Article

Do Intensive Public Debates on Direct-Democratic Ballots Narrow the Gender Gap in Social Media Use?

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Abstract
Despite the growing importance of new technologies, research on individual opinion formation in the digital domain is still in its infancy. This article empirically examines citizens' use of social media in the context of direct democracy. Based on previous work, we expect men to form their opinions on social media more frequently than women (gender gap hypothesis). In the second step, we focus on the contextual level by examining the role campaigns play in reducing this discrepancy. More specifically, we hypothesize that the presumed gender gap narrows in accordance with the increasing intensity of public debates that precede ballots (interaction hypothesis). The empirical analysis draws on 13 post-ballot surveys held at Switzerland's federal level from 2016 to 2020 and supports both the gender gap and the interaction hypotheses.

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1. Introduction

In the wake of the digital transformation, political communication has increasingly moved online. For citizens, the advance of digital technologies has dramatically expanded the range of tools through which they can get involved politically. In recent years, social media channels have established themselves as popular venues of participation. Political debates currently take place on Facebook, Twitter, and many other platforms. These new digital media have not only become important sources of information; they have also enabled citizens to counter the top-down communication of traditional print and broadcast media thanks to their flexible, open, and interactive nature, thus fostering opportunities for bottom-up communication (Esser, 2013).

However, these new platforms also raise concerns about social inequalities (Halford & Savage, 2010). It is important to consider these new venues for social inequalities given that the role of digital media is likely to continue to grow in the future. According to Robinson et al. (2015, p. 571), "one cannot understand the social landscape of the twenty-first century without coming to grips with digital inequalities." Groups that tend to be excluded from the digital domain are likely to experience decisive disadvantages in terms of political representation. If these groups are unable to compensate for their lack of online presence through their engagement in the declining offline world, it is likely that their voices will be heard less in the political debate, thus leading to reduced visibility, voice, and influence in decision-making (Grasso & Smith, 2022, p. 43). This exclusion is especially worrisome when the views of these groups differ from those of the more digitally involved ones.

This article examines the gender gap, one of the most persistent social inequalities in politics, by focusing on

the individual use of social media in political campaigns. We test two hypotheses based on theoretical considerations developed in the next section. First, we expect that men form their opinions through social media more frequently than women (gender gap hypothesis). Second, we focus on the contextual level by examining how the intensity of public debates reduces this individual-level discrepancy (interaction hypothesis). More specifically, we hypothesize that the presumed gender gap narrows with increasing media coverage.

We test these hypotheses in the context of direct-democratic votes. Although reliance on digital media has become more popular, the overwhelming majority of existing studies on citizens' use of social media in campaigns focus on elections (Owen, 2017). Research on direct democracy is thus still in its infancy. If empirical studies exist, they typically focus on single votes (e.g., Arlt et al., 2019; Del Vicario et al., 2017). Systematic studies on the use of social media in the context of referendums and initiatives can thus be considered a major lacuna in the current scholarly literature.

This article focuses on Switzerland, thereby taking full advantage of the fact that it hosts many direct-democratic ballots. The empirical analysis draws on the so-called "VOTO studies." These are post-ballot surveys of a representative sample of Swiss citizens conducted after each of the 13 ballots that occurred at the Swiss federal level from September 2016 to September 2020. Our empirical analyses reveal support for both the gender gap and the interaction hypotheses.

The remainder of this article is structured as follows. In Section 2, we develop our theoretical arguments, which culminate in the formulation of the gender gap and the interaction hypotheses. Section 3 briefly describes the selected Swiss direct-democratic context and provides an overview of the data and the measurement of the indicators. Section 4 presents the results of our bivariate and multivariate analyses. In Section 5, we recapitulate and discuss the main findings of this article and provide interested scholars with some avenues for future research.

2. Gender Gaps in Social Media Use

The late suffrage granted to women compared with men in many Western democracies has historically led to lower levels of female participation in elections. While women now generally participate more in elections, their turnout levels have still not reached those of men in some countries (Franceschet et al., 2019). In addition, women lag when it comes to numerous types of traditional political participation in the offline domain. While they tend to participate more in private and individual ways (see Gundelach & Kalte, 2021), collective and conventional forms of public engagement are more prevalent among men (Coffé & Bolzendahl, 2010).

From a theoretical point of view, there are two main explanatory factors for the persistent gender gaps in political engagement: individual resources and socialization (Verba et al., 1997). As far as individual resources are concerned, women have been historically disadvantaged in terms of income, education, time, and civic skills, thus leading to their lower levels of political participation (Grasso & Smith, 2022, p. 43). The most important factor is probably that women are still more likely to take care of their children, which allows them less time to get involved in politics and blocks their opportunities to acquire the skills to do so. As a result, politics tend to remain dominated by men.

In terms of socialization, there has always been a focus on the binary division between men's and women's roles in democratic societies. The different manners of raising young girls and boys crucially affect their political engagement. More specifically, women's spheres have been more private, given that they revolve around family well-being, while men's spheres have been public and perceived as more essential (Coffé, 2013, p. 325). Therefore, there is a culture of masculinity in the realm of politics that can act as a deterrent for women (Bäck et al., 2014, p. 507). It is therefore consistent that girls currently still express less interest and enthusiasm than boys for political life and political office (Bos et al., 2020).

In connection with today's digitization of political communication, scholars have addressed the salient question of whether existing gender gaps disappear or persist with the rise of social media, which grants citizens a new means through which to form their political opinions. There is no doubt that these platforms have become very popular in recent years. In line with the equalization thesis, according to which structurally disadvantaged groups can compensate for their political weaknesses thanks to new digital media, optimists have highlighted the potential of social media for women (e.g., Xenos et al., 2014). Due to low access barriers, social media may offer the opportunity for a larger public to get involved in political discussions. Given that social media allow for deinstitutionalized and interactive communication and permits every single user to produce content (Bechmann & Lomborg, 2013), there was hope that low-status and peripheral actors would also be able to benefit from them and not only traditionally more powerful and established ones.

The scholarly literature suggests that three main factors may encourage the equalization of political online engagement with respect to gender (e.g., for an overview of the literature see Abendschön & García-Albacete, 2021). First, social media allow women to compensate for time-consuming offline activities. Second, women were found to use more frequently social media than men in the United States (Hargittai & Jennrich, 2016), which can be seen as an encouraging sign for closing the gender gap in the political online sphere. Third, major socio-structural trends in Western societies, such as higher levels of female education and labour market participation, can be expected to lead many women to easily acquire the resources required to be involved

online. This argument thus quasi automatically envisions an increased share of women who participate in political communication.

However, after some initial optimism, numerous empirical studies on individual political online activities (e.g., Bode, 2017; Boulianne et al., 2021; Theocharis & Van Deth, 2018) have revealed significant gender gaps. In line with classic studies on political engagement in the offline world, women were also rather consistently shown to be less active than men in the digital world. This pattern lends support to the normalization thesis. According to this thesis, existing power imbalances get reproduced in the digital realm (Margolis & Resnick, 2000).

Altogether, women are much more likely to resort to social media for private purposes than men (Hargittai & Jennrich, 2016). In particular, the gender gap in social media use proves to be particularly large in online engagement that has high visibility such as posting, sharing, and debating political content (Bode, 2017; Joiner et al., 2014). Hence, women may be less likely than men to form their political opinions on social media.

To explain persisting gender gaps, various scholars have stressed that women face a particularly hostile climate on social media. Indeed, harassment of women is a recurrent topic in this strand of literature (Boulianne et al., 2021; Schiffrin et al., 2021). Amongst others, studies show that fear of harassment shapes women's likelihood to express their political views online, particularly on social media, and more so than men's (Koc-Michalska et al., 2021; Nadim & Fladmoe, 2021).

Moreover, campaign contexts may further deter women from using social media for opinion-formation purposes. Unlike ordinary politics, campaigns are characterized by highly visible public conflicts between political camps, which are typically unwilling to make any concessions or compromises. In addition, personal attacks, scandals, and other incivilities are much more likely to occur during campaigns (Kahn & Kenney, 1999). Given that women have been found to be more conflict-avoidant, more sensitive to other people's opinions, and prefer a positive tone in online communication (Lin & Lu, 2011; Ulbig & Funk, 1999), we expect gender gaps to be visible in terms of opinion formation in campaign contexts. We also believe this may apply to direct-democratic ballots, which is the focus of this article.

Hence, the gender gap hypothesis goes as follows:

H1: Men form their opinions on social media more frequently than women.

In addition to H1, we are interested in the moderating role played by contextual characteristics in reducing gendered discrepancies at the individual level. More specifically, we hypothesize that the presumed gender gap narrows with the increasing intensities of public debates that precede electoral decisions. This expectation is rooted in the following theoretical consideration: High levels of public debate intensity preceding democratic votes increase the interest of politically less involved citizens, thereby leading to a "democratic expansion," i.e., to a more inclusive use of social media for opinion formation purposes. We expect that this democratic expansion results in a narrowing of the gender gap.

In the following, we outline our line of reasoning by focusing on direct democracy. The public debates that precede referendums and initiatives provide citizens with a prime source of political information from various political actors, journalists, and their peers (Kriesi, 2011). It should be noted that we prefer the notion of public debate to that of campaigns since the latter is basically limited to mobilization and communication efforts by partisan actors who aim to convince citizens of their respective issue-specific positions (Bernhard, 2012). In contrast, media actors are usually much more neutral and also typically let both sides have their say in the reporting (Udris et al., 2016).

Overall, the cognitive and emotional involvement of individuals may increase as the public debate on a given direct-democratic ballot intensifies (Kriesi, 2005). This public debate provides citizens with a unique occasion to learn about the issues that are submitted to the ballot, to receive issue-relevant political information, and to increase their issue-specific awareness. As a result, citizens may search for additional information to form their opinions and share content on interactive social media platforms.

Two key mechanisms may be at play here: motivation and capacity. As to motivation, intensive public debates signal to citizens that important political topics are at stake. Extensive media coverage draws citizens' attention to these issues since citizens receive a high number of messages. As a result, they are willing to learn more and become better informed. In especially intensive cases, citizens can hardly escape the public debate. Many start to understand how the issue affects them at both the individual and societal levels. As a consequence, they become motivated to get involved in order to defend their personal or collective political interest (Kriesi, 2005).

Regarding capacity, direct democracy imposes high demands on citizens in terms of issue-specific knowledge. Indeed, ordinary citizens cannot generally be expected to have such information when referendums and initiatives are placed on the ballot. However, intensive public debates create an environment that may be conducive to political learning by noticeably increasing the flow of information to citizens (Kriesi, 2011). When exposed to huge amounts of media reports about the contents of the ballot propositions at stake, citizens are able to acquire substantial issue-specific knowledge (Bernhard, 2018). In this context, it has been shown that, in the case of Switzerland, intensive media coverage leads to a "steady stream of arguments and voting cues, allowing voters to make enlightened choices that are in line with their preferences" (Kriesi, 2011, p. 238).

Assuming that intensive public debates on direct-democratic ballots increase an extraordinary number of citizens' motivations and capacities to get politically involved, social media should lead to a more inclusive composition of citizens who are able to form an opinion on the issues at stake. In other words, in this environment, access to social media is expected to be less restricted to politically advantaged groups. This logic may apply to all kinds of structural inequalities, including those related to gender, which are at the core of this article.

Based on these considerations, we are now equipped to formulate the second hypothesis, the interaction hypothesis:

H2: The gender gap in social media use for opinion formation purposes narrows with the increasing intensity of public debates.

3. Case Selection, Data, and Measurements

This article focuses on Switzerland, the paradigmatic case of direct democracy. Despite the worldwide rise in the use of ballot measures in the last few decades (Qvortrup, 2018), the country still stands alone in its extensive use of referendums and initiatives. Up to four times a year, citizens are called to the ballot boxes to decide on issue-specific propositions that can occur at the country's three political levels (i.e., federal, cantonal, and local). Hence, scholars interested in the practice of direct democracy are well advised to take full advantage of Switzerland's experience.

As with experiences in other liberal democracies (e.g., de Vreese, 2007), the issue-specific public debates that precede direct-democratic votes are crucial for citizens' opinion formation in the Swiss case. In addition to interpersonal communication, citizens have been found to rather routinely make up their minds based on elite communication from political actors and journalists (Kriesi, 2011). While traditional mass media (especially newspapers, TV, and radio broadcasts) still play a central role, social media have steadily grown in importance over recent years (e.g., Arlt et al., 2019; Udris et al., 2016).

The empirical analysis relies on the so-called "VOTO studies." These are post-ballot surveys that rely on computer-assisted telephone interviews (CATI). They contain around 1,500 respondents for each study with an overrepresentation of respondents from the French and Italian-language regions, compared with the majority from the German-speaking part of the country. On behalf of the Swiss Federal Chancellery, the "VOTO studies" were conducted by the Swiss Centre of Expertise in the Social Sciences together with the Centre for Democracy Studies Aarau at the University of Zurich and the private pollster LINK after each of the 13 ballots that took place at the federal level between September 2016 and September 2020 (more details can be found at https://www.voto.swiss).

Note that we decided to limit ourselves to this dataset because previous systematic post-ballot surveys did not include the participants' social media use. In the last years of the so-called "VOX analyses" (1977–2016), the surveys only contained a crude question on the role played by the internet. The new "VOX analyses" (since November 2020), for their part, are based on a different methodological approach. They rely on mixed-mode surveys using online and paper questionnaires, which is why it is not obvious to link their data with the CATI-based "VOTO studies."

Table 1 lists the 13 selected ballots in chronological order. As can be seen from this table, the number of propositions that were submitted to the vote ranges from one to five.

We now turn to the construction of the indicators that are used in this analysis. The dependent variable is the social media use for opinion formation purposes. It is dichotomous in nature: Respondents were asked whether they relied on "social media such as Facebook and Twitter" to inform themselves and form an opinion prior to voting (code 1 for *yes*, 0 for *no*). This item is part of a battery that contained 12 other information sources (see below). It is also worth mentioning that only citizens who participated in a given ballot were asked this question. Hence, abstainers were automatically excluded from our analysis. This means that the voter composition differs across ballots. There are competing theoretical expectations as to whether this selection affects the result of our empirical analysis. We will address this question in the conclusion.

A first look at this indicator reveals that on average a little more than one in four respondents reported having used social media for their opinion formation (26.6%). It appears that there is some substantial variation across ballots. Indeed, the minimum score amounts to 23.7% for VOTO 10 and the maximum one to 33% for VOTO 13.

Regarding gender, the main independent variable, we distinguish between women (code 1) and men (code 2). While scholars usually resort to this biological operationalization, a non-binary measure would be preferable in order to be in line with gender theory (Bittner & Goodyear-Grant, 2017). Unfortunately, such an indicator is not available from the VOTO surveys.

For the intensity of the public debates, which we will interact with gender for testing H2, we incorporated external data on media coverage into the VOTO dataset. Thanks to the courtesy of the Research Center for the Public Sphere and Society at the University of Zurich (fög), we employ an indicator that includes the number of articles produced by 19 important Swiss media outlets from the two biggest language regions i.e., the German- and French-speaking parts (for similar measures, see e.g., Udris et al., 2016). We added the number of articles these media outlets produced about the proposition(s) submitted to a given ballot during the hot phase of the campaigns (i.e., in the period between 12 weeks and one week before the ballot date).

Table 1. Overview of the selected ballots (in chronological order with the submitted propositions).

Ballot	Date	Proposition	Type
VOTO 1	September 25, 2016	Green economy	Popular initiative
		Old age scheme insurance (OASI)	Popular initiative
		Intelligence law	Optional referendum
VOTO 2	November 27, 2016	Withdrawal from nuclear energy	Optional referendum
VOTO 3	February 12, 2017	Facilitated naturalizations	Compulsory referendum
		Roads and agglomeration transport fund	Compulsory referendum
		Corporate tax reform III	Optional referendum
VOTO 4	May 21, 2017	Energy law	Optional referendum
VOTO 5	September 24, 2017	Food security	Direct counter draft to popular initiative
		Additional financing of OASI	Compulsory referendum
		OASI reform 2020	Optional referendum
VOTO 6	March 4, 2018	New financial regime	Compulsory referendum
		Abolition of radio and TV fees	Popular initiative
VOTO 7	June 10, 2018	Sovereign money	Popular initiative
		Gambling law	Optional referendum
VOTO 8	September 23, 2018	Bicycle lanes	Direct counter draft to popular initiative
		Fair food	Popular initiative
		Food sovereignty	Popular initiative
VOTO 9	November 25, 2018	Subsidies for cow horns	Popular initiative
		Self-determination	Popular initiative
		Monitoring of insured people	Optional referendum
VOTO 10	February 10, 2019	Urban sprawl	Popular initiative
VOTO 11	May 19, 2019	Corporate tax reform and financing of OASI	Optional referendum
		Weapons law	Optional referendum
VOTO 12	February 9, 2020	Affordable housing	Popular initiative
		Ban of discrimination on sexual orientation	Optional referendum
VOTO 13	September 27, 2020	Limitation of immigration	Popular initiative
		Hunting law	Optional referendum
		Child tax deductions	Optional referendum
		Paternity leave	Optional referendum
		Purchase of fighter jets	Optional referendum

Among the selected ballots, VOTO 13 turns out to have attracted the highest amount of media coverage (1,376 articles). This is not surprising, given that it was the only one to include the maximum of five propositions. In contrast, the minimum value is reached for VOTO 10 (260 articles). On this ballot, Swiss citizens were only invited to decide on one proposition, a rather low-salient popular initiative aiming to contain urban sprawl. However, it is worth noting that a change occurred in the media sample from VOTO 8 on. For 13 media outlets, the articles from the print editions were replaced with online articles. According to the members of fög, this may have caused a slight increase in the number of articles after VOTO 7. We will return to this issue in the empirical analysis.

We also control for a series of variables that can be expected to influence the extent of individual social media use. Perhaps most importantly, we account for the respondents' age (in years). This is due to the fact that previous studies have consistently shown that social media are by far the most popular among younger people (e.g., Hernandez, 2019; Owen & Deng, 2021). In addition, socio-economic status is likely to be positively associated with the dependent variable. We include the respondents' level of education by relying on a six-level hierarchical classification elaborated by the Federal Statistical Office.

Additionally, we consider three types of political variables. First, we look at the respondents' degree of political interest. To that end, we rely on an increasing four-level scale (*not at all interested*, *not very interested*, *somewhat interested*, *very interested*) with the expectation that there is a positive association with social media use for opinion formation purposes. Second,

political ideology is measured by the respondents' self-positioning on a left-right scale that ranges from 0 (*completely left*) to 10 (*completely right*). Research indicates that communities from the left are particularly active on social media in Switzerland (Arlt et al., 2019). Third, we also include party identification by drawing a distinction between eight partisan groups: sympathizers with the six largest parties of the country (i.e., Swiss People's Party, Social Democrats, Liberals, Christian Democrats, Greens, and Green Liberals), sympathizers with another party as well as independents.

We also control for the effects of language region affiliation. Based on the respondents' commune of residence, we draw a distinction between German-, French-, and Italian-speaking parts. Given that the Swiss public sphere is segmented along its three main languages, the use of social media may vary across language regions. Public debates on federal direct-democratic may be generally less intense in smaller language regions, thus possibly leading to a lower social media reliance for opinion formation purposes in the French—and especially in the Italian-speaking parts—as compared to the German language region.

Finally, we consider the influence of two communication-related factors. First, we expect that citizens who discuss a given ballot with others in their private environment may be more likely to rely on social media. The intensity of private discussions is measured on a five-level scale (code 1 for *never*, 2 for *less often than weekly*, 3 for *about once a week*, 4 for *several times a week*, and 5 for *on a daily basis*). Second, we are interested in the relationship between social media and more traditional information sources. Does the use of social media substitute traditional media sources or are these media types complementary to each other? Based on the scholarly literature (e.g., Dimitrova et al., 2014), we anticipate that they are complementary. Hence, respondents who indicate that they use more traditional sources may also be more likely to form their opinions on social media platforms. For more traditional information sources, we

rely on an additive composite index that includes the remaining twelve items of battery asked in the framework of the "VOTO studies" (i.e., newspaper articles, radio broadcasts, TV broadcasts, official ballot pamphlets, leaflets, newspaper ads, billboards, online news, letters to the editor, polls, messages at the workplace, and videos). This measure thus ranges from 0 to 12.

4. Empirical Analysis

The empirical analysis occurs in two steps. First, we present descriptive bivariate analyses in which we outline social media use according to individual and contextual characteristics. Second, we turn to the multivariate analysis by testing the two hypotheses we formulated in the previous section.

In line with H1, women used social media much less frequently than their male counterparts to form an opinion before voting. On average, only 22.8% of female participants reported having relied on platforms such as Facebook and Twitter. In contrast, this share reaches 30.2% among male respondents. When dividing the latter figure by the former, one obtains a gender gap value of 1.33. This indicates that men's reliance on social media exceeds that of women by 33%. A bivariate Z-test shows that the detected gender gap is statistically significant (z-value = 9.96; $p < 0.001$).

As is visible from Table 2, men display higher shares of social media use for each of the 13 selected direct-democratic ballots. However, the degree of the gender gap varies considerably in each case. Whereas men were more than 70% as likely to rely on social media in the context of VOTO 10, the gap is slightly less than 9% in the case of VOTO 6. On the basis of bivariate Z-tests, it turns out that the gendered differences are statistically secured at the 5%-error level in eleven ballots. The exceptions include the two ballots with the lowest gender gaps in magnitude, i.e., VOTO 6 and VOTO 13.

We also analyzed the role played by media coverage. Figure 1 depicts the correlation between the number of

Table 2. The magnitude of the gender gaps in social media use by ballot.

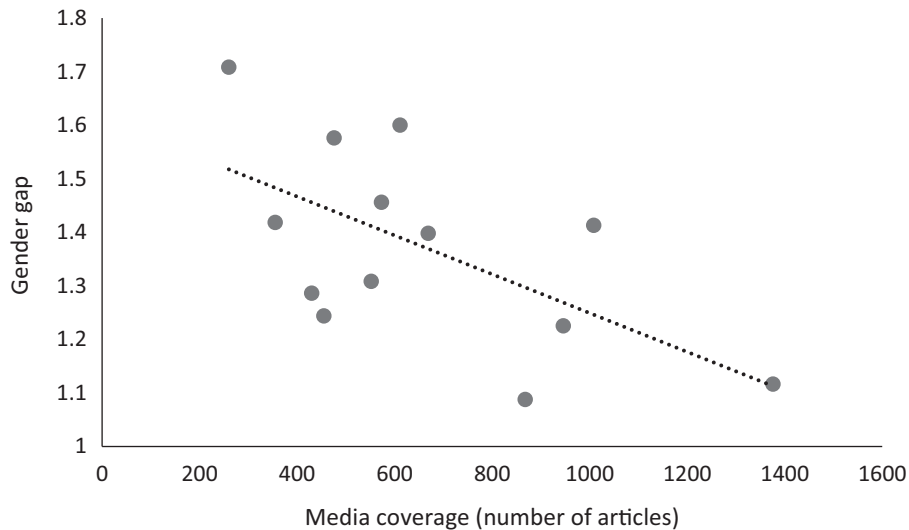| Ballot	Men	Women	Gender gap	*P > Z*
VOTO 1	26.5%	20.3%	1.31	0.009
VOTO 2	32.4%	22.8%	1.42	0.000
VOTO 3	30.6%	25.0%	1.23	0.027
VOTO 4	29.4%	23.7%	1.24	0.027
VOTO 5	32.8%	20.5%	1.60	0.000
VOTO 6	32.3%	29.7%	1.09	0.171
VOTO 7	31.9%	20.3%	1.58	0.000
VOTO 8	28.0%	19.2%	1.46	0.000
VOTO 9	29.3%	20.7%	1.41	0.001
VOTO 10	27.2%	15.9%	1.71	0.001
VOTO 11	26.5%	19.0%	1.40	0.010
VOTO 12	29.7%	23.1%	1.29	0.031
VOTO 13	34.8%	31.2%	1.12	0.071

Figure 1. Correlation between the amount of media coverage and the degree of the gender gap in social media use by ballot.

articles and the degree of the gender gap in social media use for the 13 ballots under scrutiny. As can be seen from the trend line, there is a clear negative relationship and the slope amounts to –0.61. This basic pattern is thus in line with H2.

In the following, we test our hypotheses in a multivariate setting. To that end, we relied on multilevel modelling. Model 1 in Table 3 presents the results of six two-level random-intercept regression estimations that explain the reliance on social media by individual and contextual factors. For the time being, we focus on Model 1, the standard model. In accordance with the findings of the bivariate analysis, men are generally found to rely on social media more frequently for opinion formation purposes than women. Indeed, the coefficient for "man" proves to be positively significant at the 0.1% error level. This result thus strongly supports the gender gap hypothesis (H1).

The third coefficient of Model 1 (i.e., man × media coverage) indicates that the gender gap narrows with increasing media coverage. The statistical association is secured at the 5% error level. This significant negative interaction term is in line with H2, thus confirming the impression gained from Figure 1. Hence, high levels of public debates preceding direct-democratic ballots decisively contribute to reducing gendered discrepancies in social media use for opinion formation purposes. To illustrate this significant interaction, Figure 2 depicts the predicted marginal effects of the amount of media coverage on social media use for both women and men. The positive slope is much steeper for women, thus indicating that the intensity of public debates is instrumental for women to compensate for their lower reliance on social media.

As for the control variables, three factors prove to be statistically significant. First, the amount of media coverage is instrumental in increased social media use. This indicates that there is a strong direct effect on individ-

ual social media reliance emanating from the intensity of public debate. Second, age is negatively related to the dependent variable—confirming that social media are mostly used by younger people. Third, respondents who rely on a high number of more traditional information sources are also more likely to form their opinions on social media platforms. This positive association points to a complementary relationship between older and newer forms of information sources, a pattern that has established itself in the academic literature. There are no significant effects to report for the remaining control variables.

To test the robustness of these results, we decided to rely on a series of alternative specifications. In Model 2, we applied a design weight that adjusts for the over-representation of respondents from both the Italian- and French-speaking language regions and the under-representation of those from the German-speaking part. While the use of such a procedure is controversially discussed in the literature (Solon et al., 2015), we decided to perform both weighted and unweighted estimations. In Model 3, we use an alternative dependent variable. It may be argued that a more fine-grained measurement of social media use is more appropriate than a binary indicator. Luckily enough, we were able to rely on a non-binary measure because the "VOTO studies" asked the respondents who answered that they relied on social media for their opinion formation about the strength of their social media use on a scale that ranges from 1 to 10.

Models 3, 4, and 5 account for possible biases caused by the media coverage measure provided by fög. As mentioned in Section 3, the data after VOTO 7 are likely to contain a slightly higher number of articles. To address this issue empirically, we decided to apply three different corrections to this indicator. In Model 3, the number of articles was reduced by 5% for VOTO 8 to VOTO 13. The correction is set at 10% in Model 4 and at 15% in Model 5. As can be seen in Table 2, the results remain

Table 3. Probit and ordered probit two-level random-intercept models explaining individual reliance on social media.

	Standard model (Model 1)	With design weights (Model 2)	Social media intensity (Model 3)	5% media coverage correction (Model 4)	10% media coverage correction (Model 5)	15% media coverage correction (Model 6)
Man	0.283*** (4.65)	0.358*** (5.39)	0.376*** (5.88)	0.360*** (5.32)	0.362*** (5.25)	0.362*** (5.17)
Media coverage	0.0003*** (3.57)	0.0003** (3.25)	0.0003** (2.75)	0.0003** (3.11)	0.0003** (2.95)	0.0003** (2.77)
Man × media coverage	−0.0002* (−2.18)	−0.0002* (−2.22)	−0.0002* (−2.28)	−0.0002* (−2.21)	−0.0002* (−2.19)	−0.0002* (−2.15)
Age	−0.024*** (−32.53)	−0.025*** (−30.77)	−0.025*** (−32.68)	−0.025*** (−30.77)	−0.025*** (−30.77)	−0.025*** (−30.77)
Education level	0.006 (0.55)	0.020 (1.57)	0.021 (1.42)	0.020 (1.56)	0.020 (1.56)	0.020 (1.55)
Political interest	−0.017 (−0.87)	−0.020 (−0.93)	−0.015 (−0.82)	−0.020 (−0.93)	−0.020 (−0.93)	−0.020 (−0.93)
Left–right positioning (0–10)	−0.008 (−1.04)	−0.002 (−0.28)	−0.002 (−0.14)	−0.002 (−0.28)	−0.002 (−0.28)	−0.002 (−0.28)
Swiss People's Party	0.063 (1.37)	0.009 (0.17)	−0.011 (−0.20)	0.009 (0.17)	0.009 (0.17)	0.009 (0.17)
Social Democrat	0.046 (1.13)	0.049 (1.11)	0.101 (1.63)	0.049 (1.11)	0.049 (1.11)	0.049 (1.10)
Liberal	0.001 (0.03)	0.020 (0.46)	0.044 (0.63)	0.020 (0.46)	0.019 (0.45)	0.019 (0.45)
Green	0.011 (0.18)	−0.045 (−0.69)	−0.052 (−0.68)	−0.045 (−0.69)	−0.045 (−0.69)	−0.045 (−0.68)
Christian Democrat	0.055 (1.17)	0.074 (1.45)	0.049 (0.73)	0.074 (1.44)	0.074 (1.44)	0.074 (1.44)
Green Liberal	−0.007 (−0.11)	−0.001 (−0.01)	0.004 (0.05)	−0.001 (−0.01)	−0.001 (−0.01)	−0.001 (−0.01)
Other party	0.066 (1.10)	0.009 (0.13)	0.066 (0.63)	0.009 (0.13)	0.009 (0.13)	0.009 (0.14)
French-speaking part	0.054 (1.76)	0.033 (0.99)	0.030 (0.92)	0.033 (0.99)	0.033 (0.99)	0.033 (0.98)
Italian-speaking part	0.103** (3.13)	0.057 (1.60)	0.057 (1.48)	0.057 (1.60)	0.057 (1.60)	0.057 (1.60)
Discussion frequency	0.010 (0.75)	0.007 (0.49)	0.013 (0.55)	0.007 (0.50)	0.008 (0.51)	0.008 (0.52)
Use of more traditional information sources	0.026*** (31.91)	0.026*** (28.97)	0.026*** (30.63)	0.026*** (28.96)	0.026*** (28.95)	0.026*** (28.94)
Constant/ Cut for Model 3	−0.708*** (−6.09)	−0.798*** (−5.33)	0.682*** (6.44)	−0.707*** (−6.02)	−0.704*** (−5.95)	−0.698*** (−5.85)
Intraclass correlation/ Variance partition coefficient	0.003 (1.20)	0.003 (1.32)	0.002 (1.46)	0.003 (1.37)	0.003 (1.42)	0.003 (1.48)
N individual level	11,468	11,468	11,468	11,468	11,468	11,468
N contextual level	13	13	13	13	13	13

Notes:* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; *z*-values in brackets; independents and German speakers are the reference categories for partisan groups and language regions.
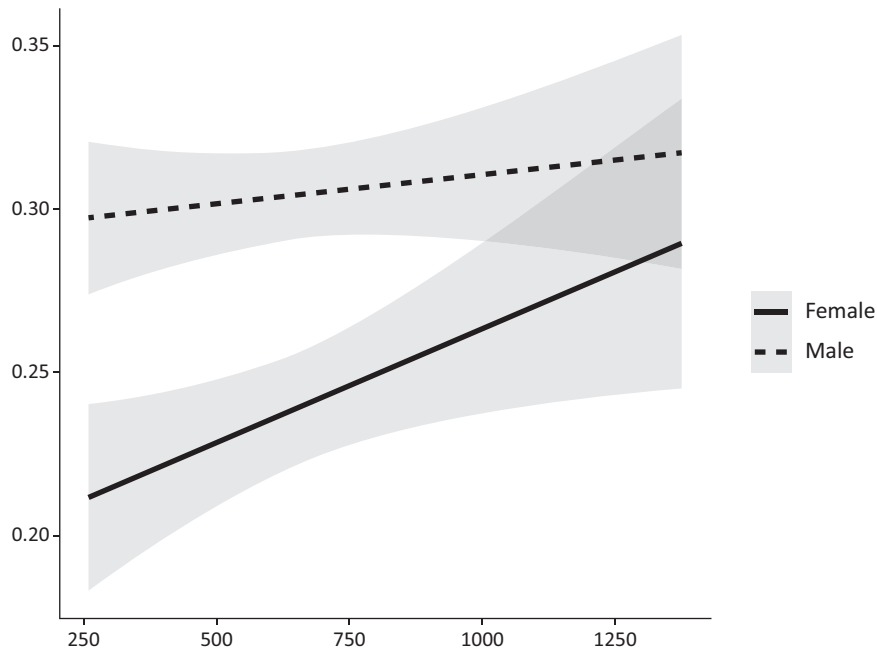
Figure 2. Predicted marginal effects of media coverage on social media use by gender (with 95% confidence interval).

unchanged in terms of significance across all alternative models. The results shown in Model 1 can thus be considered to be robust.

As far as the contextual level is concerned, we included some alternative determinants to media coverage (not shown here). Due to the low number of cases at this level ($n = 13$), we decided to rely on a similar procedure by separately considering the effects of time (either by using the numbers of the VOTO surveys that range from 1 to 13 or by calculating the daily differences from VOTO 1 for the selected ballots) and paid media (as measured by the number of newspaper ads). We looked at the direct effects of social media and interaction effects with gender. The only association that proved to be significant refers to both time indicators. We find that the reliance on social media increased over time. This is remarkable in that even though this analysis examined a short period of time (September 2016 to September 2020), patterns of saturation could be discerned as to the share of Swiss people using social media for news at least once a week (Newman et al., 2022, p. 107). This finding is in line with another indicator from the same study. Accordingly, the share of Swiss saying that social media are their "main source" of news has increased from 8% in 2016 to 13% in 2021. In any case, due to insignificant interaction terms, it appears that, in the context of direct-democratic ballots, the increased use of social media over time for opinion formation purposes did not contribute to a narrowing of the gender gap.

5. Conclusion

Due to ongoing digital transformations, citizens' reliance on social media has rapidly increased in recent years.

However, despite the growing importance, research on individual opinion formation based on digital technologies is still in its infancy. This is especially true in the domain of direct democracy. To the extent that such empirical studies exist, they typically focus on single case studies. Systematic research on the role played by digital technologies in the context of direct democracy can thus be considered a major gap in the academic literature. This is unfortunate, not the least because major challenges such as fake news, disinformation campaigns, or social bots are becoming common features in referenda and initiatives.

In light of the growing importance of digital technologies and their challenges, this article takes an empirical look at citizens' use of social media for opinion formation in the context of Swiss direct-democratic ballots. To that end, we have focused on the gender gap, which constitutes one of the most salient political inequalities in today's democracies. Corroborating previous work, and in line with H1, we find that men are on average about 30% more likely than women to rely on social media for opinion-formation purposes. Given that the data used here indicate that women neither make up for their delay over time nor compensate for their less frequent social media use when it comes to more traditional sources of information than men (results are available from the authors upon request), this finding suggests that the digital gender divide is not likely to disappear anytime soon. This is potentially a cause for concern, especially in light of the expected continuously growing importance of digital media and their crucial role in political communication.

Despite this huge gender gap, our study has detected some considerable variation across ballots This not only

suggests that there is no inevitability when it comes to the persistence of gender gaps, it also highlights the importance of contextual characteristics that have the potential to contribute to a narrowing the digital divide between men and women. In this respect, this empirical analysis has found a statistically significant reduction of the gender gap in social media use in the context of intensive public debates that precede direct-democratic ballots, thereby supporting H2. However, the results supporting the interaction hypothesis must be taken with some caution given that our empirical analysis only relied on 13 observations at the contextual level. Future research may benefit from including more cases to obtain more conclusive results.

In this context, the focus on issues could provide scholars who work on direct democracy with a promising avenue for future research. Indeed, it seems plausible that the likelihood of women relying on social media for opinion formation on referendums and initiatives heavily depends on the issues that are submitted to the ballot. Gender gaps may vanish in thematic areas that directly affect women, such as abortion, or when welfare state issues and environmental protection are at stake (Funk & Gathmann, 2015). Unfortunately, we could not address these issues properly with the data at hand. In the "VOTO studies," the measure for social media use is only available at the level of ballots, which in Switzerland usually include several propositions. In other words, there is a serious identification problem.

Another challenging aspect of the analyzed survey data refers to the fact that only respondents who participated in a given ballot were asked about their reliance on social media for opinion formation purposes. While this choice is understandable from a pragmatic point of view, it begs the question of whether there were biased results due to the varying compositions of citizens across ballots. In view of opposing theoretical expectations, we are reluctant to posit a clear direction of potential biases. On the one hand, an increasing number of participants may decrease the proportion of citizens who rely on social media, given that less politically interested citizens typically get involved in such cases (selection effect). On the other hand, turnout levels have been found to positively depend on campaign intensity (Kriesi, 2005), a fact that may increase the individual likelihood of using social media to come to a voting decision (campaign effect). Additionally, we invite scholars to go beyond developing more fine-grained measures of social media use to also look more carefully at how citizens employ these digital platforms. For examining the latter research question, more qualitative approaches may be more effective.

Finally, we have obtained our findings against the backdrop of a peculiar context—contemporary Swiss direct democracy. This raises the question as to whether the main conclusions reached here travel well to other political contexts. We believe that our basic theoretical arguments can easily be transposed to all kinds of free and fair elections and direct-democratic votes held around the world. However, Switzerland presents a case of a consensus democracy that has been characterized by a respectful political culture, and it may be that gender gaps are higher in more conflictive political contexts where women may be blocked from using social media for political opinion formation. Hence, we would like to encourage scholars to rely on case studies and comparative analyses in order to cumulatively address the generalizability of the results presented in this article.

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Conflict of Interests

The authors declare no conflict of interests.

References

Abendschön, S., & García-Albacete, G. (2021). It's a man's (online) world. Personality traits and the gender gap in online political discussion. *Information, Communication & Society*, *24*(14), 2054–2074.

Arlt, D., Rauchfleisch, A., & Schäfer, M. S. (2019). Between fragmentation and dialogue. Twitter communities and political debate about the Swiss "nuclear withdrawal initiative." *Environmental Communication*, *13*(4), 440–456.

Bäck, H., Debus, M., & Müller, J. (2014). Who takes the parliamentary floor? The role of gender in speech-making the Swedish Riksdag. *Political Research Quarterly*, *67*(3), 504–518.

Bechmann, A., & Lomborg, S. (2013). Mapping actor roles in social media: Different perspectives on value creation in theories of user participation. *New Media & Society*, *15*(5), 765–781.

Bernhard, L. (2012). *Campaign strategy in direct democracy*. Palgrave Macmillan.

Bernhard, L. (2018). What prevents knowledge inequalities among citizens from increasing? Evidence from direct-democratic campaigns in Switzerland. *Studies in Communication Sciences*, *18*(1), 103–116.

Bittner, A., & Goodyear-Grant, E. (2017). Sex isn't gender: Reforming concepts and measurement in the study of public opinion. *Political Behavior*, *39*(4), 1019–1041.

Bode, L. (2017). Closing the gap: Gender parity in political engagement on social media. *Information, Communication & Society*, *20*(4), 587–603.

Bos, A. L., Holman, M. R., Greenlee, J. S., Oxley, Z. M., & Lay, J. C. (2020). 100 years of suffrage and girls still struggle to find their fit in politics. *PS: Political Science & Politics*, *53*(3), 474–478.

Boulianne, S., Koc-Michalska, K., & Vedel, T. (2021). Gender and online politics: Digital media as friend and foe in times of change. *Social Science Computer Review*, *39*(2), 175–180.

Coffé, H. (2013). Women stay local, men go national and global? Gender differences in political interest. *Sex Roles*, 69(5/6), 323–338.

Coffé, H., & Bolzendahl, C. (2010). Same game, different rules? Gender differences in political participation. *Sex Roles*, *62*(5), 318–333.

Del Vicario, M., Zollo, F., Caldarelli, G., Scala, A., & Quattrociocchi, W. (2017). Mapping social dynamics on Facebook: The Brexit debate. *Social Networks*, *50*, 6–16.

de Vreese, C. (Ed.). (2007). *The dynamics of referendum campaigns: An international perspective*. Palgrave Macmillan.

Dimitrova, D. V., Shehata, A., Strömbäck, J., & Nord, L. W. (2014). The effects of digital media on political knowledge and participation in election campaigns: Evidence from panel data. *Communication Research*, *41*(1), 95–118.

Esser, F. (2013). Mediatization as a challenge: Media logic versus political logic. In H. Kriesi, D. Bochsler, J. Matthes, S. Lavenex, M. Bühlmann, & F. Esser (Eds.), *Democracy in the age of globalization and mediatization: Challenges to democracy in the 21st century* (pp. 155–176). Palgrave Macmillan.

Franceschet, S., Krook, M. L., & Tan, N. (Eds.). (2019). *The Palgrave handbook of women's political rights*. Palgrave Macmillan.

Funk, P., & Gathmann, C. (2015). Gender gaps in policy making: Evidence from direct democracy in Switzerland. *Economic Policy*, *30*(81), 141–181.

Grasso, M., & Smith, K. (2022). Gender inequalities in political participation and political engagement among young people in Europe: Are young women less politically engaged than young men? *Politics*, *42*(1), 39–57.

Gundelach, B., & Kalte, D. (2021). Explaining the reversed gender gap in political consumerism: Personality traits as significant mediators. *Swiss Political Science Review*, *27*(1), 41–60.

Halford, S., & Savage, M. (2010). Reconceptualizing digital social inequality. *Information, Communication & Society*, *13*(7), 937–955.

Hargittai, E., & Jennrich, K. (2016). The online participation divide. In M. Lloyd & L. A. Friedland (Eds.), *The communication crisis in America and how to fix it* (pp. 199–213). Palgrave Macmillan.

Hernandez, Y. (2019). The technology gap across generations: How social media affects the youth vote. *Political Analysis*, *20*(1), Article 1. Available at: https://scholarship.shu.edu/pa/vol20/iss1/1

Joiner, R., Stewart, C., Beaney, C., Moon, A., Maras, P., Guiller, J., Gregory, H., Gavin, J., Cromby, J., & Brosnan, M. (2014). Publically different, privately the same: Gender differences and similarities in response to Facebook status updates. *Computers in Human Behavior*, *39*, 165–169.

Kahn, K. F., & Kenney, P. J. (1999). *The spectacle of US Senate campaigns*. Princeton University Press.

Koc-Michalska, K., Schiffrin, A., Lopez, A., Boulianne, S., & Bimber, B. (2021). From online political posting to mansplaining: The gender gap and social media in political discussion. *Social Science Computer Review*, *39*(2), 197–210.

Kriesi, H. (2005). *Direct democratic choice: The Swiss experience*. Lexington.

Kriesi, H. (Ed.). (2011). *Political communication in direct democratic campaigns: Enlightening or manipulating?* Palgrave Macmillan.

Lin, K. Y., & Lu, H. P. (2011). Why people use social networking sites: An empirical study integrating network externalities and motivation theory. *Computers in Human Behavior*, *27*(3), 1152–1161.

Margolis, M., & Resnick, D. (2000). *Politics as usual: The cyberspace "revolution."* SAGE.

Nadim, M., & Fladmoe, A. (2021). Silencing women? Gender and online harassment. *Social Science Computer Review*, *39*(2), 245–258.

Newman, N., Fletcher, R., Robertson, C. T., Eddy, K., & Nielsen, R. K. (2022). *Reuters Institute digital news report 2022*. Reuters Institute for the Study of Journalism.

Owen, D. (2017). New media and political campaign. In K. Kenski & K. Hall Jamieson (Eds.), *The Oxford handbook of political communication* (pp. 1–20). Oxford University Press.

Owen, D., & Deng, W. (2021). Generational differences in digital electoral engagement in the 2020 presidential campaign. In J. C. Baumgartner & T. L. Towner (Eds.), *The internet and the 2020 campaign* (pp. 187–213). Lexington.

Qvortrup, M. (Ed.). (2018). *Referendums around the world*. Palgrave Macmillan.

Robinson, L., Cotten, S. R., Ono, H., Quan-Haase, A., Mesch, G., Chen, W., Schulz, J., Hale, T. M., & Stern, M. J. (2015). Digital inequalities and why they matter. *Information, Communication & Society*, *18*(5), 569–582.

Schiffrin, A., Koc-Michalska, K., & Ferrier, M. (2021). Women in the digital world. *Information, Communication & Society*, *24*(14), 1991–1997.

Solon, G., Haider, S. J., & Wooldridge, J. M. (2015). What are we weighting for? *Journal of Human Resources*, *50*(2), 301–316.

Theocharis, Y., & Van Deth, J. W. (2018). The continuous expansion of citizen participation: A new taxonomy. *European Political Science Review*, *10*(1), 139–163.

Udris, L., Eisenegger, M., & Schneider, J. (2016). News coverage about direct-democratic campaigns in a period of structural crisis. *Journal of Information Policy*, *6*(1), 68–104.

Ulbig, S. G., & Funk, C. L. (1999). Conflict avoidance

and political participation. *Political Behavior*, *21*(3), 265–282.

Verba, S., Burns, N., & Schlozman, K. L. (1997). Knowing and caring about politics: Gender and political engagement. *The Journal of Politics*, *59*(4), 1051–1072.

Xenos, M., Vromen, A., & Loader, B. D. (2014). The great equalizer? Patterns of social media use and youth political engagement in three advanced democracies. *Information, Communication & Society*, *17*(2), 151–167.

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