中国人民大学
RENMIN UNIVERSITY OF CHINA

Social Media, News Consumption, and Polarization

Evidence from a Field Experiment

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Outline

Outline

Facebook

- The dominant social media platform
- News feed mechanism: Algorithm
- Controversies about fake news and scandals
- **Are individuals are easily influenced by news in the Facebook feed?**

Parties in US

Figure: Democratic Party

Figure: Conservative Party

Literature Review

Article Contribution

- Social media and news consumption
  - measure segregation **within** one's social media feed
  - exploit exogenous variation
- Social media and polarization
  - identify the causal effect of pro- and counter-attitudinal news
  - the first experimental evidence revealing effect of counter-attitudinal news
- media persuasion
- online media-related experiments
  - distribute news to participants in a natural setting

Outline

Basic Information

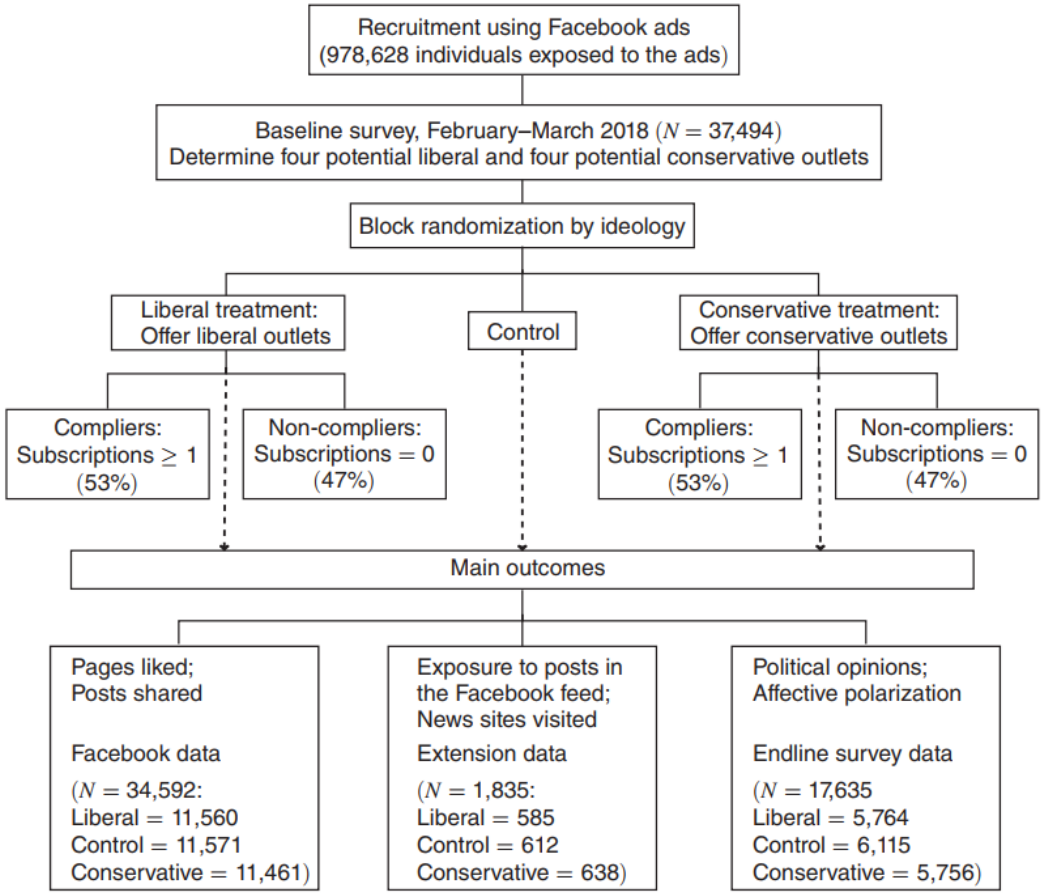


Figure: Experimental Design Tree

Surveys

Recuitment Ads

- US
- Facebook users with mobiles or desktops
- **Conservative** or **Moderate** individuals

Surveys

Recuitment Ads

(a) Political Ad

Surveys

Recuitment Ads

(b) General Ad

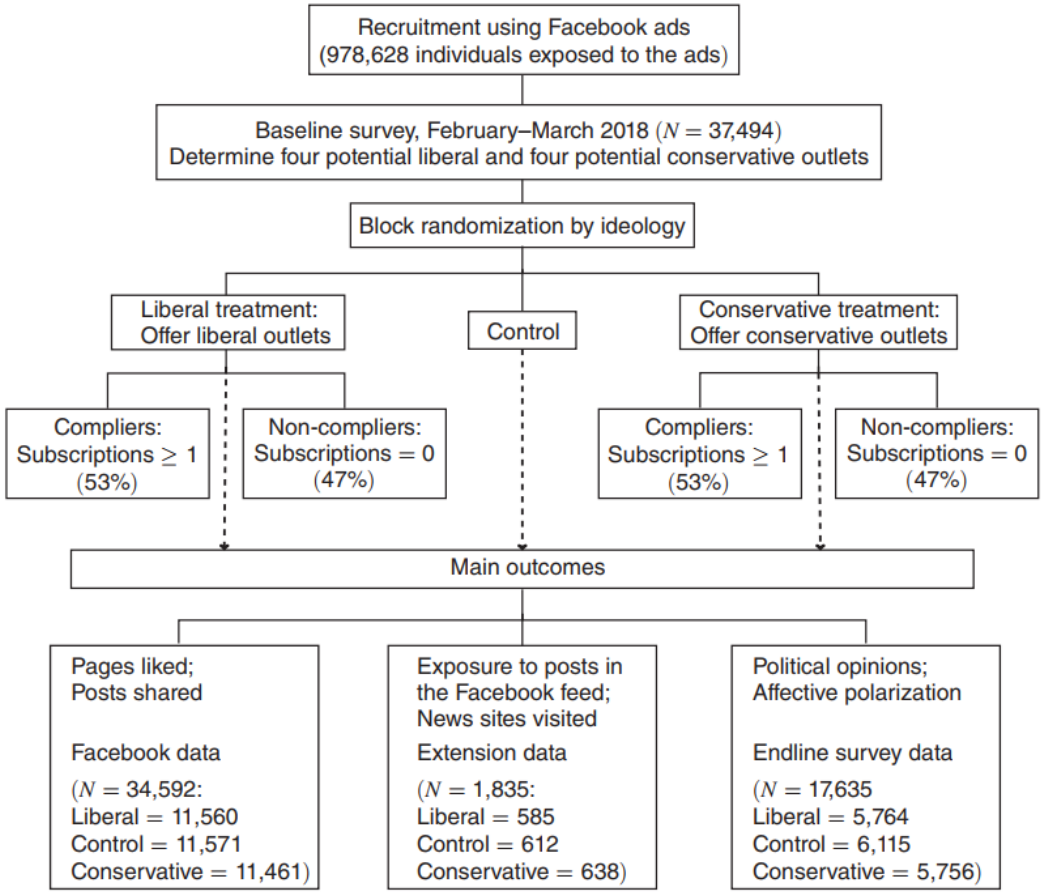


Figure: Experimental Design Tree

Randomization

Treatment Assignment

- blocked by self-reported baseline ideology
  - ✓ 7-point scale
    "I haven't thought about it much"
  - ✓ Each block has three individuals choosing the same answer
  - ✓ Subjects in same block are randomly assigned into one of three treatment groups
- Liberal Treatment
  Offered to subscribe(like) to four potential liberal outlets
- Conservative Treatment
  Offered to subscribe(like) to four potential conservative outlets
- control Group

Surveys

Self-reported Baseline Survey

- Liberal Outlets
  - *HuffPost*
  - *MSNBC*
  - *The New York Times*
  - *Slate*
- Consevative Outlets
  - *Fox News*
  - *The National Review*
  - *The wall Street Journal*
  - *The Washinton Times*

Randomization

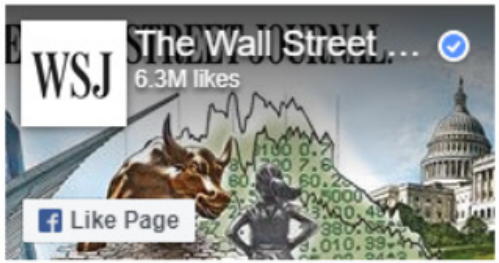
Treatment Assignment

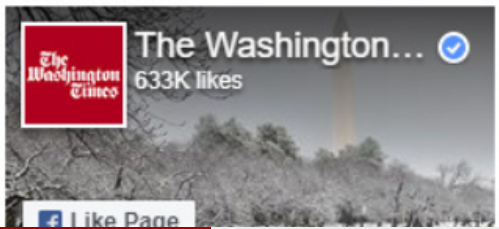
Example for the Conservative Treatment Intervention

Following a news or media page is a great way to learn about the news and hear other perspectives. Recently, researchers have suggested that subscribing to random sources can help burst the social media echo chamber.

By clicking like below, posts from randomly chosen popular Facebook pages may start appearing in your news feed. **To expand your horizons, please click "Like Page" on 1-4 of the pages below** (Facebook may ask you to confirm the like, you can always unlike the page later).

The pages were chosen randomly and therefore may all represent views you agree or disagree with. In any case, they present an opportunity to diversify your news feed.





Outline

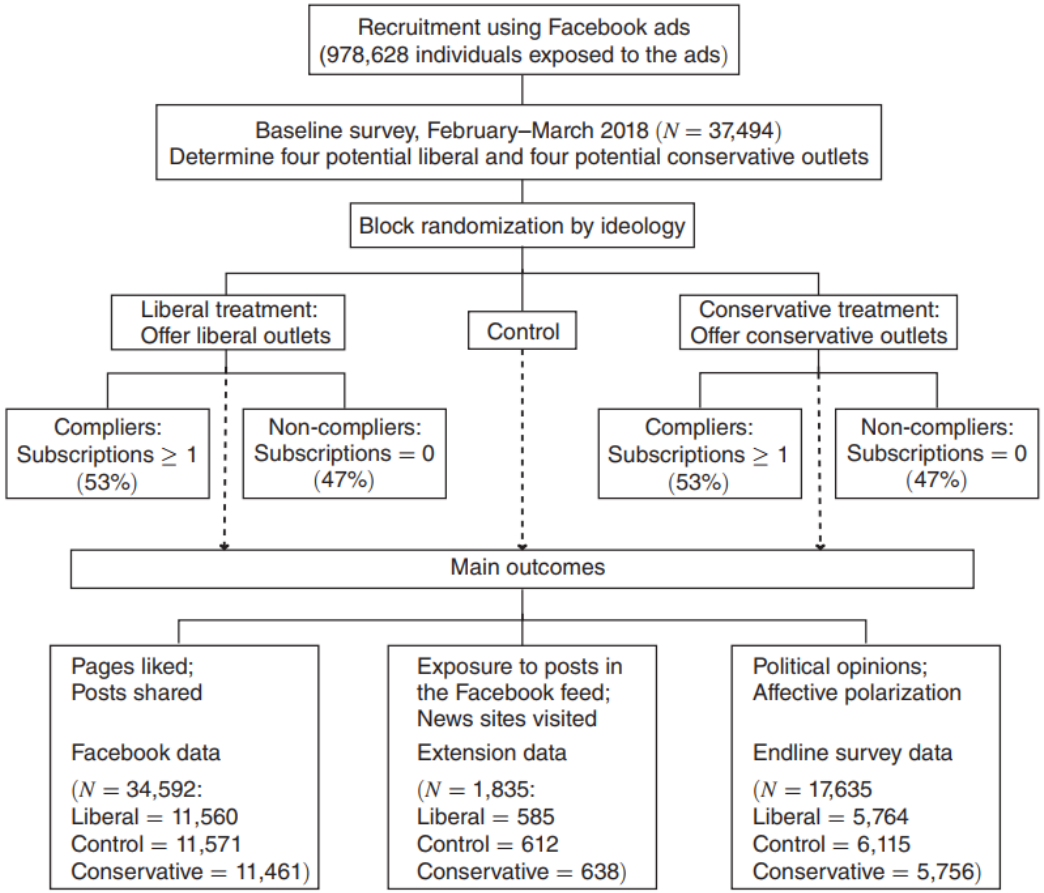


Figure: Experimental Design Tree

Data Description

Sample	Data sources	Number of participants and retention	Main outcomes
Baseline sample	Baseline survey; Facebook data on participants' subscriptions to outlets	37,494 (all participants)	Subscriptions to outlets in the intervention (compliance)
Access posts subsample	Facebook data for participants who provided permissions to access their posts and subscriptions for at least two weeks	34,592 (94 percent of participants who provided permissions in baseline)	Subscription to outlets over time; posts shared by participants
Extension subsample	Browser data for participants who installed the extension for at least two weeks	1,835 (81 percent of participants who installed the extension in baseline)	Exposure to posts in the Facebook feed; news sites visited
Endline survey subsample	Endline survey, approximately two months after baseline	17,635 (47 percent of participants who completed the baseline survey)	Political opinions; affective polarization

Figure: Description of main data sources

1 Facebook Data

- Pages liked and Posts Shared in Facebook account
- ✓ Estimate the effect of intervention on political behavior

2 Facebook Feed and Browsing behavior Data

- Google extension data –*Extension subsample* (for analyzing media outcomes)

✓ Collect facebook feed and news-relatd browsing behavior

✓ Estimate how often participants were exposed to posts from outlets on Facebook
Estimate the effect on the news sites participants visited

3 Survey Data

Endline Survey

- Self-reported political opinions
- Affective polarization
- Changes in self-reported news consumption habits
- *Endline survey subsample*

4 External Data

1. **Outlets**: Slant of news at the outlet level – the outlet dataset
2. **Comscore Browsing Data**: Descriptive statistics on news consumption outside the experimental sample –the Comscore dataset

Outline

ITT estimator

- The difference between the treatment group and control group mean regardless of the degree of compliance
- Provide unbiased comparisons among the treatment groups
- Provides information about the potential effects of treatment policy rather than on the potential effects of specific treatment
- Supplementary readings:
  1. Understanding the intention-to-treat principle in randomized controlled trials
  2. Why ITT analysis is not always the answer for estimating treatment effects in clinical trials
  3. Estimating Program Effects on Program Participants

ITT estimator

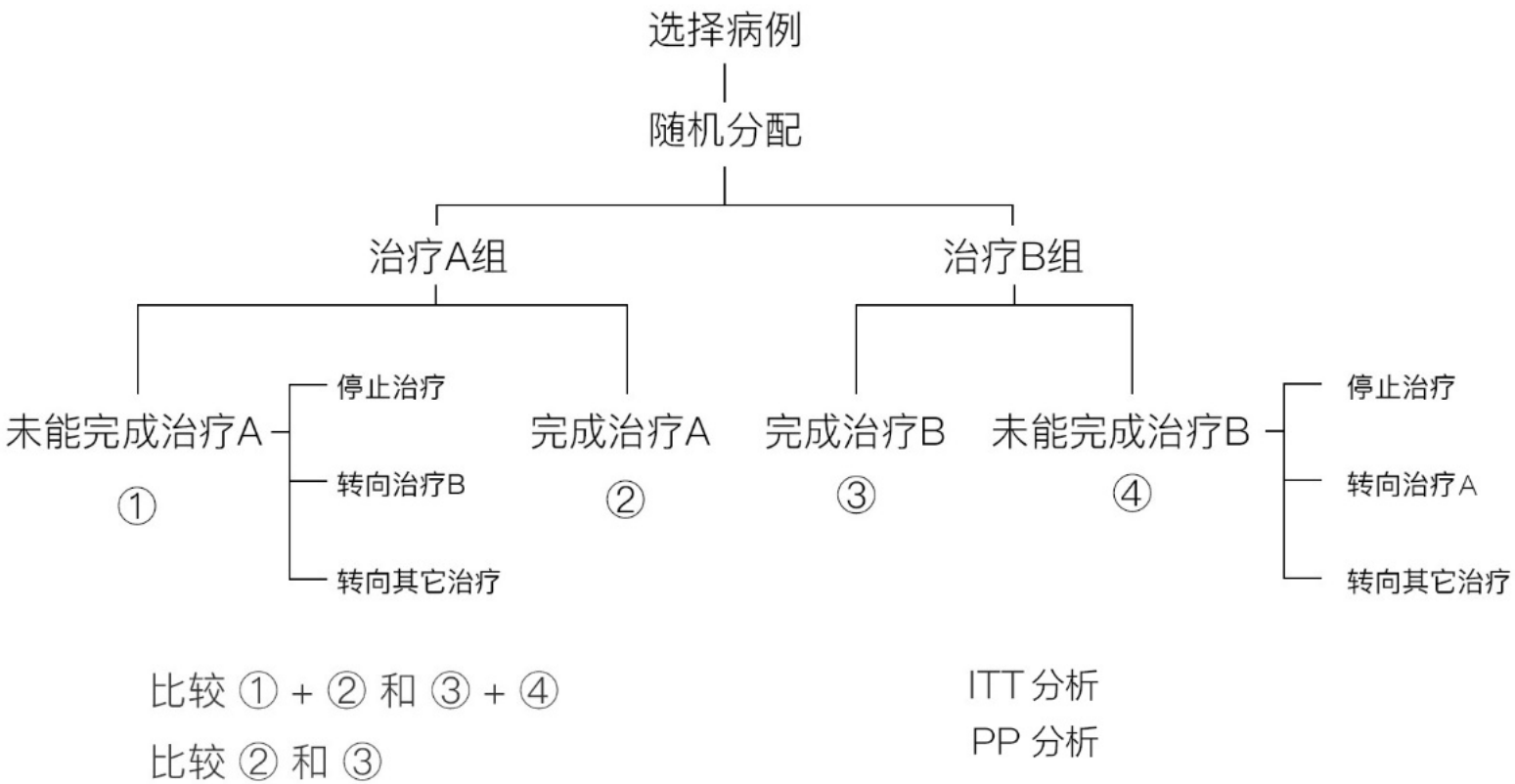


Figure: An example illustration of ITT and PP effect

Liberal and Conservative Treatment

ITT Regression

$$Y_i = \beta_1 T_i^L + \beta_2 T_i^C + \alpha X_i + \varepsilon_i$$

- Y_i
  1. The number of times participants engaged with the *potential* outlets(four) –direct effect of the experiment
  2. The mean slant of all leading news outlets with which participants engaged
  3. *A congruence scale*: calculated as the mean slant of news consumed, multiplied by (1) for liberal participants
  4. *The share of counter-attitudinal news*: the share of news form counter-attitudinal outlets among all news form pro- and counter-attitudinal outlets

Liberal and Conservative Treatment

ITT Regression

$$Y_i = \beta_1 T_i^L + \beta_2 T_i^C + \alpha X_i + \varepsilon_i$$

- Y_i
  1. Political opinion index
  2. Affective polarization index

Liberal and Conservative Treatment

ITT Regression

$$Y_i = \beta_1 T_i^L + \beta_2 T_i^C + \alpha X_i + \varepsilon_i$$

- T_i^L, T_i^C: whether participant i is assigned to the liberal or conservative treatment, respectively
- X: self-reported ideology, party affiliation, approval of President Trump,ideological leaning, age, age squared, gender, and baseline questions measuring political opinions similar in endline survey

- Estimate the effect on politcal opinions: test whether $\beta_1 < \beta_2$

Pro-Attitudinal and Counter-Attitudinal Treatment

ITT Regression

$$Y_i = \beta_1 T_i^A + \beta_2 T_i^P + \alpha X_i + \varepsilon_i$$

- T^A:Whether the participant was assigned to the counter-attitudinal treatment; T^P: the opposite one
- Individual Ideological leaning
  1. the party they identify with or lean toward
  2. Self-reported ideology
  3. The candidate they supported in the 2016 elections

- Measure more affective polarized: test whether $\beta_1 < \beta_2$

Outline

Balance Table 1

Variable	Mean: Sample $N = 37{,}494$	Mean: United States	Mean: Facebook users	Difference: Control - Lib.	Difference: Control - Cons.	Difference: Cons. - Lib.
Baseline survey						
Ideology (−3, 3)	−0.61	0.17		0.01	0.01	0.00
Democrat	0.38	0.35	0.30	0.01	0.00	0.01
Republican	0.17	0.28	0.21	−0.01	0.00	−0.01
Independent	0.37	0.32	0.35	−0.00	−0.00	−0.00
Vote support Clinton	0.53			−0.00	−0.00	−0.00
Vote support Trump	0.26			0.00	−0.00	0.01
Feeling therm., Rep.	29.07	43.06		0.11	0.25	−0.13
Feeling therm., Dem.	46.99	48.70		0.40	0.46	−0.06
Difficult pers., Rep. (1, 5)	3.13			0.02	0.00	0.02
Difficult pers., Dem. (1, 5)	2.39			−0.00	0.01	−0.01
Facebook echo chamber	1.18		1.12	−0.00	−0.00	0.00
Follows news	3.35	2.42		0.01	0.01	−0.00
Most news social media	0.18	0.13		−0.00	0.00	−0.00
Device						
Took survey mobile	0.67			−0.01	−0.00	−0.01
Facebook						
Female	0.52	0.52	0.55	−0.01	−0.00	−0.00
Age	47.69	47.30	42.86	0.22	−0.13	0.35
Total subscriptions	474			5.15	9.04	−3.89
News outlets slant (−1, 1)	−0.18			0.00	0.00	0.00
Access posts, pre-treat.	0.98			0.00	0.01	−0.00
Attrition						
Took followup survey	0.47			0.03	0.03	−0.00
Access posts, 2 weeks	0.92			0.00	0.01	−0.01
Extension install, 2 weeks	0.05			0.00	−0.00	0.00
F-test				1.20	0.89	1.05
P-value				[0.21]	[0.64]	[0.39]

Balance Table 2

Variable	Mean		Difference		
	Sample N=36,330	US	Control - Pro.	Control - Counter.	Pro. - Counter.
Baseline Survey					
Ideology, Abs. Value (0, 3)	1.80	1.31	0.00	-0.00	-0.00
Democrat	0.39	0.37	0.01	0.00	-0.01
Republican	0.17	0.30	0.00	-0.01	-0.01
Independent	0.36	0.29	-0.01*	0.00	0.01**
Vote Support Clinton	0.54		-0.00	-0.00	0.00
Vote Support Trump	0.27		0.00	0.00	0.00
Feeling Therm., Difference	50.22	38.44	0.36	0.41	0.05
Difficult Pers., Difference	1.92		0.03	0.02	-0.02
Facebook Echo Chamber	1.20		0.00	-0.01	-0.01
Follows News	3.36	2.48	0.01	0.01	0.01
Most News Social Media	0.17	0.12	0.00	-0.00	-0.01
Device					
Took Survey Mobile	0.67		-0.01*	-0.00	0.01*
Facebook					
Female	0.52	0.52	-0.01	-0.00	0.00
Age	47.91	47.70	0.02	0.08	0.06
Total Subscriptions	473		6.91	3.16	-3.75
News Outlets Slant, Abs. Value	0.54		-0.00	-0.00	0.00
Access Posts, Pre-Treat.	0.98		0.00	0.00	-0.00
Attrition					
Took Followup Survey	0.47		0.03***	0.03***	0.00
Access Posts, 2 Weeks	0.92		0.01	0.00	-0.00
Extension Install, 2 Weeks	0.05		0.00	-0.00	-0.00
F-Test			1.23	0.80	0.99
P-value			[0.20]	[0.75]	[0.48]

Segregation in Online News

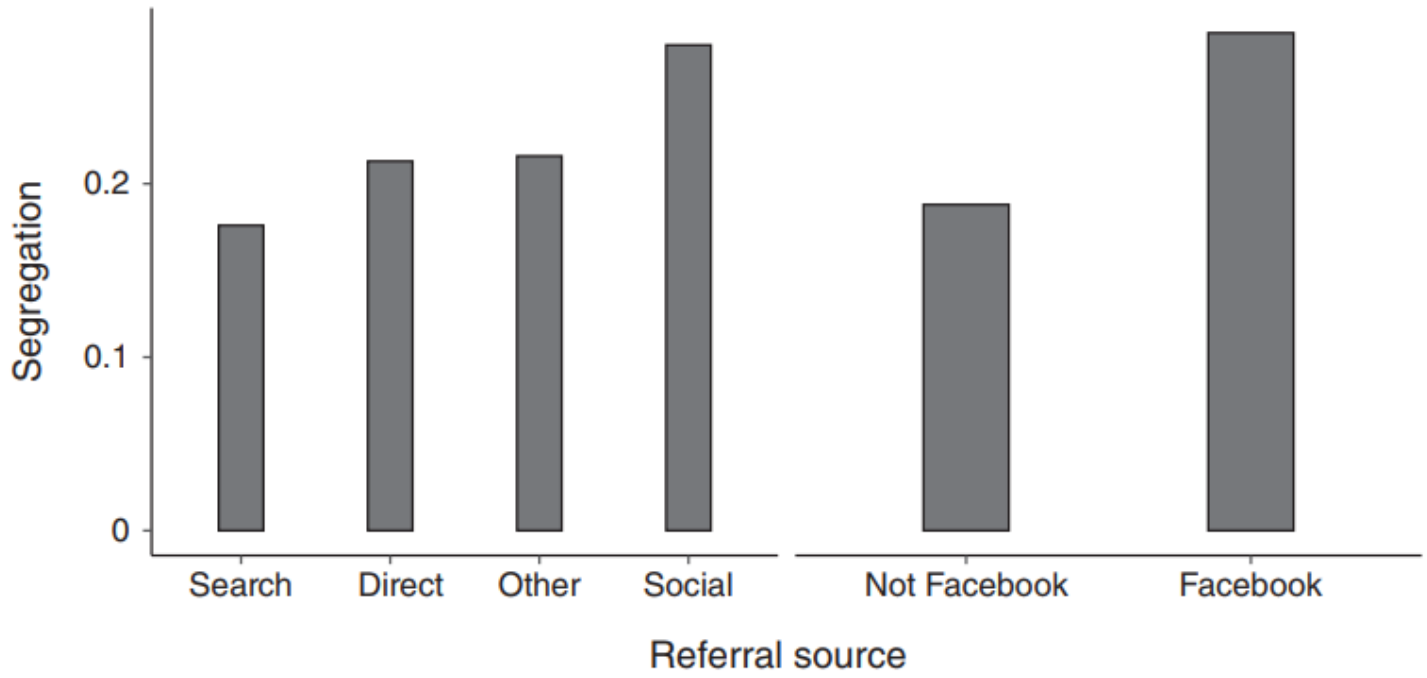


Figure: Segregation in News Sites Visited

Isolation of News

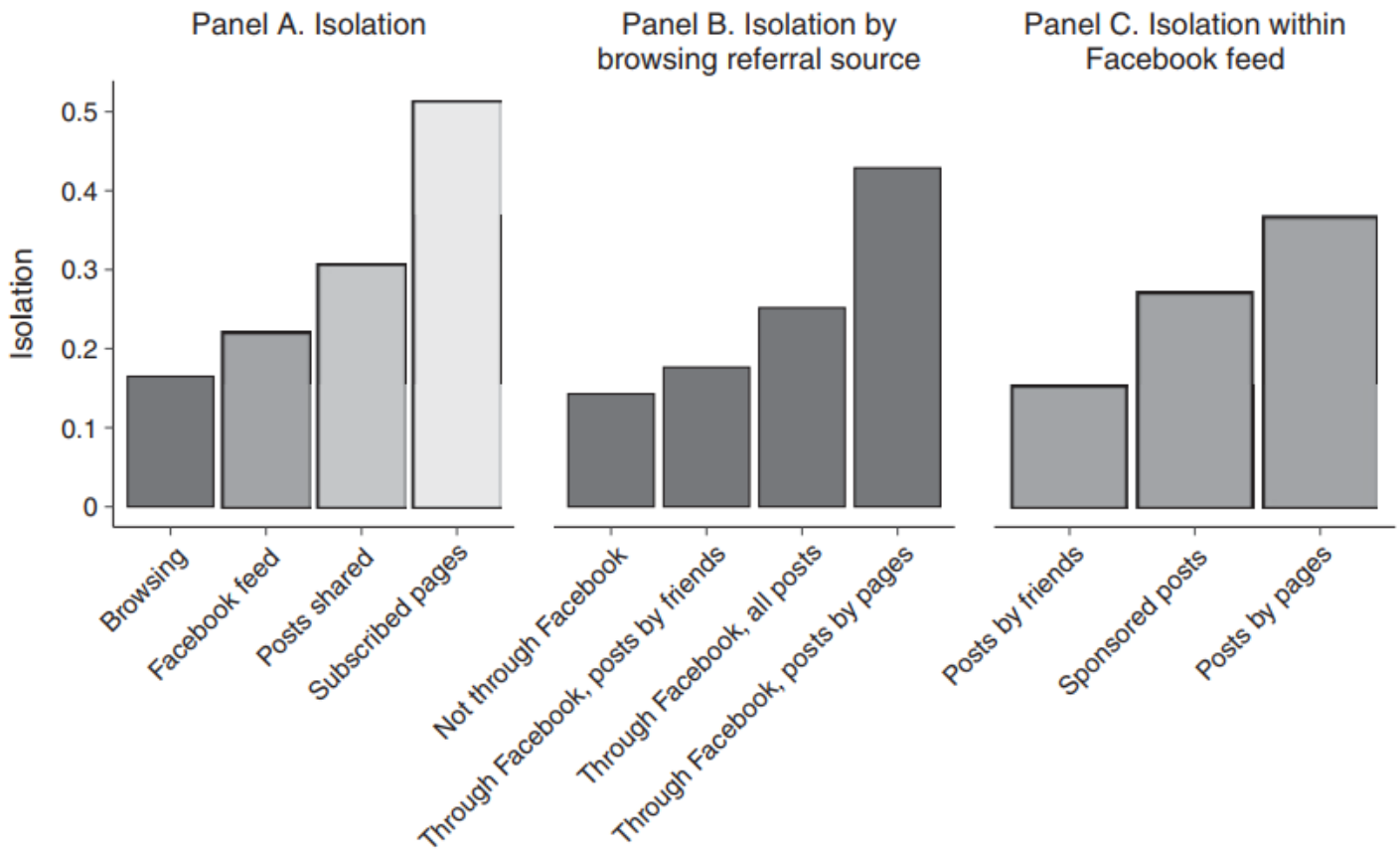
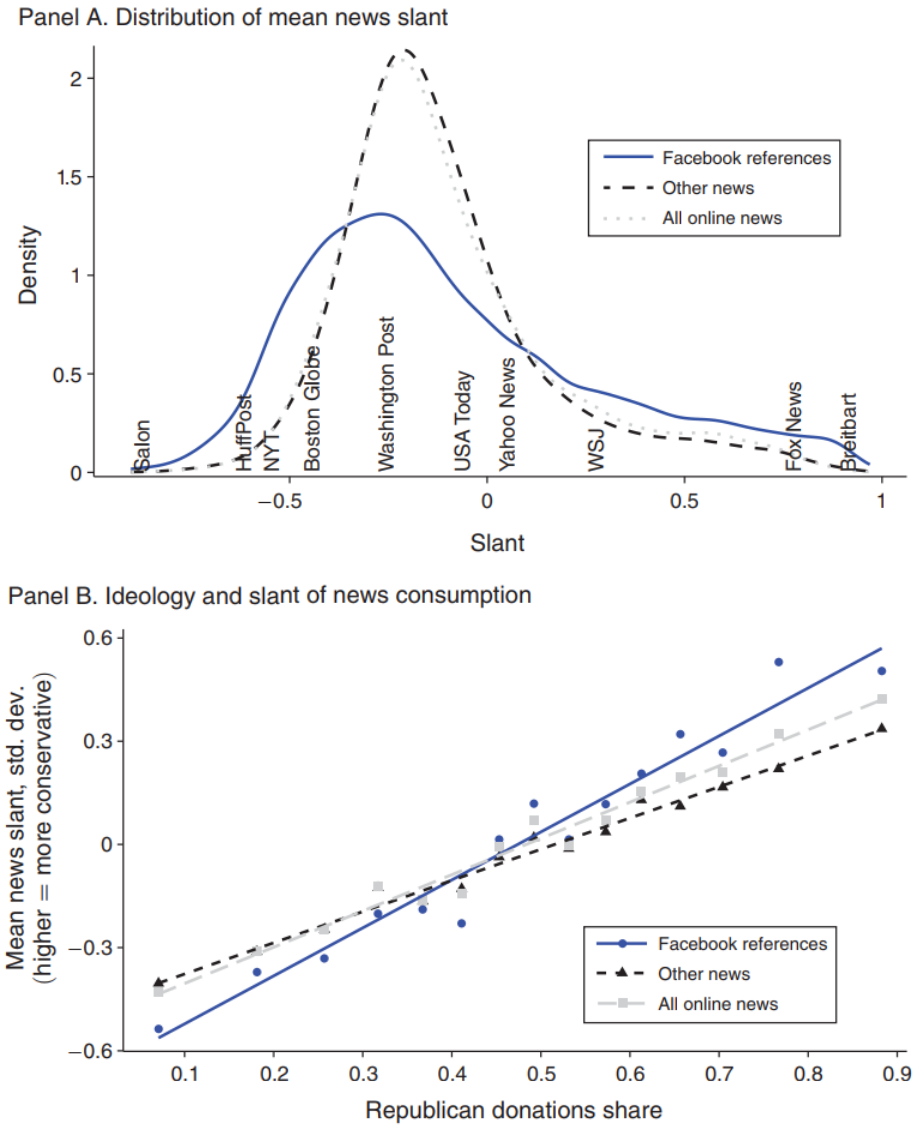


Figure: Isolation by Medium, Extension Data

News Consumption in the Comscore Panel

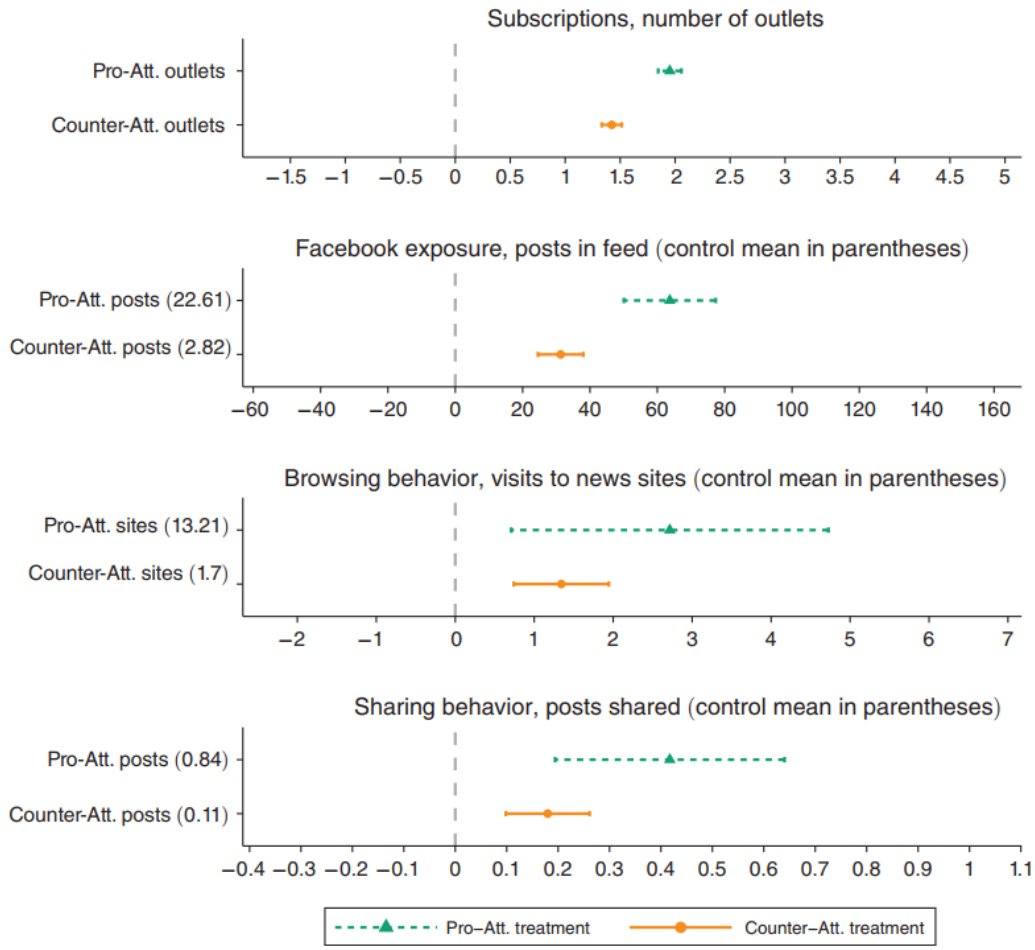


Outline

Individuals Are Willing to Engage with Counter-Attitudinal News

- Estimate the effect of the pro- and counter-attitudinal treatmets on engagement with the potential pro- and counter-attitudinal outlets
- Participants who installed the browser extension and provided permissions to access posts for at least 2 weeks
- Engagement:subscriptions, news exposure, news sites visited, and sharing behavior, two weeks following the intervention
- News is often consumed incidentally when it becomes more accessible

Individuals Are Willing to Engage with Counter-Attitudinal News



Individuals Are Willing to Engage with Counter-Attitudinal News

Poisson Regression Results

	Pro-Att. Outlets Facebook Exposure	Pro-Att. Outlets Browsing Behavior	Pro-Att. Outlets Sharing Behavior	Counter-Att. Outlets Facebook Exposure	Counter-Att. Outlets Browsing Behavior	Counter-Att. Outlets Sharing Behavior
	(1)	(2)	(3)	(4)	(5)	(6)
Pro-Att. Treat.	1.34***	0.29**	0.57***	0.33**	0.19	0.17
	(0.13)	(0.14)	(0.21)	(0.16)	(0.25)	(0.31)
Counter-Att. Treat.	−0.06	−0.03	0.26	2.49***	0.54***	1.27***
	(0.13)	(0.14)	(0.21)	(0.16)	(0.19)	(0.31)
Pro-Att. exponentiated	3.82	1.33	1.77	1.39	1.22	1.18
Counter-Att. exponentiated	0.94	0.97	1.3	12.11	1.72	3.56
Observations	1,648	1,648	1,648	1,648	1,648	1,648

The Social Media Feed Strongly Affects Online News Consumption

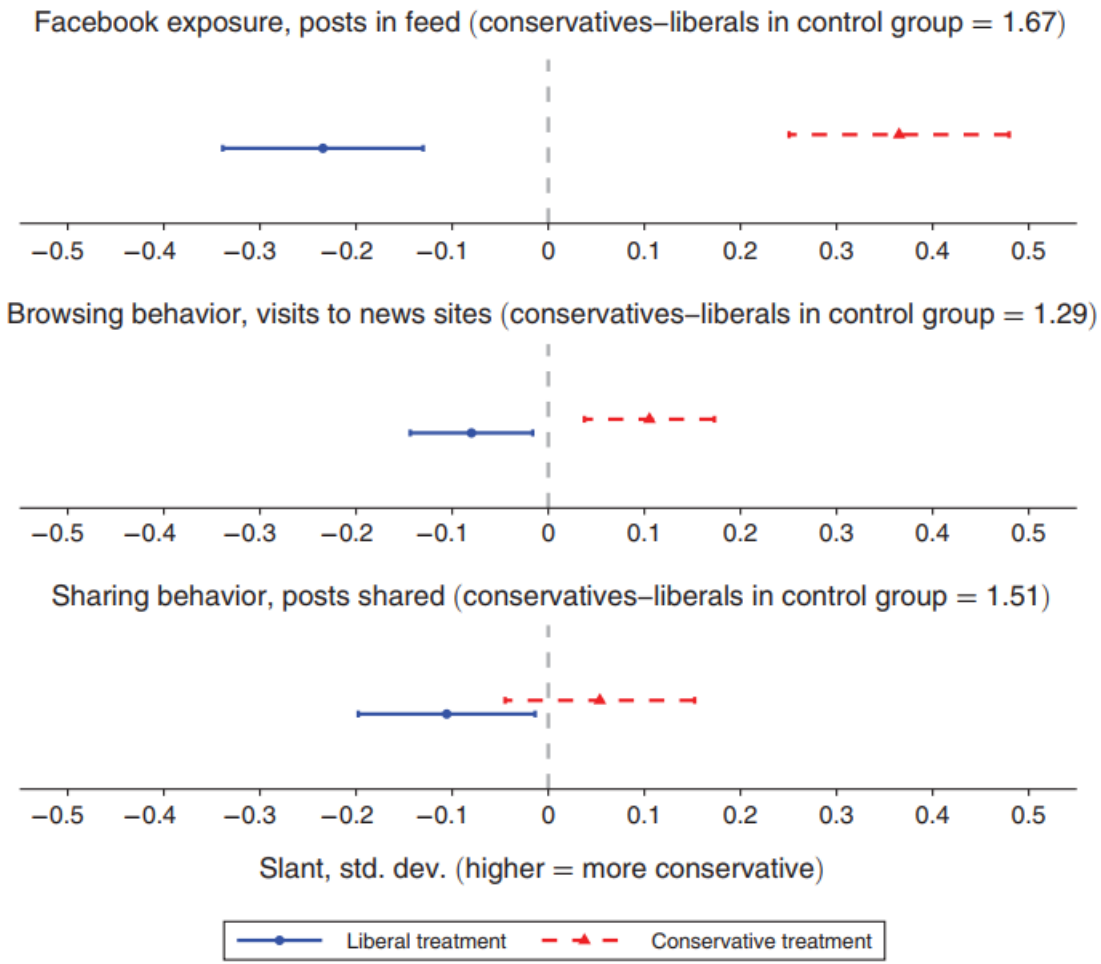
- Test whether the treatment affected the mean slant of all news with which participants are engaged
- Participants in the conservative and liberal treatments

The Social Media Feed Strongly Affects Online News Consumption

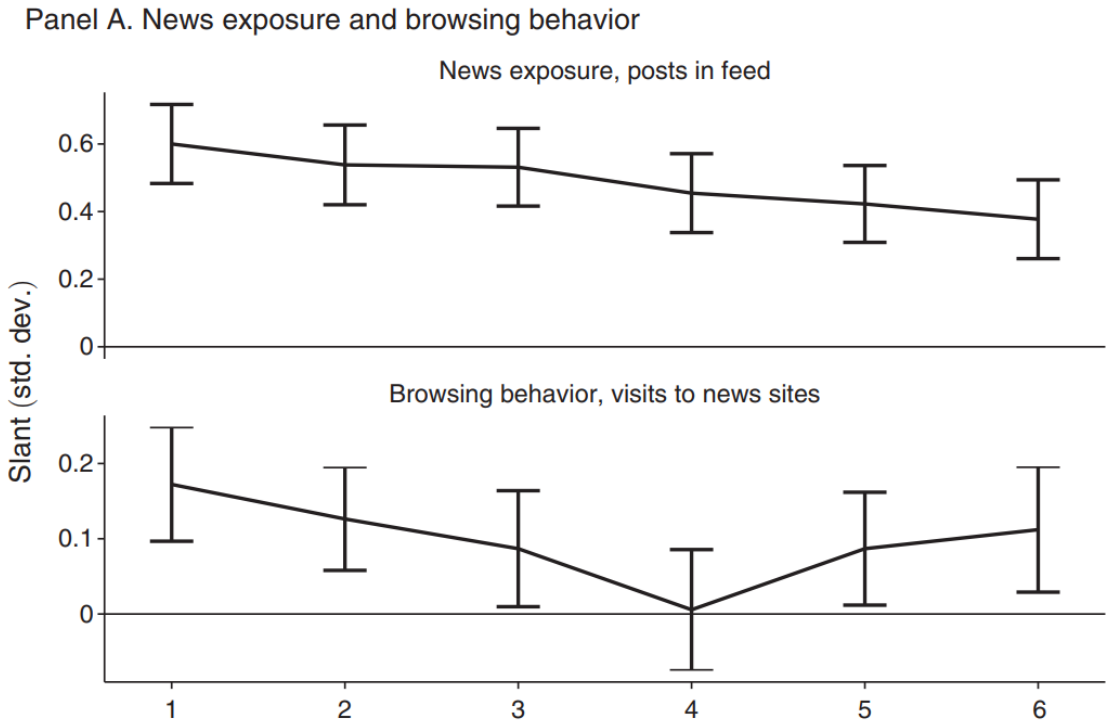
Effects of the Treatment on News Slant

	News Exposure			Browsing Behavior			Shared Posts		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Liberal Treatment	−0.237***	−0.234***	−0.191***	−0.091**	−0.080**	−0.100**	−0.021*	−0.106*	−0.045
	(0.060)	(0.063)	(0.073)	(0.037)	(0.039)	(0.046)	(0.012)	(0.056)	(0.065)
Conservative Treatment	0.355***	0.365***	0.462***	0.102**	0.105**	0.107**	0.046***	0.054	0.131*
	(0.067)	(0.070)	(0.082)	(0.040)	(0.041)	(0.050)	(0.013)	(0.060)	(0.073)
Cons. Treat. - Lib. Treat.	0.59***	0.60***	0.65***	0.19***	0.19***	0.21***	0.07***	0.16***	0.18**
	(0.06)	(0.07)	(0.08)	(0.04)	(0.04)	(0.05)	(0.01)	(0.06)	(0.07)
Ext. Subsample	X			X					
Posts Subsample							X		
Ext. + Posts Subsample		X			X			X	
Ext. + Posts + Endline Subsample			X			X			X
Observations	1,556	1,433	1,010	1,785	1,652	1,166	18,328	979	685

The Social Media Feed Strongly Affects Online News Consumption



Effects of the Conservative Treatment on Mean Slant Declines over 6 weeks but mostly remains positive and significant



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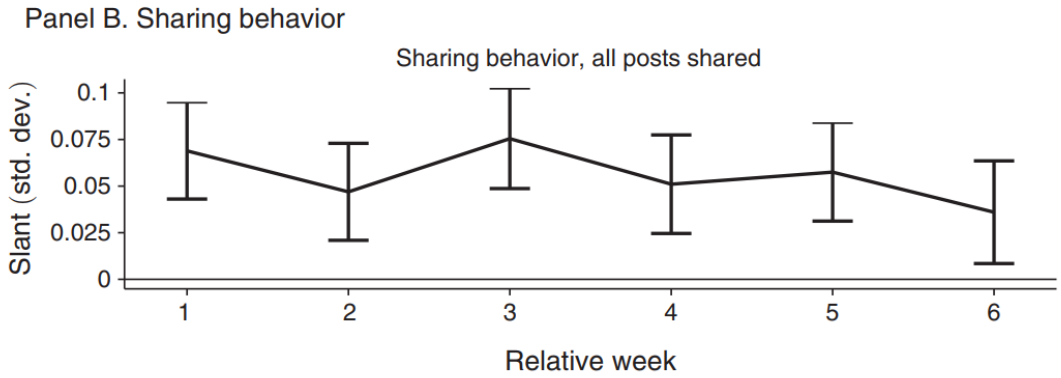
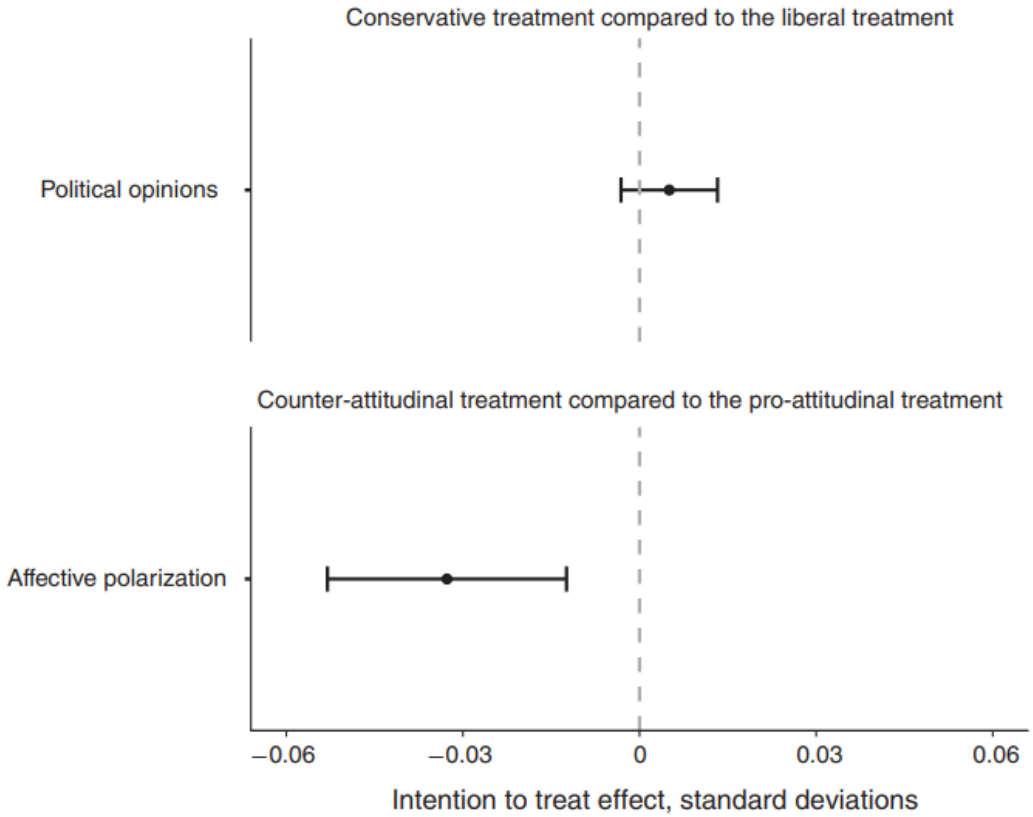


- The effects of the experiment declined but remained significant for at least **12** weeks
- Alleviate concerns of experimenter effects

Outline

Social Media News Exposure Does Not Strongly Affect Political Opinions

- The treatments did not affect the political opinions index

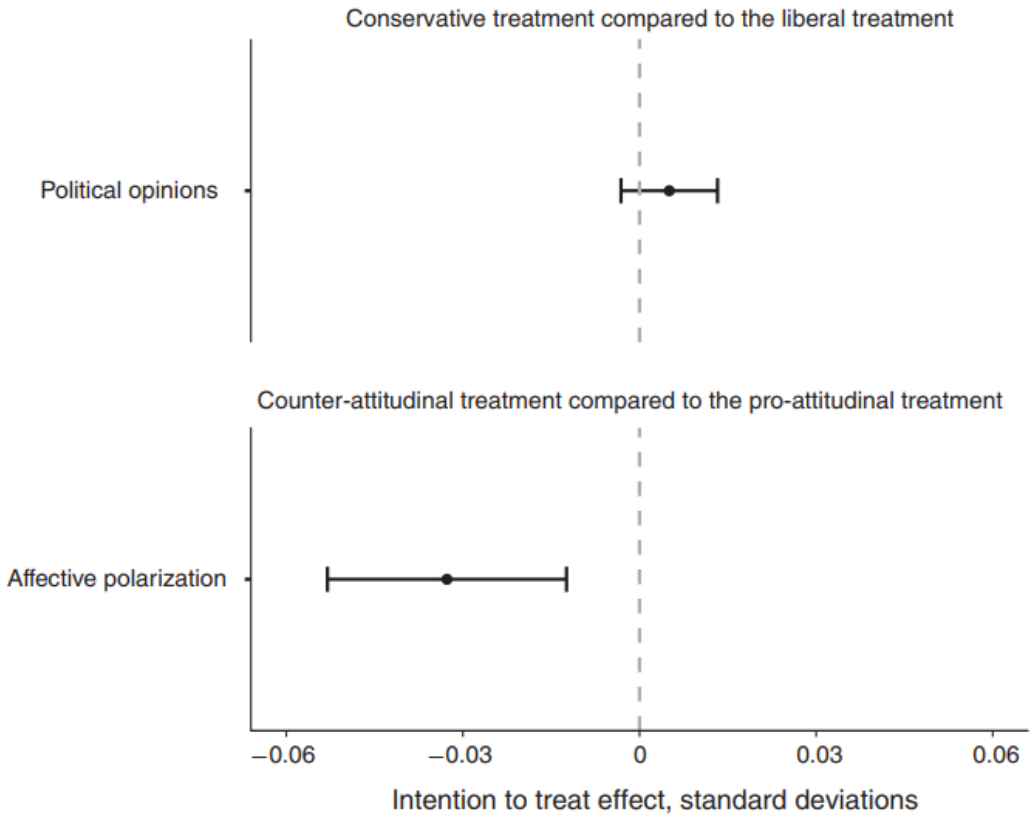


The Social Media Feed Strongly Affects Online News Consumption

(a) Effect on Political Opinions, by Subsample

	(1)	(2)	(3)	(4)
Liberal Treatment	−0.006	−0.007	−0.011	−0.020
	(0.005)	(0.005)	(0.018)	(0.019)
Conservative Treatment	−0.001	−0.003	0.002	−0.001
	(0.005)	(0.005)	(0.018)	(0.018)
Conservative Treat - Lib. Treat	0.005	0.004	0.013	0.018
	(0.005)	(0.005)	(0.018)	(0.018)
Controls	X	X	X	X
Sample	Endline	Endline+ Posts	Endline+ Ext	Endline+ Posts+Ext
Observations	17,635	16,339	1,286	1,196

- the counter-attitudinal treatment modestly decreased affective polarization index compared to the pro-attitudinal treatment



(b) Effect on Affective Polarization, by Subsample

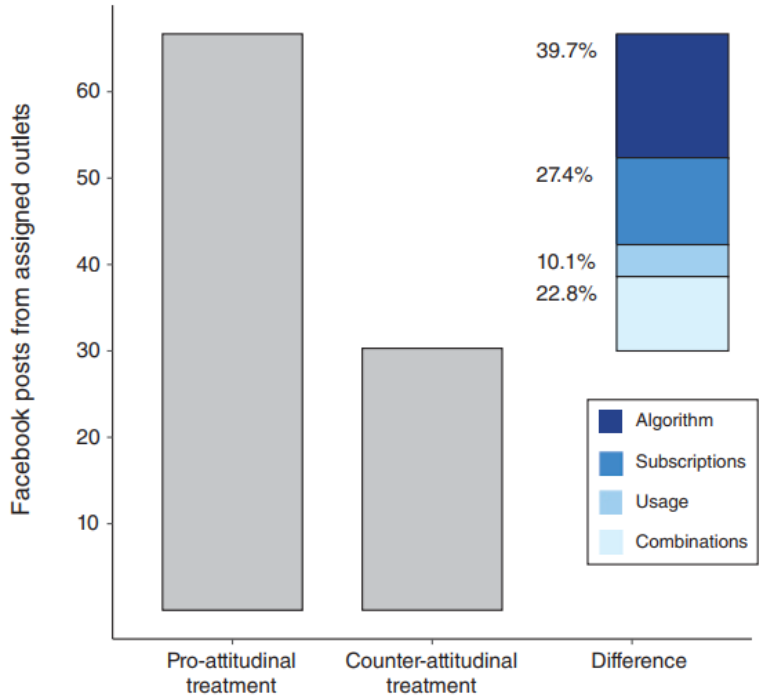
	(1)	(2)	(3)	(4)
Pro-Att. Treatment	0.005	0.008	0.015	0.027
	(0.012)	(0.013)	(0.044)	(0.046)
Counter-Att. Treatment	−0.028**	−0.027**	−0.072*	−0.056
	(0.012)	(0.013)	(0.043)	(0.045)
Pro-Att. Treat. - Counter-Att. Treat	0.033***	0.035***	0.087**	0.083*
	(0.012)	(0.013)	(0.043)	(0.045)
Controls	X	X	X	X
Sample	Endline	Endline+ Posts	Endline+ Ext	Endline+ Posts+Ext
Observations	16,896	15,647	1,241	1,151

Exposure to Pro-Attitudinal News on Social Media Increases Polarization

- Factors influencing the news individuals exposed to on social media
- Decomposes the gap between the number of posts participants were exposed to from the offered pro- and counter-attitudinal outlets

Exposure to Pro-Attitudinal News on Social Media Increases Polarization

- The strongest force associated with participants' increased exposure to pro-attitudinal news is the **algorithm**
- Personalization is leading to segregation on social media



Contributions

- Combine experimental variation with social media and news-related browsing data
- **News consumption on social media** is an important phenomenon because consumers are exposed to different news on social media, individuals incidentally consume news when it becomes **accessible** in their feed, and exposure to news on social media affects **attitudes**

Brief Conclusions

- exposure to pro-attitudinal news increases affective polarization compared to counter-attitudinal news
- individuals are not easily persuaded by the political leaning of their news exposure.

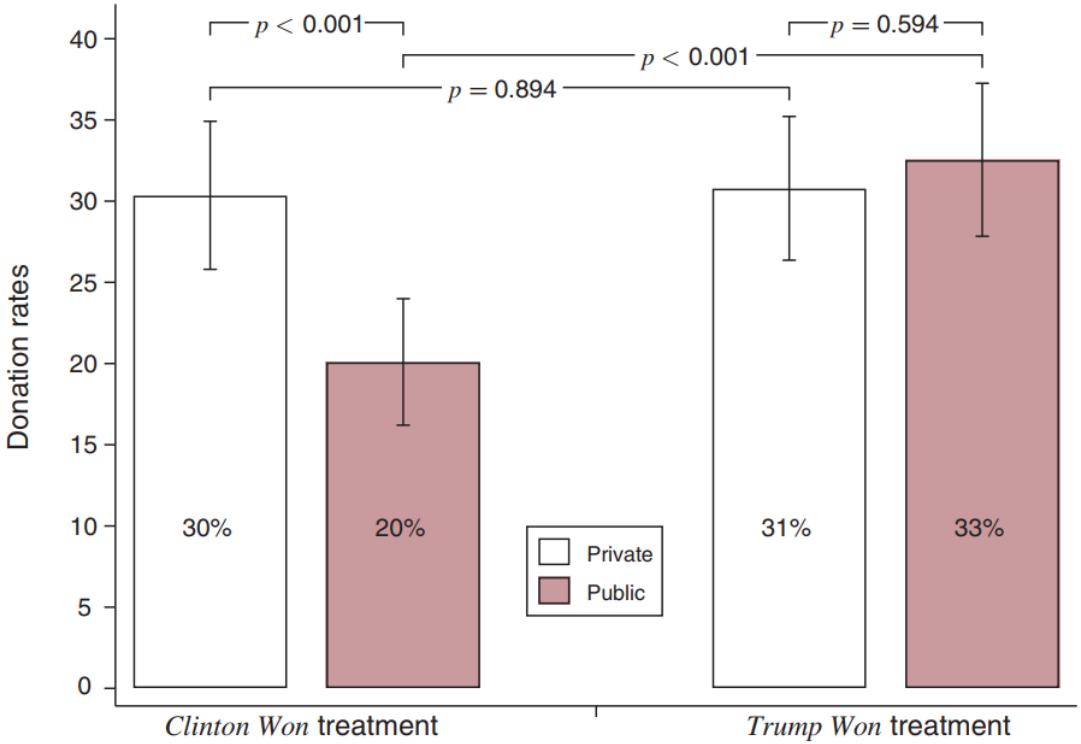
For Further Reading

- Appendix:Social Media, News Consumption, and Polarization
- Bursztyn, Leonardo, Georgy Egorov, and Stefano Fiorin. 2020. "From Extreme to Mainstream: The Erosion of Social Norms." American Economic Review, 110 (11): 3522-48

Brief Introduction to *From Extreme to Mainstream*

- Donald Trump's rise in popularity and eventual victory increased individuals' will- ingness to publicly express xenophobic views
- Individuals are sanctioned less negatively if they publicly expressed a xenophobic view in an environment where that view is more popular

Experiment 1: Revealed Preference



Experiment 2: Popularity of Xenophobia