Online Appendix

Does Social Media Promote Civic Activism? A Field Experiment with a Civic Campaign

Florian Foos*

London School of Economics & Political Science

Lyubomir Kostadinov

World Wide Fund

Nikolay Marinov

University of Houston

Frank Schimmelfennig

ETH Zurich

Abstract

Social media may help civil society organize and mobilize for different campaigns. However, the extent to which social media campaigns simply recruit like-minded individuals as compared to exerting a causal impact on joiners' attitudes is difficult to disentangle. We test both the organizational and transformative potential of a civil society campaign in a randomized field experiment deployed via Facebook or an email newsletter in collaboration with a Bulgarian environmental campaign. As expected, we find that Bulgarian Facebook users who are active in pro-environmental groups, and those who decide to follow the campaign, are more highly educated than those who decide to stay at the sidelines. Moreover, beliefs in the effectiveness of civic society, character traits, and prior activism systematically predict whether a Bulgarian Facebook user decides to join the cause on Facebook, or subscribe to the email newsletter. In contrast, we find little evidence that the campaign affected opinions, knowledge, or self-reported behavior. We conclude that social media campaigns that are commonplace among civil society organisations are effective at selecting activist-types, but changing the views and behaviors of the broader social media population may be more difficult than assumed.

A Are Facebook sign-ups systematically different from newsletter sign-ups?

Here we first regress whether the subject likes the Facebook page (Facebook complier) or whether she signed up to the Email Newsletter (Newsletter complier) on all pre-treatment covariates listed in Table A3. We then extract the f-statistic statistic, and use simple random assignment to re-assign subjects to be Facebook compliers or Newsletter compliers 5000 times, and each time regress compliance on pre-treatment covariates, and extract the F-statistic. We then count the number of f-statistics that are at least as large as the f-statistic that we obtain from our experimental sample. The p-value of .62 indicates that 3111 simulated f-statistics were at least as large as the one we obtain from our sample. Where the f-statistic that we receive from the experiment we conducted falls within the sampling distribution of the 5000 simulated f-statistics under the sharp null is displayed in Figure A1.
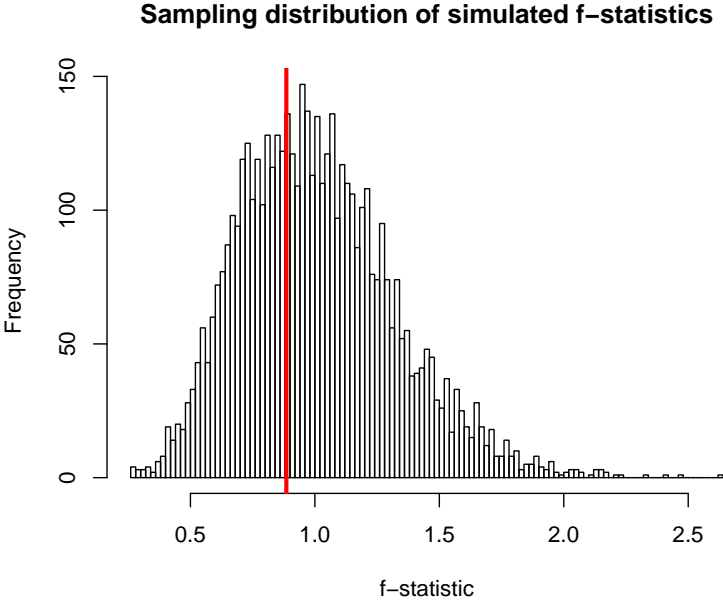

Figure A1: p=.62

1

B Some Descriptive Patterns

We offer some relevant descriptives, based on the 884 subjects - 527 representative Facebook users and 357 environmental activists. We also define and describe some of the variables we refer to in the subsequent analysis. First, illustrating the reach and potential of social media, we find that more than two-thirds of people use Facebook at least once a day, that approximately the same proportion have access to the internet via a smart phone or a similar device with a dataplan, and that about 53% of people say social media, rather than traditional newspapers, TV and radio, are their primary, most reliable first stop for news and political commentary. Furthermore, Facebook users report that they have more friends online than friends in real life. The mean *age* in our representative sample of Facebook users is 38 years, somewhat older than activist sample, but well-around the middle age. Together, these patterns illustrate the existence of a powerful online community that can be mobilized for social action.

Second, on the specific issues of nature and the Black Sea Coast, only 3% believe that further development of the Black Sea coast is acceptable. The consensus on the overall state of the environment is that it is bad. And about 45% the respondents state that they are the personality type for which nature-protection is very important (*nature-loving personality*, 6 on a 1-6 scale).

Third, many respondents report having been active in nature-preserving initiatives. About half state they have taken part in a protest or some other civic initiative designed to preserve nature (variable *participation*). A total of 42% believe that civic society should play a leading role in nature-conservation, relative to official institutions. This comes against a background of overwhelming distrust of Parliament, the courts and the police (median ranking between 1 and 2 on a 1-10 scale of mistrust-trust). By contrast, the mean trust in civil society and European (EU) institutions is 4. This picture rhymes well with the image of society where official institutions have been effectively captured by special interests and gutted from their ability to represent broad interests, something that is especially evident in the case of the state's handling of natural resources.

C Power simulations

Table A1: DeclareDesign - power simulations

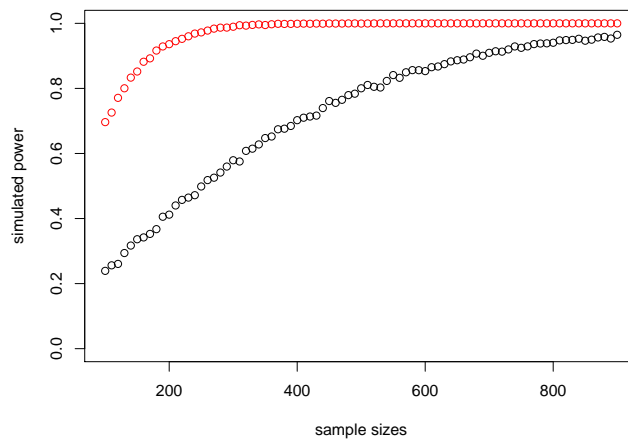|	Assumption	d newsletter	d Facebook	Power Fb vs Control	Power Nl vs Control
1	Design1	0.25	0.25	0.67	0.66
2	Design2	0.50	0.50	1.00	1.00
3	Design3	0.25	0.50	0.68	1.00

Estimated using DeclareDesign (Blair et al., 2019).

Figure A2: Power simulations; d=0.25 sd (black) and d=0.50 sd (red)

D Outcome Variables

Table A2: Outcome variables

	Variable	Question
1	Discuss with friends online	"How often lately have you discussed with friends online about protecting the remaining sea coast ?"
2	Discuss with friends offline	"How often lately have you discussed with friends offline about protecting the remaining sea coast?"
3	Feeling appreciated (norm)	"What do you think others think of people who take on civic causes?"
4	Chances of success	"What are the chances a civic campaign can preserve the remaining sea coast?"
5	Make a difference	"To what extent can you make a difference in the country's political future?"
6	Likelihood of protest	"Should you hear about a protest about the sea coast in your city in the future, how likely are you to participate?"
7	Importance of environment issue	" How important is the cause of preserving the remaining sea coast for you personally?"
8	Environmental knowledge	Sum of correct answer to five factual questions about the sea coast

E   Random assignment

After recording basic socio-demographic information and subjects' views about the environment in both the representative Facebook and the activist samples, we performed Bernoulli random assignment separately within the representative Facebook sample and the activist sample using the following Stata code:

```
gen rand_num = uniform()
gen exp_group="fb" if rand_num<.33
replace exp_group="newsletter" if rand_num>=.33
replace exp_group="control" if rand_num>=.67
```

This resulted in slightly different probabilities of assignment to experimental conditions between the two samples: .34 (Facebook condition), .34 (newsletter condition) and .32 (control) in the representative Facebook sample, and .31 (Facebook condition), .35 (newsletter condition) and .34 (control) in the activist sample. We adjust for these differential probabilities of assignment using Inverse Probability Weights (IPW), where we weight to the inverse of the probability of assignment to the experimental condition in which the subject is in.

F   Attrition

In this section we use both large sample tests and randomization inference (Gerber and Green, 2012) to check whether attrition rates between waves 1 and 2 of the survey vary significantly by experimental group. In the control condition the attrition rate is 35%, while 38% of subjects in the Facebook condition and 35% of subjects in the Email condition attrite. To obtain a p-value based on a large sample test, we regress our binary missingness indicator on the two experimental condition dummies with control as the reference category using the *lm_robust* function in *estimatr* and obtain the p-value based on a joint f-test. The p-value of 0.78 indicates that missigness does not vary significantly by treatment condition.

Moreover, we use randomization inference (Gerber and Green, 2012) to re-assign subjects to treatment and control under the sharp null of no individual level effect for any subject. Here we first use multinomial logistic regression to regress treatment assignment on missigness and extract the log-likelihood statistic. A higher log-likelihood or one which is closer to 0 means a comparatively better model fit. We then use simple random assignment to re-assign subjects to the two treatment conditions or to control 5000 times, and each time extract the log-likelihood statistic. Afterwards we count the number of log-likelihoods under the sharp null that are at least as large as the log-likelihood statistic that we obtained from our sample. The p-value of 0.51 indicates that 2531 simulated log-likelihoods were at least as large as the one we obtained from our experimental sample.

Where the log-likelihood statistic that we receive from the experiment we conducted falls within the sampling distribution of the 5000 simulated log-likelihood statistics under the sharp null is displayed in Figure A3.
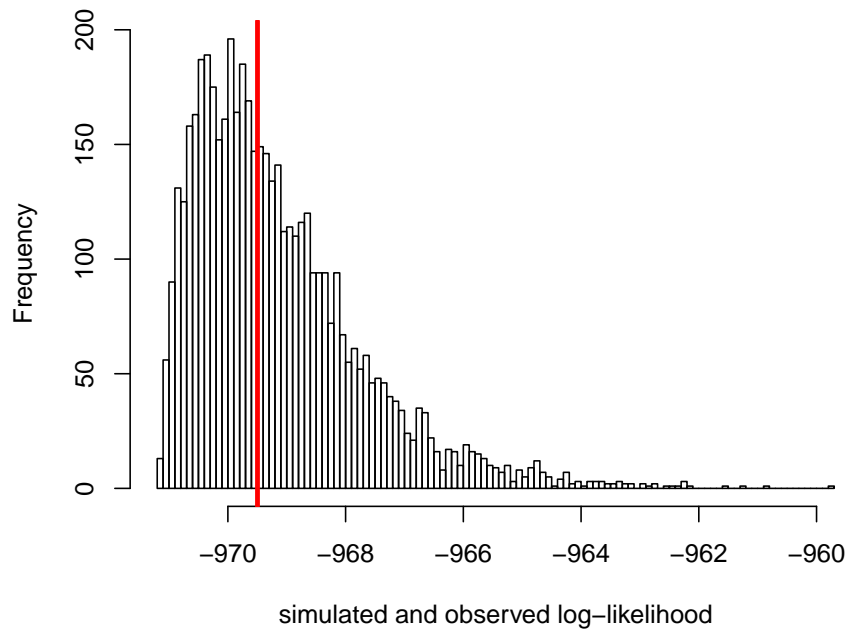
Sampling distribution of simulated log−likelihoods

Figure A3: Attrition p=0.51

G   Balance

Table A3: Balance Table

Covariate	Mean Control	Mean Email	Mean Facebook	P-Value F-test
Townpop	12.66	12.63	12.68	0.66
Age	37.33	36.59	37.62	0.56
Male	0.22	0.33	0.31	0.00
Uni	0.66	0.64	0.65	0.97
Well-Off	0.64	0.68	0.61	0.18
Number friends	2.93	2.98	2.70	0.01
Number fb friends	3.37	3.29	3.24	0.45
Freq fbook use	4.26	4.23	4.26	0.91
News from print	0.02	0.03	0.03	0.74
News from social media	0.58	0.57	0.58	0.84
Trust institutions	0.09	-0.02	0.14	0.41
Civil society equal role	0.50	0.54	0.53	0.63
Civil society secondary role	0.02	0.03	0.03	0.74
Knowledge environment	1.26	1.10	1.16	0.14
Love nature	5.34	5.24	5.22	0.25
Like danger	2.67	2.65	2.71	0.74
Seek adventure	2.85	2.75	2.79	0.80
Seek pleasure	2.89	2.88	2.85	0.97
Showcase ability	3.05	3.08	3.12	0.80
Civic activism	1.62	1.59	1.68	0.43
Environmental activism	0.55	0.50	0.56	0.33
Freq of voting	2.31	2.36	2.34	0.72

We again use randomization inference to re-assign subjects to the two treatment groups and to control under the sharp null of no individual level treatment effect for any subject. Here we first use multinomial logistic regression to regress treatment assignment on an X-by-k matrix of pre-treatment covariates listed in Table A3. We then extract the log-likelihood statistic, use simple random assignment to re-assign subjects to treatments and control 5000 times, regress treatment assignment on pre-treatment covariates, and each time extract the log-likelihood statistic. A higher log-likelihood or one which is closer to 0 means a comparatively better model fit. We then count the number of log-likelihoods that are at least as large (closer to 0) as the log-likelihood statistic that we obtained from our experimental sample. The p-value of 0.32 indicates that 1611 simulated log-likelihoods were at least as large (as close or closer to 0) as the statistic we obtained from our sample. Where the log-likelihood statistic

that we obtain from the experiment we conducted falls within the sampling distribution of
the 5000 simulated log-likelihood statistics under the sharp null is displayed in Figure A4.
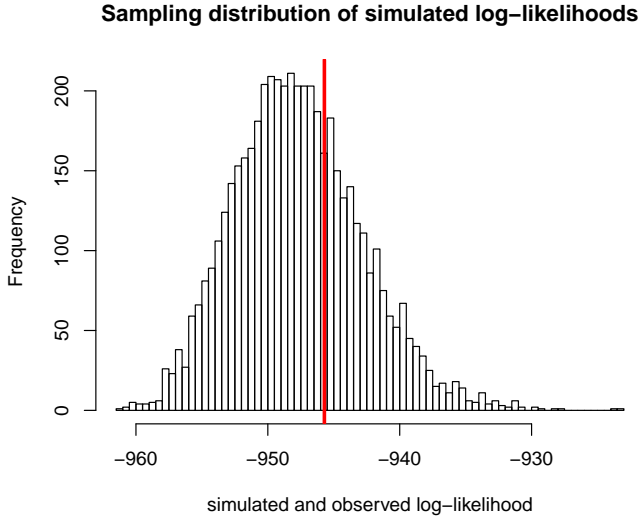
Sampling distribution of simulated log−likelihoods

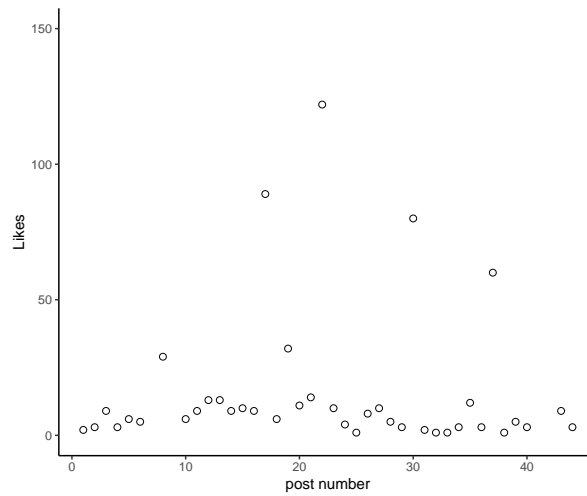
Figure A4: Balance p=0.32

H Facebook page activity

Figure A5: Likes of posts to FB page

To get a sense of the strength of the Facebook treatment, we provide a brief overview of some statistics. Our posts collected a total of 624 likes, about 180 shares and 26 comments. With this, for those users, whose identity we can verify (who have not liked the page anonymously), our posts collected 243 likes by 73 users, 40 shares by 13 users, 19 comments by 9 users. Our top 5 posts in popularity discussed actions by state institutions that were a blatant and likely corrupt violation of proper procedure and resulted or nearly resulted in the loss of an existing wild area. By contrast, posts that merely built knowledge or offered information on the bio-diversity of an area had limited impact. Three examples of popular posts include the following. A post about turning a coastal bird-wildlife area into golf-complexes, by firms close to the government garnered 44 shares. The post (available here: Kavarna) emphasized the nature-destroying power of special interests. A post about a rare flower, available in the remaining sand-dunes around the Black Sea garnered 23 shares and 80 likes. The post (available here: Piyasachni Lilii) contrasted remaining wild areas to areas next door, taken over by absentee investors and turned into massive hotel complexes. Finally, a post about a beautiful surviving beach, Karadere (available here: Kara Dere), emphasized the success of civic organizations in blocking development despite pressure from the highest echelons of power. Thus, the posts were neither depressing, nor elating, and sought to cover both the successes and failures in nature preservation. The posts highlighted the danger of corruption but also the power of citizens to hold their ground.
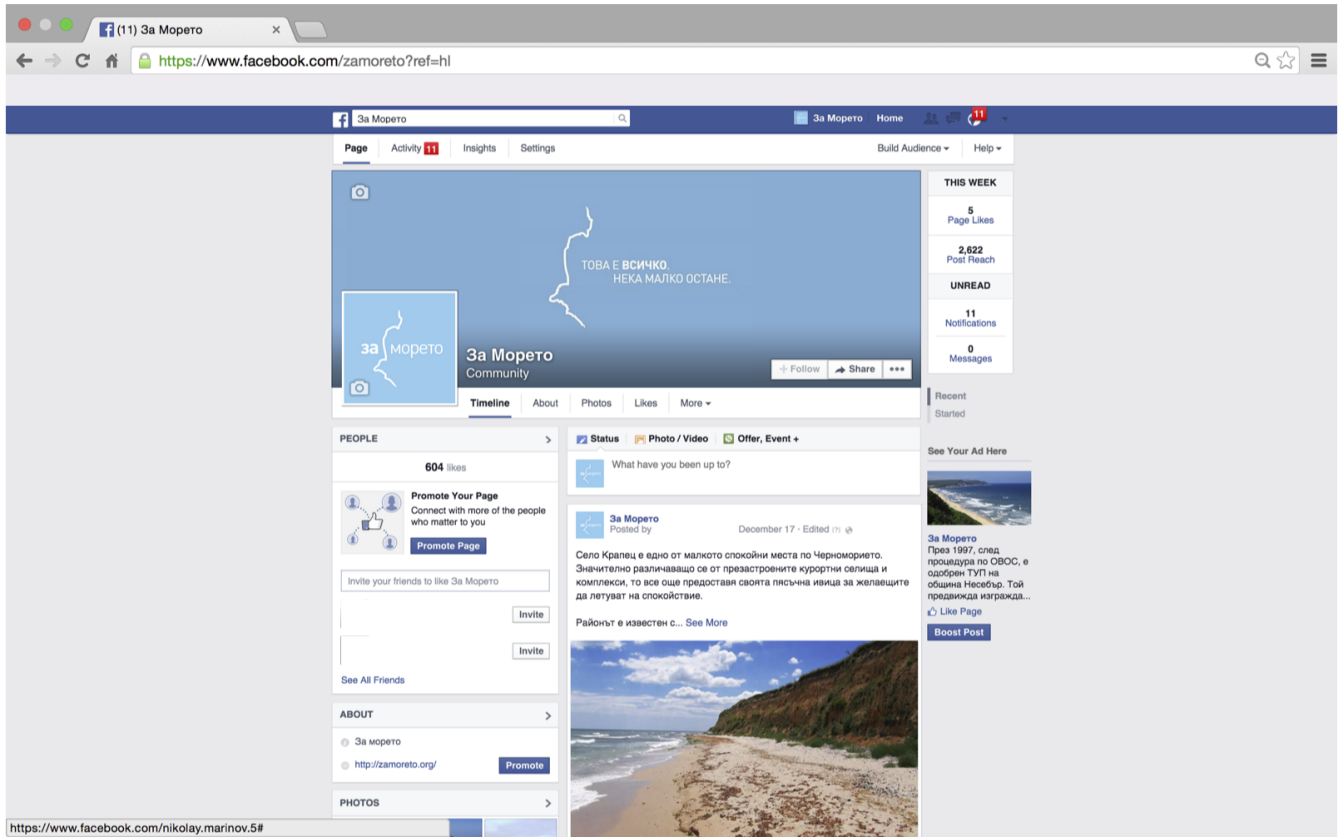
Figure A6: Snapshot of Facebook post

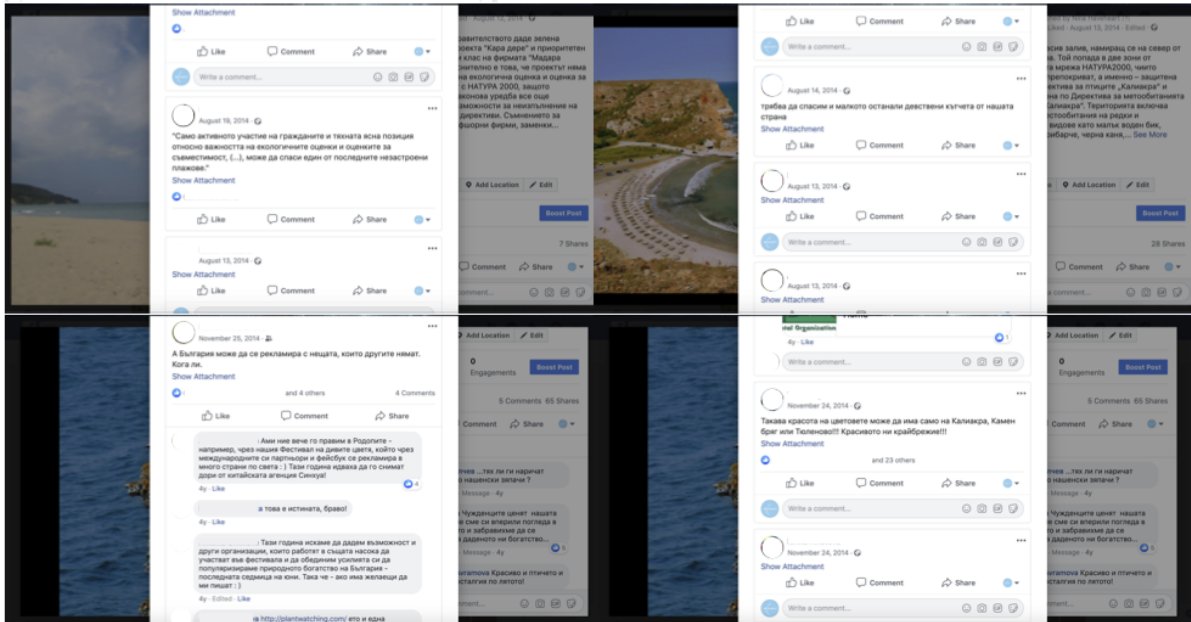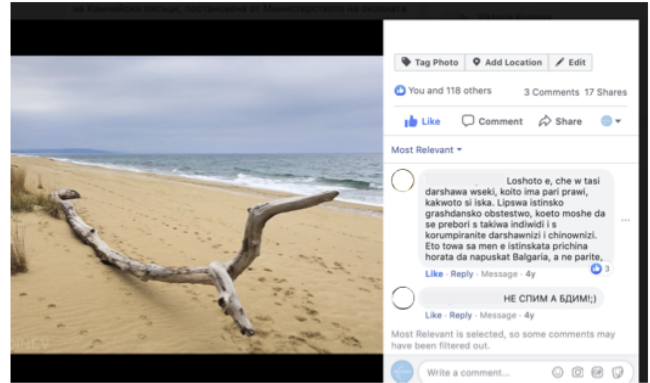Figure A7: Snapshot of Email Newsletter

Figure A8: An effective publicity post about illegal development and some comments and shares from the page "ZaMoreto"

Table A4: Selection into campaign - linear regression estimates for representative facebook sample

	Follow Facebook Campaign				Follow Newsletter Campaign					
	β	SE	β	SE	β	SE	β	SE	β	SE
Demographics										
Population (log)	0.018	0.037	−0.014	0.038	0.057	0.036	0.055	0.035	0.047	0.035
Age	0.012***	0.003	0.011***	0.003	0.008**	0.003	0.007**	0.003	0.006*	0.003
Male	−0.038	0.090	−0.044	0.089	0.004	0.084	−0.030	0.084	−0.033	0.087
University	0.183**	0.083	0.144*	0.081	−0.067	0.078	−0.076	0.083	−0.072	0.085
Well-off	−0.112	0.087	−0.046	0.096	−0.011	0.080	−0.007	0.080	−0.019	0.082
Social conectedness										
No friends	−0.012	0.035	−0.037	0.035	−0.091***	0.033	−0.086**	0.035	−0.085**	0.036
No Fb friends	0.026	0.038	0.014	0.037	0.102***	0.036	0.100**	0.039	0.103**	0.040
Frequ. Fb use	0.065*	0.037	0.065*	0.039	−0.065*	0.036	−0.065*	0.035	−0.072**	0.036
Perceptions and attitudes										
News from TV	Reference category									
News print	0.277	0.204	0.267	0.188			0.003	0.183	−0.023	0.196
News soc. media	0.014	0.085	−0.015	0.085			−0.029	0.081	−0.006	0.081
Trust institutions	−0.004	0.026	0.007	0.027			−0.032	0.022	−0.035	0.023
Civil soc. leading	Reference category									
Equal role	−0.237***	0.077	−0.248***	0.075			−0.042	0.084	−0.051	0.086
Secondary role	0.003	0.467	−0.050	0.485			0.027	0.139	0.048	0.140
Environ. knowl.	0.014	0.036	0.002	0.035			−0.048	0.034	−0.047	0.035
Love of nature	0.031	0.044	0.017	0.044			0.044	0.041	0.053	0.042
Like danger	−0.081***	0.031	−0.088***	0.031			0.027	0.032	0.028	0.032
Like adventure	0.077**	0.031	0.071**	0.031			0.006	0.032	0.011	0.032
Seek pleasure	−0.025	0.035	−0.012	0.035			−0.002	0.038	−0.004	0.038
Showcase ability	−0.032	0.038	−0.038	0.037			0.037	0.034	0.033	0.035
Self-reported activism										
Civic activism	0.087**	0.037							−0.020	0.038
Envrionment act.	0.091	0.091							−0.057	0.084
Frequ. of voting	−0.035	0.040							0.044	0.039
N	163				187					

*** p < .01; ** p < .05; * p < .1, robust standard errors (HC2).

Table A5: Intent-to-Treat Effects and Compliers Average Causal Effects

	Discussion Offline	Discussion Online	Appreciated
Intent-to-Treat Effect			
Unadjusted			
Facebook	0.088	−0.090	−0.278***
	(−0.115, 0.291)	(−0.309, 0.130)	(−0.489, −0.067)
Newsletter	0.162	0.015	−0.135
	(−0.040, 0.363)	(−0.207, 0.237)	(−0.332, 0.062)
N	559	500	562
Covariate-adjusted			
Facebook	0.136	−0.067	−0.270**
	(−0.064, 0.337)	(−0.268, 0.134)	(−0.476, −0.063)
Newsletter	0.195*	0.023	−0.105
	(−0.003, 0.393)	(−0.175, 0.222)	(−0.306, 0.096)
Complier Average Causal Effect			
Unadjusted			
Facebook	0.139	−0.139	−0.439**
	(−0.179, 0.457)	(−0.484, 0.206)	(−0.779, −0.099)
Newsletter	0.297	0.026	−0.247
	(−0.073, 0.666)	(−0.368, 0.421)	(−0.606, 0.111)
Covariate-adjusted			
Facebook	0.214	−0.104	−0.423**
	(−0.101, 0.529)	(−0.445, 0.238)	(−0.754, −0.093)
Newsletter	0.375*	0.043	−0.206
	(−0.008, 0.757)	(−0.365, 0.450)	(−0.587, 0.174)
N	559	500	562

***$p < .01$; **$p < .05$; *$p < .1$, robust standard errors (HC2).

Table A6: Intent-to-Treat Effects and Compliers Average Causal Effects

	Chances of Success	Make a Difference	Likelihood of Protest
Intent-to-Treat Effect			
Unadjusted			
Facebook	0.084	−0.130	−0.047
	(−0.120, 0.288)	(−0.339, 0.078)	(−0.246, 0.153)
Newsletter	−0.027	−0.088	−0.121
	(−0.221, 0.168)	(−0.292, 0.116)	(−0.311, 0.069)
Covariate-adjusted			
Facebook	0.120	−0.135	0.002
	(−0.081, 0.320)	(−0.332, 0.063)	(−0.174, 0.179)
Newsletter	−0.025	−0.047	−0.093
	(−0.221, 0.172)	(−0.243, 0.149)	(−0.272, 0.086)
Complier Average Causal Effect			
Unadjusted			
Facebook	0.132	−0.206	−0.074
	(−0.188, 0.452)	(−0.535, 0.124)	(−0.391, 0.243)
Newsletter	−0.049	−0.163	−0.225
	(−0.410, 0.311)	(−0.539, 0.212)	(−0.585, 0.134)
Covariate-adjusted			
Facebook	0.187	−0.211	0.004
	(−0.127, 0.501)	(−0.523, 0.101)	(−0.273, 0.280)
Newsletter	−0.045	−0.093	−0.179
	(−0.422, 0.333)	(−0.470, 0.284)	(−0.528, 0.170)
N	567	565	562

***$p < .01$; **$p < .05$; *$p < .1$, robust standard errors (HC2).

16

Table A7: Intent-to-Treat Effects and Compliers Average Causal Effects

	Importance of Environment	Environmental Knowledge
Intent-to-Treat Effect		
Unadjusted		
Facebook	−0.138	0.051
	(−0.354, 0.079)	(−0.154, 0.256)
Newsletter	−0.273**	−0.162
	(−0.494, −0.052)	(−0.357, 0.033)
Covariate-adjusted		
Facebook	−0.066	0.074
	(−0.268, 0.136)	(−0.132, 0.280)
Newsletter	−0.183*	−0.139
	(−0.391, 0.025)	(−0.343, 0.064)
Complier Average Causal Effect		
Unadjusted		
Facebook	−0.219	0.081
	(−0.569, 0.130)	(−0.243, 0.404)
Newsletter	−0.506**	−0.300
	(−0.930, −0.081)	(−0.665, 0.066)
N	555	565
Covariate-adjusted		
Facebook	−0.103	0.116
	(−0.422, 0.216)	(−0.207, 0.440)
Newsletter	−0.351*	−0.265
	(−0.758, 0.057)	(−0.659, 0.129)
N	555	565

***$p < .01$; **$p < .05$; *$p < .1$, robust standard errors (HC2).

References

Blair, Graeme, Jasper Cooper, Alexander Coppock and Macartan Humphreys. 2019. "Declaring and Diagnosing Research Designs." *American Political Science Review* 113(3):838–859.

Gerber, Alan S. and Donald P. Green. 2012. *Field Experiments. Design, Analysis and Implementation.* New York: W. W. Norton and Company.