

Do Online Voter Guides Empower Citizens? Evidence from a Field Experiment with Digital Trace Data*

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Abstract. Voting Advice Applications (VAAs), which provide citizens with information on the party that best represents their political preferences, are often cited as evidence of the empowering capabilities of digital tools. Aside from the informational benefits of these voter guides, observational studies have suggested a strong effect on political participation and vote choice. However, existing impact evaluations have been limited by a reliance on convenience samples, lack of random assignment, or both. This raises questions about self-selection and the precise mechanisms underlying how voters learn about politics. Here, we provide evidence from a field experiment with survey outcomes conducted with a sample of over 1,000 German citizens in the 2017 federal election campaign. Using linked panel survey and digital trace data combined with a randomized encouragement to complete a VAA, we are able to assess respondents' compliance as well as to observe how the use of this tool affects political behavior, attitudes, media consumption, political knowledge, and even social media activity. Our findings reveal that the overwhelming consensus in favor of positive effects on turnout and vote choice should be treated with caution, as we find no such effects. Rather, we show that the actual virtue of VAAs in a complex online information environment is in increasing knowledge about parties' positions on issues — exactly the kind of information these tools were designed to provide.

Introduction

Knowledge about politics is widely regarded as the “currency of citizenship” ([Delli Carpini and Keeter, 1996](#)). Aside from having informed and well-established preferences, a primary assumption of the “folk theory” of democracy ([Achen and Bartels, 2017](#)) is that people understand the positions of competing candidates for office. In two-party systems, such knowledge may not be hard to come by: the parties are consistently on opposite sides of the ideological center.¹ But in dynamic electoral systems with multiple parties and shifting coalitions, even attentive voters may have trouble keeping track of platforms and campaign promises.

¹Although even in such contexts, the share of the mass public possessing this knowledge may be limited ([Freeder, Lenz and Turney, 2019](#)).

As a result, acquiring policy-relevant knowledge is a costly activity, and for many people it is arguably “rational” not to expend this effort (Downs, 1972), which can create low levels and an uneven social distribution of political knowledge (Delli Carpini and Keeter, 1996). This inequality in political knowledge may give a relative advantage to those who are politically and socially privileged by allowing them to make more informed choices that represent their interests (Althaus, 1998).

Despite some people’s best efforts to avoid it, however, they may nevertheless end up acquiring knowledge about issues. In the broadcast era, “byproduct learning” was possible due to the limited availability of entertainment counter-programming during the nightly news (Prior, 2009). Research on “soft news” has suggested that viewers of daytime talk shows can be inadvertently exposed to information, especially in low-salience domains such as foreign affairs (Baum, 2002). More recently, research has found that incidental exposure to news is possible on social media, especially among younger people and those with low political interest (Fletcher and Nielsen, 2017). If people acquire this knowledge and are able to incorporate it, attitudes and vote choice may also change to better reflect their underlying predispositions (Althaus, 1998; Bartels, 1996; Lau and Redlawsk, 1997; Gilens, 2001).

But an individual’s knowledge about politics and policy is not static. As the number of media choices continues to proliferate, and at a time when selecting content according to one’s preferences can be outsourced to algorithms, the opportunities for incidental learning may be dwindling. Some scholars fear that this will exacerbate inequalities in citizens’ capacity to make informed choices and further polarize the electorate (Prior, 2009; Levensky, 2013). These concerns have led to civic interventions designed to boost knowledge

about the positions of political candidates and how they relate to citizens' own preferences. A prominent example is the introduction of online voter guides, or Voting Advice Applications (VAAs), that quiz users on their positions and provide information about the parties and candidates in various races that most closely match theirs. Often deployed in cooperation with major media organizations, public broadcasters, and online platforms, these voter guides are widely used — and shared via social media — in many countries.

Aside from their informational benefits, proponents argue that VAAs can boost turnout and even facilitate voting behavior that more closely matches users' preferred political positions. The challenge in evaluating these claims is that self-selection patterns observed in online media consumption may also be present in the use of voter guides. If people who have better access to political information in the first place are more likely to use these guides, then their effectiveness in reducing inequalities in knowledge and turnout may be limited. Such tendencies could also be reinforced on social media, where people can easily tailor the content of their information feeds. With a seemingly endless amount of content available to consume, and competing demands on people's attention, do voter guides effectively help the citizens who could benefit from them the most?

To answer this question, we study the real-world effects of an online tool designed to provide voters with useful information about their policy positions relative to those of competing candidates in a real election. We deployed a field experiment in a nationally representative online panel survey in Germany in which respondents were randomly assigned to receive incentives to use a VAA shortly before the 2017 federal elections. To avoid well-known problems with self-reported measures of participation, we were also able to track use of the application with digital trace data linked to individual-level survey outcomes.

Challenging the consensus in existing research, we find no evidence that VAAs are effective in motivating citizens to vote or to change their vote preferences. Furthermore, we shed light on possible mechanisms for how VAA use can activate citizens' political behavior: encouraging them to seek out more information or actively share political content in online social networks. Here again we do not find any evidence that supports these conjectures. Importantly, however, we do show that the virtue of VAAs in a complex online information environment is in significantly increasing knowledge about parties' positions on issues — exactly the kind of information these tools are designed to provide.

The use and popularity of voting advice applications

A Voting Advice Application (VAA) is an online tool, either a website or a mobile app, that guides voters' choices by showing them how their positions on issues correspond to those of each party competing in the election (see, e.g., [Garzia and Marschall, 2012](#)). When voters open this tool, they are first asked to complete a series of items to indicate their agreement with policy statements on salient political, social, and economic issues. VAAs compile party positions on this exact same set of issues by either asking them directly or inferring them from public statements such as manifestos, press releases, and speeches. This allows the VAA to compute the overlap between a voter's and each party's position and make a recommendation to the voter regarding which party best represents his or her opinion. This information is then displayed to the voter as a ranked list of parties or a graph that visualizes how their positions compare to those of the parties. The tool thus matches

voters with parties and also provides them with information about the issue positions of parties.²

Over the past decade, VAAs have become extremely popular, particularly in European countries with multi-party systems such as Netherlands, Belgium, Germany and Switzerland, and also during second-order elections, such as the elections to the European Parliament. Although VAAs tend to be developed by governmental agencies or private companies in partnership with academics, they are often advertised by the most prominent media outlets in each country, which contributes to their visibility. More recently, Facebook deployed its own variant in countries including Germany and the United States, where it offered a “Vote Planner” for the 2016 election with information about where candidates at all levels of government stood on relevant political issues.³

On the search for effects of voting advice applications

A large number of studies has examined the potential effects of VAAs on voters’ political behavior at the individual level, with at times contradictory findings. These studies can be grouped into three main categories, according to their outcome variable of interest: the decision to turn out to vote, whom to vote for in the election, and other behavioral and cognitive consequences, such as information seeking during the campaign or changes in political knowledge.

²See Section C in the Online Appendix for screenshots from the German VAA “Wahl-O-Mat” as implemented for the German Federal Election 2017, which is the tool under study here.

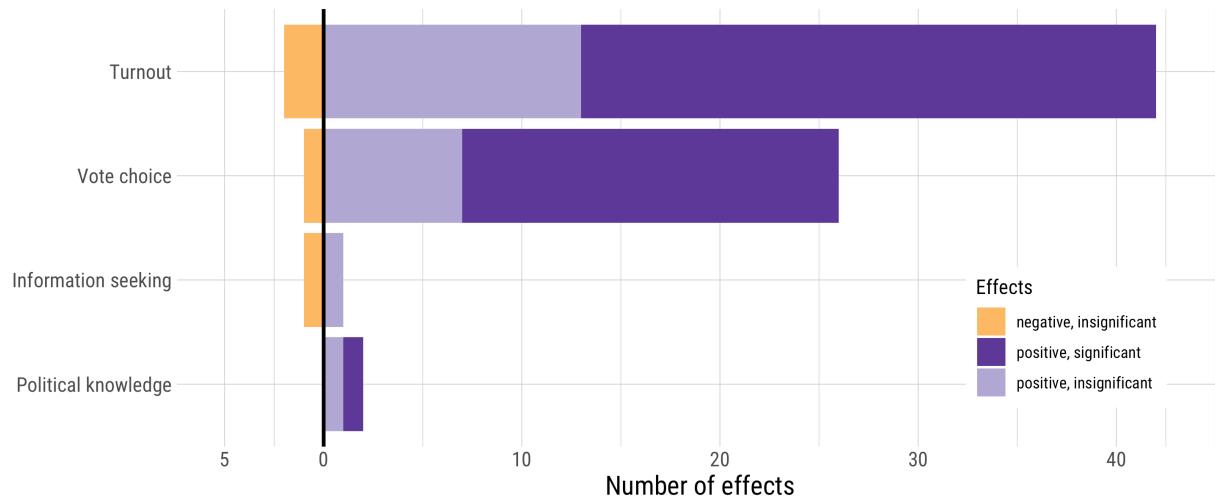
³See <https://newsroom.fb.com/news/2016/10/preparing-for-the-us-election-2016/>, last accessed: March 2, 2019.

Our study likewise adopts these outcomes of interest. To be able to contrast our results with those presented in previous research, we conducted a systematic review of VAA effects studies.⁴ The reported effects we identified in published and unpublished research are summarized in Figure 1. As can be seen, the question of whether VAAs help mobilize voters is at the core of the VAA effects research program and has received the widest attention. The vast majority of effects reported in the literature are positive, and most imply a significant boost in turnout among VAA users compared to VAA non-users. Substantively, the magnitude of the reported effects varies widely. [Gemenis \(2018\)](#) estimates an effect on the probability of voting in the May 2012 Greek parliamentary election of 9.5 percentage points. [Ruusuvirta and Rosema \(2009\)](#) report a difference associated with vote selector usage of 24 percentage points for those who were a priori uncertain about their intention to vote. On the other hand, [Mahéo \(2017\)](#), who studies the effect in the context of a small randomized field experiment, finds no significant effect on electoral participation. This is also the case for several observational studies.

The second major outcome that is studied in VAA effects research is vote choice (sometimes operationalized as vote switching). Again, the majority of studies identifies positive and significant effects of VAA usage on people's inclination to adapt their voting behavior. [Alvarez et al. \(2014\)](#) claim that the effect can be potentially quite large, since only 20% of users are matched with their preferred party before using the tool, and estimate that 8% of users switch to the party proposed by the tool. However, it is unclear how these reported effects translate into actual vote choices since, as [Walgrave, Van Aelst and Nuytemans](#)

⁴Section A in the Online Appendix reports our procedure to identify and classify the relevant literature as well as a list of all the studies used.

Figure 1: Summary of VAA effects studies. Reported effects by outcomes, direction, and significance (at $p < 0.05$)



(2008) show, a large proportion of people who report changing their mind are actually loyal to their initial party choice.

Finally, an obvious but understudied question is whether these tools, which first and foremost provide information about parties' policy positions, foster knowledge about these positions or even motivate them to look for further information on vote options. This mechanism is fundamental for downstream effects on actual changes in voting behavior. The research on such immediate cognitive and behavioral consequences, however, is limited. When measuring levels of political knowledge about party positions using a pre-election survey, Schultze (2014) finds moderate positive effects of VAA usage. Conversely, Westle, Begemann and Rütter (2015) do not find robust changes on a similar measure. Mahéo (2017) is the first to provide evidence on the impact on VAA usage on campaign-related information seeking, finding no substantive effects.

Methodological issues in research on VAA effects

Our discussion of the literature indicates that, while the reported effect sizes vary substantially and are at times difficult to compare, they are often large, positive, and significant. So why keep studying these questions? The seeming consensus in the literature is, in our view, largely due to key methodological decisions that limit our ability to make valid inferences about these important questions. These issues are related to two areas: sampling and measurement.

Most previous studies rely on observational data that suffers from self-selection into the treatment and into the sample, which leads to endogeneity issues that are likely to inflate the estimated effects of VAA usage (Pianzola, 2014). Despite their wide popularity across multiple countries, previous work has revealed important selection effects regarding who uses VAA tools, consistent with inequalities in other forms of online political engagement (Norris, 2001; Vaccari, 2013). Younger voters who are highly educated, politically interested, and politically knowledgeable are disproportionately more likely to use a VAA (Marschall and Schultze, 2014, 2015; Vassil, 2011). Other difficult-to-observe characteristics such as digital literacy might play a role as well.

Still, the modal study measures the effect of voters' decision to log on to these tools using a post-completion survey. Given the biases in usage as well as selection into taking the survey, studies using this design suffer from lack of internal (causal) and external validity (generalizability). To counter these biases, a set of pioneering recent studies has adopted an experimental approach to identify VAA effects by randomly assigning VAA use (e.g., Enyedi, 2016; Mahéo, 2016; Vassil, 2011). An additional concern is that these

well-designed studies tend to rely on small sample sizes and lack compliance indicators. The former is problematic when expected effect sizes are small, providing the designs with too little power. The latter is important for identifying the effect of VAA use among “compliers” — those who use it as a result of treatment assignment ([Gerber and Green, 2012](#)).

A second set of issues relates to measurement of treatment and outcome variables. Studies that use post-election surveys rely on self-reported measures of VAA usage, which could suffer from over-reporting due to social desirability bias or under-reporting if the survey is administered weeks after respondents use the tool. Surveys embedded within VAAs themselves do not suffer from this issue, but they do lack a control group of non-VAA users. Common to both designs is the lack of both pre- and post-treatment measures of the relevant outcome variables, such as levels of political knowledge or vote choice. In the absence of this longitudinal component, it is hard to overcome the selection issues discussed above.

As we discuss in the next section, the research design we adopt in this paper addresses all of these shortcomings and represents, to our knowledge, the largest and most exhaustive field experiment on the effects of VAA usage.

Experimental setup and identification

Our experimental setup is built on a randomized encouragement to use the German VAA (Wahl-O-Mat) during the field period between two survey waves. The Wahl-O-Mat is the most popular VAA in Germany. It was deployed for the first time in advance of the 2002 Federal Election and, with all its various editions (many of the state-level elections had

their own version of the Wahl-O-Mat, too), has been used over 70 million times since then ([Bundeszentrale für politische Bildung, 2018](#)). It was used more than 15 million times for the 2017 Federal Election alone, compared to an electorate of about 60 million.⁵ A significant share of the attention the tool has received is often attributed to the fact that it was promoted by over 60 media partners (mostly online news outlets), some of which embedded the tool on their webpages. Further, a smartphone and tablet app was available for Android and iOS.

A randomly chosen subset of the survey respondents (60%) received an encouragement in the form of a request to use the Wahl-O-Mat before the next survey wave. Figure 2 provides the encouragement shown to the randomly selected subset of survey respondents.⁶ Note that the respondents had three options: (1) agree to use the Wahl-O-Mat and at the same time disclose that they have not used it yet, (2) agree to use the Wahl-O-Mat and disclose that they have already used it, and (3) decline to use it. Given that we could neither prevent respondents from using the tool if they did not receive the encouragement (or had used it before the encouragement was delivered) nor force non-users to use it, our design produces two types of non-compliance:

- (a) Respondent is encouraged to use VAA but does not (“never-takers”);
- (b) Respondent is not encouraged to use VAA but nevertheless does (“always-takers”).

The challenge in addressing two-sided non-compliance in designs lacking a placebo group is that we cannot observe membership in the “always-taker” or “never-taker” groups ([Ger-](#)

⁵This figure represents uses, not unique users, so the actual fraction of Wahl-O-Mat users in the electorate is likely to be lower than 25%.

⁶See Section C in the Online Appendix for screenshots of the actual implementation.

Figure 2: Representation of the encouragement item in the survey (translated from German)

In the next survey, we would like to ask you some questions on positions of parties as well as your own attitudes towards certain political topics. For this purpose, we would like to ask you to use the voting advice application “Wahl-O-Mat”, offered by the Federal Agency for Civic Education [Bundeszentrale für Politische Bildung] at www.wahl-o-mat.de until the next wave. Would you be willing to use this tool until the next survey, which will take place in about two weeks?

Please note: If you agree, we would remind you of using the tool by e-mail before the next survey starts. In compensation of your consent, you would be reimbursed with 50 YouGov points.

- Yes, I am willing to use the Wahl-O-Mat until the next survey, and I have not used it so far.
- Yes, I am willing to use the Wahl-O-Mat until the next survey, and I have already used it.
- No, I am not willing to use the Wahl-O-Mat.

ber and Green, 2012). This is because subjects in the control group who do not use the VAA could either be “complying” with non-encouragement or they could be never-takers who would also not have used the VAA had they been assigned to the treatment group. Similarly, those in the treatment group who use the VAA could be compliers or always-takers.

The typical resolution to this issue is to compute the Complier Average Causal Effect (CACE), an estimand equivalent to the treatment effect among compliers (Angrist, Imbens and Rubin, 1996). The CACE (sometimes referred to as the LATE, or Local Average Treatment Effect) is estimated by using treatment assignment as an instrument for actual treatment, scaling the Intent to Treat (ITT) by the share of compliers in the treatment group. This is identified because, while we do not know the precise identity of the compliers in both treatment and control groups, randomization guarantees that in expectation the proportion of compliers in both is equal. In interpreting the CACE, it is important to

remember that estimates are local: specific to compliers, or subjects who use the VAA if and only if encouraged to do so.

In our presentation of results, in addition to the CACE estimates we will also offer ITT as an estimand gauging the impact of treatment assignment. ITT speaks to the causal effect of randomly encouraging people in the population to make use of the VAA, which is a relevant quantity of interest from a policy intervention perspective. Furthermore, we will report the effect solely based on observed VAA usage, irrespective of treatment. This is an estimand much more vulnerable to selection bias and therefore potentially closer to many of the effects reported in earlier literature. Instrumenting VAA usage with assignment, we estimate the CACE for all outcomes reported in the paper via Two Stage Least Squares regression with robust standard errors (HC2) and adjusting using the pre-treatment covariates gender, age, education, household income, political interest, and left-right ideology. For the ITT, treatment assignment is used along with the same set of covariates.

Data and measures

Survey design and sample characteristics

The experiment was embedded in a panel survey initially fielded to 1,500 respondents recruited for the German YouGov Pulse panel, which enables passive metering of individuals' web usage on desktop and mobile devices. This allows us to observe every URL that respondents visited and the apps they used during our period of study. The Pulse panel is a subset of YouGov's standard survey respondent pool.

Figure 3: Panel setup. The survey launched in July 2017; the encouragement to use the VAA was randomly assigned in Wave 3.

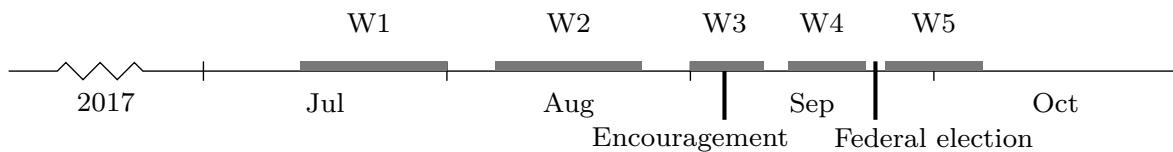


Figure 3 provides a conceptual overview of the panel's timeline. The survey launched on July 13, 2017, about ten weeks before election date and just before the more intensive campaign phase. The first four waves were fielded before the election, the last wave after the election. The encouragement was issued in Wave 3, which was fielded between September 4 and 13, or three weeks before election date. The Wahl-O-Mat launched on August 30, 2017, which gave respondents the opportunity to use it before receiving the encouragement treatment in the survey. For the analysis presented here, we subset our sample, only using respondents who took part in Waves 3, 4, and 5, which are the waves in which most of the outcomes of interest are measured. This reduces our sample size to 1,050 respondents.

Table 1 reports a comparison of respondent characteristics on core demographic variables in the full sample as well as by encouragement assignment and VAA use, together with distributional information from the Best for Planning study ([Best for Planning, 2017](#)), a high-quality face-to-face study that was used to identify target marginals of the German population that used the internet as a sampling frame, which were then employed by YouGov for quota-based recruitment. It is evident that the target distributions are mostly well matched by the full sample, with the only exception being that people in the upper

Table 1: Descriptive statistics of respondent characteristics, by subgroup. Percentages within characteristics reported.

Respondent characteristic	b4p '17 Index	Full sample	Wahl-O-Mat...			
			treatment		use	
			No	Yes	No	Yes
Gender						
—Male	53	52	57	52	52	53
—Female	47	48	43	48	48	47
Age						
—18-34	28	28	23	23	26	26
—35-44	17	18	19	20	19	18
—45-54	23	24	26	24	24	24
—55+	32	30	32	33	31	32
Education						
—No graduation	1	1	0	1	1	1
—Lower secondary school	27	15	18	15	18	15
—Middle school	35	39	40	41	47	35
—High school	37	44	42	43	34	49

two quartiles on the education variable are slightly overrepresented. While the treatment and control groups are balanced reasonably well, actual use (which was partly encouraged) is more prevalent among highly educated people (those with a high school degree) than people of lower formal education (degree from a lower secondary school or middle school).⁷

Compliance

A core advantage of our setup is that we can draw on two complementary indicators of VAA usage. First, we have a conventional survey-based measure that asks about VAA use in Wave 4 (post-treatment). While this item helps uncover treatment status for both groups, it should not be used naïvely, as it might suffer from social desirability bias: Respondents

⁷It is likely that these differences would have been even larger had we not randomly encouraged a subset of the sample to use the tool.

who originally agreed to using the tool—and were incentivized to do so regardless of actual usage—might feel obliged to report compliance. Furthermore, respondents from the control group might more generally feel that using this tool is socially desirable, especially in the context of a study that is clearly focused on political matters. Moreover, they might confuse their usage of the VAA for previous elections with the currently available tool, although we try to guard against such misunderstandings by asking for usage for this particular election.

Unlike previous field experiments of media effects, which have relied on self-reported measures of compliance collected via post-treatment surveys (e.g., [Albertson and Lawrence, 2009](#)), we are able to at least partly overcome this shortcoming by exploiting comprehensive individual-level data on web usage. This allows us to directly observe whether a respondent used (and, making some assumptions, did not use) the VAA. To that end, we compared subjects' complete available browsing histories with URLs that led to the Wahl-O-Mat.⁸ If any of these URLs was found in a person's browsing history, we coded this as a valid case of usage of the VAA. In addition, we tracked whether the person had installed the VAA app on her mobile device. If yes, we also coded this as VAA usage. Comparing both measures of compliance, we find that while they are fairly strongly correlated, there is disagreement for a substantive fraction of respondents. 47% of those for which we could not identify VAA usage in the tracking data they provided stated that they used the Wahl-O-Mat (see Table 2). Disaggregating this by encouragement assignment group

⁸In addition to the official landing page of the Federal Agency for Civic Education, <https://www.wahl-o-mat.de/bundestagswahl2017/>, we collected 30 more URLs from media partners who embedded the tool on their page. For instance, the popular mainstream news outlet SPIEGEL ONLINE hosted the Wahl-O-Mat at <http://wahlomat.spiegel.de/2017bundw/>, while the webpage of the flagship TV news program of the public service broadcaster ARD, the Tagesschau, featured it at <http://wahl-o-mat.tagesschau.de/>. For a complete list of the URLs used, see Table B9 in the Online Appendix.

Table 2: VAA use, survey-based vs. tracking-based measure

		VAA use, reported			
		No	Yes	Missing	Total
VAA use, tracked	No	233	203	0	436
	Yes	39	344	0	383
	Missing	84	147	0	231
Total		356	694	0	1050

shows that measurement error in the tracking software is probably not the main culprit for this mismatch: While 34% of those identified by tracking as non-users in the control group reported using the tool, 63% did so in the encouragement group. This is a strong indication of socially desirable answering behavior. At the same time, the share of respondents who were identified as having used the VAA but reported not doing so is substantially smaller (10%). We take this as evidence in favor of using the tracking data as a more robust compliance measure. While this tracking-based measure is certainly an improvement over previous accounts of compliance, it is not perfect. Respondents in the panel are not always online and using the passive metering software. In our case, web visit data was missing for 22% of our respondents in the period under study. For those, we imputed VAA use with the self-reported measure.

Outcome measures

In line with the vast majority of the VAA effects literature, we start by focusing on three core potential effects on citizen empowerment: increasing turnout, changing vote choice, and acquiring political knowledge. In addition, we make use of the unique behavioral data available for many of the respondents to shed light on the effect of VAA use on online news

consumption and social media interactions. Although these are arguably preconditions for downstream consequences on political behavior, these potential effects of VAA use have barely been studied. The measures are operationalized as follows:⁹

Turnout. Lacking validated information about voting behavior, we rest on the reported turnout variable, measured in wave 5, to assess whether a person voted or not.

Vote choice. Respondents were asked in all waves about their vote intention for the upcoming federal election. We identify changes in vote intention using the immediate pre-and post-treatment measures of waves 3 and 4.

Political knowledge. In order to measure respondents' knowledge about parties' positions on policy items that were the subject of the tool, we reproduced six of the original 38 Wahl-O-Mat items and asked respondents to select, for each item, the parties that agree with the corresponding statement.¹⁰ Comparing these judgments with the party positions as reported in the tool, we then computed the fraction of correctly perceived positions.

News consumption and political exchanges. We approximated respondents' exposure to political information by observing how many visits they made to the online portals of news outlets. To that end, we matched the web tracking data with a list of 309 major and regional media websites and then measured news consumption (in log counts) between wave 4 and Election Day.

⁹The exact question wordings used for these variables as well as those used for adjustment in the regression setup are documented in Section D in the Online Appendix. Descriptive statistics of the outcome measures by encouragement group and compliance are reported in Table B2 in the Online Appendix.

¹⁰Due to time and budget constraints, we could not replicate the entire set of items in the survey.

Another possible behavioral manifestation of increased interest in politics resulting from VAA completion is a greater number of political posts on social media. As part of our study, we also asked our respondents to provide voluntary access to their Twitter and Facebook feeds.¹¹ Of the 74% of respondents with a Facebook account, 79% agreed to share their posts; of the 26% with a Twitter account, 49% gave their permission. We then used a dictionary of keywords and hashtags related to politics and the election as a simple classification method to detect how frequently our respondents post political messages on their profiles. Given the sparsity of the data (only 10% of Facebook users and 28% of Twitter users ever posted about politics), our outcome variable is simply whether they posted at least one tweet or profile update mentioning one of these keywords during the period after the initial VAA intervention and before the election.

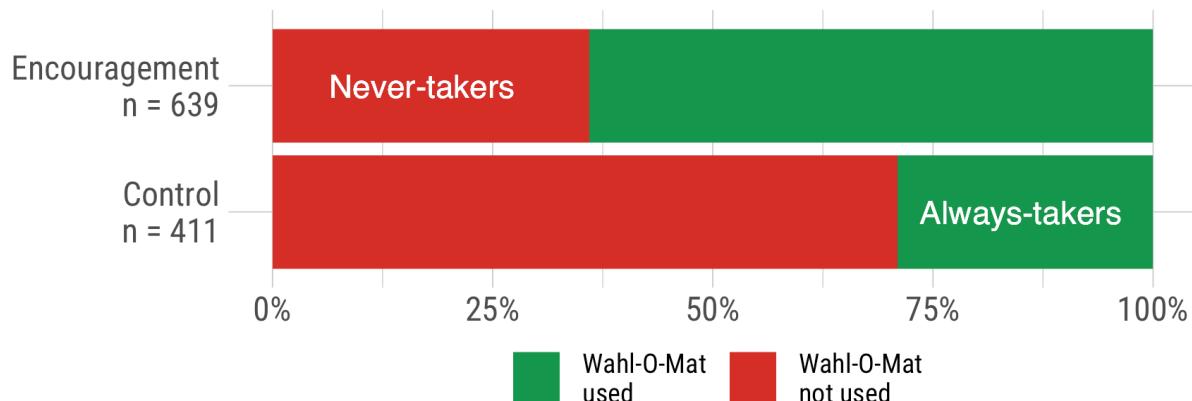
Results

First-stage results

Before we turn to the main results, we explore the effectiveness of the encouragement. Overall, the encouragement worked very well. Figure 4 provides compliance statistics for both the encouragement and the control group. Using the combined measure (i.e. tracking-based indicator with imputed survey reports), we find that 65% of those who re-

¹¹Using an approved Facebook web application, we asked respondents if they would be willing to share information about their Facebook activity. We requested several data fields available to app developers, including public profile information, Timeline posts, and page likes. Respondents were given the opportunity to log into their Facebook account after a survey prompt, and if they did so they were asked what specific pieces of information they were willing to share. They could choose to share all of the information, selectively approve only some information, or share nothing. No data on News Feed content or subjects' friends was shared with researchers. We additionally used an approved Twitter app that, again with subjects' permission, collected publicly available information from their Twitter profiles.

Figure 4: Experiment compliance: VAA use by encouragement group



ceived the encouragement actually used the VAA, whereas 71% of those who did not receive the encouragement also did not use it. These figures imply substantive two-sided non-compliance, with 35% never-takers in the encouragement group and 29% always-takers in the control group.

To identify the causal effect among compliers, we instrument VAA use with treatment assignment. The first-stage results indicate the strength of the instrument (F -test for weak instrument in first stage = 131.53).¹² Once the encouragement treatment is taken into account, none of the pre-treatment covariates, with the exception of education, seems to have had an impact on VAA use.

Effects on turnout, vote change, and issue knowledge

The first panel on Figure 5 summarizes our results on the impact of the Wahl-O-Mat on turnout, along with 83% and 95% confidence intervals.¹³ When we simply compare respondents who completed the VAA with those who did not in an observational analysis

¹²Table B1 in the Online Appendix reports the complete first-stage results.

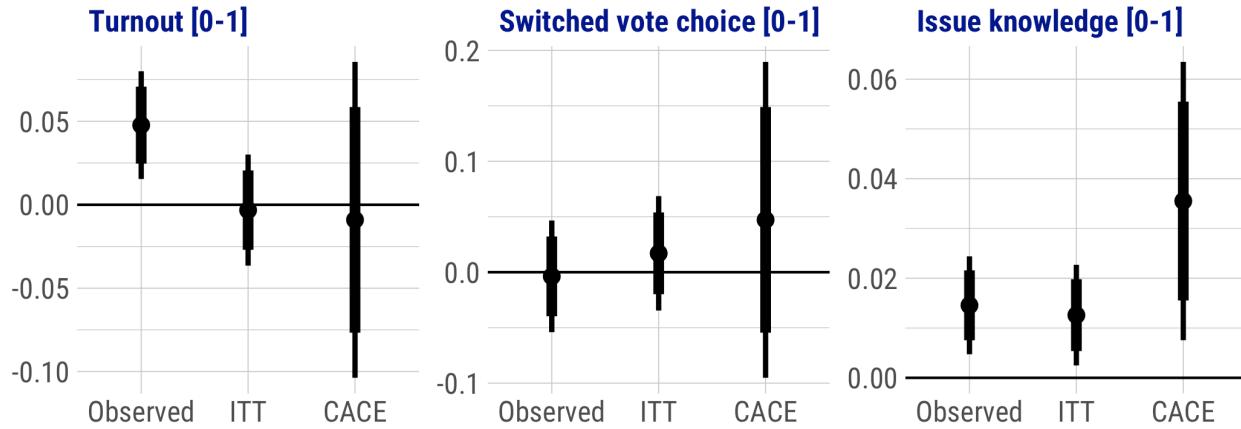
¹³In Tables B3 to B8 in the Online Appendix we provide the full regression results of the models summarized here.

— ignoring the randomized component of our design and mirroring standard practice in prior work — we do find that VAA use is associated with a 5-percentage-point increase in turnout. However, this difference, which is consistent with the average result in past studies, appears to be due almost entirely to selection bias. The causally identified estimate in our randomized experiment shows that the effect on turnout is not statistically different from zero.

The second panel in this figure displays results on whether respondents switched vote choice between waves. To provide some context for this finding, we compared each respondent's reported VAA recommendation (the party for which the tool reported the highest overlap with the respondent's issue positions) with her pre-treatment vote intention and found that the preferred party was recommended by the app in less than a third of the cases (see Figure B1 in the Online Appendix for the distributions of recommendations and anti-recommendations by party preferences). While these mismatches between preferences and recommendations could conceivably induce users to adapt their vote choices, we find no such evidence in the data using either of the causal estimands.

But did the additional information that respondents obtained by completing the Wahl-O-Mat actually translate into better knowledge of where parties stand? The last panel on Figure 5 displays the change in knowledge about parties' issue positions from before to after the completion of the VAA tool. Here, we do find a significant and positive causal effect: among compliers, the increase in the percentage of issue positions respondents are able to recognize is around 3 percentage points, from roughly 63% to 66%. The substantive magnitude of this effect is fairly large: It is similar to the gap in political knowledge between respondents who report moderate political interest and high political interest, and 50%

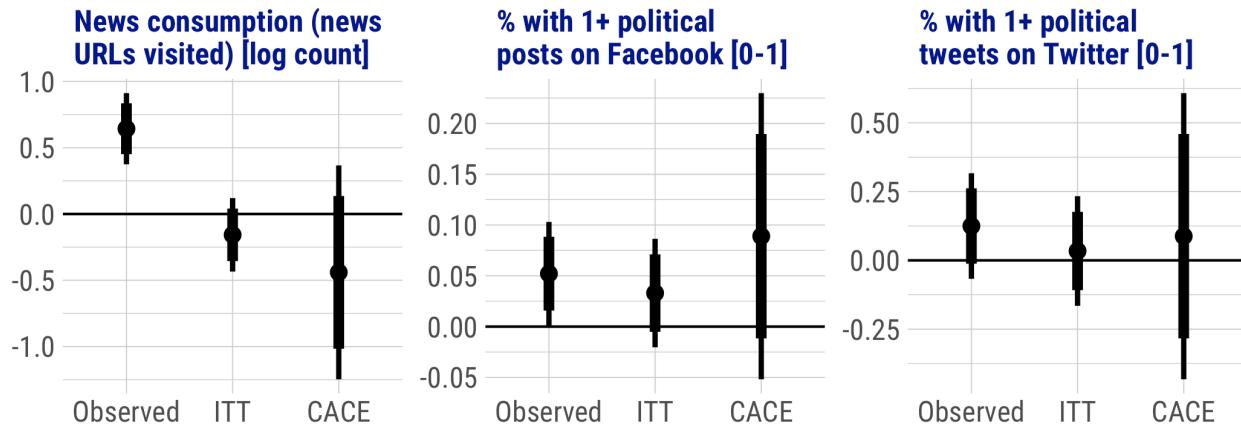
Figure 5: Effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions. Observed = VAA users vs. VAA non-users, ITT = Intent-to-Treat, CACE = Complier Average Causal Effect. Bars represent 83% and 95% confidence intervals using HC2 standard errors.



of the gap in political knowledge between low and high political interest. In other words, completing the Wahl-O-Mat can increase respondents' knowledge from the level of a person who is only somewhat interested in the campaign to someone who is very interested.

In addition to this core set of measures, we employ numerous alternative measures and outcomes, including change in reported likelihood of voting, change in vote certainty, mobilization to vote between elections, sympathy towards the Christian Democrats (the modal recommendation of the Wahl-O-Mat), change in political interest, and change in political efficacy. We also explore effects on other forms of political knowledge (knowledge about recent news events, candidate recognition using pictures, and civic knowledge). The corresponding results are presented in Figures B2 and B3 in the Online Appendix. In sum, the results match the main findings above: We do not find evidence for substantive CACE effects on any of those outcomes. For knowledge outcomes other than those about parties' issue positions, we also do not find any effects, which seems plausible given the specific, issue-based knowledge that is communicated by the VAA.

Figure 6: Effects of VAA use on news consumption and political posts on Facebook and Twitter. Observed = VAA users vs. VAA non-users, ITT = Intent-to-Treat, CACE = Complier Average Causal Effect. Bars represent 83% and 95% confidence intervals using HC2 standard errors.



Effects on information search and social media activity

Completing a VAA could potentially have effects beyond an increase in citizens' level of political knowledge or their likelihood to turn out to vote; it may also affect their propensity to consume or produce political information. Being more familiar with the structure of political competition could boost interest in the election, leading to an increase in visits to news websites; or it may even encourage the sharing of political positions on social media (Fischer et al., 2017). We test this set of hypotheses in Figure 6. Contrary to our expectations, however, here we also find null effects. Even though individuals who complete the VAA visit news websites more than 50% more often than those who do not, once we account for self-selection, we do not find any significant effects. The pattern for posting about politics on Facebook and Twitter is similar: The naïve estimates are in the expected direction (although not statistically significant at conventional levels), but the effects are indistinguishable from zero among compliers.

Heterogeneity

Even among those who visit VAA websites, there may be considerable effect heterogeneity. If VAAs only reach voters with high levels of knowledge, as [Mummolo and Peterson \(2017\)](#) show in the U.S. context, they may exacerbate participation differences if they impede alternative outreach efforts by media organizations and civic groups, with similar effects as get-out-the-vote campaigns that only mobilize individuals with a high pre-existing propensity to vote ([Enos, Fowler and Vavreck, 2013](#)).

Past work has identified heterogeneity of effects along characteristics such as education ([Mahéo, 2017](#)), political interest ([Alvarez et al., 2014](#)), socio-economic status, and gender ([Mykkänen and Moring, 2006](#)). The sample size and compliance rates of our experiments limits our ability to explore subgroup differences in effects. Nevertheless, Figures [B4](#) to [B8](#) in the Online Appendix provide CACE estimates on the core set of outcomes by age, education, gender, political ideology, and political interest. Even setting aside the enlarged standard errors due to subgroup analysis, we find little evidence of trends in heterogeneity, with one exception: The effect on knowledge of parties' issue positions seems to be concentrated among the 46-60-year-old respondents as well as those with lower levels of formal education. In line with previous findings by [Mahéo \(2017\)](#), this shows that the VAA can offer important benefits to educationally disadvantaged citizens.

Discussion and Conclusion

Do voter guides empower citizens? Focusing on whether they provide the resources voters need to make informed decisions, the answer is yes: encouraging citizens to use VAAs

causes a measurable and nontrivial increase in political knowledge. More specifically, this result is driven by an increase in exactly the kind of information these tools are designed to provide—knowledge about parties’ positions on issues. Judged according to its stated goals, then, the Wahl-O-Mat is arguably a success.

When we define empowerment more broadly, however, the limitations of voter guides become apparent. Taking an online quiz and receiving informative feedback may help those with less engagement in politics to quickly bring themselves up to speed with details of policy debates and partisan competition. This can be especially useful for the citizens of multi-party-system countries like Germany, where policy debates can be more complex. But we find little evidence of downstream effects on political behaviors such as turning out to vote, seeking out new information, or changing self-reported vote choice. Voter guides can help to reduce inequalities in political knowledge—to expand the currency of citizenship—but that may not be sufficient to carry over into more concrete civic obligations such as voting. At the same time, we can rule out potentially negative consequences of widespread VAA dissemination such as confusion or demobilization.

These mixed findings suggest that designers of VAAs should focus on the core problem the tools were designed to solve: insufficient levels of basic political knowledge in the mass public. This is an important normative goal in itself, core to theories of democratic competence and representation. Given that the currency of citizenship is not evenly distributed, voter guides can also play an important equalizing role in the provision of policy-relevant information. Our encouragement partially closed the educational gap in voter guide use, suggesting that intensive targeting efforts aimed at specific subgroups

could similarly boost usage among people with lower levels of interest in politics, further reducing inequalities in knowledge.

Our study’s design provides a template for rigorously quantifying the effects of online media use on both behavioral and survey-based outcomes. We deploy a randomized encouragement within an online survey panel and embed our post-treatment measures within an ostensibly unrelated survey ([Broockman, Kalla and Sekhon, 2017](#)). Recruiting subjects who simultaneously share web consumption data enables two further advantages. First, we unobtrusively measure whether or not a subject takes up the treatment, allowing us to estimate the effect on compliers — those who use the VAA if and only if encouraged to do so. This limits the need to rely on self-reported measures of online behavior, which are subject to well-known distortions and biases ([Guess, 2015](#); [Guess et al., 2018](#)). Second, we can observe downstream web consumption behavior to test hypotheses about habit formation and information seeking.

We emphasize that the divergence between our findings and those in much of the literature on VAA use illustrates the challenges of estimating causal effects in the presence of self-selection. This difficulty directly parallels debates in the media effects literature over whether, for instance, media choice exacerbates or attenuates polarization ([Levendusky, 2013](#); [Arceneaux, 2008](#)). We present evidence that political interest and educational attainment are correlated with Wahl-O-Mat use, but controlling for these factors is not sufficient to correct for the bias in our naive estimates of the effects on turnout and vote choice as compared to our experimental benchmark. Even if existing theory and evidence are clear about these known predictors of VAA use, any additional unobserved confounders correlated with both treatment and the outcome will continue to bias estimates.

Of course, our study has limitations of its own. Though we recruited our subjects from a high-quality online panel balanced on key demographic and political variables, such samples have been shown to be somewhat *more* knowledgeable than the population ([Ansolabehere and Schaffner, 2014](#)). It is also possible that the additional step of selecting into the Pulse panel may have resulted in the under- or over-representation of participants with particular characteristics. We still recover unbiased sample average treatment effects, but in making inferences to the population we implicitly assume that selection into our sample is unrelated to potential outcomes.

We hope future research will incorporate similar design innovations to evaluate the effectiveness of other VAA tools, both within and beyond Germany. Are some types of VAAs more effective than others? How do effects vary across different national and political contexts? Additional research can also explore how best to encourage the use of voter guides among those least likely to do so. This could build on the real-world strategies attempted by VAA sponsors as well as insights from the literature on voter turnout and social pressure. Finally, given the increasing importance of social media as an information source, maximizing the likelihood of encountering voter information online will be a crucial task for platforms and civil society alike.

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Do Online Voter Guides Empower Citizens? Evidence from a Field Experiment with Digital Trace Data

Online Appendix

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Appendix A Literature used for VAA effect studies review

In order to identify research on attitudinal and behavioral effects of VAAs, we proceeded as follows: First, we looked through the work listed on the pages of the ECPR Research Network on Voting Advice Applications, which provides a curated bibliography on research related to VAAs in general (see http://vaa-research.net/?page_id=18). Second, we did a research on Google Scholar using the keywords “voting advice application” and “effect”. Next, using all studies we had identified until then, we screened their bibliographies for further relevant studies.

In the next step, we selected those studies that were designed to identify attitudinal and behavioral effects of VAA usage. We excluded studies that did not examine an outcome that roughly fell into one of the categories of turnout behavior, voting behavior, political knowledge, and information seeking. Furthermore, we excluded studies that implemented a design which did not offer a plausible control group of VAA usage by design, in particular studies exclusively looking at VAA user samples without a before-after measure.

The remaining studies were then classified according to sample type, the existence of a before-after measure, the general design setup (observational vs. experimental), the outcome under study, and the effect direction and significance. The studies identified and used in this exercise are listed in Table A1. A descriptive summary of study characteristics is provided in Table A2.

Table A1: Overview of VAA effects studies used.

Article	Country	Sample type	Before-after	Experiment
Alvarez et al. (2014)	EU	VAA users	yes	no
Enyedi (2016)	Hungary	Election survey	yes	yes
Garry et al. (2018)	N. Ireland	VAA users	yes	yes
Garzia and Angelis (2014)	Finland	Election survey	no	no
Garzia, Trechsel and De Angelis (2017)	Finland	Election survey	no	no
Gemenis and Rosema (2014)	Netherlands	Election survey	yes	no
Gemenis (2018)	Greece	Election survey	no	no
Germann and Gemenis (2019)	Switzerland	Election survey	no	no
Israel, Marschall and Schultze (2017)	Germany (EU)	Student lab	yes	no
Klein Kranenburg (2015)	Netherlands	Election survey	yes	no
Kleinnijenhuis et al. (2017)	Netherlands	Election survey	yes	no
Ladner, Fivaz and Pianzola (2012)	Switzerland	Election survey	yes	no
Mahéo (2016)	Canada	Election survey	yes	yes
Mahéo (2017)	Canada	Election survey	yes	yes
Marschall and Schultze (2012)	Germany	Election survey	no	no
Pianzola (2014a)	Switzerland	Election survey	no	no
Pianzola (2014b)	Switzerland	Survey + VAA	no	no
Ruusuvirta and Rosema (2009)	Netherlands	Election survey	yes	no
Schultze (2014)	Germany	Election survey	no	no
Vassil (2011)	Estonia (EU)	Election survey	yes	yes
Walgrave, Van Aelst and Nuytemans (2008)	Belgium	Election survey	yes	no
Wang (2016)	Taiwan	VAA users	yes	no
Westle, Begemann and Rütter (2015)	Germany	Election survey	yes	no

Table A2: Study characteristics of VAA effects studies

	# studies
<i>Outcome</i>	
Vote choice	12
Turnout	8
Political knowledge	2
Information seeking	1
<i>Sample type</i>	
Election survey	18
VAA users	3
Student lab	1
Survey + VAA	1
<i>Setting</i>	
Germany	4
Netherlands	4
Switzerland	4
Other	11
<i>Experimental</i>	
No	18
Yes	5
Total	23

Appendix B Supporting Tables and Figures

Figure B1: Summary of Wahl-O-Mat matches of parties with voters. The top panel shows the distribution of recommended parties (indicated using different colors) for each respondent according to the party preferences they reported in the initial wave of our study, before our treatment was administrated (each of the facets of the plot, as shown on the horizontal axis). The bottom panel shows the anti-recommendations, that is the parties with which respondents from each subgroup reported the lowest overlap.

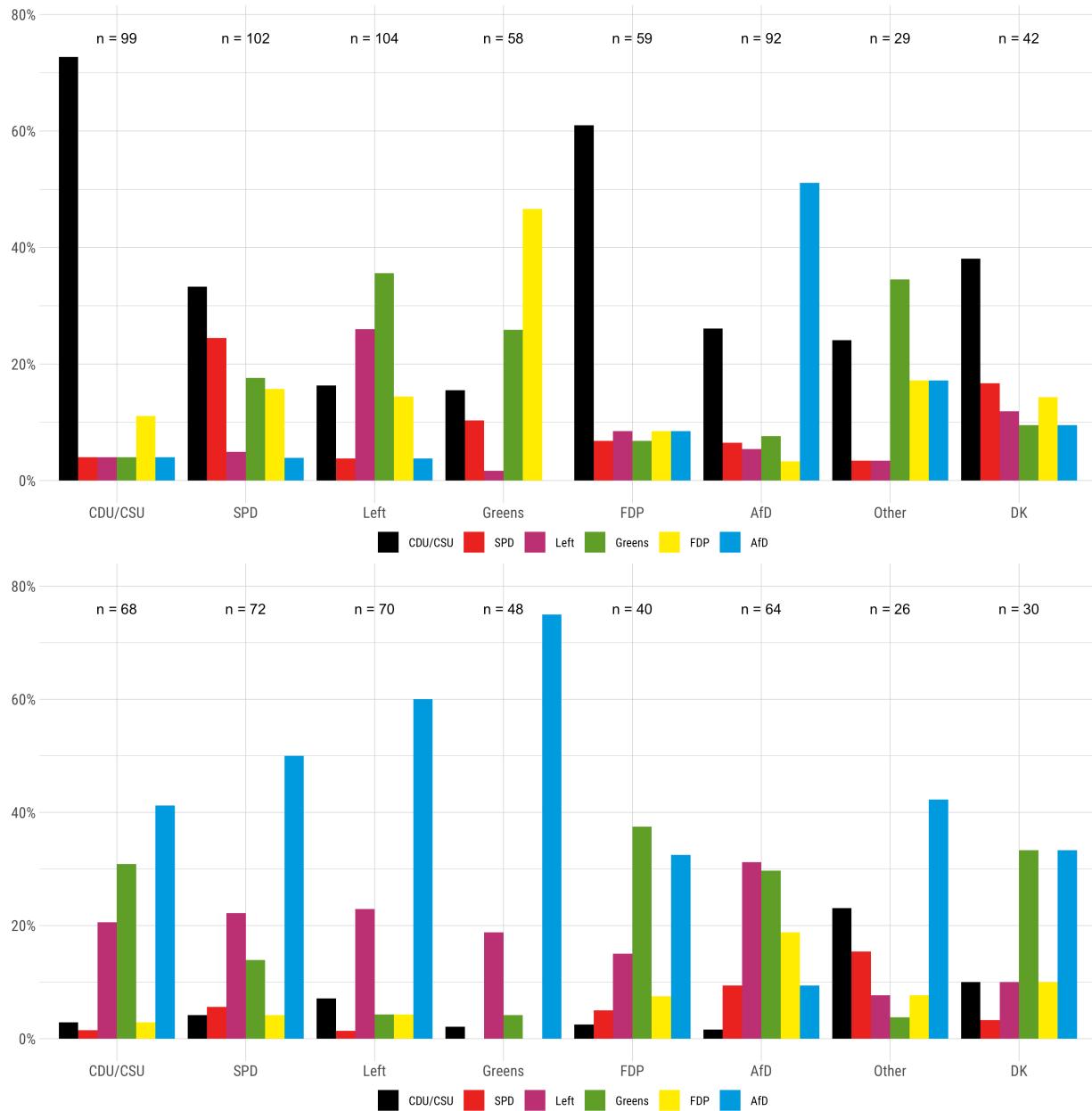


Table B1: First-stage effects of VAA encouragement and covariates on VAA usage

	Wahlomat Use
(Intercept)	-0.03 (0.13)
Gender	-0.00 (0.03)
Age	0.00 (0.00)
Education	0.05 (0.02)*
Household Income	-0.00 (0.00)
Political Interest	0.02 (0.02)
Left-Right Ideology	0.00 (0.01)
Wahlomat Encouragement	0.35 (0.03)***
R²	0.13
Num. obs.	979
RMSE	0.47

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Figure B2: Effects of VAA use on alternative outcomes. Observed = VAA users vs. VAA non-users, ITT = Intent-to-Treat, CACE = Complier Average Causal Effect.

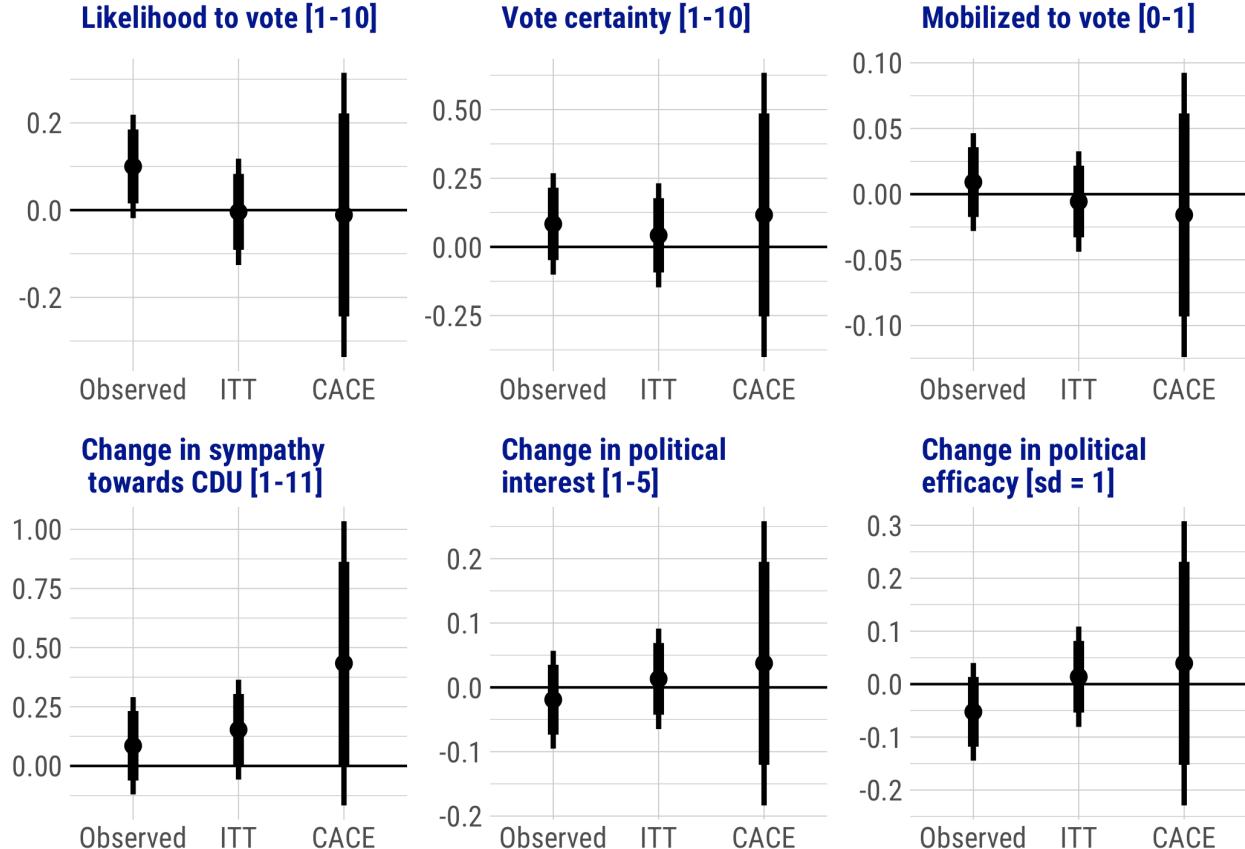


Table B2: Descriptive statistics of outcome variables, by subgroup. Mean and standard deviation within groups reported.

Outcome variable	Full Sample	Encouragement		Control	
		VAA used	VAA not used	VAA used	VAA not used
Turnout	0.91 (0.29)	0.93 (0.26)	0.84 (0.37)	0.91 (0.28)	0.95 (0.22)
Switched vote choice	0.20 (0.40)	0.21 (0.41)	0.21 (0.41)	0.20 (0.40)	0.16 (0.37)
Issue knowledge	0.65 (0.08)	0.66 (0.08)	0.64 (0.09)	0.64 (0.07)	0.66 (0.08)
News consumption	38.13 (176.72)	34.90 (80.20)	17.7 (66.60)	47.90 (268.00)	55.30 (137.00)
Facebook political use	0.92 (9.02)	0.65 (4.20)	0.87 (8.60)	1.38 (13.20)	0.46 (1.33)
Twitter political use	5.95 (28.38)	11.20 (42.70)	0.30 (0.92)	4.05 (20.00)	5.08 (15.50)
Likelihood to vote	0.16 (0.98)	0.22 (1.00)	0.10 (1.12)	0.11 (0.90)	0.20 (0.80)
Vote certainty	0.34 (1.43)	0.40 (1.46)	0.38 (1.48)	0.24 (1.33)	0.30 (1.46)
Mobilized to vote	0.11 (0.32)	0.11 (0.31)	0.12 (0.32)	0.12 (0.32)	0.11 (0.32)
Change in sympathy towards CDU	0.07 (1.66)	0.18 (1.71)	0.09 (1.79)	-0.06 (1.47)	-0.06 (1.66)
Political interest	-0.03 (0.66)	-0.02 (0.67)	-0.01 (0.68)	-0.01 (0.66)	-0.13 (0.55)
Political efficacy	0.00 (1.00)	0.00 (0.98)	-0.11 (1.04)	0.06 (0.95)	0.10 (1.09)
Candidate recognition	5.10 (2.59)	5.39 (2.50)	4.84 (2.54)	4.86 (2.64)	5.47 (2.64)
Event knowledge	6.89 (1.42)	6.95 (1.40)	6.71 (1.39)	6.86 (1.45)	7.14 (1.38)
Civic knowledge	1.14 (0.80)	1.24 (0.78)	1.00 (0.81)	1.09 (0.80)	1.24 (0.81)

Table B3: Effect of VAA usage/encouragement on turnout.

	Observed	ITT	CACE
Intercept	0.54 (0.07)***	0.56 (0.07)***	0.55 (0.09)***
Gender	0.00 (0.02)	0.01 (0.02)	0.01 (0.02)
Age	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**
Education	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)
Household Income	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Political Interest	0.06 (0.01)***	0.06 (0.01)***	0.06 (0.01)***
Left-Right Ideology	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)
Wahlomat Use	0.05 (0.02)**		-0.01 (0.05)
Wahlomat Encouragement		-0.00 (0.02)	
R ²	0.09	0.08	0.08
Num. obs.	979	979	979
RMSE	0.26	0.26	0.26

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table B4: Effect of VAA usage/encouragement on switched vote choice.

	Observed	ITT	CACE
Intercept	0.32 (0.11)**	0.31 (0.11)**	0.30 (0.11)**
Gender	0.09 (0.03)***	0.09 (0.03)***	0.09 (0.03)**
Age	-0.00 (0.00)***	-0.00 (0.00)***	-0.00 (0.00)***
Education	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Household Income	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Political Interest	-0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)
Left-Right Ideology	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Wahlomat Use	-0.00 (0.03)		0.05 (0.07)
Wahlomat Encouragement		0.02 (0.03)	
R ²	0.04	0.04	0.03
Num. obs.	923	923	923
RMSE	0.39	0.39	0.39

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table B5: Effect of VAA usage/encouragement on issue knowledge.

	Observed	ITT	CACE
Intercept	0.59 (0.02)***	0.58 (0.02)***	0.58 (0.02)***
Gender	-0.02 (0.01)***	-0.02 (0.01)***	-0.02 (0.01)***
Age	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Education	0.02 (0.00)***	0.02 (0.00)***	0.02 (0.00)***
Household Income	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Political Interest	0.02 (0.00)***	0.02 (0.00)***	0.02 (0.00)***
Left-Right Ideology	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***
Wahlomat Use	0.01 (0.01)**		0.04 (0.01)*
Wahlomat Encouragement		0.01 (0.01)*	
R ²	0.13	0.13	0.11
Num. obs.	979	979	979
RMSE	0.08	0.08	0.08

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table B6: Effect of VAA usage/encouragement on news consumption (news urls visited).

	Observed	ITT	CACE
Intercept	0.29 (0.60)	0.50 (0.61)	0.51 (0.63)
Gender	-0.42 (0.14)**	-0.43 (0.14)**	-0.43 (0.15)**
Age	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)
Education	0.07 (0.10)	0.10 (0.10)	0.11 (0.10)
Household Income	0.03 (0.02)	0.02 (0.02)	0.01 (0.02)
Political Interest	0.27 (0.07)***	0.27 (0.07)***	0.28 (0.07)***
Left-Right Ideology	0.03 (0.03)	0.04 (0.03)	0.04 (0.03)
Wahlomat Use	0.64 (0.14)***		-0.44 (0.41)
Wahlomat Encouragement		-0.16 (0.14)	
R ²	0.08	0.05	0.00
Num. obs.	712	712	712
RMSE	1.81	1.84	1.89

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table B7: Effect of VAA usage/encouragement on posts on facebook.

	Observed	ITT	CACE
Intercept	0.03 (0.11)	0.02 (0.12)	0.02 (0.12)
Gender	-0.03 (0.03)	-0.03 (0.03)	-0.03 (0.03)
Age	0.00 (0.00)*	0.00 (0.00)*	0.00 (0.00)*
Education	-0.03 (0.02)	-0.03 (0.02)	-0.04 (0.02)
Household Income	0.01 (0.00)	0.01 (0.00)	0.01 (0.00)
Political Interest	0.04 (0.01)**	0.04 (0.01)**	0.04 (0.01)**
Left-Right Ideology	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Wahlomat Use	0.05 (0.03)*		0.09 (0.07)
Wahlomat Encouragement		0.03 (0.03)	
R ²	0.06	0.05	0.05
Num. obs.	549	549	549
RMSE	0.30	0.30	0.30

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table B8: Effect of VAA usage/encouragement on % with 1+ political tweets on twitter.

	Observed	ITT	CACE
Intercept	-0.20 (0.37)	-0.15 (0.39)	-0.17 (0.36)
Gender	0.10 (0.11)	0.08 (0.11)	0.10 (0.10)
Age	0.01 (0.00)	0.01 (0.00)	0.01 (0.00)
Education	-0.06 (0.06)	-0.05 (0.06)	-0.06 (0.06)
Household Income	0.01 (0.01)	0.01 (0.02)	0.01 (0.02)
Political Interest	0.04 (0.05)	0.04 (0.05)	0.04 (0.04)
Left-Right Ideology	-0.00 (0.02)	-0.00 (0.02)	-0.00 (0.02)
Wahlomat Use	0.12 (0.10)		0.09 (0.27)
Wahlomat Encouragement		0.03 (0.10)	
R ²	0.08	0.07	0.08
Num. obs.	92	92	92
RMSE	0.45	0.46	0.45

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Figure B3: Effects of VAA use on alternative knowledge outcomes. Observed = VAA users vs. VAA non-users, ITT = Intent-to-Treat, CACE = Complier Average Causal Effect.

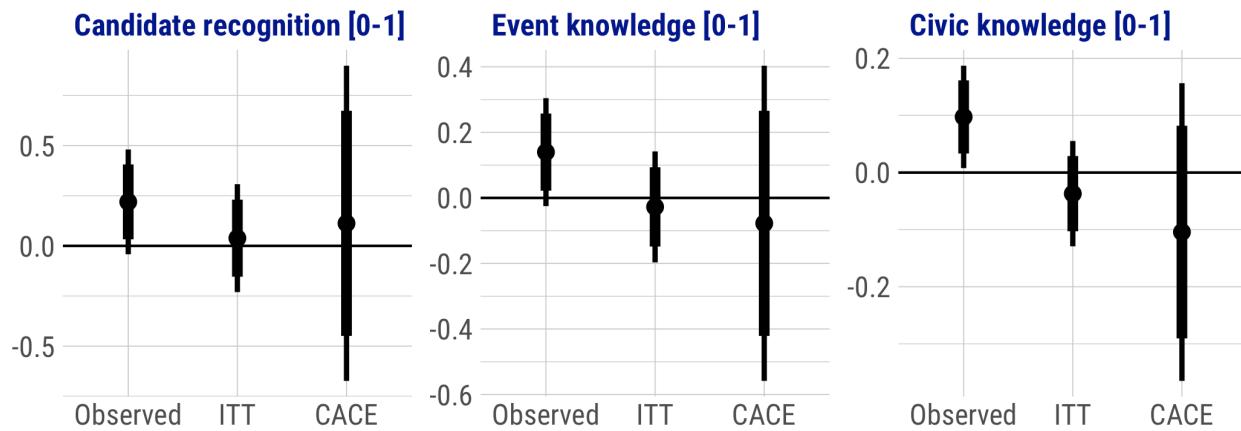


Figure B4: CACE effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions, by age groups.

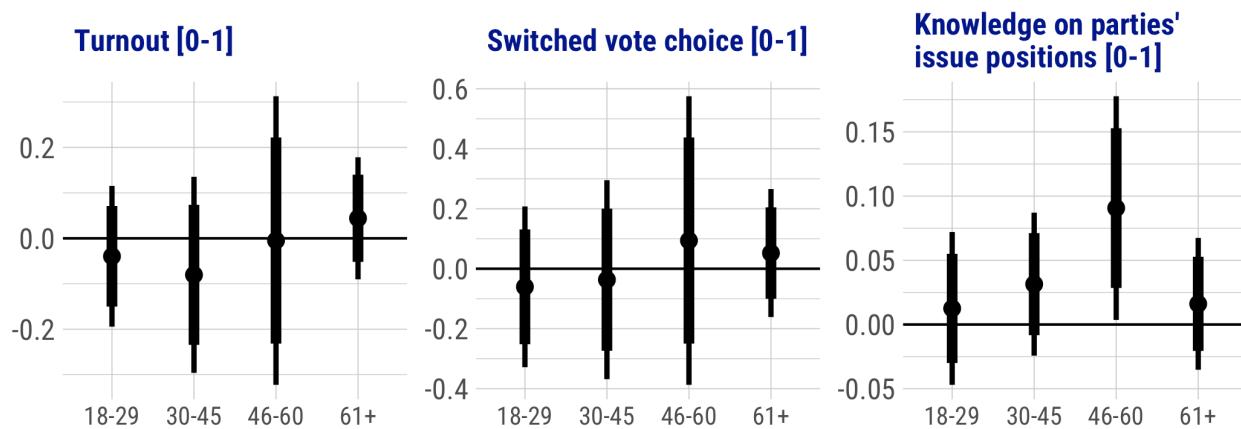


Figure B5: CACE effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions, by education.

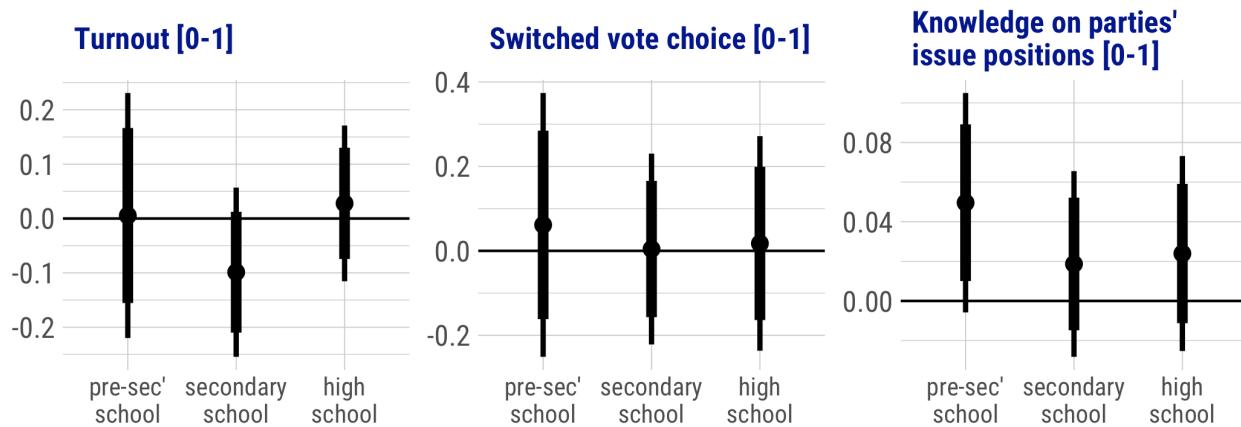


Figure B6: CACE effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions, by gender.

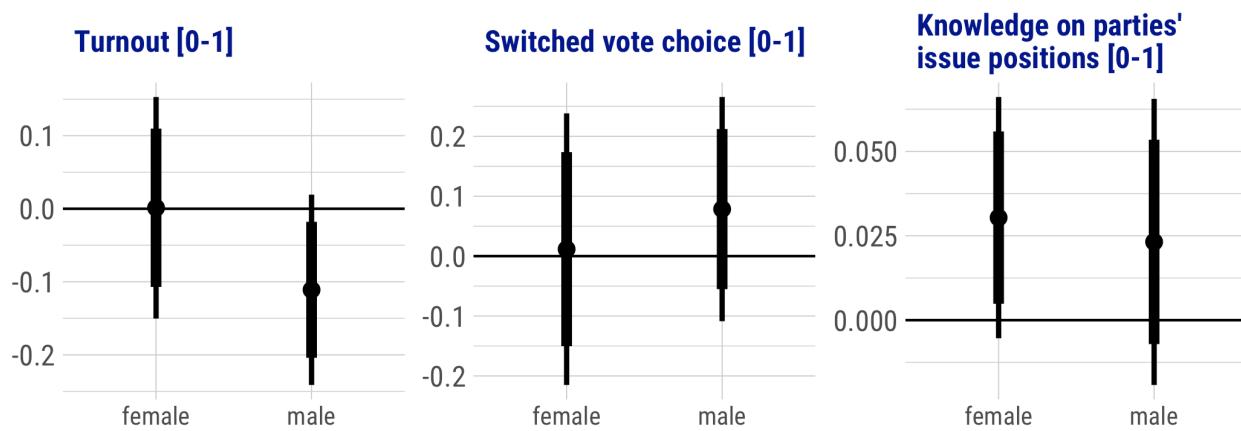


Figure B7: CACE effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions, by political ideology.

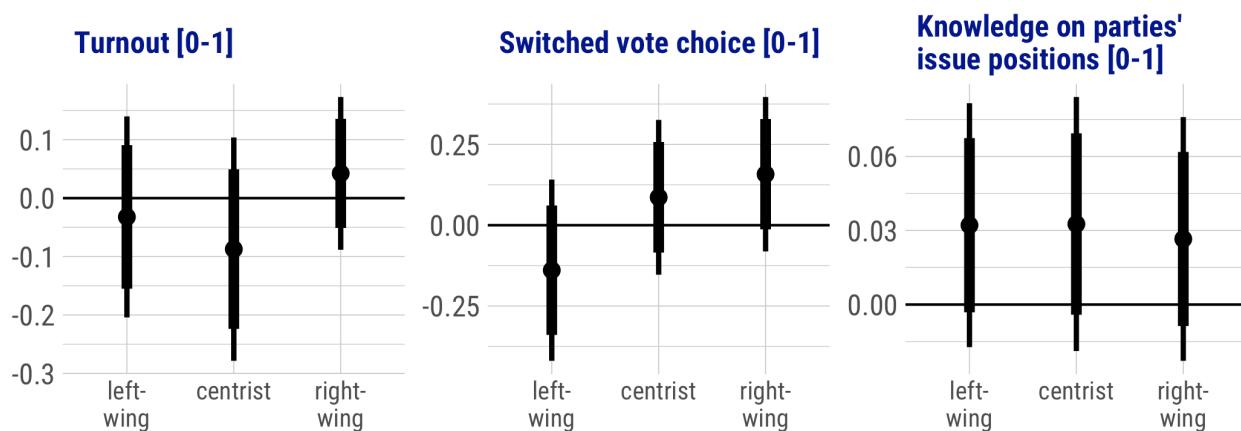


Figure B8: CACE effects of VAA use on self-reported turnout, change in vote choice, and knowledge on parties' issue positions, by political interest.

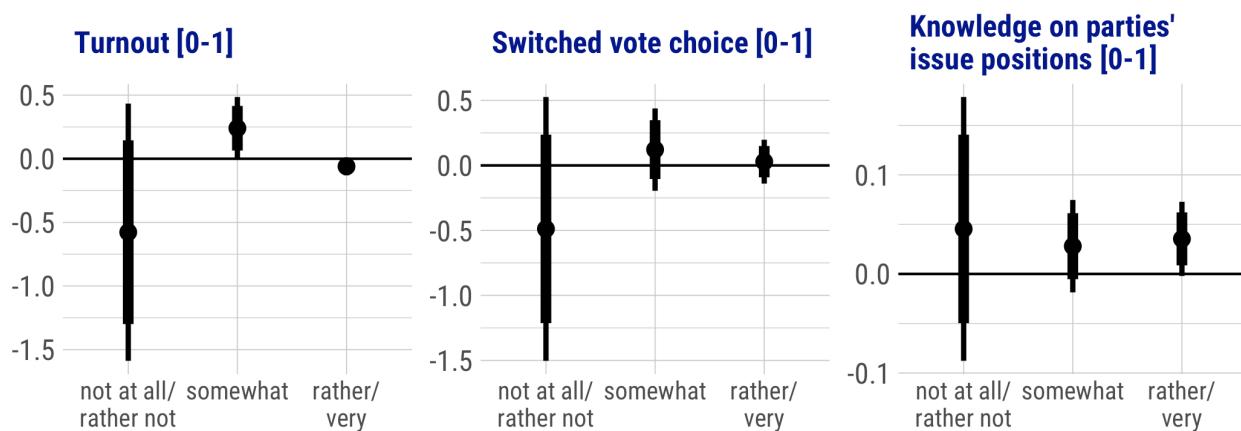


Table B9: List of URLs hosting the Wahl-O-Mat

Outlet	URL
BpB	https://www.wahl-o-mat.de/bundestagswahl2017/
Bild	http://www.bild.de/politik/inland/bundestagswahl2017/wahl-o-mat-zur-bundestagswahl-startet-am-30-august-53933038.bild.html
FAZ	http://event.faz.net/wom/wahlomat-btw/
Focus	http://www.focus.de/politik/deutschland/bundestagswahl_2017/
Freenet	https://www.freenet.de/nachrichten/wahlomat/index.html
Handelsblatt	http://www.handelsblatt.com/politik/deutschland/bundestagswahl/interaktiv/wahlomat_bundestagswahl/
infranken.de	http://www.infranken.de/regional/bundestagswahl/wahl-o-mat/
Koeln.de	http://www.koeln.de/apps/wahlomat/
Kölner Stadtanzeiger	http://wahl-o-mat.ksta.de/
Medienhaus Nord	https://www.svz.de/deutschland-welt/bundestagswahl/machen-sie-den-test-welche-partei-passt-zu Ihnen-id17687051.html
Mindener Tageblatt	https://www.mt.de/lokales/landtagswahl_2017/wahl_o_mat
Mittelbayerische Zeitung	https://wahl-o-mat.mittelbayerische.de/
MSN	http://www.mz-web.de/politik/bundestagswahl/wahl-o-mat-2017-welche-partei-passt-zu Ihnen--finden-sie-es-heraus--28249176
Nordbayern	http://www.nordbayern.de/politik/welche-partei-passt-zu-mir-der-wahl-o-mat-hilft-1.6564575
Nürtinger Zeitung	http://www.ntz.de/wahl-o-mat/
Osnabrücker Zeitung	http://www.noz.de/wahlomat
Pforzheimer Zeitung	https://wahlomat.pz-news.de/
Saarbrücker Zeitung	http://wahlomat.saarbruecker-zeitung.de/
Spiegel	http://www.stern.de/politik/deutschland/der-wahl-o-mat-2017-und-andere-entscheidungshelfer-im-ueberblick-6703528.html
T-Online	http://www.t-online.de/nachrichten/deutschland/bundestagswahl/id_8185887/2/bundestagswahl-2017-mit-dem-wahl-o-mat-die-passende-partei-finden.html
Tagesschau	http://wahl-o-mat.tagesschau.de/
Tagesspiegel	https://service.tagesspiegel.de/wahl-o-mat/bundestagswahl2017/
Volksstimme	https://www.volksstimme.de/dossiers/wahlen/wahlomat
Wahlomat	https://www.antenne.de/nachrichten/deutschland/wahl-o-mat-bundestagswahl-2017
Welt	https://www.welt.de/politik/deutschland/article167387539/Bundestagswahl-Welche-Partei-passt-am-besten-zu-mir.html
Wirtschaftswoche	http://www.wiwo.de/Wahl-O-Mat/2017/bund/
ZDF	http://module.zdf.de/Wahl-O-Mat/2017/bund/
Zeit	http://www.zeit.de/wahlomat/bundestagswahl

Appendix C Wahl-O-Mat screenshots

Figure C9: Wahl-O-Mat application: start screen



Figure C10: Wahl-O-Mat application: example item



Figure C11: Wahl-O-Mat application: selection of parties for comparison

Bundeszentrale für politische Bildung

Welche **Parteien** möchten Sie auswählen?

Sie können Ihre Positionen mit bis zu acht Parteien vergleichen.

Sie haben **6** von **8** Parteien ausgewählt.

Parteien * , die zurzeit im Bundestag vertreten sind:

--	--	--	--

Alle weiteren Parteien * :

--	--	--	--	--

Figure C12: Wahl-O-Mat application: example result

Bundeszentrale für politische Bildung

Ihr Wahl-O-Mat **Ergebnis**

Hohe Übereinstimmungen Ihrer Antworten mit mehreren Parteien bedeuten nicht zwangsläufig eine inhaltliche Nähe dieser Parteien zueinander.

Ja. Nein. Vielleicht. Was sagen eigentlich die Parteien dazu? >

Partei	Antwort%
DIE LINKE	63,2 %
FDP	60,5 %
GRÜNE	59,2 %
SPD	59,2 %
CDU/CSU	55,3 %
AfD	38,2 %

Figure C13: Wahl-O-Mat application: party positions explained

The screenshot shows the 'Begründungen' (Explanations) section of the Wahl-O-Mat application. At the top, there is a navigation bar with links: < Thesen, Gewichtung, Parteienauswahl, Ergebnis, and Begründungen. The main title is 'Begründungen der Parteien'. Below it, a sub-section title is '1/38 Bundeswehr im Inneren ⓘ'. A text box contains the statement: 'Bei der Terrorismusbekämpfung soll die Bundeswehr im Inland eingesetzt werden dürfen.' A 'nächste These >' button is located at the bottom right of this box. Below this, there is a 'Ihre Position' (Your Position) section with a slider bar. The 'CDU/CSU' position is marked with a checked checkbox. Below this, there is a 'Begründung der Partei:' (Explanation of the Party) section for the SPD, which has an unchecked checkbox.

bpb:
Bundeszentrale für
politische Bildung

Wer steht zur Wahl?
Fakten zur Wahl
Unterrichtsmaterial
FAQ
Presse
Impressum
Vorlesefunktion aktivieren

Ihre Position

CDU/CSU

Begründung der Partei:
„Bei der Abwehr eines besonders schweren Terrorangriffs kann die Polizei an die Grenzen ihrer Möglichkeiten kommen. In besonderen Gefährdungslagen werden wir daher die Bundeswehr unter Führung der Polizei unterstützend zum Einsatz bringen. Solche Einsätze unter Leitung der Polizei müssen regelmäßig geübt werden. Dabei wollen wir zunächst den bestehenden Rechtsrahmen ausschöpfen.“

SPD

Begründung der Partei:
„Eine Militarisierung der öffentlichen Sicherheit lehnen wir ab. Mit uns wird es,

Figure C14: Wahl-O-Mat application: party positions listed

Wahl-O-Mat® Bundestagswahl 2017				
Vergleich der Positionen				
	CDU CSU	SPD	DIE LINKE.	BÜNDNIS 90/ Die Grünen
1. Bei der Terrorismusbekämpfung soll die Bundeswehr im Inland eingesetzt werden dürfen.	✓	✗	✗	✗
2. Dieselkraftstoff für Pkw soll höher besteuert werden.	✗	✗	✓	✓
3. Für die Aufnahme von neuen Asylsuchenden soll eine jährliche Obergrenze gelten.	—	✗	✗	✗
4. Der Ausbau erneuerbarer Energien soll vom Bund dauerhaft finanziell gefördert werden.	✗	✓	✓	✓
5. Der Bund soll mehr Mittel für den sozialen Wohnungsbau bereitstellen.	✓	✓	✓	✓
6. BAföG soll generell unabhängig vom Einkommen der Eltern gezahlt werden.	✗	—	✓	✓
7. Die Videoüberwachung im öffentlichen Raum soll ausgeweitet werden.	✓	✓	✗	✗
8. Deutschland soll einem Schuldenschnitt für Griechenland zustimmen.	✗	—	✓	✓
9. Generelles Tempolimit auf Autobahnen!	✗	✗	✓	✓
10. Die Verteidigungsausgaben Deutschlands sollen erhöht werden.	✓	—	✗	✗
11. Betreiber von Internetseiten sollen gesetzlich dazu verpflichtet sein, Falschinformationen ("Fake News") zu löschen, auf die sie hingewiesen wurden.	✓	✓	✗	✓
12. Ökologische Landwirtschaft soll stärker gefördert werden als konventionelle Landwirtschaft.	—	✗	✓	✓
13. Kindergeld soll nur an deutsche Familien ausgezahlt werden.	✗	✗	✗	✗
14. Arbeitsverträge sollen weiterhin ohne Angabe von Gründen befristet sein dürfen.	✓	✗	✗	✗
15. Kinder sollen gegen ansteckende Krankheiten geimpft werden müssen.	✓	✗	✗	✗
16. Alle Banken sollen verstaatlicht werden.	✗	✗	✗	✗
17. Der Völkermord an den europäischen Juden soll weiterhin zentraler Bestandteil der deutschen Erinnerungskultur sein.	✓	✓	✓	✓
18. Haushaltüberschüsse sollen überwiegend zum Abbau von Staatsschulden verwendet werden.	—	✗	✗	✗
19. Die Gesamtzahl der Nutztiere in den landwirtschaftlichen Betrieben einer Gemeinde soll begrenzt werden können.	—	✓	✓	✓
20. In Deutschland soll auch zukünftig Braunkohle abgebaut werden dürfen.	—	✓	✗	✗

Appendix D Questionnaire items

Figure D1: Request for Wahl-O-Mat use (encouragement); wave 3

YouGov®

Wir möchten Ihnen in der nächsten Befragung ein paar Fragen zu den Positionen der Parteien und auch Ihre eigenen Positionen zu bestimmten politischen Themen stellen. Dazu möchten wir Sie bitten, bis zur nächsten Befragung das Wahlinformations-Tool der Bundeszentrale für politische Bildung „Wahl-O-Mat“ zu nutzen, das unter www.wahl-o-mat.de zur Verfügung steht. Wären Sie bereit, dieses Tool bis zur nächsten Befragung, die etwa in zwei Wochen stattfinden wird, zu nutzen?

Hinweis: Wir würden Sie im Falle Ihrer Einwilligung vor Beginn der nächsten Befragung nochmals per Email erinnern. Für Ihre Bereitschaft würden wir Ihnen außerdem 50 YouGov-Punkte gutschreiben

Ja, ich bin bereit, bis zur nächsten Befragung den Wahl-O-Mat zu nutzen, und habe es bis jetzt noch nicht genutzt.
 Ja, ich bin bereit, bis zur nächsten Befragung den Wahl-O-Mat zu nutzen, und habe es bereits genutzt.
 Nein, ich bin nicht bereit, den Wahl-O-Mat zu nutzen.

[Translated] In the next survey, we would like to ask you some questions on positions of parties as well as your own attitudes towards certain political topics. For this purpose, we would like to ask you to use the voting advice application “Wahl-O-Mat”, offered by the Federal Agency for Civic Education [Bundeszentrale für Politische Bildung] at www.wahl-o-mat.de until the next wave. Would you be willing to use this tool until the next survey, which will take place in about two weeks?

Please note: If you agree, we would remind you of using the tool by e-mail before the next survey starts. In compensation of your consent, you would be reimbursed with 50 YouGov points.

- Yes, I am willing to use the Wahl-O-Mat until the next survey, and I have not used it so far.
- Yes, I am willing to use the Wahl-O-Mat until the next survey, and I have already used it.
- No, I am not willing to use the Wahl-O-Mat

Figure D2: Reported Wahl-O-Mat use (encouragement group); wave 4



In der letzten Befragung hatten Sie sich dazu bereiterklärt, das Wahlinformations-Tool „Wahl-O-Mat“ zu verwenden. Hatten Sie Gelegenheit, den „Wahl-O-Mat“ zu nutzen?

Ja, ich habe den Wahl-O-Mat genutzt.
 Nein, ich habe den Wahl-O-Mat nicht genutzt.

[Translated] In the last survey, you agreed to use the voting guide tool “Wahl-O-Mat”. Did you have the opportunity to use the “Wahl-O-Mat”?

- Yes, I did use the Wahl-O-Mat.
- No, I did not use the Wahl-O-Mat.

Figure D3: Reported Wahl-O-Mat use (control group); wave 4



Seit kurzem steht online das Wahlinformations-Tool „Wahl-O-Mat“ zur Verfügung, mit dem man die eigenen Einstellungen mit Positionen der Parteien gegenüber verschiedenen Themen vergleichen kann. Wie ist das bei Ihnen: Haben Sie den Wahl-O-Mat für diese Bundestagswahl schon genutzt?

Ja, ich habe den Wahl-O-Mat genutzt.
 Nein, ich habe den Wahl-O-Mat nicht genutzt.

[Translated] As of late the voting guide tool “Wahl-O-Mat” is available online, which can be used to compare own preferences with parties’ positions on various issues. What about you: Did you have the opportunity to use the “Wahl-O-Mat” yet?

- Yes, I did use the Wahl-O-Mat.
- No, I did not use the Wahl-O-Mat.

Figure D4: Reported Wahl-O-Mat advice (encouragement group); wave 4



Wir hatten Sie ebenfalls gebeten, am Ende der Benutzung des Wahl-O-Mat die Übereinstimmungsraten mit den Parteien zu notieren. Wir bitten Sie nun, uns diese Übereinstimmungsraten mitzuteilen!

CDU/CSU: %
 SPD: %
 FDP: %
 Die Linke: %
 B'90/Die Grünen: %
 AfD: %
 Ich habe diese Zahlen nicht.
 Ich möchte diese Zahlen nicht mitteilen.

[Translated] We also asked you to write down the overlap rates with the parties after using the Wahl-O-Mat. We now ask you to tell use these overlap rates!

- ...
- I do not have these numbers.
- I do not want to share these numbers.

Figure D5: Reported Wahl-O-Mat advice (control group); wave 4



YouGov

Können Sie sich noch erinnern, mit welcher der nachfolgenden Parteien sie nach Auswertung des Wahl-O-Mat die höchste Übereinstimmung auf den angebotenen Thesen hatten?

- CDU/CSU
- SPD
- Die Linke
- B'90/Die Grünen
- FDP
- AfD
- Ich kann mich nicht mehr erinnern.

[Translated] Can you still remember with which of the following parties you had the highest overlap on the presented issues according to the Wahl-O-Mat evaluation?

- ...
- I cannot remember anymore.

Figure D6: Perceived party positions on Wahl-O-Mat items; wave 4

	CDU/CSU	SPD	Grüne	Linke	FDP	AfD	weiß nicht / keine Angabe
Der Ausbau erneuerbarer Energien soll vom Bund dauerhaft finanziell gefördert werden.	<input type="checkbox"/>						
Betreiber von Internetseiten sollen gesetzlich dazu verpflichtet sein, Falschinformationen ("Fake News") zu löschen, auf die sie hingewiesen wurden.	<input type="checkbox"/>						
Für die Aufnahme von neuen Asylsuchenden soll eine jährliche Obergrenze gelten.	<input type="checkbox"/>						
Alle Bürgerinnen und Bürger sollen bei gesetzlichen Krankenkassen versichert sein müssen.	<input type="checkbox"/>						
Der Erwerb von selbstgenutztem Wohneigentum soll bis zu einer bestimmten Höhe steuerfrei sein.	<input type="checkbox"/>						
Dieselkraftstoff für Pkw soll höher besteuert werden.	<input type="checkbox"/>						

[Translated] Now for some politically contested issues. What do you think, which parties agree with the following statements, i.e. support the corresponding statement in the campaign? Please select the respective parties!

- The expansion of renewable energies should be permanently subsidized by the federal state.
- Internet platform providers should be obliged by law to delete false information ("Fake News") which they are made aware of.
- There should be a yearly upper limit for accepted news asylum seekers.
- All citizens should be under statutory health insurance.
- Acquiring owner-occupied property should be tax-free up to a certain extent.
- Diesel fuel for cars should be taxed higher.

Figure D7: Reported turnout at election; wave 5



POLITIK & Medien HUMBOLDT-UNIVERSITÄT ZU BERLIN



Haben Sie bei der Bundestagswahl am 24. September gewählt?

- Ja, ich habe am Sonntag gewählt.
- „Ja, ich hatte schon per Briefwahl oder vorab im Wahllokal gewählt.
- Ich wollte wählen, habe aber nicht gewählt.
- Nein, ich war nicht stimmberechtigt.
- Nein, ich habe nicht gewählt.

[Translated] Did you vote at the Federal election on September 24?

- Yes, I voted on Sunday.
- Yes, I had previously voted by mail or at the polling station
- I planned to vote, but I did not.
- No, I was not entitled to vote.
- No, I did not vote.

Figure D8: Vote intention; waves 3 and 4



YouGov

Bei der Bundestagswahl im September 2017 können Sie zwei Stimmen vergeben. Die Erststimme für einen Kandidaten aus Ihrem Wahlkreis und die Zweitstimme für eine Partei. Was werden Sie auf Ihrem Stimmzettel ankreuzen?

Zweitstimme für

CDU/CSU	Die Linke
SPD	AfD
FDP	Andere Partei
Bündnis 90/Die Grünen	Weiß ich noch nicht

[Translated] You have two votes at the federal election in September 2017. The first is for a candidate in your constituency, the second for a party. What will you choose on the ballot

- ...
- I don't know yet.

Figure D9: Political interest; waves 1, 3, and 4

POLITIK & Medien HUMBOLDT-UNIVERSITÄT ZU BERLIN YouGov

Wie stark interessieren Sie sich im Allgemeinen für Politik?

- überhaupt nicht
- weniger stark
- mittelmäßig
- stark
- sehr stark
- weiß nicht

[Translated] How interested are you in politics in general

- not at all
- not very
- moderately
- strongly
- very strongly
- don't know

Figure D10: Political ideology; wave 1

In der Politik reden die Leute häufig von "links" und "rechts". Wo würden Sie sich auf einer Skala von 0 bis 10 einordnen?

links 0 1 2 3 4 5 6 7 8 9 10 rechts

Weiß nicht

[Translated] In politics, people often speak of “left” and “right”. Where would you place yourself on a scale from 0 to 10?

- left
- ...
- right
- don’t know

Figure D11: Likelihood to vote; waves 3 and 4

Bei Wahlen nehmen viele Leute teil. Andere schaffen es nicht, ihre Stimme abzugeben, oder nehmen aus anderen Gründen nicht teil. Auf einer Skala von 1 bis 10, wie wahrscheinlich ist es, dass Sie an der Bundestagswahl am 24. September teilnehmen werden?

Ganz sicher nein 1 2 3 4 5 6 7 8 9 10 Ganz sicher ja

Weiß nicht

[Translated] Many people participate in elections. Some do not manage to cast a vote or do not participate for other reasons. On a scale from 1 to 10, how likely is it that you will participate at the federal election on September 24?

- Certainly not
- ...
- Certainly yes
- Don’t know

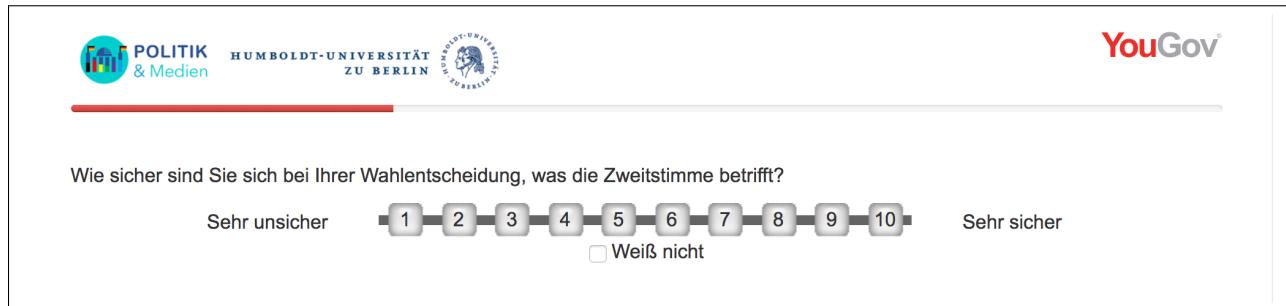
Figure D12: Political efficacy; waves 3 and 4

	stimme überhaupt nicht zu	stimme eher nicht zu	teils/teils	stimme eher zu	stimme voll und ganz zu	weiß nicht
Die Politiker kümmern sich darum, was Leute wie ich denken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kenne mich in der Politik im Allgemeinen sehr gut aus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Parteien wollen nur die Stimmen der Wähler, ihre Ansichten interessieren sie nicht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Politische Fragen sind für mich oft schwer zu verstehen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin über das politische Tagesgeschehen sehr gut informiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die heutigen Probleme sind so kompliziert, dass die Politik sie nicht mehr lösen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Translated] To what extent do you agree with the following statements?

- Politicians care about what the people think.
- I am generally very well informed about politics.
- Parties only want to get people's votes; they don't care about their opinion.
- It is often difficult for me to understand political questions.
- I am generally very well informed about daily political events.
- The problems are so complex today that politics cannot solve them anymore.

Figure D13: Vote certainty; waves 3 and 4



[Translated] How certain are you regarding your decision whom to vote for with your second vote?

- Very uncertain
- ...
- Very certain
- Don't know

Figure D14: Party scalometers; waves 3 and 4



[Translated] Generally, what do you think of the individual political parties? Please use the scale from -5 to +5!

- Nothing at all
- ...
- Very much
- Don't know

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