

Online Appendix for “Testing the Robustness of the ANES Feeling Thermometer Indicators of Affective Polarization”

Matthew Tyler Shanto Iyengar

October 11, 2023

Contents

A Methodology: Weighting and Variance Estimation	2
A.1 Unweighted Time Series	2
B Additional Results	3
C Changes in Non-Partisan Affect	9
D Design and Collection of the Survey Experiment	10
D.1 Questions for Non-Political Condition	13
D.2 Questions for Political Condition	17
E Within-Respondent Questionnaire Changes	21
F Imputing the Face-to-Face Affective Polarization Trend	22

A Methodology: Weighting and Variance Estimation

Table A1: Weighting variables and data sources.

Data	Weights	Source
ANES Time Series	VCF0009z	ANES Cumulative File
2020 ANES	V200010b	2020 ANES Release
ANES-GSS Joint Study	V200017b	ANES-GSS Joint Study (2020-2021)
GSS (1972-2002)	WTSSALL	GSS 1972-2021 Release
GSS (2004-2018)	WTSSNR	GSS 1972-2021 Release
GSS (2020/2021)	WTSSNRPS	GSS 1972-2021 Release
Priming Experiment	weight	YouGov (2022)

Note that the ANES Time Series is analyzed with the weights provided in the cumulative file, while the 2020 ANES is analyzed using the post-election weights provided in the 2020 ANES Release. This means the 2020 ANES data is analyzed with pre-election weights when included in the ANES Time Series but with post-election weights otherwise. We do this because (a) the pre-election weights are the only weights included on the cumulative file and we don't want to ruin over-time comparability of the time series and (b) it has only a minimal impact on our estimates.

Variance estimation for both the 2020 ANES and the ANES-GSS Joint Study are analyzed according to their respective survey designs. We use the recommended variables provided in each dataset's respective source file documentation; see the table below. We do not account for the influence of complex survey design on variance estimation for the other datasets because the survey design variables are one or more of the following: irrelevant for variance estimation, unavailable, or ignored since we do not use the dataset to estimate a variance.

Table A2: Survey design variables used in variance estimation.

Dataset	PSU/Cluster	Stratum
2020 ANES	V200010c	V200010d
ANES-GSS Joint Study	V200017c	V200017d

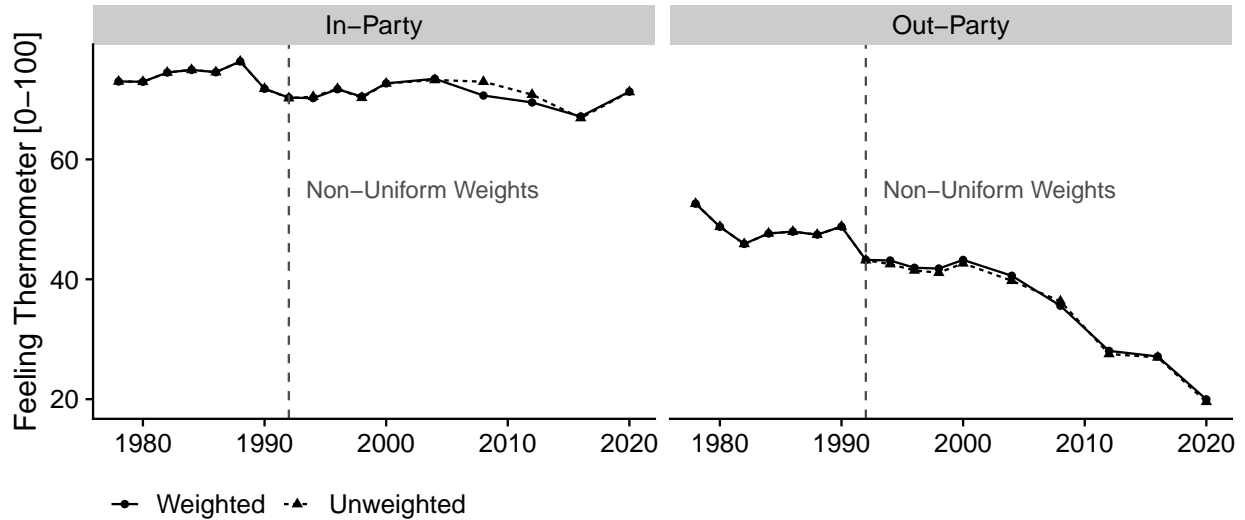
A.1 Unweighted Time Series

A potential confounder of the ANES affective polarization time series is the change in weighting methodology over time. While constructing a theoretically justified common set of temporally comparable weights over time for the ANES time series is outside the scope of this project, we can explore whether the adoption of weights over time has a significant impact on the observed trend in affective polarization.

Figure A1 plots the in-party and out-party feeling thermometers for both the weighted and unweighted version of each time series. Note that the weights in the cumulative file are uniform for the years 1980–1990, so the weighted and unweighted time series are necessarily

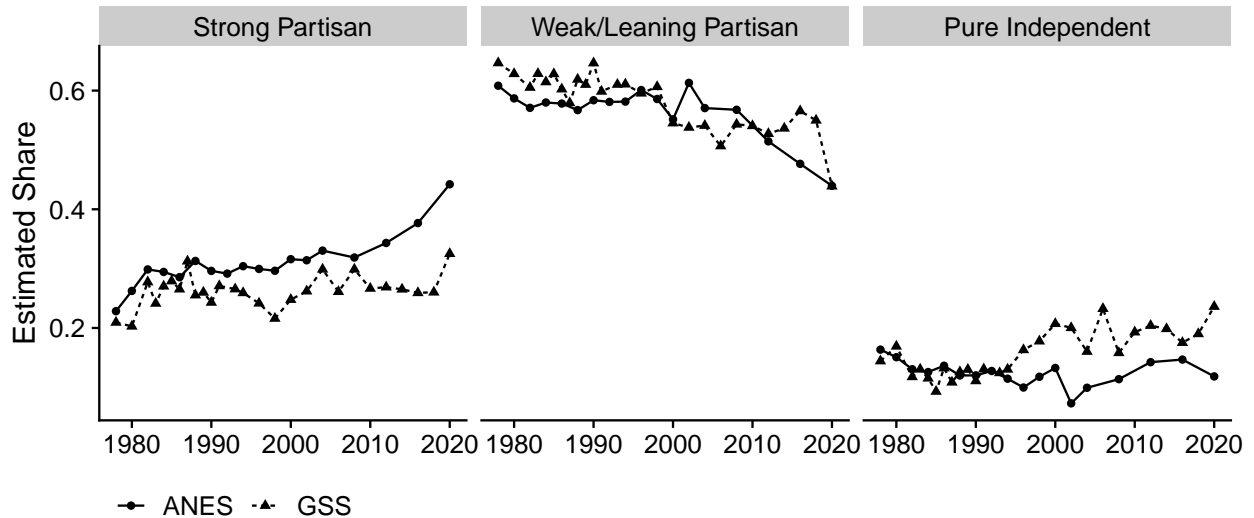
the same for those years. The two time series are extremely similar for most of the years we consider. There is a slight divergence in 2008 and 2012 but, in that case, the unweighted data would imply higher in-party ratings (and thus higher polarization).

Figure A1: Weighted vs. Unweighted ANES Affective Polarization



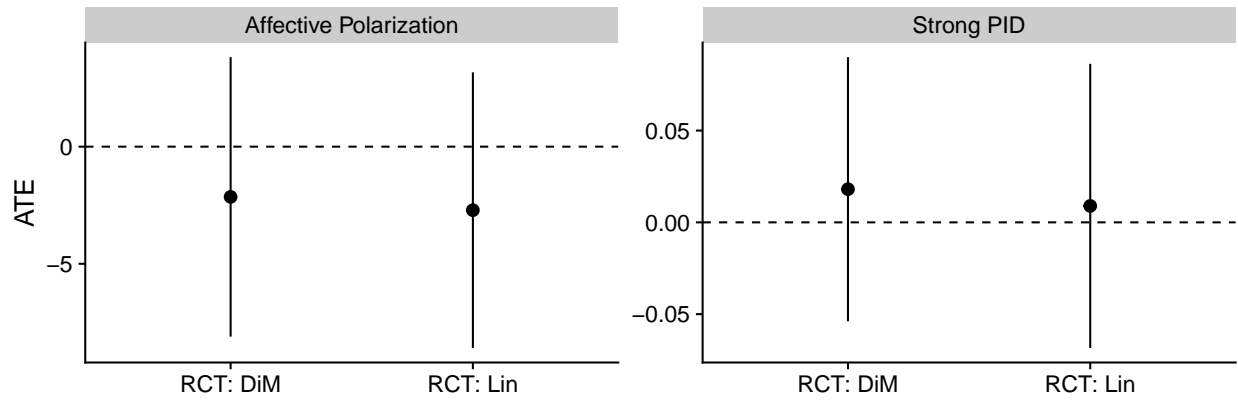
B Additional Results

Figure B1: PID Strength Across Surveys.



Note: for each survey-year observation, points correspond to the weighted average share of strong partisan, weak/leaning partisan, or pure independents in that survey's sample that year.

Figure B2: The effects of political content on AP levels and strong partisanship.



Note: See Table B1 for the full results.

Figure B3: Democratic party feeling thermometer vs. Biden feeling thermometer (2020 ANES)

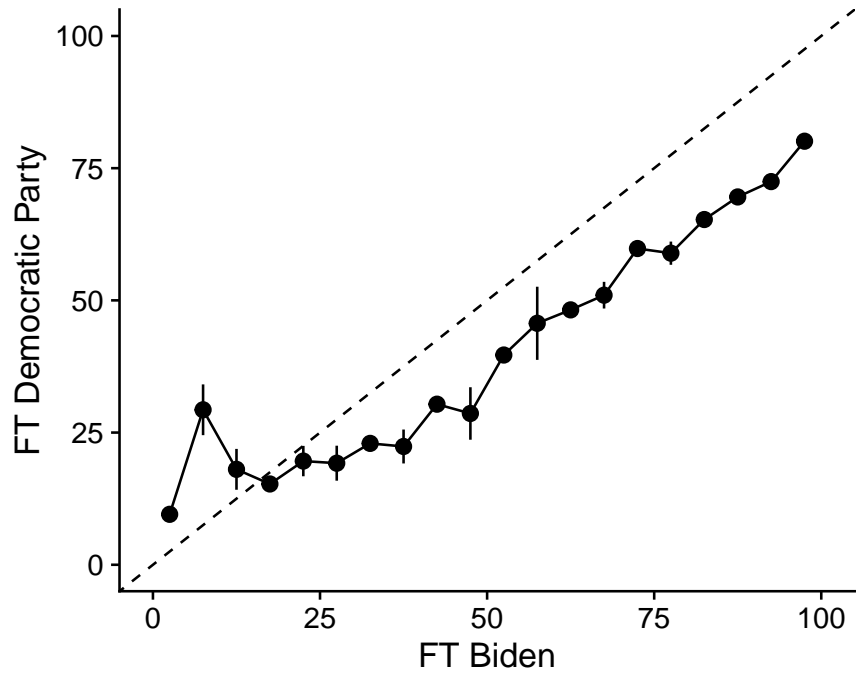


Figure B4: Republican party feeling thermometer vs. Trump feeling thermometer (2020 ANES)

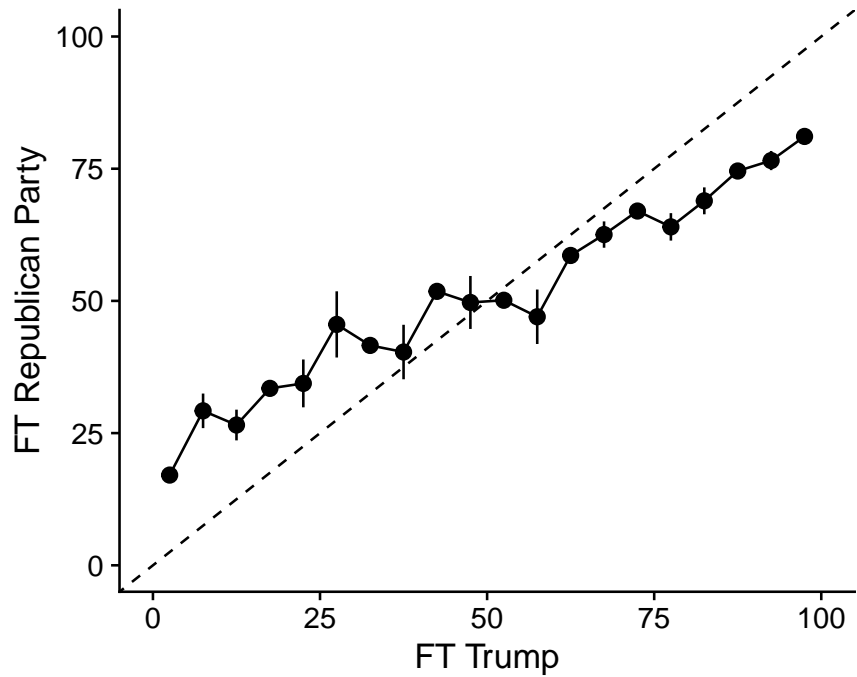


Figure B5: Proportion of PID Subgroups (2020-21)

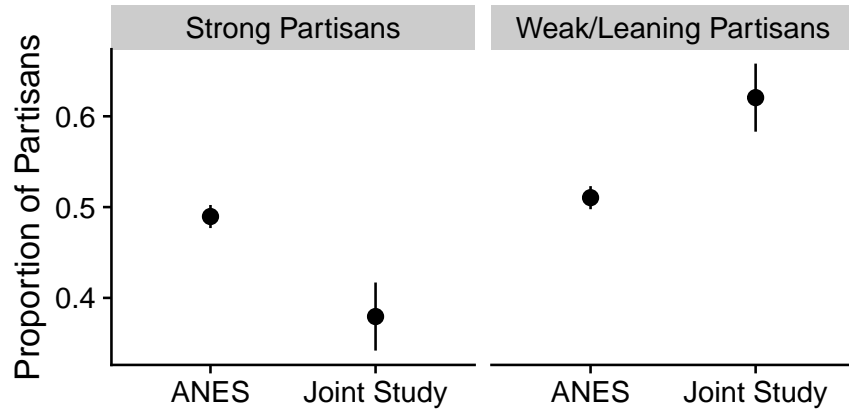


Figure B6: ANES strong partisan share conditional on mode analyzed

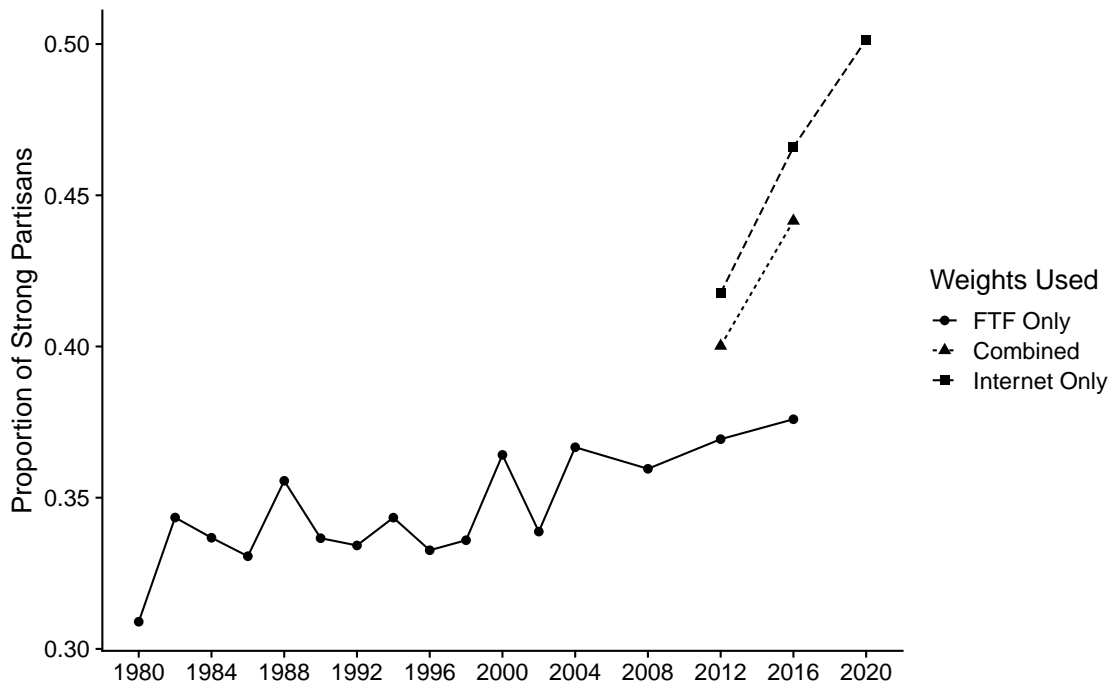


Table B1: Survey experiment regression estimates

	Strong partisan indicator		Feeling Therm Difference (AP)	
	Model 1	Model 2	Model 3	Model 4
(Intercept)	0.4*** (0.0)	0.5*** (0.0)	54.1*** (2.2)	53.2*** (2.1)
treat	0.0 (0.0)	0.0 (0.0)	-2.1 (3.0)	-2.7 (3.0)

	Strong partisan indicator		Feeling Therm Difference (AP)	
	Model 1	Model 2	Model 3	Model 4
ageAge-2_c		0.1 (0.1)		5.9 (8.2)
ageAge-3_c		-0.0 (0.1)		11.5 (9.0)
ageAge-4_c		0.1 (0.1)		21.4* (9.5)
ageAge-5_c		0.2 (0.1)		24.8** (8.4)
ageAge-6_c		0.1 (0.1)		28.0*** (8.2)
educEduc-2_c		0.1 (0.1)		-11.7 (12.7)
educEduc-3_c		-0.1 (0.1)		-5.9 (12.6)
educEduc-4_c		-0.0 (0.2)		-9.6 (13.9)
educEduc-5_c		0.1 (0.1)		-8.0 (13.0)
educEduc-6_c		0.1 (0.2)		-9.8 (13.3)
ethnoraceEthnorace-2_c		0.1 (0.1)		-2.3 (5.0)
ethnoraceEthnorace-3_c		-0.0 (0.1)		-8.3 (7.1)
ethnoraceEthnorace-4_c		-0.1 (0.2)		-7.1 (16.6)
ethnoraceEthnorace-5_c		-0.3** (0.1)		-31.7 (18.3)
female_c		0.0 (0.1)		15.3*** (4.4)
incomeIncome-2_c		0.2* (0.1)		0.7 (5.6)
incomeIncome-3_c		0.2 (0.1)		5.3 (5.5)
incomeIncome-4_c		0.1 (0.1)		-1.8 (9.7)
incomeIncome-5_c		0.1 (0.1)		-0.5 (8.5)
treat:ageAge-2_c		-0.1 (0.2)		-12.6 (13.4)
treat:ageAge-3_c		0.1 (0.2)		-0.5 (14.0)
treat:ageAge-4_c		-0.0		8.2

	Strong partisan indicator		Feeling Therm Difference (AP)	
	Model 1	Model 2	Model 3	Model 4
		(0.2)		(14.1)
treat:ageAge-5_c		-0.1		-6.2
		(0.2)		(13.7)
treat:ageAge-6_c		0.1		-3.9
		(0.2)		(13.7)
treat:educEduc-2_c		-0.2		31.5
		(0.2)		(18.6)
treat:educEduc-3_c		-0.0		29.1
		(0.2)		(18.5)
treat:educEduc-4_c		-0.1		37.5
		(0.2)		(19.6)
treat:educEduc-5_c		-0.2		35.3
		(0.2)		(18.5)
treat:educEduc-6_c		-0.2		46.8*
		(0.2)		(19.6)
treat:ethnoraceEthnorace-2_c		0.0		-12.0
		(0.1)		(8.3)
treat:ethnoraceEthnorace-3_c		-0.0		10.2
		(0.1)		(9.7)
treat:ethnoraceEthnorace-4_c		0.4		8.1
		(0.2)		(17.9)
treat:ethnoraceEthnorace-5_c		0.2		29.8
		(0.2)		(21.3)
treat:female_c		0.1		-8.3
		(0.1)		(6.2)
treat:incomeIncome-2_c		-0.1		-8.3
		(0.1)		(7.7)
treat:incomeIncome-3_c		-0.1		-10.1
		(0.1)		(8.3)
treat:incomeIncome-4_c		-0.2		-6.5
		(0.1)		(11.7)
treat:incomeIncome-5_c		0.1		-16.5
		(0.2)		(15.0)
R ²	0.0	0.1	0.0	0.2
Num. obs.	999	861	773	681
RMSE	0.5	0.5	35.6	33.1

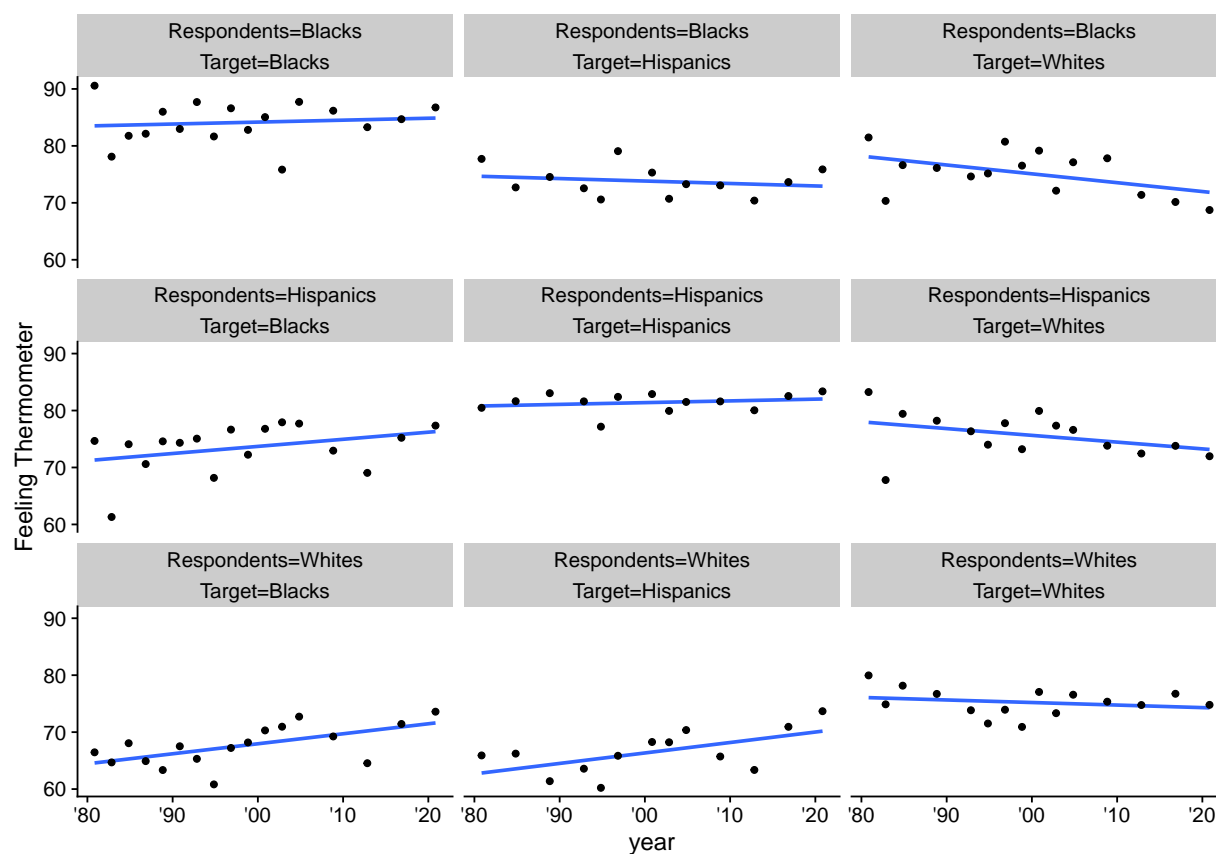
*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

C Changes in Non-Partisan Affect

In this appendix we contextualize affective polarization by contrasting changes in affect towards the parties with changes in affect towards non-partisan groups.

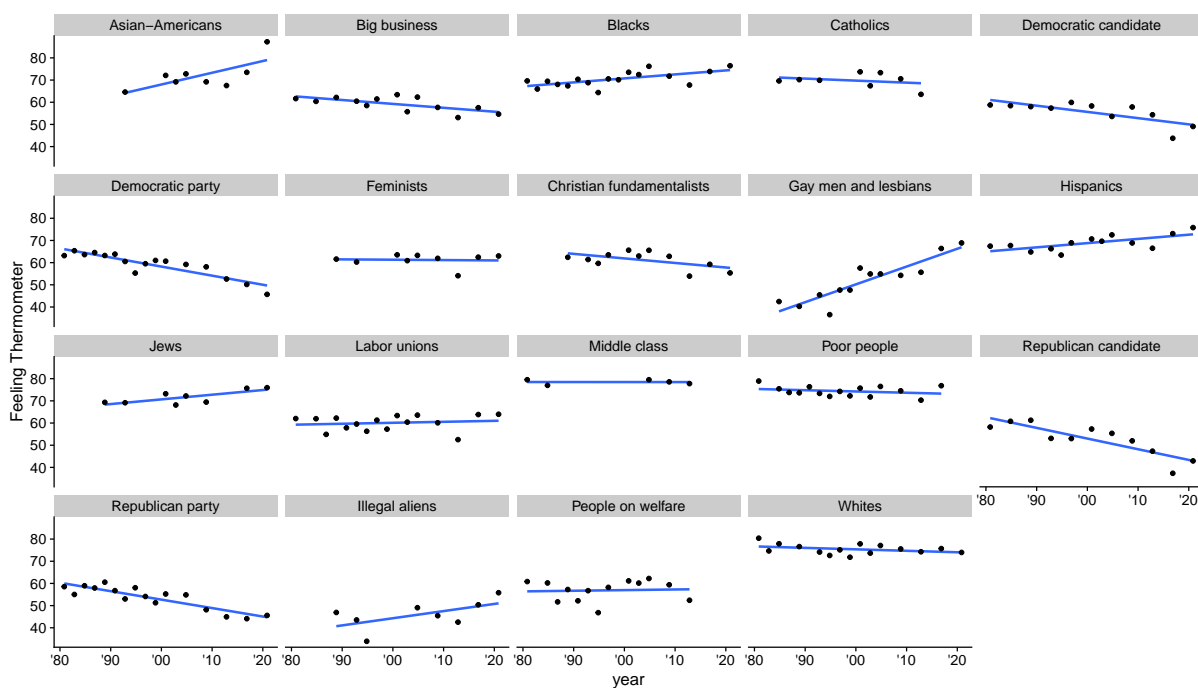
First, the polarization between in-party and out-party affect stands out relative to other social cleavages. Figure C1 plots the average ANES feeling thermometer scores generated from and with respect to the three largest ethnoracial groups: (non-Hispanic) Blacks, Hispanics, and (non-Hispanic) Whites. Each row corresponds to a group of respondents (e.g., Blacks in the top row), while each column corresponds to the group they are rating (e.g., ratings of Hispanics in the middle column). Note that the plots placed along the diagonal are the in-group ratings while the off-diagonal plots are the out-group ratings.

Figure C1: ANES Ethnicity/Race Feeling Thermometers by Respondent's Ethnicity/Race



In contrast with the in-party/out-party trends, the trends in ethnoracial in-group/out-group ratings do not indicate polarization. All three groups rate Blacks higher over time. All three groups rate Whites lower over time, even White respondents. The only trend which seem conditional on the in-group/out-group pair is the Black rating of Hispanics, which has decreased slightly over time — but this is not reciprocated since Hispanics rate Blacks higher now than they did in 1980. All told, there is no evidence of polarization or a polarization-like trend in the ethnoracial in-group/out-group ratings — certainly nothing akin to the trend we observe for in-party/out-party ratings.

Figure C2: ANES Feeling Thermometers for Various Groups (Democrat and Republican Respondents Only)



Second, we might wonder if partisans (Republicans and Democrats) are simply more negative in general. That is, perhaps the sharp decline in out-party ratings is part of a broader decline in feeling thermometer ratings for many politically relevant groups. To explore this idea, Figure C2 plots the ANES feeling thermometer scores provided by Democrats and Republicans for a wide array of groups — selected based on their availability across time in the ANES cumulative file. We include the Democratic and Republican candidates and parties for ease of comparison.

The results show that there is not a widespread decline in feeling thermometer ratings between 1980 and 2020. Apart from the Democratic/Republican parties/candidates, only a few groups experience a decline in ratings over time. Most groups are relatively stable, while a few other groups experience a significant *increase* in ratings over time. We are ultimately forced to conclude there is something special about the change in ratings of the political parties and candidates that is not common to all or even most salient groups.

D Design and Collection of the Survey Experiment

The survey experiment described in the main article was deemed exempt by the Stanford Institutional Review Board under eProtocol # 65566.

Adult subjects were recruited from the YouGov panel via the following prompt.

BEGIN

STUDY INTRODUCTION

(please read before beginning this survey)

<p>DESCRIPTION: You are invited to participate in a research study on individuals' attitudes toward current issues and consumer products. You will be asked to answer a short survey including questions about American politicians and political organizations.</p>

<p>TIME INVOLVEMENT: Your participation will take approximately 10 minutes.</p>

<p>RISKS AND BENEFITS: There are no foreseeable risks associated with this study. No benefits may reasonably be expected to result from this study. We cannot and do not guarantee or promise that you will receive any benefits from this study.</p>

<p>PAYMENTS: You will receive 1000 points towards your YouGov account as payment for your participation.</p>

<p>PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. Your individual privacy will be maintained in all published and written data resulting from the study.</p>

<p>Identifiers might be removed from identifiable private information and, after such removal, the information could be used for future research studies or distributed to another investigator for future research studies without additional informed consent from you.</p>

<p>CONTACT INFORMATION:

<i>Questions:</i> If you have any questions, concerns or complaints about this research, its procedures, risks and benefits, contact the Protocol Director, [REDACTED].</p>

<p><i>Independent Contact:</i> If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your rights as a participant, please contact the [REDACTED] to speak to someone independent of the research team at [REDACTED], or email at [REDACTED]. You can also write to [REDACTED].</p>

<p>Please save or print a copy of this form for your records. If you agree to participate, please complete the following survey.</p>

[content] {single} Please click "I ACCEPT" to indicate that you have read this consent form and voluntarily agree to participate.

- <1> I ACCEPT
- <2> I DECLINE

END

Areas marked [REDACTED] contain the names and addresses of the researchers or university staff; these were provided to the research subjects but are redacted here for the purposes of peer review and privacy.

Respondents were compensated 1000 YouGov points for their participation, which they can convert into gift cards for a wide variety of merchants.

Additional details provided by YouGov on the final sample composition and weighting procedures:

BEGIN

YouGov interviewed 1639 respondents who were then matched down to a sample of 1000 to produce the final dataset. The respondents were matched to a sampling frame on gender, age, race, and education. The frame was constructed by stratified sampling from the full 2019 American Community Survey (ACS) 1-year sample with selection within strata by weighted sampling with replacements (using the person weights on the public use file).

The matched cases were weighted to the sampling frame using propensity scores.

The matched cases and the frame were combined and a logistic regression was estimated for inclusion in the frame. The propensity score function included age, gender, race/ethnicity, years of education, and region. The propensity scores were grouped into deciles of the estimated propensity score in the frame and post-stratified according to these deciles.

The weights were then post-stratified on 2016 and 2020 Presidential vote choice, and a four-way stratification of gender, age (4-categories), race (4-categories), and education (4-categories), to produce the final weight.

END

Around halfway through both the political and non-political questionnaires, respondents were exposed to following party identification battery taken from the 2020 ANES.

BEGIN

- Generally speaking, do you usually think of yourself as [a Democrat, a Republican / a Republican, a Democrat], an independent, or what?
- (If R considers self a Democrat/Republican) Would you call yourself a strong [Democrat / Republican] or a not very strong [Democrat / Republican]?
- (If R does not consider self a Democrat / Republican) Do you think of yourself as closer to the Republican Party or to the Democratic Party?

END

The feeling thermometer at the end of each treatment condition uses the following wording:

BEGIN

The final section of the survey asks you to use a ‘feeling thermometer’ to indicate your feelings toward political leaders and other groups. Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person or group. Ratings between 0 degrees and 50 degrees mean that you don’t feel favorable toward the person and that you don’t care too much for that person. You would rate the person at the 50 degree mark if you don’t feel particularly warm or cold toward the person.

- [q12_1] <Joe Biden>
- [q12_2] <Donald Trump>
- [q12_3] <Hillary Clinton>
- [q12_4] <Mike Pence>
- [q12_5] <Democratic Party>
- [q12_6] <Republican Party>
- [q12_7] <NRA>
- [q12_8] <Black Lives Matter>
- [q12_9] <Liberals>
- [q12_10] <Conservatives>
- [q12_11] <Muslims>
- [q12_12] <Evangelical Christians>
- [q12_13] <Vladimir Putin>

END

D.1 Questions for Non-Political Condition

Variable	Description
cell_type	Cellphone type
cellphone_manufacturer	Cell phone brand owned
cellphone_satisfaction	Cell phone satisfaction
cellphone_nps	Primary cell phone NPS
retail_purchase_last_1	Purchased last 12 months - Toys or games
retail_purchase_last_2	Purchased last 12 months - Books
retail_purchase_last_3	Purchased last 12 months - TVs
retail_purchase_last_4	Purchased last 12 months - Computers
retail_purchase_last_5	Purchased last 12 months - Wearable technology
retail_purchase_last_6	Purchased last 12 months - Mobiles/cell phones or accessories
retail_purchase_last_7	Purchased last 12 months - Homeware or soft furnishings

retail_purchase_last_8	Purchased last 12 months - Furniture
retail_purchase_last_9	Purchased last 12 months - DIY products
retail_purchase_last_10	Purchased last 12 months - Kitchen and home appliances
retail_purchase_last_11	Purchased last 12 months - Sports clothing/equipment
retail_purchase_last_12	Purchased last 12 months - Bed and bath
retail_purchase_last_13	Purchased last 12 months - Mattresses
retail_purchase_last_14	Purchased last 12 months - Luggage
retail_purchase_last_15	Purchased last 12 months - Baby products
retail_purchase_last_97	Purchased last 12 months - Other
retail_purchase_last_98	Purchased last 12 months - Don't know
retail_purchase_last_99	Purchased last 12 months - None of these
retail_purchase_next_1	Purchase next 12 months - Toys or games
retail_purchase_next_2	Purchase next 12 months - Books
retail_purchase_next_3	Purchase next 12 months - TVs
retail_purchase_next_4	Purchase next 12 months - Computers
retail_purchase_next_5	Purchase next 12 months - Wearable technology
retail_purchase_next_6	Purchase next 12 months - Mobiles/cell phones or accessories
retail_purchase_next_7	Purchase next 12 months - Homeware or soft furnishings
retail_purchase_next_8	Purchase next 12 months - Furniture
retail_purchase_next_9	Purchase next 12 months - DIY products
retail_purchase_next_10	Purchase next 12 months - Kitchen and home appliances
retail_purchase_next_11	Purchase next 12 months - Sports clothing/equipment
retail_purchase_next_12	Purchase next 12 months - Bed and bath
retail_purchase_next_13	Purchase next 12 months - Mattresses
retail_purchase_next_14	Purchase next 12 months - Luggage
retail_purchase_next_15	Purchase next 12 months - Baby products
retail_purchase_next_97	Purchase next 12 months - Other categories of products
retail_purchase_next_98	Purchase next 12 months - Don't know
retail_purchase_next_99	Purchase next 12 months - None of these
cellnext	Time to buy next cellphone
cellphone_method	Method of buying next cell phone
next_cellphone_manufacturer	Next cellphone brand
cellphone_spend	Amount intending to spend on cell phone
cellphone_carrier_2021	Cell phone carrier
cellphone_carrier_satisfaction	Cell phone carrier satisfaction
cellphone_carrier_nps	Primary cell phone carrier NPS
monthllyspend_cell	Monthly spend
q1_1	Leisure activities frequency – Going to the gym
q1_2	Leisure activities frequency – Attending concerts
q1_3	Leisure activities frequency – Socializing with friends
q1_4	Leisure activities frequency – Eating out
q1_5	Leisure activities frequency – Playing sports
q1_6	Leisure activities frequency – Going to the movies
q1_7	Leisure activities frequency – Gardening
q1_8	Leisure activities frequency – Playing video games

q1_9	Leisure activities frequency – Other outdoor activities
q1_10	Leisure activities frequency – Home improvements
q1_11	Leisure activities frequency – Social media
q1_12	Leisure activities frequency – Attending religious services
q1_13	Leisure activities frequency – Watching TV
q1_14	Leisure activities frequency – Going to a shopping mall
q2	Number of automobiles
q3	Vegetarian
q4_1	Non-vegetarian-meat - Pork
q4_2	Non-vegetarian-meat - Lamb
q4_3	Non-vegetarian-meat - Beef
q4_4	Non-vegetarian-meat - Chicken
q4_5	Non-vegetarian-meat - Fish
q5	Alcohol consumption
q6_1	Alcoholic beverages - Beer
q6_2	Alcoholic beverages - Wine
q6_3	Alcoholic beverages - Brandy
q6_4	Alcoholic beverages - Tequila
q6_5	Alcoholic beverages - Rum
q6_6	Alcoholic beverages - Gin
q6_7	Alcoholic beverages - Whisky
q6_8	Alcoholic beverages - Vodka
q6_9	Alcoholic beverages - Spritzers
q7_m_1	Non-alcoholic beverages - Tea
q7_m_2	Non-alcoholic beverages - Coffee
q7_m_3	Non-alcoholic beverages - Fruit Juice
q7_m_4	Non-alcoholic beverages - Coke/Pepsi
q7_m_5	Non-alcoholic beverages - 7Up/Sprite
q7_m_6	Non-alcoholic beverages - Diet Coke/Pepsi
q7_m_7	Non-alcoholic beverages - Dr Pepper
q8	Eating out frequency
q9_1	Eating out - Cuisine - Fast food
q9_2	Eating out - Cuisine - Pizza
q9_3	Eating out - Cuisine - Steak houses
q9_4	Eating out - Cuisine - European
q9_5	Eating out - Cuisine - Middle Eastern
q9_6	Eating out - Cuisine - Mexican
q9_7	Eating out - Cuisine - Chinese
q9_8	Eating out - Cuisine - Indian
q9_9	Eating out - Cuisine - Other
q10_1	Impression of brands/businesses – McDonalds
q10_2	Impression of brands/businesses – Pizza Hut
q10_3	Impression of brands/businesses – Budweiser
q10_4	Impression of brands/businesses – Subway
q10_5	Impression of brands/businesses – Burger King

q10_6	Impression of brands/businesses – Dominos
q10_7	Impression of brands/businesses – Dunkin Donuts
q10_8	Impression of brands/businesses – Jack in the Box
q10_9	Impression of brands/businesses – Panda Express
q10_10	Impression of brands/businesses – Coors
q10_11	Impression of brands/businesses – Starbucks
q10_12	Impression of brands/businesses – Taco Bell
q10_13	Impression of brands/businesses – Jamba Juice
q10_14	Impression of brands/businesses – Kentucky Fried Chicken
q10_15	Impression of brands/businesses – General Motors
q10_16	Impression of brands/businesses – Tesla
q10_17	Impression of brands/businesses – Ford
q10_18	Impression of brands/businesses – BMW
q10_19	Impression of brands/businesses – Toyota
q10_20	Impression of brands/businesses – Subaru
q10_21	Impression of brands/businesses – Honda
q11_1	Appliances - TV
q11_2	Appliances - Cell phone
q11_3	Appliances - Kindle
q11_4	Appliances - iPad
q11_5	Appliances - Laptop computer
q11_6	Appliances - Desktop computer
q11_7	Appliances - Washing machine
q11_8	Appliances - Dryer
q11_9	Appliances - Refrigerator
q11_10	Appliances - Microwave oven
q11_11	Appliances - Toaster oven
q11_12	Appliances - Dishwasher
q11_13	Appliances - Toaster
q11_14	Appliances - Coffee maker
q11_15	Appliances - Vacuum cleaner
q11_16	Appliances - Blender
q11_17	Appliances - Sewing machine
pid3_nonpol	3 point party ID - nonpol
pid7_nonpol	7 point Party ID - nonpol
q12_1	Political Feeling Thermometer – Joe Biden
q12_1_dk_flag	q12_1 - don't know flag
q12_2	Political Feeling Thermometer – Donald Trump
q12_2_dk_flag	q12_2 - don't know flag
q12_3	Political Feeling Thermometer – Hillary Clinton
q12_3_dk_flag	q12_3 - don't know flag
q12_4	Political Feeling Thermometer – Mike Pence
q12_4_dk_flag	q12_4 - don't know flag
q12_5	Political Feeling Thermometer – Democratic Party
q12_5_dk_flag	q12_5 - don't know flag

q12_6	Political Feeling Thermometer – Republican Party
q12_6_dk_flag	q12_6 - don't know flag
q12_7	Political Feeling Thermometer – NRA
q12_7_dk_flag	q12_7 - don't know flag
q12_8	Political Feeling Thermometer – Black Lives Matter
q12_8_dk_flag	q12_8 - don't know flag
q12_9	Political Feeling Thermometer – Liberals
q12_9_dk_flag	q12_9 - don't know flag
q12_10	Political Feeling Thermometer – Conservatives
q12_10_dk_flag	q12_10 - don't know flag
q12_11	Political Feeling Thermometer – Muslims
q12_11_dk_flag	q12_11 - don't know flag
q12_12	Political Feeling Thermometer – Evangelical Christians
q12_12_dk_flag	q12_12 - don't know flag
q12_13	Political Feeling Thermometer – Vladimir Putin
q12_13_dk_flag	q12_13 - don't know flag

D.2 Questions for Political Condition

Variable	Description
q13	Frequency of attention to government/politics
q14	2012 election voting status
q15	2012- Candidate voted for
q16	2016 election voting status
q17	2016-Candidate voted for
q18	2020 election voting status
q19	2020-Candidate voted for
q20	Attention to news about national politics
q21	Voter registration status
q22	Political Party
q23	2022 election voting intentions
q24	Candidate/Party House of Representatives
q25	Approve/Disapprove U.S. Congress handling its job
q26	Strongly/Not Strongly Approve/Disapprove U.S. Congress handling its job
q27	Approve/Disapprove Joe Biden
q28	Strongly/Not strongly Joe Biden
q29	Approve/Disapprove Donald Trump
q30	Strongly/Not strongly Donald Trump
q31	Approve/Disapprove Joe Biden economy
q32	Strongly/Not strongly Joe Biden economy
q33	Approve/Disapprove Joe Biden war in Ukraine
q34	Strongly/Not Strongly Joe Biden war in Ukraine
q35	Approve/Disapprove Joe Biden crime

q36 Strongly/Not strongly Joe Biden crime
q37 Approve/Disapprove Joe Biden COVID-19
q38 Strongly/Not strongly Joe Biden COVID-19
q39_1 Confidence in political parties for issues – Rising prices
q39_2 Confidence in political parties for issues – Illegal immigration
q39_3 Confidence in political parties for issues – Racial equality
q39_4 Confidence in political parties for issues – Climate change
q39_5 Confidence in political parties for issues – Taxes
q39_6 Confidence in political parties for issues – Health care
q39_7 Confidence in political parties for issues – Discrimination against gays and lesbians
q39_8 Confidence in political parties for issues – Unemployment
q39_9 Confidence in political parties for issues – Foreign affairs
q39_10 Confidence in political parties for issues – Violent crime
q39_11 Confidence in political parties for issues – Abortion
pid3_pol 3 point party ID - pol
pid7_pol 7 point Party ID - pol
q40_healthinsurance Health Insurance scale
q41 View on government policy about unauthorized immigrants
q42 Federal government gun restrictions
q43 Climate change statements
q44_1 Past 12 months frequency of political activities – Attended a protest or rally
q44_2 Past 12 months frequency of political activities – Donated money to a candidate
q44_3 Past 12 months frequency of political activities – Signed an online petition
q44_4 Past 12 months frequency of political activities – Tried to convince someone how to vote (online or offline)
q44_5 Past 12 months frequency of political activities – Wrote and posted political messages online
q44_6 Past 12 months frequency of political activities – Had a political argument with someone you know
q44_7 Past 12 months frequency of political activities – Bought or avoided a product because of the company’s social or political values
q45_1 Agree/Disagree Blacks statements – Irish, Italian, Jewish and many other minorities overcame prejudice and worked their way up. Blacks should do the same without any special favors.
q45_2 Agree/Disagree Blacks statements – Generations of slavery and discrimination have created conditions that make it difficult for blacks to work their way out of the lower class.
q46_1 Political Feeling Thermometer-2 – Joe Biden
q46_1_dk_flag q46_1 - don’t know flag
q46_2 Political Feeling Thermometer-2 – Donald Trump
q46_2_dk_flag q46_2 - don’t know flag

q46_3	Political Feeling Thermometer-2 – Hillary Clinton
q46_3_dk_flag	q46_3 - don't know flag
q46_4	Political Feeling Thermometer-2 – Mike Pence
q46_4_dk_flag	q46_4 - don't know flag
q46_5	Political Feeling Thermometer-2 – Democratic Party
q46_5_dk_flag	q46_5 - don't know flag
q46_6	Political Feeling Thermometer-2 – Republican Party
q46_6_dk_flag	q46_6 - don't know flag
q46_7	Political Feeling Thermometer-2 – NRA
q46_7_dk_flag	q46_7 - don't know flag
q46_8	Political Feeling Thermometer-2 – Black Lives Matter
q46_8_dk_flag	q46_8 - don't know flag
q46_9	Political Feeling Thermometer-2 – Liberals
q46_9_dk_flag	q46_9 - don't know flag
q46_10	Political Feeling Thermometer-2 – Conservatives
q46_10_dk_flag	q46_10 - don't know flag
q46_11	Political Feeling Thermometer-2 – Muslims
q46_11_dk_flag	q46_11 - don't know flag
q46_12	Political Feeling Thermometer-2 – Evangelical Christians
q46_12_dk_flag	q46_12 - don't know flag
q46_13	Political Feeling Thermometer-2 – Vladimir Putin
q46_13_dk_flag	q46_13 - don't know flag
q6_8	Alcoholic beverages - Vodka
q6_9	Alcoholic beverages - Spritzers
q7_m_1	Non-alcoholic beverages - Tea
q7_m_2	Non-alcoholic beverages - Coffee
q7_m_3	Non-alcoholic beverages - Fruit Juice
q7_m_4	Non-alcoholic beverages - Coke/Pepsi
q7_m_5	Non-alcoholic beverages - 7Up/Sprite
q7_m_6	Non-alcoholic beverages - Diet Coke/Pepsi
q7_m_7	Non-alcoholic beverages - Dr Pepper
q8	Eating out frequency
q9_1	Eating out - Cuisine - Fast food
q9_2	Eating out - Cuisine - Pizza
q9_3	Eating out - Cuisine - Steak houses
q9_4	Eating out - Cuisine - European
q9_5	Eating out - Cuisine - Middle Eastern
q9_6	Eating out - Cuisine - Mexican
q9_7	Eating out - Cuisine - Chinese
q9_8	Eating out - Cuisine - Indian
q9_9	Eating out - Cuisine - Other
q10_1	Impression of brands/businesses – McDonalds
q10_2	Impression of brands/businesses – Pizza Hut
q10_3	Impression of brands/businesses – Budweiser
q10_4	Impression of brands/businesses – Subway

q10_5	Impression of brands/businesses – Burger King
q10_6	Impression of brands/businesses – Dominos
q10_7	Impression of brands/businesses – Dunkin Donuts
q10_8	Impression of brands/businesses – Jack in the Box
q10_9	Impression of brands/businesses – Panda Express
q10_10	Impression of brands/businesses – Coors
q10_11	Impression of brands/businesses – Starbucks
q10_12	Impression of brands/businesses – Taco Bell
q10_13	Impression of brands/businesses – Jamba Juice
q10_14	Impression of brands/businesses – Kentucky Fried Chicken
q10_15	Impression of brands/businesses – General Motors
q10_16	Impression of brands/businesses – Tesla
q10_17	Impression of brands/businesses – Ford
q10_18	Impression of brands/businesses – BMW
q10_19	Impression of brands/businesses – Toyota
q10_20	Impression of brands/businesses – Subaru
q10_21	Impression of brands/businesses – Honda
q11_1	Appliances - TV
q11_2	Appliances - Cell phone
q11_3	Appliances - Kindle
q11_4	Appliances - iPad
q11_5	Appliances - Laptop computer
q11_6	Appliances - Desktop computer
q11_7	Appliances - Washing machine
q11_8	Appliances - Dryer
q11_9	Appliances - Refrigerator
q11_10	Appliances - Microwave oven
q11_11	Appliances - Toaster oven
q11_12	Appliances - Dishwasher
q11_13	Appliances - Toaster
q11_14	Appliances - Coffee maker
q11_15	Appliances - Vacuum cleaner
q11_16	Appliances - Blender
q11_17	Appliances - Sewing machine
pid3_nonpol	3 point party ID - nonpol
pid7_nonpol	7 point Party ID - nonpol
q12_1	Political Feeling Thermometer – Joe Biden
q12_1_dk_flag	q12_1 - don't know flag
q12_2	Political Feeling Thermometer – Donald Trump
q12_2_dk_flag	q12_2 - don't know flag
q12_3	Political Feeling Thermometer – Hillary Clinton
q12_3_dk_flag	q12_3 - don't know flag
q12_4	Political Feeling Thermometer – Mike Pence
q12_4_dk_flag	q12_4 - don't know flag
q12_5	Political Feeling Thermometer – Democratic Party

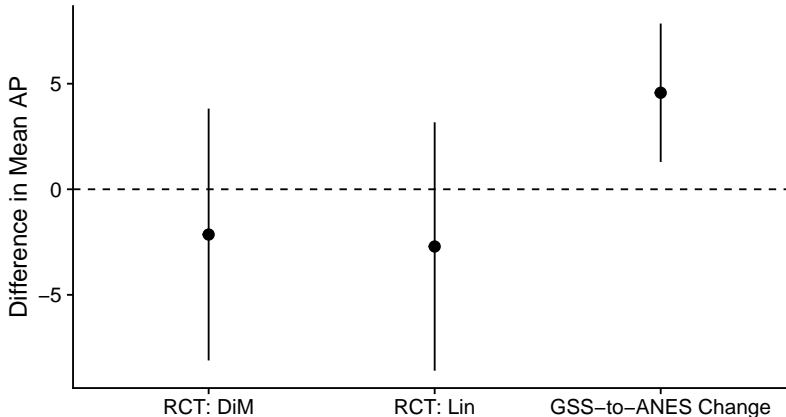
q12_5_dk_flag	q12_5 - don't know flag
q12_6	Political Feeling Thermometer – Republican Party
q12_6_dk_flag	q12_6 - don't know flag
q12_7	Political Feeling Thermometer – NRA
q12_7_dk_flag	q12_7 - don't know flag
q12_8	Political Feeling Thermometer – Black Lives Matter
q12_8_dk_flag	q12_8 - don't know flag
q12_9	Political Feeling Thermometer – Liberals
q12_9_dk_flag	q12_9 - don't know flag
q12_10	Political Feeling Thermometer – Conservatives
q12_10_dk_flag	q12_10 - don't know flag
q12_11	Political Feeling Thermometer – Muslims
q12_11_dk_flag	q12_11 - don't know flag
q12_12	Political Feeling Thermometer – Evangelical Christians
q12_12_dk_flag	q12_12 - don't know flag
q12_13	Political Feeling Thermometer – Vladimir Putin
q12_13_dk_flag	q12_13 - don't know flag

E Within-Respondent Questionnaire Changes

At the end of the 2020 wave of the 2016-2020 GSS panel, eligible respondents were asked to fill out a module of about 25 ANES questions. This module included attitudinal questions, feelings thermometers for presidential candidates, and plans for voting in the 2020 presidential election. The 2020 wave of the 2016-2020 GSS panel was fielded from August 24, 2020 to September 26, 2020, so it constitutes a pre-election survey. Eligible respondents were then recontacted to fill out the ANES post-election survey after election day, which is the data analyzed in the main text.

Since the presidential candidate feeling thermometers were part of both the pre-election module and the post-election survey, we can perform a within-respondent analysis to test for priming effects of the ANES questionnaire relative to the GSS questionnaire. The candidate feeling thermometers appeared at the start of the pre-election module, so there is no reason to expect priming effects from the subsequent ANES questions in that module. Setting aside the validity of this test for a moment, Figure E1 plots the estimated within-respondent change in (candidate) AP levels from the pre-election module embedded in the GSS to the post-election ANES survey. The estimated change of 4.6 (1.7) implies that the same respondents were more polarized when answering the ANES post-election survey than they were on the pre-election module at the end of the GSS survey.

Figure E1: Questionnaire Experiment Results vs. GSS-to-ANES Change



Note that we have plotted the experimental results on the same figure for easy comparison. Even though the estimates are of a different sign, they are not statistically incongruent: the experimental confidence intervals and the GSS-to-ANES change overlap for small, positive priming effects.

However, it is worth keeping in mind that the ANES-to-GSS change is potentially confounded with the over-time change in the political context. Respondents may have genuinely polarized between taking the pre-election module and the post-election survey. For example, the last fielding day of the pre-election module was several days before the first presidential debate (September 29), while the post-election surveys were completed after a close election in which the losing candidate failed to concede. In contrast, there is no such over-time confounding for the experimental results.

F Imputing the Face-to-Face Affective Polarization Trend

To construct the “FTF Imputed” time series in Figure 2 in the main text, we use the following procedure.

1. We created a dataset of 2016-2020 ANES panelists, limiting the sample to self-identified Democrats and Republicans (2016 measure) who completed both the 2016 and 2020 questionnaires online ($n=1,747$). We constructed this sample by merging the public use files for the 2016 ANES and 2020 ANES time series studies based on the panel identifier (V160001_orig).
2. For each respondent, we calculated their AP level (i.e., difference between in-party and out-party feeling thermometers) in 2016 and 2020. In both years, we used the respondent’s contemporary party identification to calculate their AP level. For example, a Democrat in 2016 who later identified as a Republican in 2020 would have their AP level in 2016 calculated using the Democratic minus Republican feeling thermometer and their AP level in 2020 calculated using the Republican minus Democratic feeling thermometer. We do this because that is how AP levels are effectively calculated over the course of the ANES time series since it is basically a rolling cross-section.

3. For each respondent, we calculate the change in AP levels over time (i.e., 2020 minus 2016). We refer to this as Δ .
4. We then constructed a set of demographic and geographic control variables based on the list of 2020 ANES raking dimensions (see DeBell et al. 2022). We choose these variables since they have been identified by the ANES as salient predictors of both political attitudes and survey response/nonresponse. Note, however, that all of the measures derive from the 2016 ANES since we will be imputing Δ for the 2016 face-to-face respondents. We refer to these control variables collectively as X .

Control Variable (Source)	Levels
Strong Partisanship (V161158x)	Weak/leaning partisan; Strong partisan
Gender (V161342)	Female; Other
Ethnicity (V161310x)	(Non-Hispanic) Black, Hispanic, Other
Age (V161267x)	18-39; 40-59; 60+
Education (V161270)	Less than HS; HS; Some College; Bachelor's; Postgraduate
Home Ownership (V161334)	Renting; Not Renting
Census Region (V163003)	Northeast; Midwest; South; West
Marital Status (V161268)	Married; Single; Others
Income (V161361x)	<\$25k; \$25k-50k; \$50k-100k; >\$100k
Nation of Birth (V161316)	US; Not US

5. 9.2% of the 2016-2020 online panelists and 8.6% of the 2016 FTF sample are incomplete cases in the sense that they have missing data for one or more of the X variables and/or the affective polarization measures. Rather than drop these incomplete cases, we fill in the missing values with stochastic imputation. Stochastic imputation in this case takes the form of a single completed data set from multivariate imputation by chained equations (MICE) via the `mice` package in R (van Buuren and Groothuis-Oudshoorn 2011). We use the completed data set from the fifth iteration. (Note that this multiple imputation step is only used to simplify our steps below and does not itself impute the missing Δ values for the 2016 FTF respondents.)
6. Our imputation approach requires that the data be missing at random — that is, the missing values are independent of the missingness indicators conditional on observed values. In all but a few cases, incomplete cases are associated with only one missing value. Given these missing data patterns, it seems likely that the missing at random assumption holds (if only approximately) given the comprehensive set of observed data for each case.
7. The `mice` package, which uses the multivariate imputation by chained equations (MICE) framework, requires us to specify a conditional distribution for each variable with missing data given all the other variables. We use the `mice` package defaults, which are (binary or multinomial) logistic regressions for all of the X variables and the method

of predictive mean matching for the affective polarization variables. These are conventional settings in multiple imputation analyses, and we have no particular reason to doubt them here.

8. Stochastic regression imputation preserves correlation between variables, so our downstream prediction exercise is not biased by only using a single completed data set from the MICE framework. Compared to using multiple imputation, the only disadvantage of using stochastic imputation is underestimating standard errors (Buuren 2018). However, that flaw is largely irrelevant in our analysis since we omit standard errors in the presentation of our results in the main.
9. Once we have a complete dataset, we construct a design matrices for the panelists and 2016 FTF respondents that includes all two-way interactions between variables of X . The design matrices thus include 196 binary variables for the different levels of the interactions. We then train a linear regression model to predict Δ with X using the square-root LASSO of Belloni, Chernozhukov, and Wang (2011). We use the panelists to estimate the linear regression model since both variables are observed in that sample.
10. Our prediction model assumes that we can approximate the conditional distribution of Δ given X using a sparse linear function of all two-way interactions. This approach is justified if the conditional relationship between Delta and X does not depend significantly on higher-order interactions after taking into account all main effects and second-order interactions. Scholars have found this assumption plausible in similar settings (e.g., Chernozhukov et al. 2018).
11. Using the square-root LASSO of Belloni, Chernozhukov, and Wang (2011) in particular allows us to fit a sparse linear regression model without estimating the usual LASSO penalty parameter. Traditional approaches that rely on cross-validation are perhaps more prone to model selection error.
12. Finally, we calculate the average predicted value of Δ among the 2016 FTF respondents by combining the linear regression fit above with the X values from the 2016 FTF respondents. More specifically, we predict (impute) Δ for each 2016 FTF respondent using the linear regression fit, and then we take the average of these predicted (imputed) Δ values to arrive at the reported estimated change of 9.6. A standard error of 0.27 was calculated based on the 2016 complex sampling design, but note that this does not necessarily reflect error in the prediction step.

References

- Belloni, Alexandre, Victor Chernozhukov, and Lie Wang. 2011. "Square-root lasso: pivotal recovery of sparse signals via conic programming." *Biometrika* 98 (4): 791–806.
- Buuren, Stef van. 2018. *Flexible Imputation of Missing Data*. CRC press.

- Chernozhukov, Victor, Denis Chetverikov, Mert Demirer, Esther Duflo, Christian Hansen, Whitney Newey, and James Robins. 2018. *Double/debiased machine learning for treatment and structural parameters*.
- DeBell, Matthew, Michelle Amsbary, Ted Brader, Shelly Brock, Cindy Good, Justin Kamens, Natalya Maisel, and Sarah Pinto. 2022. *Methodology Report for the ANES 2020 Time Series Study*. Palo Alto, CA and Ann Arbor, MI: Stanford University and the University of Michigan. Accessed March 28, 2023. www.electionstudies.org.
- van Buuren, Stef, and Karin Groothuis-Oudshoorn. 2011. "mice: Multivariate Imputation by Chained Equations in R." *Journal of Statistical Software* 45 (3): 1–67. <https://doi.org/10.18637/jss.v045.i03>.