions (e.g., the climate denialist proposal) more strongly than to enthusiastically support one of the available positions per issue. To account for these scenarios, Online Appendix Figure A19 replicates the analysis for the least preferred issue proposal per group. While the differences were less stark, radical right voters still stand out in terms of the overall strength of issue preferences and their unwillingness to differentiate further between their lesser preferred issue positions. An analysis of the average duration respondents needed for a conjoint task sheds more light on these patterns: radical right voters were significantly quicker in

rejecting their least preferred and selecting their most preferred issue proposal than radical left and mainstream party voters (Online Appendix Figure A24).

Overall, there is mixed evidence regarding our hypotheses. As hypothesized, radical right voters were very much willing to accept issue trade-offs in order to fulfill their preference for restrictive immigration policies (*H2*). In fact, despite many different angles to look at the results, no clear second most important issue besides immigration emerged. Their radical left counterparts indeed had a preference for redistributive policies and an even more pronounced dislike of economic self-sufficiency. However, in contrast to the expectation in *H3*, radical left voters had a more variegated range of issue preferences, some of them so strong that they were not traded off for their redistribution preferences. Finally, *H1* is only partially supported, since in contrast to radical right voters' preference for restrictive immigration policies, both, radical left voters and mainstream party voters were equally unlikely to accept large trade-offs in other issues (most importantly, climate change) to have their most preferred issues fulfilled.

Robustness tests and replication study

We conducted various robustness tests. First, a heterogeneity test across countries shows that study participants from France, Italy, Spain and Germany had rather similar issue preferences (Online Appendix Figure A8). There are some noteworthy deviations among radical right voters, though. *AfD* voters were the only voter group preferring the climate-denialist proposal, whereas voters of *Vox* were more pro-EU compared with their radical right counterparts in the other countries. We also found only marginal and generally plausible divergences in issue preferences by respondents' age, gender, education and income (Online Appendix Figures A9–A12). We also reran the main models using post-stratification weights that correct for deviations of our sample from population margins, with similar results (Online Appendix Tables A7–A9).

We further assessed the robustness of effects by how consistent respondents were in their party identification and previous voting behaviour, which they reported in several survey waves. Online Appendix Figures A13–A17 generally reveal minor differences between consistent and inconsistent voter groups. The most noteworthy difference is that consistent radical right voters had more pronounced anti-EU preferences than their counterparts who were less loyal to a radical right party. We also included a robustness test based on (non-)voting in the 2019 EP election to distinguish non-voters – who potentially feel underrepresented in party politics – from radical left and right voters. Online Appendix Figure A18 reveals some commonalities of non-voters and radical left voters, for example, in their dampened enthusiasm for EU integration. Yet in the dimensions immigration and redistribution, non-voters are more similar to mainstream party voters.

As Green parties are niche parties with a strong orientation towards one issue – environmental protection – the preferences of their voters might be skewed as well. In additional analyses (Online Appendix Section A6.6), we show that Green party voters have an equal disdain for climate denialist stances as radical right voters dislike of open borders (Online Appendix Figure A20). Nonetheless, there is greater variety in their revealed preferences when taking the multidimensionality of the choices Green party voters were facing into account (Online Appendix Figures A22 and A23). While radical right voters were indifferent to other issue proposals when their most preferred or most disliked position was shown, Green party voters also

strongly disliked leaving the EU and were less likely to vote for a candidate with a stated populist reason to run.

Finally, the replication study was motivated by four downsides of our cross-country research design: (1) the study was not pre-registered; (2) the sampling strategy was especially targeting radical right voters; (3) there were only 170 radical left respondents in our sample resulting in underpowered findings for this group; and (4) the research period covered only an isolated time period in European politics before a period of dramatic political changes induced by the COVID-19 pandemic. We turn to the German replication sample to probe the generalizability of the main results. Despite being conducted almost 2 years later with a different coalition including the social democratic, green and liberal parties in government, the results of the replication study are remarkably similar to the cross-country findings (Online Appendix Section A8).

Conclusion

Voting behaviour is becoming increasingly complex in the post-Rokkanian political space that is so characteristic of contemporary European democracies. One of the reasons is that voters' issue preferences can cut across established and emerging political cleavages, pressuring them to prioritize and trade off their concerns against each other. Accordingly, researchers increasingly acknowledge the importance of issue cross-pressures in vote choices (He, 2016). Our goal was to examine the relative strength of issue preferences and to what extent voters of radical and mainstream parties are willing to make issue trade-offs.

Our study innovated by conducting a conjoint experiment featuring salient contemporary issues across four major European democracies. Setting a similar number of levels (proposals) per issue and avoiding party labels allowed us to identify the strength of issue preferences of different groups of voters. The results show that radical right voters were willing to make large issue trade-offs as long as their most important issue preference of restricting immigration is fulfilled. In contrast, radical left and mainstream party voters were more willing to compromise on their most important issue position in favour of issues ranked lower in their order of preference.

Our experimental findings have implications for several streams of research. The striking absence of a pronounced second most important issue preference among radical right voters adds to ongoing debates about the broader shifts in party systems due to the advent of radical right parties. Much of this research has centred on the (re)positioning of conservative and mainstream left parties on the issue of immigration and the (lack of) success of such accommodation strategies (Chou et al., 2021; Spoon & Klüver, 2020). Our research adds another perspective to these debates. If their voters are barely considering any issue proposals other than restrictive immigration policies, attempts of radical right parties to broaden their platform (e.g., Marine Le Pen's flirtations with ecological issues) seem futile. In many electoral scenarios, the chances of radical right parties will therefore hinge on the salience of the immigration issue.

While bundles of cultural explanations were identified as the core drivers of the radical right vote, voting behaviour of radical left voters most often tends to be reduced to economic concerns and traditional political cleavage structures. Yet in our study, radical left voters were not willing to accept climate denialist stances as a trade-off for their preferences over redistribution. These results were confirmed in the well-powered replication study where respondents were sampled systematically according to German population margins. Taken together with more EU-friendly preferences than found in previous studies, these results tentatively point towards

an increased sorting of radical left voters along a new post-materialist cultural axis. However, further issue-specific research is needed. More action-oriented proposals, for instance, to 'tax the rich' might trigger stronger reactions among radical left voters (Neuner & Wratil, 2022).

The unifying issue preference among the heterogeneous group of mainstream voters was in the field of EU politics. While they were equally likely to choose candidates who proposed to keep the status quo or who wanted to institutionally strengthen the EU, they despised leaving the common currency Euro. Voters of mainstream parties also clearly preferred climate policies aiming to curb CO_2 emissions while rejecting climate denialist positions. These experimental insights contribute to emerging research on the role of climate politics in European party systems (Farstad, 2018).

Beyond the need for additional replication studies with bigger samples for all four countries, our study design comes with additional limitations. The survey experiment took place while the COVID-19 pandemic was intensifying in spring 2020. Accordingly, the ongoing discussions about closing borders to curb the spread of the pandemic might have increased the appeal of border controls to restrict immigration. Reassuringly, there is first evidence that the pandemic did not drastically influence behaviour in experiments (Peyton et al., 2020). The replication study that we conducted in early 2022 also confirmed the results. We further acknowledge that the operationalization of populist stances might suffer from a limited external validity. While in line with other experimental studies (Chou et al., 2021; Neuner & Wratil, 2022), one possible explanation of why an anti-elitist stance of candidates did not have large effects might be that such strategies only appeal to radical electorates in combination with specific party cues. While being a necessary design choice to separate issue preferences from partisan identity, one specificity of the research design is the lack of party labels of candidates. Similarly, forced-choice conjoint experiments reveal preferences of participants but do not allow for abstention, a viable option when voters are feeling cross-pressured. Finally, while our process of identifying issues was informed by survey responses, party manifestos, parties' social media communication and consultations with experts, the issues and associated positions were chosen in a way that they are applicable across the four democracies under study during one specific research period. As a consequence, country experts perhaps regard other issue areas as more important than some of the ones chosen in this period.

Despite these caveats, the paper has offered an important step towards uncovering the similar and distinct issue considerations underlying vote choices of radical left, radical right and mainstream party voters. Revealing these mechanisms holds implications not only for specialists of populism and political behaviour but also for scholars interested in how issue dynamics are re-configuring political conflict in Europe.

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Conflict of interest

The authors declare no conflict of interest.

Ethical approval

The study was approved by the GESIS ethics committee (reference number 2019-2).

Online Appendix

Additional supporting information may be found in the Online Appendix section at the end of the article:

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Table A3: Count and share of voters' party family by country.
Table A4: Count and share of voters by party family.
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Figure A26: The effect of issue proposals on candidate choice among radical right voters holding candidates' proposals on immigration constant: border controls, status quo or removing restrictions (replication of Figure 2 in main paper).
Figure A27: The effect of issue proposals on candidate choice among radical left voters holding candidates' proposals on redistribution constant (replication of Figure 3 in main paper).
Figure A28: The effect of issue proposals on candidate choice among mainstream voters holding candidates' proposals on the EU constant (replication of Figure 4 in main paper).
Figure A29: Difference in effect sizes for other issue proposals when the most desirable issue proposal among radical left, right, and mainstream voters was shown.
Figure A30: Exaggeration ratio by sample size and effect size (AMCIE).

Notes

1. Non-response rates were higher than in usual re-contact surveys since our experimental survey was in the field almost 10 months after the first contact survey.
2. The overwhelming majority of responses took place during the first couple of days.
3. In the survey, only a small share of radical right voters chose the environment as the most important issue. Yet the survey results might be a by-product of the design of the most important problem question (Wlezien, 2005). Specifically, what we observe might be radical right voters' unwillingness to openly state the importance or existence of climate change.
4. Note that no party classified as radical right or radical left according to Rooduijn et al. (2019) was in government in the four countries at the time of our study.
5. On climate policy, the clearest cross-country differences among radical right voters emerged. While *AfD* voters were the staunchest climate change deniers, their counterparts in other countries saw a need to tackle rising CO_2 emissions, mostly by taxing corporations (see Online Appendix Figure A8). However, a bigger sample is needed to more thoroughly investigate differences between individual parties.

6. Introducing a CO_2 tax for corporations was even slightly more popular among radical left voters than increasing subsidies. We chose redistribution as the issue that more clearly distinguishes them from mainstream party voters for this analysis but show in Online Appendix Section A6.5 that radical right voters are still unique independent of the chosen reference issue.

References

Arzheimer, K. (2018). Explaining electoral support for the radical right. In J. Rydgren (Ed.), *The Oxford handbook of the radical right* (pp. 143–165). Oxford University Press.

Berelson, B.R., Lazarsfeld, P.F., & McPhee, W.N. (1954). *Voting: a study of opinion formation in a presidential campaign*. University of Chicago Press.

Campbell, A., Converse, P., Miller, W., & Stokes, D.E. (1960). *The American voter*. University of Chicago Press.

Castles, F.G., Mair, P., & Pedersen, M.N. (1997). Left-right political scales. *European Journal of Political Research*, *31*(1–2), 147–157.

Chou, W., Dancygier, R.M., Egami, N., & Jamal, A. (2021). Competing for loyalists? How party positioning affects populist radical right voting. *Comparative Political Studies*, *54*(12), 2226–2260.

Costello, R., Toshkov, D., Bos, B., & Krouwel, A. (2020). Congruence between voters and parties: The role of party-level issue salience. *European Journal of Political Research*, *60*, 92–113.

Dalton, R.J. (2018). *Political realignment: Economics, culture, and electoral change*. Oxford University Press.

Dalton, R.J., & Wattenberg, M.P. (2002). *Parties without partisans: Political change in advanced industrial democracies*. Oxford University Press.

Dalton, R.J., & Welzel, C. (2014). Political culture and value change. In R.J. Dalton & C. Welzel (Eds.), *The civic culture transformed* (pp. 1–16). Cambridge University Press.

Döring, H., & Manow, P. (2019). Parliaments and governments database (ParlGov): Information on parties, elections and cabinets in modern democracies. Development version. http://www.parlgov.org

Enggist, M., & Pinggera, M. (2022). Radical right parties and their welfare state stances – not so blurry after all? *West European Politics*, *45*(1), 102–128.

Farstad, F.M. (2018). What explains variation in parties' climate change salience? *Party Politics*, *24*(6), 698–707.

Franchino, F., & Zucchini, F. (2015). Voting in a multi-dimensional space: A conjoint analysis employing valence and ideology attributes of candidates. *Political Science Research and Methods*, *3*(2), 221–241.

Graham, M.H., & Svolik, M.W. (2020). Democracy in America? Partisanship, polarization, and the robustness of support for democracy in the United States. *American Political Science Review*, *114*(2), 392–409.

Hainmueller, J., Hopkins, D.J., & Yamamoto, T. (2014). Causal inference in conjoint analysis: Understanding multidimensional choices via stated preference experiments. *Political Analysis*, *22*(1), 1–30.

Halikiopoulou, D. (2019). Right-wing Populism as a nationalist vision of legitimating collective choice: A supply-side perspective. *The International Spectator*, *54*(2), 35–49.

Halikiopoulou, D., Nanou, K., & Vasilopoulou, S. (2012). The paradox of nationalism: The common denominator of radical right and radical left Euroscepticism. *European Journal of Political Research*, *51*(4), 504–539.

Halikiopoulou, D., & Vlandas, T. (2020). When economic and cultural interests align: The anti-immigration voter coalitions driving far right party success in Europe. *European Political Science Review*, *12*(4), 427–448.

Hanretty, C., Lauderdale, B.E., & Vivyan, N. (2020). A choice-based measure of issue importance in the electorate. *American Journal of Political Science*, *64*(3), 519–535.

He, Q. (2016). Issue cross-pressures and time of voting decision. *Electoral Studies*, *44*, 362–373.

Hooghe, L., & Marks, G. (2018). Cleavage theory meets Europe's crises: Lipset, Rokkan, and the transnational cleavage. *Journal of European Public Policy*, *25*(1), 109–135.

Hutter, S., & Kriesi, H. (2019). *European party politics in times of crisis*. Cambridge University Press.

Ignazi, P. (1992). The silent counter-revolution: Hypotheses on the emergence of extreme right-wing parties in Europe. *European Journal of Political Research*, *22*(1), 3–34.

Inglehart, R. (1971). The silent revolution in Europe: Intergenerational change in post-industrial societies. *The American Political Science Review*, *65*, 991–1017.

Ivaldi, G., Lanzone, M.E., & Woods, D. (2017). Varieties of populism across a left-right spectrum: The case of the Front National, the Northern League, Podemos and Five Star Movement. *Swiss Political Science Review*, *23*(4), 354–376.

Kirkland, P., & Coppock, A. (2018). Candidate choice without party labels: New insights from U.S. Mayoral elections 1945–2007 and conjoint survey experiments. *Political Behavior*, *40*(3), 571–591.

Kitschelt, H. (1994). *The transformation of European social democracy*. Cambridge University Press.

Kriesi, H., Grande, E., Dolezal, M., Helbling, M., Höglinger, D., Hutter, S., & Wüest, B. (2012). *Political conflict in western Europe*. Cambridge University Press.

Lazarsfeld, P., Berelson, B., & Gaudet, H. (1944). *The people's choice: How the votes up his mind in a presidential campaign*. Columbia University Press.

Leeper, T.J., Hobolt, S.B., & Tilley, J. (2020). Measuring subgroup preferences in conjoint experiments. *Political Analysis*, *28*(2), 207–221.

Lefkofridi, Z., Wagner, M., & Willmann, J.E. (2014). Left-authoritarians and policy representation in Western Europe: Electoral choice across ideological dimensions. *West European Politics*, *37*(1), 65–90.

Lipset, S.M., & Rokkan, S. (1967). *Party systems and voter alignments: Cross-national perspectives*. Free Press.

Mair, P. (1989). The problem of party system change. *Journal of Theoretical Politics*, *1*(3), 251–276.

March, L. (2012). *Radical left parties in Europe*. Routledge.

Mudde, C. (2007). *Populist radical right parties in Europe*. Cambridge University Press.

Mudde, C., & Kaltwasser, C.R. (2012). *Populism in Europe and the Americas: Threat or corrective for democracy?* Cambridge University Press.

Neuner, F.G., & Wratil, C. (2022). The populist marketplace: Unpacking the role of "thin" and "thick" ideology. *Political Behavior*, *44*(2), 551–574.

Peyton, K., Huber, G.A., & Coppock, A. (2020). The generalizability of online experiments conducted during the COVID-19 pandemic. SocArXiv. osf.io/preprints/socarxiv/s45yg

Ramiro, L., & Gomez, R. (2017). Radical-left populism during the great recession: Podemos and its competition with the established radical left. *Political Studies*, *65*(1_suppl), 108–126.

Rokkan, S. (1967). Geography, religion, and social class: Crosscutting cleavages in Norwegian politics. In S.M. Lipset & S. Rokkan (Eds.), *Party systems and voter alignment: Cross-national perspectives* (pp. 367–444). Free Press of Glencoe.

Rooduijn, M. (2018). What unites the voter bases of populist parties? Comparing the electorates of 15 populist parties. *European Political Science Review*, *10*(3), 351–368.

Rooduijn, M., Burgoon, B., Van Elsas, E.J., & Van de Werfhorst, H.G. (2017). Radical distinction: Support for radical left and radical right parties in Europe. *European Union Politics*, *18*(4), 536–559.

Rooduijn, M., Van Kessel, S., Froio, C., Pirro, A., de Lange, S., Halikiopoulou, D., & Taggart, P. (2019). The PopuList: An overview of populist, far right, far left and Eurosceptic parties in Europe. http://www.popu-list.org

Rovny, J., & Polk, J. (2020). Still blurry? Economic salience, position and voting for radical right parties in Western Europe. *European Journal of Political Research*, *59*(2), 248–268.

Schuessler, J., & Freitag, M. (2020). Power analysis for conjoint experiments. SocArXiv. osf.io/preprints/socarxiv/9yuhp

Spoon, J.J., & Klüver, H. (2020). Responding to far right challengers: Does accommodation pay off? *Journal of European Public Policy*, *27*(2), 273–291.

Steiner, N.D., & Hillen, S. (2021). Vote choices of left-authoritarians: Misperceived congruence and issue salience. *Electoral Studies*. *70*, 102280.

Traber, D., Giger, N., & Häusermann, S. (2018). How economic crises affect political representation: Declining party–voter congruence in times of constrained government. *West European Politics*, *41*(5), 1100–1124.

Treib, O. (2021). Euroscepticism is here to stay: What cleavage theory can teach us about the 2019 European Parliament elections. *Journal of European Public Policy*, *28*(2), 174–189.

Van Hauwaert, S.M., & Van Kessel, S. (2018). Beyond protest and discontent: A cross-national analysis of the effect of populist attitudes and issue positions on populist party support. *European Journal of Political Research*, *57*(1), 68–92.

Visser, M., Lubbers, M., Kraaykamp, G., & Jaspers, E. (2014). Support for radical left ideologies in Europe. *European Journal of Political Research*, *53*(3), 541–558.

Wlezien, C. (2005). On the salience of political issues: The problem with 'most important problem'. *Electoral Studies*, *24*(4), 555–579.

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Appendix C.

Paper 3: Predicting Political Attitudes from Web Tracking Data: a Machine Learning Approach

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In

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Abstract

Anecdotal evidence suggests that the surge of populism and subsequent political polarization might make voters' political preferences more detectable from digital trace data. This potential scenario could expose voters to the risk of being targeted and easily influenced by political actors. This study investigates the linkage between over 19,000,000 website visits, tracked from 1,003 users in Germany, and their survey responses to explore whether website choices can accurately predict political attitudes across five dimensions: Immigration, democracy, issues (such as climate and the European Union), populism, and trust. Our findings indicate a limited ability to identify political attitudes from individuals' website visits. Our most effective machine learning algorithm predicted interest in politics and attitudes toward democracy but with dependency on model parameters. Although website categories exhibited suggestive patterns, they only marginally distinguished between individuals with anti- or pro-immigration attitudes, as well as those with populist or mainstream attitudes. This further confirm the reliability of surveys in measuring attitudes compared to digital trace data and, from a normative perspective, suggests that the potential to extract sensitive political information from online behavioral data, which could be utilized for microtargeting, remains limited.

Contribution of thesis author

My contributions to the paper encompasses literature review, formulating hypothesis and theory, developing research design, data processing, and data analysis.

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ABSTRACT
Anecdotal evidence suggests that the surge of populism and subsequent political polarization might make voters' political preferences more detectable from digital trace data. This potential scenario could expose voters to the risk of being targeted and easily influenced by political actors. This study investigates the linkage between over 19,000,000 website visits, tracked from 1,003 users in Germany, and their survey responses to explore whether website choices can accurately predict political attitudes across five dimensions: Immigration, democracy, issues (such as climate and the European Union), populism, and trust. Our findings indicate a limited ability to identify political attitudes from individuals' website visits. Our most effective machine learning algorithm predicted interest in politics and attitudes toward democracy but with dependency on model parameters. Although website categories exhibited suggestive patterns, they only marginally distinguished between individuals with anti- or pro-immigration attitudes, as well as those with populist or mainstream attitudes. This further confirm the reliability of surveys in measuring attitudes compared to digital trace data and, from a normative perspective, suggests that the potential to extract sensitive political information from online behavioral data, which could be utilized for microtargeting, remains limited.

KEYWORDS
Political attitudes; web tracking data; machine learning; surveys; life-style, immigration, climate change, democracy, European union

Introduction

Increasing political polarization makes voters' policy preferences easier to identify from self-reported vote choice and political ideology. However, anecdotal evidence shows that effects of political polarization may expand beyond politics. For example, an online quiz published by New York Times, a newspaper in the United States, demonstrated that some Donald Trump voters could be identified from their food diets.[1] Republican party in the United States targets with political ads Facebook users who are hunting, fishing, or playing golf.[2] As a result of the potential for vote choices to be identified from digital trace data the industry became more cautious. For example, Google, Facebook, X (former Twitter) made significant changes to their political advertising policies to prevent the display of ads containing potentially false information prior to the US presidential election in 2020.[3,4,5]

However, despite major social media platforms and search engines adapting preemptive privacy policies, research offers mixed evidence of political features being identifiable from digital trace data. ML models trained on Facebook likes, including lifestyle-related ones, can predict if a person is Democrat or Republican (Kosinski et al. 2013), and even vote choices themselves (Cerina & Duch, 2020). Visits to untrustworthy news websites are related to people's populist attitudes (Stier et al. 2020) and right-wing political ideology (Guess, Nyhan, & Reifler, 2020). Praet, Guess, Tucker, Bonneau, and Nagler (2021), however, show that lifestyle Facebook likes have limited prediction power when used to identify political ideology. The source of this mixed evidence may be traced back to the data-generating process: Since people may be reluctant to publicly show their true life-style choices, social media might not offer a complete picture. In this article, we use browsing histories, which directly identify peoples' everyday decisions, to explore the link between political orientations and lifestyle beyond the image of users displayed on social media. We also go beyond a political ideology argument, which is often applied to the US samples, by testing the predictive power of website choices to identify political

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attitudes in broader policy domains in a European country.

We test this argument based on several types of ML models which we supply with three-month web browsing histories from 1,003 individuals living in Germany and survey data measuring political attitudes toward (1) *immigration*, (2) *democracy*, (3) *climate change policies*, (4) *trust in public institutions*, and (5) *populist attitudes* — policy dimensions that reflect manifestos of major political parties in Germany, and parties' Facebook pages (Kirkizh et al. 2022). We also measured participants' interest in politics and attitudes toward the European Union (the EU). Overall, we examine if individual political attitudes are identifiable from *general* website choices, not just their news-related behavior or Facebook likes, which, as mentioned above, has been the focus of most previous research.

The contribution of this paper lies in methodological and policy making dimensions. First, from a methodological perspective, we offer an ML application to investigate political attitudes measured with surveys. ML algorithms used in this study allow to capture complex non-linear patterns in the data and obtain more robust predictions to advance theory on relationships between political attitudes and web browsing behavior (Leist et. al., 2022). Second, we show whether web tracking data can be used as a measurement of attitudes and compete with survey-based measures. Third, we offer the investigation of potential and the limits of web tracking data in predicting political attitudes based on the 2019 data setting up a pipeline for future research in different time frames. From normative perspective, our study sheds light on how much third parties can potentially learn about voters from their browsing histories, which, in turn, is connected to whether the urge for recent developments in digital privacy policies is justified. This, in turn, is connected to our initial argument about political polarization expanding beyond consumption of political content.

Theory and literature

Can website choices reveal relevant signals to identify political attitudes, and if yes, what is the underlying theory? We rely on two bodies of literature. One proposes theory and evidence that personality is linked to political attitudes; the other is that personality can define lifestyle preferences.[6] Establishing these two links and following the transitive property, we posit the link "*political attitudes – online behavior*". In Figure 1, we visualize our theoretical model. The right part of the model shows the link between personality traits and political attitudes, and the left part –– personality traits and online behavior. However, empirical evidence for this link is limited. Praet, Guess, Tucker, Bonneau, and Nagler (2021) used lifestyle Facebook likes to predict political ideology based on the US sample. Consistent with the existing literature, the authors found that Facebook pages related to politics are the strongest predictors of political ideology, while other topic domains, such as sports, food, and music among others did not show significant effects on ideology. Other studies show similar results. For example, political Facebook likes can predict individuals' vote choices (Cerina & Duch, 2020), whether a user is a democrat or republican (Kosinski et al. 2013), and visits to untrustworthy news websites are associated with populist attitudes (Stier et al. 2020) and political ideology (Guess et al. 2020). Overall, the predictive power of lifestyle website choices is still understudied and limited to social media data and the United States context. Since people may be reluctant to publicly show their true lifestyle choices, social media might offer an incomplete picture. In this paper, we use more advantageous data source than social media –– web tracking data that can show a closer to a complete picture of respondents' lifestyle behavior than what social media or surveys are able to demonstrate. A primary reason of this advantage of web tracking data is that it measures online behavior directly while social media and surveys are data sources significantly altered by users or respondents.

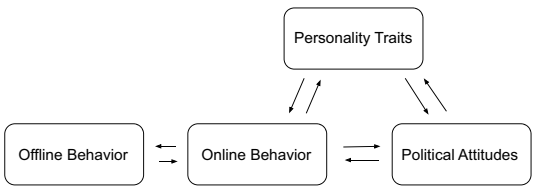

Figure 1. Theoretical model.

We present an identification of a broad set of political attitudes based on voters' website choices that are observable from browsing histories. We further leverage the premise that lifestyle choices or life circumstances, which we observe from web tracking data, are affecting political attitudes. A limited number of studies show that lifestyle can be tied to political views (DellaPosta et al. 2015), book shopping signal political ideology (Shi et al. 2017) and surveys conducted by Pew Research Center show that size and location of the house can predict political ideology.[7] For example, visits to accommodation services (e.g., booking.com), or flight booking websites (e.g., google.com/travel/flights) may signify frequency or interest in traveling and therefore signal potential support for open-borders policies and welcoming immigrants; gambling platforms (e.g., lotto.de) may be linked to financial issues and therefore potentially directed toward support for populist politics, which often exploits economic hardship (Wiedemann, 2023); job search websites (e.g., indeed.com) signal about employment status (Kerna et al. 2019) and therefore, if unemployed, could correlate with populist attitudes; political online media outlets signify interest in politics (Möller et al. 2020), and visits to pirate video streaming websites (e.g., uTorrent.com) could be linked to low trust in institution. And this list can continue: Shopping (amazon.com), sports, dating websites, well-being online services (meditations, yoga, etc.), and websites related to food diets, which may also be linked to political attitudes (Althoff et al. 2022). We leverage browsing behavior data from users to count their visits to this kind of lifestyle-related website and link them to their political attitudes.

Importantly, we do not test mechanisms that can be behind of the link between *political attitudes and online behavior*. In this paper, we are strictly interested in the predictive power of online behavior concerning political attitudes. One of the reasons for this theoretical strategy is that establishing mechanisms based on online behavioral data is challenging. For example, theoretically, hotel and flight booking platforms can be a proxy of cosmopolitan or, exactly opposite, nationalist orientations because it is important where exactly the respondent travels; visits to gambling websites can be because respondent has extra budget or, the opposite, lack of financial flexibility; visits to job search websites may be a sign of unemployed status or, the opposite, it could be a routine procedure for a professional to stay sharp in the profession; real estate websites might be visited by tenants as well as by owners. Consequently, our article rather focuses on methodological advantages of web tracking data for predicting political attitudes, which may facilitate further studies that are using web tracking data, including the study of mechanisms.

Data and measurement

In this paper, we use two types of data: web browsing logs and online survey responses. The data was collected with approval from the Oxford Internet Institute's Departmental Research Ethics Committee at the University of Oxford (Reference Number SSH IREC 18 004). We chose web tracking data over surveys to measure online behavior to avoid biases and the incomplete picture that survey panelists may have in their responses when asked to disclose or recall websites they visited during a particular week. Existing research shows that direct measure of online behavior with web tracking data is more accurate than self-reported measures and, to some extent, social media (Araujo et al. 2017; Englehardt et al. 2016; Scharkow, 2016; Stier et al. 2020).

Web tracking

We acquired web browsing histories of respondents from an online access panel maintained by Netquest, a market research company (please, see more details on recruiting in the Online Appendix.) Personally identifiable information is algorithmically anonymized by Netquest. We utilize web browsing histories from 1,003 study participants living in Germany. The tracking period is between mid-March and mid-June 2019. The dataset includes anonymized IDs, visited URLs, domains, and time spent on a web page. The dataset comprises 19,026,887 URLs (96,093 unique domains), with an average number of URL visits of 18,000 per respondent (Please, see more details on descriptive statistics of web tracking data in Table 1.) We specifically focus on cumulative

Table 1. Descriptive statistics of web tracking variables. There were 1,003 panelists 19,026,887 unique URLs, and 96,093 unique domains.

Statistic	N	Mean	St. Dev.	Min	Max
N visited URLs	1,003	18,080.07	23,864.05	53	191,526
N unique domains	1,003	362.04	328.97	9	2,279
μ visits per unique domain	1,003	43.36	37.30	3.28	376.76
μ duration per unique domain (sec.)	1,003	1,373.64	1,955.56	56.90	44,116.23
μ duration per URL (sec.)	1,003	33.34	23.58	1.62	276.12

number of visits to the websites, which we further group into topic domains (please, see the Models subsection), since we are striving for automated ML analysis. For more nuanced analysis of repeated visits to individual website domains, further in-depth research is required.

Further, we eliminated respondents who made less than 50 visits and visited less than nine unique domains. We also eliminated visits on which respondents spent less than three seconds, which allows us to avoid unintentional visits. Table 1 illustrates the distribution of means on a respondent level. Most of the respondents in our sample spend between 20 and 50 s on a unique web page (URL). Overall, the mean duration per unique domain and URL reported in Table 1 demonstrates regular browsing behavior, suitable to capture lifestyle preferences and daily life routines rather than incidental behavior.

We also tested to what extent our collected data represents the behavior of the general population. Since our panelists were aware of the tracking, they might have altered their behavior. In addition, we evaluate the extent to which tracking panelists' privacy attitudes diverge from panelists who participate in surveys but do not have tracking tools installed. Both validity tests are available in the Online Appendix.

Survey

We measured political attitudes with surveys, which we conducted in Germany parallel to the web tracking. We measured political attitudes based on survey questions from established annual survey panels such as *Eurobarometer*, *European Social Survey*, and *World Values Survey*. We also relied on systematic research of agendas of the major political parties and voters in Germany provided in Kirkizh, Froio, and Stier (2022). After the content analysis of party programs, political Facebook pages, and text analysis of open-ended questions related to the most critical issues in the country, Kirkizh, Froio, and Stier (2022) identified the four most prevalent policy domains: *immigration*, *democracy*, *climate change*, *the European Union* (the EU), and *populism*. Using these policy domains, we asked the respondents a set of attitudinal questions listed, along with the summary statistics, in Table 2. In addition to questions about attitudes toward democracy, we also measure trust in democratic institutions. Following a common political science practice, we also included a question measuring *political interest*. We placed responses to each survey question on Likert (from strongly disagree to strongly agree) or 1–11 scales (Please find the entire question wordings in the note of the Table 2). Distributions of a selected set of survey items are provided in the Online Appendix, Figure B1.

In addition to attitudinal questions, we asked demographic questions such as *age*, *gender*, *education* based on the German education system, and *income*. Overall, the sample composition consists of 1,003 respondents living in Germany, of which, 51% identified as female, and 49% as male. 24% of participants held at least elementary-level education, 54% had a mid-level education, and 22% reported a high education level (high school or above). Respondents were also distributed in the following age groups: 0.07% in 18–24, 21% in 25–54, 21% in 55–64, and 10% in 65+ age group. Median income of the respondents is 34,000 EUR. (See more details on sampling in the Online Appendix.) The following demographics distributions are deviating from nationally representative samples. Our respondents on average younger, more educated and have higher incomes than average population in Germany, which is common for online survey panels.

Table 2. Descriptive statistics of survey-based political attitudes.

Statistic	N	Mean	St. Dev.	Min	Max
Interest in politics	1,019	2.86	0.86	1.00	4.00
Trust in parliament (D)	1,019	3.24	1.17	1.00	5.00
Trust in the police (D)	1,020	2.54	1.10	1.00	5.00
EU integration (EU)	871	6.79	2.92	1.00	11.00
Income redistribution (P)	871	3.30	1.14	1.00	5.00
Big business and the people (P)	869	3.72	1.03	1.00	5.00
Social benefits and laziness (P)	870	2.79	1.15	1.00	5.00
Islam (I)	940	3.46	1.31	1.00	5.00
Immigrants and jobs (I)	1,020	2.83	0.91	1.00	4.00
Immigrants and crime (I)	1,020	2.04	0.89	1.00	4.00
Climate change and humans (C)	869	3.49	0.89	1.00	5.00
Free elections (D)	866	9.60	2.19	1.00	11.00
People obey their rulers (D)	866	3.96	2.92	1.00	11.00
Democratic political system (D)	868	3.39	0.69	1.00	4.00
Satisfaction with democracy (D)	1,019	2.63	0.80	1.00	4.00

Political attitudes question wordings and scales: interest in politics (1 - not at all, 4 very interested); trust in parliament and trust in the police (1 - not at all, 5 - a great deal); EU integration (1 - gone too far, 11 - should be pushed further); government should redistribute income from the better off to those who are less well off, big business takes advantage of ordinary people, social benefits make people lazy, Islam promotes violence more than other religions (1 - strongly disagree, 5 - strongly agree); immigrants take jobs away from German people, immigrants make crime problems worse (1 - strongly agree, 4 - strongly disagree); climate change is caused by natural processes, human activity, or both (1- natural processes, 5 - human activity); the following things are essential characteristics of democracy: free elections, and obeying the rulers (1 - not essential for democracy, 11 - essential for democracy); having a democratic political system (1 - very good way of governing this country, 4 - very bad way of governing this country); satisfaction with democracy (1 - not at all, 4 very satisfied).

Methods

We measure respondents' political attitudes with surveys and match them with their lifestyle choices, which we learn from web browsing histories. We combine these data types to find meaningful associations between political attitudes and daily life choices. We have over a thousand survey participants and their corresponding browsing histories, which generated millions of URLs over three months, which we further grouped into categories. Each website category can potentially be associated with a specific political attitude. Hence, each website category is an independent variable in a regression model, while political attitudes are dependent variables. The number of models equals to the number of attitudinal questions in Table 1.

However, in our data, the number of websites exceeds the number of respondents: Each regression model will have one dependent variable, thousands of independent variables, and only one thousand respondents. Because many websites in our data will have no visits since outside most popular websites like google.com or amazon.com, very few users visit the same web pages, it contributes to the increase of data sparsity, meaning that many cells in the data frame do not carry data points, which is in other words, missing data. There are several methods to deal with data sparsity (Dixit et al. 2020). In this paper, we use a multidimensionality reduction method (Engel, Hüttenberger, & Hamann, 2012), which helps to compress a data frame with thousands of websites. Following this approach, we offer a multidimensionality reduction method: Grouping websites by categories. Categories (specifically, the sum of visits for each category) are features that we used to train the algorithms.

Data pre-processing

We made two data pre-processing decisions based on our theory. In the analysis, we use website domains ([*domain*].com) to count visits and threshold for a visit duration. If we record 10 URLs with common domain *amazon* we count it as 10 visits to Amazon.com, ignoring URLs. Unlike URLs, the exact website domains appear more often across individuals' browsing histories in the dataset. For instance, users visit amazon.com several times a week, but URLs –– amazon.com/art-supplies/sale/TDFG54jjdiO320 –– they visit only once. The same web page can often have different URLs. Using website domains, we have more data points for each website of interest, e.g., Amazon, Netflix, LinkedIn, and others, than for a single URL. This approach is also a dimensionality

reduction method in addition to the main method we offer in this paper.

Additionally, to the processing of URLs, we use a specific time spent on a web page (TPS) threshold to capture deliberate visits. Since we aim for online behavior that signify individuals' lifestyle and routine behavior, domains larger TSP would more likely represent deliberate and meaningful visit of a web page. Extensive body of literature in the field of human-computer interaction established that TSP is one of the user interests in a web page (see a literature review in (Al Halabi, Kubat et al. 2007)) Empirical evidence offers several different thresholds for TSP to count a visit as a session and thus a deliberate web page visit. The suggested thresholds are between 48 s and 1.5 min (Hofgesang, 2006). We decide to use mean TSP based on this literature, which is 1-min threshold. After we removed "short" domain visits, where individuals spent less than one minute, the data generated 1,632,769 URLs (35,380 unique domains) for 1,003 respondents.

Models

We grouped website domains into categories provided by an online service Webshrinker (webshrinker.com) as a dimensionality reduction method. Webshrinker catalogs and scans websites and uses ML algorithms to categorize website domains in Europe and the United States. Since our web tracking data was collected from German participants, we needed a service that could work with German domains. Being able to match as many websites as possible impacts how to complete the picture of the respondents' web browsing, we will have in our data.

Webshrinker managed to match 49,918 unique domains in our web tracking dataset to categories. After applying a one-minute duration and at least five visit thresholds 13,824 unique domains are left in our dataset. Table 3 shows the domain categorization structure with nested data. The domains fall into the 12 groups of categories listed in the first column of the table, and there are several categories (or sometimes only one category) within each group, for instance, sports, blogs, dating, gambling, social media, travel, news, games, and health. Furthermore, each category is represented by domains, which we matched with domain categories available from Webshrinker. Table 3 also shows the number of visits per domain group. As expected, consumption, general, and communication are the most visited domain groups, followed by education, media, and tech services. Domains from more specific lifestyle groups like adult, life, gambling, sports, and social status are among the least visited categories.

We use three different algorithms to test the predictability of website choices, which we measure by summing the visits to each website category and for each respondent: a baseline model, where we estimate the average predictability from a training dataset, linear model, elastic net regression, which is sensitive to multicollinearity (Zou & Hastie, 2005), and random forest, which identifies variables with the most significant explanatory power (Breiman, 2001). For the modeling, we use the

Table 3. Domain categories, groups, examples, and number of visits per group.

Group	Domain category	Top domains	N of visits
Consumption	shopping, business, vehicles, finance, real estate, weapons, alcohol/tobacco	amazon.de, otto.de, bonprix.de, eclipso.de, deutschebank.de, mobile.de, immonet.de, kotte-zeller.de, flaschenpost.de	8,779,614
General	search engines	google.com, web.de, gmx.net	5,654,703
General	information tech, blacklist, filter avoidance, content server, parked	chip.de, microsoft.com, office.com	648,507
Communication	social media, forums, messaging	facebook.com, twitter.com, instagram.com, live.com, msn.com, spin.de	1,750,701
Media	news and media, streaming media, blogs, illegal content, media sharing	bild.de, welt.de, focus.de bs.to, 9gag.com, serienjunkies.org, share-online.biz	1,242,623
Entertainment	games, virtual reality, humor	gameduell.de, youtube.com, netflix.com, twitch.tv	525,399
Entertainment	adult	xhamster.com, planetromeo.com, pornhub.com	488,999
Entertainment	gambling	jackpot.de, tipico.de, bet3000.com	209,355
Life	education, translators	wikipedia.org, uni-mannheim.de, sfgame.de reverso.net	1,719,116
Life	travel, food/recipes, health, drugs	booking.com, bahn.de, chefkoch.de lieferando.de, docmorris.de, zamnesia.com	308,651
Life	sports	flashscore.de, livetv.sx, sport1.de	154,690
Life	job search, religion, dating	indeed.com, stepstone.de, jw.org, finya.de	83,550
TOTAL			21,591,904

functionality of a scikit-learn library in Python, which provides the tools to build predictive models. The library uses random forest and elastic net specification from (Pedregosa et al., 2011). To demonstrate if the chosen algorithms are working, we compare our estimates with benchmark demographics such as gender, income, education, and age (Kosinski et al., 13). Overall, we have 15 questions measuring political attitudes in Table 3, meaning we run 15 regression models.

Cross-validation

To measure its ability to predict political attitudes for each model, we use 10-fold cross-validation (CV) and repeated 3 times, a method for model validation and out-of-sample prediction accuracy (please, see more details on why CV are important in ML in the Online Appendix). The 3×10-fold CV process includes splitting the initial dataset into 10 parts and using nine parts to predict the 10th part. We then run three repetitions of the CV process while randomly splitting the data into 10 folds each time. Repeating the CV three times ensures that the prediction was not an artifact of the selection of the 10 fixed parts. We considered a dependent variable as "predicted" if p-values are less than 0.05 in all the cases in which the CV was repeated. In addition, we calculate R-squared coefficient to measure the model performance in each CV fold. For further validation of the results, we added MSE as well in the Online Appendix. We measure the prediction accuracy of a political attitude with Pearson correlation between the predicted and actual values of dependent variables on the test splits. We conduct 3×10-fold repeated CV for the 15 political attitudes listed in Table 2.

Variable importance

After running all regression models, we calculate Variable Importance (VI) for each feature. VI is a method to rank each covariate by their prediction power in a single model. For VI, we use an R package caret (Classification and Regression Training) and a function varImp, which provides the following VI measure for random forest: "The measure is computed from permuting out-of-bag (OOB) data."[8] Behind the VI measure lies an algorithm that tracks the model's prediction accuracy change and records it after each predictor is included in the model (Kuhn, 2008). Because VI can differ depending on model specification (Fisher, Rudin, & Dominici, 2019), we will focus on VI for the best performance model. In this paper, VI helps us understand which websites of which category has the highest power in predicting each political attitude of interest. VI can also show behavioral patterns based on visit domain categories. In Table 3, we group domain categories by topic, 12 groups in total (see the first column of the table). VI will show if there is a pattern where a specific group of domain categories has the higher predicting power. Since each model includes more than 30 features (each of which assigned to a domain group), we will primarily focus on the features with the highest performing coefficients. However, VI measures are model dependent. We therefore calculate and interpret the VI for our best performing model.

Results

As we described in Method section, we build predictive models where the predicted outcome is a political attitude of interest, and predicting features are visits to website categories. We focus on five dimensions of political attitudes from Table 2: immigration, democracy, climate change, populism, and the EU. The covariates in the models, website categories, are listed in Table 3.[9]

Predictive models

Our focus is on determining the extent to which website categories, when included into a singular model, can account for the variance measured by R-squared or R^2. Following (Stachl et al., 2020) we compare the performance of three regression models as described in Method section: Linear model, Elastic Net, and Random Forest against average prediction on a test data. We also measure performance with Pearson correlation (r) and with MSE (Mean Squared Error) between actual and predicted values for each political attitude. MSE, unlike Pearson's correlation, is better suited for assessing the distance between predicting models and the actual values r (Waldmann, 2019). This

method also demonstrates the average discrepancy, measured in scale points of attitudes that the models display. We report MSE in the Online Appendix.

Figure 2 reports the prediction performance of baseline (linear models), Elastic Net, and Random Forest from repeated cross-validation for each political attitude of interest. We also included a model performance for socio-demographic variables: Gender, income, education, and age –– a common practice in ML literature that deals with social science concepts (Kosinski, Stillwell, & Graepel, 2013; Stachl et al., 2020). Comparing the model performance for political attitudes with socio-demographic variables helps assess ML methods' validity. On average, all three regression models (baseline, Elastic Net, and Random Forest) perform moderately compared to gender or age. Across most political attitudes, the random forest method is the best-performing algorithm compared to Linear and Elastic Net algorithms. However, even with one of the most sophisticated algorithms, such as Random Forest, the Pearson correlation coefficients (r) are significant within 2.5% and 97.5% quantiles only for two features out of 15: interest in politics and support for a democratic political system. The correlation coefficients are modest, with a median $r = 0.15$ for interest in politics, $r = 0.13$ for support in the democratic political system. The coefficients are comparable to those that are reported in the existing literature that deals with social science concepts measured with surveys (Kosinski, Stillwell, & Graepel, 2013; Stachl et al., 2020). Random Forest and Elastic Net models were also able (within 25% and 75% quantiles) to signal populist attitudes, attitudes toward Islam, support for free elections, satisfaction with democracy, and trust in a national parliament.

However, the models' performance is not stable. We increased the number of repeats of 10-folds CV from 3 to 10, which is a stricter robustness test. The effect for interest in politics persisted while for the attitude "support for a democratic political system" did not survive. The results from 10×10-fold cross-validated models together with hyperparameters configurations are reported in the Online Appendix. We also added gradient boosting model

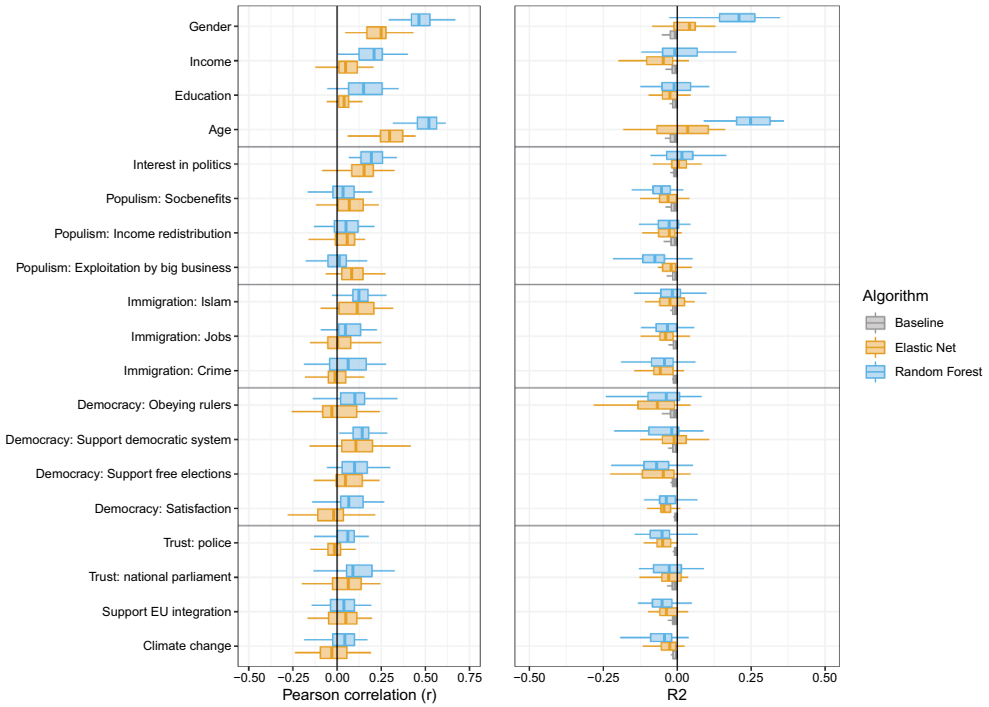

Figure 2. Box and whisker plot of prediction performance measures from repeated cross-validation for each political attitude and demographic category. The middle symbol represents the median, boxes include values between the 25% and 75% quantiles, and whiskers extend to the 2.5% and 97.5% quantiles.

to show if more advanced algorithm would be capable to improve the predictions. The results improved only slightly further demonstrating the challenge of predicting political attitudes based on web tracking data and showing that this kind of data can offer only suggestive evidence.

Although some statistically significant predictions were reached, R^2 is small and negative. Negative R^2 contradicts its initial definition (Colin Cameron & Windmeijer, 1997). This suggests that the models are unable to capture robust and convincing connections between features and the outcome because the features are not informative enough, and, hence, are affecting their performance on test data. Nevertheless, our results for R^2 are consistent with the existing literature dealing with survey-based feature predictions. In (Stachl et al., 2020), R^2 for all models, the baseline model, Random Forest, Elastic Net are negative for many features. In (Panicheva et al. 2022), the R^2 coefficient for the Elastic Net model predicting subjective well-being is 0.11, although a confidence interval is not provided. Brandenstein (2022) reports $R^2 = 0.17$ for a Random Forest model that predicts beliefs in conspiracy theories. Praet, Guess, Tucker, Bonneau, & Nagler (2021) reports Pseudo $R^2 = 0.28$ but without a cross-validation. On the contrary, both measures of our models' performance r and R^2 are larger for socio-demographic variables, similar to Kosinski, Stillwell, and Graepel (2013), which means that the performance of the selected models is challenged specifically when applied to political attitudes. However, according to Chicco, Warrens, and Jurman (2021), it is still more informative than other metrics used in regression model performance evaluation.

Variable importance

Although, the model performance is not stable and offers suggestive predictions (within 25% and 75% quantiles) and interpretations should be treated with cautious, exploring what website categories are at the front of the predictive model may help offer the direction for the further research. Figure 3 shows the variable importance rank for each of the best random forest models predicting political attitudes from Figure 2. We also assigned predicting variables to higher level topics: Issues (trust in institutes, climate change, EU integration), Democracy, Immigration, and Populism. Our grouping strategy here deviates from the one in Table 2. We separated trust variables from democracy to have a clear group measuring attitudes toward democracy. Trust is only remotely related to attitudes toward democracy.

Variable importance ranks covariates by the contribution each of these covariates makes to predicting the accuracy of each model. Each square represents a covariate, such as visits to a website category from the first row of Table 3 and is colored accordingly. We use a color-coding to visually demonstrate if there are observable predictive patterns and what website categories form those patterns. Since we focused on the top performing categories, we applied the fading visual effect to the plot to reflect the decreasing importance of these categories.

We focus on behavioral patterns across all attitudes of interest. Overall, life and general purposes websites are the most potent variables in models for predicting attitudes toward immigration, populist and issue-related attitudes, and communication and media websites are the most substantial contributors in the models' predicting attitudes toward democracy. Entertainment websites, which include games, gambling, adult content, and humor, are among the weakest predictors.

The observed patterns have two social science implications. First, the variable importance patterns indicate that media and communication websites such as news and social media hold low predicting power in models that are predicting issue-related or populist attitudes and attitudes toward immigration. This finding contradicts the existing literature focusing on the role of new or social media on populist attitudes or attitudes toward immigration, climate change, or EU integration. Our findings suggest that these attitudes are better predicted with lifestyle or general purposes websites such as shopping, business, or search engines, which reflect respondents' social status, financial conditions, and other interests that, when combined, might affect, or even form the attitudes. And second, media and communication websites displayed a suggestive prediction pattern in relation to attitudes toward democracy. However, specific mechanisms behind these

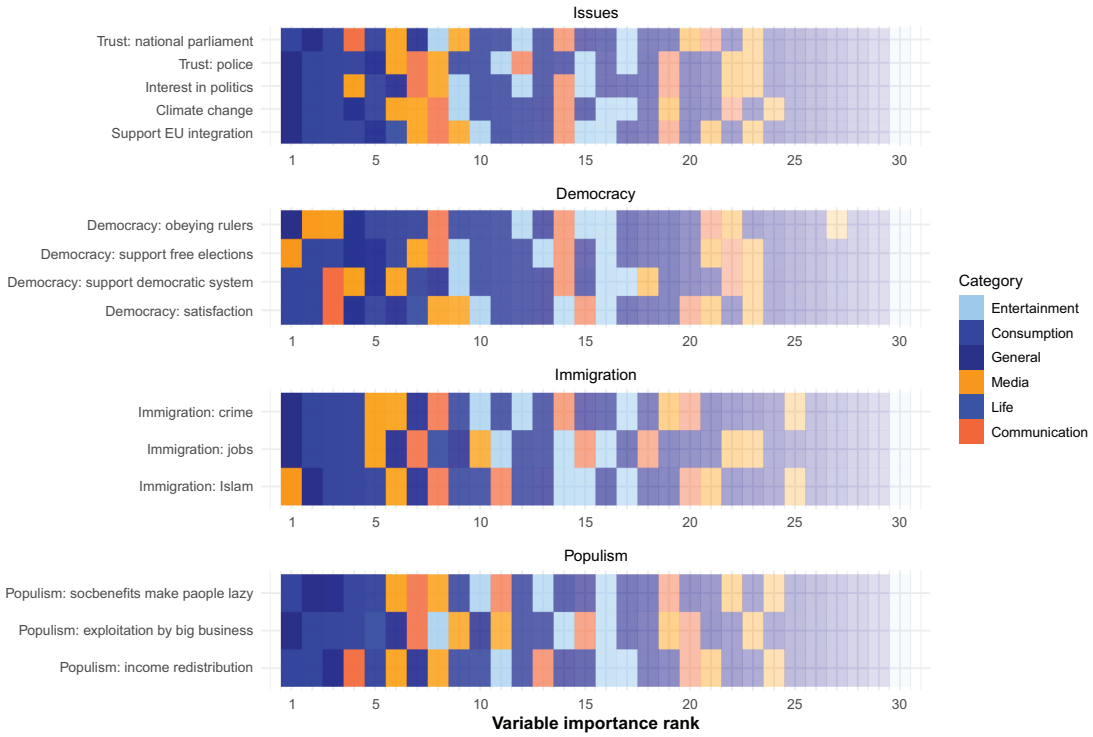

Figure 3. Domain categories ranked by importance in the Random Forest model for attitudes toward policy issues, democracy, immigration, and populism. The fading effect on the plot represents the decrease in the importance of each domain category since the top five domains bring the most significant contribution to prediction accuracy. The color represents two palettes – orange and blue – in order to distinguish between domains related to media/communication and consumption/life-style. To see what specific domain category is behind each square, we made an interactive plot, which can be downloaded from an anonymous OSF repository of this paper: https://osf.io/us4dz/and in the supplementary materials of this manuscript. Additionally, the list of variables for significant models is also available in the online appendix on page 13 and 14.

observed behavioral patterns need further exploration.

Despite offering largely suggestive predictions, Random Forest regression model was able to predict interest in politics. Figure 3 shows that, as expected, media websites play an essential role in predicting interest in politics. We also plot the list of variables ranked by importance in Figure E.3 in the Online Appendix. The websites related to shopping, business, and finance contributed to the prediction accuracy just as much as media websites, suggesting that day-to-day life choices may affect attitudes and media consumption. However, social media, news, and streaming media significantly predict support for a democratic political system, although based on 3×10-fold CV model (see Figure E2 in the Online Appendix). Further research is needed to explore the mechanisms since each category represents specific websites. More granular data analysis will show why visits to business-related websites are associated with populist attitudes and visits to media websites predict attitudes toward democracy.

Discussion

In this paper, we combined surveys with observational data collected from tracking online browsing of 1,003 German individuals. Combining these two types of data, we offer an exploratory analysis of whether big data and ML algorithms can help infer voters' political features, specifically political attitudes measured with surveys. We tested the predictive performance of three ML algorithms: random forest, elastic net, and gradient boosting, supplied with 10-fold repeated cross-validation. Specifically, we built 15 models predicting four groups of political attitudes: Attitudes toward immigration, democracy, the EU, and populist attitudes. We found mixed evidence of the

predictability of political attitudes from web tracking data based on our best-performing random forest model.

The model predicted interest in politics and attitudes toward democratic systems. Despite the limitations of our data and measurements, the results are compatible with previous studies of individuals' personalities with larger samples. Our highest predictions for interest in politics and attitudes toward democracy vary from $r = 0.09$ to 0.15 compared to 0.17 for "satisfaction with life" also measured on a 5-point scale in Kosinski, Stillwell, and Graepel (2013), [0.20, 0.40] average estimation in Stachl et al. (2020) and in Funder and Ozer (2019). The predictability of interest in politics can be explained by more specific website domain visits, which can be associated with it, such as media outlets and other political content. Trust toward political institutions, however, are more abstract and cannot be attributed to specific websites.

We also explored what model features impact the prediction of political attitudes. Two main categories of websites demonstrated observable patterns: General-purpose and consumption websites (e.g., business and shopping) and media and communication websites.

General-purpose websites (e.g., search engines) and consumption websites (e.g., shopping, real estate, finance, etc.) display a suggestive predictive pattern for issue-related (e.g., climate change, the EU integration, immigration) and populist attitudes. One potential reason for these associations is that it is consistent with the nature of these attitudes since they are related to social benefits, business, and income in case of populist attitudes, taxes, and other economic changes in case of climate change policies and EU integration, as well as trust in the police. Attitudes toward immigration could also be affected by social status and life circumstances reflected in consumption-related websites, primarily if immigration is associated with crime and jobs. This is something that respondents might experience rather than receive information from news or social media. Further in-depth exploration of the web tracking data is needed to understand what kind of websites, including web search queries or YouTube video topics, drive the predicting effects.

The second group that stands-out in the models is media and communication. Visits to these websites are correlated to attitudes toward democracy. Media websites are also the top websites that are predicting two attitudinal items, such as perception of Islam and support for free elections, while they are ranked fourth in predicting interest in politics. The role of media domains in predicting some political attitudes, specifically attitudes toward democracy, adds to the literature on media effects and the role of news in politics. This finding contradicts the literature arguing that media have limited effect on political behavior or attitudes. The finding also shows methodological potential of ML models: These advanced ML methods can help to learn about political behavior or attitudes from large amount of data and avoid manual website labeling. Nevertheless, as mentioned before, an in-depth exploration of website domains and the mechanisms that each domain might uncover is needed.

The third category of websites we anticipated would exhibit significant effects in the models –– entertainment and lifestyle websites –– ultimately did not emerge as strong predictor. This does not confirm hypotheses in the existing literature that economic frustration (if we associate gambling with economic hardship) could be responsible for populist attitudes. Our findings are consistent with Praet, Guess, Tucker, Bonneau, and Nagler (2021) that political orientations are moderately reflected in lifestyle choices. One potential reason for null effect of this group is that these websites could represent the opposite mechanisms. Respondents may visit gambling websites because of economic hardship or, the opposite, because of excessive financial sources and, therefore, the effect may not be as sounding as if the group represent a single-meaning mechanism. This, in turn, raises the issue of mechanisms in the observed associations between political attitudes and website visits measured based on web tracking data. Further in-

depth website categorization is needed to ensure consistency in the mechanism that each website domain accounts for.

In general, this paper broadens the scope of political science literature concerning the methodology and utilization of predictive modeling within the discipline. The paper additionally presents an algorithm for implementation of predictive modeling based on the combination of web tracking and survey data. Moreover, it provides theoretical foundations and suggests for potential directions for explanatory research. Lastly, the findings of the paper have policy making and normative implications.

Initially, from a broader perspective within political science, this paper's findings indicate the challenge in identifying political attitudes from web tracking data. This has two implications: (1) putting attitudes on a latent left-right ideology scale, we did not find observable differences in website visits among respondents with pro- or anti-immigration attitudes, pro- or anti- climate change policies, which is consistent with Praet, Guess, Tucker, Bonneau, and Nagler (2021) suggesting that political polarization is not reflected in the lifestyle but rather limited to partisan news preferences; (2) contrary to Kosinski, Stillwell, and Graepel (2013), which shows that Facebook likes could be used to measure users' personality traits, our advanced ML models were able to retrieve only suggestive signals about what attitudes individuals might have based on their website visits' patterns, which implies that surveying is still the most reliable method to measure attitudes. However, our data is bounded by a specific timeframe and can potentially show different results over time. We made the replication materials available on an OSF repository for testing predictive capabilities of web tracking data in different time frames and political contexts.

From a normative perspective, our study reveals that despite the vast amount of available data, only a limited amount of information related to political attitudes can be harvested from individuals' browsing histories. Hence, contrary to recent developments in digital privacy policies, our findings do not substantiate the assumption that sensitive political information can be extracted from digital trace data. This also challenges the notion that such data could be utilized by advertising distributors like Google or by politicians for political microtargeting.

Although we performed several robustness tests of our models, the study has several limitations that could affect the results. Our findings represent a conservative estimation of the predictive power of web tracking data. Our estimation is based on bounded ordinal variables standard in political science to measure political attitudes, but only sometimes informative for predictive ML models (Seveso, Campagner, Ciucci, & Cabitza, 2020). We also do not use data from mobile devices, which could potentially reveal more patterns from individuals' daily life. With larger samples, better representations of URLs that are not limited to domains, alternative continuous instead of categorical measures of attitudes, and various model specifications, including hyperparameters configurations beyond the ones considered in our grid search that improves the model performance, we expect the findings to gain more accuracy and robustness. Our findings also might change through time. Therefore, in this paper, we offer the algorithm to replicate this analysis for future research. All materials for the replication of this paper with new data can be found in repositories available on open-source platforms OSF.

Notes

1. https://www.nytimes.com/interactive/2020/10/27/upshot/biden-trump-poll-quiz.html
2. https://whotargets.me/en/
3. https://blog.google/technology/ads/update-our-political-ads-policy
4. https://about.fb.com/news/2020/01/political-ads/
5. https://business.twitter.com/en/help/ads-policies/prohibited-content-policies/political-content.html
6. A full literature review is available in the Online Appendix.
7. https://www.pewresearch.org/politics/2014/06/12/section-3-political-polarization-and-personal-life/.
8. https://topepo.github.io/caret/variable-importance.html.
9. We provide the exploratory analysis of base-line OLS regressions in the Online Appendix.

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References

Al Halabi, W. S., Kubat, M., & Tapia, M. (2007). Time spent on a web page is sufficient to infer a user's interest. In *Proceedings of the Third IASTED European Conference on Internet and Multimedia Systems and Applications*, USA: ACTA Press, (p. 41–46).

Althoff, T., Nilforoshan, H., Hua, J., & Leskovec, J. (2022). Large-scale diet tracking data reveal disparate associations between food environment and diets. *Nature Communications*, *13*(267). doi:10.1038/s41467-021-27522-y

Araujo, T., Wonneberger, A., Neijens, P., & de Vreese, C. (2017). How much time do you spend online? understanding and improving the accuracy of self-reported measures of internet use. *Communication Methods and Measures*, *11* (3), 173–190. doi:10.1080/19312458.2017.1317337

Brandenstein, N. (2022). Going beyond simplicity: Using machine learning to predict belief in conspiracy theories. *European Journal of Social Psychology*, *52*(5–6), 910–930. doi:10.1002/ejsp.2859

Breiman, L. (2001). Random forests. *Machine Learning*, *45*(1), 5–32. doi:10.1023/A:1010933404324

Cerina, R., & Duch, R. (2020, March). Measuring public opinion via digital footprints. *International Journal of Forecasting (To Appear)*, *36*(3), 987–1002. doi:10.1016/j.ijforecast.2019.10.004

Chicco, D., Warrens, M. J., & Jurman, G. (2021). The coefficient of determination r-squared is more informative than SMAPE, MAE, MAPE, MSE and RMSE in regression analysis evaluation. *Peer Journal of Computer Science*, *7*(623), e623. doi:10.7717/peerj-cs.623

Colin Cameron, A., & Windmeijer, F. A. (1997). An r-squared measure of goodness of fit for some common nonlinear regression models. *Journal of Econometrics*, *77*(2), 329–342. doi:10.1016/S0304-4076(96)01818-0

DellaPosta, D., Shi, Y., & Macy, M. (2015). Why do liberals drink lattes? *American Journal of Sociology*, *120*(5), 1473–1511. doi:10.1086/681254

Dixit, R., Chinnam, R. B., & Singh, H. (2020). Artificial intelligence and machine learning in sparse/inaccurate data situations. In *2020 IEEE Aerospace Conference*, Big Sky, MT, USA, 1–8.

Engel, D., Hüttenberger, L., & Hamann, B. (2012). A survey of dimension reduction methods for high-dimensional data analysis and visualization. In C. Garth, A. Middel, & H. Hagen (Eds.), *Visualization of large and unstructured data sets: Applications in geospatial planning, modeling and engineering - proceedings of IRTG 1131 workshop 2011* (Vol. 27, pp. 135–149). Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik.

Englehardt, S., & Narayanan, A. (2016). Online tracking: A 1-million-site measurement and analysis. In *Proceedings of the 2016 ACM SIGSAC Conference on Computer and Communications Security* (p. 1388–1401). New York, NY, USA: Association for Computing Machinery.

Fisher, A., Rudin, C., & Dominici, F. (2019). All models are wrong, but many are useful: Learning a variable's importance by studying an entire class of prediction models simultaneously. *Journal of Machine Learning Research*, *20* (177), 1–81.

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Advances in Methods and Practices in Psychological Science*, *2*(2), 156–168. doi:10.1177/2515245919847202

Guess, A. M., Nyhan, B., & Reifler, J. (2020). Exposure to untrustworthy websites in the 2016 us election. *Nature Human Behaviour*, *4*(5), 472–480. doi:10.1038/s41562-020-0833-x

Hofgesang, P. I. (2006). Relevance of time spent on web pages. In *Proceedings of KDD Workshop on Web Mining and Web Usage Analysis, in conjunction with the 12th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*.

Kerna, M. L., McCarthyb, P. X., Chakrabartyb, D., & Rizoiud, M.-A. (2019). Social media-predicted personality traits and values can help match people to their ideal jobs. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(52), 26459–26464. doi:10.1073/pnas.1917942116

Kirkizh, N., Froio, C., & Stier, S. (2022). Issue trade-offs and the politics of representation: Experimental evidence from four European democracies. *European Journal of Political Research*, *62*(4), 1009–1030. doi:10.1111/1475-6765.12558

Kosinski, M., Stillwell, D., & Graepel, T. (2013). Private traits and attributes are predictable from digital records of human behavior. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(15), 5802–5805. doi:10.1073/pnas.1218772110

Kuhn, M. (2008). Building predictive models in r using the caret package. *Journal of Statistical Software*, *28*(5), 1–26. doi:10.18637/jss.v028.i05

Leist, A. K., Klee, M., Kim, J. H., Rehkopf, D. H., Bordas, S. P. A., Muniz-Terrera, G., & Wade, S. (2022). Mapping of machine learning approaches for description, prediction, and causal inference in the social and health sciences. *Science Advances*, *8*(42), eabk1942. doi:10.1126/sciadv.abk1942

Möller, J., van de Velde, R. N., Merten, L., & Puschmann, C. (2020). Explaining online news engagement based on browsing behavior: Creatures of habit? *Social Science Computer Review*, *38*(5), 616–632. doi:10.1177/0894439319828012

Panicheva, P., Mararitsa, L., Sorokin, S., Koltsova, O., & Rosso, P. (2022). Predicting subjective well-being in a high-risk sample of Russian mental health app users. *EPJ Data Science*, *11*(1), 21. doi:10.1140/epjds/s13688-022-00333-x

Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., & Duchesnay, E. (2011). Scikit-learn: Machine learning in python. *Journal of Machine Learning Research*, *12*(85), 2825–2830.

Praet, S., Guess, A. M., Tucker, J. A., Bonneau, R., & Nagler, J. (2021). What's not to like? Facebook page likes reveal limited polarization in lifestyle preferences. *Political Communication*, *39*(3), 1–28. doi:10.1080/10584609.2021.1994066

Scharkow, M. (2016). The accuracy of self-reported internet use—a validation study using client log data. *Communication Methods and Measures*, *10*(1), 13–27. doi:10.1080/19312458.2015.1118446

Seveso, A., Campagner, A., Ciucci, D., & Cabitza, F. (2020). Ordinal labels in machine learning: A user-centered approach to improve data validity in medical settings. *BMC Medical Informatics and Decision Making*, *20*(142). doi:10.1186/s12911-020-01152-8

Shi, F., Shi, Y., Dokshin, F. A., Evans, J. A., & Macy, M. W. (2017, April). Millions of online book co-purchases reveal partisan differences in the consumption of science. *Nature Human Behaviour*, *1*(4), doi:10.1038/s41562-017-0079

Stachl, C., Au, Q., Schoedel, R., Gosling, S. D., Harari, G. M., Buschek, D., & Bühner, M. (2020). Predicting personality from patterns of behavior collected with smartphones. *Proceedings of the National Academy of Sciences*, *117*(30), 17680–17687. doi:10.1073/pnas.1920484117

Stier, S., Breuer, J., Siegers, P., & Thorson, K. (2020). Integrating survey data and digital trace data: Key issues in developing an emerging field. *Social Science Computer Review*, *38*(5), 503–516. doi:10.1177/0894439319843669

Stier, S., Kirkizh, N., Froio, C., & Schroeder, R. (2020). Populist attitudes and selective exposure to online news: A cross-country analysis combining web tracking and surveys. *The International Journal of Press/politics*, *25*(3), 426–446. doi:10.1177/1940161220907018

Waldmann, P. (2019). On the use of the Pearson correlation coefficient for model evaluation in genome-wide prediction. *Frontiers in Genetics*, *10*. doi:10.3389/fgene.2019.00899

Wiedemann, A. (2023). The electoral consequences of household indebtedness under austerity. *American Journal of Political Science*. doi:10.1111/ajps.12708

Zou, H., & Hastie, T. (2005). Regularization and variable selection via the elastic net. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, *67*(2), 301–320. doi:10.1111/j.1467-9868.2005.00503.x

Appendix D.

Paper 4: Populist Attitudes and Selective Exposure to Online News: A Cross-Country Analysis Combining Web Tracking and Surveys

Authors

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Abstract

Research has shown that citizens with populist attitudes evaluate the news media more negatively, and there is also suggestive evidence that they rely less on established news sources like the legacy press. However, due to data limitations, there is still no solid evidence whether populist citizens have skewed news diets in the contemporary high-choice digital media environment. In this paper, we rely on the selective exposure framework and investigate the relationship between populist attitudes and the consumption of various types of online news. To test our theoretical assumptions, we link 150 million Web site visits by 7,729 Internet users in France, Germany, Italy, Spain, the United Kingdom, and the United States to their responses in an online survey. This design allows us to measure media exposure more precisely than previous studies while linking these data to demographic attributes and political attitudes of participants. The results show that populist attitudes leave pronounced marks in people's news diets, but the evidence is heterogeneous and highly contingent on the supply side of a country's media system. Most importantly, citizens with populist attitudes visit less Web sites from the legacy press, while consuming more hyperpartisan news. Despite these tendencies, the Web tracking data show that populist citizens still primarily get their news from established

sources. We discuss the implications of these results for the current state of public spheres in democracies.

Contribution of thesis author

My contributions to the paper encompasses developing research design, data processing, and data analysis.

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Populist Attitudes and Selective Exposure to Online News: A Cross-Country Analysis Combining Web Tracking and Surveys

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Abstract

Research has shown that citizens with populist attitudes evaluate the news media more negatively, and there is also suggestive evidence that they rely less on established news sources like the legacy press. However, due to data limitations, there is still no solid evidence whether populist citizens have skewed news diets in the contemporary high-choice digital media environment. In this paper, we rely on the selective exposure framework and investigate the relationship between populist attitudes and the consumption of various types of online news. To test our theoretical assumptions, we link 150 million Web site visits by 7,729 Internet users in France, Germany, Italy, Spain, the United Kingdom, and the United States to their responses in an online survey. This design allows us to measure media exposure more precisely than previous studies while linking these data to demographic attributes and political attitudes of participants. The results show that populist attitudes leave pronounced marks in people's news diets, but the evidence is heterogeneous and highly contingent on the supply side of a country's media system. Most importantly, citizens with populist attitudes visit less Web sites from the legacy press, while consuming more hyperpartisan news. Despite these tendencies, the Web tracking data show that populist citizens still primarily get their news from established sources. We

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discuss the implications of these results for the current state of public spheres in democracies.

Keywords
populist attitudes, selective exposure, Web tracking, news consumption, political information

Introduction

Extant research has shown that people with populist attitudes evaluate the news media more negatively (Fawzi 2019; Pew Research 2018; Schulz et al. 2018). Moreover, there is some evidence that citizens with populist attitudes make less use of established news sources like legacy press outlets (Newman et al. 2019; Schulz 2019b). These political predispositions can be especially impactful given the increasing autonomy of citizens in contemporary high-choice digital media environments (Van Aelst et al. 2017). If people with populist attitudes tune out of legacy news and turn toward less politically balanced digital sources, this might embolden them in their negative views of political actors and processes, polarize public opinion on issues, and ultimately contribute to the fragmentation of democratic public spheres (Bennett and Pfetsch 2018).

In this paper, we investigate *selective exposure to news among citizens with populist attitudes*. The selective exposure literature is full of evidence showing pronounced effects of partisan predispositions on news selection (Stroud 2017). In light of recent developments on the supply side of politics such as the electoral successes of populist parties, populist attitudes might be a crucial factor guiding information selection. Whereas previous research has relied on survey-based self-reports of media exposure, we use digital behavioral data from the Web browsing histories of 7,729 study participants in France, Germany, Italy, Spain, the United Kingdom, and the United States. This has several advantages: First, such "Web tracking" data provide more reliable measures than commonly used self-reports on media exposure, which have several limitations (Prior 2009; Scharkow 2016). Behavioral data are particularly valuable for the study of sensitive issues like news consumption and visits to hyperpartisan sources. Second, Web tracking data have a unique granularity and therefore provide novel insights into the character and intensity of online media exposure. Third, our approach also captures domains in the long tail of news sources, whereas the list of news brands in surveys is naturally restricted. To classify online media exposure at a large scale, we coded the top five thousand visited domains per country into a typology that comprises the legacy press, tabloid press, public broadcasting, commercial broadcasting, digital-born outlets, and hyperpartisan news. Fourth, the research design allows us to link the behavioral measures to the individual level through a survey on demographic attributes and political attitudes (Stier et al. 2019). We further show that the study participants are similar to participants in external benchmark studies in their online and offline news consumption and in their privacy attitudes.

Our regression models show that citizens with populist attitudes visit the Web sites of the legacy press less often but obtain more contents from hyperpartisan sources. The findings with regard to selective exposure by populist citizens to tabloid news and public broadcasters are mixed. Taken together, populist attitudes leave pronounced marks on people's media diets, but the evidence is heterogeneous and highly contingent on the supply side of a country's media system. In the conclusion, we discuss the implications of these results for the current state of public spheres in democracies.

Populism and Selective Exposure

While there are ongoing debates whether populism is an ideology or a style (Rooduijn 2019), scholars agree that populism encompasses a specific set of ideas relying on two elements: a moral distinction between the "good people" and the "corrupt elites" (Canovan 1981; Moffitt 2016; Mudde 2007), and the idea that politics is about respecting the general will of the people (Hawkins et al. 2018; Mudde 2007). Recent studies have shown that a substantial share of citizens in established democracies holds populist attitudes (Akkerman et al. 2014; Schulz et al. 2017); which we conceptualize hereafter as a latent political worldview consisting of anti-elitist attitudes, a preference for popular sovereignty, and a belief in the homogeneity and virtuousness of the people (Schulz et al. 2017; Wettstein, Schulz, Steenbergen, Schemer, Müller, Wirz and Wirth, 2020).

Our paper aims to contribute to debates among researchers and journalists about the impact of populism on democracy and whether the media "play an important part in the political success and failure of populist forces" (Mudde and Kaltwasser 2017: 114; see also Mazzoleni 2008). Recent theoretical accounts of populism have pointed to digital media which provide an ever-increasing proliferation of sources of political information (Engesser et al. 2017; Krämer 2018; Moffitt 2016). In the high-choice digital media environment (Van Aelst et al. 2017), traditional media like the legacy press or public broadcasters are competing with a multitude of digital-born information sources (Bennett and Pfetsch 2018). At an aggregate level, the Web sites of traditional media with an established offline presence are still the most popular news sources on the Web (Fletcher and Nielsen 2017; Nelson and Webster 2017), yet the high-choice digital media environment provides ample opportunities to self-select into a highly individualized news diet structured along populist attitudes. This perspective combining "demand" and "supply" leads us to our first research question:

> **Research Question 1 (RQ1):** Do citizens with populist attitudes engage in selective exposure when consuming different types of online news?

Demand Side: Populist Attitudes and Selective Exposure

Recently, populism studies have moved beyond supply side explanations that focus on political parties and politicians' discourse to also investigate populism as an individual-level predisposition. While there are methodological debates on the measurement of populist attitudes (Castanho Silva, Jungkunz, Helbling and Littvay, 2019;

Wuttke et al. 2020), such batteries can be used as an independent variable in cross-country research (Wettstein, Schulz, Steenbergen, Schemer, Müller, Wirz and Wirth, 2020). Most prominently, populist attitudes transcend existing political cleavages and predict voting for populist radical left and right parties in many Western democracies (Van Hauwaert and Van Kessel 2018; Wettstein et al. 2019).

In the following, we argue that populist attitudes are related to selective exposure, that is, the selection of information according to prior political beliefs (Stroud 2017). In his review, Krämer (2018) breaks down the relationship between populism and the media into various dimensions. Most important to our study is what he calls "anti-media populism" by "populist groups or members of the general population" who consider "mainstream (non-populist) media as a part of an elite conspiracy" (Krämer 2018: 453). We therefore assume that "source cues" matter, that is, the identity of the sender and its perceived trustworthiness influence content selection (Iyengar and Hahn 2009; Stroud 2010). While message and topic cues as well as other content features also drive selective exposure, a populist worldview should negatively affect evaluations of journalists and news organizations. This might not only decrease the likelihood of visiting particular pieces of content but also translate into a more general avoidance of sources that are perceived as conspiring against "the people."

A survey of Western European citizens found that citizens with populist attitudes are less likely to trust mainstream news sources, especially public broadcasters (Pew Research 2018). Citizens with populist attitudes also tend to have hostile media perceptions and regard their own political opinions as more congruent with public opinion than the media's reporting on political matters (Schulz et al. 2018). More specifically, populist citizens consider the legacy press and public service media as being hostile toward them, whereas commercial providers and the tabloid press are not regarded in this way, even though the latter are arguably also part of the mainstream media (Schulz 2019a). A disaggregated analysis of various dimensions of populism showed that anti-elitist attitudes are negatively related to trust in traditional media and to evaluations of the media's performance and quality (Fawzi 2019). Interestingly, anti-elitism is also negatively correlated with trust in tabloid media, whereas beliefs in the homogeneity of the people and anti-outgroup feelings are positive predictors (Fawzi 2019). Citizens with populist attitudes also have an affinity for beliefs in conspiracies (Castanho Silva et al. 2017). In sum, the psychological processes revealed by these studies suggest that a populist worldview would also translate into skewed media consumption patterns.

Few empirical studies have so far investigated the relationship between populist attitudes and *actual news consumption*. The most comprehensive and in-depth analysis can be found in Schulz (2019a). She did not consistently find more tabloid use among those with populist attitudes across countries. There was, however, a positive relation between populist attitudes and use of "anti-elitist" media, at least for Germany. Other research revealed a positive relationship between populist attitudes and tabloid news consumption only for its exclusionist dimension (Hameleers et al. 2017). In contrast, quality newspapers were read less by populist citizens, whereas surprisingly, public TV news was similarly popular among populist citizens (Schulz 2019b).

While these studies have provided novel insights, it is noteworthy that they relied entirely on self-reported data on media consumption (see "Measuring online news consumption" section for the limitations of this approach). As the number of news sources that can be included in surveys is constrained, variation across news types might be concealed by survey instruments that are skewed toward the most popular news sources in a country. Moreover, related research almost exclusively focuses on news consumption via television and newspapers.

Supply Side: Populist Attitudes and Different News Types

Several scholars contend that tendencies in news coverage toward sensationalism and adherence to news values provide opportunity structures beneficial to populists (Krämer 2018; Mazzoleni 2008; Mudde 2007). A conventional way to account for the extent to which news coverage is affected by these structural changes in political communication is the distinction between several types of journalism (Esser 1999; Mazzoleni 2008). In the theoretical discussion and in the empirical analysis, we distinguish six news types: tabloid press, legacy press, public broadcasters, hyperpartisan news, commercial broadcasters, and digital-born outlets.

The tabloid press typically uses a more personalized and sensationalist style, focuses more on soft news (Esser 1999), and frames politics from a layperson's perspective. This style of coverage seems to be attractive for people with populist attitudes (Fawzi 2019). Recent research shows that even though populist actors are not openly promoted or particularly salient in their coverage, tabloids still use populist frames extensively (Wettstein et al. 2019). At the same time, other findings suggest that tabloids do not contain higher levels of populist or anti-elitist coverage (Bos and Brants 2014). Findings from the "supply side" centered research about populism and the tabloid press can thus be regarded as mixed (see also Schulz 2019a).

The tabloid style of presenting the news stands in stark contrast to the mission of the legacy press (i.e., broadsheets, regional newspapers, and weekly current affairs magazines) and public broadcasters. Public service mandates and journalistic norms require representing a diversity of views. Ideally, the "legacy press could assess power balances among different political actors, introduce their positions proportionately, and, thus, set agendas, referee frame contests, and produce effects" (Bennett and Pfetsch 2018: 248). According to a populist worldview, however, "liberal journalism betrays the people and conspires with, or is instrumentalized by, the ruling elite to manipulate the people" (Krämer 2018: 454).[1] Public broadcasters also face accusations, particularly from populist parties, that their financing through public funds is a strain on citizens and makes them susceptible to interference by governments.

The contemporary high-choice media environment is characterized by a number of additional news types. In the digital age, social networking sites such as Facebook and Twitter and digital-born news Web sites have emerged as sources for political information (Bennett and Pfetsch 2018). While many online news providers have a professional staff, others lack journalistic quality. Outlets regarded as "fake news," "junk news," or "alternative media" in the literature are the most notorious sources of

dubious political information (Allcott and Gentzkow 2017; Guess et al. 2018; Holt et al. 2019). At the same time, defining them is fraught with difficulty.

Several recent studies have used the term "hyperpartisan" (Benkler et al. 2018; Guess et al. 2019; Pennycook and Rand 2019), without providing a clear definition though. In our conceptualization, hyperpartisan sources purport to be news outlets while promoting a narrow and skewed political agenda without making an effort toward a balanced representation of major political issues, events, or political actors.[2] It should be noted that our definition does not encompass what is commonly regarded as "political slant." Fox News, The Guardian, and the partisan press in Southern Europe present a broad agenda of newsworthy topics and feature, howsoever occasionally, diverse views. We also find "hyperpartisan" conceptually more useful than "alternative" news media as defined by Holt et al. (2019), because they define these media in opposition to hegemonic media, whereas we do not regard the public-mediated arena as necessarily hegemonic.

There is considerable diversity within the spectrum of hyperpartisan Web sites in terms of political ideology and the topical skew inherent to their coverage. Yet, there is a common tendency to frame political opponents as illegitimate groups (e.g., "globalists" on Breitbart), which we assume should align well with a populist worldview.

Taken together, we hypothesize that the relationship between populist attitudes and news consumption varies across different news types. Our analysis is thus guided by the following hypotheses:

Hypothesis 1 (H1): Citizens with stronger populist attitudes expose themselves less to the legacy press.
Hypothesis 2 (H2): Citizens with stronger populist attitudes expose themselves less to public service media.
Hypothesis 3 (H3): Citizens with stronger populist attitudes expose themselves more to the tabloid press.
Hypothesis 4 (H4): Citizens with stronger populist attitudes expose themselves more to hyperpartisan news sources.

We also classify commercial broadcasters and digital-born outlets such as the HuffPost without a clear hyperpartisan slant. While it is difficult to formulate concrete theoretical expectations for them, we still report results for these sources to get a holistic perspective of online news consumption.

Country Heterogeneity

We also expect to find differences across countries because contextual factors shape the opportunity structures for populist actors and citizens (Reinemann et al. 2016). First, various characteristics of political systems such as the electoral system, electoral results, the political culture, and societal polarization vary. Most importantly, the information ecology in each country differs significantly; some countries have an established tabloid press and public broadcasting system or a sprawling hyperpartisan

media ecosphere, some not. Moreover, long-lasting macro-level factors like the economic environment, ownership structures, and political parallelism (Hallin and Mancini 2004) still affect news coverage, even in the digital age. Accordingly, studies have found that a strong public broadcasting presence mitigates selective exposure in a country (Bos et al. 2016). Schulz (2019b) also found cross-country variation in selective exposure by populist citizens to newspapers and television news.

The present study covers six Western democracies: France, Germany, Italy, Spain, the United Kingdom, and the United States. The countries selected differ with regard to the above-mentioned contextual factors, the role of populist parties in the political system and whether right and left wing populism (and sometimes both) is prevalent. The cases represent all three types of media systems according to the typology of Hallin and Mancini (2004): the polarized pluralist model (France, Italy, and Spain), the democratic corporatist model (Germany), and the liberal model (the United Kingdom and the United States). Hence, our second research question is as follows:

Research Question 2 (RQ2): To what extent does selective exposure by citizens with populist attitudes vary across countries?

Measuring Online News Consumption

Most recent studies found few indications of selective exposure in news consumption on Web sites (Flaxman et al. 2016; Fletcher and Nielsen 2017; Nelson and Webster 2017). Although research on this topic relies on various research designs and data types, each of these approaches has drawbacks. First, survey-based studies rely on self-reports of media consumption which naturally restricts the number of Web sites covered as well as the granularity and precision of the measurement. For the approaches that use Web tracking data, the measurement of media consumption is much more precise and researchers know that user X visited Web site Y and also visited Web site Z. This allows for an assessment of "audience networks" (Majó-Vázquez et al. 2019). However, the proprietary Web tracking data only provide information on Web site visits, not on the users themselves. Such audience-centered approaches, therefore, mask considerable differences between individuals and cannot be directly linked to political attitudes.

It is particularly troublesome that self-reports on news consumption are affected by various politically motivated biases. People's reporting on news use depends on the political cues provided by different types of content (Vraga and Tully 2018) and tends to overrepresent socially desirable activities like consumption of quality news (Prior 2009). Especially when studying a subject like populism and media use, this approach is therefore limited. Moreover, the state-of-the-art list-frequency technique (used, for example, by Newman et al. 2019; Schulz 2019b) covers only a limited number of news sources. This measurement approach is necessarily skewed toward the more prominent, most frequently used news sources and is prone to miss less popular sources which might be particularly popular among people critical of the mainstream media.

Improving upon previous measurement approaches, we are able to test our theoretical assumptions using a data set linking surveys with a passive tracking of the Web browsing behavior of participants.[3] This mitigates problems of recall and social desirability bias in surveys and further adds information on individual-level attributes, predispositions, and attitudes that are lacking in the highly aggregated Web tracking data used in audience research. Guess and colleagues (Guess et al. 2019; Guess et al. 2018) studied selective exposure during the 2016 U.S. presidential election campaign with a similar research design. However, they focused on "fake news" and partisan predispositions—not on populist attitudes—and only on one country. With our country-comparative design, we also aim to contribute to the question of how prevalent selective exposure is beyond the much-studied bipolar U.S. case.

At the same time, the large sets of unstructured data that Web tracking techniques produce are an analytical challenge for researchers. Conventional media formats like newspaper articles lend themselves more naturally to content analysis. Therefore, to make sense of the types of contents people see online, most news consumption studies relying on passive tracking data restrict themselves to the domain level (e.g., www.nytimes.com) instead of coding actual contents at the article level (Allcott and Gentzkow 2017; Guess et al. 2019; Guess et al. 2018, but see Budak et al. 2016; Flaxman et al. 2016). We follow this approach in our coding of domains but acknowledge the limitation that we cannot know which individual article, and hence which share of Web site visits, is related to politics. Visitors to commercial broadcasters, for instance, are infrequently exposed to political contents, in contrast to visitors of our main news types of interest—legacy press, tabloid press, public broadcasting, and hyperpartisan news. Because the actual share of political contents seen on Facebook and Twitter is impossible to measure for external researchers without access to the news feeds of people, we exclude social networking sites from our analysis.

Method

Our study relies on a combined data set of Web browsing histories and survey responses. In the following, we describe the data collection and the methods used in the empirical analysis.

Web Tracking

The collection of Web tracking data for this study was done by the survey company *Netquest* (an affiliate of GfK) in full compliance with EU GDPR (General Data Protection Regulation) regulations.[4] The company is the only one that maintains Web tracking panels in all of the countries under study. Loyal panelists in the regular online access panel are incentivized to also install tools for the tracking of Web site visits on desktop computers as well as Web site visits and app use on smartphones and tablets. Participants are informed about the nature of the data collection and asked for their explicit consent to participate in surveys and Web tracking. The data include the full

URL, the name of the domain, the time of access, and the duration of a visit (on desktop computers, an active browser tab). In this paper, we use information about visited URLs aggregated to the domain level (in what follows, "visits").

Attention is distributed very unequally on the Web, that is, a few (political) Web sites receive many visits while most Web sites in the long tail are visited only rarely (Hindman 2008). We use the skewed attention on the Web to our advantage by capturing most Web site visits through an extensive coding of domains. We first coded the five thousand most visited domains per country into the categories non-political/political. Among the Web sites which cover political issues and actors prominently, we then coded six different news types: legacy press, tabloid press, commercial broadcasters (TV and radio), public broadcasters (TV and radio), digital-born outlets, and hyperpartisan news. For a better understanding of the distinction between the two online only news types, an example is that we code the HuffPost as a digital-born outlet and Breitbart News as hyperpartisan news. Our coding approach covers 93 percent of all Web site visits. A codebook with definitions for each category and a flowchart for the coding can be found in Online Appendix Section 2. The list of coded news domains is shared in the Supplemental Material.

It could well be the case that the online behavior of panelists who agree to install tracking tools differs from the general population of Internet users. However, we validated that the visits of panelists to news domains are comparable with national benchmarks (Online Appendix Section 3). The popularity of news domains in our data corresponds strongly with Alexa data and another benchmark available for Germany, data from the "Informationsgemeinschaft zur Feststellung der Verbreitung von Werbeträgern" (IVW), a Joint Industry Committee to which media providers, advertisers, and advertising agencies submit their original visit data to evaluate their marketing value. Comparisons of tracking data with these external sources result in correlations ranging from $\rho = .48$ to $\rho = .72$. We also assessed to what extent the offline news consumption of panelists via newspapers and television diverges from an external benchmark (Online Appendix Section 4). For this, we implemented items from the *Reuters Institute Digital News Report 2019* (Newman et al. 2019) in our survey and compared the popularity of offline news media brands in both data sources. The resulting rank correlations ($\rho \geq .93$) demonstrate that the Web tracking participants consume similar offline news media like the general population.

Following the approach of Guess et al. (2018), we conducted an additional survey on privacy attitudes in the regular online access panel of the survey company. This helps us to better understand to what extent the "opt in" to the more intrusive tracking components might bias the sample toward less privacy sensitive individuals. However, privacy attitudes of tracked online panelists differ only marginally from a demographically weighted sample of non-tracked online panelists (Online Appendix Section 5).

Survey

The survey company is still in the process of expanding their Web tracking panels in our target countries so that there is quite a bit of variation in the sample sizes as well

as their demographic composition per country (Online Appendix Section 1). We addressed this issue in two ways. First, the sampling of panelists was determined by national census statistics as far as possible. As some of the quota cells were not fully available (e.g., lower education) and due to the overall limited number of tracked desktop users in some countries, we still have pronounced deviations from national census data for some demographic groups. Therefore, after the field period, we post-stratified our samples according to population weights based on census data (Online Appendix Section 1). We invited participants in the Web tracking panels to a survey on media and politics. The survey was in the field from April 23 to May 11, 2019.

In our survey, we used the scale by Schulz et al. (2017) that consists of 12 survey items to measure populist attitudes. For the aggregation of items into one scale we followed the advice by Wuttke et al. (2020) and treated the three subdimensions anti-elitism, beliefs in popular sovereignty and the homogeneity of the people as non-substitutable (what they call the "Goertz concept structure"). Concretely, the 12 original items were first standardized to a mean of zero and a standard deviation of one. Afterwards, the four items belonging to each of the three subdimensions were aggregated by calculating their mean value. Finally, the minimum value of each respondent on the three subdimensions was taken to determine the final *populist attitudes* score with a range from -3.21 to 0.93 (mean = -0.56; median = -0.53). This procedure ensures that all three theoretical subdimensions are treated as necessary conditions, whereas in compensatory operationalizations of populist attitudes (e.g., using factor analysis) low values on one subdimension can be compensated for by high values on another subdimension.

Analysis

We link the survey and Web tracking data via a unique anonymized panelist ID. The final analysis is based on the survey responses from 7,729 panelists and approximately 150 million desktop URL visits made by them between March 15 and June 16, 2019.[5] To construct our dependent variables, we aggregate all visits by a respondent to domains belonging to one of the six news types we distinguish. Because the dependent variables are heavily skewed, we use count models for the multivariate analysis. Likelihood ratio tests show that the over-dispersion parameter is significant in each of the models (each $p < .001$). Therefore, negative binomial regressions are preferable over Poisson models.

We include several control variables. Political interest was measured on a 4-point scale in all countries, ranging from "not at all interested" to "very interested." We also include controls for age, gender, and education. Education was recoded into a country-comparative scale according to the International Standard Classification of Education (ISCED) 2011 classification. The resulting levels are "Low education," "Intermediate education," and "High education." In line with theories of attitude polarization and selective exposure, people with more extreme ideological leanings might be more prone to engage in selective exposure (Fawzi 2019; Möller et al. 2019). Political extremism could also be correlated with populist attitudes, which are

a phenomenon that goes beyond left and right ideological leanings (Van Hauwaert and Van Kessel 2018). Hence, we constructed a political extremism variable by calculating the distance of a respondent from the midpoint on an 11-point left/right scale.[6] Especially populist radical right parties and politicians like Donald Trump or Matteo Salvini criticize the mainstream media for political gains. As people with populist attitudes also have a higher likelihood of being a supporter of these parties (Van Hauwaert and Van Kessel 2018; Wettstein et al. 2019), their media preferences could be shaped by these anti-media party cues (Ladd 2011). We therefore included a dummy variable indicating that a respondent identifies with the Alternative for Germany (AfD), Brexit Party, Lega, Rassemblement National, the Republican Party, United Kingdom Independence Party (UKIP), or VOX.[7] We also include dummies that control for country differences, for example, in media and political systems or political culture. Finally, we control for the total number of Web site visits by participants. The more active a person is online, the more likely she will also visit news Web sites, not least due to incidental exposure to such contents via social networking sites (Flaxman et al. 2016).

The regression analyses are based on the Web tracking and survey data of all respondents who had no missing values for the variables included in the regression models. We conducted all analyses in R (R Core Team 2016).[8]

Results

We first provide descriptive evidence on the number of visits to each news type. Figure 1 shows that most people still get their news from established sources, but that the mean number of visits per news type varies across countries. It is a plausible assumption that U.S. participants visited less news sites than European participants because the latter were mobilized to some extent by the EU election campaign.[9] Furthermore, well-known structural differences between media systems still leave a strong mark in online news consumption (RQ2). The legacy press which includes regional newspapers dominates news visits from continental European countries, whereas the BBC is the overwhelming market leader in online news in the United Kingdom with more than three hundred mean visits per panelist. Digital-born outlets and hyperpartisan news have their highest market shares in the United States.

We next turn to RQ1 and investigate populist attitudes and selective exposure to different news types while controlling for alternative explanations. In Figure 2, we visualize the main findings from negative binomial regression models with all control variables included (Table A8 in the Online Appendix).[10] The data are weighted by population margins from census data so that the panel resembles the national population on core demographics.[11]

In line with H1, populist citizens indeed visit domains of legacy press outlets such as the New York Times or Corriere della Sera less often. Populist citizens also seem to avoid public broadcasting websites. However, the coding of domains as news is particularly imprecise for broadcasting sites, which contain a significant share of entertainment contents and non-political videos. To investigate this, we coded the

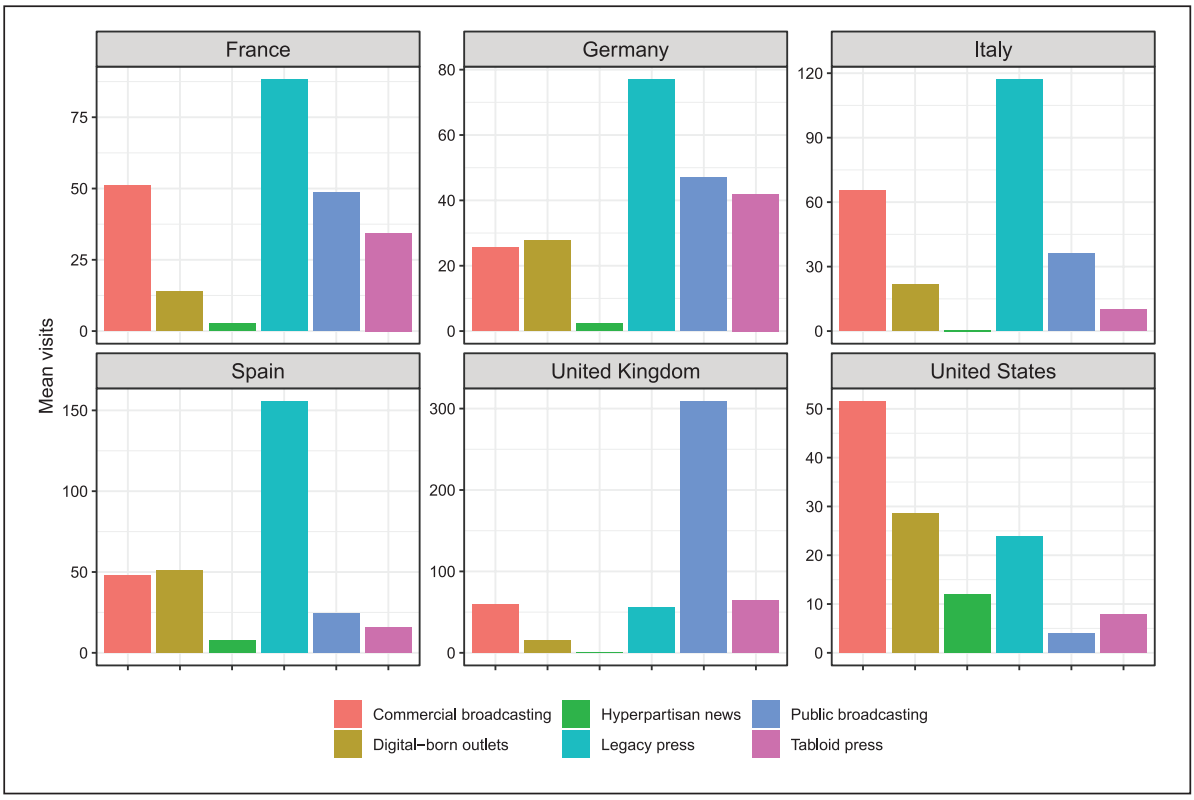

Figure 1. Mean visits by participant for each news type.
Note. Each country has an individual range on the *y*-axis.

subdomains of public broadcasters whether they specifically refer to news (e.g., www.bbc.co.uk/news). The results in Table A15 show that citizens with populist attitudes do not avoid news on websites of public broadcasters (contradicting H2).

We find that people with stronger populist attitudes tend to consume less tabloid news (contradicting H3) and more hyperpartisan news (supporting H4). However, the results for these two news types have to be further contextualized, as differences in media systems are particularly relevant (see cross-country results below). Populist citizens visit digital-born outlets like the HuffPost less frequently, while coefficients are not significant in the case of commercial broadcasting websites.

But do the identified effects substantively matter? Figure 3 shows the marginal effects for hyperpartisan news and the legacy press, the two categories of primary theoretical interest.[12] The sizes of the effects are clearly contingent on the different market shares of each news type (see Figure 1). The effect sizes are small for hyperpartisan news as these domains are not very prominently visited overall. A shift from the weakest to the strongest populist attitudes would be associated with an increase of 0.056 hyperpartisan Web site visits (95 percent confidence interval [CI] = [0.036, 0.076]). On the contrary, a shift from the weak to the extreme end of the populist attitudes scale would be associated with a decrease of −24.56 legacy press Web site visits (95 percent CI = [−19.40, −29.72]). Given that we control for confounders—most importantly political interest and general online activity—we regard these effect sizes as substantively meaningful considering our research period of three months.

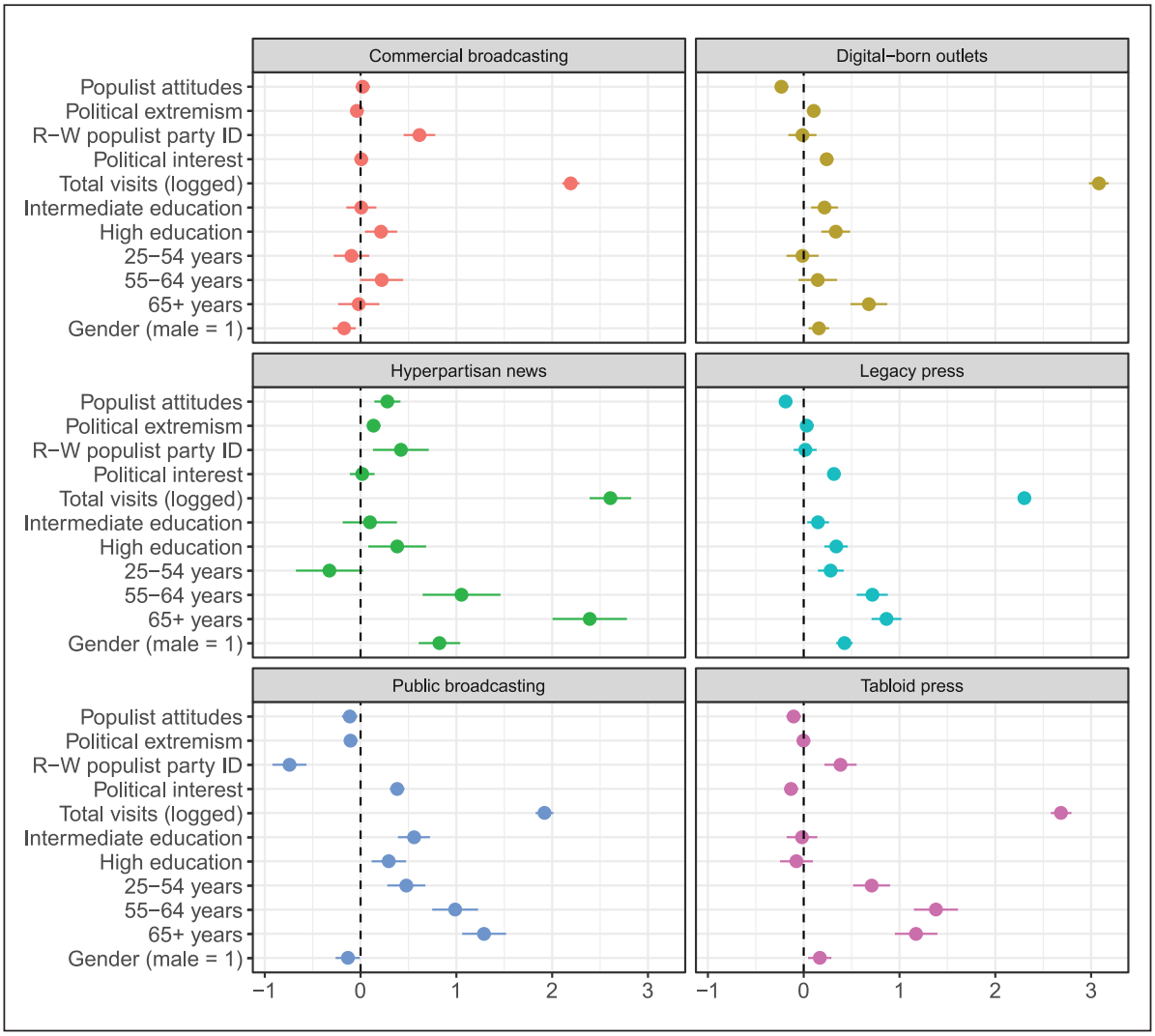

Figure 2. The relationship between populist attitudes and online news consumption.
Note. Coefficients and 95 percent confidence intervals from negative binomial regression models on weighted data. "Low education" is the reference category for education. "Female" is the reference category for gender. "18–24 years" is the reference category for age. Country dummy variables are included but not reported. Full results can be found in Table A8 in the Online Appendix.

The control variables show quite a bit of variation across news types, but mostly in the expected directions. Even though there is evidence that populist attitudes, political extremism, and a right-wing populist party identification are independent constructs (Van Hauwaert and Van Kessel 2018), there might be concerns that multicollinearity distorts the findings.[13] In robustness tests, we excluded these variables step wise (Tables A10-A12), introduced media trust as a control variable (Table A13) and used the aggregated duration spent on websites as the dependent variable instead of the number of visits (Table A14). The findings for the legacy press, hyperpartisan news and the tabloid press remain mostly consistent, while the coefficient of populist attitudes on public broadcasting use becomes insignificant in various model specifications.[14]

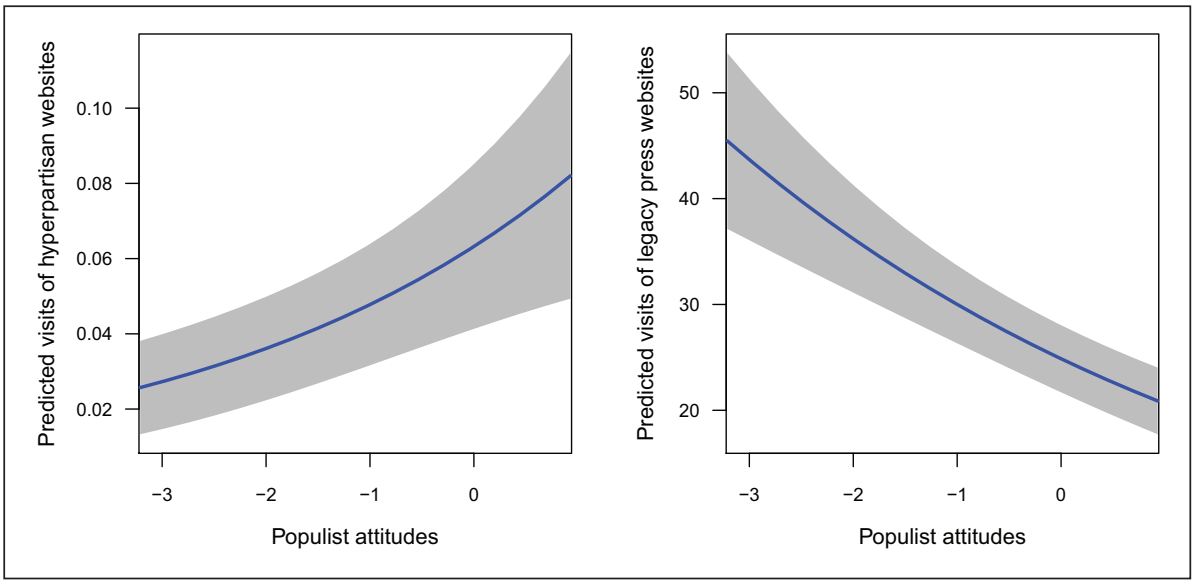

Figure 3. Average marginal effects for visits to hyperpartisan news and legacy press Web sites.
Note. Plots are based on the models in Table A8 in the Online Appendix.

Table 1. Effects of populist attitudes on news consumption across countries.

Country	Hyperpartisan News	Legacy Press	Public Broadcasting	Tabloid Press
France	*ns*	−	*ns*	*ns*
Italy	*ns*	−	*ns*	−
Germany	+	−	*ns*	−
Spain	*ns*	*ns*	*ns*	*ns*
United Kingdom	*ns*	−	*ns*	*ns*
United States	+	*ns*	*ns*	*ns*

Note. *ns* = populist attitudes not significant. − = populist attitudes negatively significant ($p < .05$). + = populist attitudes positively significant ($p < .05$).

Whereas six cases are not sufficient to relate macro-level factors to individuals' online behavior in multi-level regression models, we supplement our main results with separate regression models for each country and news type (see Online Appendix Section 8) to investigate RQ2. The main findings related to our main hypotheses are summarized in Table 1. The negative effect of populist attitudes on visits to legacy press outlets is significant in four countries, while the insignificant results for public broadcasters are consistent across all countries. The coefficients for populist attitudes are negatively significant for tabloid use in Germany and Italy. In the case of hyperpartisan news, the relationship is only significantly positive for Germany and the U.S.

How can we make sense of these patterns? Only when there is a noteworthy hyperpartisan ecosystem do citizens with populist attitudes navigate to such sources. A point in case is the United Kingdom, where the tabloid press already saturates the market

with sensationalist news.[15] It is also the only country where the tabloid press surpasses the audience share of the legacy press. Use of tabloids is widespread there, independent of populist or non-populist attitudes, and therefore one should not automatically conclude that the overall quality of information is higher in contexts where hyperpartisan news cannot gain a foothold. Also noteworthy is the negative relationship between populist attitudes and tabloid use in Germany, where the BILD Zeitung, the most popular tabloid online and offline, has always been critical of populist radical right parties even though its coverage focuses on similar topics (Mudde 2007: 249–250). In contrast, the effect of populist attitudes on hyperpartisan news is strongest in Germany, which hints at substitution effects between tabloids and hyperpartisan media. In the absence of tracking data for more countries that would allow for robust country-comparative statistical estimations, these conclusions are necessarily tentative. But it is evident that news consumption by citizens with populist attitudes is strongly related to the supply side of media systems.

Discussion and Conclusion

This is the most comprehensive analysis of online selective exposure by citizens with populist attitudes to date. A few findings are surprising but they do not necessarily contradict previous research. By focussing on just the news sections of public broadcasting Web sites, it became clear that populist citizens do not avoid public service news. Yet they might still *process* information differently. In line with the motivated reasoning paradigm (Taber and Lodge 2006), the underlying motive could be not to accurately inform oneself but rather to satisfy directional goals by occasionally hearing what the "fake news media" or "lying press" has to say and confirm that these sources are indeed biased.

The inconsistent cross-country findings with regard to the relationship between populist citizens and the consumption of tabloid news add to a still unresolved puzzle in the literature. While populist citizens should feel aligned with a tabloid style of coverage that pits the ordinary "people" against the elites (Mazzoleni 2008), empirical findings are conflicting (Bos and Brants 2014; Hameleers et al. 2017; Schulz 2019b; Wettstein et al. 2019).

The finding that citizens with populist attitudes consume less legacy news has potentially severe implications for democracy. This is a sign for the weakened role of the legacy press in times of "disrupted public spheres" (Bennett and Pfetsch 2018). At the same time, the concerns that digital media would drive citizens with populist attitudes to alternative sources at a large scale are unwarranted. Legacy press outlets were still consumed nineteen times as much as hyperpartisan news sources in our panel, and only 151 people (out of 7,729) had more visits to hyperpartisan than to legacy press sources. Moreover, the relationship between populist attitudes and visits to hyperpartisan news sites was not robust across countries. Like other problematic aspects of digital media such as self-segregation or exposure to disinformation, consumption of hyperpartisan news is still a fringe phenomenon.

We also acknowledge several limitations. We only measured media exposure at the domain level and did not take into account which individual articles participants visited. In further research, one could use machine learning to classify all articles from a given domain as political or not (Budak et al. 2016; Flaxman et al. 2016). We also could not directly measure exposure to news within social networking sites like Facebook. Our findings were based on a non-probability sample, as for such a sensitive data collection, the informed consent of participants is required. Despite the applied population weights and evidence that online and offline news consumption as well as privacy attitudes by tracking panelists closely resemble external benchmarks, unobserved confounders could still affect our results. Note, however, that we investigate relationships between variables and do not extrapolate from our sample to the general population (Baker et al. 2013). Finally, there is also evidence for the reverse causal mechanism that selective exposure to news emboldens people in their populist attitudes (Müller et al. 2017).

Several of our results mirror previous research on populist attitudes and offline news consumption (Schulz 2019b). This speaks for a profound audience duplication and deeply ingrained habits so that people stick to well-known sources (Fletcher and Nielsen 2017), despite their mistrust of the mainstream media. However, the finding that already disaffected citizens turn their back toward the legacy press is a troubling sign for democratic public spheres. It is clear that citizens with populist attitudes have a different orientation toward news media than their fellow citizens. This orientation may be an indication of a political shift in what some parts of "the people" want, in addition to who they vote for. Ultimately, selective exposure by populist citizens could exacerbate the tendency toward new fault lines in the politics of established democracies.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. Even though weekly magazines also feature populist style elements and contents prominently (Wettstein et al. 2019).
2. Our definition excludes parody or satire (see also Allcott and Gentzkow 2017; Newman et al. 2019).
3. See Stier et al. (2019) for the potential of linking surveys and digital trace data.
4. Institutional Review Board (IRB) approval was obtained from the Oxford Internet Institute's Departmental Research Ethics Committee at the University of Oxford (Reference Number SSH IREC 18 004).
5. For this paper, we exclude the mobile data, which are only available for a subset of respondents.
6. The endpoints in the U.S. survey were labeled "very liberal" and "very conservative."
7. Including the Republican Party is debatable because not the whole party can be regarded as populist. However, Donald Trump has successfully evoked anti-media sentiments among Republican supporters who still overwhelmingly support Trump according to all public opinion surveys in 2019.
8. Replication materials are available at the Open Science Framework (see https://dx.doi.org/10.17605/OSF.IO/5PE27).
9. We have no reasons to believe that the relationship between populist attitudes and news consumption is different during election and non-election periods.
10. Note that coefficients are not standardized so that a direct comparison of effect sizes, for example, between dummy variables and a Likert scale like political interest is not possible.
11. For results of regression models without weights see Table A9 in the Online Appendix.
12. We used the R library margins to calculate and plot the marginal effects (Leeper 2018).
13. The correlation between populist attitudes and political extremism is $r = 0.01$, and the correlation between populist attitudes and right-wing populist party identification is $r = 0.09$.
14. The effect of populist attitudes on hyperpartisan news is insignificant in the models with duration as dependent variable. This suggests that the selection of hyperpartisan news is driven by populist attitudes, but not necessarily the intensity of exposure to such contents.
15. See https://www.buzzfeed.com/jimwaterson/fake-news-sites-cant-compete-with-britains-partisan-newspape

References

Akkerman, Agnes, Cas Mudde, and Andrej Zaslove. 2014. "How Populist Are the People? Measuring Populist Attitudes in Voters." *Comparative Political Studies* 47 (9): 1324–53.

Allcott, Hunt, and Matthew Gentzkow. 2017. "Social Media and Fake News in the 2016 Election." *Journal of Economic Perspectives* 31 (2): 211–36.

Baker, Reg, J. Michael Brick, Nancy A. Bates, Mike Battaglia, Mick P. Couper, Jill A. Dever, Krista J. Gile, and Roger Tourangeau. 2013. "Summary Report of the AAPOR Task Force on Non-probability Sampling." *Journal of Survey Statistics and Methodology* 1 (2): 90–143.

Benkler, Yochai, Robert Faris, and Hal Roberts. 2018. *Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics*. Oxford: Oxford University Press.

Bennett, W. Lance, and Barbara Pfetsch. 2018. "Rethinking Political Communication in a Time of Disrupted Public Spheres." *Journal of Communication* 68 (2): 243–53.

Bos, Linda, and Kees Brants. 2014. "Populist Rhetoric in Politics and Media: A Longitudinal Study of the Netherlands." *European Journal of Communication* 29 (6): 703–19.

Bos, Linda, Sanne Kruikemeier, and Claes de Vreese. 2016. "Nation Binding: How Public Service Broadcasting Mitigates Political Selective Exposure." *PLoS ONE* 11 (5): e0155112.

Budak, Ceren, Sharad Goel, and Justin M. Rao. 2016. "Fair and Balanced? Quantifying Media Bias through Crowdsourced Content Analysis." *Public Opinion Quarterly* 80 (Suppl. 1): 250–271.

Canovan, Margaret. 1981. *Populism*. Boston: Houghton Mifflin Harcourt.

Castanho Silva, Bruno, Sebastian Jungkunz, Marc Helbling, and Levente Littvay. 2019. "An Empirical Comparison of Seven Populist Attitudes Scales." *Political Research Quarterly* 73 (2): 409–24. doi:10.1177/1065912919833176.

Castanho Silva, Bruno, Federico Vegetti, and Levente Littvay. 2017. "The Elite Is Up to Something: Exploring the Relation between Populism and Belief in Conspiracy Theories." *Swiss Political Science Review* 23 (4): 423–43.

Engesser, Sven, Nicole Ernst, Frank Esser, and Florin Büchel. 2017. "Populism and Social Media: How Politicians Spread a Fragmented Ideology." *Information, Communication & Society* 20 (8): 1109–26.

Esser, Frank. 1999. "'Tabloidization' of News: A Comparative Analysis of Anglo-American and German Press Journalism." *European Journal of Communication* 14 (3): 291–324.

Fawzi, Nayla. 2019. "Untrustworthy News and the Media as 'Enemy of the People?' How a Populist Worldview Shapes Recipients' Attitudes toward the Media." *The International Journal of Press/Politics* 24:146–64.

Flaxman, Seth, Sharad Goel, and Justin M. Rao. 2016. "Filter Bubbles, Echo Chambers, and Online News Consumption." *Public Opinion Quarterly* 80 (Suppl. 1): 298–320.

Fletcher, Richard, and Rasmus Kleis Nielsen. 2017. "Are News Audiences Increasingly Fragmented? A Cross-National Comparative Analysis of Cross-Platform News Audience Fragmentation and Duplication." *Journal of Communication* 67 (4): 476–98.

Guess, Andrew M., Jonathan Nagler, and Joshua A. Tucker. 2019. "Less than You Think: Prevalence and Predictors of Fake News Dissemination on Facebook." *Science Advances* 5 (1): eaau4586.

Guess, Andrew M., Brendan Nyhan, and Jason Reifler. 2018. "Selective Exposure to Misinformation: Evidence from the Consumption of Fake News during the 2016 U.S. Presidential Campaign." https://www.dartmouth.edu/~nyhan/fake-news-2016.pdf.

Hallin, Daniel C., and Paolo Mancini. 2004. *Comparing Media Systems: Three Models of Media and Politics*. Cambridge: Cambridge University Press.

Hameleers, Michael, Linda Bos, and Claes H. de Vreese. 2017. "The Appeal of Media Populism: The Media Preferences of Citizens with Populist Attitudes." *Mass Communication and Society* 20 (4): 481–504.

Hawkins, Kirk A., Cristóbal Rovira Kaltwasser, and Ioannis Andreadis. 2018. "The Activation of Populist Attitudes." *Government and Opposition* 55 (2): 283–307. doi: 10.1017/gov.2018.23.

Hindman, Matthew. 2008. *The Myth of Digital Democracy*. Princeton: Princeton University Press.

Holt, Kristoffer, Tine Ustad Figenschou, and Lena Frischlich. 2019. "Key Dimensions of Alternative News Media." *Digital Journalism* 7:860–69.

Iyengar, Shanto, and Kyu S. Hahn. 2009. "Red Media, Blue Media: Evidence of Ideological Selectivity in Media Use." *Journal of Communication* 59 (1): 19–39.

Krämer, Benjamin. 2018. "Populism, Media, and the Form of Society." *Communication Theory* 28 (4): 444–65.

Ladd, Jonathan M. 2011. *Why Americans Distrust the News Media and How It Matters*. Princeton: Princeton University Press.

Leeper, Thomas J. 2018. "Margins: Marginal Effects for Model Objects." R Package Version 0.3.23. https://thomasleeper.com/margins

Majó-Vázquez, Sílvia, Rasmus K. Nielsen, and Sandra González-Bailón. 2019. "The Backbone Structure of Audience Networks: A New Approach to Comparing Online News Consumption across Countries." *Political Communication*. 36 (2): 227–40.

Mazzoleni, Gianpietro. 2008. "Populism and the Media." In *Twenty-First Century Populism: The Spectre of Western European Democracy*, ed. Daniele Albertazzi and Duncan McDonnell, 49–64. Houndmills: Palgrave Macmillan.

Moffitt, Benjamin. 2016. *The Global Rise of Populism: Performance, Political Style, and Representation*. Stanford: Stanford University Press.

Möller, Judith, Robbert Nicolai van de Velde, Lisa Merten, and Cornelius Puschmann. 2019. "Explaining Online News Engagement Based on Browsing Behavior: Creatures of Habit?" *Social Science Computer Review*. Published electronically February 10. doi:10.1177/0894439319828012.

Mudde, Cas. 2007. *Populist Radical Right Parties in Europe*. Cambridge: Cambridge University Press.

Mudde, Cas, and Cristóbal Rovira Kaltwasser. 2017. *Populism: A Very Short Introduction*. Oxford: Oxford University Press.

Müller, Philipp, Christian Schemer, Martin Wettstein, Anne Schulz, Dominique S. Wirz, Sven Engesser, and Werner Wirth. 2017. "The Polarizing Impact of News Coverage on Populist Attitudes in the Public: Evidence from a Panel Study in Four European Democracies." *Journal of Communication* 67 (6): 968–92.

Nelson, Jacob L., and James G. Webster. 2017. "The Myth of Partisan Selective Exposure: A Portrait of the Online Political News Audience." *Social Media & Society* 3 (3).

Newman, Nic, Richard Fletcher, Antonis Kalogeropoulos, and Rasmus Kleis Nielsen. 2019. "Reuters Institute Digital News Report 2019." https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2019-06/DNR_2019_FINAL_0.pdf

Pennycook, Gordon, and David G. Rand. 2019. "Fighting Misinformation on Social Media Using Crowdsourced Judgments of News Source Quality." *Proceedings of the National Academy of Sciences of the United States of America* 116 (7): 2521–26.

Pew Research. 2018. "In Western Europe, Public Attitudes toward News Media More Divided by Populist Views than Left-Right Ideology." https://www.journalism.org/2018/05/14/in-western-europe-public-attitudes-toward-news-media-more-divided-by-populist-views-than-left-right-ideology

Prior, Markus. 2009. "The Immensely Inflated News Audience: Assessing Bias in Self-Reported News Exposure." *Public Opinion Quarterly* 73 (1): 130–43.

R Core Team. 2016. "R: A Language and Environment for Statistical Computing." Vienna: R Foundation for Statistical Computing. https://www.R-project.org/

Reinemann, Carsten, Toril Aalberg, Frank Esser, Jesper Strömbäck, and Claes H. de Vreese. 2016. "Populist Political Communication: Toward a Model of Its Causes, Forms, and

Effects." In *Populist Political Communication in Europe*, ed. Toril Aalberg, Frank Esser, Carsten Reinemann, Jesper Stromback, and Claes De Vreese, 12–25. New York: Routledge.

Rooduijn, Matthijs. 2019. "State of the Field: How to Study Populism and Adjacent Topics? A Plea for Both More and Less Focus." *European Journal of Political Research* 58 (1): 362–372.

Scharkow, Michael. 2016. "The Accuracy of Self-Reported Internet Use? A Validation Study Using Client Log Data." *Communication Methods and Measures* 10 (1): 13–27.

Schulz, Anne. 2019a. "Populist Citizens' Media Perceptions and Media Use in Western Democracies." Dissertation University of Zurich, Faculty of Arts.

Schulz, Anne. 2019b. "Where Populist Citizens Get the News: An Investigation of News Audience Polarization along Populist Attitudes in 11 Countries." *Communication Monographs* 86 (1): 88–111.

Schulz, Anne, Philipp Müller, Christian Schemer, Dominique S. Wirz, Martin Wettstein, and Werner Wirth. 2017. "Measuring Populist Attitudes on Three Dimensions." *International Journal of Public Opinion Research* 30 (2): 316–26.

Schulz, Anne, Werner Wirth, and Philipp Müller. 2018. "We Are the People and You Are Fake News: A Social Identity Approach to Populist Citizens' False Consensus and Hostile Media Perceptions." *Communication Research* 47 (2): 201–26. doi:10.1177/0093650218794854.

Stier, Sebastian, Johannes Breuer, Pascal Siegers, and Kjerstin Thorson. 2019. "Integrating Survey Data and Digital Trace Data: Key Issues in Developing an Emerging Field." *Social Science Computer Review*. Published electronically April 24. doi:10.1177/0894439319843669.

Stroud, Natalie J. 2010. "Polarization and partisan selective exposure." *Journal of Communication* 60 (3): 556–76.

Stroud, Natalie J. 2017. "Selective Exposure Theories." In *The Oxford Handbook of Political Communication*, ed. Kate Kenski and Kathleen H. Jamieson, 531–48. Oxford: Oxford University Press.

Taber, Charles S., and Milton Lodge. 2006. "Motivated Skepticism in the Evaluation of Political Beliefs." *American Journal of Political Science* 50 (3): 755–69.

Van Aelst, Peter, Jesper Strömbäck, Toril Aalberg, Frank Esser, Claes de Vreese, Jörg Matthes, David Hopmann, Susana Salgado, Nicolas Hubé, Agnieszka Stępińska, Stylianos Papathanassopoulos, Rosa Berganza, Guido Legnante, Carsten Reinemann, Tamir Sheafer, and James Stanyer. 2017. "Political Communication in a High-Choice Media Environment: A Challenge for Democracy?" *Annals of the International Communication Association* 41 (1): 3–27.

Van Hauwaert, Steven M, and Stijn Van Kessel. 2018. "Beyond Protest and Discontent: A Cross-National Analysis of the Effect of Populist Attitudes and Issue Positions on Populist Party Support." *European Journal of Political Research* 57 (1): 68–92.

Vraga, Emily K., and Melissa Tully. 2018. "Who Is Exposed to News? It Depends on How You Measure: Examining Self-Reported versus Behavioral News Exposure Measures." *Social Science Computer Review*. Published electronically November 15. doi:10.1177/0894439318812050.

Wettstein, Martin, Frank Esser, Florin Büchel, Christian Schemer, Dominique S. Wirz, Anne Schulz, Nicole Ernst, Sven Engesser, Philipp Müller, and Werner Wirth. 2019. "What Drives Populist Styles? Analyzing Immigration and Labor Market News in 11 Countries." *Journalism & Mass Communication Quarterly* 96 (2): 516–36.

Wettstein, Martin, Anne Schulz, Marco Steenbergen, Christian Schemer, Philipp Müller, Dominique S. Wirz, and Werner Wirth. 2020. "Measuring Populism across Nations:

Testing for Measurement Invariance of an Inventory of Populist Attitudes." *International Journal of Public Opinion Research* 2020: 284–305. doi:10.1093/ijpor/edz018.

Wuttke, Alexander, Christian Schimpf, and Harald Schoen. 2020. "When the whole is greater than the sum of its parts: On the conceptualization and measurement of populist attitudes and other multidimensional constructs." *American Political Science Review* 114 (2): 356–74. doi:10.1017/S0003055419000807

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Appendix E.

Paper 5: When Do Candidates "Go Negative"? A Conjoint Analysis to Unpack the Mechanisms of Negative Campaigning

Authors

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In

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Abstract

Negative campaigning has become a prevalent campaign strategy not just in the U.S., but also in other established democracies. While negative campaigning has been a prominent focus of the academic literature, the state of knowledge is still mostly based on observational data, often artifacts of campaigning such as content analysis of press releases, campaign ads or social media posts. Based on a pre-registered conjoint experiment embedded in surveys of more than 800 candidates running in German state elections, the paper aims to explain under what conditions candidates attack their opponents. Rational-choice considerations matter, as candidates are more likely to attack when they see a net gain in the strategy. However, the characteristics and behavior of the opponent also play an important role. Negative campaigning is more likely if the opponent is male, ideologically distant, and has attacked before. In contrast, the closeness of the race and the likelihood of retaliation have no influence on attack behavior. Furthermore, the decision to attack their opponent is largely independent of candidates' own incumbency status, gender, or personality. By integrating relevant factors that were identified in the literature in one research design, the paper sheds light on the drivers of campaign negativity and points towards the role of further situational factors that are shaping candidates' behavior on the campaign trail. Beyond negative campaigning, this study demonstrates the value of embedding experimental designs in samples of political elites.

Contribution of thesis author

My contributions to the paper encompasses designing and executing survey experiments and data analysis.

When Do Candidates "Go Negative"? A Conjoint Analysis to Unpack the Mechanisms of Negative Campaigning

Sebastian Stier[1,2], Corinna Oschatz[3], Bernhard Clemm von Hohenberg[1], Jürgen Maier[4], Alessandro Nai[3] & Nora Kirkizh[5]

Abstract

Negative campaigning has become a prevalent campaign strategy not just in the U.S., but also in other established democracies. While negative campaigning has been a prominent focus of the academic literature, the state of knowledge is still mostly based on observational data, often artifacts of campaigning such as content analysis of press releases, campaign ads, or social media posts. Based on a pre-registered conjoint experiment embedded in surveys of more than 800 candidates running in German state elections, the paper aims to explain under what conditions candidates attack their opponents. Rational-choice considerations matter, as candidates are more likely to attack when they see a net gain in the strategy. However, the characteristics and behavior of the opponent also play an important role. Negative campaigning is more likely if the opponent is male, ideologically distant, and has attacked before. In contrast, the closeness of the race and the likelihood of retaliation have no influence on attack behavior. Furthermore, the decision to attack their opponent is largely independent of candidates' own incumbency status, gender, or personality. By integrating relevant factors that were identified in the literature in one research design, the paper sheds light on the drivers of campaign negativity and points towards the role of further situational factors that that are shaping candidates' behavior on the campaign trail. Beyond negative

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campaigning, this study demonstrates the value of embedding experimental designs in samples of political elites.

Keywords: negative campaigning; conjoint experiment; candidate survey; political elites; campaigning; German politics

Introduction

Over the last two decades, election campaigns have been run in an increasingly harsh and aggressive manner (Klinger et al., 2023) —a strategy referred to as negative campaigning. Negative campaigning (NC) can be defined as “any criticism leveled by one candidate against another during a campaign” (Geer, 2006, p. 23). Such attack behavior among political opponents has been associated with profound negative consequences for the health of democracies. Voters are repelled by the negative tone leading to a decline in trust and engagement with political processes and institutions (e.g., Ansolabehere et al., 1994; Ansolabehere & Iyengar, 1995). More recently, rising affective polarization, i.e., strong negative feelings towards members of an opposing party has been associated with negative campaigning (Banks et al., 2021; Martin & Nai, 2024; Sood & Iyengar, 2016). Coinciding with not just the rise of affective polarization, but also the establishment of populist parties and the contestation of cultural issues by political issue entrepreneurs (Hobolt & De Vries, 2015), NC can generate negative feedback loops, potentially exacerbating the dysfunctionality of political systems. Against the backdrop of these recent transformations of party systems, NC has thus become a major strand of research (Haselmayer, 2019) as scholars worldwide make an effort to understand the determinants of candidates’ decisions to go negative in the first place.

Most of this research seeks to explain attack behavior through social and political characteristics of the *sender*, i.e., the political role (e.g., incumbent vs. challenger), the party,

(extreme) political ideology, or the gender of a politician. However, besides some noteworthy exceptions (Ridout & Holland, 2010; Song et al., 2019; Taylor, 2023), the characteristics of the potential *target of attacks* are most often ignored. Moreover, the identified characteristics driving the use of negative campaigning are usually studied in isolation without taking their joint occurrence into consideration. Furthermore, we know that *contextual factors* substantially affect the tone of campaigning. For example, campaigns become especially negative, nasty even, when the race is highly contested and both candidates have a realistic chance of winning (Damore, 2002; Elmelund-Præstekær, 2008; Fowler et al., 2016; Lau & Pomper, 2004). So far, we know very little about how the sponsors and targets as well as the political and social profile interact in a dynamic campaign environment. Therefore, this study aims to answer the research question: *How do characteristics of the sender and the target of negative campaigning drive politicians' attack behavior in a dynamic campaign context?*

To answer this research question, we ran a conjoint experiment embedded in an original candidate survey. We put more than 800 candidates in seven German state elections into a hypothetical situation where the *personal profile* of the target of the attack (ideological proximity, gender), the *attack behavior* of the target, and the *competitiveness* of the race vary. By testing pre-registered hypotheses on each of these dimensions, we thereby study the drivers of the use of NC not in isolation but in a multidimensional scenario. Besides the relevance of rational choice considerations – candidates are more likely to attack when they see a net gain in this behavior – we find that candidates tend to attack when the opponent is male, ideologically more distant, and has attacked before. In contrast, the closeness of the race and the likelihood of retaliation have no influence on candidates' attack behavior.

Our study makes three main contributions to research on negative campaigning. First, the usual methodological toolbox to study the determinants of NC includes content analysis of political messages (e.g., Auter & Fine, 2016; Benoit, 2004; Duggan & Milazzo, 2023;

Elmelund-Præstekær, 2010; Song et al., 2019) and surveys of candidates and experts (Maier et al., 2022, 2023; Nai, 2020). To the best of our knowledge, our conjoint experiment is the first study to investigate the causal mechanisms behind attack behavior of election candidates. Second, politicians are rarely surveyed as scholars lack access to political elites. Our conjoint analysis is embedded in a demographically and ideology diverse sample of real election candidates that varies on theoretically relevant dimensions. Our findings thus offer rare and relevant insights into candidate’s strategic reasoning with high ecological validity. Finally, most research on negative campaigning has been conducted in the US two-party system. However, the influence of the most influential determinants of negative campaigning might substantially diverge in a multidimensional political landscape (Debus & Tuttnauer, 2024). We add to the empirical evidence on European multi-party systems and provide further insights into the context-dependent nature of NC in such a polity. Taken together, our approach and findings create avenues for further research on candidates’ campaign behavior and beyond.

Attacking in a complex campaign environment

The decision to go negative in a campaign depends on multiple factors. Research indicates that the candidate’s attack behavior is predominantly depending on rational considerations (e.g., Benoit, 2022; Maier et al., 2023), a candidate’s own social and political profile (e.g., Dolezal et al., 2015), the setting and the dynamics of the race (e.g., Fowler et al., 2016; Lau & Pomper, 2004), and opponents’ characteristics and behavior (Lau & Pomper, 2004; Song et al., 2019). Previous studies usually did not cover all of these factors; in fact, they often failed to take into account candidates’ considerations regarding their opponents. Our study aims to explicitly conceptualize this multidimensionality and to assess the relative

influence of different factors. In the following, we discuss prominent explanations of negative campaigning and introduce our pre-registered hypotheses.

Rational-choice considerations

Most researchers agree that candidates base their decision whether to attack an opponent on rational considerations (for a critical assessment of this assumption: Maier et al., 2023). Candidates weight the potential benefits and the likely costs of an attack against each other (Benoit, 2022; Garramone, 1984; Lau & Rovner, 2009). On the one hand, an attack is considered as beneficial if candidates can either directly increase their political support by mobilizing their own voters (Jackson & Carsey, 2007) or convincing undecided voters (Nai, 2020). On the other hand, candidates might indirectly gain from NC, e.g., by attracting the media’s attention (Haselmayer, 2019). By blaming the opponent, e.g., for failure in handling domestic and foreign policy issues, or by showcasing the opponent as incompetent and of unsuitable character for office, successful attacks increase a candidate’s “net favorability” (Benoit, 2022, p. 39) at the expense of the political opponent. But negative campaigning is not without risks. Most importantly, a candidate might suffer from backlash effects when voters withdraw their support (Garramone, 1984; Roese & Sande, 1993). Nonetheless, voters do not generally disapprove of negative campaigning, as their tolerance for the practice varies across different types of attacks (Lau & Rovner, 2009).

The decision to go negative depends on the perceived ratio of the costs and benefits, which might vary depending on the social and political profile of a candidate. Ultimately, each candidate weights the relevant factors differently to arrive at her individual benefit-cost ratio, but the overall direct net effect should still be observable. Hence, we derive our first hypothesis:

H1 The likelihood of attacking the opponent is higher when the likely consequence is to win votes instead of losing votes, and lower in the opposite scenario.

Competitiveness of the race

Candidates do not campaign in a vacuum but consider the constraints of the electoral race and react to its dynamics. For instance, previous studies have shown that campaigns become especially negative, nasty even, when the race is highly contested and both candidates have a realistic chance of winning (Damore, 2002; Elmelund-Præstekær, 2008; Fowler et al., 2016; Lau & Pomper, 2004). In particular, candidates who are trailing are more likely to resort to negative campaigning. Building on prospect theory, it can be assumed such gains and losses are valued asymmetrically (Kahneman & Tversky, 1979). An individual’s fear of losses is greater than the joy of a potential gain. Therefore, when faced with a certain loss, individuals become risk-seeking to avoid the pain of losing. In the context of negative campaigning, this means that a candidate who falls behind in the polls is more likely to go negative to preserve a chance of winning. Negative campaigning as a risky strategy becomes an appropriate measure as they have nothing left to lose. The costs of potential backlash effects thus weigh less in the cost-benefit-calculation. We therefore posit:

H2 The likelihood of attacking the opponent is higher when candidates are trailing or on par with the opponent, and lower when they are ahead of the opponent.

Profile of the opponent

A political actor’s cost-benefit-ratio is affected by the profile of the political opponent (Dolezal et al., 2015), for instance, factors like gender or ideology. Although the role of gender in politics has changed considerably over the last decades, many behaviors of politicians are still associated with gender stereotypes. According to role congruity theory,

female politicians are usually ascribed qualities such as being honest, friendly, and caring (e.g., Fridkin & Kenney, 2009; Turska-Kawa & Olszanecka-Marmola, 2018). Such stereotypical gender roles can substantially influence how candidates deal with their political opponents and ultimately reduce the likelihood of women being targeted. In the public perception, attacking a potentially aggressive male candidate may be seen as legitimate, while attacking a female candidate may be seen as unfair (Fridkin et al., 2009; Kenney & Kahn, 2004). A softer campaign style towards women is also advisable due to the socially accepted rules of politeness, as aggressive behavior is seen as a violation of these norms (Maier & Renner, 2018). Because an attack on a male politician is differently perceived than an attack on a female politician, we hypothesize that:

H3 The likelihood of attacking the opponent is higher when the opponent is a man, and lower when the opponent is a woman.

More recently, empirical studies started shedding light on attack behavior in multi-party systems (De Nooy & Kleinnijenhuis, 2013; Song et al., 2019; Walter, 2014b). Negative campaigning in such contexts is more complex than in the US, as winning and losing voters is not a zero-sum game (Walter, 2014a) and political power relations after an election, particularly with respect to coalition building, should affect political strategy. For the latter, ideological closeness matters. In line with this, Song et al. (2019, p. 286) found that candidates are more likely to attack when the target is an “enemy’s friend” or a “friend’s enemy”. Although some studies show that ideological closeness increases the likelihood of being criticized (Walter, 2014a) or failed to show an impact of ideological proximity (Haynes & Rhine, 1998), we follow other studies showing that ideologically distant parties are more likely to become targets of attacks than ideologically close parties (Nai, 2020; Ridout & Holland, 2010). On the one hand, their party programs have less commonalities with a

candidate’s own party or even hold opposing positions. Therefore, they present more obvious points of attack than candidates who have a similar view of politics (Walter, 2014a). Moreover, ideologically distant parties are unlikely to become coalition partners after election day. Attacking them does therefore not harm future parliamentary work. In contrast, leaving scorched earth behind by attacking a top candidate of an ideologically close party is not conducive to future cooperation after the election is decided (Haselmayer & Jenny, 2018). We therefore hypothesize that:

> *H4* The likelihood of attacking the opponent is higher when the opponent is ideologically distant, and lower when the opponent is ideologically close.

Attack behavior of the opponent

Extent literature identified retaliation as a driver of negative campaigning (Damore, 2002; Druckman et al., 2010; Lau & Pomper, 2004; Song et al., 2019). The logic of retaliation is based on the assumption of reciprocity between the candidates – a candidate who goes negative triggers being counterattacked (De Nooy & Kleinnijenhuis, 2013). A rational candidate might consider to fight with fire to not appear weak to uncommitted voters or to mitigate the attack by damaging the reputation of the attacker in return (Damore, 2002; Dolezal et al., 2016). Retaliation might even mitigate the risk of backlash effects as voters expect a counterattack in response to aggressive behavior (Nai, 2020). The legitimacy of a counterattack is hence assumed to be higher than that of an initial attack (Dolezal et al., 2016). We therefore assume that:

> *H5* The likelihood of attacking the opponent is higher when the opponent previously attacked the candidate (often), and lower when the opponent did not previously attack.

However, the logic of retaliation also applies to the target of negative campaigning; if the political opponent is attacked, he/she also has strong incentives to respond with a counterattack. If the target’s counterattack is successful, it has negative consequences for the candidate who started the dispute, resulting in a lower net favorability. Due to this dynamic, candidates will carefully consider the likely reactions to their attacks. If the risk of a counterattack is low because the opponent is facing some constraints, for instance, in a scenario where a female candidate faces an older male opponent, negative campaigning becomes an even more attractive strategy. If there is a high risk of counterattacks, candidates might be more restrained in their own attacks.

H6 The likelihood of attacking the opponent is higher when the likelihood of a counterattack is low, and lower when the likelihood of a counterattack is high.

The relative influence of factors driving attacks

In essence, the decision to go negative in a campaign is inherently multidimensional. For instance, a candidate may be in a close race in his district against an opponent who is from an ideologically distant party but could still decide against attacking this opponent because it might cost him votes if he attacks a female opponent. Besides these tradeoffs that have to be considered, a candidate is also facing (competing) incentives originating from different arenas of a campaign. Candidates must navigate a highly dynamic (1) contextual environment with external influences like election polls, (2) constantly anticipate, react, and adapt to the campaign behavior of the opponent and (3) keep the personal and political profile of the specific opponent(s) in mind. Despite considering so far understudied characteristics of the targets of attacks, we still hypothesize in line with previous studies that rational considerations should be the strongest predictor of a candidate’s campaign behavior (Maier et al., 2023):

H7a: A positive benefit-cost differential is the most important factor for attacking the opponent.

H7b: A negative benefit-cost differential is the least important factor for attacking the opponent.

Moderators of candidates' attack behavior

There is no question that the decision to go negative in a campaign is influenced by multiple factors. However, the relevance of individual factors can vary from candidate to candidate. Yet so far only few studies of NC took into account the social characteristics of election candidates, their political profile and the campaign context in which they are embedded. As specified in our preregistration,[6] we are following an open research question on the moderation effect of two candidate characteristics, namely gender and incumbency, assessing whether the main effects are uniform across different groups of candidates.

Gender. When it comes to political competition, women are oftentimes perceived as being more willing to compromise and seek consensus than male politicians (Fridkin et al., 2009). Therefore, attacking opponents does not correspond with the socially acceptable traditional female role. In contrast, for men – whose political role is often regarded as assertive, strong, competent, and aggressive – going negative vis-a-vis their political opponent is an accepted part of the political game (Fridkin et al., 2009; Turska-Kawa & Olszanecka-Marmola, 2018). Due to the enduring persistence of gender stereotypes the campaign environment and profile of the political opponent might affect female and male candidates differently. Gender could therefore moderate the direct effects posited in *H1-H6*.

[6] *RQ*1 in the preregistration reads: "Are there heterogeneous effects by gender or incumbency?"

For instance, the gender of a candidate resulted in different perceptions with respect to the risks and benefits of going negative or the influence of the competitiveness of an electoral race. This is to be expected in particular because women are considered to be more risk-averse, whereas men exhibit riskier behavior (Byrnes et al., 1999). Therefore, women might generally be more cautious in attacking their opponent than men, even if, for example, they expect similar level of benefits from negative campaigning.

Incumbency. The decision to attack opponents also depends on whether a candidate is already in office. It has been observed that challengers often adopt a more negative approach in their campaigns compared to incumbents (e.g., Benoit, 2022). Incumbents have the advantage and feel the necessity of defending their own political accomplishments while challengers, lacking such a record, find negative campaigning to be their most effective strategy (Polborn & Yi, 2006). For challengers, no current position is at stake, potentially making them more inclined to embrace the risks associated with negative campaigning. Therefore, the costs of losing campaigns (i.e., loss of election and office) are higher for incumbents than for challengers, which may affect cost-benefit calculations (Benoit, 2022, p. 132) and moderate the direct effects postulated in *H1*-*H6*.

Methods

To investigate the impact of the perceived benefits and costs of an attack, the competitive situation, and the characteristics and behavior of the potential attack target on candidates’ use of negative campaigning, we implemented a conjoint experimental design in a candidate survey. In our conjoint experiment (Hainmueller et al., 2014), election candidates were asked to select, out of two hypothetical opponents in their constituency, the one they would be more likely to attack. The attributes of each hypothetical opponent were randomized which allowed us to establish a causal effect of every attribute of an opponent’s

profile. Unlike traditional candidate surveys, conjoint experiments allow to analyze decision-making in a multidimensional environment when multiple factors are offered at the same time and a respondent must choose the most preferred option.

The study design and research hypotheses were preregistered on OSF: https://osf.io/a4rpz/ The data collection received approval from the GESIS Ethics Committee (decision 2020-6), and the specific conjoint experiment was approved by the Institutional Review Board of the University of Koblenz-Landau (decision LEK-345).

Sample

We test our propositions using a post-election survey among candidates running for seven state parliaments in Germany (Saxony-Anhalt 2021, Berlin 2021, Mecklenburg-Western Pomerania 2021, Schleswig-Holstein 2022, North Rhine-Westphalia 2022, Lower Saxony 2022, and Saarland 2022; for more information see Table C.1 in the Supplementary Materials [SM]). The study sample was drawn by inviting the full population of all candidates to participate (including smaller parties' candidates in the 2021 elections, but only candidates of the six major parties in the 2022 elections). Data were collected using a mixed-mode design, starting on the day after the election and ending two months later.

A total of *N*= 3,978 candidates ran for office in the analyzed state elections. All candidates who provided an email address in their professional online contact details were invited via email to participate in our online survey. All candidates without online contact details were invited by mail including a paper-and-pencil questionnaire and a return envelope. Candidates invited by mail were also provided with a personalized link if they preferred to answer the survey online. *N*= 3,876 candidates could be contacted successfully and were invited to participate in the survey. 39.2 percent (*N*= 1,520) of candidates gave their informed consent and answered the questionnaire. 1,200 candidates took part in the survey

online, where the conjoint experiment was embedded; candidates who answered the paper-and-pencil questionnaire had no opportunity to participate in the conjoint study. The achieved response rates are considerably higher than the around 8% reported in studies with U.S. legislators (Druckman et al., 2023; Teele et al., 2018). Participants were instructed to fill out the questionnaires personally. In total, two reminders were sent to increase response rates.

Of the online respondents, *N*=853 candidates took part in the conjoint task. 35.4% of the participating candidates were female. Participants were between 18 and 87 years old (*M*= 45.0) and 10.2% of them were incumbents. In Table D.1 in the SM, we compare our sample to the population of candidates, which is strikingly similar in terms of gender (population 35.7% female), age (population *M*= 45.4), and incumbency status (population 8.8% incumbents). Meanwhile, our sample slightly over-represents candidates from the Left, the Social Democrats, the Liberal Democrats and the Greens, while slightly under-representing candidates from the Christian Democrats, the Alternative for Germany and from other smaller parties. Also, candidates from Berlin and Mecklenburg-Western Pomerania were significantly less likely, and candidates from the other states more likely to participate.

Experimental design

We embedded a choice-based conjoint experiment in the online questionnaire, in which respondents were confronted with two profiles of an opposing candidate (up to three times). In each choice task, respondents were invited to imagine a hypothetical scenario in which they would run for office with only few days left until the election, and were asked: "In which of the following two situations would you be more likely to attack the opponent?" The situations manipulated the following variables (see all the conjoint attributes and their levels in Table 1): the likelihood of winning or losing votes by attacking the political opponent (*H1*), the competitiveness of the race (*H2*), whether the opponent is a man or a

woman (*H3)*, whether (s)he is ideologically close or distant to the candidate (*H4*), the campaign behavior of a hypothetical opponent (*H5*), i.e., whether (s)he has attacked the candidate before, and (*H*6) if the likelihood of retaliation is high or low.

Table 1: Overview of conjoint attributes

Attributes	Levels
Net effect of attack (*H1*)	Losing more votes than winning
	Winning more votes than losing
Competitiveness of the race (*H*2)	Opponent behind
	Opponent on par
	Opponent ahead
Gender of opponent (*H3*)	Female
	Male
Ideology of opponent (*H4*)	Close
	Far
Previous attacks of opponent (*H5*)	Never
	Sometimes
	Often
Likelihood of counterattack (*H6*)	Low
	High

For example, one of the candidate profiles read (translated from German, the varying attributes underlined): "Polls show that your strongest opponent - a <u>woman</u> - is slightly <u>behind</u> you. Ideologically, she is <u>close</u> to you. She <u>sometimes</u> attacked you during the election campaign. The likelihood of a counterattack is <u>high</u> if you attack now. Forecasts show that you are likely to <u>lose more votes than you gain</u> by attacking.". In SM Appendix F, we report frequencies of the different conjoint attributes (Figure F.1) and show that covariates are balanced across feature levels (Figures F.2 through F.4).

After the first task, respondents were asked whether they would like to respond to a second scenario, and after that, to a third scenario (see, e.g., Teele et al. 2018 who also implemented three distinct pairwise comparisons). Hence, each candidate was exposed to a maximum of six observations (three tasks * two situations). 453 respondents chose to respond

to three tasks; 110 respondents to two tasks; 290 respondents to one task. Our overall number of observations is thus 3,738. Our dependent variable for each observation is whether the respondent selected that scenario.

Moderators

Our open research question *RQ*1 asks whether any of the attributes' effects are heterogenous across different groups of election candidates. Our data contains measures of the respondent's gender (male vs. female) and of incumbency (non-incumbent vs. incumbent). These measures, as well as measures of party affiliation and age, which we use for summary statistics, were provided by the respective electoral state officers. In the preregistration, we further created hypotheses for moderating effects of dark personality traits, conflict approach, values, attitudes on negative campaigning and ideological extremism. The results of these additional analyses will be reported in the SM. We furthermore test the robustness of the results by analyzing whether there are differences between the different states. Our minor deviations from the pre-analysis plan are discussed in SM Section B, while all moderator variables including the original German wording and Cronbach's alpha reliability statistics are described in SM Table G.1.

Analysis

Our primary presentation of results is based on marginal means (as pre-registered). As pointed out by Leeper et al. (2020), marginal means allow for an easier comparison of the effect sizes of attributes with each other (as required by *H*7a/b) and facilitate clearer subgroup analyses (*RQ1*, additional robustness tests in the SM). A marginal mean describes the favorability towards situations with a certain attribute level, ignoring all other attributes. To exemplify with our data, a marginal mean of 0.60 for the level "male" on the attribute "gender" would mean that situations in which the opponent is male are selected with a

probability of 60 percent as a target for an attack. However, to also test the effects of attributes statistically, we also run the more common AMCE models, and include these in the Supplementary Material. To test subgroup differences formally, we apply an F-test as proposed by Leeper et al. (2020). All analyses were run in R, Version 4.3.1. For the conjoint analysis we used the R Package *cregg* (Leeper, 2020).

Results

Main results

Figure 1 displays marginal means for the complete sample of respondents while SM Figure E.1 shows the AMCEs. The ratio between expected benefits and costs of an attack (*H1*) has the hypothesized effect: Respondents were more likely to attack an opponent when the likely consequence is to win votes instead of losing votes than in the opposite scenario. The marginal mean for the scenario in which a candidate would gain from an attack is 0.56 (SE = 0.008), in contrast to marginal mean of 0.42 (SE = 0.008) for the opposite scenario (with a highly significant AMCE, $p_{AMCE} < 0.001$). *H2* predicted that attacking the opponent is more likely when the candidate is behind or on par with the opponent, and lower when ahead. We do not find strong support for this idea, with marginal means of 0.48 (SE = 0.012) for a situation in which the candidate is behind the opponent, 0.51 (SE = 0.011) for an on-par race, and 0.50 (SE = 0.012) for a race which the opponent is leading. The attribute’s effect is not statistically significant.

Does the gender of the opponent matter (*H3*)? The data supports this hypothesis and shows a marginal mean for a male opponent of 0.54 (SE = 0.008) and of 0.46 (SE = 0.008) for a female opponent, which represents a statistically significant effect ($p_{AMCE} < 0.001$). Likewise, we find support for our hypothesis about ideological distance (*H4*). The participating candidates were more likely to state that they would attack an ideologically

distant opponent (marginal mean of 0.54, SE = 0.008) than an ideologically close one (marginal mean of 0.46, SE = 0.008), a statistically significant effect ($p_{AMCE} < 0.001$).

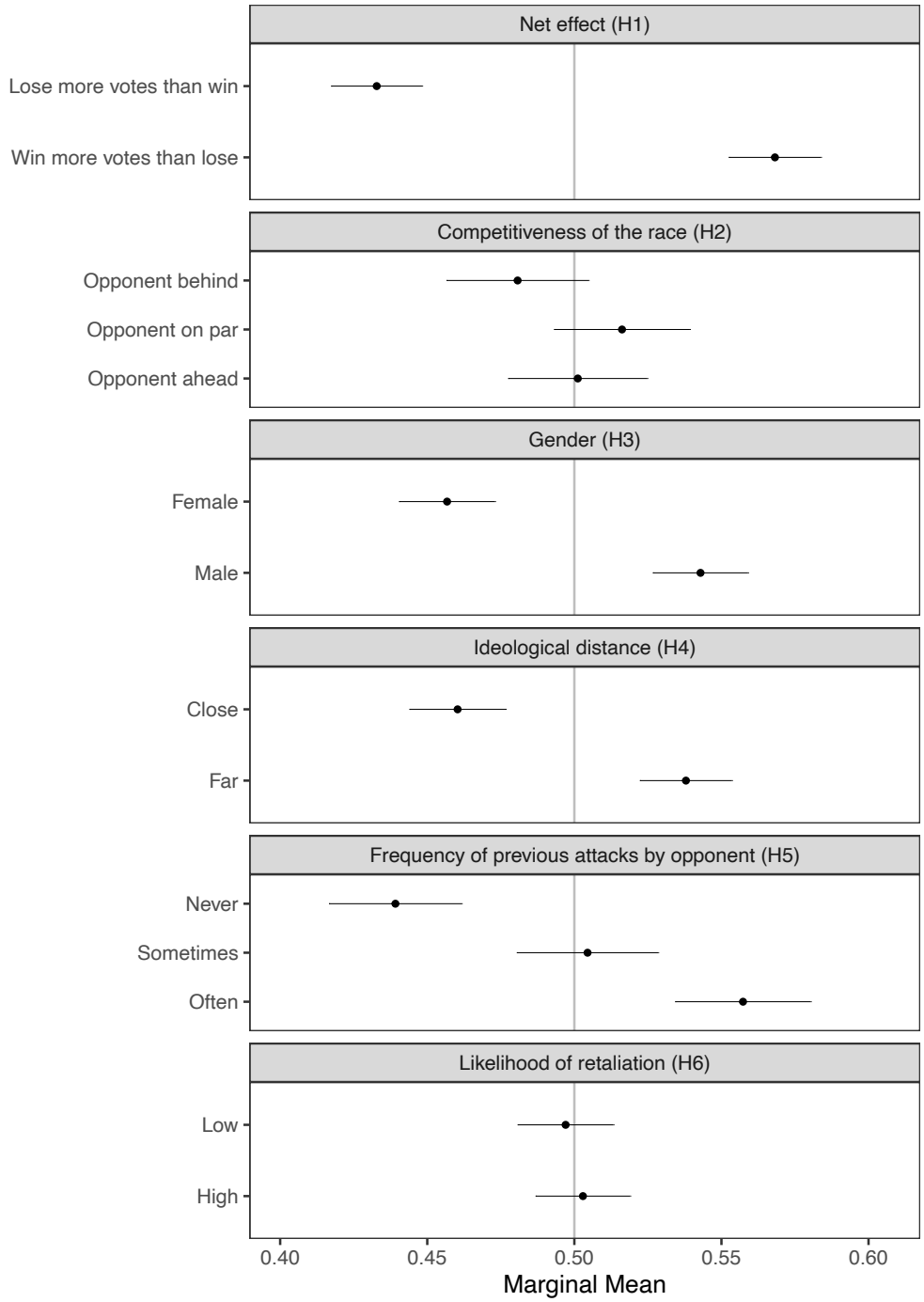

Fig. 1: Marginal means of attribute levels

H5 predicted that candidates would be more likely to attack when the opponent was described as previously having attacked the candidate sometimes or often rather than never.

Again, the results support this prediction, with marginals means of 0.44 (SE = 0.011) for a scenario of no past attacks, of 0.50 (SE = 0.012; $p_{AMCE} < 0.001$ with baseline "never") for some past attacks, and of 0.56 (SE = 0.011, $p_{AMCE} < 0.001$ with baseline "never") for attacks having happened often.

Last, does the likelihood of retaliation matter (*H6*)? Not for the candidates in our sample, who are not significantly more likely to say they would attack an opponent who is highly likely to retaliate (marginal mean of 0.50, SE = 0.008) than someone with a low probability to strike back (marginal mean of 0.50, SE = 0.008). This represents an insignificant effect ($p_{AMCE} = 0.54$).

Next to the individual effects of these attributes, we were also interested in their relative size, hypothesizing that a positive benefit-cost differential would be the most important factor driving an attack (*H7a*), and a negative differential the least important factor (*H7b*). The data supports this idea to some extent, as the two levels of the net effect attribute do indeed show the largest and smallest marginal means. However, there is a large overlap with two levels of the attribute "frequency of previous attacks": the marginal mean of a scenario with previous attacks "never" happening is only 0.01 points larger than that of a negative benefit-cost differential, and the confidence intervals overlap widely. Similarly, the marginal mean of a scenario with previous attacks "often" happening is only 0.01 points smaller than that of the positive benefits-cost differential, with a wide overlap of confidence intervals. In sum, we cannot rule out that the frequency of previous attacks may be as important as the benefit-cost differential, and reject hypotheses *H7a/b*.

Subgroup analyses

We next investigate whether these effects vary by respondent gender and incumbency (*RQ1*), two individual-level factors for which evidence exists that they make a difference in the likelihood to attack. Figure 2 presents marginal means split by gender.

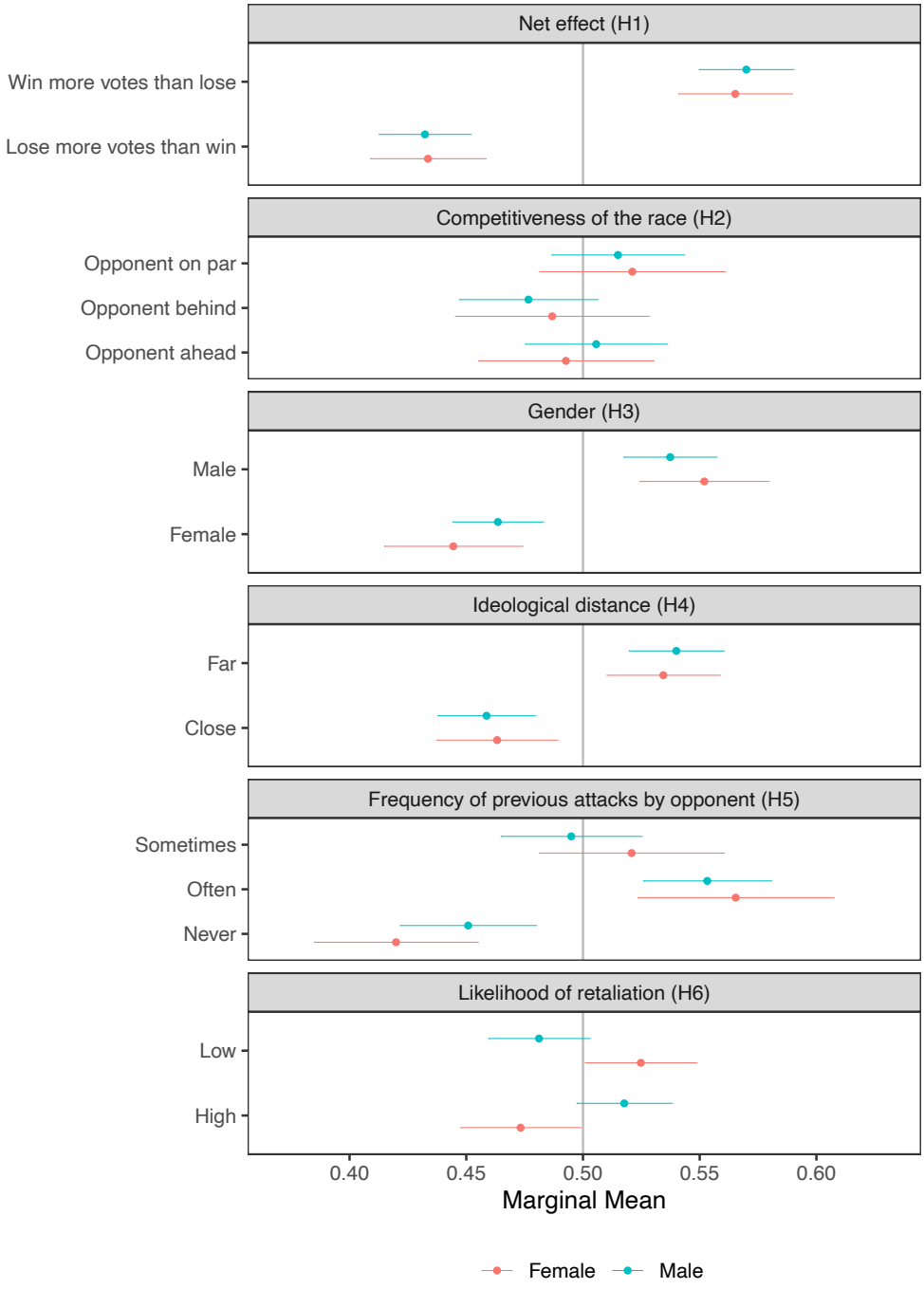

Fig. 2: Marginal means of attribute levels, by candidates' gender

Not much heterogeneity is discernible, except for the attribute of retaliation likelihood: Male candidates were more likely to still attack the opponent when retaliation is likely compared with female candidates. Following Leeper et al. (2020), we test the significance of this heterogeneity with a nested model comparison, that is, we test whether the fit of a model that allows for an interaction between retaliation attribute and gender is better than a model that does not model that interaction. We can reject the null hypothesis that the fit between these two models is equal (SM Table G.7; $F = 3.30$, $p < 0.05$). For all other attributes, this test does not provide any further signs of a heterogeneity by gender (SM Section G).

Figure 3 presents marginal means by incumbency status. Although we see some suggestive patterns – e.g., it seems to matter more for incumbents whether they will win or lose votes – none of these differences reach levels of statistical significance (SM Section G).

Robustness checks

We conducted further robustness tests. First, as we conducted our experiments in seven different states at seven different points in time. Since in a federal system like Germany, campaigning cultures are likely to vary between states (and may also change over the time of two years), we ran a subgroup analysis by state. SM Figure G.1 shows that by and large, results are robust across states. Second, as recent research indicates that there is a relationship between the personality of politicians and their campaign style (Nai & Maier, 2020), we consider the possibility that attribute effects vary across personality types. In our pre-registration, we hypothesized that the cost-benefit attribute should vary between those with low and high scores on dark-personality traits, conflict-approach traits, endorsement of power and of achievement values, attitude on negative campaigning, and between those that are ideologically moderate or extreme. SM Figures G.2 through G.7 show that no such

heterogeneity is present. In other words, attribute effects have robust effects, irrespective of a range of personality traits – though the design may have been underpowered to detect small differences.

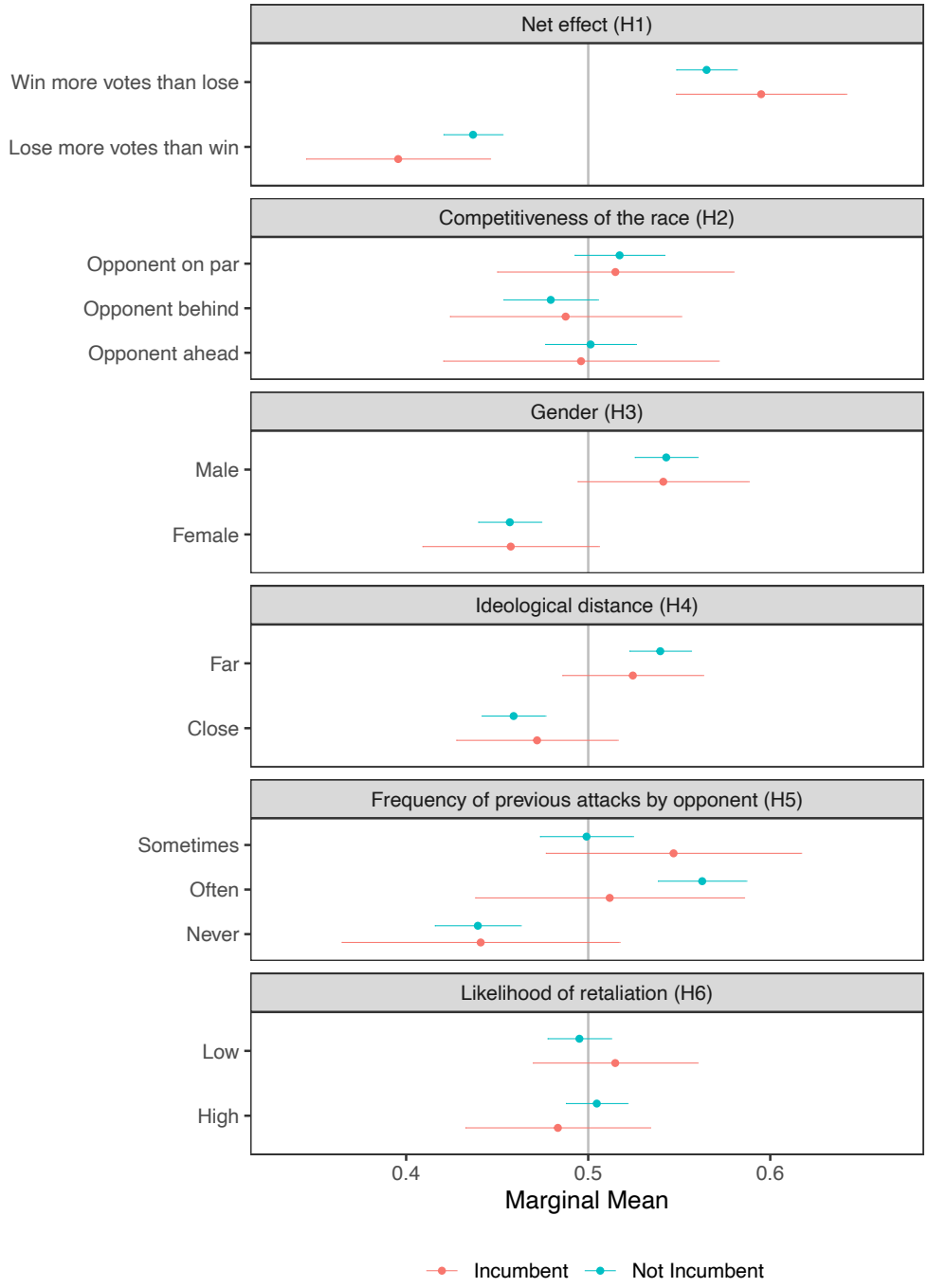

Fig. 3: Marginal means of attribute levels, for incumbents vs. challengers

Discussion and conclusion

This article unpacks the drivers of negative campaigning through a pre-registered conjoint experiment embedded in surveys of more than 800 candidates in German state elections. Combining several theoretical and methodological innovations, our approach advances research on negative campaigning in several respects. First, we more holistically conceptualized the conditions under which candidates decide to attack an opponent or not, incorporating several factors depicting the campaign environment and the specific constellations vis-à-vis two hypothetical opponents. Second, we varied characteristics of the potential target of an attack, which was often not possible or ignored in the most frequently used research designs. Third, by putting real election candidates into scenarios they may face during campaigns, we were able to estimate the relative causal effect of various factors shaping the propensity to use negative campaigning.

The results show that candidates’ decision to attack is shaped by rational-choice considerations but that the profile and the campaign behavior of the political opponent also matter a great deal. Female opponents were less likely to be chosen as the target of attacks, while ideologically distant candidates who themselves go negative were more likely to be attacked. The previous attack behavior of an opponent even was of equal importance as the expected net effect of an attack, suggesting that being attacked triggers either affective reactions or that candidates at least see a necessity to jump into the fray to defend themselves. A host of subgroup analyses showed that candidates’ decisions to go negative are largely independent from moderator variables such as candidates’ gender, incumbency, or candidates’ personality. Taken together, our study demonstrates that election candidates consider the characteristics and attack behavior of their opponents when selecting targets for negative campaigning.

Beyond its findings on the drivers of negative campaigning, the study contributes to the strand of research using experiments with samples of political elites (Druckman et al., 2023; Kertzer & Renshon, 2022). Paired-conjoint experimental designs (Hainmueller et al., 2014) are widely used in population samples (especially on voting behavior, e.g., Nyholt, 2024; Neuner & Wratil, 2022), but have rarely been applied to causally study elites’ political behavior (see for an exception Teele et al., 2018). In particular, we are not aware of studies using a conjoint design to explain the use of negative campaigning.

We also acknowledge several limitations. By design, forced-choice conjoint experiments limit the range of choices to a narrow set of options. To reduce complexity and the burden of the task for candidates, we had to zoom in on six theoretically important factors. Additional relevant factors that could matter such as media coverage, the campaign venue (e.g., social media, local debates between candidates) or the party of an opponent could not be considered. In addition, only a moderate number of levels could be shown for each candidate attribute to achieve sufficient statistical power. Therefore, we had to resort to binary categories such as low/high ideological distance, sacrificing the granularity of more fine-grained ideological distance measures (e.g., from 1 to 11 as asked in surveys). Because the conjoint experiment could only be technically implemented in an online survey, the part of the candidate sample responding to the survey offline could not be included in this experiment. Finally, our study focused on candidates from the second, state-level tier of the German multilevel polity, raising the question of how well the findings generalize to national-level candidates and countries with different political and party systems.

An extension of the study could widen the range of options beyond attacks, making available choices like ignoring opponents or instead appraising own positions. Other experimental designs such as vignette experiments allow for further manipulating different campaign scenarios to elucidate the behavioral reactions by candidates. In such experimental

designs, more dynamic characteristics of the campaign environment like the salience and tone of media coverage could be manipulated. By shifting the focus from the sender of negative campaigning to the characteristics and behavior of potential targets, our approach and findings should open avenues for further research.

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Declaration of interest

The authors report there are no competing interests to declare.

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Data and code availability

Data files and code to replicate the results are available on OSF: https://osf.io/j6w3k/

References

Ansolabehere, S., & Iyengar, S. (1995). *Going negative: How political advertisements shrink and polarize the electorate*. Free Press.

Ansolabehere, S., Iyengar, S., Simon, A., & Valentino, N. (1994). Does attack advertising demobilize the electorate? *American Political Science Review*, *88*(4), 829–838. https://doi.org/10.2307/2082710

Auter, Z. J., & Fine, J. A. (2016). Negative campaigning in the social media age: Attack advertising on Facebook. *Political Behavior*, *38*(4), 999–1020. https://doi.org/10.1007/s11109-016-9346-8

Banks, A., Calvo, E., Karol, D., & Telhami, S. (2021). #PolarizedFeeds: Three experiments

on polarization, framing, and social media. *The International Journal of Press/Politics*, *26*(3), 609–634. https://doi.org/10.1177/1940161220940964

Benoit, W. L. (2004). Election outcome and topic of political campaign attacks. *Southern Communication Journal*, *69*(4), 348–355. https://doi.org/10.1080/10417940409373305

Benoit, W. L. (2022). *Communication in political campaigns: Functional analysis of election messages*. Peter Lang.

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, *125*(3), 367–383. https://doi.org/10.1037/0033-2909.125.3.367

Damore, D. F. (2002). Candidate strategy and the decision to go negative. *Political Research Quarterly*, *55*(3), 669–685. https://doi.org/10.1177/106591290205500309

De Nooy, W., & Kleinnijenhuis, J. (2013). Polarization in the Media During an Election Campaign: A Dynamic Network Model Predicting Support and Attack Among Political Actors. *Political Communication*, *30*(1), 117–138. https://doi.org/10.1080/10584609.2012.737417

Debus, M., & Tuttnauer, O. (2024). Negative campaign statements, coalition heterogeneity, and the support for government parties. *Electoral Studies*, *87*, 102738. https://doi.org/10.1016/j.electstud.2023.102738

Dolezal, M., Ennser-Jedenastik, L., & Müller, W. C. (2015). When do parties attack their competitors? Negative campaigning in Austria, 2002-08. In A. Nai & A. S. Walter (Eds.), *New perspectives on negative campaigning* (pp. 165–181). ECPR Press.

Dolezal, M., Ennser-Jedenastik, L., & Müller, W. C. (2016). Negative campaigning and the logic of retaliation in multiparty competition. *The International Journal of Press/Politics*, *21*(2), 253–272. https://doi.org/10.1177/1940161215626566

Druckman, J. N., Kang, S., Chu, J., N. Stagnaro, M., Voelkel, J. G., Mernyk, J. S., Pink, S. L., Redekopp, C., Rand, D. G., & Willer, R. (2023). Correcting misperceptions of out-partisans decreases American legislators’ support for undemocratic practices. *Proceedings of the National Academy of Sciences*, *120*(23), e2301836120. https://doi.org/10.1073/pnas.2301836120

Druckman, J. N., Kifer, M. J., & Parkin, M. (2010). Timeless strategy meets new medium: Going negative on congressional campaign web sites, 2002-2006. *Political Communication*, *27*(1), 88–103. https://doi.org/10.1080/10584600903502607

Duggan, A., & Milazzo, C. (2023). Going on the offensive: Negative messaging in British

general elections. *Electoral Studies*, *83*, 102600. https://doi.org/10.1016/j.electstud.2023.102600

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, *109*(3), 573–598. https://doi.org/10.1037/0033-295X.109.3.573

Elmelund-Præstekær, C. (2008). Negative Campaigning in a Multiparty System. *Representation*, *44*(1), 27–39. https://doi.org/10.1080/00344890701869082

Elmelund-Præstekær, C. (2010). Beyond American negativity: Toward a general understanding of the determinants of negative campaigning. *European Political Science Review*, *2*(01), 137. https://doi.org/10.1017/S1755773909990269

Fiske, S. T. (2018). Stereotype content: Warmth and competence endure. *Current Directions in Psychological Science*, *27*(2), 67–73. https://doi.org/10.1177/0963721417738825

Fowler, E. F., Franz, M. M., & Ridout, T. N. (2016). *Political advertising in the United States*. Westview Books. https://doi.org/10.4324/9780429498275

Fridkin, K. L., & Kenney, P. J. (2009). The Role of Gender Stereotypes in U.S. Senate Campaigns. *Politics & Gender*, *5*(03), 301. https://doi.org/10.1017/S1743923X09990158

Fridkin, K. L., Kenney, P. J., & Woodall, G. S. (2009). Bad for Men, Better for Women: The Impact of Stereotypes During Negative Campaigns. *Political Behavior*, *31*(1), 53–77. https://doi.org/10.1007/s11109-008-9065-x

Garramone, G. M. (1984). Voter responses to negative political ads. *Journalism Quarterly*, *61*(2), 250–259. https://doi.org/10.1177/107769908406100202

Geer, J. G. (2006). *In defense of negativity: Attack ads in presidential campaigns*. University of Chicago Press.

Hainmueller, J., Hopkins, D. J., & Yamamoto, T. (2014). Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments. *Political Analysis*, *22*(1), 1–30. https://doi.org/10.1093/pan/mpt024

Haselmayer, M. (2019). Negative campaigning and its consequences: A review and a look ahead. *French Politics*, *17*(3), 355–372. https://doi.org/10.1057/s41253-019-00084-8

Haselmayer, M., & Jenny, M. (2018). *Friendly fire?* Negative campaigning among coalition partners. *Research & Politics*, *5*(3), 205316801879691. https://doi.org/10.1177/2053168018796911

Haynes, A. A., & Rhine, S. L. (1998). Attack Politics in Presidential Nomination Campaigns: An Examination of the Frequency and Determinants of Intermediated Negative Messages

Against Opponents. *Political Research Quarterly*, *51*(3), 691–721. https://doi.org/10.1177/106591299805100307

Hobolt, S. B., & De Vries, C. E. (2015). Issue Entrepreneurship and Multiparty Competition. *Comparative Political Studies*, *48*(9), 1159–1185. https://doi.org/10.1177/0010414015575030

Jackson, R. A., & Carsey, T. M. (2007). US Senate campaigns, negative advertising, and voter mobilization in the 1998 midterm election. *Electoral Studies*, *26*(1), 180–195. https://doi.org/10.1016/j.electstud.2006.06.010

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263. https://doi.org/10.2307/1914185

Kenney, P. J., & Kahn, K. F. (2004). *No holds barred: Negativity in U.S. Senate campaigns*. Pearson Prentice Hall.

Kertzer, J. D., & Renshon, J. (2022). Experiments and Surveys on Political Elites. *Annual Review of Political Science*, *25*(1), 529–550. https://doi.org/10.1146/annurev-polisci-051120-013649

Klinger, U., Koc-Michalska, K., & Russmann, U. (2023). Are campaigns getting uglier, and who is to blame? Negativity, dramatization and populism on Facebook in the 2014 and 2019 EP election campaigns. *Political Communication*, *40*(3), 263–282. https://doi.org/10.1080/10584609.2022.2133198

Lau, R. R., & Pomper, G. M. (2004). *Negative campaigning: An analysis of U.S. Senate elections*. Rowman & Littlefield.

Lau, R. R., & Rovner, I. B. (2009). Negative campaigning. *Annual Review of Political Science*, *12*(1), 285–306. https://doi.org/10.1146/annurev.polisci.10.071905.101448

Leeper, T. J. (2020). cregg: Simple Conjoint Analyses and Visualization. *CRAN*. https://cran.r-project.org/package=cregg

Leeper, T. J., Hobolt, S. B., & Tilley, J. (2020). Measuring Subgroup Preferences in Conjoint Experiments. *Political Analysis*, *28*(2), 207–221. https://doi.org/10.1017/pan.2019.30

Maier, J., Dian, M., & Oschatz, C. (2022). Who are the ‘dark’ politicians? Insights from self-reports of German state parliament candidates. *Politics and Governance*, *10*(4), 349–360. https://doi.org/10.17645/pag.v10i4.5493

Maier, J., & Renner, A.-M. (2018). When a man meets a woman: Comparing the use of negativity of male candidates in single- and mixed-gender televised debates. *Political Communication*, *35*(3), 433–449. https://doi.org/10.1080/10584609.2017.1411998

Maier, J., Stier, S., & Oschatz, C. (2023). Are candidates rational when it comes to negative campaigning? Empirical evidence from three German candidate surveys. *Party Politics*, *29*(4), 766–779. https://doi.org/10.1177/13540688221085239

Martin, D., & Nai, A. (2024). Deepening the rift: Negative campaigning fosters affective polarization in multiparty elections. *Electoral Studies*, *87*, 102745. https://doi.org/10.1016/j.electstud.2024.102745

Nai, A. (2020). Going negative, worldwide: Towards a general understanding of determinants and targets of negative campaigning. *Government and Opposition*, *55*(3), 430–455. https://doi.org/10.1017/gov.2018.32

Nai, A., & Maier, J. (2020). Dark necessities? Candidates’ aversive personality traits and negative campaigning in the 2018 American Midterms. *Electoral Studies*, *68*, 102233. https://doi.org/10.1016/j.electstud.2020.102233

Neuner, F. G., & Wratil, C. (2022). The populist marketplace: Unpacking the role of “thin” and “thick” ideology. *Political Behavior*, *44*(2), 551–574. https://doi.org/10.1007/s11109-020-09629-y

Nyholt, N. (2024). Why Do Voters Prefer Local Candidates? Evidence from a Danish Conjoint Survey Experiment. *Political Behavior*. https://doi.org/10.1007/s11109-024-09919-9

Polborn, M. K., & Yi, D. T. (2006). Informative positive and negative campaigning. *Quarterly Journal of Political Science*, *1*(4), 351–371. https://doi.org/10.1561/100.00000013

Ridout, T. N., & Holland, J. L. (2010). Candidate Strategies in the Presidential Nomination Campaign. *Presidential Studies Quarterly*, *40*(4), 611–630. https://doi.org/10.1111/j.1741-5705.2010.03803.x

Roese, N. J., & Sande, G. N. (1993). Backlash effects in attack politics. *Journal of Applied Social Psychology*, *23*(8), 632–653. https://doi.org/10.1111/j.1559-1816.1993.tb01106.x

Song, H., Nyhuis, D., & Boomgaarden, H. (2019). A Network Model of Negative Campaigning: The Structure and Determinants of Negative Campaigning in Multiparty Systems. *Communication Research*, *46*(2), 273–294. https://doi.org/10.1177/0093650217712596

Sood, G., & Iyengar, S. (2016). Coming to dislike your opponents: The polarizing impact of political campaigns. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2840225

Taylor, M. A. (2023). The Role of Personal Availability and Gender in Negative Online

Congressional Campaigning. *Political Behavior*, *45*(3), 923–953. https://doi.org/10.1007/s11109-021-09732-8

Teele, D. L., Kalla, J., & Rosenbluth, F. (2018). The Ties That Double Bind: Social Roles and Women’s Underrepresentation in Politics. *American Political Science Review*, *112*(3), 525–541. https://doi.org/10.1017/S0003055418000217

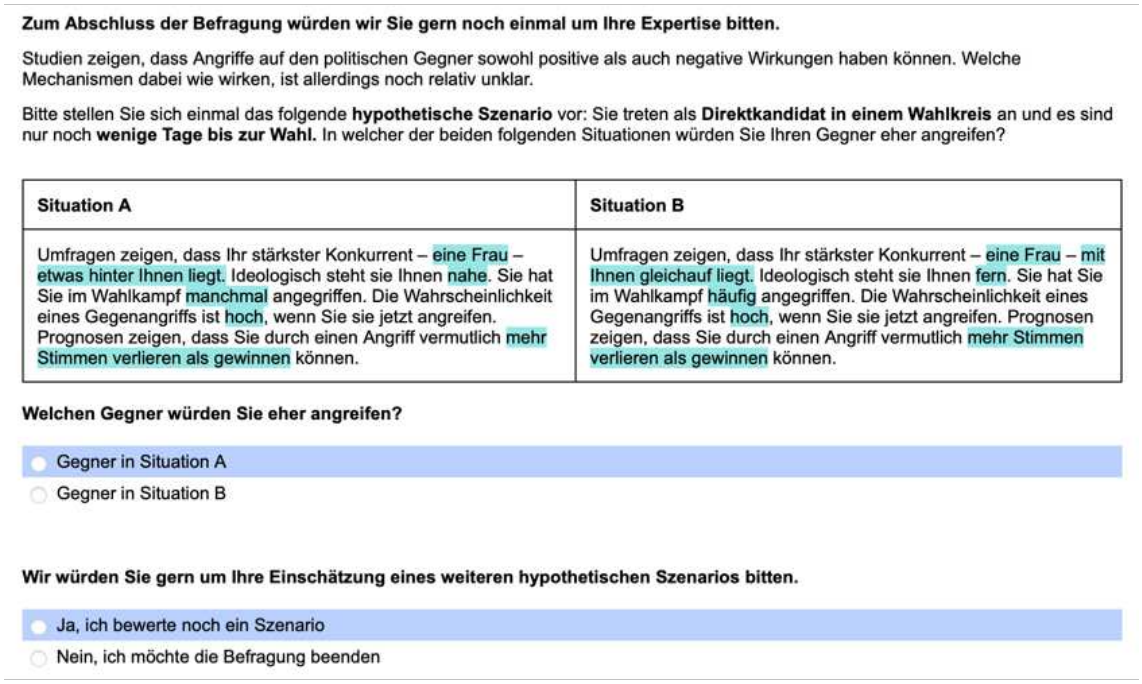
Turska-Kawa, A., & Olszanecka-Marmola, A. (2018). Stereotypes determining perceptions of female politicians: The case of Poland. *Politics in Central Europe*, *14*(3), 7–30. https://doi.org/10.2478/pce-2018-0016

Walter, A. S. (2014a). Choosing the enemy. *Party Politics*, *20*(3), 311–323. https://doi.org/10.1177/1354068811436050

Walter, A. S. (2014b). Negative Campaigning in Western Europe: Similar or Different? *Political Studies*, *62*(1_suppl), 42–60. https://doi.org/10.1111/1467-9248.12084

Supplementary material

Appendix A: Experimental setup



Zum Abschluss der Befragung würden wir Sie gern noch einmal um Ihre Expertise bitten.

Studien zeigen, dass Angriffe auf den politischen Gegner sowohl positive als auch negative Wirkungen haben können. Welche Mechanismen dabei wie wirken, ist allerdings noch relativ unklar.

Bitte stellen Sie sich einmal das folgende **hypothetische Szenario** vor: Sie treten als **Direktkandidat in einem Wahlkreis** an und es sind nur noch **wenige Tage bis zur Wahl.** In welcher der beiden folgenden Situationen würden Sie Ihren Gegner eher angreifen?

Situation A	Situation B
Umfragen zeigen, dass Ihr stärkster Konkurrent – eine Frau – etwas hinter Ihnen liegt. Ideologisch steht sie Ihnen nahe. Sie hat Sie im Wahlkampf manchmal angegriffen. Die Wahrscheinlichkeit eines Gegenangriffs ist hoch, wenn Sie sie jetzt angreifen. Prognosen zeigen, dass Sie durch einen Angriff vermutlich mehr Stimmen verlieren als gewinnen können.	Umfragen zeigen, dass Ihr stärkster Konkurrent – eine Frau – mit Ihnen gleichauf liegt. Ideologisch steht sie Ihnen fern. Sie hat Sie im Wahlkampf häufig angegriffen. Die Wahrscheinlichkeit eines Gegenangriffs ist hoch, wenn Sie sie jetzt angreifen. Prognosen zeigen, dass Sie durch einen Angriff vermutlich mehr Stimmen verlieren als gewinnen können.

Welchen Gegner würden Sie eher angreifen?

- Gegner in Situation A
- Gegner in Situation B

Wir würden Sie gern um Ihre Einschätzung eines weiteren hypothetischen Szenarios bitten.

- Ja, ich bewerte noch ein Szenario
- Nein, ich möchte die Befragung beenden

Appendix B: Deviations from the pre-analysis plan

We deviated from the pre-analysis plan (https://osf.io/a4rpz/?view_only=2ccad8addede4622a4ee7f83e5abe373) in one regard. The pre-registered hypotheses H8 to H12 were originally designated as hypothesis tests for a second paper. Instead, we integrate the results of these hypothesis tests as robustness tests in the present paper. Results can be found in Appendix F.

H8 The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for candidates scoring low on dark personality traits than for candidates scoring high on dark personality traits.

H9 The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for candidates scoring low on conflict approach than for candidates scoring high on conflict approach.

H10a The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for candidates scoring low on the basic human value "power" than for candidates scoring high on the basic human value "power".

H10b The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for candidates scoring low on the basic human value "achievement" than for candidates scoring high on the basic human value "achievement".

H11 The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for candidates who regard negative campaigning as a legitimate strategy than for candidates who regard negative campaigning as an illegitimate strategy.

H12 The effect of a positive benefit-cost differential on the likelihood to attack is significantly stronger for ideologically moderate than for ideologically extreme candidates.

Appendix C: Data sources

Table C1: Covered state elections

State	Date of election	# constituencies	Data taken from (last access 13 Dec 2022)
Saxony-Anhalt	6 Jun 2021	41	https://wahlergebnisse.sachsen-anhalt.de/wahlen/lt21/erg/wkr/lt.01.ergtab.php
Berlin	26 Sep 2021	78	https://www.berlin.de/wahlen/historie/berliner-wahlen/ergebnisberichte/sb_b07-02-03_2021j05_be_ah_bvv-2.pdf
Mecklenburg-Western Pomerania	26 Sep 2021	36	https://www.laiv-mv.de/serviceassistent/download?id=1651135
Schleswig-Holstein	8 May 2022	35	https://www.statistik-nord.de/fileadmin/Dokumente/Wahlen/Schleswig-Holstein/Landtagswahlen/2022/endgültig/Wahlbericht_LTW_SH_2022_endgültig.pdf
Saarland	27 Mar 2022	3	https://wahlergebnis.saarland.de/LTW/
North Rhine-Westphalia	15 May 2022	128	https://webshop.it.nrw.de/gratis/B799%20202251.pdf
Lower Saxony	9 Oct 2022	87	https://wahlen.statistik.niedersachsen.de/LW2022/

Appendix D: Sample description

Table D.1: Comparison of population of candidates and conjoint sample

		Population (%)	Sample (%)	p-value (chi-squared test)
Gender	Female	34.11	35.4	0.205
	Male	65.89	64.6	
Age	18-29	12.27	12.69	0.382
	30-49	46.51	47.99	
	50-69	38.34	36.69	
	70+	2.89	2.62	
Party	DIE LINKE	14.04	17.22	< 0.001
	SPD	18.27	16.86	
	DIE GRÜNEN	16.22	21.97	
	CDU	21.92	16.98	
	FDP	15.94	17.4	
	AFD	13.61	9.56	
State	Berlin	29.01	15.73	< 0.001
	Lower Saxony	14.03	18.03	
	Mecklenburg-Western Pomerania	11.64	6.31	
	Northrhine-Westphalia	19.88	29.64	
	Saarland	6.59	5.78	
	Saxony-Anhalt	10.99	11.5	
	Schleswig-Holstein	7.87	13	
Incumbency	not incumbent	91.18	89.77	0.131
	incumbent	8.82	10.23	

Appendix E: Main models with AMCEs

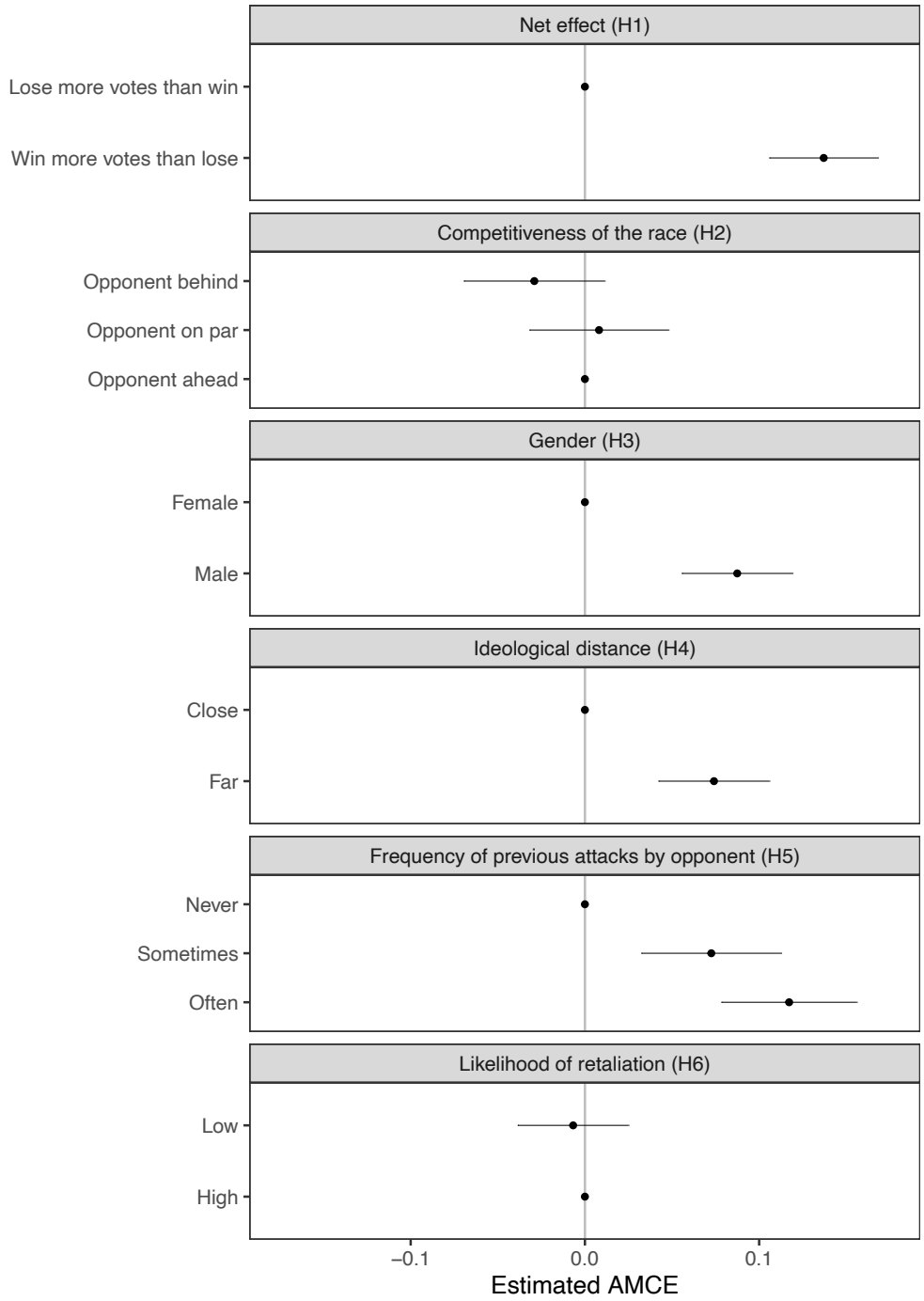


Figure E.1. Average marginal component effect

Appendix F: Diagnostics

Attribute distribution

Figure F.1 shows how often each attribute level was shown in the conjoint tasks. It illustrates that, as expected by virtue of randomization, levels within an attribute were shown at roughly equal rates.

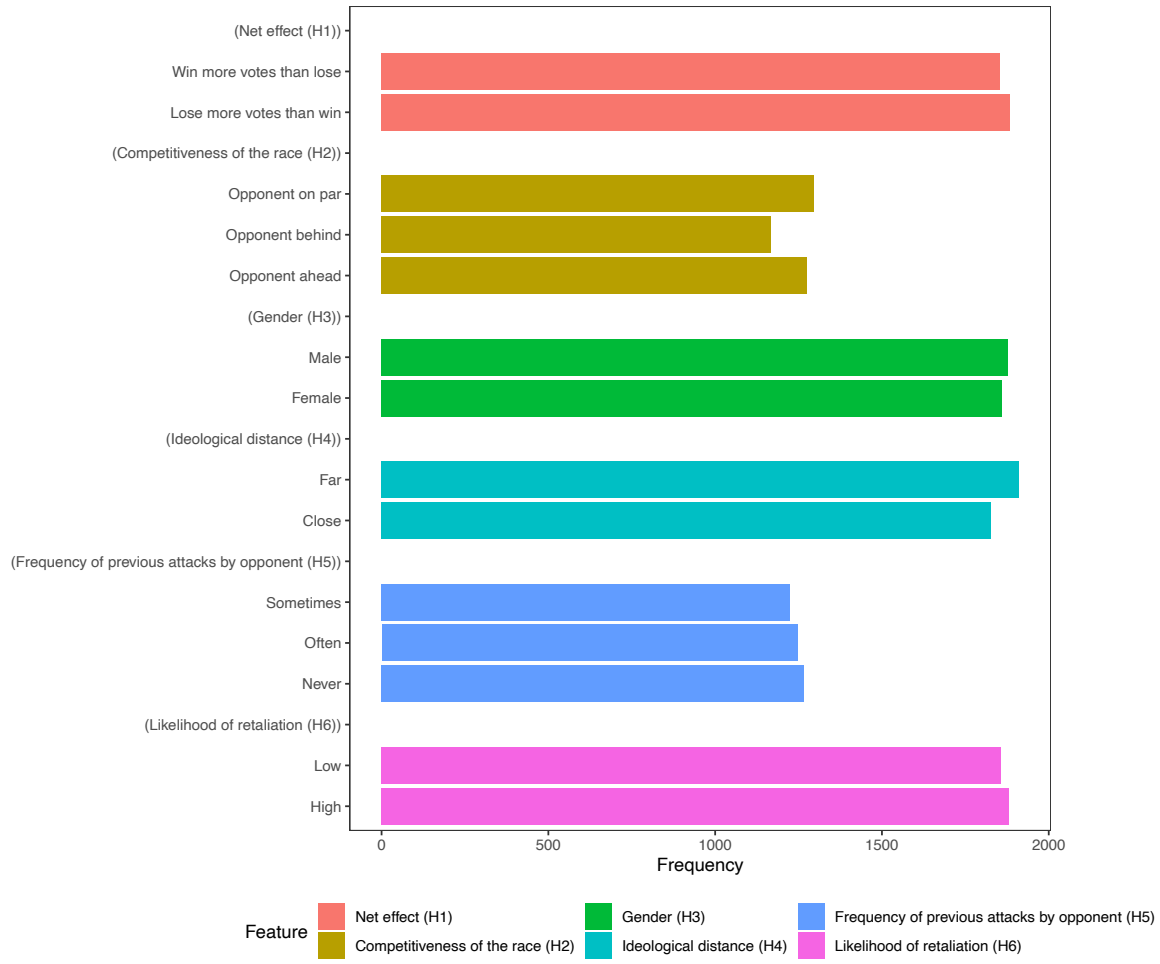


Figure F.1. Distribution of attribute levels

Balance testing

Figures F.2 though F.4 show balance tests for some key observable demographics. Even though in expectation, randomization will ensure that covariates are equally distributed between conditions, imbalances can always emerge in a particular experiment, which in turn could influence differences between treatments. Each plot shows whether the central tendency of the covariate differs between attribute levels. We use the proportion of women,

the proportion of incumbents, and the average age. As all confidence intervals overlap with each other, there is no indication for any imbalance.

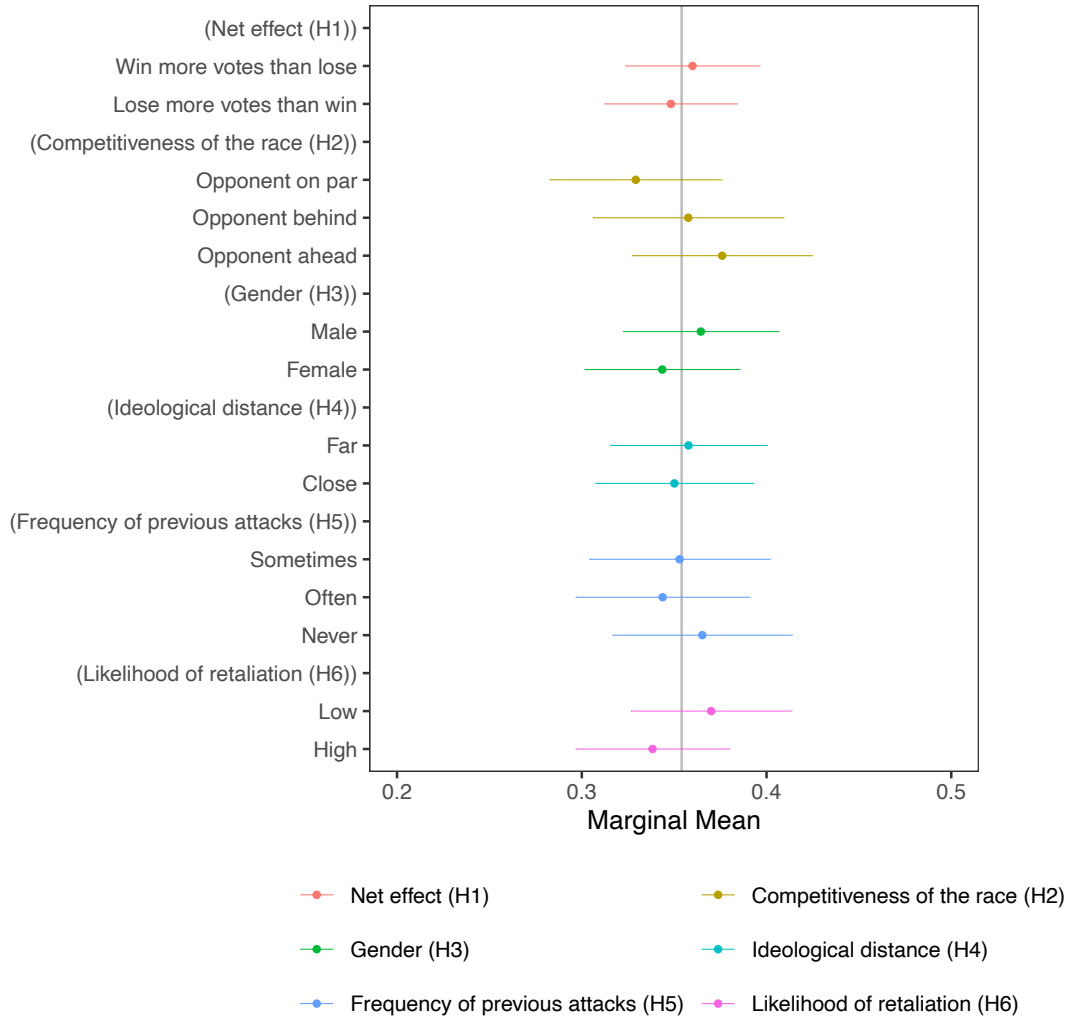


Figure F.2. Balance of gender (proportion female) across attribute levels

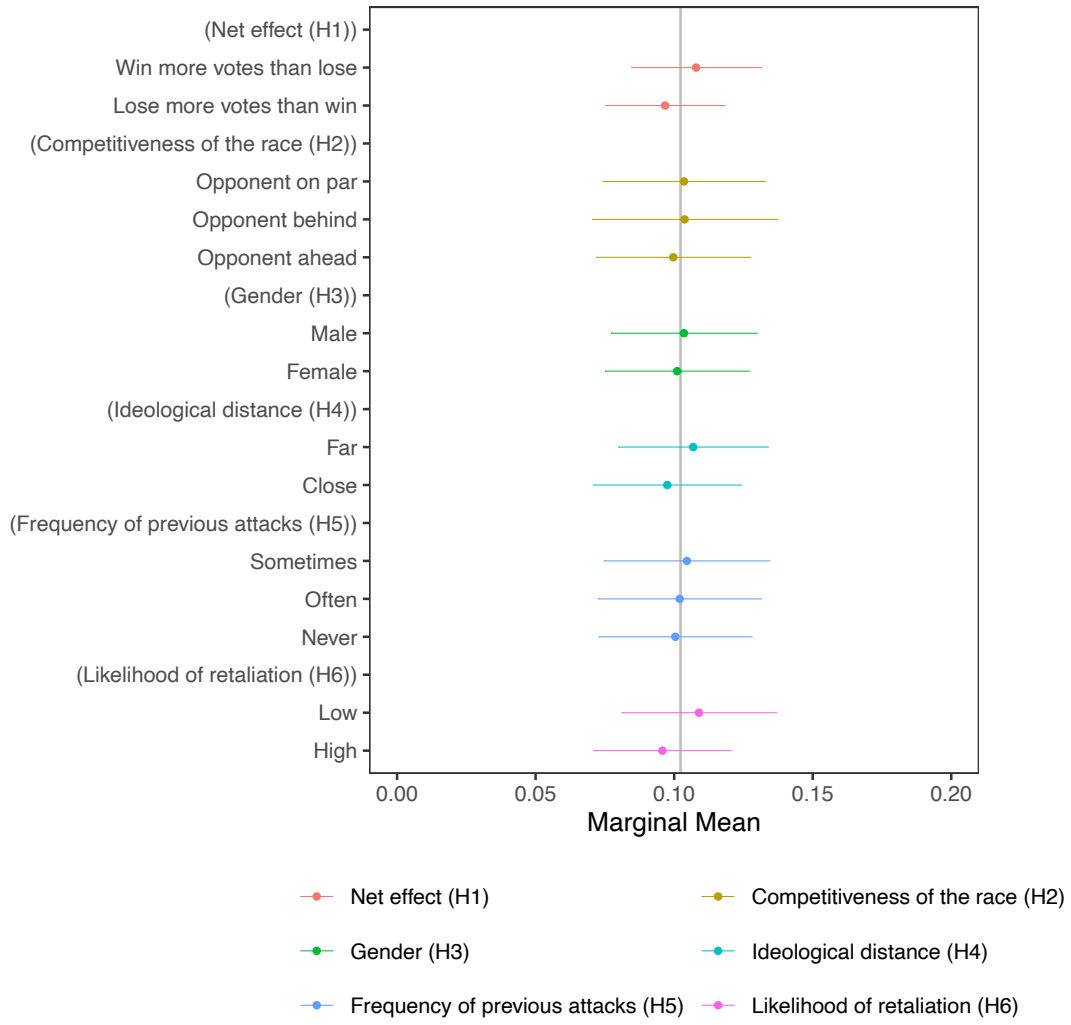


Figure F.3. Balance of incumbency (proportion incumbents) across attribute levels

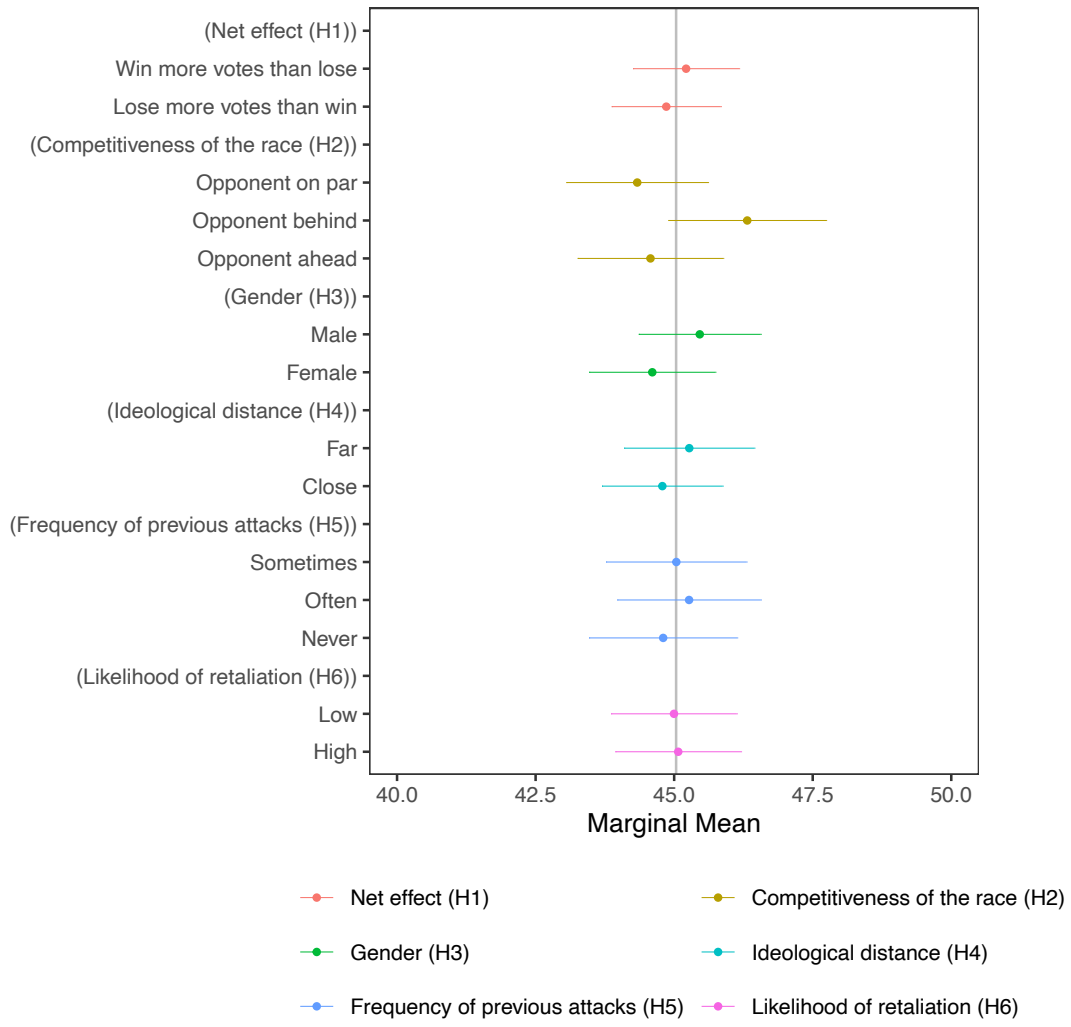


Figure F.4. Balance of age (average) across attribute levels

Appendix G: Robustness checks

Table G.1: Description of covariates

Concept	Question	Mean	SD	Alpha
Conflict approach	Index	3.404	0.81	0.617
	"Ich mag es, andere herauszufordern." ("I like challenging others.")	3.536	1.049	
	"Ich finde Konflikte interessant." ("I find conflict interesting.")	3.553	1.067	
	"Streit stört mich nicht." ("I don't mind arguing.")	3.02	1.143	
Dark personality	Index	2.587	0.666	0.651
	"Ich habe schon mal kleine Nachteile in Kauf genommen, um eine Person zu bestrafen, die es verdiente." ("I've taken small penalties before to punish someone who deserved it.")	1.826	1.054	
	"Menschen bereuen es immer, wenn sie sich mit mir anlegen." ("People always regret messing with me.")	2.309	1.065	
	"Es ist ratsam, Informationen im Auge zu behalten, die man später gegen andere verwenden kann." ("It's wise to keep track of information that you can later use against others.")	2.953	1.164	
	"Es gibt Dinge, die du vor anderen Menschen verbergen solltest, um dein Ansehen zu wahren." ("There are things you should hide from other people to protect your reputation.")	2.838	1.158	
	"Ich beharre darauf, den Respekt zu bekommen, den ich verdiene." ("I insist on getting the respect I deserve.")	2.636	1.124	
	"Ich will, dass meine Konkurrenten scheitern." ("I want my competitors to fail.")	2.687	1.149	
Ideology	Left-right scale	4.75	2.232	
Negative campaigning attitude	Index	2.928	0.894	0.709
	"Angriffe auf den politischen Gegner sind ein angemessenes Mittel, um sich einen Vorteil im Wahlkampf zu verschaffen." ("Attacks on political opponents are an appropriate means of gaining an advantage in an election campaign.")	3.046	1.126	
	"Wenn Angriffe auf den politischen Gegner nur das Ziel haben, sich einen Vorteil zu verschaffen, ist das unfair." ("If attacks on the political opponent are only aimed at gaining an advantage, this is unfair.")	3.453	1.26	
	"Angriffe auf den politischen Gegner sind gerechtfertigt, da man so die eigenen Wähler mobilisieren kann." ("Attacks on the political opponent are justified, since one can mobilize one's own voters in this way.")	2.961	1.105	
Value: achievement	Index	2.668	0.936	0.796
	"Meine Fähigkeiten zu zeigen; danach zu streben, dass die Leute bewundern, was ich tue." ("to show my skills; to strive for people to admire what I do.")	2.398	1.216	
	"Sehr erfolgreich zu sein; andere Leute zu beeindrucken." ("To be very successful; to impress other people.")	2.132	1.085	
	"Ehrgeizig zu sein; zu zeigen, wie fähig ich bin." ("to be ambitious; to show how capable I am.")	3.132	1.266	

	"Im Leben vorwärts zu kommen; danach zu streben, besser zu sein als andere." ("To get ahead in life; to strive to be better than others.")	2.811	1.27	
Value: power	Index	2.26	0.813	0.689
	"Reich zu sein; viel Geld und teure Sachen zu besitzen." ("to be rich; having a lot of money and expensive things.")	1.463	0.736	
	"Die Führung zu übernehmen und anderen zu sagen, was sie tun sollen; andere dazu zu bewegen zu tun, was ich sage." ("Taking the lead and telling others what to do; to get others to do what I say.")	2.427	1.163	
	"Immer derjenige zu sein, der die Entscheidungen trifft; Führungspositionen zu übernehmen." ("Always being the one who makes the decisions; to take on management positions.")	2.667	1.18	

Subgroup analyses: F-tests

Gender

Table G.2: Test of interaction of net effect with respondent gender

Model	*Resid..Df*	*Resid..Dev*	*df*	*Deviance*	*statistic*	*p.value*
Basic model	*3732*	*916.357*	*NA*	*NA*	*NA*	*NA*
Interaction model	*3730*	*916.346*	*2*	*0.01*	*0.021*	*0.979*

Table G.3: Test of interaction of closeness of race with respondent gender

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3731	932.671	NA	NA	NA	NA
Interaction model	3728	932.583	3	0.089	0.118	0.949

Table G.4: Test of interaction of gender with respondent gender

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	926.644	NA	NA	NA	NA
Interaction model	3730	926.398	2	0.246	0.495	0.61

Table G.5: Test of interaction of ideological distance with respondent gender

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	927.866	NA	NA	NA	NA
Interaction model	3730	927.844	2	0.022	0.044	0.957

Table G.6: Test of interaction of attack frequency with respondent gender

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3731	924.747	NA	NA	NA	NA
Interaction model	3728	924.238	3	0.509	0.684	0.562

Table G.7: Test of interaction of retaliation likelihood with respondent gender

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	933.473	NA	NA	NA	NA
Interaction model	3730	931.821	2	1.652	3.307	0.037

Incumbency

Table G.8: Test of interaction of net effect with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	916.357	NA	NA	NA	NA
Interaction model	3730	915.919	2	0.438	0.892	0.41

Table G.9: Test of interaction of competitiveness of race with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3731	932.671	NA	NA	NA	NA
Interaction model	3728	932.66	3	0.011	0.015	0.998

Table G.10: Test of interaction of gender with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	926.644	NA	NA	NA	NA
Interaction model	3730	926.643	2	0.001	0.001	0.999

Table G.11: Test of interaction of ideological distance with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	927.866	NA	NA	NA	NA
Interaction model	3730	927.798	2	0.068	0.137	0.872

Table G.12: Test of interaction of attack frequency with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3731	924.747	NA	NA	NA	NA
Interaction model	3728	924.191	3	0.556	0.748	0.523

Table G.13: Test of interaction of retaliation likelihood with respondent incumbency

Model	Resid..Df	Resid..Dev	df	Deviance	statistic	p.value
Basic model	3732	933.473	NA	NA	NA	NA
Interaction model	3730	933.329	2	0.144	0.288	0.75

Subgroup analysis by state

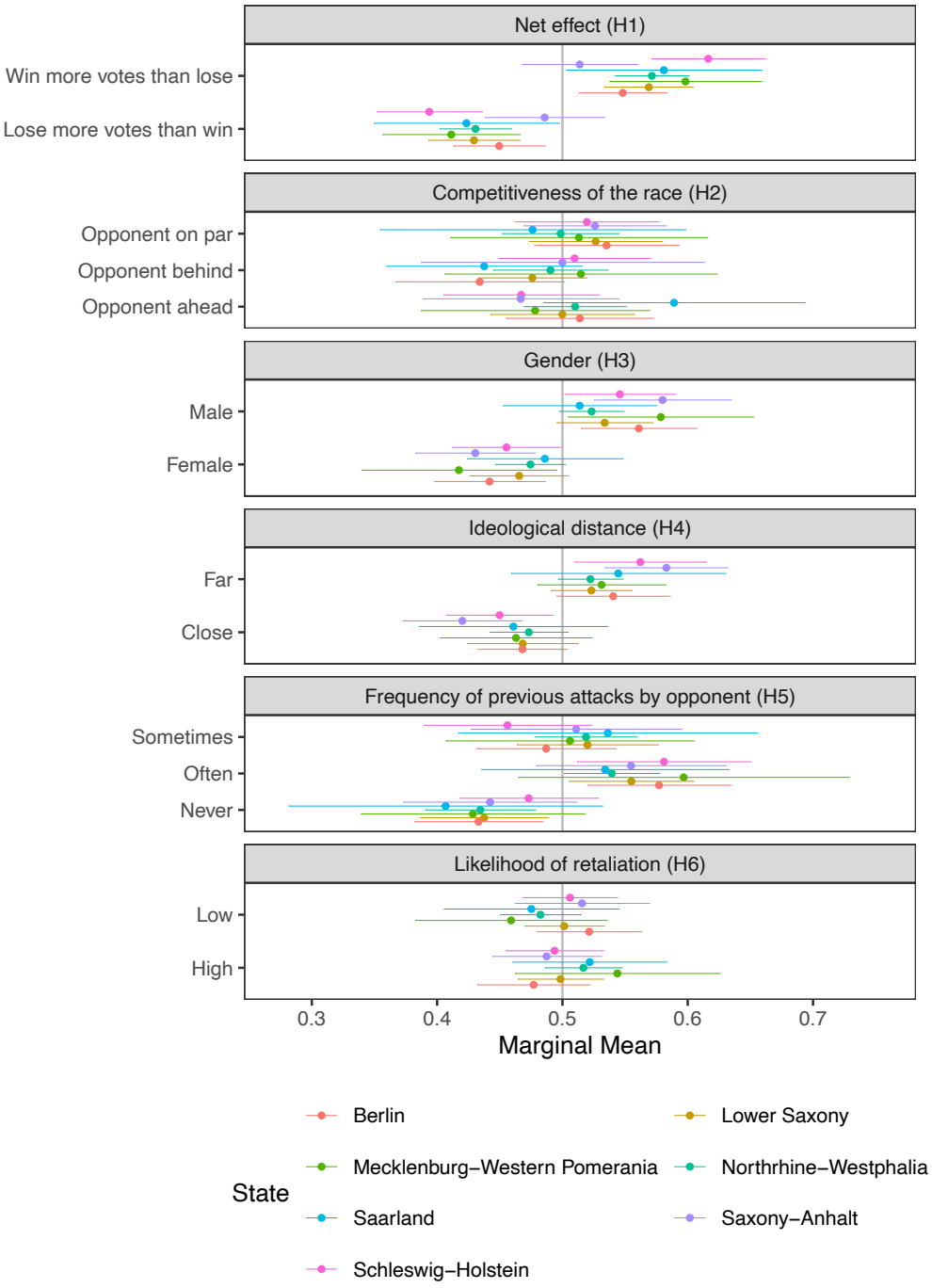


Figure G.1: Marginal means by state

Subgroup analysis by other psychological traits

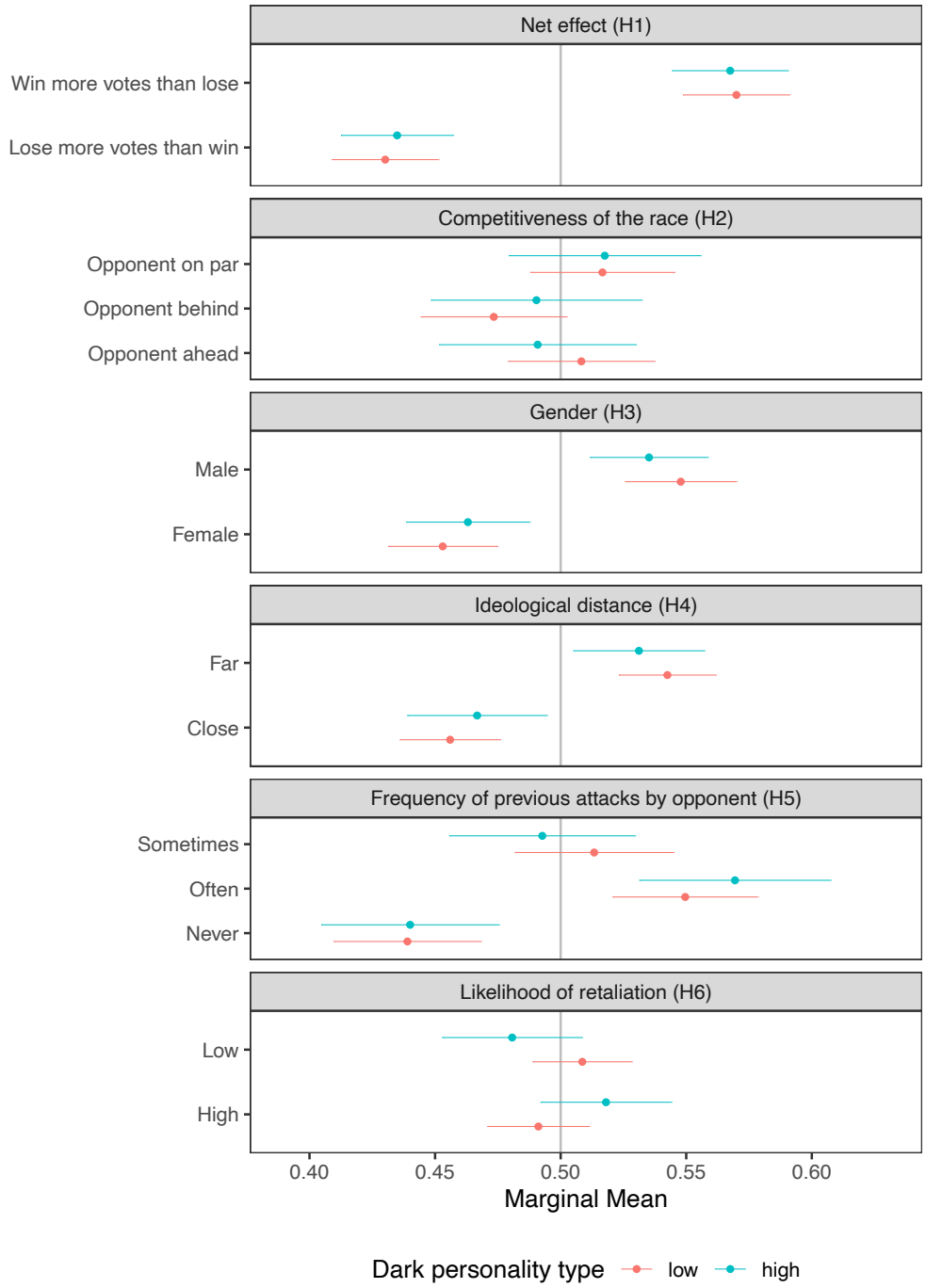


Figure G.2: Marginal means by dark personality

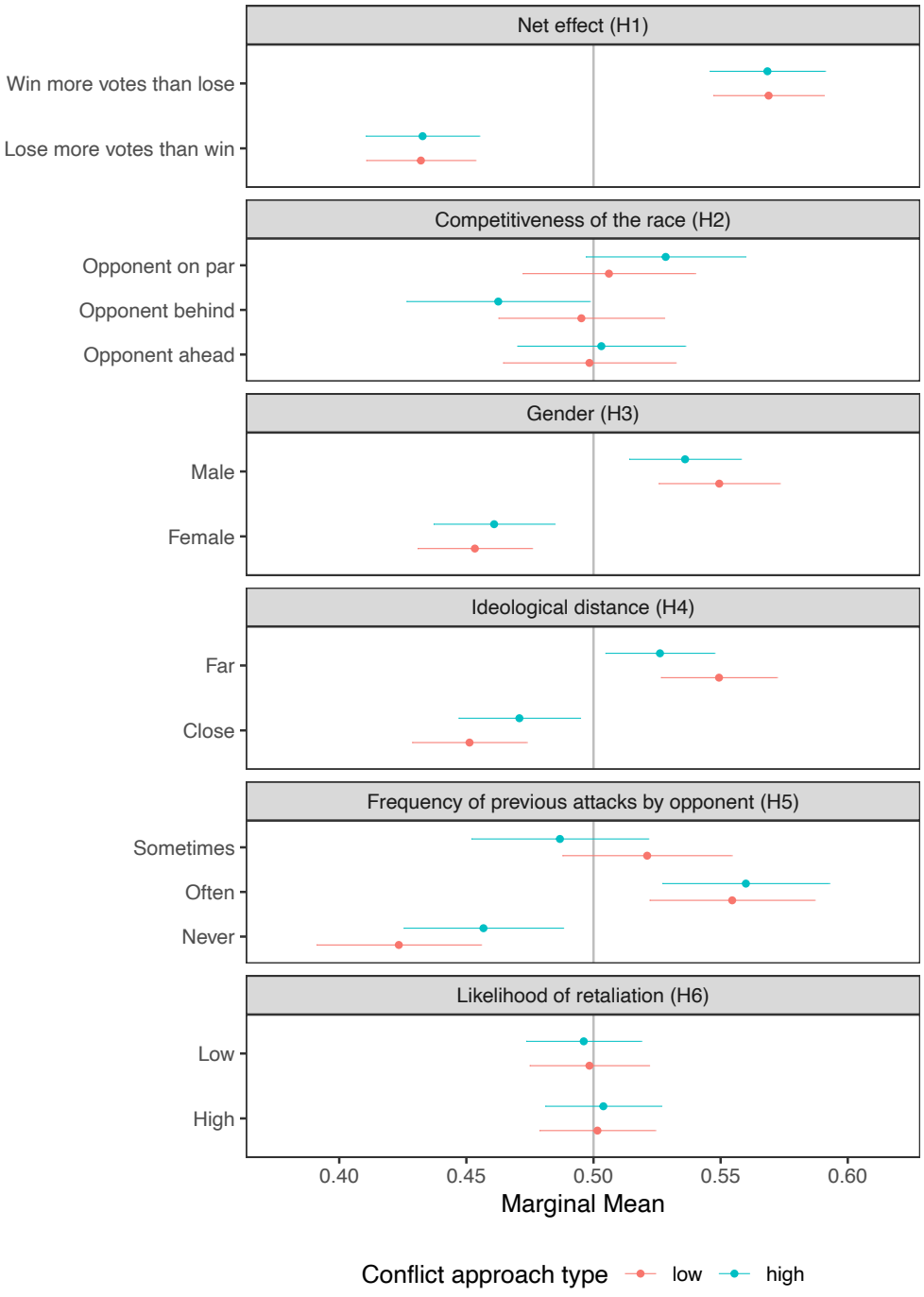


Figure G.3: Marginal means by conflict approach

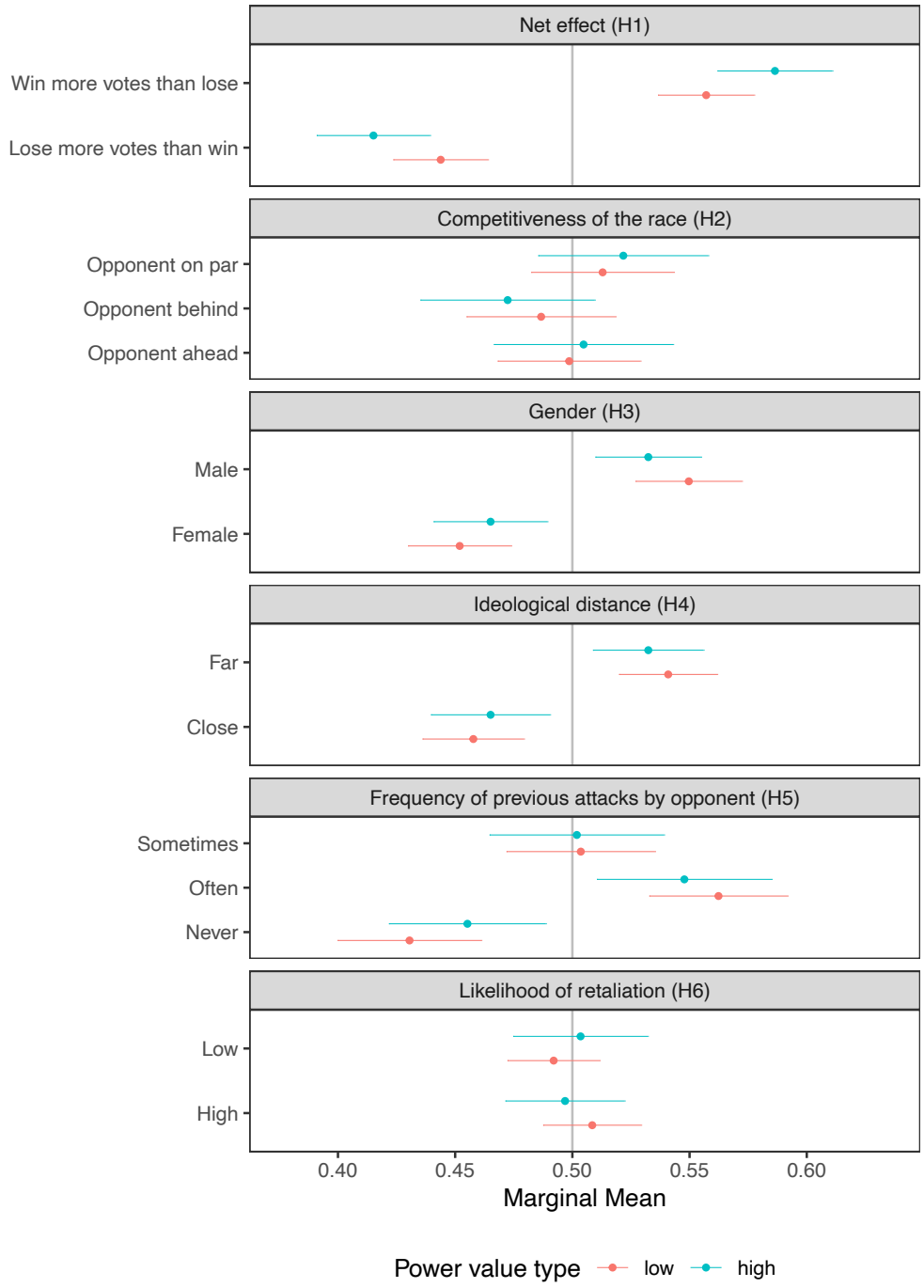


Figure G.4: Marginal means by power values

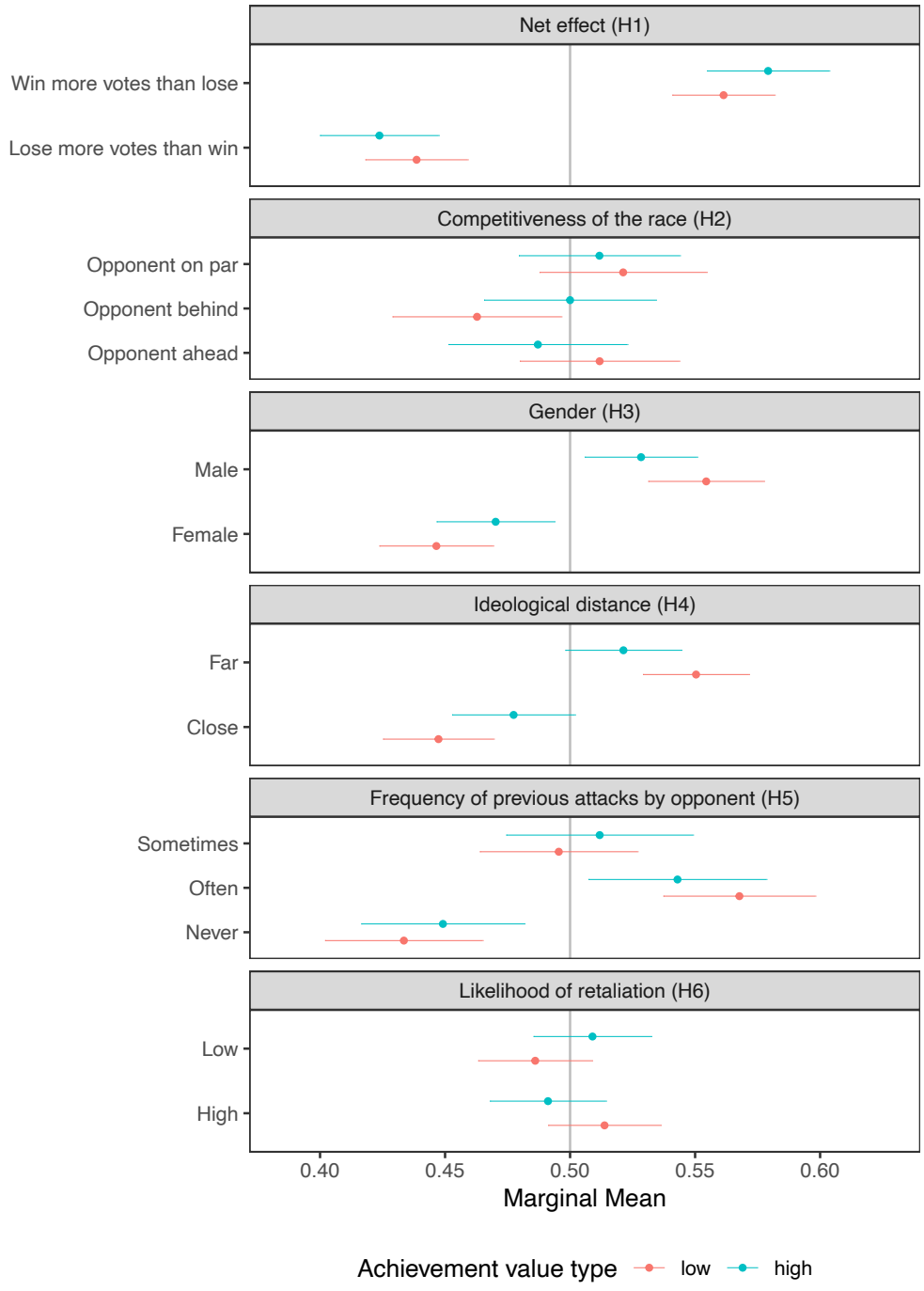


Figure G.5: Marginal means by achievement values

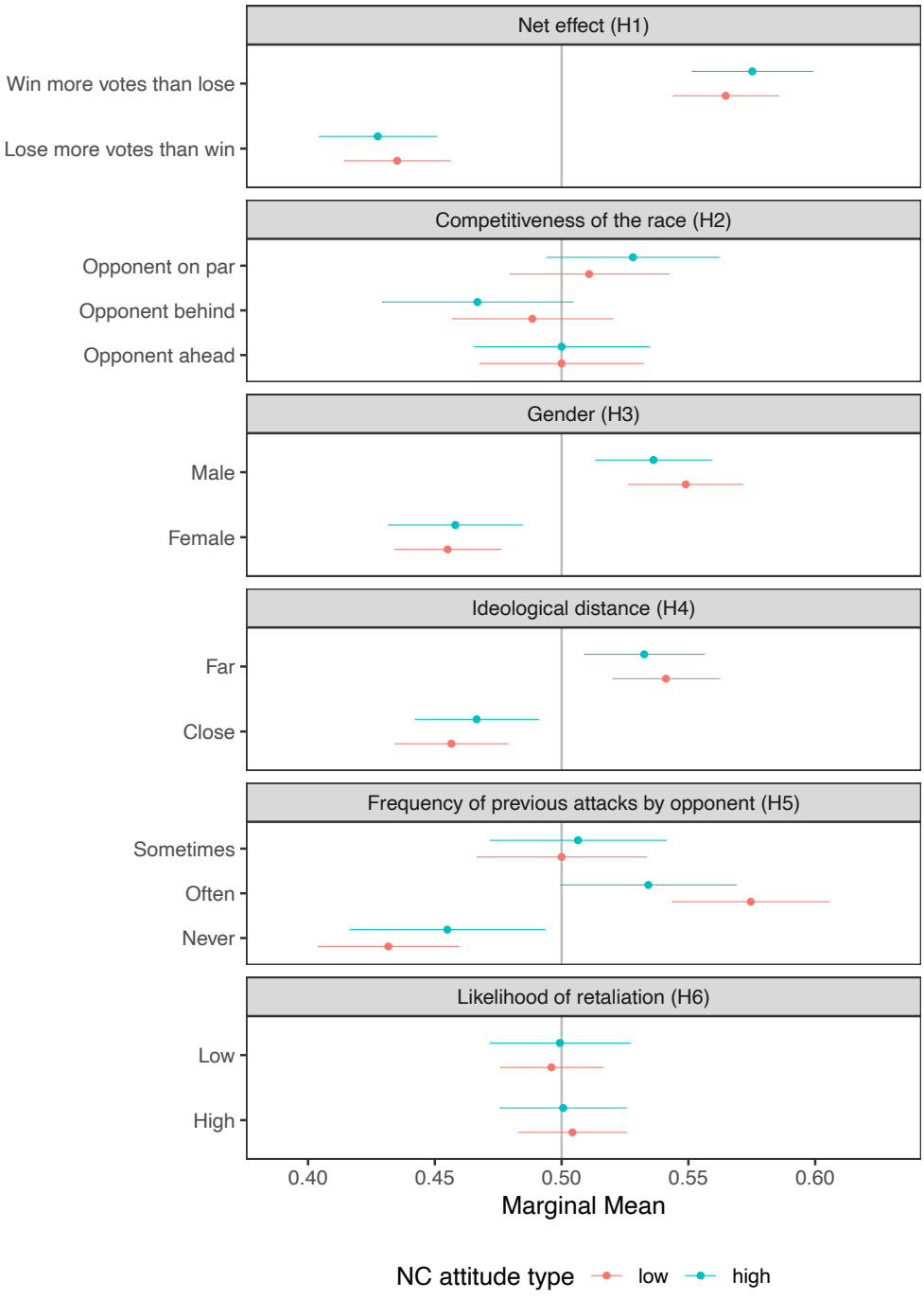


Figure G.6: Marginal means by negative campaigning attitudes

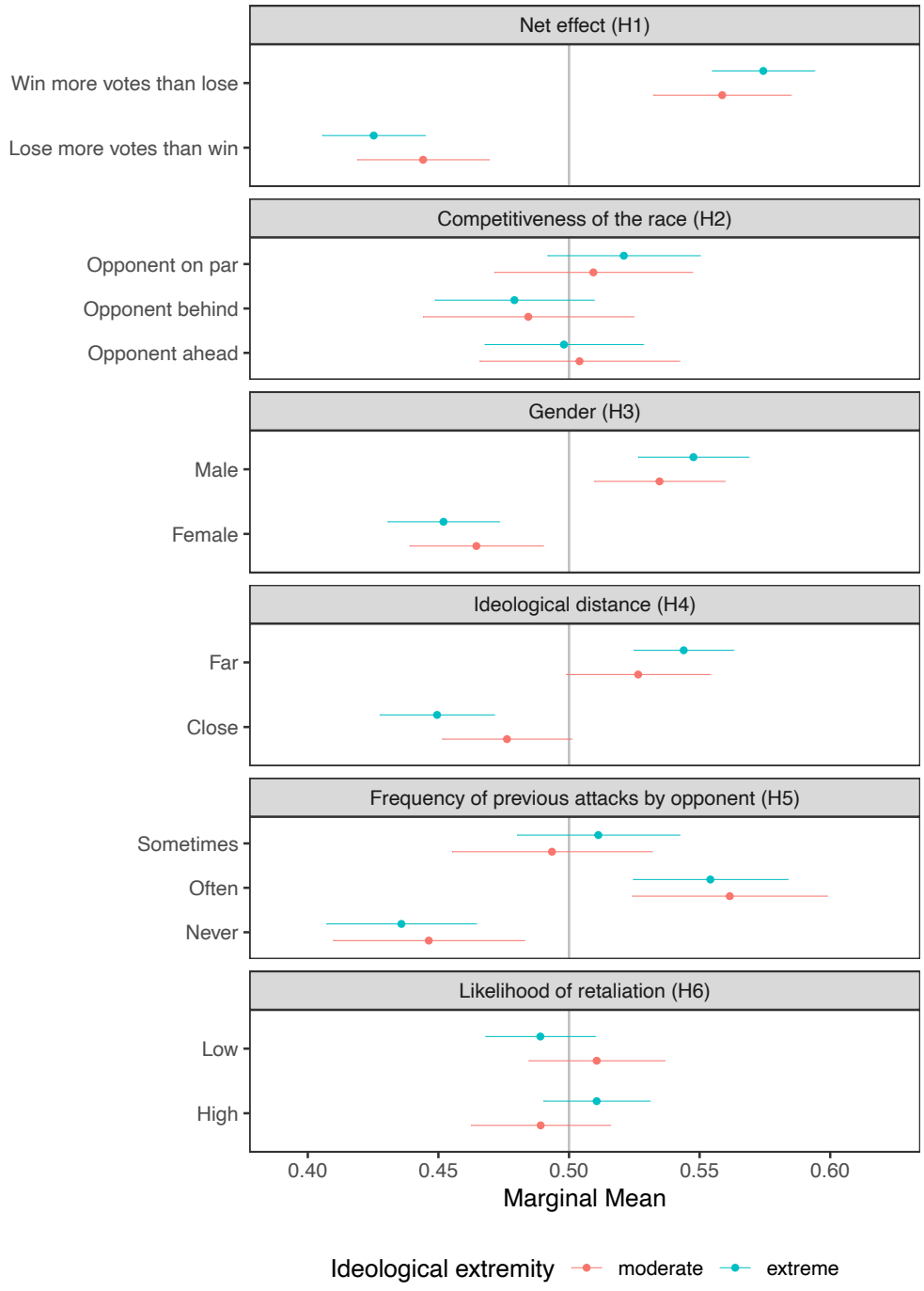


Figure G.7: Marginal means by ideological extremity