

# Voter's polarization and news consumption in election campaigns

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## Abstract

The polarization of voters has been a great concern of scholars for years as it arguably has a direct impact on the quality of democracies. Yet, we still know very little about the roots of this phenomenon. A widespread perspective is that the abundance of news and related patterns of selective exposure could influence the polarization of individual voters. As of today, evidence of the influence of types of media consumption on voters' polarization is still limited. Due to the widely recognized polarization of political elites, scholars disagree on what exactly represents mass polarization. This paper aims to contribute to this literature by studying how the polarization of voters during election campaigns is influenced by the types of media they consume during election campaigns - partisan or non-partisan - as well as the selective online exposure that results from this media consumption. With a two waves panel survey in Switzerland, this paper is able to (1) identify polarization of individual voters based on the evolution of their vote intention between survey waves and (2) link this polarization to the type of media consumed by voters. Results indicate that different types of media have different effects on the polarization of vote choice during an election, albeit no all means carry the same weight.

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## Introduction

The political polarization of the public is a threat to the sustainability of democratic institutions (Arbatli & Rosenberg, 2020; Štětka, Mihelj, & Tóth, 2020). While the debate about the size of the phenomenon has not yet settled (see e.g. Fiorina & Abrams, 2008), the consequences of such polarization are widely recognized as being detrimental for democracies. Given the importance of this issue, it is surprising that we know little about the individual drivers of political polarization. Even if political polarization is not a phenomenon that can be observed in a single individual (Lelkes, 2016), the behavior of individual voters is at the center of mass polarization. This paper investigates the complex relationship between the type of media consumption and individual polarization during election campaigns.

The political polarization of the mass public is subjected to numerous debates. Coming from the US, the literature generally agrees that political elites got more polarized over the last decades (Abramowitz & Saunders, 2008; Fiorina, Abrams, & Pope, 2008). However, there is less consensus regarding the polarization of the mass public. In their seminal book, Fiorina, Abrams, and Pope (2005) argue that the political attitudes of the mass public only appear to be polarized because of their limited political options. With different conceptions and definitions of political polarization, others have argued that the polarization of political attitudes is occurring in the US mass public (Abramowitz & Saunders, 2008; Fiorina et al., 2008, 2005; Hetherington, 2009). What makes it hard to study polarization in the US context is the nature of the party competition. Indeed, as a bipartisan system that got polarized over the last decades, voting for either party in an election would make voters' choice look more polarized than before, even though they keep voting for the same party (Hetherington, 2009). Also, the increased correlation between party identification and vote choice might be due to the polarization of the elite. So, while it is possible to imagine a weak Democrat voting for a moderate Republican, the more position of the elites get polarized, the less it will be likely that the weak Democrat votes for the Republican candidate (Prior, 2013).

To avoid this issue, this paper investigates the polarization of vote choice during an election in a multiparty system - the 2019 state election of the parliament and the government in the canton of Zurich Switzerland. With ten different parties competing for this election, it is possible to directly measure whether the change in vote intention for parties and candidates is to the benefit of a more centrist or more extreme party/candidate. In this context, even if parties get more polarized over time, voters can always change their vote to a more centrist party. Furthermore, we innovate on the measurement front. We inspire from a measure developed by Dalton (2021) and use the discrimination parameter of voting for candidates and the latent position of parties from Bayesian Item-Response Theory (IRT) models (Clinton, Jackman, & Rivers, 2004). With

this measure, this paper thus proposes a behavioral measure of individual polarization in an election where the various choice implies that change in vote choice is a meaningful indication of political polarization. Last, we study one prominent factor potentially driving polarization, news consumption.

## Theory and hypotheses

Scholars also have focused their attention on the factors that foster this polarization. One of the main drivers of political polarization identified by the literature is media consumption. In the US, the transformation of the media ecosystem and the multiplication media group has created a partisan media ecosystem (Prior, 2013). With the multiplication of news channels, only people who are interested in politics watch the news still. As these politically interested people are more polarized than others, the news media followed the demand side and polarized its content as well (Hetherington, 2009). Hence, the literature suggests that one of the main drivers of political polarization in the US mass public is the transformation of news channels to partisan media (Levendusky, 2009).

Why does partisan media affect the polarization of political attitudes? Many scholar have studied the relationship between media consumption and political attitudes and polarization (e.g. Arceneaux & Johnson, 2010; Arceneaux, Johnson, & Murphy, 2012; Peterson, Goel, & Iyengar, 2019; Peterson et al., 2019; Prior, 2013; Stier, Kirkizh, Froio, & Schroeder, 2020). The link between media consumption and political polarization has been theorized in two broad ways (see Prior, 2013). First, the selective attention mechanism argues that during political campaigns, voters will be more and more attentive to information that is in line with their prior beliefs (Arceneaux et al., 2012; Peterson et al., 2019). With the politicization of the media, this selective attention is coupled to partisan media and increases the polarization of political attitudes of voters (Prior, 2013). The more media become partisan, the less likely it is that voters will seek information from news media with opposite partisan beliefs. Second, the motivated reasoning approach assesses that it is far more cognitively demanding to process information that is inconsistent with one's prior beliefs. To minimize demanding cognitive activity, voters will turn their attention to the information source that is least demanding for them. While both theories propose a different process, as a result they both suggest that voters will get polarized because of the increased partisan media environment.

Aside from theorizing on the determinants of polarization, scholars also asked how political polarization potentially decreases. So far, the study of political polarization mainly focused on the evaluation of the phenomena in the political elites and the mass public (Fiorina & Abrams,

2008) but some cues can be found regarding the easing of polarization. As mentioned before, one of the main explanation of why elites and voters are more polarized today than in the past is the transformation of news media to partisan media. This means that voters were less polarized when the news media was less partisan because the information is more and more in line with the prior partisan belief of individual voters. This means that in general, voters should get less polarized when they consume some types of media that are less partisan. In broader terms, voters should get less polarized when they are exposed to opposing views.

Empirical studies on the determinants of "de-polarization" are scarce. Research has found that disagreement can lead to de-polarization in specific cases (Kim, 2015). While it is theoretically argued that exposure to opposing views reduces political polarization, a recent study on Twitter exposing respondents to tweets from the other party - Democrat or Republican - found that voters who were exposed to tweets from the opposing side were significantly more polarized than voters who were not exposed to it (Bail et al., 2018). Thus, is political polarization a fatality? We argue that what is important is not to be exposed to partisan news from different ideologies but to be presented with *balanced news information*. While partisan media tend to present unbalanced opinions, traditional news media were focusing on debating different opinions and objective information. As a result, when people held prior beliefs on a political issue and they saw a news segment about it, they were presented with an issue in its complexity. Thus let's for instance say that one voter holds beliefs against immigrants and another one in favor of immigration. When exposed to partisan media, they would identify the partisan media that holds beliefs closer to theirs and reinforce their belief that immigration is either good or bad. However, when exposed to balanced news information, both would be subjected to a complex topic where the complexity of the situation is presented. Both would not change their views on immigration but the exposure to the complexity of the issue will not reinforce their prior views - as more partisan medias would - but on the contrary balance them with other information.

Unlike the U.S., the Swiss media system (like the ones in Germany, Austria and the UK) is characterized by a strong public broadcaster, media ownership regulations, weak press subsidies and relatively high inclusiveness in the press market (Brüggemann, Engesser, Büchel, Humprecht, & Castro, 2014). As a consequence, the traditional media - TV, newspaper, radio - is less partisan, meaning that during political campaigns, voters who get informed with these traditional media channels will be exposed to more "balanced" information. On the other hand, voters can seek information with the material produced and distributed by political parties. This information presents a uniform vision of reality. If voters seek information directly from political parties, they will be exposed to unbalanced opinions. This distinction between news media and partisan information is crucial in our view. We argue that the crucial difference

between polarization and depolarization is not to be exposed to partisan media from the other side but to be exposed to unbalanced or balanced information. While the literature posits the importance of disagreement for the de-polarization of the mass public, we argue that the crucial factor for the de-polarization of the mass public is the exposure to balanced news information. Based on the specificity of this media environment we expect that consumption of information on based on resources produced by political parties - flyers, website, events - increase the polarization of voters (*Partisan media polarization hypothesis*). On the contrary, we expect that the consumption of information on traditional news media - TV, radio, Newspaper - decreases the polarization of vote choice (*Balanced media depolarization hypothesis*).

While this change in the media ecosystem is especially true in the US, the media ecosystem in - practically - every context has been modified with the growing importance of social media. The effect these new resources have on political polarization and political attitudes is not yet clear. Studies have highlighted that by design these social networks have a tendency to reinforce the selective attention bias of voters. Through the algorithm they are based on, social media have a net incentive to propose content that will generate more interaction with their web-platform and thus, more ad revenues. While selective exposure was a known phenomenon way before the existence of the internet, the consumption of online news may reinforce this effect with people selecting news content that aligns with their predispositions (Peterson et al., 2019). Nevertheless, empirical findings have highlighted that this is not necessarily the case and that news consumption on social media may also increase the amount of different news sources consumed by individual voters. For instance, (Hosseinmardi et al., 2021) do not find that Youtube's algorithm drive users towards more fare-right views. Also, (Haim, Graefe, & Brosius, 2018) find no evidence for the filter bubble hypothesis based on Google News suggestion. On the contrary, (Cinelli et al., 2020) finds that Facebook's algorithm increase the selective exposure of users based on their preferences. However, while the link between news consumption and social media use is being studied widely, we still know little about the actual effect it has on political attitudes and political polarization. The large amount of data that these social media channels are sending to their networks makes it impossible to verify their veracity or the quality of information they actually display. Thus, it is not clear whether the consumption of news on social media and the potential plurality of sources this may trigger is attenuating the polarization of political attitudes or not. Voters are exposed to untrustworthy websites (Guess, Nyhan, & Reifler, 2020), fake news (Allcott & Gentzkow, 2017), and the economic incentives regulating this ecosystem rely on sensationalism which may amplify the emotional content of otherwise regular news stories (Prior, 2013). In sum, although there is an existing debate on whether the consumption of online news - especially via social media - increases selective exposure, there are

also reasons to believe that the effect of the rise of social media and internet news consumption have deeper implication of politics (Peterson et al., 2019; Štětka et al., 2020; Stier et al., 2020). Because we consider that the use of social networks may reinforce the selective exposure of voters and in general increase the probability that voters are exposed to news information that reinforces their political predispositions, we expect that the using social networks increase the polarization of individual voters during political campaigns (*Social Networks hypothesis*).

In this paper, we investigate the relationship between the news environment of individual voters and the polarization of their vote choice during elections campaigns. In contrast to most studies on mass polarization, we focus on short term drivers of political polarization at the individual level during election campaign in the canton of Zurich in Switzerland. We rely on two waves panel survey data and operationalize the polarization of vote choice by using Bayesian IRT models (Clinton et al., 2004) coupled with the measure of political polarization developed by Dalton (2021). We thus propose behavioral measures of individual polarization based on the respondents' vote intention. We analyze how the different information sources - partisan or not partisan, i.e. balanced or unbalanced- used by voters influence the polarization of their vote intention and what role their social media use plays in this.

The paper unfolds as follows. We first present the data and the estimation methods we use to operationalize the individual polarization of voters and see how this depends on their consumption of news. Then we present the results and additional analyses. Finally, we conclude the paper with remarks on the individual factors driving mass polarization and its link to media consumption.

## Data and Method

This paper relies on a panel survey conducted during the 2019 sub-national election campaign of the canton of Zurich in Switzerland. Switzerland is an interesting case to study polarization due to their multi-party system and its open-list PR system. It is also a hard case to see increases in polarization as it is known to be already quite polarized (Bornschieer, 2018).

During this campaign, voters chose their representative in the parliament as well as the government. For the parliament, voters could either choose a party list or use a blank list and fill in the name of the individuals they wanted to vote for. For the government, voters had seven voices - one for each government member. Overall, voters could choose between one and seven different candidates and distribute their seven voices among them. The panel survey asks respondents about their vote intention in the beginning and at the end of the campaign.

The present paper aims to estimate whether specific types of news consumption influence

the polarization of voting behavior of voters. We examine whether specific forms of news consumption influence the polarization of the vote choice during election campaigns. This paper thus relies on three different operationalizations of one dependent variable - the polarization of vote intention in the parliament, the government, and on both - and the independent variables are the type of news consumption. Here we rely on respondents indicating which type of information they seek during the election campaign, between the first and the second survey wave. Formally, the different models can be written as:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \dots + \beta_{13} X_{13i} + \beta_c \text{Control}_i + \epsilon_i \quad (1)$$

Where  $Y_i$  is the dependent variable - the polarization of vote intention in the parliament, the government, or both - and  $X_{1i}$  to  $X_{13i}$  represents the seven news items survey respondents answered about their consumption of news media or party resources.  $\beta_1$  to  $\beta_{13}$  are the regression coefficients of the different news items. Our hypotheses state that, for the more traditional source of information, we expect coefficients  $\beta_{1-3}$  to be negative - diminish the polarization of vote choice - and  $\beta_{4-7}$  to be positive. The *Social Networks hypothesis* expects that  $\beta_{12}$  should be positive while we do not expect other forms of online news consumption to have an effect on political polarization of voters during the election campaign.

The independent variables are binary and indicate what type of news respondents consumed during the political campaign. These questions asked whether respondents (1) read the newspaper, (2) watch television, (3) listen to the radio, (4) consulted candidates or parties' websites, (5) read candidates or parties flyers or signs, (6) participated to a party podium or had interaction with parties in the street, and (7) had a telephone or door to door contact with parties or candidates. These items represent information that is considered part of traditional source information. Then, we also consider 6 items that are more related to online news consumption. These questions asked whether respondents rely on Blogs (8), Web Forum (9), Email (10), Messenger apps (11), Social Media (12) and Online Newspaper (13) as a source of information. These items are coded 1 if respondents consumed them during the campaign and 0 otherwise. Table 1 presents the distribution of each news item.

Table 1 presents the distribution of each item in the sample of respondents. Overall, the data contains information on 3567 individuals who indicated their vote choice in the Parliament and 3431 that indicated their vote choice in the government. We see that the consumption of the different media types varies widely. Indeed, at the extreme, we see that 88% of respondents read the newspaper while only about 6% were contacted by a party or went to a party event.

The news consumption items refer to different types of information. Indeed, while items 1 to 3 mostly refer to balanced information from traditional news media, items 4 to 7 seeking in-

Table 1: Rate of news item use in the panel

Media Type	Rate of use
<i>Traditional media</i>	
Newspaper	0.88
TV	0.41
Radio	0.26
Party Website	0.19
Party Flyer	0.33
Party Podium	0.06
Party Contact	0.06
<i>Online media</i>	
Blogs	0.25
Web Forum	0.13
Email	0.36
Messenger App	0.33
Social Media	0.37
Online Newspaper	0.52

formation from parties refers more to unbalanced information. For instance, while on television parties and politicians often see their opinion opposed either by a journalist or a political opponent when voters take information from party-related content they are subjected to a uniform vision of issues. Furthermore, the item 12 asks respondents whether they rely on social media as a source of information. This enables to test whether the use of social media also has an effect on polarization of vote choice - which is expected to be positive. Using these items, we aim to estimate the effect of party VS non-partisan media consumption on vote polarization.

The dependent variable is the polarization of vote choice of respondents between the first and the second wave of the survey. During the election under study, the choice of voters was twofold - they elect their regional parliament and their government. Both elections take place at the same time but are widely different. For the parliament election, voters normally choose a party list or sometimes fill a blank list with the candidate names. For the government election, voters can choose up to seven candidates they want to form the government. The dependent variable is built as the change in vote choice between the first and the second wave for the election of the parliament - with a party list - and the government - with a list of candidates. However, to know whether a change in vote choice means the polarization or centralization of vote choice, we first must quantify the ideological meaning of voting for parties for the parliament election



and candidates for the election of the government.

In order to get at this information on ideological leanings, we rely on Bayesian Item-Response Theory (IRT) models to quantify the ideological meaning of voting for parties and candidates. This model gives indications on the position of actors on a latent scale based on their responses to question items. The Bayesian IRT model can be formulated as:

$$Y_{ij} \sim \theta_j * b_i + a_i \quad (2)$$

Where  $Y_{ij}$  is the outcome variable which is the response of actor  $j$  to item  $i$ . This outcome is binary and indicates whether the actor  $j$  responded with the positive - 1 - or negative - 0 - to the item question  $i$ . The parameter  $\theta_j$  represents the position of actor  $j$  on the latent space. Finally, the parameters  $b_i$  and  $a_i$  respectively represent the discrimination and the difficulty of the item question  $i$ .

In this paper, we use two different instances of this Bayesian IRT model. First, for the parliament election, we estimate the latent position of parties based on the vote recommendation they give to voters between the end of 2015 and the end of 2019 - the legislature that is getting to an end with the 2019 election. From this model, we extract the parameter  $\theta_j$  that represents the position of parties on a latent space. Figure 1 presents the parameters estimates of  $\theta_j$  for this first model.

We then assign the scores of parties on the latent space to the respondents who voted for them in the first and the second wave. Afterward, we subtract the absolute score of respondents' party choice in the second wave from their absolute score in the first wave. This means that if respondents voted for the same parties, this difference is equal to 0 and if they changed their choice, this difference is equal to the absolute ideological difference of the party selected in wave two and in wave 1<sup>1</sup>. This gives a variable that takes 0 if no change in party choice was observed between the first and the second waves, greater than 0 if their change in vote intention was towards a party that is further away than the center in the second wave than in the first wave and is lower than 0 if respondents voted for a party that has a more central ideology in the second than in the first wave. Figure 2 present the ideal position of the different parties that are computed using the Bayesian IRT model which corresponds very closely to what is known on the ideological positioning of Swiss parties from other sources.

For the government election, we rely on another Bayesian IRT model that relies on the

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<sup>1</sup>For instance, if a respondents vote for a party that scores -1 in the first wave and 1 in the second wave, the difference between the two would be 2 even though the respondent is as far from the center in the first and the second wave. Taking the absolute value implies that the difference between the two positions is equal to 0 reflecting the idea that the individual is not more polarized in the second wave than in the first wave.

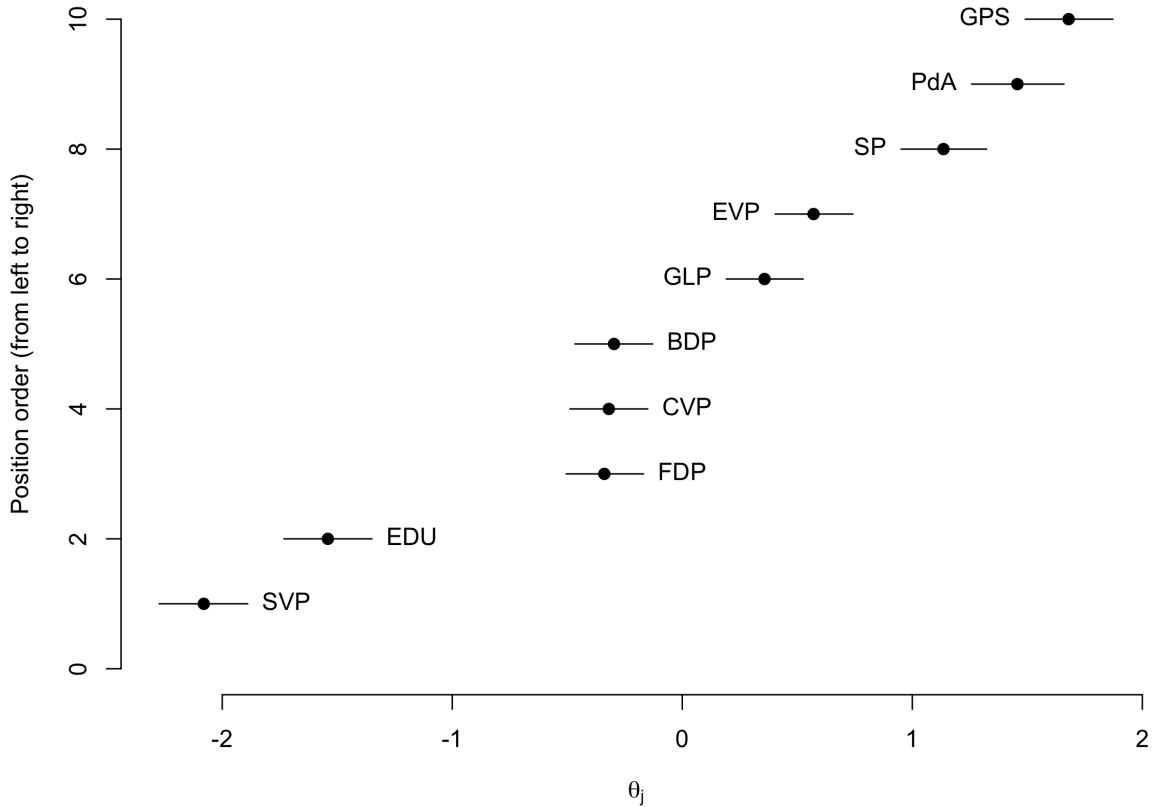


Figure 1: Position of political parties  $\theta_j$  on a latent space

discrimination of voting for candidates among the survey respondents. To run this model, we consider the vote intention of respondents for the 13 candidates for the government election as the outcome variable. If respondents indicated they will vote for the candidate the outcome takes 1 and 0 otherwise. Furthermore, we include the vote choice of the respondents on 4 direct democratic proposals. As Switzerland often uses direct democratic institutions, this survey also asked respondents about their choice on four ballot proposals. This second model has the survey respondents as actors and 17 item questions - 13 for each candidate and 4 on vote choice in direct democratic proposals. We then extract the posterior estimates of the discrimination of voting for each of the candidates. This indicates whether voting for each candidate is more conservative or progressive. The more respondents vote for candidates that are far from 0 the more their vote choice is polarized. Figure 3 presents the values of the discrimination parameters for the 13 candidates.

We see that the distribution of the discrimination of voting for a candidate is in line with the position of party candidates are from. Indeed, at the extreme, we see the Green and the SVP candidates. If we go more in the center we see the PdA and the social democratic candidates on

## Vote choice polarization of survey respondents in the parliament's election

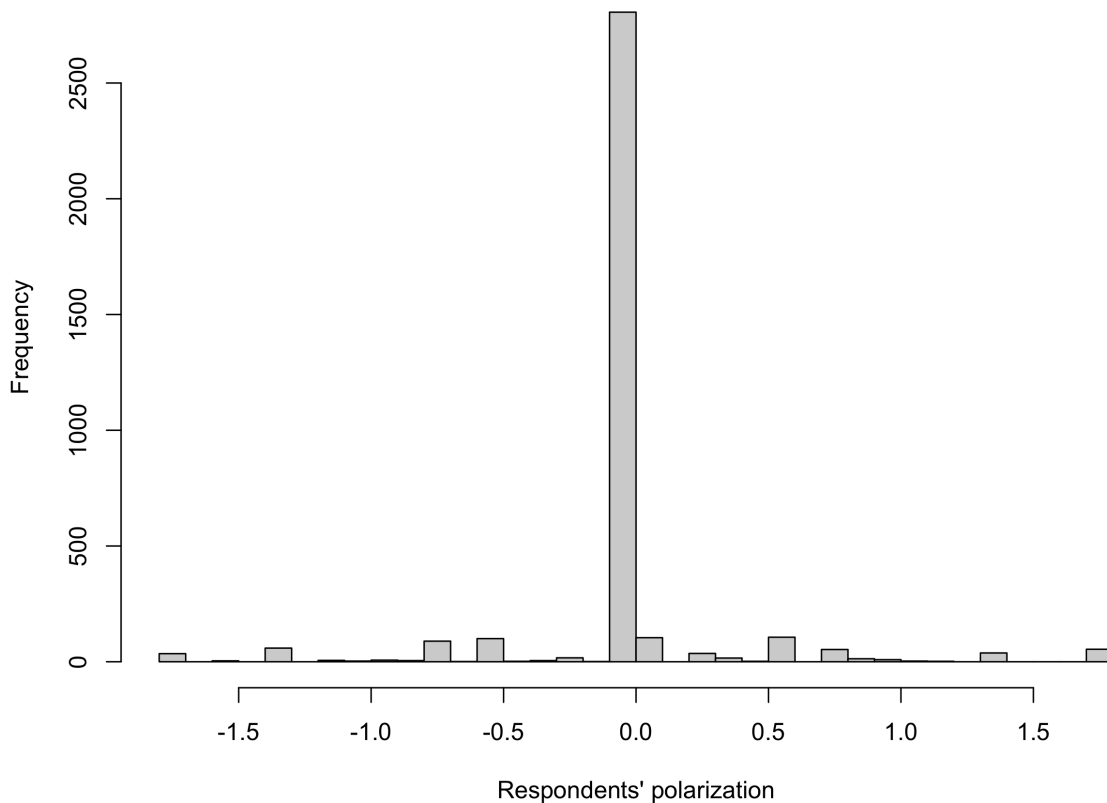


Figure 2: Polarization of respondents' vote intention for parties in parliament between the first and the second wave.

the left and the candidate of the FDP and the EVP on the right. This indicates that the latent space we computed in the first Bayesian IRT model based on the vote recommendation of parties in direct democracy is similar to this latent space. To push the test further, we can compare the discrimination parameters posterior estimates of the four direct democratic ballot proposal respondents indicated their vote choice. Indeed, if the discrimination of these items is similar to the discrimination of the same items in the first model, this means that we are measuring similar ideological latent space. By extracting the  $b_i$  parameters posterior estimates from both models we calculated that their correlation is equal to 0.83. Thus, while the latent space between these two models is not the same, we see that the correlation between these discrimination parameters indicates very similar latent spaces.

The construction of the dependent variable on government choice is a bit more complex as the voters could choose between one and seven candidates. So, we first assign the discrimination parameter value to the respondent when they voted for the candidate and assign a score of 0 otherwise. We then compute the average discrimination of candidate choice for each respondent

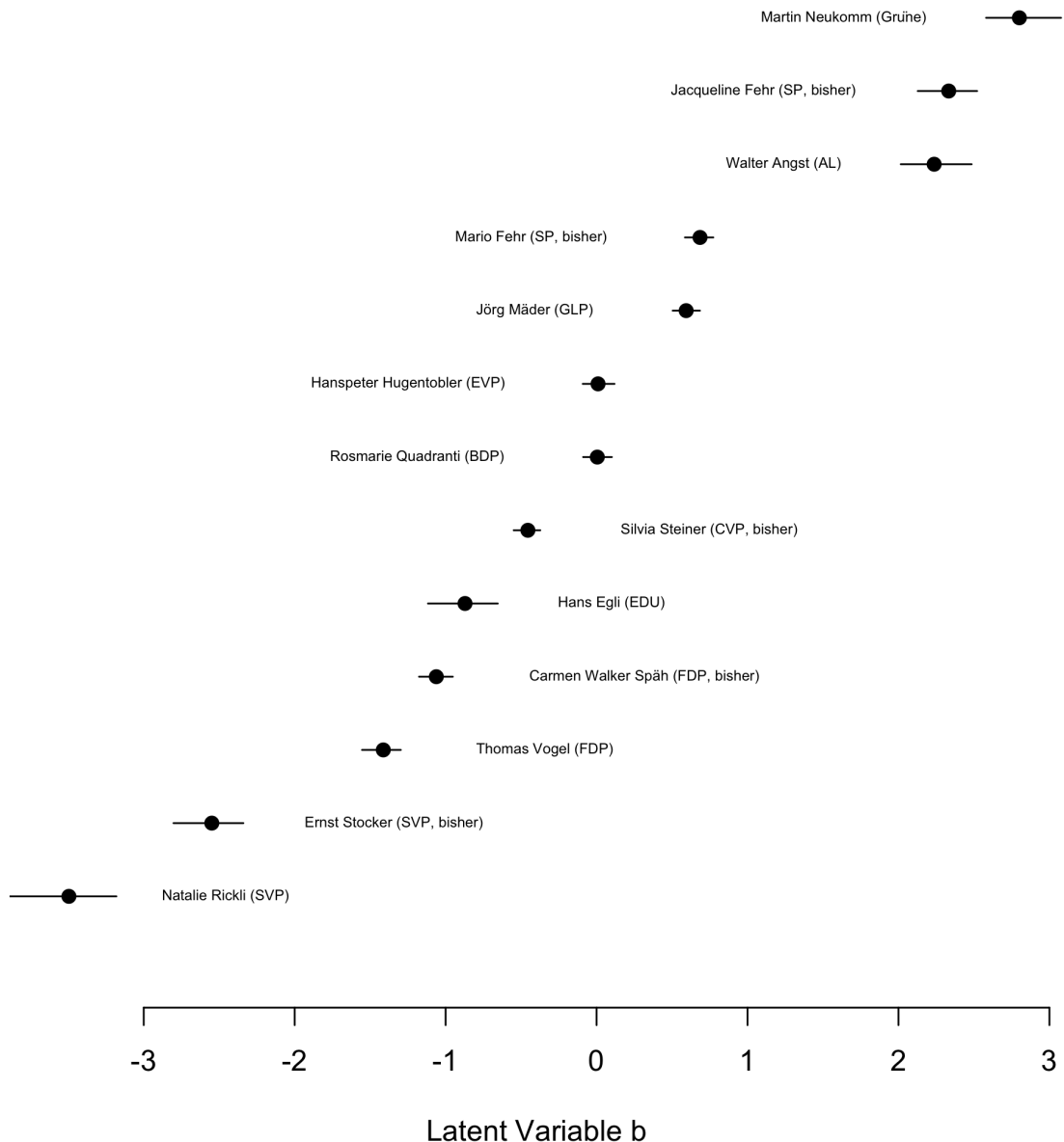


Figure 3: Discrimination Parameter  $b_i$  of Voting for Government Candidate

by dividing the sum of discrimination by the number of the chosen candidate. This way we operationalize the mean discrimination values of the candidate chosen by respondents. Finally, we subtract the absolute value of this score in the second wave by the absolute values in the first wave. This gives a variable that takes the value 0 if respondents choose the same pool of candidates in the first and the second wave, it is greater than 0 if the pool of chosen candidates is more polarized and is below 0 if it is less polarized. Figure 4 shows the distribution of this variable.

Figure 4 shows a relatively normal distribution. We see that when the indicator is computed based on a list of choices, the values of the variables are much more continuous than the distribution of the variable on polarization in the parliament presented in Figure 2.

## Vote choice polarization of survey respondents in the government's election

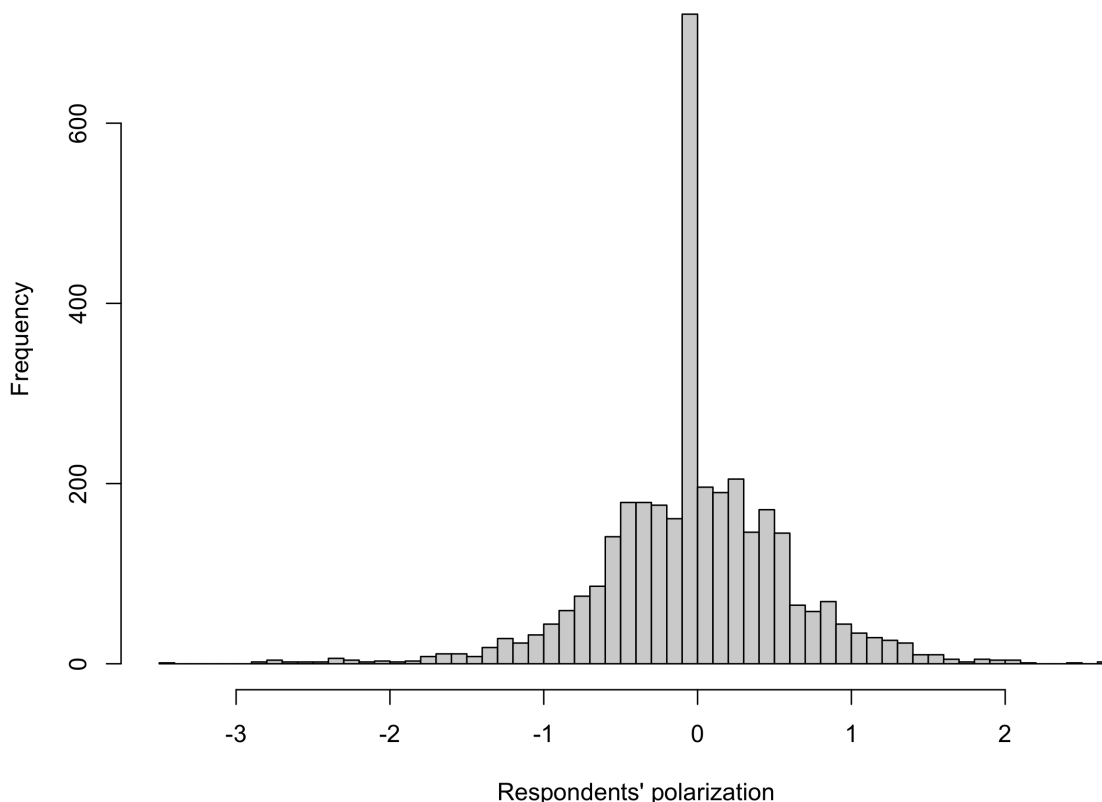


Figure 4: Polarization of respondents' vote intention for candidates in the national election in parliament between the first and the second wave.

To have a global variable for the general polarization of vote choice during the 2019 election of the canton of Zurich, we compute one last dependent variable with the sum of the polarization in the parliament and the government. This should indicate the overall polarization of respondents' vote choices.

In the next section, we present the results of different regression models based on equation (1). We control for the absolute position of the party vote choice in the first wave. This is an important control since the evolution between the first and the second wave is directly dependent on the respondent's position in the first wave. Indeed, if respondents have the most extreme position in the first wave, they cannot get polarized with the political campaign. On the contrary, respondent with a score of 0 in the first wave cannot de-polarize their vote choice during the campaign. To take this into account we control for the position of respondents' vote choice in the first wave.

Overall, 6 regression models are presented in the results. We run two regressions for each of our dependent variables - polarization of vote in the parliament, the government, and the

election in general - one with all respondents and one only with respondents that change their vote intention between the first and the second wave. After presenting the result we will discuss the variation in the effect each item has on the polarization of vote and present some concluding remarks.

## **Results**

In this section, we present the results of the analyses. Table 2 presents the results of the 6 regression models we use to test our two hypotheses. We see that the results are not completely consistent between the parliament and the government election. As shown in Figure 3 the indicator built on the vote change in the government is much more precise as it relies on the pooled choice of several candidates and offers a wider range of possible values than the indicator builds on party choice in the parliament.

Table 2:

	Parliament Election			Government Election		
	Trad. Media	Online Media	Both	Trad. Media	Online Media	Both
<i>Traditional Media</i>						
Newspaper	-0.018 (0.021)		-0.014 (0.021)	-0.108*** (0.029)		-0.102*** (0.029)
TV	-0.009 (0.014)		-0.009 (0.014)	-0.038* (0.019)		-0.037+ (0.019)
Radio	-0.015 (0.016)		-0.014 (0.016)	0.015 (0.021)		0.017 (0.021)
<i>Partisan Resources</i>						
Party Website	0.029+ (0.017)		0.028 (0.018)	0.064** (0.023)		0.061* (0.024)
Party Flyer	-0.014 (0.014)		-0.011 (0.015)	-0.021 (0.019)		-0.017 (0.019)
Party Podium	0.019 (0.029)		0.019 (0.029)	0.084* (0.039)		0.083* (0.039)
Party Contact	0.013 (0.029)		0.015 (0.029)	0.077* (0.039)		0.079* (0.039)
<i>Online News Consumption</i>						
Blogs		-0.008 (0.017)	-0.011 (0.017)		0.010 (0.023)	0.003 (0.023)
Web Forum		-0.008 (0.022)	-0.008 (0.022)		0.023 (0.029)	0.021 (0.029)
Email		-0.017 (0.015)	-0.014 (0.015)		-0.017 (0.020)	-0.014 (0.020)
Messenger		-0.010 (0.016)	-0.011 (0.017)		-0.026 (0.022)	-0.028 (0.022)
Social Media		0.031* (0.016)	0.025 (0.016)		0.050* (0.021)	0.029 (0.022)
Online Newspaper		0.006 (0.014)	0.006 (0.014)		-0.014 (0.019)	-0.010 (0.019)
<i>Control: Position in the first wave</i>						
NR_1_val_abs	-0.218*** (0.011)	-0.216*** (0.011)	-0.218*** (0.011)			
ST_1_val_all_abs				-0.393*** (0.012)	-0.383*** (0.012)	-0.393*** (0.012)
Constant	0.241*** (0.024)	0.221*** (0.017)	0.241*** (0.026)	0.548*** (0.033)	0.447*** (0.023)	0.551*** (0.036)
Observations	3,567	3,576	3,567	3,431	3,438	3,431
Adjusted R <sup>2</sup>	0.105	0.105	0.105	0.236	0.227	0.235

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

As a result, we see that most of the sample change their vote intention between the first and the second wave and compared to only a small portion of vote change in the parliament.

The regression coefficient reported in Table 2 indicates that seeking news information from traditional media decreases the polarization of vote choice. This is especially true if we look at the effect of reading newspapers and watching Television. However, it seems not to affect the polarization of vote choice in the parliament. As stated, we think that the measure of polarization we adopt for the election of the government is more precise, however, the results presented in Table 2 do not completely reject the null hypothesis. Indeed, while it seems that the consumption of TV and newspaper decreases the polarization of vote choice in the government, we do not see this effect for the vote choice in Parliament.

The second part of Table 2 indicates that the consumption of partisan material - mostly party website, party podium and personal contact with parties or candidate - increase the polarization of vote choice. However, this result is also less strong for the vote choice of respondents in the parliament than in their choice for government. Again, this may indicate that our indicator on the vote in government is more precise but it also indicates that we cannot completely reject the null hypothesis.

To see whether the polarization of the vote choice of respondents increased with more party media consumption and decrease with the consumption of more balanced news we computed the sum of respondents' scores on polarization in the Parliament and the government and ran the same model as presented in Table 2. This analysis aims to see whether the polarization of respondents' vote choice in both races is influenced by the media consumption of voters or whether the parliament election follows a different path and cancels the effect observed in the government. Table 3 presents the results of the regression with the sum of the polarization in the government and the parliament as the dependent variable.

Results presented in Table 3 show that the consumption of traditional media - more precisely reading newspapers - decrease the polarization of vote choice. On the contrary, relying on information produced and distributed by parties increases political polarization of vote choice. However, we also see that not every material has the same effect on voters' polarization. Indeed, the regression coefficients reported in Table 3 indicate that the vote choice of respondents gets polarized when they seek information on party websites events or direct contacts with parties and candidates. On the contrary, only seeking information in newspapers seems to significantly decrease the polarization of voters' choice in elections.

Overall, we ran six models to assess whether different types of media consumption affect differently the polarization of vote choice. To compare the effect of types of news consumption on the news media, we turn to Figure 5 which displays the estimates of the news items for the



Table 3:

	Trad. Media	Online Media	Both
<i>Traditional Media</i>			
Newspaper	-0.106** (0.039)		-0.098* (0.039)
TV	-0.038 (0.025)		-0.037 (0.025)
Radio	0.006 (0.028)		0.008 (0.028)
<i>Partisan Resources</i>			
Party Website	0.075* (0.031)		0.073* (0.031)
Party Flyer	-0.035 (0.026)		-0.030 (0.026)
Party Podium	0.089 <sup>+</sup> (0.051)		0.087 <sup>+</sup> (0.052)
Party Contact	0.079 (0.052)		0.083 (0.052)
<i>Online News Consumption</i>			
Blogs		0.005 (0.031)	-0.003 (0.031)
Web Forum		0.015 (0.039)	0.013 (0.039)
Email		-0.025 (0.026)	-0.021 (0.027)
Messenger		-0.051 <sup>+</sup> (0.029)	-0.053 <sup>+</sup> (0.029)
Social Media		0.075** (0.028)	0.051 <sup>+</sup> (0.028)
Online Newspaper		-0.002 (0.024)	0.002 (0.025)
<i>Control: Position in the first wave</i>			
all_val_abs	-0.245*** (0.010)	-0.238*** (0.010)	-0.245*** (0.010)
Constant	0.623*** (0.046)	0.516*** (0.033)	0.624*** (0.049)
Observations	3,431	3,438	3,431
Adjusted R <sup>2</sup>	0.148	0.143	0.148
<i>Note:</i>		*p<0.1; **p<0.05; ***p<0.01	

6 models presented in this section.

The figure shows first that the model on respondents who changed vote for the parliament

election has fare greater standard errors than the other models. This is due to the lack of observation - voters mostly kept their first vote intention for the election of the parliament. Concerning the type of media consumption and its effect on political polarization, we see two trends. First, the consumption of traditional news media affects decrease the polarization of voters' choice in elections. Second, the consumption of party resources increases the polarization of vote choice. However, not all the different traditional and party resources have the same effect. Indeed, while we see a quite clear effect of watching television and reading the newspaper, listening to the radio seems more inclined to increase political polarization. Also, the direct contact with parties - in an event or on the street - as well as the consumption of information on parties website increase the polarization of vote intention, seeking information on party flyers seem to have more a de-polarizing effect - although it is not significant. While we see that the type of news consumption is driving the polarization of vote choice, we do not explain why the radio and party flyers would have different effects than the other items in the same category. The following part aims to propose a theoretical explanation for both items.

In contrast to reading the newspaper, listening to the radio is a more passive activity. As a result, the cognitive involvement of both activities is not equal. When the cognitive involvement is lower, it is less easy to treat inconsistent information. Thus, while listening to the radio, people may invest sufficient cognitive resources to treat information that is consistent with their belief and discard the other content. This may lead to voters getting more polarized while listening to the radio not because the content of the news is unbalanced but because their cognitive unavailability reinforces their prior beliefs by focusing on content that is consistent with their prior belief and rejecting other content. Reading the newspaper, on the contrary, is an activity that is very cognitively demanding. Thus, when reading the newspaper, people's cognitive availability is higher leading them to treat all the consistent and inconsistent information with their prior beliefs. The result is that they will consider the full extent of the balanced information and evaluate their prior beliefs accordingly. Finally, the television is an in-between case. Indeed, the cognitive involvement of watching the news on TV should be between reading the newspaper and listening to the radio. One interesting element is that our results suggest that the effect of watching TV is between the effect of reading the newspaper and listening to the radio. This suggests that more than being subjected to balanced news sources, voters cognitive availability is crucial for the depolarization.

Concerning the partisan resources, we see that flyers of parties have an opposite effect than the other party items. Indeed, while all other interactions with party resources increase the polarization of vote choice, we see that seeking information on party flyers is more de-polarizing people. We argue that this is due to the solicited VS unsolicited information. Indeed, while

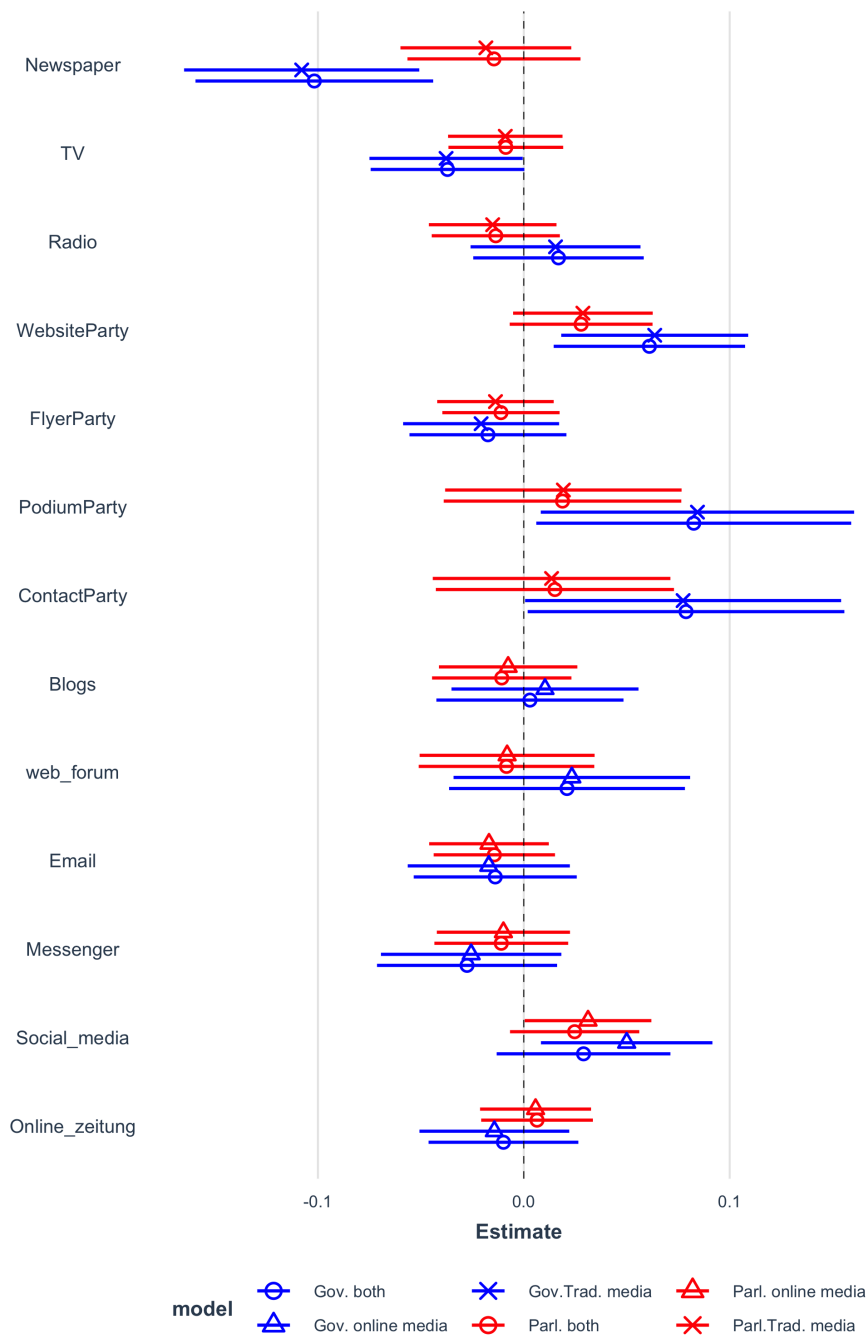


Figure 5: Estimates of the effect of types of media consumption on political polarization of vote choice.

voters are willing to visit party websites, to talk to parties and candidates, or to go to an event from parties, the distribution of flyers is done without the solicitation of voters. Additionally, while flyers have large visibility, they are a weak campaign tool used by all parties.

## Additional analyses

In this section, we present additional results to test for different factors that could affect the relationship between political polarization and the type of media consumed by individual voters. These analyses concern the government election - where we have the more detailed indicator based on the aggregation of the selection of up to seven candidate. The regression tables are displayed in Appendix A and the replication of the analyses produce in this section with the vote polarization in parliament are presented in Appendix C.

First, one of the the main issue with political polarization is the double sided effect. In the statistical analyses, we made sure to treat similarly polarization to the extreme both on the left and on the right. However, while these represent better the whole concept of political polarization, the mechanism behind the political polarization may not be the same for left and right voters. To test for this, this section presents the results of the analyses for voters on the left and on the right. To do so, we will keep only voters whose vote choice was only "negative" or "positive" in both panel waves. This exclude voters who passed through what is identified as the political center by the Bayesian IRT models during the political campaign.

Second, we present the effect the independent variables have on the absolute value of the vote choice ideology in the second wave. The analyses presented considered that voters who did not change their vote choice during the political campaign did not get polarized. While this operationalization more accurately represents the concept of political polarization, it remains limited in what it can show. Importantly, in the analyses we controlled for the vote choice ideology of voters in the first wave. If voters indicate they vote for the most extreme party or candidate in the first waves, they cannot have a more polarized vote choice in the second wave. Similarly, if voters choose a centrist party or candidate, they cannot get more centrist. Thus, we also provide analyses on the effect of news consumption of vote choice extremism.

Figure 6 presents the results of the analyses of the effect of the type of media consumption for voters on the left and on the right. We see that the results essentially go in the same direction. However, we see interesting difference when it comes to the effect size. Indeed, the most notable difference concerns the consultation of party websites. While consulting party website has very little effect on leftist voters, it seems to polarize the vote choice of voters on the right. Interestingly, social media also seem to have a different effect on the polarization of voter on the left and the right side of the political spectrum although these effects are not significant. While Figure 6 shows relatively similar patterns on the effect of media consumption on vote polarization, the small variation highlighted here would need to be investigated further. This nevertheless highlights that the link between media consumption and political polarization is essentially the same between left and right voters.

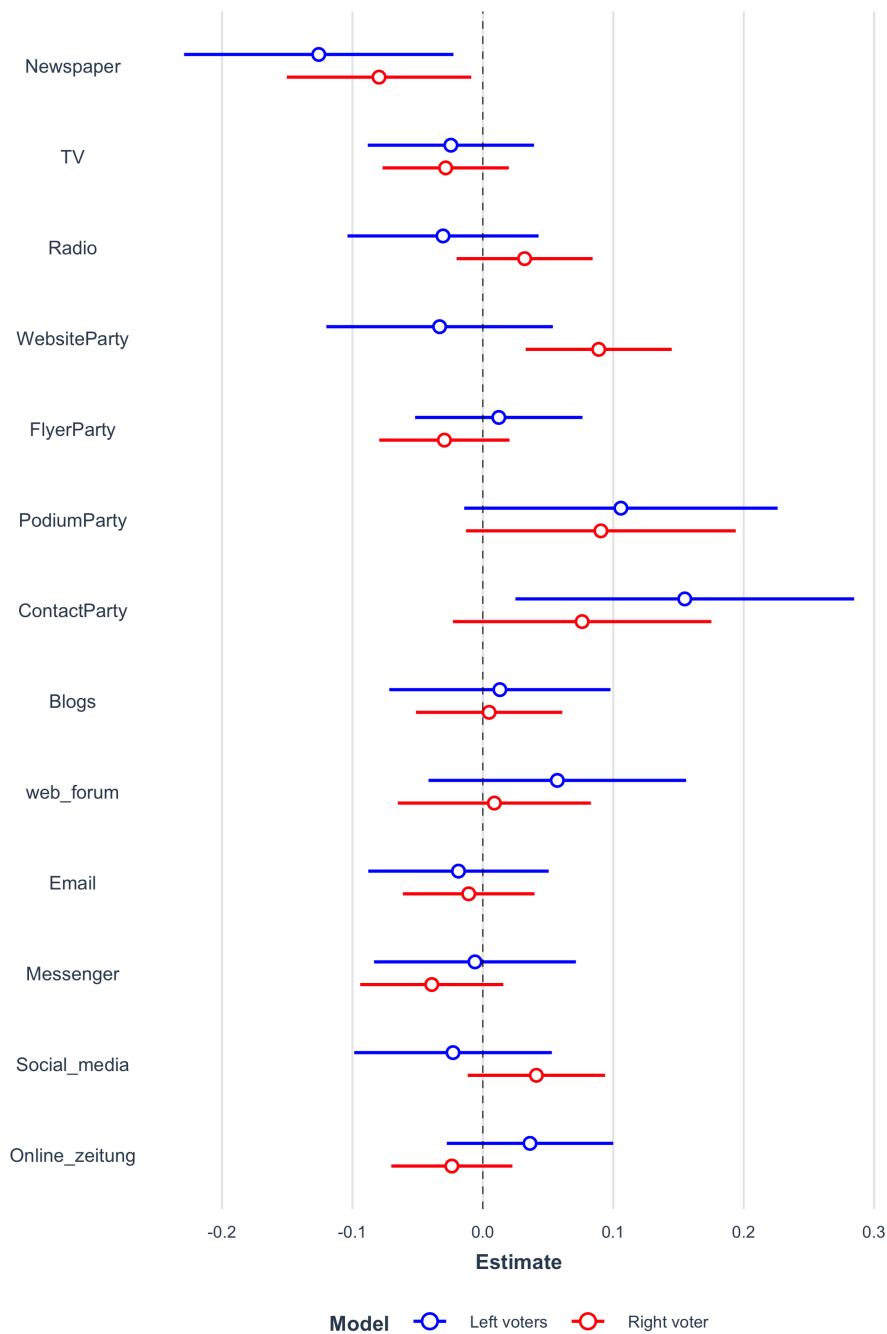


Figure 6: Effect of media consumption on political polarization for left and right voters.

Figure 7 displays the results of the analyses on the effect of media consumption on vote extremism for the whole sample, left voters, and voters on the right. Interestingly, it shows a very similar picture than the analyses on vote polarization. Indeed, the consumption traditional media - TV, radio and Newspaper - centralise the vote choice of voters - both left and right. For the partisan media, we also see that the effects are quite similar to the ones on polarization - also both for left and right voters. However, when it comes to social media, we see some divergence between left and right voters. While it seems that voters on the right who use social media are

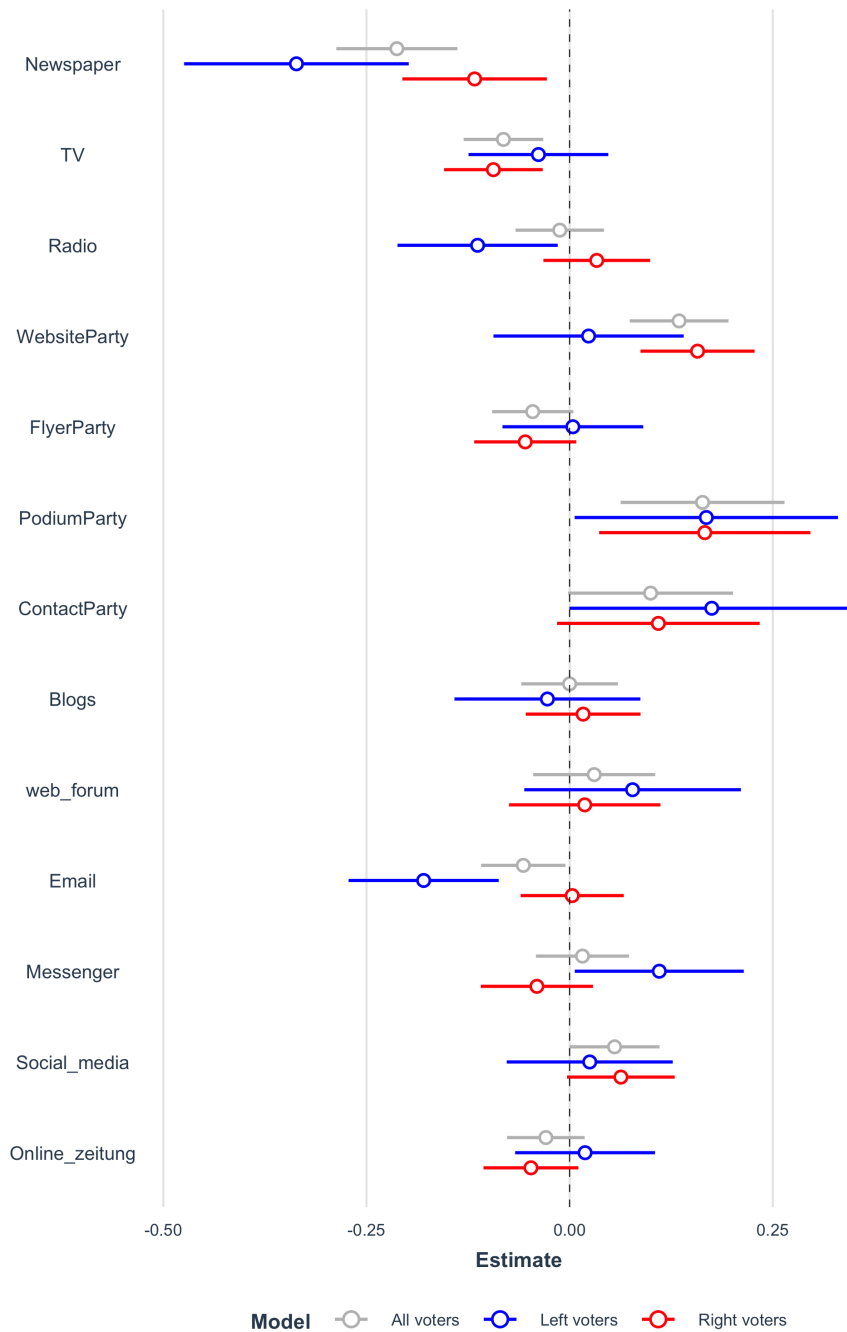


Figure 7: Effect of media consumption on vote extremism.

more extreme, the effect is practically null for leftist voters. Although the difference between left and right voters is not significant it would be of interest to study them beyond the scope of this paper.

These additional analyses showed that the results presented in the paper mostly hold when we consider different ideologies and that the link between media consumption and political polarization or extremism is essentially the same.

## Conclusion

This paper studies the link between media consumption and political polarization. We differentiate between different media types based on the assumption that more *balanced* medias will trigger less polarization and more centralization of voting behaviour while more *partisan* medias will strengthen the polarization of voters. In a second step, we also study the impact of the consumption of information on social media on the political polarization of voters during political campaigns.

The results indicate that the consumption of some types of media influence the polarization of vote choice during elections. Indeed, first the traditional media - identified as more *balanced* - diminish political polarization and have a tendency to lead to more centrist vote choices of individual voters during the political campaign. Second, our results highlight how the consumption of *partisan* media - in our study, the information produced by parties - increase the polarization of vote choice during the course of the campaign.

The first contribution of this study is theoretical. Indeed, our framework as well as our results indicate that different media types - traditional VS partisans - affect differently the polarization of vote choice. We argue that this is because traditional media present information in a more balanced matter than partisan medias. As argued, the issue is not only that people are shown only one side or the other of a story but that the information in partisan media is not presented with the potential downside of the position.

The second contribution of this paper is the measure of individual polarization based on vote choice in election. Using Bayesian IRT models, this paper measures the polarization of vote choice through the parameters that represent the ideology of parties and candidates. This way, we do not only operationalize the direction of individual polarization using a behavioral metric, but we also quantify this polarization using the distance between parameters from Bayesian IRT models as indication of the ideological distance between parties and candidates.

While these contribution are important for the study of the individual drivers of political polarization, it is subjected to some limitations. Indeed, while we know what types of media respondents use to get informed, we do not know exactly what media they consume or what information they are exposed to. Thus, although we theorize how the formatting of the information on different media means should influence the political polarization of vote choice during election campaigns, we do not know what information respondents consume during this campaign. Thus, it is possible that even if voters consume only print media - newspaper - they might be exposed to very extreme and unbalanced rhetoric. Also, while social media is believed to have a negative effect on political polarization, some voters may well use it to be exposed to highly balanced information on a large variety of topics. We believe that to understand better

the link between media consumption and political polarization - or more largely its link to political attitudes - future study should try to have better indication on the content and the source that voters rely on during election campaigns.

The results of this paper focus on a regional election in the Swiss context, which may limit the generalization of the results. We suggest that other studies should study the individual drivers of political polarization during election campaigns in multiparty system to know whether the patterns we find in this specific context - the link between polarization of vote choice and the consumption of balanced or partisan information - is similar elsewhere. While there is some evidence from the US that the growing partisan media ecosystem influences the polarization of the mass public, the bipartisan system and the aggregate measure of political polarization makes it difficult to really link these two elements.

This paper finds that more balanced media brings less polarization and more centrist vote choices and the opposite is true for partisan medias. The sustainability of political institutions directly depends on the polarization of the mass public. We show that individuals who consume more balanced information get less polarized during the course of a political campaign. Nowadays, the media ecosystem favor more than ever partisan medias. Although they are dangerous for democratic institutions, they are the clear winner of the changing media environment. Thus, while it is clear that the freedom of speech should prevail and not forbid partisan media, it could be desirable for democracies to invest resources in a balanced media environment to enable those who seek balanced information to have it.



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## Appendix

In this section, we present the additional analyses conducted for the paper. First, Appendix A presents the regression tables used to make the figure presented in the additional analyses. Afterwards, we present the results of the analyses in the paper with different draws from the posterior estimates of the Bayesian IRT models. While in the paper we present the results with the 50<sup>th</sup> percentile of the posterior, Appendix B present the same results with draws at 2.5, 25, 75 and 97.5 percentiles. Finally, Appendix C shows the results of the additional analyses with the dependent variables built on both the polarization of vote choice in the parliament and in the government. Overall, the appendix show that the results presented in the paper are robust.

### **Appendix A: Regression results for the additional analyses**

Table 4: Regression results for left and right voters.

	Only left voters	Only right voters
Newspaper	-0.126*	-0.080*
	(0.053)	(0.036)
TV	-0.025	-0.029
	(0.032)	(0.025)
Radio	-0.031	0.032
	(0.037)	(0.027)
Party Website	-0.033	0.089**
	(0.044)	(0.029)
Party Flyers	0.012	-0.029
	(0.033)	(0.025)
Party Podium	0.106	0.091
	(0.061)	(0.053)
Party Contact	0.155*	0.076
	(0.066)	(0.051)
Blogs	0.013	0.005
	(0.043)	(0.029)
Web Forum	0.057	0.009
	(0.050)	(0.038)
Email	-0.019	-0.011
	(0.035)	(0.026)
Messenger	-0.006	-0.039
	(0.039)	(0.028)
Social Media	-0.023	0.041
	(0.039)	(0.027)
Online Newspaper	0.036	-0.024
	(0.033)	(0.024)
ST_1_val_all_abs	-0.357***	-0.443***
	(0.020)	(0.017)
Constant	0.494***	0.652***
	(0.066)	(0.045)
Observations	1,262	1,805
Adjusted R <sup>2</sup>	0.205	0.268
<i>Note:</i>	*p<0.05; **p<0.01; ***p<0.001	

Table 5: Regression results on extremism of vote choice.

	All voters	Left voters	Right voters
Newspaper	-0.213*** (0.038)	-0.336*** (0.070)	-0.117** (0.045)
TV	-0.081** (0.025)	-0.038 (0.044)	-0.094** (0.031)
Radio	-0.012 (0.028)	-0.113* (0.050)	0.033 (0.033)
Party Website	0.135*** (0.031)	0.023 (0.060)	0.157*** (0.036)
Party Flyer	-0.045 (0.025)	0.004 (0.044)	-0.055 (0.032)
Party Podium	0.164** (0.051)	0.168* (0.083)	0.166* (0.066)
Party Contact	0.100 (0.052)	0.175 (0.089)	0.109 (0.064)
Blogs	-0.00003 (0.030)	-0.027 (0.058)	0.017 (0.036)
Web Forum	0.030 (0.038)	0.077 (0.068)	0.019 (0.047)
Email	-0.057* (0.026)	-0.180*** (0.047)	0.003 (0.032)
Messenger	0.016 (0.029)	0.110* (0.053)	-0.040 (0.035)
Social Media	0.055 (0.028)	0.025 (0.052)	0.063 (0.034)
Online Newspaper	-0.029 (0.024)	0.019 (0.044)	-0.048 (0.030)
Constant	1.414*** (0.041)	1.592*** (0.077)	1.413*** (0.049)
Observations	3,479	1,262	1,805
Adjusted R <sup>2</sup>	0.031	0.041	0.033

Note:

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

**Appendix B: Regression results of analyses with different percentiles of  $\theta_j$  and  $\beta_i$  parameters from the Bayesian IRT models**

Table 6: Regression models for the vote choice in Government with different percentile draws.

	2.5 <sup>th</sup>	25 <sup>th</sup>	75 <sup>th</sup>	97.5 <sup>th</sup>
Newspaper	-0.102*** (0.030)	-0.103*** (0.029)	-0.100*** (0.030)	-0.100** (0.032)
TV	-0.038* (0.019)	-0.038* (0.019)	-0.035 (0.019)	-0.053** (0.020)
Radio	0.024 (0.021)	0.020 (0.021)	0.015 (0.021)	0.041 (0.023)
Party Website	0.050* (0.024)	0.057* (0.024)	0.064** (0.024)	0.107*** (0.025)
Party Flyer	-0.017 (0.019)	-0.017 (0.019)	-0.017 (0.020)	-0.043* (0.021)
Party Podium	0.079* (0.039)	0.081* (0.039)	0.084* (0.039)	0.054 (0.042)
Party Contact	0.069 (0.039)	0.075 (0.039)	0.083* (0.039)	0.080 (0.042)
Blogs	0.015 (0.023)	0.007 (0.023)	-0.001 (0.023)	0.024 (0.025)
Web Forum	0.008 (0.029)	0.016 (0.029)	0.024 (0.029)	0.009 (0.031)
Email	-0.020 (0.020)	-0.016 (0.020)	-0.012 (0.020)	-0.001 (0.022)
Messenger	-0.029 (0.022)	-0.028 (0.022)	-0.028 (0.022)	-0.041 (0.024)
Social Media	0.030 (0.022)	0.029 (0.021)	0.029 (0.022)	0.038 (0.023)
Online Newspaper	-0.016 (0.019)	-0.012 (0.019)	-0.008 (0.019)	-0.045* (0.020)
Ideology vote choice	-0.392*** (0.012)	-0.393*** (0.012)	-0.391*** (0.012)	-0.391*** (0.013)
1 <sup>st</sup> wave				
Constant	0.562*** (0.036)	0.556*** (0.036)	0.541*** (0.036)	0.560*** (0.039)
Observations	3,431	3,431	3,431	3,431
Adjusted R <sup>2</sup>	0.234	0.236	0.232	0.213

*Note:*

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

Table 7: Regression models for the vote choice in Parliament with different percentile draws.

	2.5 <sup>th</sup>	25 <sup>th</sup>	75 <sup>th</sup>	97.5 <sup>th</sup>
Newspaper	-0.008 (0.022)	-0.012 (0.021)	-0.017 (0.021)	-0.021 (0.022)
TV	-0.007 (0.015)	-0.008 (0.014)	-0.009 (0.014)	-0.011 (0.015)
Radio	-0.010 (0.016)	-0.012 (0.016)	-0.015 (0.016)	-0.017 (0.016)
Party Website	0.029 (0.018)	0.028 (0.018)	0.027 (0.018)	0.027 (0.018)
Party Flyer	-0.011 (0.015)	-0.011 (0.015)	-0.011 (0.015)	-0.012 (0.015)
Party Podium	0.021 (0.030)	0.019 (0.030)	0.018 (0.030)	0.017 (0.030)
Party Contact	0.023 (0.030)	0.018 (0.030)	0.012 (0.030)	0.007 (0.030)
Blogs	-0.011 (0.018)	-0.011 (0.017)	-0.011 (0.017)	-0.010 (0.018)
Web Forum	-0.006 (0.022)	-0.008 (0.022)	-0.009 (0.022)	-0.011 (0.022)
Email	-0.008 (0.015)	-0.012 (0.015)	-0.016 (0.015)	-0.020 (0.015)
Messenger	-0.013 (0.017)	-0.012 (0.017)	-0.010 (0.017)	-0.009 (0.017)
Social Media	0.022 (0.016)	0.024 (0.016)	0.026 (0.016)	0.028 (0.016)
Online Newspaper	0.003 (0.014)	0.005 (0.014)	0.008 (0.014)	0.010 (0.014)
Vote choice ideology	-0.203*** (0.011)	-0.213*** (0.011)	-0.224*** (0.011)	-0.235*** (0.011)
1 <sup>st</sup> wave				
Constant	0.206*** (0.027)	0.229*** (0.026)	0.253*** (0.026)	0.277*** (0.027)
Observations	3,567	3,567	3,567	3,567
Adjusted R <sup>2</sup>	0.087	0.099	0.109	0.115

*Note:*

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001



**Appendix C: Regression results of the additional analyses with vote polarization and extremism in the parliament.**

Table 8: Regression results for left and right voters, for the polarization in the vote choice for the Parliament.

	Left voters	Right voters
Newspaper	-0.006 (0.026)	0.038 (0.041)
TV	-0.022 (0.018)	-0.017 (0.025)
Radio	-0.019 (0.019)	0.009 (0.029)
Party Website	0.028 (0.021)	0.022 (0.034)
Party Flyer	-0.031 (0.018)	-0.008 (0.025)
Party Podium	0.020 (0.037)	0.021 (0.047)
Party Contact	-0.020 (0.035)	0.030 (0.051)
Blogs	0.005 (0.020)	-0.001 (0.033)
Web Forum	-0.027 (0.027)	0.008 (0.038)
Email	0.012 (0.018)	-0.025 (0.027)
Messenger	-0.023 (0.020)	-0.050 (0.030)
Social Media	0.040* (0.019)	0.011 (0.030)
Online Newspaper	-0.025 (0.017)	0.047 (0.025)
Vote choice ideology	-0.001	-0.013
1 <sup>st</sup> wave	(0.012)	(0.015)
Constant	-0.012 (0.032)	0.020 (0.051)
Observations	2,056	1,244
Adjusted R <sup>2</sup>	0.003	-0.002

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

Table 9: Regression results on extremism of vote choice for the polarization in the vote choice for the Parliament.

	All voters	Left voters	Right voters
Newspaper	-0.091** (0.034)	-0.011 (0.033)	-0.259*** (0.078)
TV	-0.017 (0.023)	-0.058* (0.022)	0.048 (0.049)
Radio	-0.029 (0.025)	0.038 (0.024)	-0.173** (0.057)
Party Website	0.096*** (0.028)	0.070** (0.026)	0.114 (0.067)
Party Flyer	0.004 (0.023)	-0.028 (0.023)	0.062 (0.049)
Party Podium	0.039 (0.047)	0.010 (0.048)	0.019 (0.093)
Party Contact	0.068 (0.047)	-0.020 (0.045)	0.167 (0.099)
Blogs	-0.053 (0.027)	-0.019 (0.026)	-0.117 (0.065)
Web Forum	0.005 (0.035)	0.033 (0.035)	0.008 (0.073)
Email	-0.057* (0.024)	0.003 (0.023)	-0.188*** (0.053)
Messenger	0.029 (0.026)	-0.016 (0.026)	0.128* (0.058)
Social Media	0.033 (0.025)	0.031 (0.025)	0.064 (0.057)
Online Newspaper	-0.011 (0.022)	-0.073*** (0.022)	0.090 (0.049)
Constant	1.124*** (0.037)	1.087*** (0.035)	1.274*** (0.084)
Observations	3,567	2,093	1,261
Adjusted R <sup>2</sup>	0.009	0.010	0.036

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