

UC Berkeley

UC Berkeley Electronic Theses and Dissertations

Title

Understanding and Reducing Bias among Political and Social Elites

Permalink

<https://escholarship.org/uc/item/5dv120q7>

Author

Kalla, Joshua L

Publication Date

2018

Peer reviewed|Thesis/dissertation

Understanding and Reducing Bias among Political and Social Elites

by

Joshua L. Kalla

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Political Science

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Jasjeet Sekhon, Chair

Professor Eric Schickler

Professor Gabriel Lenz

Professor Avi Feller

Fall 2018

Understanding and Reducing Bias among Political and Social Elites

Copyright 2018
by
Joshua L. Kalla

Abstract

Understanding and Reducing Bias among Political and Social Elites

by

Joshua L. Kalla

Doctor of Philosophy in Political Science

University of California, Berkeley

Professor Jasjeet Sekhon, Chair

This dissertation considers the biases that exist in the American political system. The first chapter presents a field experiment on the under-representation of women and people of color in American politics, finding that politicians may condition responsiveness and helpfulness on the ethnicity of their constituents, but not the gender of their constituents. The second chapter conducts a field experiment to study whether state legislators are responsive to public opinion and finds that most state legislators do not care about learning public opinion and therefore mis-perceive what their constituents believe. The final chapter then studies pediatricians and whether their incentives may explain low vaccination rates.

To Armon, with love.

Contents

Contents	ii
List of Figures	iv
List of Tables	v
1 Are You My Mentor? A Field Experiment on Gender, Ethnicity, and Political Self-Starters	1
1.1 Experimental Design	3
1.2 Results	4
1.3 Study-group heterogeneity	5
1.4 Internal Validity	6
1.5 External Validity	6
1.6 Discussion	7
1.7 Appendix	8
2 Correcting Bias in Perceptions of Public Opinion Among American Elected Officials	18
2.1 Introduction	19
2.2 Do Legislators Seek Information On Their Constituents?	20
2.3 Experimental Design	21
2.4 Results	25
2.5 Discussion	27
2.6 Appendix	28
3 Pediatricians Role in America’s Vaccination Problem: Street-Level Bureaucrats and Interest Group Members	58
3.1 Explaining Vaccine Rates and Refusals in the United States	60
3.2 Pediatricians as Political Actors	61
3.3 Expectations of Pediatricians	62
3.4 A Survey of Pediatricians as Interest Group Members	63
3.5 An Audit Study of Pediatricians as Street-Level Bureaucrats	65

3.6 Discussion	68
3.7 Appendix	69
Bibliography	77

List of Figures

1.1	Treatment wording	3
2.1	Sample District-Specific Polling Treatment	23
3.1	Parent Script	74
3.2	Academic Survey Script	75

List of Tables

1.1	Treatment Effects by Dependent Variable	5
1.2	Experimental Balance	9
1.3	List of Names Used for Email Accounts	9
1.4	Details of Coding Classifications: Gender of Coer	10
1.5	Details of Coding Classifications	11
1.6	Experimental Results by Gender of Legislator and Gender of Sender.	12
1.7	Experimental Results by Party of Legislator and Gender of Sender.	13
1.8	Experimental Results by Office Level of Legislator and Gender of Sender.	14
1.9	Experimental Results by Latinx Sender.	14
1.10	Experimental Results by Latinx and Gender of Sender.	15
2.1	Policies and Outcome Measures	22
2.2	Experimental Results	26
2.4	Balance Check: All Legislators	34
2.5	Balance Check: Among Those Who Accessed Website	35
2.6	Balance Check: Among Those Who Accessed Website and Took Post-Treatment Survey	36
2.8	Predictors of Accessing District Pulse	42
2.10	Experimental Results: Personal Policy Agreement	44
2.11	Experimental Results: Expected Voting Behavior	45
2.12	Experimental Results: Perception of Constituent Support	46
2.13	Experimental Results: Personal Policy Agreement (Republicans)	47
2.14	Experimental Results: Expected Voting Behavior (Republicans)	48
2.15	Experimental Results: Perception of Constituent Support (Republicans)	49
2.16	Experimental Results: Personal Policy Agreement (Democrats)	50
2.17	Experimental Results: Expected Voting Behavior (Democrats)	51
2.18	Experimental Results: Perception of Constituent Support (Democrats)	52
2.19	Experimental Results: Personal Policy Agreement (No ACA)	53
2.20	Experimental Results: Expected Voting Behavior (No ACA)	54
2.21	Experimental Results: Perception of Constituent Support (No ACA)	55

3.1	Pediatrician's open-ended responses when asked the most important political issues for the AAP to work on. Each cell is the percent mentioning that issue. . .	65
3.2	Pediatricians' close-ended responses when asked about a policy to eliminate all non-medical immunization exemptions.	65
3.3	How pediatricians respond to a parent seeking a delayed schedule by experimental condition.	67

Acknowledgments

I am in deep gratitude to the many people who have made this dissertation and my doctorate possible. Donald Green and Alan Gerber lit the spark that led me to discover field experiments and inspired me to pursue academic research. Dan Butler, John Bullock, Greg Huber, and David Mayhew continued to fan the flame while I was an undergraduate at Yale. At Berkeley, Eric Schickler, Laura Stoker, Jas Sekhon, Avi Feller, Sean Gailmard, Gabe Lenz, Sarah Anzia, Rob Van Houweling, Jack Citrin, Paul Pierson, and Thad Dunning have continued to serve as incredible advisors. David Broockman, Peter Aronow, Frances Rosenbluth, Dawn Teele, and Alan Yan have served as tremendous colleagues and coauthors. Without them, my research would not have been possible. I have also been fortunate to have countless mentors and friends in the world of politics. Conversations with them have always helped ground my research and ask the right questions. Thank you to Michael Kieschnick, Becky Bond, Zack Malitz, Alexander Berger, Josh Rosmarin, Matt Morrison for all of the help you have provided over the years. Thank you to my parents and family for the support and love over the years. You have instilled in me a love of learning. Most of all, thank you to my fiancé, Armon Dadgar, for being by my side, for guiding me, for loving me.

Chapter 1

Are You My Mentor? A Field Experiment on Gender, Ethnicity, and Political Self-Starters

Do public officials respond unequally to requests for career advice? Through a correspondence experiment with 8,189 officials, we examine whether (hypothetical) male and female students who express interest in political careers receive differential responses from public officials. We report three striking findings. First, emails sent by female students were more likely to receive a response than those sent by male students, especially when the official was male. Second, the responses that women received were as likely to be long, thoughtful, and contain an offer of help as those to men. Third, there were no partisan differences in responsiveness to male or female senders. Examining senders with Hispanic last names bolsters the results: Hispanic senders, especially men, were less likely to receive a quality response than non-Hispanic senders. Thus, politicians may condition responsiveness and helpfulness on the ethnicity of constituents, but women who are self-starters in search of advice receive equal treatment.

A substantial body of research on the persistent under-representation of women in American politics has found gendered differences in the decision to run for office.¹ Men are more

¹This paper is coauthored with Frances Rosenbluth and Dawn Langan Teele. This paper is published as (J. Kalla, Rosenbluth, and D. L. Teele 2018). Data and supporting materials necessary to reproduce the numerical results in the article are available in the JOP Dataverse (<https://dataverse.harvard.edu/dataverse/jop>). An online appendix with supplementary material is available at <http://dx.doi.org/10.1086/693984>. This research was approved by the University of California, Berkeley Committee for Protection of Human Subjects (CPHS Protocol no. 2014-09-6668). Support for this research was provided by the Yale University Institution for Social and Policy Studies and the Alfred P. Sloan Foundation. We would like to thank Kathleen Christiansen, Kira Sanbonmatsu, Monica Schneider, Jessica Preece, Don Green, Guy Grossman, Dan Butler, Jennifer Lawless, Rachel Silbermann, Peter Aronow, and David Broockman for helpful suggestions and support. Thanks, too, to Anika Steig, Caitlin Purdome, Catherine Wall, Daniel Yu,

likely to voice interest in holding public office from a young age and are often “self-starters” in the path to a political career, while women more frequently require active recruitment before running (Carroll and Sanbonmatsu 2012; Carroll and Sanbonmatsu 2013; Fox and Lawless 2004; Fox and Lawless 2014; Lawless and Fox 2013). The extra nudge needed to convert women into candidates is compounded by gender bias in party recruitment strategies; even among qualified candidates, men are more likely to be actively recruited than women (Lawless and Fox 2013). Add to this the additional external validation that women need when considering entering a race (Fowler and McClure 1990), and the number of hurdles toward equal representation ticks ever upward. These findings have sparked an important line of inquiry into understanding how candidates are recruited and whether experimental interventions such as signals of strategic and financial support from party elites may help close the gender gap (Butler and Preece 2016; Preece and Stoddard 2015).

The focus on recruitment strategies and the psychological factors that dampen women’s political ambition is crucial, but it has perhaps also turned us away from studying the experiences and candidacies of women who are self-starters. A considerable number of women do decide on their own to enter the political fray; among female mayors surveyed in 2008 in the United States, one-third were complete self-starters (Carroll and Sanbonmatsu 2012), and over one-fifth of US female state legislators report having sought office entirely on their own without being actively recruited (Carroll and Sanbonmatsu 2013). This means that among women who actually attain an elective office, upward of 20% did not need an external nudge. Does this type of aspirant receive similar informal cues about her career choice as men? Or does gender condition the reception of more ambitious women in a way that mirrors the gendered recruitment and socialization processes more generally?

We approach these questions using a field experiment designed to test whether, when women express an interest in politics, they are less likely to receive helpful and enthusiastic responses than men. Although race and ethnicity have been key concerns in experimental studies of constituents’ access to public servants, we know of no other experimental study that is primarily concerned with how gender influences interactions with public officials.² However, one highly powered experiment that looks at these issues in the pipeline to Ph.D. programs finds a large bias in favor of white male students (Milkman, Akinola, and Chugh 2015), leading to a hypothesis that female political self-starters may also face discrimination in their attempts to learn about political careers. We conceive of early email correspondence as a type of “micro”- mentorship where even a small act of encouragement can teach an aspirant about the profession and provide cues about whether he or she will be welcome.

In our correspondence experiment (sometimes called an audit experiment), which entailed sending emails to 8,189 officials in the United States, hypothetical students expressed an interest in politics and asked officials for information on how to start down a political career path.³ We ask whether officials are less responsive to female students that reach out to them

Elisabeth Bernabe, Grant Kopplin, Irene Chung, Karen Lazcano, Radu Simeon, Sandy Wongwaiwate, and Yasmine Di-Giulio, for research assistance.

²(White, Nathan, and Faller 2015) note that most audit studies rely only on male names.

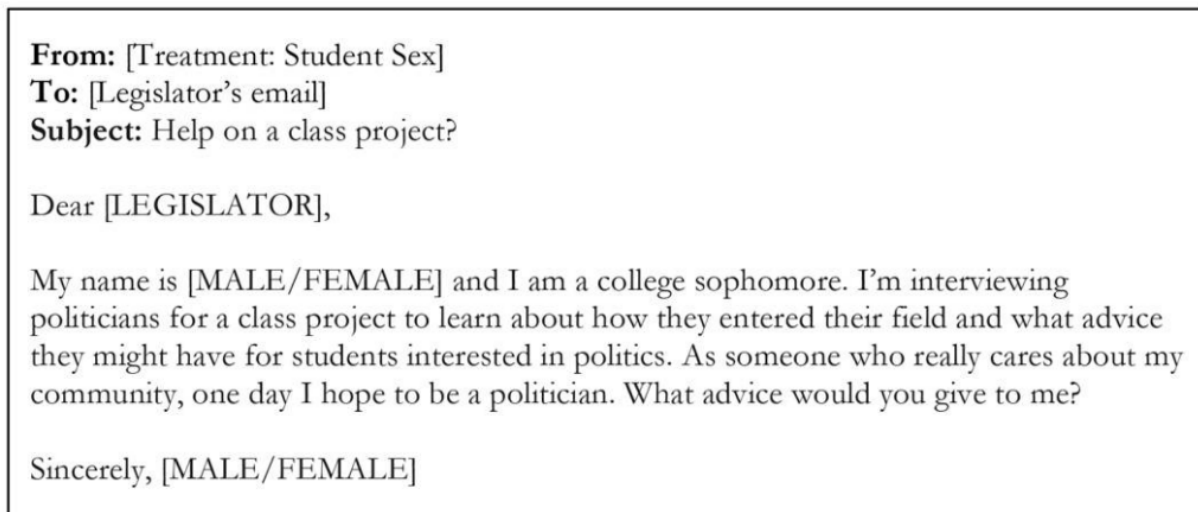
³We preregistered hypotheses by the gender, party, office type (local vs. state) and state-level profession-

for advice. Across our analyses, we find the arresting result that if anything, female students were more likely to receive responses and advice for pursuing political careers than men.

The incredibly thoughtful emails written by officials to students of different genders suggest that to the extent that gender bias exists in the political pipeline, it does not crop up at this early stage of political interest. On the other hand, examining senders with Hispanic last names shows that Hispanics, especially men, were less likely to receive a quality response than non-Hispanic senders. Thus, politicians may condition access and helpfulness on the ethnicity of constituents, but women who are self-starters are not disadvantaged.

1.1 Experimental Design

Using information supplied by the New Organizing Institute, we constructed a database of elected and appointed officials at all levels of government in the United States (city, county, and state) that included the email addresses and basic demographic characteristics of 8,189 officials. Since staff may be responsible for communication, the unit of analysis is the email address of an official rather than the officials themselves. Figure 1.1 displays the text of the email. Officials were told that the sender was a student working on a class project about politicians' career paths, that the sender is interested in becoming a politician, and they were solicited for advice on how the student could become involved in politics. The email senders name provided the only cue for gender.



From: [Treatment: Student Sex]
To: [Legislator's email]
Subject: Help on a class project?

Dear [LEGISLATOR],

My name is [MALE/FEMALE] and I am a college sophomore. I'm interviewing politicians for a class project to learn about how they entered their field and what advice they might have for students interested in politics. As someone who really cares about my community, one day I hope to be a politician. What advice would you give to me?

Sincerely, [MALE/FEMALE]

Figure 1.1: Treatment wording.

The college student sender treatments, one male and one female, were assigned a “typical” name drawn from Census and Social Security data. The most common male and female alization of the legislator using Experiments in Governance and Politics (EGAP)s design registration form, <http://egap.org/registration-details/705>.

names, such as Jacob and Lauren, communicate the sex of the sender but are less obviously tied to ethnicity or income. Table 1.3 provides a list of first and last names used. After randomly combining gender-typical first names with common last names, we generated Gmail accounts in the form: first.lastXXXX@gmail.com, where XXXX were four random digits. The accounts were randomly assigned to send emails over one of two days, either a Sunday or Monday in October 2014, with no follow-up requests thereafter. Because of the November 2014 election, this is a time when we might expect heightened responsiveness, although the election could also place more time constraints on the officials.

In order to ensure that all treatment conditions were evenly distributed, we block randomized by legislators' gender and state. We then randomly assigned the sender's gender within each block. The first row in table 1.1 summarizes the experimental design, and table 1.2 shows that there is balance across the experimental conditions of officials' gender, ethnicity, partisanship, local or national office, and whether the email bounced.

1.2 Results

Table 1.1 presents the main results. It considers the difference in response rates on eight outcome variables based on whether the email sender was purportedly male or female. These outcome variables include (1) receiving a reply, (2) receiving a meaningful response, (3) receiving praise, (4) receiving an offer of help, (5) being warned against running, (6) receiving substantive advice, (7) response length measured by the log word count, and (8) the character count in the reply. Additional details on the coding of the dependent variables are presented in table 1.5. Examples of "meaningful" responses are in the appendix.

In table 1.1 and throughout this section, all p -values and standard errors are based on OLS regressions that control for strata fixed effects and cluster-robust standard errors. For randomization, the strata were defined as a legislator's gender and state. Standard errors are clustered at the email account level. Importantly, for word and character count, a "no reply" was coded as 0 to avoid post-treatment bias, meaning that the denominator is always the total number of emails sent from a male or female address.

Contrary to expectations, we found no favoritism toward male students. The first dependent variable in table 1.1 measures the difference in response rates to male and female students. We expected that women would be less likely to receive a reply; however, there are no differences across the sender's gender. Moreover, women and men were as likely to receive what our coding scheme deemed a "meaningful" response which was not a "canned" letter or a request for more information from the student; they were as likely to be praised (5.2% of responses on average); they were as likely to be discouraged from running as male senders (on average 1.2% of emails received a discouraging response); and they were as likely to get substantive advice (7.7% of responses).

In fact, when gender differences occurred, female students were slightly more likely to be encouraged than their male counterparts. In sum, 5% of female senders received an offer of help from the legislator as opposed to 3% of male legislators (row 4). And the responses sent

Treatment	Male Sender	Female Sender	
Design: Emails by condition (N)	4,097	4,092	
Dependent variable:			<i>p</i> -value of diff.
1. Received reply	25%	27%	.15
2. Meaningful response	11%	13%	.47
3. Praised	5%	6%	.17
4. Offer to help	3%	5%	.09
5. Warned against running	1%	1.50%	.14
6. Substantive advice	7%	8%	.33
7. Log word count	1	1.1	.06
8. Character count	145	170	.04

Table 1.1: Treatment Effects by Dependent Variable

Note. All (two-tailed) *p*-values estimate the effect of the gender of the sender for different replies. The *p*-values are based on OLS regressions that control for strata fixed effects and cluster-robust standard errors. Strata were defined as gender and state of legislator for randomization. Standard errors are clustered at the email account level. Nonresponses are included in the denominators.

to women tended to be longer over all (rows 7 and 8). In three of eight outcomes, women were more likely to be encouraged. This share is larger than what is likely to have happened by chance, implying that overall, when given an opportunity for informal networking and communication, politicians are not less supportive of women.

1.3 Study-group heterogeneity

To see whether these overall results mask differences across officials, we investigate responses for several subgroups. First, we calculate response rates based on the gender associated with the officials email account. Table 1.6 shows that emails sent to male legislators drive most of the increased response rate to female students. Across both sender genders, emails sent to female legislators received responses 27% of the time. However, emails sent from male accounts to male office holders received responses 24% of the time, while those sent from female senders to male legislators received a response 27% of the time.⁴ Second, we examined whether response rates varied based on the officials' partisan affiliations. Despite the presence of a US gender voting gap in a Democratic direction and a common association of female politicians with liberal leanings (Sanbonmatsu and Dolan 2009), both Democratic and Republican officials were around 2 percentage points more likely to reply to female than male senders (see table 1.7 for full results). Finally, we consider the level of office held by

⁴Because we cannot be certain who within an office is replying to the emails, future research may wish to conduct audit studies of legislative staff and examine how gender makeup and division of responsibilities within the office varies by the gender of the politician.

the official. In the database, 74% of the officials contacted served at the city or county level. Overall, we find that state officials replied to 26% of emails while local officials replied to 27%. Across both groups of official, we continue to find that female senders were more likely to receive helpful replies than male senders (see table 1.8).

1.4 Internal Validity

How credible is the pro-woman bias the finding that women received preferential treatment? The study is highly powered, with a sufficient number of emails sent ($N = 8,189$) and responses received ($N = 2,127$) to detect differences in responses as small as two percentage points. Nevertheless, social desirability bias could drive respondents (legislators or their aides), especially those in male officials' offices, to be particularly sensitive to inquiries by women. One way to investigate this is by utilizing the fact that many common last names have discernible Latin roots.⁵ Emails sent with the surnames Garcia, Hernandez, Martinez, and Rodriguez (comprising 11% of the emails sent) were as likely to receive a reply as non-Hispanic senders (24% vs. 26%, $p = .3$). However, table 1.9 shows that senders with Latinx last names were less likely to receive a meaningful response, less likely to be encouraged to run, and less likely to receive substantive advice.

When these findings are broken down by the gender of the Latinx sender, we find that most of these differences stem from male senders (see table 1.10). Female senders with nonethnic first names but Latinx surnames receive similar response rates across all seven indicators while male senders with nonethnic first names but Latinx last names were given less encouragement than men with nonethnic names. The effect of being a Latinx sender is negative for both male and female students, but we did not find additive bias for being female and Hispanic. The fact that we find differential patterns of response to senders with Latinx last names increases our confidence that the findings of heightened responsiveness to women are not simply an artifact of the method.

1.5 External Validity

There are three concerns for external validity. The first two have to do with the realism of the experiment itself. If parties are the big recruiters, does it make sense to think of correspondence with officials as an important factor in candidates decisions to run? Second, would political aspirants, or even more narrowly, college students, actively seek advice from office holders? As argued above, upward of 20% of women who hold mayoral or state legislative office were self-starters, making the traditional recruitment process by parties only one possible avenue for candidate emergence. Second, although women in general may be less likely to contact political elites, this is probably not the case for political self-starters.

⁵This is a happy feature of choosing common surnames, not part of the registered design. We thank Don Green for this suggestion.

Hence it seems reasonable to assume at least some degree of early contact with officeholders absent a prior connection.

A third concern for external validity is whether the findings are better understood as speaking to the literature on elite access or constituency services. The emails did not imply that the student was a constituent, and the content was often addressed to the micro-mentorship question at hand: of all the emails sent, 37% of all replies received contained either an offer of help or substantive advice on entering politics. In these responses, officials were specifically discussing the path to politics, often drawing on their own experiences, in ways more akin to the small acts of mentorship we describe above than run of the mill constituency service. Moreover, if our treatments were interpreted as constituency service we would have expected (1) that ethnic minorities would have received lower response rates over all (Butler and Broockman 2011; White, Nathan, and Faller 2015), and (2) that female legislators would be the most likely to reply because they do more constituency service. We find that senders with Hispanic last names are as likely to receive a response as non-Hispanic senders, but that the content of these responses is less thoughtful and helpful. So unlike in the elite access literature, minorities have equal “access” here but are given less information about how to pursue a political career. Second, we do not find that female legislators respond more, again pushing against standard knowledge about constituency service.

1.6 Discussion

Our study finds that students who contact politicians for advice do not receive vastly different attention based on their gender. In fact, there appears to be a small pro-woman bias in small acts of mentorship by these officials. Taken at face value, this is encouraging, but in closing we note that the vast majority of emails sent (74%) received no response. As recent research suggests, men and women may interpret this “rejection” differently. If, as (London et al. 2012) show, women are more easily discouraged, or, as (Butler and Preece 2016) find, women place a lower probability on the likelihood that they will receive support than men, then we can still make sense of women’s underrepresentation even in a world of positive encouragement. On a more optimistic note, sharing these findings of pro-woman bias may modify the narratives women consider when entering politics (Holman and Schneider 2018) and increase the number of women that act as political self-starters.

1.7 Appendix

Ethics

As experiments designed and implemented by political researchers have become increasingly common, important questions have been raised about the conditions under which these projects can be executed ethically. Because experiments are carried out in real world settings, and because they are distinguished by an “intervention” as opposed to mere “observation”, experiments raise higher hurdles to guarantee the ethical treatment of human subjects than traditional observational methods.⁶ In particular, there are four issues to consider: the exploitation of vulnerable groups; risk to subjects and community; deception; and consent. While the experiment is safely in ethical terrain on the first two issues (that is, it does not place undue burden on vulnerable groups to be the subjects of study, and poses minimal risk on the subjects and community at large), it does involve deception and does not procure standard forms of informed consent. It is our belief that deception and a lack of informed consent are ethically problematic when experiments are carried out on vulnerable populations, when they carry risk to the participant, and when they have potential community-level or downstream consequences after the experiment is completed. An intervention of the sort described here, which asks elite leaders to help a student with a class project, and to engage in communication that is on-par with the types of things that these leaders do every day (i.e. answer emails) does not evince these concerns.

Estimation Procedures

In this section, we provide additional details on the estimation procedures used throughout the main text. For each outcome in Table 1.1, the first two columns are the mean values (e.g., the average number of respondents receiving a reply by the gender of the sender or the mean character count of a received email). In the cases where no emails were received, these outcomes are coded as 0, except for the log word count, which is coded as $\log(1)$. In the third column, we report the p -value of the difference between columns 1 and 2. We calculate this by regressing the dependent variable on an indicator of the treatment (male or female) and strata-fixed effects. The strata used for randomization were the gender and state of the legislator. Finally, we use cluster-robust standard errors at the level of the email account because this was the level at which randomization was assigned and to account for any idiosyncrasies specific to the email address. These cluster-robust standard errors are then used to calculate the two-tailed p - values reported in Table 1.1.

Names Used for Email Accounts

The most common first (by gender) and last names were randomly assigned as well to generate Gmail accounts in the form: first.lastXXXX@gmail.com, where XXXX were 4

⁶See (D. Teele 2014).

	Male Sender	Female Sender
Female Legislator	32%	32%
Democratic Legislator	21%	23%
Republican Legislator	27%	26%
Local Official	74%	74%
White Legislator	87%	88%
% Bounced Email	4%	5%
<i>N</i>	4,097	4,092

Table 1.2: Experimental Balance

random digits.⁷

Masculine Names	Feminine Names	Last Names
Andrew, Brandon, Christopher, Daniel, David, Jacob, James, John, Joseph, Joshua, Matthew, Michael, Nicholas, Ryan, and Tyler	Amanda, Ashley, Brittany, Elizabeth, Emily, Hannah, Jessica, Kayla, Lauren, Megan, Rachel, Samantha, Sarah, Stephanie, and Taylor	Allen, Anderson, Brown, Clark, Davis, Garcia, Hall, Harris, Hernandez, Jackson, Johnson, Jones, King, Lee, Lewis, Martin, Martinez, Miller, Moore, Robinson, Rodriguez, Smith, Taylor, Thomas, Thompson, Walker, White, Williams, Wilson, and Young

Table 1.3: List of Names Used for Email Accounts

Details of Coding Classifications

The PIs trained undergraduate research assistants to read and code the emails by answering the list of questions in table 1.5. These coding questions were developed by the PIs' close readings of twelve randomly selected emails. The RAs were blind to the hypotheses being tested. The RAs re-coded those same twelve emails to ensure consistency. The PIs then reviewed these codings with the RAs and engaged in additional practice coding. For word and character count, no reply was coded as 0 to avoid post-treatment bias.

To avoid biases in the coding, the PIs randomly assigned which RAs coded which email accounts. 63% of the emails were coded by female RAs while 37% were coded by male RAs.

⁷First names came from the Social Security Administration's list of most popular male and female names, 1994. <http://www.ssa.gov/cgi-bin/popularnames.cgi>. Last names came from the Frequently Occurring Surnames from Census 1990. Available at http://www.census.gov/topics/population/genealogy/data/1990_census/1990_census_na%20mefiles.html.

The below table shows that the manual coding did not meaningfully differ by the gender of the RA. Note that only emails that received a reply were coded, hence the denominator for each cell is different from that of other tables.

	Female Coder	Male Coder	p-value (Effect of male vs. female coder)
% Receiving Meaningful Response	48%	43%	0.56
% Receiving Praise	20%	20%	0.91
% Receiving Offer to Help	17%	13%	0.18
% Warned Against Running	4%	6%	0.16
% Receiving Substantive Advice	29%	30%	0.92
<i>N</i>	1,335	792	

Table 1.4: Details of Coding Classifications: Gender of Coer

Note: The *p*-values are based on OLS regressions that control for cluster-robust standard errors of the email account.

Subgroup heterogeneity

Outcome	Description
Receiving a reply	Any non-bounceback sent from legislator’s account.
Receiving a meaningful response	Qualitative assessment by coder that the email “contains real content.”
Receiving praise	Coded as either “Praises student for an interest in a political career” or a vague praises (e.g., “Good luck with everything”, “hope this helps”).
Receiving an offer to help	Coded as willing to meet, to talk on the phone, to email further, or a general offer to follow-up (e.g., “If you have any other specific questions, please let me know.”)
Being warned against running	Coded as containing an explicit statement not to run, an encouragement to consider other career paths, or a warning of time commitment, work-life balance challenges, the difficulty of finding time for family, the challenges of fundraising, or the loss of privacy.
Receiving any advice	Coded as containing either practical advice (e.g., motivational advice, get a business job, go to law school, get a different type of job, become involved in local community groups, attend local party or political meetings, volunteer, get a mentor, fundraising advice, run for student government, learn about the issues, get a good education, always put your values first, stay loyal to your political party) or personality/image advice (e.g., always have a professional appearance, have thick skin, learn to be extroverted, learn to deal with conflict).

Table 1.5: Details of Coding Classifications

	Sent to Female Legislator			Sent to Male Legislator		
	Male Sender	Female Sender	p-value of diff.	Male Sender	Female Sender	p-value of diff.
% Receiving Reply	27%	27%	.85	24%	27%	0.08
% Receiving Meaningful Response	12%	13%	.67	11%	12%	0.42
% Receiving Praise	7%	8%	.42	4%	5%	0.11
% Receiving Offer to Help	3%	5%	.03	4%	5%	0.21
% Warned Against Running	1.7%	1.5%	.78	0.7%	1.4%	0.03
% Receiving Substantive Advice	9%	9%	.86	6%	8%	0.17
Log Word Count	1.18	1.20	.83	0.94	1.09	0.01
Character Count	199	209	.69	120	152	0.01
N	1,301	1,299	-	2,796	2,793	-

Table 1.6: Experimental Results by Gender of Legislator and Gender of Sender.

	Sent to Dem Legislator			Sent to Rep Legislator		
	Male Sender	Female Sender	p-value of diff.	Male Sender	Female Sender	p-value of diff.
% Receiving Reply	24%	26%	.64	27%	28%	.49
% Receiving Meaningful Response	9%	10%	.60	12%	13%	.75
% Receiving Praise	3%	4%	.47	5%	6%	.47
% Receiving Offer to Help	3%	4%	.22	3%	6%	.02
% Warned Against Running	0.7%	1.2%	.22	1.2%	1.9%	.19
% Receiving Substantive Advice	5%	6%	.47	8%	8%	.70
Log Word Count	0.93	1.02	.43	1.06	1.17	.27
Character Count	110	134	.12	147	174	.26
N	868	919	-	1,106	1,065	-

Table 1.7: Experimental Results by Party of Legislator and Gender of Sender.

	City Official			State Official		
	Male Sender	Female Sender	p-value of diff.	Male Sender	Female Sender	p-value of diff.
% Receiving Reply	24%	27%	.07	27%	27%	.95
% Receiving Meaningful Response	12%	13%	.39	11%	11%	.75
% Receiving Praise	5%	7%	.16	3%	4%	.54
% Receiving Offer to Help	4%	5%	.26	3%	5%	.03
% Warned Against Running	1.1%	1.7%	.19	0.7%	0.9%	.41
% Receiving Substantive Advice	8%	9%	.27	5%	6%	.67
Log Word Count	1.0	1.15	.02	1.04	1.04	.97
Character Count	155	187	.04	116	123	.75
N	3,021	3,014	-	1,076	1,078	-

Table 1.8: Experimental Results by Office Level of Legislator and Gender of Sender.

	Non-Hispanic Sender	Hispanic Sender	p-value
N	7,307	882	-
% Receiving Reply	26%	24%	.27
% Receiving Meaningful Response	13%	7%	.06
% Receiving Praise	6%	3%	.03
% Receiving Offer to Help	4%	2%	.08
% Warned Against Running	1.3%	0.7%	.1
% Receiving Substantive Advice	8%	4%	.07
Log Word Count	1.08	0.97	.30
Character Count	160	135	.21

Table 1.9: Experimental Results by Latinx Sender.

	Male Non-Latino	Male Latino	p-value of diff.	Female Non-Latina	Female Latina	p-value of diff.
% Receiving Reply	26%	21%	.03	27%	27%	.83
% Receiving Meaningful Response	12%	7%	.11	13%	6%	.23
% Receiving Praise	5%	2%	.02	6%	3%	.24
% Receiving Offer to Help	4%	2%	.22	5%	2%	.21
% Warned Against Running	1.1%	0.6%	.15	1.5%	0.8%	.28
% Receiving Substantive Advice	8%	5%	.17	9%	4%	.21
Log Word Count	1.03	0.83	.03	1.12	1.15	.80
Character Count	152	94	<.01	169	186	.43
N	3,607	490	-	3,700	392	-

Table 1.10: Experimental Results by Latinx and Gender of Sender.

Examples of meaningful responses

The following were rated as meaningful responses:

From a Utah female official to a female student “Thanks for reaching out and having some interest in political action. I’ll try to answer your questions and then if you’d like more information I’d be happy to talk with you on the phone. You could call my cell [... cut 220 words ...] My advice to someone like yourself who really cares about your community and wants to lay the groundwork for future political involvement is to find something you’re passionate about: zoning laws, education, business regulation, potholes in your streets, or whatever it is. Then start following that issue on the local, state, or federal level. Find others with similar interests who can provide support and a platform for your voice. You’ll find that numbers matter and your voice will be impactful on both an individual level as you reach out to elected officials, but as well when you’ve joined a larger group. Advocate and make your voice heard on the issues important to you. Maybe consider becoming involved in someone’s campaign as a worker or supporter so you can see what things look like from that angle. Make a game plan and time line for yourself for potentially running for office. Life is long and it may not be right away, but be thinking of it and how it could combine with the other plans you have for your life (career, family etc.). Find mentors who you can bounce ideas off of and keep you involved. These can be community members or elected officials or just friends. There are plenty of things to be involved with and lots of time to do so. I applaud your commitment as this young age and encourage you to continue your efforts. Please reach out to me again if I can be of any help and good luck!”

From a Tennessee male official to a female student “Well I dont consider myself a politician. I consider myself as an elected official. Some generic advice that I would give you is to be involved in your community. To know get to know as many people as you can, treat them all the same, and never meet a stranger. I wish you the best of luck in whatever you choose to do.”

From a Washington male official to a male student “Thanks for your email. Many people dont realize that the office of X is a political office with responsibilities set by statute and is the oldest law enforcement entity in history. [... cut 10 words ...] It is great that you hope to be a politician someday so you can prepare yourself by maintaining a good record and developing networks of friends and employment contacts that will support you down the road. Everything you do from now on will either help or hurt you when you decide to campaign. To answer your questions: [... cut 183 words about personal trajectory ...] My suggestion for a successful future in politics is to get involved in the community through service clubs, volunteer to be on special planning committees

for the school districts, city or county government and most important lead by example. Everything you do should pass the Front Page Test. How would what you do or your decision look like to your family or friends on the front page of the paper? Build a consistent trust from the community and when you run for office it will pay dividends. Avoid negative campaigning and have thick skin for those who choose to throw mud during a campaign. I suggest joining XX as a fun way to learn to be more comfortable when giving speeches. Remember as an elected person, you can be unelected if you lose the trust of the voters and do not solve their problems. If I can answer any other questions, please ask.”

The following were rated as NOT meaningful responses:

From an Iowa female official to a female student “I apologize for not getting back to you sooner. I think my advice would be to work hard and stay positive. Hope this helps! Best regards,”

From a Mississippi male official to a male student “Pray, be honest and sincere.”

From a Michigan male official to a female student “Get involved now. Can we talk more after election.”

From a Virginia male official to a female student “I entered local politics as a way to give back to the community that educated me and then supported me when I opened my business. I felt that I had much to offer. I am an individual that believes in cooperation and compromise to get real solutions to questions. Good luck in your future.”

Chapter 2

Correcting Bias in Perceptions of Public Opinion Among American Elected Officials

Recent survey research of state legislators and senior Congressional staff find that these political elites systematically mis-estimate their constituents' opinions on salient public policies. These findings represent significant threats to the quality of dyadic representation. In an attempt to overcome these problems, we conducted a novel field experiment where we invited sitting state legislators (n=2,346) to receive access to a dashboard of constituent opinion generated using the 2016 Cooperative Congressional Election Study. First, we find that despite extensive outreach efforts, only 11% accessed the information, with Democrats and legislators representing wealthier districts the most likely. More troubling for democratic norms, we find that access to constituent opinion had no effect on legislators' perceptions of constituency opinion or legislators' own policy preferences. Our findings suggest that information alone will fail to improve the quality of dyadic representation. We are currently replicating this experiment to assess the robustness of these null findings.

“Thats the big problem. Youre here to represent your people but you don’t know what they want. The only way to really know is to take a referendum.”

A U.S. Congressman, as quoted in (Kingdon 1973, p. 32)

2.1 Introduction

The extent to which constituency public opinion determines the legislative behavior of elected officials has motivated normative and empirical research on representation for decades (Miller and D. E. Stokes 1963; Mansbridge 2003).¹ By one account, legislators are fairly effective stewards of the attitudes of their constituents. Liberal constituents elect liberal legislators, and conservatives do the same (Ansolabehere, Snyder Jr, and Stewart III 2001; Canes-Wrone, Brady, and Cogan 2002; Griffin 2006). When prompted, survey respondents express attitudes in line with their representatives (Ansolabehere and Jones 2010). In the aggregate, public opinion seems to drive the decisions of political office-holders (Page and Shapiro 1992). And when legislators are provided with information about their constituents’ opinions, they seem to adjust their voting behavior to match their constituents’ preferences (Butler and Nickerson 2011).

(Broockman and Skovron 2018) take a broader perspective and reach a much different conclusion. Relying on a national survey of elected officials, they find that legislators wildly misperceive the preferences of their constituents (see also Hertel-Fernandez, Mildemberger, and L. Stokes 2017). Conservative lawmakers are particularly prone to this dynamic, as they dramatically overestimate the conservatism of those they represent. Nevertheless, (Broockman and Skovron 2018, p. 38) remain optimistic, arguing that representatives’ information environments are “demonstrably malleable” and that “any biases in representation that may result from misperceptions of public opinion could be feasible to correct” (Bendor and Bullock 2008; Bergan 2009; Butler and Nickerson 2011; Bergan and Cole 2015; Coppock 2014).

In this paper, we report the results of an effort designed to test how “malleable” elected officials’ information environments actually are, and whether it is possible to mitigate their misperceptions. Relying on data from the 2016 Cooperative Congressional Election Study (Ansolabehere and Schaffner 2017), we provided sitting state legislators (n=2,346) the opportunity to view granular information about the policy attitudes of their constituents.

¹This paper is coauthored with Ethan Porter. We thank Peter Aronow, Avi Feller, Donald Green, Steven Klein, Gabe Lenz, Winston Lin, Eric Schickler, Jasjeet Sekhon, and John Sides for helpful feedback. Participants in UC Berkeleys Undergraduate Research Apprentice Program provided invaluable research assistance in contacting state legislators. We also thank Frank Chi and Will Donahoe for website design. All remaining errors are our own. This research was approved by the George Washington University Committee for Protection of Human Subjects (IRB#071742). Full replication materials, pre-analysis plan, data, and code will be made available upon publication.

The vast majority of legislators failed to access the information we provided them, with Democrats and legislators from wealthier districts the most likely. As we discuss in detail below, our experiment was designed to achieve sufficient statistical power, despite anticipated low levels of compliance. Yet even with ample statistical power, results from a post-treatment survey make clear that those legislators who accessed the data were most likely unaffected by it. That is, providing information to legislators about what their constituents believe has no demonstrable impact on legislators' perceptions of those beliefs, nor does it cause legislators to bring their own attitudes in line with their constituents'. While everyday people can, in certain circumstances, update their factual beliefs upon receiving new information that challenges their priors (A. Gerber and D. Green 1999; Wood and Porter 2017), we did not observe elected officials doing the same. We are currently conducting an exact replication of this study to assess the robustness of these null findings.

2.2 Do Legislators Seek Information On Their Constituents?

The literature on representation generally assumes that politicians are “single-minded seekers of reelection” (Mayhew 1974). Even allowing for the possibility that voters are sometimes uninformed and lack genuine policy preferences, election-minded representatives nevertheless have an electoral incentive to learn the preferences of their constituents. Whether it is because politicians attempt to match their policy stances to the preferences of a majority of their constituents or they seek to shape their constituents' preferences to better match their own, a common feature of these approaches is the incentive that politicians have to know their constituents' positions.²

Nevertheless, a wave of recent empirical work has suggested that politicians and their staff are unaware of their constituents' policy preferences (Miler 2010; Broockman and Skovron 2018; Hertel-Fernandez, Mildenerger, and L. Stokes 2017). In one recent addition to this literature, (Butler and Nickerson 2011) administered a field experiment around a special legislative session in New Mexico in 2008, during which time they surveyed constituents about how the constituents wished their representatives would vote on a one-time tax rebate following a budget surplus from natural resource revenues. The researchers then communicated the results to legislators in treatment who, in turn, voted in ways that seemed to more closely match their constituents' attitudes, compared to legislators in control who received no survey results. In one state, about one low-salience issue, legislators updated their impressions about their constituents' opinions.

In this paper, we build on this nascent literature in two key ways. First, we study whether legislators from 32 states are responsive to constituency opinion on eight public policy issues,

²Our post-treatment survey finds legislators at least rhetorically indicating interest in such information. Two-thirds of legislators surveyed said that with polling information, they would be more likely to follow the preferences of their constituents than change the preferences of their constituents. They report a desire to be responsive to public opinion; yet in the main, they do not follow up on this desire.

all of which tend to be highly salient in American politics. Second, we measure not only legislators' personal policy preferences, but also their perceptions of constituent opinion. This allows us to test whether providing information on constituents policy preferences can improve legislators perceptions of constituent support and increase the congruence between legislative behavior and constituent preferences.

2.3 Experimental Design

To measure whether providing constituent opinion to state legislators can correct biases in perception of public support and increase the congruence between legislative behavior and public opinion, we conducted a randomized field experiment.³ The experiment proceeded in five steps. First, using data from the 2016 Cooperative Congressional Election Study (Ansolabehere and Schaffner 2017) and multi-level regression and poststratification (Gelman and Little 1997; Park, Gelman, and Bafumi 2004; Lax and Phillips 2009a; Lax and Phillips 2009b; Warshaw and Rodden 2012; Hanretty, Lauderdale, and Vivyan 2016; Ahler and Broockman 2017; Broockman and Skovron 2018), we estimated district-level public opinion in 2,346 state house and senate districts on eight issues: immigration, mandatory minimum sentencing, renewable fuel standards, background checks for gun purchases, minimum wage, highway funding, abortion, and repealing the Affordable Care Act (full wording of the policy areas is included in Table 2.1a).

First, we randomly assigned state legislators to receive access to the public opinion estimates derived from the CCES on a randomly selected set of four of the eight issues. Next, we randomly assigned legislators to receive either polling estimates specific to their district *or* polling estimates only of the U.S. Census regions. The former acted as our treatment of interest; the latter was meant to serve as a placebo. Because Census regions are large – four Census regions cover the entire U.S. – we anticipated that providing the regional polling data would be uninformative for a state legislator trying to understand her constituent's opinions.

In delivering the public opinion data, we sought to maximize both the credibility and usability of the data. We partnered with Chi/Donahoe, a digital creative consulting firm that has significant experience in data visualizations and interactive experiences for political clients, to create District Pulse, an online dashboard. After receiving an invitation from us, state legislators could log onto District Pulse to access their public opinion polling data. To ensure this dashboard was useful and understandable by state legislators, we pre-tested it with several current and former legislators and staffers. The results of this informal pre-testing are reported in the Online Appendix. To further establish the credibility of District Pulse, we noted that the polling data came from a large National Science Foundation-funded study and that this was not a partisan or interest group project. Notably, we received no replies from state legislators or their staff questioning the credibility or legitimacy of District Pulse.

³IRB approval was obtained before conducting the experiment. Full replication materials, pre-analysis plan, data, and code are available at [LINK](#).

(a) Policy Areas

Policy Areas

1. Grant legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.
2. Eliminate mandatory minimum sentences for non-violent drug offenders.
3. Require a minimum amount of renewable fuels (wind, solar, and hydroelectric) in the generation of electricity even if electricity prices increase somewhat.
4. Background checks for all gun sales, including at gun shows and over the Internet.
5. Increase the federal minimum wage to \$12 an hour by 2020.
6. Authorize \$305 Billion to repair and expand highways, bridges, and transit over the next 5 years.
7. Make abortions illegal in all circumstances.
8. Repeal the Affordable Care Act of 2009 (also known as Obamacare)

(b) Outcome Measures

Outcome	Coding Rules
Please indicate whether you agree or disagree with the following policy positions: <i>Agree vs. Disagree binary response.</i>	Coded as 1 if the legislator & 55%+ of the district supports the proposal OR the legislator & 55%+ of the district opposes the proposal; 0 otherwise; excluded if district opinion is within 45 – 55%.
Now imagine you had to vote on the following policy proposals. How would you vote? <i>Vote Yes vs. Vote No binary response.</i>	Coded as 1 if the legislator & 55%+ of the district supports the proposal OR the legislator & 55%+ of the district opposes the proposal; 0 otherwise; excluded if district opinion is within 45 – 55%.
Consider the people living in your legislative district. To the best of your knowledge, what percentage of these people do you think would agree with the following policy statements? The slider below goes from 0% (no one) to 100% (everyone). Please give your best guess by clicking in the slider. <i>Slider response option.</i>	Coded as the absolute value of the legislator’s response minus district support.

Note: All rules were pre-specified in the pre-analysis plan. District support was calculated using the pre-treatment MRP estimates.

Table 2.1: Policies and Outcome Measures



State House District 112, Maine

Below you can find maps on where the American public stands on a number of policy issues using data from the Cooperative Congressional Election Study – a 65,000 person survey funded by the National Science Foundation. If you have any questions about these surveys, please email [redacted]@districtpulse.us.

Issues

- [Immigration](#)
- [Crime](#)
- [Environment](#)
- [Abortion](#)

Immigration

In your legislative district (State House District 112, Maine), the data show that 36.3% support granting legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.

The map below shows data on the percent of Americans who support granting legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school

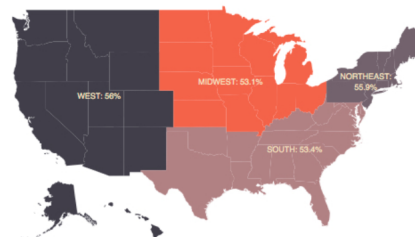


Figure 2.1: Sample District-Specific Polling Treatment

Note: An example treatment including district-specific polling information. Had this legislator been randomly assigned to the placebo condition, the web page would have looked identical except that the sentence reading “*In your legislative district...*” would have been removed, as would have the district-specific data.

Figure 2.1 shows what District Pulse looked like for a state legislator randomly assigned to receive district-specific polling. Had this legislator been randomly assigned to the placebo condition, wherein only regional polling results were available, the web page would have looked identical except that the sentence reading “*In your legislative district...*” would have been removed, as would have the district-specific data.

We provided access to District Pulse by emailing custom URLs and passwords to state legislators. In total, we sent three rounds of email invitations and made one set of phone

call invitations to legislators, all under the auspices of District Pulse. Again, we sought to ensure that these invitations conveyed the credibility and non-partisan nature of District Pulse. We did so by again noting the large sample size, the National Science Foundation support, and that the polling was being offered by a professor from a well-known university. The District Pulse project was framed as giving back to elected officials. In the invitation email, we wrote “I understand the difficulty in finding high-quality polling information on what Americans think about various public policies. . . As an academic who studies public opinion and relies on the taxpayer-funded National Science Foundation, I want to return the favor by providing this information to elected officials across the country.” The full text of the invitation emails and phone calls are included in the Online Appendix. In total, 11% of state legislators accessed District Pulse at least once. We were able to track which legislators accessed the polling data, when they did so, and how many times, by requiring them to log into District Pulse.

Beginning two weeks after the final invitation to access District Pulse, an unaffiliated academic invited the state legislators to complete a post-treatment survey. For each of the eight policy proposals, we asked three distinct outcome measures: the legislator’s personal policy positions, the legislator’s expected voting behavior if the policy were to come before them, and their perception of constituent support (full wording of the outcome measures is included in Table 2.1b).

Following the procedure for analyzing field experiments with survey outcomes outlined in (Broockman, J. L. Kalla, and Sekhon 2017), we then analyzed the data by limiting the post-treatment survey responses to the compliers – those legislators who logged in to access District Pulse. 22% of compliers responded to the post-treatment survey. This response rate exceeds the rates found in recent surveys of political elites (Broockman and Skovron 2018; Broockman, Carnes, et al. 2017; D. L. Teele, J. Kalla, and Rosenbluth 2018). A full 85% of responders described themselves as legislators, as opposed to legislative staff. As we note in the Online Appendix, these responders are broadly representative of all compliers in terms of baseline constituent opinion on the eight issues, Trump vote share, and median household income. Furthermore, there is no evidence of differential attrition on who responded to these surveys.

The outcomes were coded according to Table 2.1b, which followed from our pre-analysis plan. We generated a “long” dataset where each row is a legislator-issue (meaning each legislator who was a complier and responded to the post-treatment survey appears eight times) and columns are the three outcome measures. We analyzed the data by regressing the dependent variable on the treatment indicator using OLS and calculating cluster-robust standard errors at the state legislator level. In accordance with our pre-analysis plan, our primary model includes the pre-treatment covariates for whether the legislator is a Democrat or Republican, for whether the legislator serves in the state’s upper or lower chamber, Trump’s 2016 vote share in the legislator’s district, and state fixed effects.⁴

⁴Note that contrary to our pre-analysis plan, no baseline survey was conducted, so no baseline responses are included as covariates. Results are the same with and without covariates (see SM Table 8-10.)

We took several steps in designing the experiment to maximize our statistical power. First, by randomly assigning each legislator to receive polling information on four of eight issues but collecting outcome measures for all eight, we were able to conduct a within-subjects analysis and increase the effective sample size (see (D. P. Green, Wilke, and Cooper 2017) for a similar experimental design). Second, by randomly assigning subjects to receive either district-specific or placebo regional polling aggregates and tracking whether a legislator accessed their polling information, we were able to create a placebo group to estimate the treatment-on-treated (TOT) effect that is robust to our low compliance rate (Nickerson 2005; Broockman, J. L. Kalla, and Sekhon 2017). With these design features and the observed compliance and post-treatment survey response rates, our experiment had 80% power to detect a 0.07 point reduction in misperception from .18 in control (a 40% reduction in bias). An ongoing replication study will further increase the statistical power.

The Online Appendix includes many additional details on the MRP procedure, balance checks, implementation, and robustness checks under alternative model specifications.

2.4 Results

We test the effect of providing district-specific polling information by first examining the likelihood that a state legislator accesses this information. As (Broockman and Skovron 2018) note, Republican legislators drive much of the misperception of constituent public opinion. Consistent with this, we find that 14% of Democratic legislators accessed the polling information, while only 8% of Republican legislators did. Also consistent with wealthy constituents being better represented in American politics (Gilens 2012), we find that legislators from districts with higher median household incomes are more likely to access the polling information.

Our primary question examines whether, conditional on accessing the polling information and responding to the post-treatment survey, receiving district-specific polling corrects the misperceptions and improves the congruence between legislative and constituent preferences more than receiving the regional aggregates or no polling information. In short, the answer is no. What (Broockman and Skovron 2018) call the most “malleable” outcome is a legislator’s information environment. Despite this, we find that legislators receiving no polling information had an average misperception score of 0.18 points (ranging from 0, perfectly matching constituent preferences to 1), while legislators provided with the placebo regional polling information and district-specific information had average misperception scores of 0.16 and 0.18, respectively. In sum, legislators remained roughly equivalently uninformed about their constituents regardless of whether they were provided with specific information about their constituents; whether they received information about the broad U.S. Census regions; or whether they received no information at all.

As shown in the first column of Table 2.2, neither of these results are statistically significant. Moreover, their substantive significance is ambiguous: taking the largest effect implied by the 95% confidence interval – a reduction of 0.06 points – only reflects a 33%

	Constituent Perception	Personal Policy Agreement	Voting Behavior
District-Specific Treatment	.175 (.016)	.790 (.047)	.814 (.043)
Regional Placebo	.158 (.015)	.831 (.038)	.826 (.043)
No-Info Control	.179 (.013)	.792 (.021)	.815 (.021)
Treatment Effect vs. Placebo	$p = .53$	$p = .51$	$p = .84$
Treatment Effect vs. Control	$p = .87$	$p = .97$	$p = .97$

Table 2.2: Experimental Results

Note: “District-Specific Treatment” refers to legislators who saw district-specific polling information; “Regional Placebo” refers to those who saw the placebo; “No-Info Control” refers to those who received no polling information on this issue. The first column reports legislators’ perceptions of their constituents preferences where larger numbers denote greater misperceptions; the second reports the congruence between constituents’ preferences and legislators’ own preferences where larger numbers denote greater congruence; the third reports the congruence between constituents’ preferences and legislators’ own preferences where larger numbers denote greater congruence. Results presented are the predicted margins from OLS regressions and include cluster-robust standard errors at the state-legislator level in parentheses. All models include pre-treatment covariates and state fixed effects that were specified in our pre-analysis plan. Additional model details and robustness tests are included in the online supplementary materials.

overall reduction in the misperceptions around constituent support. This approximates the upper bound of knowledge increases observed in studies when researchers offer subjects extra money and time for correct answers (Prior and Lupia 2008). For elected officials, the reelection incentive should loom larger than any one-time monetary incentive researchers can offer non-elite survey respondents. Yet this does not appear to be the case.

As we did not observe treatment effects on decreasing biases around constituent perception, we did not expect to find any effects on the congruence between either legislators’ personal policy preferences and their expected voting behavior, and their constituents’ preferences. And indeed, these expectations were borne out. These results are shown in the final two columns of Table 2.2. Though it is interesting to note that the base rates of congruence on both the personal policy agreement and voting behavior measures is high, around 80% in the control group. One possibility may be that while legislators misperceive public opinion, they nevertheless vote according to public opinion. We will continue to examine this pattern in our replication study as we expand our sample size.

In the Online Appendix, we present additional robustness results, which consistently fail to find evidence of either statistically or substantively significant effects as a result of providing polling information to state legislators.⁵

⁵In the Online Appendix, we also present results by legislator party. While there are suggestive results that Republicans may be responsive to providing them polling information, this analysis suffers from a small sample size because Republican were less likely to access the polling information. Only 19 Republican legislators both accessed the polling information and responded to our post-treatment survey.

2.5 Discussion

Our results are sobering. While previous research has established that elected officials systematically misperceive what their constituents want (Broockman and Skovron 2018), the evidence presented here portrays such officials as virtually immune to efforts to correct those misperceptions. Simply put, legislators do not appear to update their attitudes to match their constituents' preferences on salient political issues as measured in survey responses, even when the requisite information is quite literally at their fingertips. Non-elite survey respondents have proven more accurate when offered a small monetary incentive for accuracy (Bullock et al. 2015; Prior, Sood, Khanna, et al. 2015) and legislators have proven responsive to the provision of constituent information on a low-salient budget measure (Butler and Nickerson 2011). Here, the implicit incentive would seem to be much larger: Insofar as the polling data we presented to legislators communicates information about their constituents' attitudes on salient issues, accessing and updating in response to that information should increase their chances of reelection. To assess the robustness of these findings and address concerns with statistical power, we are currently conducting an exact replication of this study.

Two potential explanations emerge for this result. First, legislators may discount aggregate measures of their constituents' attitudes, and instead focus exclusively on political elites and policy-demanders whom they view as more central to their electoral prospects (Miler 2010; Gilens 2012). Knowing what all of your constituents believe on policy matters may be less important than knowing what your most influential constituents believe. Second, given levels of polarization in statehouses (Shor and McCarty 2012) and the "nationalization" of U.S. politics (Hopkins 2018), legislators may think of themselves not as delegates for their specific constituents, but as participants in national partisan debates. Knowing what your constituents believe on policy matters may be less important than knowing the positions of your national party – and sticking to them. These positions are hardly mutually exclusive. Whatever the reason, a surprisingly small share of legislators appear interested in gathering and then reflecting the views of their constituents.

With all this in mind, future research should investigate ways to spur legislators to have more accurate impressions of what their constituents believe, and to update their own impressions and attitudes accordingly. In prior studies, elites have responded to informational treatments when such treatments allude to their reelection chances (Nyhan and Reifler 2015b). The quality of representation may depend on reminding elected officials of the contingent nature of their employment—"hitting them between the eyes," a la (Kuklinski 2000), with information about the incentives that scholars often assume are staring legislators right in the face.

2.6 Appendix

Experimental Design

Setting

Our field experiment was conducted from 10 October 2017 to 3 January 2018 among state legislators in the United States.

Study Population

The starting universe for the experiment was all sitting United States state legislators in either the upper or lower chamber. We then limited the experiment to legislators we could identify as either Democrat or Republican (no independents were included), for whom we had contact information (email address and phone number), and for whom we could get 2016 presidential voting results. Election data were compiled from the Daily Kos Elections' 2016 presidential results for congressional and legislative districts.⁶

This led to a final universe of 2346 state legislators. The below table provides summary statistics:

Variable	Freq.
Upper Chamber	31.5%
Democrat	43.9%
Republican	56.1%
2016 Trump Percent	47.5%
Median Household Income (log \$)	10.2
Constituent Support (MRP): DREAM Act	51.7%
Constituent Support (MRP): Mandatory Minimum	68.5%
Constituent Support (MRP): Renewable Fuels	61.3%
Constituent Support (MRP): Background Checks	85.9%
Constituent Support (MRP): Minimum Wage	64.8%
Constituent Support (MRP): Highway Funding	84.9%
Constituent Support (MRP): Abortion	17%
Constituent Support (MRP): ACA Repeal	57%

Treatments

Treatments varied in two ways. First, state legislators could receive polling on 4 out of 8 possible policy issues. The issues were:

⁶<https://www.dailykos.com/stories/2017/2/6/1629653/-Daily-Kos-Elections-2016-presidential-results-for-congressional-and-legislative-districts>

- Grant legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.
- Eliminate mandatory minimum sentences for non-violent drug offenders.
- Require a minimum amount of renewable fuels (wind, solar, and hydroelectric) in the generation of electricity even if electricity prices increase somewhat.
- Background checks for all sales, including at gun shows and over the Internet.
- Vote for Minimum wage: federal minimum wage to \$12 an hour by 2020.
- Vote for Highway and Transportation Funding Act: Authorizes \$305 Billion to repair and expand highways, bridges, and transit over the next 5 years.
- Make abortions illegal in all circumstances.
- Vote for Repeal Affordable Care Act: Would repeal the Affordable Care Act of 2009 (also known as Obamacare).

Note that first six issues were framed on the liberal side and the final two were framed on the conservative side. These issues were selected to include a wide range of policy issues across a number of domains, with an emphasis for those on which state legislators might be expected to hold opinions because they influence state public policy. We were also constrained by the questions asked in the 2016 Cooperative Congressional Election Study (CCES).

In a below section, we discuss how we generated the district-specific polling from the 2016 CCES using a multilevel regression and poststratification (MRP) procedure similar to that used by (Ahler and Broockman 2017) and (Broockman and Skovron 2018). We generated the regional polling by taking the weighted average within Census region using the Common Content weights supplied with the CCES.

Second, state legislators were provided either with a regional polling aggregate (a placebo condition) or their district-specific polling.

The below images show what the treatments looked like.



Welcome to District Pulse, a free dashboard for high-quality polling on the issues and policies people care most about.

This website was created using data from the Cooperative Congressional Election Study – a 65,000 person survey funded by the National Science Foundation. We’ve compiled data from this survey into easily digestible maps so that elected officials can learn where the public stands on various policies.

If you received an email invitation to access District Pulse, please use the link and password in the email. If you would like access or have any questions, please email [REDACTED]@districtpulse.us.

Contact

About Us

Home Screen

Login Screen (to identify compliers)



State House District 103, Illinois

This content is password protected. To view it please enter your password below:

Password:

Enter

Contact

About Us



State House District 103, Illinois

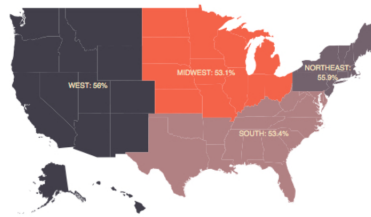
Below you can find maps on where the American public stands on a number of policy issues using data from the Cooperative Congressional Election Study – a 65,000 person survey funded by the National Science Foundation. If you have any questions about these surveys, please email [redacted]@districtpulse.us.

Issues

- [Immigration](#)
- [Crime](#)
- [Environment](#)
- [Guns](#)

Immigration

The map below shows data on the percent of Americans who support granting legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school



Regional Polling

District Specific Polling



State House District 112, Maine

Below you can find maps on where the American public stands on a number of policy issues using data from the Cooperative Congressional Election Study – a 65,000 person survey funded by the National Science Foundation. If you have any questions about these surveys, please email ████████@districtpulse.us.

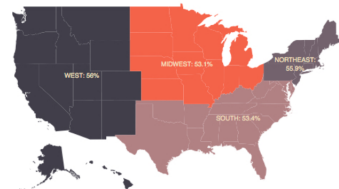
Issues

- [Immigration](#)
- [Crime](#)
- [Environment](#)
- [Abortion](#)

Immigration

In your legislative district (State House District 112, Maine), the data show that 36.3% support granting legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.

The map below shows data on the percent of Americans who support granting legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.



Randomization Procedure

Our randomization procedure followed one similar to that used in (D. P. Green, Wilke, and Cooper 2017). In conducting their experiment, they were interested in measuring the effect of three distinct treatments on three distinct policies: reducing intimate partner violence, reducing the stigma surrounding abortions, and reducing teacher absenteeism. By randomly assigning villages to receive a subset of these treatments or a placebo and by collecting outcome measures for all policies regardless of treatment assignment, (D. P. Green, Wilke, and Cooper 2017) are able to use the treatment group for one policy domain as the control group for the other and vice-versa. Doing so substantially increases the statistical power of the experiment by allowing for both within-village comparisons across policies as well as between-villages.

Our experiment benefited from a similar design. In our case, legislators were randomly assigned to receive polling information on 4 out of a possible 8 policy issues. Furthermore, half of legislators were randomly assigned to receive district-specific polling information (treatment) while half were randomly assigned to receive regional polling aggregates (placebo).

To conduct the randomization, the below procedure was followed:

1. State legislators were organized into blocks based on their party (Democrat or Republican, no independents were included) and the number of issues they were out of sync on (0 or 1, 2-5, or 6-8). On each issue, a legislator was coded as out of sync if the MRP estimates predicted that a majority of constituents supported the liberal (conservative) position but the legislator was a Republican (Democrat). While this is likely a noisy measure of dyadic representation, as (Higgins, Savje, and Sekhon 2016) note, “even when the covariates contain no information about the outcomes, blocking cannot increase the variance of the treatment effect estimator compared to when no blocking is done”.
2. Within blocks, half of state legislators were randomly assigned to receive district-specific polling and half were randomly assigned to receive regional aggregate polling.
3. Within blocks, state legislators were randomly assigned to receive polling on one of 70 combinations ($8 \text{ choose } 4 = 70$) of issues. Of 8 possible issues, legislators were randomly assigned to receive information on 4. Whether the information was district-specific or regional aggregate polling depended on their random assignment from #2.
4. State legislators were invited via email and phone call to access District Pulse and their polling information.
5. District Pulse logs which state legislators access the password-protected website, allowing us to identify the compliers.
6. State legislators were invited via email and phone call to a post-treatment survey. Note that the post-treatment survey was conducted by a researcher unaffiliated with the treatment and District Pulse.

Balance Check

In the below tables, we check whether pre-treatment covariates are predictive of treatment. The first table looks at all state legislators, the second table is subsetted to the compliers (those who access the polling information), and the third table is subsetted to the compliers who also responded to the post-treatment survey. In each table, the first column is whether the state legislator was randomly assigned to receive district-specific or regional polling. The remaining 8 columns are whether the legislator received polling on that particular issue, regardless of the geography of the polling.

As the tables show, pre-treatment covariates are not consistently predictive of treatment assignment, suggesting: (1) the randomization was properly implemented, (2) treatment did not influence who accessed the polling information, and (3) treatment did not influence who completed the post-treatment survey.

MRP Procedure

Our MRP procedure follows closely from that used by used by (Ahler and Broockman 2017) and (Broockman and Skovron 2018) and we thank the authors for sharing their code.

Table 2.4: Balance Check: All Legislators

	<i>Dependent variable:</i>								
	District (1)	DREAM (2)	Man. Min. (3)	Renewables (4)	Gun (5)	Wage (6)	Transit (7)	Abortion (8)	ACA (9)
# Out Sync	.001 (.010)	-.005 (.010)	-.001 (.010)	.004 (.010)	.001 (.010)	.008 (.010)	-.003 (.010)	.003 (.010)	-.008 (.010)
Trump %	-.062 (.083)	-.121 (.083)	.122 (.083)	-.051 (.083)	.009 (.083)	.050 (.083)	-.026 (.083)	.115 (.083)	-.098 (.083)
Democrat	-.014 (.059)	-.059 (.059)	.037 (.059)	.001 (.059)	.010 (.059)	.053 (.059)	-.024 (.059)	.057 (.059)	-.075 (.059)
HH Income	-.042 (.040)	-.004 (.040)	.017 (.040)	-.076* (.040)	.035 (.040)	-.028 (.040)	.054 (.040)	.034 (.040)	-.032 (.040)
Constant	.961** (.424)	.661 (.423)	.261 (.424)	1.284*** (.424)	.124 (.424)	.703* (.424)	-.019 (.424)	.052 (.424)	.935** (.424)
Observations	2,346	2,346	2,346	2,346	2,346	2,346	2,346	2,346	2,346
R ²	.001	.001	.001	.002	.0004	.001	.001	.001	.001

Note:

*p<0.1; **p<0.05; ***p<0.01

Estimation of our MRP model proceeded in two stages. First, a hierarchical logistic choice model was estimated for each public opinion survey question studied. Our models include predictors at three different levels. At the individual level, we include random effects for the respondent’s education, gender, and race/ethnicity as well as interaction effects between gender/race and education/race. At the state-house and -senate district level, we include individual district random effects, fixed effects for the districts’ median household income, and Trump’s share of the 2016 Presidential vote in the district. State random effects, centered around regional random effects, were included in the individual model as well. This model yields predictions for the share of individuals in any given state legislative district who support the various outcome measures in all possible combinations of race, gender, and education.

The final step in constructing district-level estimates is poststratification. We first use data from the US Census’s American Community Survey 2015 5-Year file to calculate the share of individuals in each state legislative district that fall into each ‘cell’ (e.g., what share of individuals living in a particular state legislative district are white college-educated women?).

We then merge these cell-level district proportion estimates from the Census with our cell-level opinion estimates from the multilevel regression model to construct the district-level

Table 2.5: Balance Check: Among Those Who Accessed Website

	<i>Dependent variable:</i>								
	District (1)	DREAM (2)	Man. Min. (3)	Renewables (4)	Gun (5)	Wage (6)	Transit (7)	Abortion (8)	ACA (9)
# Out Sync	-.023 (.032)	.022 (.032)	.018 (.032)	.029 (.032)	-.062* (.032)	-.017 (.032)	-.033 (.032)	.065** (.032)	-.023 (.032)
Trump %	.297 (.254)	-.305 (.253)	.397 (.251)	-.377 (.249)	.035 (.252)	.014 (.254)	.418* (.252)	-.436* (.252)	.253 (.254)
Democrat	-.008 (.184)	-.022 (.183)	.249 (.182)	.078 (.180)	-.344* (.183)	-.127 (.184)	-.053 (.182)	.200 (.182)	.020 (.183)
HH Income	.051 (.097)	-.138 (.096)	.213** (.095)	-.148 (.095)	-.027 (.096)	-.060 (.097)	.194** (.096)	-.023 (.096)	-.011 (.096)
Constant	-.076 (1.020)	2.019** (1.015)	-2.025** (1.008)	1.969* (1.001)	1.172 (1.014)	1.243 (1.022)	-1.526 (1.011)	.611 (1.012)	.537 (1.018)
Observations	256	256	256	256	256	256	256	256	256
R ²	.008	.014	.030	.019	.017	.005	.025	.025	.010

Note:

*p<0.1; **p<0.05; ***p<0.01

opinion estimates. This poststratification process is a straightforward aggregation process by which estimates for each cell in each district are summed in proportion to the share of the district that they represent.

The result of this poststratification process are estimates of district support for each issue for each of the nation's state legislative districts.

Outcome Measures

Our post-treatment survey asked three questions:

1. Please indicate whether you agree or disagree with the following policy positions: Agree vs. Disagree binary response.
2. Now imagine you had to vote on the following policy proposals. How would you vote? Vote Yes vs. Vote No binary response.
3. Consider the people living in your legislative district. To the best of your knowledge, what percentage of these people do you think would agree with the following policy statements? The slider below goes from 0% (no one) to 100% (everyone). Please give your best guess by clicking in the slider. Slider response option.

Table 2.6: Balance Check: Among Those Who Accessed Website and Took Post-Treatment Survey

	<i>Dependent variable:</i>								
	District	DREAM	Man. Min.	Renewables	Gun	Wage	Transit	Abortion	ACA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
# Out Sync	.040 (.080)	.046 (.081)	-.049 (.077)	-.008 (.077)	-.024 (.081)	.046 (.081)	.004 (.081)	-.085 (.077)	.069 (.075)
Trump %	-.375 (.615)	-.874 (.618)	1.102* (.586)	-1.004* (.590)	-.132 (.617)	.660 (.618)	.447 (.618)	-.014 (.591)	-.185 (.573)
Democrat	-.138 (.474)	-.075 (.476)	.100 (.452)	-.554 (.455)	-.239 (.475)	.568 (.477)	.210 (.476)	-.766* (.456)	.758* (.441)
HH Income	-.101 (.202)	-.181 (.203)	-.141 (.193)	-.199 (.194)	.196 (.203)	-.184 (.203)	.257 (.203)	.340* (.194)	-.088 (.188)
Constant	1.707 (2.079)	2.700 (2.089)	1.409 (1.981)	3.231 (1.994)	-1.145 (2.085)	1.664 (2.090)	-2.400 (2.088)	-2.314 (1.998)	.856 (1.936)
Observations	55	55	55	55	55	55	55	55	55
R ²	.064	.051	.085	.106	.023	.055	.044	.131	.185

Note:

*p<0.1; **p<0.05; ***p<0.01

For each of the above questions, the following 8 statements were presented in a **random** order:

- Grant legal status to people who were brought to the US illegally as children, but who have graduated from a U.S. high school.
- Eliminate mandatory minimum sentences for non-violent drug offenders.
- Require a minimum amount of renewable fuels (wind, solar, and hydroelectric) in the generation of electricity even if electricity prices increase somewhat.
- Background checks for all gun sales, including at gun shows and over the Internet.
- Increase the federal minimum wage to \$12 an hour by 2020.
- Authorize \$305 Billion to repair and expand highways, bridges, and transit over the next 5 years.
- Make abortions illegal in all circumstances.
- Repeal the Affordable Care Act of 2009 (also known as Obamacare)

Survey Response Rates and Characteristics of Respondents

Our survey response rate was 21.5%. This is calculated by taking the number of compliers and responders divided by the number of compliers. Following the design in (Broockman,

J. L. Kalla, and Sekhon 2017), we only re-survey the compliers for the purpose of the experiment. This survey response rate exceeds the rates found in recent surveys of political elites (Broockman and Skovron 2018; Broockman, Carnes, et al. 2017; D. L. Teele, J. Kalla, and Rosenbluth 2018).

The below table shows demographic characteristics of state legislators at the three stages of the experiment. The first column is for all state legislators who were invited to access polling data. The second column (compliers) are those state legislators who accessed the polling data. The third column (compliers + responders) are those state legislators who both accessed the polling data and responded to our post-treatment survey. It is among this set of state legislators for whom we can estimate treatment effects. Notably, this subset of state legislators is more Democratic than the overall universe of state legislators, as we discuss elsewhere.

Variable	Starting Universe	Compliers	Responders
Upper Chamber	31.5%	29.7%	36.4%
Democrat	43.9%	58.2%	65.5%
Republican	56.1%	41.8%	34.5%
2016 Trump Percent	47.5%	42%	41%
Median Household Income (log \$)	10.2	10.3	10.2
DREAM Act (MRP)	51.7%	53.6%	55%
Mandatory Minimum (MRP)	68.5%	69.7%	70.9%
Renewable Fuels (MRP)	61.3%	64%	67.5%
Background Checks (MRP)	85.9%	86.7%	86.6%
Minimum Wage (MRP)	64.8%	66.5%	69%
Highway Funding (MRP)	84.9%	85.7%	85.4%
Abortion (MRP)	17%	15.7%	16.3%
ACA Repeal (MRP)	57%	54.3%	51.6%
N	2346	256	55

Implementation Procedures

Invitation to District Pulse The first two emails were sent using Yet Another Mail for Gmail and was sent from an official “**REMOVED**@districtpulse.us” email account. Because of sending limits withing Gmail, these emails were spread across multiple days. The order of send was randomly assigned. The third email was sent using MailChimp from an official “**REMOVED**@districtpulse.us” email account. The MailChimp sending limit was sufficiently high to allow for all emails to send in one day.

Emails were sent on 10-12 October, 17-19 October, and 25 October. Phone calls were conducted by undergraduate research assistants from 12 October - 1 November.

Below is the email:

Dear Assembly Member **NAME**, I am **REMOVED** and I am a Professor at **RE-**

MOVED University. I recently emailed to invite you to access new detailed policy polling on what Americans think about some of the most important issues facing our country.

I understand the difficulty in finding high-quality polling information on what Americans think about various public policies. That's why I've collected information from the Cooperative Congressional Election Study — a 65,000 person survey funded by the National Science Foundation — into easily digestible maps so that elected officials like yourself can learn where the public stands on various policies.

Accessing this polling is totally free. As an academic who studies public opinion and relies on the taxpayer-funded National Science Foundation, I want to return the favor by providing this information to elected officials across the country.

To access polling information tailored specifically for you, please visit **URL**. Your password is **PW**.

If you have any trouble accessing your polling information or would like to learn more, please do not hesitate to get in touch with me at **EMAIL**.

Sincerely,

REMOVED

Below is the phone script:

Hi, my name is **RA NAME** and I am a research assistant at District Pulse. District Pulse uses data from the Cooperative Congressional Election Study to create a free dashboard for high-quality polling on the issues and policies people care most about. We are providing free access to state legislators and want to make sure you see this. Your office can log in by going to **URL** and entering password **PW**. Do you want to try logging in right now? I can help you if you have any issues. Thank you very much and have a great day!

Invitation to Post-Treatment Survey Note that the post-treatment survey was conducted by a researcher unaffiliated with the treatment and District Pulse.

Emails were sent on 13 November, 16 November, 20 November, 28 November, 1 December, 7 December, and 18 December. Phone calls were conducted by undergraduate research assistants from 28 November - 8 December.

Below is the email:

Dear Assembly Member **NAME**,

As an elected official in the United States, you have been selected to participate in the 2017 National Survey of American Politicians, a brief, five-minute survey that will help scholars better understand how elected officials have achieved their positions in politics. Hundreds of officials around the world have already answered these questions to help scholars understand electoral success and legislative effectiveness. Please join them in answering this short survey.

Please follow this link to the Survey: **URL**

All survey answers will be completely anonymous and confidential; neither your name or any identifying information will be made available to anyone at any time.

Please follow the link to participate: **URL**

Or copy and paste the URL below into your internet browser: **URL**

Thank you very much for taking your valuable time to help with this study! If you have any questions about the survey, please do not hesitate to contact us at **EMAIL**.

Sincerely, **REMOVED**

Below is the phone script:

Hi, my name is **RA NAME** and I am a research assistant for Professor **REMOVED** at **REMOVED** University. Your office has been selected to participate in the 2017 National Survey of American Politicians. This is a brief online survey that **LEGISLATOR NAME** or the legislative staff can complete. Is there a good email for me to send the survey? Great! I'll send you the survey right now. Thank you very much and have a great day!

Upon accessing the survey, respondents saw the following welcome page:

2017 National Survey of American Politicians

The National Survey of American Politicians is an **independent, confidential research study** of the experiences and views of of the remarkable people who serve in public office in the United States. The survey is conducted by researchers from leading universities around the country. The current survey is administered by Professor **REMOVED** of **REMOVED** University. It should take less than ten minutes to complete.

The survey is voluntary and completely anonymous. Your name will not be made available to anyone. If you have any questions regarding this research, you can email Professor **REMOVED** at **REMOVED.edu**.

District Pulse Validation

District Pulse was designed by Chi/Donahoe, a digital creative consultant firm specializing in data visualizations and interactive experiences for political clients, such as the AFL-CIO, the Center for American Progress, and the Elizabeth Warren for Senate campaign.

Before launching District Pulse, we pre-tested its content by sending the introductory email along with a URL and password to two former legislative assistants and one sitting state legislator (who was excluded from the experiment). We simply asked them “What do you think?” in brief interviews conducted over Facebook Messenger.

A former Legislative Aide for Colorado House Democrats and the Oklahoma Senate replied: “I would have logged in, vetted it, then seeing all signs good - passed it along to the rep. This was always a resource being requested in office. And some lobbyists carried binders of confidential polling info. The information on the website is all written clearly.”

A former Staff Assistant in the US Congress replied: “i think it’s good. there is a little bit of a disconnect for me between the text talking about the polling in an individual district and then the map below being divided by regions. but that isn’t a huge deal.” When asked to say more about the disconnect, the staffer replied “so as a staffer, i cared about polling in the district and polling in the state. i don’t recall looking at regional data very often. i think it might make it easier for people to ignore that info.” The staffer confirmed that they understood the district-specific polling information and would have ignored the regional polling.

A sitting state legislator replied: “This strikes me as an exciting email to receive! I don’t have any constructive feedback. It reads really well.”

In addition, we collected any replies received from legislators or their staff after they were invited to access District Pulse. We only received 16 replies. The replies consistently express gratitude for this type of polling information. Replies from legislators in the district specific polling condition suggest that the MRP estimates are generally consistent with that the legislators expect based on their own polling. The replies are listed below, slightly modified to maintain anonymity:

- Thanks for sending along that link! It’s interesting to see what our constituency thinks about these issues.
- Thank you - this is very interesting! What was the date of the survey and how were the questions worded? I ask because the health care answer stands out to me (your national numbers not just my district). Recent polls show that less than a quarter of people think the ACA should be repealed, but your numbers show around 50% nationally, and around 40% for my district. I am just trying to figure out why the drastic difference. The timing and wording might explain it.
- Thank you for sharing
- Thanks for sharing this information. Could you say a bit more about the distribution of the 65,000 N across state legislative districts or at least across states? Using 5411 lower chamber legislative districts (per NCSL) a perfectly even distribution (which I’m sure is not the case) is about 12, which I know can’t be right. So I’m sure there is some other methodology used to render the district-level data. Is the survey designed with a state-level valid N which is then extrapolated to the district level based on the extent to which demographic sub-samples at the district level vary from the demographic sub-samples at the state level?
- Thanks. I will try to Access information through the link.
- I got the invitation to check out polling information by District Pulse, and did so - I was particularly interested in the statistic on % support for renewable energy even if prices increase. I was wondering, do you have a way I could access that percent district-by-district for the other districts in MA besides my own?
- Thank you so much for offering me the opportunity to learn more about my district as it pertains to important issues facing our constituents in the ##th Legislative District. I look forward to reviewing the policy polling.
- Thank you for giving me access to this data set. There are clear parallels between the findings of the CCES and what I know of the sentiments of the people in my district. Some of the values seem a little high but on target. This will be a good tool to help me frame my survey questions and interactions with my constituents going forward.
- Assemblywoman XX asked me to find out whether you have access to polling data that would be specific to her district rather than regional data. Are we not understanding how to use the website or is the data regional? Thank you for your help. **NOTE: In the regional condition.**

- Thank you for the information. I reviewed it and have found it incorrect. I have done in-depth polling in my district of most likely voters... my data is very different on every issue than yours. Thank you. **NOTE: In the regional condition.**
- Thank you for sharing the polling information you have been working on nationwide, it is very much appreciated. It is helpful to have an understanding of what folks would like to see done, how needs may have changed, perceptions of how things in general are going and if there are potential gaps in resources or services that are important to them. Thank you again. Have a great day and a good week!
- Thank you for sending Representative XXX a link to polling information from constituents across District ##. She is currently away on maternity leave but wanted me to reach out and express our gratitude for this valuable data.
- Thank for making this available.
- Thanks for this info. I'll try to look into it soon.
- Thank you for this information.
- wanted to check with you to see if we could get info. on the below just for Representative XX's district. **NOTE: In the regional condition.**

Who Accessed District Pulse?

Overall, 256 state legislators out of 2346 or 11% accessed District Pulse at least once. We were able to track access by logging when a password was entered.

In this section, we report which variables predict access. The below table regresses a binary variable for whether or not the polling data was accessed on a series of predictors. The predictors are whether the legislator is a Democrat, Trump's 2016 presidential vote share in the district, whether the legislator sits in the upper chamber, the log of the media household income in the district, an indicator for whether an RA called the legislative office to inform them of District Pulse (in addition to just the emails; note that the order in which legislators was called was randomly assigned), and state fixed effects.

Across the various model specifications, two types of variables are consistently significant predictors. First is the politics of the district. Being a Democrat and Trump's 2016 presidential performance are both significant predictors of accessing the website. Second are the economics of the district. Legislators from districts with higher median household incomes are also more likely to have accessed the website. These findings are also reflected in the table included in "Characteristics of Respondents", the complier column.

Experimental Results

In analyzing the experiment, we first limit our data to the compliers (those who accessed the polling data) who responded to the post-treatment survey. This results in 55 subjects. We then transformed this dataset into a "long" dataset where each row is a distinct policy. Since there are 8 possible policy areas, this dataset has $55 * 8 = 440$. Each row then has

Table 2.8: Predictors of Accessing District Pulse

	Accessed Polling Data									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Democrat	.07*** (.01)	.04*** (.01)			.06*** (.02)	.03 (.02)			.06*** (.02)	.03* (.02)
Trump %			-.15*** (.03)	-.10*** (.04)	-.05 (.05)	-.04 (.05)			-.04 (.05)	-.03 (.05)
Upper Chamber	-.01 (.01)	-.01 (.01)	-.01 (.01)	-.01 (.01)	-.01 (.01)	-.01 (.01)			-.01 (.01)	-.01 (.01)
HH Income	.09*** (.02)	.06** (.03)	.07*** (.02)	.05* (.03)	.09*** (.02)	.06** (.03)			.09*** (.02)	.06** (.03)
Called by RA							.01 (.01)	.02 (.01)	.02 (.01)	.02 (.01)
Constant	-.87*** (.25)	-.56** (.29)	-.56** (.25)	-.38 (.28)	-.79*** (.26)	-.53* (.29)	.10*** (.01)	.07 (.06)	-.81*** (.26)	-.53* (.29)
State FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,346	2,346	2,346	2,346	2,346	2,346	2,346	2,346	2,346	2,346
R ²	.02	.07	.01	.07	.02	.07	.0004	.06	.02	.07

Note:

*p<0.1; **p<0.05; ***p<0.01

three columns for the different dependent variables: personal policy agreement, expected voting behavior, and perception of constituent support.

According to our pre-analysis plan, the following rules were used in defining the outcome measures:

- **Personal Policy Agreement:** We will create an outcome of policy agreement defined as 1 for agreement and 0 for disagreement. For each issue-legislator combination, we will exclude those where support/opposition is within five percentage points of 50% (i.e., for issues where district opinion is between 45-55%) or who did not answer this question.
- **Expected Voting Behavior:** We will create an outcome of voting agreement defined as 1 if a majority of respondents in the district SUPPORT the proposal and the legislator votes YES. 1 if a majority of respondents in the district OPPOSE the proposal and the legislator votes NO. 0 if a majority of respondents in the district SUPPORT the proposal and the legislator votes NO. 0 if a majority of respondents in the district OPPOSE the proposal and the legislator votes YES. Again, for each issue-legislator

combination, we will exclude those where support/opposition is within five percentage points of 50% (i.e., for issues where district opinion is between 45-55%) or who did not answer this question.

- **Perception of Constituent Support:** We will create an outcome of accuracy defined as the absolute value of the legislator’s response minus district support on the issue calculated using MRP.

A final column of note in this long dataset is a treatment indicator. The treatment is coded as 0 if the state legislator received no polling information on this issue; 1 if the state legislator received regional aggregate polling on this issue 2 if the state legislator received district-specific polling on this issue.

We analyzed the data by regressing the dependent variable on the treatment indicator using OLS and clustering the standard errors at the state legislator level. In some models, we include the pre-treatment covariates indicators for whether the legislator is a Democrat or Republican, indicator for upper vs lower chamber, 2016 Trump vote share in the district, and state fixed effects. These were all specified in our pre-analysis plan. Note that no baseline survey was conducted, so no baseline responses are included as covariates.

The below tables summarize the results.

First, we present mean values of each of the three outcomes across the three treatments. This transparent analysis shows that the district-specific polling does not increase the likelihood that a state legislator will personally agree with the policy positions of a majority of her constituents, does not increase the likelihood that a state legislator’s expected voting behavior on a policy position will align with the policy positions of a majority of her constituents, and does not increase the likelihood that a state legislator accurately perceives the policy positions of her constituents.

Treatment	Avg. Policy Agreement	Avg. Voting Behavior	Avg. Perception
Control	0.79	0.82	0.18
Regional	0.86	0.85	0.16
District	0.75	0.78	0.18

The next three tables look at the effects on policy agreement, voting behavior, and constituent perception using OLS with cluster-robust standard errors at the state legislator level. In each table, the first column regresses the outcome on just the treatment indicator. In the second column, state fixed effects are added. In the third column, the pre-treatment covariates specified in the pre-analysis plan are added without state fixed effects. In the fourth column, the pre-treatment covariates specified in the pre-analysis plan are added with state fixed effects.

This first table shows the non-effects of district-specific polling on policy agreement.

This second table shows the non-effects of district-specific polling on expected voting behavior.

Table 2.10: Experimental Results: Personal Policy Agreement

	Personal Policy Agreement			
	(1)	(2)	(3)	(4)
Treat Regional	.07 (.05)	.08 (.05)	.03 (.05)	.04 (.05)
Treat District	-.05 (.06)	-.05 (.06)	.01 (.05)	-.002 (.05)
Democrat			.43*** (.12)	.42*** (.13)
Upper Chamber			.01 (.05)	-.03 (.05)
Trump %			-.06 (.24)	-.20 (.23)
Constant	.79*** (.04)	.52*** (.03)	.53*** (.17)	.62*** (.14)
State FE	No	Yes	No	Yes
Observations	308	308	308	308
R ²	.01	.22	.29	.35

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.11: Experimental Results: Expected Voting Behavior

	Expected Voting Behavior			
	(1)	(2)	(3)	(4)
Treat Regional	.04 (.06)	.04 (.06)	.01 (.06)	.01 (.05)
Treat District	-.04 (.07)	-.04 (.05)	.001 (.05)	-.002 (.05)
Democrat			.36*** (.11)	.41*** (.13)
Upper Chamber			.003 (.05)	-.03 (.04)
Trump %			-.26 (.22)	-.22 (.23)
Constant	.82*** (.04)	.52*** (.03)	.66*** (.16)	.63*** (.14)
State FE	No	Yes	No	Yes
Observations	291	291	291	291
R ²	.005	.22	.29	.35

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

This third table shows the non-effects of district-specific polling on perceptions of constituent support.

Table 2.12: Experimental Results: Perception of Constituent Support

	Perception of Constituent Support			
	(1)	(2)	(3)	(4)
Treat Regional	-.02 (.02)	-.03 (.02)	-.02 (.02)	-.02 (.02)
Treat District	-.002 (.02)	.001 (.03)	-.01 (.02)	-.004 (.03)
Democrat			.02 (.04)	-.005 (.04)
Upper Chamber			-.01 (.02)	-.001 (.01)
Trump %			.21* (.12)	.25** (.11)
Constant	.18*** (.02)	.18*** (.01)	.09 (.06)	.03 (.07)
State FE	No	Yes	No	Yes
Observations	312	312	312	312
R ²	.005	.11	.06	.15

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Effects by Party

(Broockman and Skovron 2018) note in their discussion that one prediction from their observational findings is that field experiments in which legislators are provided information about public opinion in their districts should have larger effects among Republicans than among Democrats. In this section, we test this prediction.

Republicans

Table 2.13: Experimental Results: Personal Policy Agreement (Republicans)

	Personal Policy Agreement			
	(1)	(2)	(3)	(4)
Treat Regional	.31*** (.12)	.33*** (.09)	.30** (.12)	.34*** (.12)
Treat District	.04 (.10)	.07 (.12)	.04 (.10)	.07 (.11)
Upper Chamber			-.01 (.13)	-.11 (.89)
Trump %			.01 (.55)	4.88 (20.17)
Constant	.43*** (.06)	.46*** (.06)	.43 (.37)	-2.46 (12.09)
State FE	No	Yes	No	Yes
Observations	102	102	102	102
R ²	.05	.18	.05	.18

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Democrats

Robustness Check - No ACA

As a robustness check, we also analyzed the experiment excluding the Affordable Care Act policy. Given that the experiment was conducted as repeal was being debated and public opinion was actively being covered by the media, the ACA may be a unique policy that is not broadly representative.

Table 2.14: Experimental Results: Expected Voting Behavior (Republicans)

	Expected Voting Behavior			
	(1)	(2)	(3)	(4)
Treat Regional	.24 (.17)	.24 (.19)	.25 (.18)	.23 (.22)
Treat District	.02 (.12)	.06 (.14)	.01 (.12)	.08 (.14)
Upper Chamber			-.05 (.14)	.79 (1.10)
Trump %			-.77 (.48)	-7.33 (22.47)
Constant	.44*** (.07)	.47*** (.07)	.93*** (.32)	4.85 (13.43)
State FE	No	Yes	No	Yes
Observations	86	86	86	86
R ²	.04	.18	.07	.21

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.15: Experimental Results: Perception of Constituent Support (Republicans)

	Perception of Constituent Support			
	(1)	(2)	(3)	(4)
Treat Regional	-.07* (.04)	-.07*** (.02)	-.07* (.04)	-.07*** (.02)
Treat District	-.04 (.04)	-.04 (.05)	-.04 (.04)	-.04 (.05)
Upper Chamber			.001 (.03)	.04 (.03)
Trump %			.46* (.25)	.38 (.87)
Constant	.23*** (.04)	.20*** (.03)	-.05 (.13)	-.03 (.50)
State FE	No	Yes	No	Yes
Observations	112	112	112	112
R ²	.03	.24	.10	.24

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.16: Experimental Results: Personal Policy Agreement (Democrats)

	Personal Policy Agreement			
	(1)	(2)	(3)	(4)
Treat Regional	-.07 (.04)	-.05 (.04)	-.07 (.04)	-.05 (.04)
Treat District	.003 (.03)	-.03 (.03)	.004 (.03)	-.03 (.03)
Upper Chamber			.03 (.03)	.02 (.03)
Trump %			-.11 (.18)	.04 (.11)
Constant	.97*** (.02)	1.02*** (.01)	.99*** (.05)	1.00*** (.04)
State FE	No	Yes	No	Yes
Observations	206	206	206	206
R ²	.02	.11	.03	.11

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.17: Experimental Results: Expected Voting Behavior (Democrats)

	Expected Voting Behavior			
	(1)	(2)	(3)	(4)
Treat Regional	-.07 (.04)	-.05 (.04)	-.07 (.04)	-.05 (.04)
Treat District	.003 (.03)	-.03 (.03)	.004 (.03)	-.03 (.03)
Upper Chamber			.03 (.03)	.02 (.03)
Trump %			-.11 (.18)	.04 (.11)
Constant	.97*** (.02)	1.02*** (.01)	.99*** (.05)	1.00*** (.04)
State FE	No	Yes	No	Yes
Observations	205	205	205	205
R ²	.02	.11	.03	.11

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.18: Experimental Results: Perception of Constituent Support (Democrats)

	Perception of Constituent Support			
	(1)	(2)	(3)	(4)
Treat Regional	.01 (.02)	-.001 (.02)	.01 (.02)	-.003 (.02)
Treat District	.01 (.02)	.02 (.02)	.01 (.02)	.02 (.02)
Upper Chamber			-.01 (.02)	-.02 (.02)
Trump %			.07 (.08)	.12 (.10)
Constant	.15*** (.01)	.13*** (.01)	.14*** (.03)	.11*** (.03)
State FE	No	Yes	No	Yes
Observations	200	200	200	200
R ²	.001	.06	.01	.07

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.19: Experimental Results: Personal Policy Agreement (No ACA)

	Personal Policy Agreement			
	(1)	(2)	(3)	(4)
Treat Regional	.09 (.06)	.10* (.06)	.06 (.05)	.07 (.05)
Treat District	-.03 (.07)	-.02 (.05)	.05 (.04)	.04 (.04)
Democrat			.49*** (.12)	.47*** (.15)
Upper Chamber			.02 (.05)	-.01 (.06)
Trump %			-.10 (.25)	-.30 (.22)
Constant	.78*** (.05)	.51*** (.03)	.47*** (.17)	.66*** (.13)
State FE	No	Yes	No	Yes
Observations	278	278	278	278
R ²	.01	.27	.37	.43

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.20: Experimental Results: Expected Voting Behavior (No ACA)

	Expected Voting Behavior			
	(1)	(2)	(3)	(4)
Treat Regional	.07 (.06)	.08 (.06)	.05 (.06)	.06 (.06)
Treat District	-.02 (.07)	-.02 (.05)	.04 (.05)	.04 (.04)
Democrat			.39*** (.11)	.45*** (.15)
Upper Chamber			.01 (.05)	-.01 (.05)
Trump %			-.34 (.24)	-.32 (.23)
Constant	.80*** (.05)	.51*** (.02)	.63*** (.16)	.67*** (.14)
State FE	No	Yes	No	Yes
Observations	262	262	262	262
R ²	.01	.26	.37	.42

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Table 2.21: Experimental Results: Perception of Constituent Support (No ACA)

	Perception of Constituent Support			
	(1)	(2)	(3)	(4)
Treat Regional	-.03 (.02)	-.03** (.02)	-.02 (.02)	-.03** (.02)
Treat District	-.01 (.02)	-.01 (.02)	-.02 (.02)	-.02 (.03)
Democrat			.001 (.04)	-.01 (.04)
Upper Chamber			-.01 (.02)	-.002 (.02)
Trump %			.20* (.12)	.33*** (.11)
Constant	.18*** (.02)	.21*** (.01)	.11* (.06)	.02 (.07)
State FE	No	Yes	No	Yes
Observations	273	273	273	273
R ²	.01	.10	.09	.18

Note: *p<0.1; **p<0.05; ***p<0.01
 Cluster-robust standard errors
 at the state legislator level.

Additional Survey Results

How do you normally get information about your constituents' policy preferences? Select all that apply.

Outcome	All Respondents	Complier Respondents
Reading the newspaper and news websites	67.7%	71.8%
Social media	61.3%	61.5%
Town halls with constituents	75.8%	76.9%
Meetings with community leaders	84.7%	79.5%
Phone calls, emails and letters from constituents	97.6%	100%
Lobbyists or other non-elected political professionals	39.5%	41%
Polling	26.6%	28.2%
Other legislators	37.1%	35.9%
N	124	39

How do you usually get your polling? Select all that apply. (among those who selected polling to the above question)

Outcome	All Respondents	Complier Respondents
I commission it through my campaign	39.4%	36.4%
I commission it through my legislative office	27.3%	18.2%
I rely on state party polling	60.6%	81.8%
I rely on national party polling	33.3%	36.4%
I rely on polling described in the media	39.4%	36.4%
N	33	11

If you had the opportunity, would you make use of polling about the policy preferences of your constituents?

Outcome	All Respondents	Complier Respondents
Yes, if it were complimentary	59.3%	52.5%
Yes, even if I had to pay for it	15.4%	22.5%
No, no matter what	7.3%	5%
I'm not sure	17.9%	20%
N	123	40

If you had polling information about your constituents, what would you be more likely to do with it in most situations? Please select the option that you think best reflects what you would be more likely to do.

Outcome	All Respondents	Complier Respondents
I would work to change the preferences of my constituents.	32.1%	37.8%
I would work to better follow the preferences of my constituents.	67.9%	62.2%
N	112	37

Do you recall receiving polling information about your district from District Pulse, an organization led by political scientists **REMOVED**?

Outcome	All Respondents	Complier Respondents
I remember	12.4%	34.2%
I don't remember	69%	47.4%
I'm not sure	18.6%	18.4%
N	113	38

Chapter 3

Pediatricians Role in America's Vaccination Problem: Street-Level Bureaucrats and Interest Group Members

Childhood vaccinations are one of the most cost-effective public health investments in the United States. Despite this, vaccination rates are declining, with many American counties falling below the necessary threshold for herd immunity. Why is this happening and how can these trends be reversed? While much of the existing research focuses on parents' vaccination decisions, this paper examines the role of pediatricians. Through their membership association, the American Academy of Pediatrics, pediatricians are influential actors in shaping state-level immunization policies and as caregivers, pediatricians are also the street-level bureaucrats charged with helping enforce those policies. Using an audit study and an original survey of pediatricians, we find that the degree of support and meaningful actions offered by pediatricians is likely overstated in the existing research and that pediatricians may not be doing enough to promote vaccines. By studying pediatricians as political actors, we see how their competing considerations lead to sub-optimal societal outcomes.

Childhood vaccinations in the United States prevent an estimated 42,000 deaths and save society nearly \$70 billion per birth cohort (Zhou et al. 2014; Ozawa et al. 2016). Despite this, an increasing number of parents are choosing to break with the established immunization schedules promoted by the Centers for Disease Control and Prevention by delaying or refusing vaccines.¹ The proportion of children with at least one vaccine refusal increased from 2.5

¹See (Centers for Disease Control & Prevention 2013) for details on the established immunization schedules.

percent for children born in 2010 to 4.2 percent for children born in 2013.² These refusals have been linked to an increased risk for measles and pertussis among both those who refuse vaccines and among fully vaccinated individuals (Phadke et al. 2016). The problem of under-vaccination is widespread. One illustrative case is Seattle, where during the 2017-2018 school year, over one in ten kindergartners in Seattle Public Schools were not fully vaccinated against measles or pertussis. During the first nine months of 2018, 137 cases of measles have been confirmed in 24 states and the District of Columbia, a 117% increase from 2010.³

What is causing this growing trend of breaking with established medical recommendations on childhood vaccinations? And what can be done to reverse it? Previous research has examined the correlations between vaccination hesitancy and other attitudes and demographics (Larson et al. 2014), while survey experimental research has studied whether public service messages can effectively change parental and societal beliefs about the efficacy of vaccination (Lewandowsky et al. 2012; Nyhan, Reifler, et al. 2014; Nyhan and Reifler 2015a; Horne et al. 2015; Reavis et al. 2017; Pluviano, Watt, and Della Sala 2017). These studies all focus on the attitudes of the mass public and parents. This focus on parental and mass opinion may be painting an incomplete picture of why vaccination rates are declining.

In this study, we take a different approach from the existing research by focusing on the role of pediatricians as political actors. Pediatricians have a dual role in explaining vaccination rates. First, individual pediatricians serve as the “street-level bureaucrats” charged with ensuring compliance with government immunization laws and recommendations. Pediatricians are on the front lines ensuring whether or not patients are fully vaccinated. Second, pediatricians, through their memberships organization, the American Academy of Pediatrics, have a formal role in setting many state and federal vaccination policies. Yet despite the potential for substantial influence that pediatricians hold over both vaccination policies and parental decision-making, it remains an open question to what extent pediatricians are actually exercising these powers.

In this paper, we explore the incentives pediatricians face with regard to vaccinations in America. While pediatricians overwhelmingly support vaccines, this support does not necessarily translate into taking meaningfully action to support vaccines. First, using an original survey of the political priorities of pediatricians, we find that pediatricians face competing demands between prioritizing advocacy that benefit their material well-being (such as raising Medicaid reimbursement rates) and advocacy that improves public health (such as vaccination policies). While this survey shows that pediatricians do care about vaccine policy, they do not care at meaningfully greater rates relative to other policies that they may spend their limited advocacy resources on. Second, we conduct an audit study to measure how pediatricians respond when faced with a clear trade-off between providing a public good and their personal financial incentives to acquire new patients. We find that pediatricians, when faced with the cost of engaging with a parent who does not wish to

²Report from the Blue Cross Blue Shield Association, <https://www.bcbs.com/the-health-of-america/reports/early-childhood-vaccination-trends-america>

³Report from the CDC, <https://www.cdc.gov/measles/cases-outbreaks.html>.

see their child vaccinated, are not following their endorsed best practices but are instead acquiescing and allowing children to go under-vaccinated.

In the next section, we first review the existing literature attempting to explain the growth of vaccine refusals in the United States and show the assumptions that are made about pediatricians. We then present the role pediatricians play in vaccinating children, both at the individual and interest group levels, and the incentives they face. We then test our theories using an original survey of pediatricians and an audit study, before concluding.

3.1 Explaining Vaccine Rates and Refusals in the United States

One of the primary mechanisms through which vaccines are successful in reducing the morbidity of infectious diseases is through a high vaccination rate among the public in a community. While vaccines typically provide direct protection to the vaccinated, the indirect protection provided by “herd immunity” is an essential feature to protect those unable to be vaccinated or individuals for whom vaccines might prove to be less effective (Dube et al. 2013). For measles, vaccination rates of 96% to 99% in a community are estimated to be required for herd immunity (Majumder et al. 2015). Despite this, in half of U.S. states in 2017, the measles vaccination rate for kindergarten students was under 94%, including 87% in Colorado, 89% in Kansas, 91% in Washington, and 93% in Ohio (Seither et al. 2017).

Why are vaccination rates so low in many parts of the United States? Access to vaccines are unlikely to be the cause. Children who are uninsured or Medicaid-eligible qualify for the federal Vaccines for Children program, which offers vaccines at no cost, while under the Affordable Care Act, private insurance companies are barred from charging co-pays or deductibles for recommended vaccines; financial and access barriers do little to explain low vaccination rates (Shen et al. 2014).

Instead, much of the existing literature focuses on parental attitudes and beliefs. Recent research has found how parental lack of knowledge about the benefits and risks of vaccines, belief in conspiratorial thinking, and overconfidence can predict vaccine hesitancy (Nyhan, Reifler, et al. 2014; Hornsey, Harris, and Fielding 2018; Motta, Callaghan, and Sylvester 2018). Yet importantly, not all parents who are vaccine hesitant refuse to vaccinate: the 2009 National Immunization Survey found that nearly a third of parents who ultimately vaccinated their children according to the federally recommended schedule believed that vaccines can cause serious side effects and that children receive too many vaccines (P. J. Smith, Humiston, et al. 2011). So while parental attitudes are an important factor in determining whether children are vaccinated, attitudes alone do not explain the entire decision. For this reason, in a recent review, (Salmon et al. 2015) argue that three prongs are necessary to ensure high vaccination rates: parental confidence in vaccines, government regulation to ensure vaccine safety, and pediatricians recommending and administering vaccines. In the remainder of this paper, we focus on the dual role of pediatricians as members of the interest group that help

set federal vaccine policies and as the street-level bureaucrats charged with implementing them.

3.2 Pediatricians as Political Actors

Largely absent from the existing literature on vaccination is the role of pediatricians. While previous research has shown how trust in pediatricians is correlated with higher vaccination rates (Motta, Callaghan, and Sylvester 2018; P. J. Smith, Kennedy, et al. 2006), no existing work considers the actions that pediatricians take – or could take – as individual health care providers or as a collective lobbying group to increase vaccination rates. This is surprising given the political history of vaccinations in the United States (Schwartz and Mahmoud 2014; J. C. Smith, Hinman, and Pickering 2014; Walton, Orenstein, and Pickering 2015).

Federal vaccination policy is set by the Advisory Committee on Immunization Practices (ACIP), an external advisory committee that serves the Centers for Disease Control and Prevention (CDC) and the Secretary of the U.S. Department of Health and Human Services (DHHS). Prior to the formation of ACIP in 1964, vaccine recommendations were set by the American Academy of Pediatrics' Committee on Infectious Diseases in a publication known informally as the "Red Book." While the Red Book provided recommendations to individual pediatricians, prior to the establishment of ACIP, there was no formal body for setting federal immunization policy.

With the development of several new vaccines in the early 1960s (monovalent oral poliovirus vaccine, 1961; trivalent oral poliovirus vaccine, 1963; and measles vaccine, 1963) and the passage of the Vaccination Assistance Act of 1962, the need for a centralized federal vaccination policy became evident. When the Surgeon General first constituted the ACIP in 1964, pediatricians and the American Academy of Pediatrics were central to the process. The AAP Committee on Infectious Diseases was one of three official liaison organizations to ACIP, along with the American Medical Association and the Canadian National Advisory Committee on Immunization. Furthermore, the ACIP's first agenda included an item on ACIP's relationship with the AAP and ACIP has always worked to harmonize its recommendations with those of the AAP; all changes to vaccination recommendations are approved by both the AAP and ACIP before going into effect. Thus the AAP has an invaluable seat at the table that sets federal vaccination policies. These policies include determining which vaccines are recommended, which vaccines should be made freely available to low-income children through the federal Vaccines for Children program, and which vaccines health insurers must cover under the Affordable Care Act. In addition to these formal policy levers, the ACIP and AAP's vaccination recommendations get promulgated to individual providers (95% of providers state they follow these recommendations (Martin and Badalyan 2012)) and serve as the basis for state-level vaccination requirements (a state's receipt of federal funds depend on its implementation and enforcement of school vaccination regulations (Kitch, Evans, and Gopin 1999)). Thus in a formal policy-making sense, the AAP is one of the most influential actors.

In addition to their role in setting federal vaccination policies, pediatricians are also the street-level bureaucrats charged with implementing these policies. According to (Lipsky 2010, p.3), street-level bureaucrats are “public service workers who interact directly with citizens in the course of their jobs, and who have substantial discretion in the execution of their work.” Street-level bureaucrats determine whether and how government policies are enforced. While pediatricians are not public service workers in that they are directly employed by a government, they nevertheless work in a highly regulated industry where nearly half of their payments tend to come from Medicaid or the Children’s Health Insurance Program.⁴ Furthermore, the role of the pediatrician as a quasi-governmental agent is codified into many state vaccination laws. For example, New York’s Public Health Law Section 2164 gives pediatricians the authority to provide a certificate of immunization and to determine whether a particular immunization may be detrimental to a child’s health, exempting them from a vaccine. Similar laws exist in nearly all states. Thus legally, pediatricians are authorized to use their discretion to determine which children should be required to abide by state vaccination laws. This paper investigates how pediatricians choose to use that discretion.

3.3 Expectations of Pediatricians

Both pediatricians individually and through their interest group, the American Academy of Pediatrics, support vaccines. Yet, support alone is not enough to ensure that pediatricians will exercise their social and political capital to promote immunization among both individual patients and as a society. As both individuals and as an interest group, pediatricians face competing demands between taking actions that support the public good and taking actions that support their material well-being. How pediatricians weigh these competing considerations is an open empirical question.

First, as individuals, pediatricians face a collective action problem (May 2000; Bauch, Galvani, and Earn 2003). Even if we assume that every pediatrician’s goal is for their community to reach herd immunity, a single pediatrician may still choose to not vaccinate a particular child without harming herd immunity because herd immunity only typically requires that 95% of the population be vaccinated, not 100%. As street-level bureaucrats, pediatricians typically have the discretion to determine how they wish to deal with a vaccine hesitant parent. From an individual pediatrician’s perspective in a world with high vaccination rates, the externality of foregoing vaccinating one child is minimal. On the other hand, pediatricians face a cost in addressing vaccine hesitant parents. Getting a vaccine hesitant parent to vaccinate their children takes time. This time talking with a parent to encourage vaccination is not billable and therefore is lost income to the pediatrician. And if the pediatrician is too insistent in encouraging vaccines, the pediatrician risks losing a paying patient altogether. Thus an individual pediatrician faced with this decision may choose rationally not to forcefully encourage vaccination in all cases where a child should otherwise be vaccinated. 87% of pediatricians report facing at least one vaccine hesitant parent a

⁴https://www.aap.org/en-us/Documents/practicet_Profile_Pediatric_Visits.pdf

year (Edwards et al. 2016), so as many pediatricians faced with similar incentives make the same decision, society may end up with a sub-optimal outcome where herd immunity could dissipate. In the sections that follow, we use an audit study of pediatricians to determine how, in a naturalistic setting, pediatricians choose to respond to vaccine hesitant parents.

Second, as an interest group, the American Academy of Pediatrics, like any interest group, has limited capacity and political capital and therefore is forced to prioritize which issues it seeks to address. As a member-run organization, we might expect that the AAP will prioritize issues that are of most importance to its members (Strolovitch 2006). So while the AAP lists childhood immunizations as one of its legislative priorities, it also includes other public health priorities (e.g., distracted driving, school physical education, and gun control) as well as specific laws that affect the material well-being of their members (e.g., medical liability reform and Medicaid payment increases). We might expect that the AAP will prioritize lobbying for policies that directly benefit its members before advocating for broader public health policies. To investigate this, we conduct an original survey of pediatricians to measure their political priorities.

3.4 A Survey of Pediatricians as Interest Group Members

To measure the political priorities of pediatricians as members of an interest group, we conducted an original survey of pediatricians. We conducted the survey in the summer of 2018 following similar procedures as (Hersh and Goldenberg 2016). We first downloaded the National Provider Identification (NPI) file of U.S. physicians and identified physicians with a specialty in pediatrics.⁵ We then worked with Catalist, a political data firm that maintains a national list of both registered voters and unregistered but eligible Americans, to match the name, gender, and work addresses provided in the NPI file to pediatricians' home addresses. Catalist was able to match 70% of pediatricians. From the matches, we then randomly sampled 7,999 pediatricians and sent them a letter inviting them to participate in an online survey titled the "National Survey of Pediatricians", sponsored by the University of California, Berkeley (following the procedures in (Broockman, J. L. Kalla, and Sekhon 2017)). Respondents were offered \$5 as a gift card or donation in exchange for participating. Only those respondents who confirmed they were pediatricians (active or retired) and provided preventative or well-child care were eligible for the survey. Overall, of the pediatricians invited to participate in the survey, 597 responded and 418 were eligible.

Asking for political priorities is susceptible to social desirability bias, particularly when asked in a close-ended response where issues are suggested to the respondent (Reja et al. 2003; Schuman, Ludwig, and Krosnick 1986). While a pediatrician's top concern might be

⁵The NPI file is a listing of all physicians who are covered by the Health Insurance Portability and Accountability Act. Some physicians who do not use electronic systems and do not accept insurance may not have an NPI number. Otherwise the NPI file is comprehensive.

their salary and they might genuinely want the AAP to lobby for increased Medicaid reimbursement rates, they might not wish to explicitly say this out of a fear of appearing selfish. To attempt to ameliorate these concerns, we therefore conducted a survey of pediatricians where we asked them a simple, open-ended question without priming for any particular response options. We asked, "Whether or not you are a Fellow [of the American Academy of Pediatrics]⁶, what do you think are the most important political issues for the American Academy of Pediatrics to work on?" Following this question, we then asked pediatricians whether they support the AAP advocating for, whether they believe the AAP's lobbying increases the likelihood of passage, and whether they personally would be willing to attend a meeting with an elected official to lobby for the policy of eliminating all non-medical exemptions to school entry immunization requirements. We asked this set of three questions also on policies that affect the material well-being of pediatricians: medical liability reform and increasing Medicaid payment rates.

Pediatrician Survey Results

Our primary analysis is the degree to which pediatricians believe vaccines are a top political priority for the AAP. To estimate this, we coded open-ended responses for whether they mentioned a broad public health policy (vaccination, gun control, immigration reform⁷), a policy that would affect the material well-being of pediatricians (increasing reimbursement rates, regulation of the health care industry⁸, expanding access to pediatricians⁹) or for whether the respondent believes the AAP should be non-political and should not take stances on particular policies.

Overall, we found that a large percentage, 18% of AAP members and 16% of non-members, mention vaccines as one of the most important political issues for the AAP to address (see Table 3.1). Yet, pediatricians also frequently mentioned policies that affect their material well-being: reimbursement rates, regulations, and expanding access to pediatricians. Similar results are seen when we asked in close-ended questions the degree to which pediatricians supported the AAP advocating for particular policies, would be willing to attend lobbying meetings in support of those policies, and believed that the AAP, as an interest group, could pass those policies (see Table 3.2). While pediatricians are more supportive, more willing to lobby, and more likely to believe passage is possible for vaccines, sizable percentages of pediatricians feel the same about medical liability reform and

⁶77% of respondents reported being Fellows of the AAP, meaning that they are board certified in pediatrics and pay annual dues to the AAP

⁷The survey took place while immigration was a top issue covered by the media due to the Trump administration's family separation policy.

⁸Health care regulation covered diverse topics, such as limiting the roles of mid-level practitioners (nurse practitioners and physician assistants), the use of electronic medical records, and the certification process.

⁹Expanding access to pediatricians included policies such as defending funding for the State Children's Health Insurance Program and Medicaid, working to lower insurance costs through the Affordable Care Act, and promoting universal health-care. These policies would allow pediatricians to gain new patients, increasing their annual salaries.

Table 3.1: Pediatrician's open-ended responses when asked the most important political issues for the AAP to work on. Each cell is the percent mentioning that issue.

	AAP Member	Non-Member
Vaccines	18%	16%
Gun Control	12%	3%
Immigration Reform	25%	9%
Increase Reimbursement Rates	9%	7%
Health Care Regulation	8%	13%
Expand Access to Pediatricians	50%	38%
Non-Political	3%	3%
N	322	96

Table 3.2: Pediatricians' close-ended responses when asked about a policy to eliminate all non-medical immunization exemptions.

	Vaccines	Liability Reform	Medicaid Payments
Strongly Support AAP Lobbying	67%	51%	61%
Very Willing to Attend Lobbying Meeting	32%	17%	20%
Very Likely Will Pass Given AAP Support	7%	5%	3%

Policies asked about where: (1) "Eliminate all non-medical exemptions to school entry immunization requirements"; (2) "Support medical liability reform"; and (3) "Increase Medicaid payment rates".

increasing Medicaid payment rates. Furthermore, while two-thirds of pediatricians state their strong support for political actions on vaccines when asked in the close-ended question, less than one-in-five pediatricians offer vaccines when asked in the open-ended question. It is possible that the close-ended questions over-state pediatric support for vaccines. Given that the AAP is primarily a member-serving and member-supported interest group, as opposed to a philanthropic-supported public-serving interest group, we might expect that the AAP would prioritize policies that directly benefit their members and their members support over policies that their members also support but that benefit the public at large.

3.5 An Audit Study of Pediatricians as Street-Level Bureaucrats

To study how pediatricians respond in the real-world to the competing incentives of promoting public health and promoting their material well-being, we conducted an audit study where pediatricians' offices were assigned to receive a call to participate in an academic sur-

vey¹⁰ or to receive a call from a purported parent.¹¹ Both types of calls asked about the pediatricians' vaccine policies. The only difference is that while the academic survey was neutrally framed, the parent self-identified as someone who was vaccine hesitant and wanted to know if the pediatrician would accommodate a delayed vaccination schedule.

The academic survey condition was expected to replicate existing work showing that pediatricians support vaccines. Pediatric best practices, such as those put forward by the Children's Hospital of Philadelphia's PolicyLab recommend that pediatricians inform all patients that their "office follows the CDC recommended vaccine schedule and every parent is expected to have their children fully vaccinated on time" (Nabet et al. 2017). We expect that academic surveys likely overstate pediatricians' true compliance with these best practices given concerns with social desirability bias. Pediatricians' reactions to the purported parent therefore provide a more naturalistic response to vaccine hesitancy and allow for a more unobtrusive measure into the role of pediatricians in discouraging the use of delayed schedules than self-reported survey outcomes.

The experiment in this study entailed calling 2,681 pediatricians from the 11 states that record and publicly publish county-level vaccination data.¹² Pediatricians were identified using the National Provider Identifier (NPI) Registry, a public database maintained by the U.S. Centers for Medicare and Medicaid Services listing medical providers and their specialties. In the academic survey condition, pediatricians' offices were asked if they have a policy on vaccines, what that policy is, and questions about how they interact with parents who do not want to follow CDC vaccination recommendations. In the parent condition, offices received a phone call from a purported parent moving to the area who is looking for a pediatrician for their two-month old and who is vaccine hesitant. The parent would ask if the office had a vaccine policy and if they would allow the child to follow a delayed vaccine schedule. Full scripts are available in the Appendix. 606 offices in the parent condition and 250 offices in the academic survey condition provided responses. The study was conducted in spring 2017.¹³

In both conditions, either pediatricians or their staff may have responded. We use the staff responses as a proxy for a given pediatrician's office policy on vaccines. This is consistent with

¹⁰The academic survey call was designed to replicate prior surveys of pediatricians (Kempe et al. 2015; Hough-Telford et al. 2016). The results of our academic survey are broadly consistent with this existing work.

¹¹IRB approval was obtained before conducting the experiment. Full replication materials, data, and code are available from the author.

¹²These 11 states are broadly representative of the U.S. According to CDC estimates of state-level vaccination rates, the average kindergarten MMR vaccination rate in these 11 states was 93.5% in 2016-2017 compared to 94.4% in the remaining 37 states, a statistically insignificant difference ($p = 0.34$). Note that the CDC does not report data for Oklahoma and Wyoming. See <https://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/data-reports/coverage-reports/2016-17.html> for CDC estimates of state-level vaccination rates.

¹³The lower response rate in the academic survey condition was expected because many offices might have an aversion to respond to a survey while offices are unlikely to refuse to talk to a prospective patient. As shown in the supplementary materials, covariates are balanced among the offices that responded.

Table 3.3: How pediatricians respond to a parent seeking a delayed schedule by experimental condition.

Outcome	Parent Audit	Academic Survey
% Require Full Vaccination on Time	17%	66%
% Parent Decides	23%	12%
% Explicitly Allow Delayed Schedule	46%	5%
N Pediatricians	606	240

For full question wording and distribution of responses, see the SI Appendix.

the Centers for Disease Control and Prevention's best practices, which state that, "Nurses, physician assistants, and other office staff play a key role in establishing and maintaining a practice-wide commitment to communicating effectively about vaccines and maintaining high vaccination rates" (Centers for Disease Control & Prevention 2012). Throughout, we use pediatrician as shorthand for the overall pediatrician's office. We did not record who in the office responded.

Audit Study Results

While previous research has found that nearly all pediatricians encounter requests for a delayed vaccination schedule (Kempe et al. 2015), this study is the first to document the behavioral responses of pediatricians and their staff towards vaccine-hesitant parents and how this differs from the self-reported surveys of pediatricians used in much of the existing literature. Consistent with this research, we find that when pediatricians are asked directly in an academic survey, 66% state that their vaccination policy is consistent with CDC recommendations.

However, when a pediatrician is approached by a purported new patient seeking a delayed vaccination schedule, which are contrary to CDC recommendations, 46% explicitly agree while an additional 22% state that it is up to the parent to decide. Only 17% of the time do pediatricians or their staff explicitly state that a delayed vaccination schedule is not acceptable. Furthermore, despite 69% reporting in our academic survey that they always attempt to educate parents seeking a delayed schedule regarding the importance of immunization, only 11% inquired into why the purported patient was interested in a delayed schedule. These results are summarized in Table 3.3.

While much of the existing literature takes for granted that pediatricians are working on the front-lines to promote vaccines, the results of this audit study suggest otherwise. In academic surveys, social desirability bias may make pediatricians more likely to say they resist vaccine hesitant parents than they actually do. With this audit study, we can see that the discretion afforded to pediatricians as street-level bureaucrats may not be promoting the public interest.

There are important limitations to this audit study. First, our survey did not ask who in a pediatrician's office responded to the survey. While the Centers for Disease Control and Prevention recommend that all office staff play an important role in a practices vaccination efforts (Centers for Disease Control & Prevention 2012), future research may wish to consider how the different incentives face by pediatricians, nurses, physician assistants, and other office staff may lead them to respond to vaccine hesitant parents in different ways. Second, it is possible that pediatricians' are intentionally and strategically being less pro-vaccination in the initial call with a potential patient's parent in order to prevent "doctor-shopping" and to create an opportunity for future parental persuasion. While plausible, we think this is unlikely to entirely be the case. First, many pediatricians and their staff explicitly accepted the delayed schedule. There was no modicum of push-back offered. Second, we would expect more pediatricians to ask the purported parent why they were vaccine hesitant so that they could have more information to use when attempting to persuade the parent later in person. Third, as other research suggests, physicians tend not to take the time to educate patients and instead comply with their patients' requests, even if they are not considered to be best practice (J. Kim and S. Kim 2009; Murray et al. 2003). Finally, other researchers have found that the more a pediatrician perceives that parents have concerns with vaccines, the less likely they are to intend to recommend vaccines (Kahn et al. 2005). Nevertheless, some pediatricians likely do engage in this strategy of getting vaccine-hesitant parents in the office in order to educate them. Future research should investigate how widespread this practice is and whether it is an effective approach.

3.6 Discussion

This study provides survey evidence that pediatricians face competing incentives between promoting the public good of vaccinations and their material well-being and behavioral evidence, through the audit study, that pediatricians frequently choose their material well-being over the public good. These results are concerning because previous work has shown that when pediatricians follow-through and are willing to inform parents of the harmful effects of refusing and delaying vaccines, pediatricians are able to promote positive public health outcomes (Opel et al. 2013; Dorell, Yankey, and Strasser 2011). Yet, pediatricians' incentives are not necessarily aligned with promoting those public health outcomes.

Pediatricians have the potential to exert substantial influence over public health outcomes. As both individuals interacting with patients and an interest group interacting with elected officials and bureaucrats, they are a highly trusted source (A. S. Gerber et al. 2014; Motta, Callaghan, and Sylvester 2018; P. J. Smith, Kennedy, et al. 2006). Yet, these results find that pediatricians do not always exercise that influence because doing so is often at odds with their immediate incentives. These results suggest the need to critical examine incentives and to not just take pediatricians' words at face value. While pediatricians support vaccines, their behavior, when faced with costly trade-offs, is not always consistent with that.

Going forward, researchers should further investigate the decision-making processes of

pediatricians and other healthcare professionals. Through a careful assessment of economic and political incentives, it may be possible to redesign parts of the healthcare system so that pediatricians' incentives are more closely aligned with public health outcomes. For example, increasing the financial incentives to pediatricians for providing vaccines has been shown in some studies to increase vaccination rates (Armour et al. 2001). More generally, future research should continue to explore the ways in which individual incentives are misaligned with public health outcomes and continue to test interventions that can change those incentives.

3.7 Appendix

Audit Study

Implementation Details

To begin, this experiment was limited to states for which we could get county-level kindergarten vaccination rates. We were interested in exploring how vaccination rates might vary within states. Much extant research makes use of the National Immunization Surveys. While these surveys provide reliable estimates of state-level vaccination rates, no such data exists at the sub-state level, with the exception of a handful of local areas.

To gather county-level vaccination rates, we focused on the states that post local (either school with a corresponding county or county-level) vaccination rates online (<https://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/pubs-resources.html>). We then collected the percent of kindergarten students who had completed all the school-entry vaccination requirements for their age and grade. We chose this vaccination measure because it was the most similar across states and allowed for easy comparisons.

This produced a sample of 11 states and 668 counties covering over 33% of Americans. Among pediatricians in these 11 states we conducted our audit study with the below procedures:

1. Using the National Provider Identifier (NPI) Registry from January 2017, identify pediatricians (those with a taxonomy code of 208000000X) living in the 11 states.
2. Using the business mailing address listed in the NPI Registry, form practices of pediatricians who share an address.
3. Drop all practices containing more than 10 pediatricians.
4. Drop all pediatricians who did not list a phone number in the NPI Registry.
5. Drop all practices who were included in a small pilot project.
6. Randomly select one pediatrician from each practice for inclusion in the experiment.
7. Randomly assign pediatricians to receive either the **parent** script (50%) or the **academic survey** script (50%).

8. Randomly assign the order in which pediatricians would be called and by which research assistant.
9. Implement the experiment by calling pediatricians at the phone number listed on the NPI Registry. Pediatricians were attempted up to 3 times. Calling took place from February to April 2017.
10. Responses from pediatricians or their staff were recorded and analyzed.

Response Rate

Below, we report the types of responses received by experimental condition. 2,681 pediatricians were attempted. As expected by random assignment, no large differences appear for the percent of offices called that were bad phone numbers, hospitals, military bases, non-pediatricians, or retired pediatricians by experimental condition. Offices were significantly more likely to refuse to participate in the academic survey condition than in the parent condition, which was to be expected. In the next section, we show that refusal to participate is independent of pre-treatment covariates and that covariate balance exists between the two conditions when limited to the pediatricians who partially or fully completed the survey.

	Academic Survey	Parent
Bad phone number	16.0	13.5
Completed	14.2	41.9
Hospital	6.8	5.9
Military base	0.5	0.3
Never reached human	25.1	22.0
Not a pediatrician	4.9	5.1
OTHER does not offer preventive child care	6.2	5.8
Partial complete	5.4	1.3
Refused to answer	19.4	2.7
Retired	1.5	1.5

Covariate Balance in Randomization

Below, we report covariate balance between the two treatments among the pediatricians who responded to the survey (complete or partial complete). We do this by first presenting the average value of each pre-treatment covariate by the two experimental conditions. The p-value column reports the p-value from the difference-in-means between these average values. In expectation, from random assignment, the covariates should be independent of treatment assignment. In addition, we regress a treatment indicator on all of the covariates. This allows us to use an F-test to test the hypothesis that all coefficients on the pre-treatment covariates are zero. We find a p-value from this F-test of 0.477, suggesting balance between

the experimental conditions on pre-treatment covariates.

	Parent	Academic	P-value of Diff.
Clinton Vote Share, County	56	55	0.42
Total Population	1,903,935	1,797,986	0.63
% African American	0.1	0.094	0.39
% with Some College or More	0.41	0.41	0.64
Median Household Income	60,640	60,652	0.99
% Under 18 Population w/o Insurance	0.015	0.015	0.33
% Under 18	0.23	0.23	0.21
% Kindergarten Fully Immunized	0.92	0.9	0.04
# of Pediatricians in County	219	210	0.71
N	606	250	NA

Covariate Balance of Experiment. Each cell reports the average value of a different covariate by treatment assignment.

Results Replication and Additional Details

When pediatricians are asked in an academic survey, 65.8% report requiring vaccinations at the recommended time (for short, we refer to this as following CDC recommendations) among those offices that provide preventive child care. On the other hand, when pediatricians are asked in the parent condition, 45.4% report that, with the exception of medial conditions, every child needs to be vaccinated. Note that despite the policies being equivalent, pediatricians are far more likely to report following CDC recommendations when asked as part of an academic survey than when asked by a purported parent. Using a t-test, we can show that this difference of 20.5 percentage points is statistically significant ($p < 0.001$).

Furthermore, we can see that pediatricians' reported policies are significantly more deferential to parents' decisions when a purported parent is calling than when part of an academic survey. Using a t-test, we can show that this difference of 11 percentage points is statistically significant ($p < 0.001$).

Below we report the full distribution of responses across the two experimental conditions.

Academic Survey Condition: What is your office's vaccine policy?

- Require full vaccination: 65.8%
- Delayed schedule: 4.6%
- Parent gets to decide: 12.1%
- Other: 7.5%
- No reply: 10%
- Total N: 240

Parent Condition: Does your office have a policy requiring everyone to be vaccinated?

- Yes (except for medical conditions): 45.4%
- Doctor recommends, but parent can decide: 23.1%
- Other: 5%
- No policy: 25.2%
- No reply: 1.3%
- Total N: 606

We can further break down these results by examining the next question that pediatricians were asked in the parent condition: "If I wanted my children to be on a delayed schedule, would that be ok?" If pediatricians were actively promoting CDC best practices that every child be fully vaccinated at the proper time, they would say "no" and inquire into why the parent wanted a delayed schedule. Instead, we found that only 17% of pediatricians explicitly said no to the delayed schedule and 10.7% asked the follow-up question to ask why the parent wanted the delayed schedule. This is in marked contrast to Q11 of the academic survey condition, where 69.2% of pediatricians replied "always" when asked "If a parent requests an alternative schedule or refuses permission for a vaccination, how frequently do you attempt to educate the parents regarding the importance/safety of the immunization?"

Below we present the full distribution of responses to these questions:

Parent Condition: If I wanted my children to be on a delayed schedule, would that be ok?

- Yes: 46%
- Soft/Implied Yes (e.g., we will work with you, you can decide): 22.1%
- No: 17%
- Not sure: 12.7%
- No reply: 2.1%
- Total N: 606

Parent Condition: Does the pediatrician ask why you don't want your child vaccinated?

- Yes: 10.7%
- No: 88%
- No reply: 1.3%
- Total N: 606

Academic Survey Condition: If a parent requests an alternative schedule or refuses permission for a vaccination, how frequently do you attempt to educate the parents regarding the importance/safety of the immunization?

- Always: 69.2%
- Sometimes: 7.9%
- Never: 0.8%
- n/a (e.g., parents don't request this): 1.2%

- Refused/No reply: 20.8%
- Total N: 240

Scripts

Hi, my name is [X] and I'm moving to the area. I'm looking for a pediatrician for my two-month old girl and was wondering if you could tell me about your policy on vaccines. I'm not sure if I want my child fully vaccinated.

[IF THEY SAY THEY ARE BUSY, ASK FOR A BETTER TIME TO CALL BACK AND CALL BACK THEN.]

[IF THEY ASK WHY YOU DON'T WANT YOUR CHILD VACCINATED, RECORD THIS, SAY FOR "HEALTH REASONS" AND MOVE ON WITH THE REST OF THE QUESTIONS.]

1. Does your office have a policy requiring everyone to be vaccinated?
 - a. YES (except for medical conditions)
 - b. NO
 - c. Other
2. [IF Other] What is that policy?
 - a. RECORD ANSWER
3. If I wanted my children to be on a delayed schedule, would that be ok?
 - a. YES
 - b. SOFT/IMPLIED YES (e.g., we will work with you, you can decide, implicit yes without actually saying yes)
 - c. NO
 - d. NOT SURE

Thanks you! Have a good day!

Responses to Common Questions:

- Currently have a two-month old girl.
- Live in Berkeley, CA.
- Will be getting insurance through work; still figuring out details.
- If they ask when are you moving: "By the end of the year."
- If they ask how you got phone numbers:
 - Parents: Found you online.
 - Researcher: From the publicly-accessible list of pediatricians maintained by the government.
- You do not need to talk to the actual doctor listed. You are asking on behalf of their practice. So the nurse/receptionist is fine to talk with.
- If asked about delayed schedule: "I would like to follow Dr. Sears's vaccination schedule of only giving two vaccines at a time."

Figure 3.1: Parent Script

Hi, my name is [X] and I am a researcher at [UNIVERSITY] and we are trying to understand how vaccination practices vary across the United States. I have just a few questions. All of your answers will remain confidential.

[DON'T PAUSE. START WITH FIRST QUESTION.]

[IF THEY SAY THEY ARE BUSY, ASK FOR A BETTER TIME TO CALL BACK AND CALL BACK THEN.]

1. Does your office provide preventive child care?
 - a. Yes
 - b. No [END] (Record as hospital, retired, military base, etc.)
2. Do you currently offer all vaccines on the national routine childhood immunization schedule to eligible age-appropriate patients in your practice?
 - a. Yes
 - b. No
 - c. Not Sure
3. Does your office currently have a policy on vaccines?
 - a. Yes
 - b. No
 - c. Not sure [Only after you push them with a follow-up.]
4. [IF YES] What is that policy?
 - a. Standard/CDC/AAP/state recommendations
 - b. Space out timing / delayed schedule
 - c. Parent gets to decide (e.g., encourage, but do not require, vaccinations, parent must sign consent form but still up to them)
5. How often, if ever, do parents **request an alternative schedule** for a vaccination?
 - a. Never
 - b. Almost never
 - c. Occasionally
 - d. Sometimes
 - e. Most of the time
 - f. Always
6. [IF NOT NEVER] If a parent **requests an alternative schedule** for a vaccination, do you **ever** tell them you will no longer be their child's doctor?
 - a. Yes
 - b. No
 - c. n/a - Parents don't request this
7. [IF YES] How frequently do you tell parents you will no longer be their doctor when a parent **requests an alternative schedule**?
 - a. Always
 - b. Sometimes
 - c. Never

Figure 3.2: Academic Survey Script

- d. REFUSED
 - e. n/a - Parents don't request this
8. How often, if ever, do parents **refuses permission** for a vaccination?
- a. Never
 - b. Almost never
 - c. Occasionally
 - d. Sometimes
 - e. Most of the time
 - f. Always
9. [IF NOT NEVER] If a parent **refuses permission** for a vaccination, do you **ever** tell them you will no longer be their child's doctor?
- a. Yes
 - b. No
 - c. n/a - Parents don't request this
10. [IF YES] How frequently do you tell parents you will no longer be their doctor when a parent **refuses permission**?
- a. Always
 - b. Sometimes
 - c. Never
 - d. REFUSED
 - e. n/a - Parents don't request this
11. If a parent requests an alternative schedule or refuses permission for a vaccination, how frequently do you attempt to educate the parents regarding the importance/safety of the immunization?
- a. Always
 - b. Sometimes
 - c. Never
 - d. n/a - Parents don't request this
12. Finally, approximately how many active patients are there in your practice? [ENTER NUMBER]
- a. [IF UNSURE] Approximately how many patients does your practice see on an average day? [ENTER NUMBER]

Thank you! Have a good day.

Bibliography

- Ahler, Douglas and David E Broockman (2017). “The Delegate Paradox: Why Polarized Politicians Can Represent Citizens Best”. In: *Journal of Politics*.
- Ansolabehere, Stephen and Philip Edward Jones (2010). “Constituents’ Responses to Congressional Roll-Call Voting”. In: *American Journal of Political Science* 54.3, pp. 583–597.
- Ansolabehere, Stephen and Brian F. Schaffner (2017). *CCES Common Content, 2016*. Tech. rep. Harvard Dataverse.
- Ansolabehere, Stephen, James M Snyder Jr, and Charles Stewart III (2001). “Candidate positioning in US House elections”. In: *American Journal of Political Science*, pp. 136–159.
- Armour, Brian S et al. (2001). “The effect of explicit financial incentives on physician behavior”. In: *Archives of internal medicine* 161.10, pp. 1261–1266.
- Bauch, Chris T, Alison P Galvani, and David JD Earn (2003). “Group interest versus self-interest in smallpox vaccination policy”. In: *Proceedings of the National Academy of Sciences* 100.18, pp. 10564–10567.
- Bendor, Jonathan and John G Bullock (2008). “Lethal incompetence: Voters, officials, and systems”. In: *Critical Review* 20.1-2, pp. 1–23.
- Bergan, Daniel E (2009). “Does grassroots lobbying work? A field experiment measuring the effects of an e-mail lobbying campaign on legislative behavior”. In: *American politics research* 37.2, pp. 327–352.
- Bergan, Daniel E and Richard T Cole (2015). “Call Your Legislator: a field experimental study of the impact of a constituency mobilization campaign on legislative voting”. In: *Political Behavior* 37.1, pp. 27–42.
- Broockman, David E, Nicholas Carnes, et al. (2017). *Having Their Cake and Eating It, Too: (Why) Local Party Leaders Prefer Nominating Extreme Candidates*. Tech. rep. Working paper, Stanford University.
- Broockman, David E, Joshua L Kalla, and Jasjeet S Sekhon (2017). “The design of field experiments with survey outcomes: A framework for selecting more efficient, robust, and ethical designs”. In: *Political Analysis* 25.4, pp. 435–464.
- Broockman, David E and Christopher Skovron (2018). “Bias in Perceptions of Public Opinion among Political Elites”. In: *American Political Science Review*, pp. 1–22.

- Bullock, John G et al. (2015). "Partisan Bias in Factual Beliefs about Politics". In: *Quarterly Journal of Political Science* 10.4, pp. 519–578.
- Butler, Daniel M and David E Broockman (2011). "Do politicians racially discriminate against constituents? A field experiment on state legislators". In: *American Journal of Political Science* 55.3, pp. 463–477.
- Butler, Daniel M and David W Nickerson (2011). "Can learning constituency opinion affect how legislators vote? Results from a field experiment". In: *Quarterly Journal of Political Science* 6.1, pp. 55–83.
- Butler, Daniel M and Jessica Robinson Preece (2016). "Recruitment and perceptions of gender bias in party leader support". In: *Political Research Quarterly* 69.4, pp. 842–851.
- Canes-Wrone, Brandice, David W Brady, and John F Cogan (2002). "Out of step, out of office: Electoral accountability and House members' voting". In: *American Political Science Review* 96.1, pp. 127–140.
- Carroll, Susan J and Kira Sanbonmatsu (2012). "Entering the Mayor's Office: Women's Decisions to Run for Municipal Positions". In: *Women and Executive Office: Pathways and Performance*. Boulder, CO: Rienner.
- (2013). *More women can run: Gender and pathways to the state legislatures*. Oxford University Press.
- Centers for Disease Control & Prevention (2012). *Talking with Parents about Vaccines for Infants*. Tech. rep. <https://www.cdc.gov/vaccines/hcp/conversations/downloads/talk-infants-color-office.pdf>: Centers for Disease Control and Prevention.
- (2013). *The childhood immunization schedule*. Tech. rep. <https://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-child-immun-color-office.pdf>: Centers for Disease Control and Prevention.
- Coppock, Alexander (2014). "Information spillovers: Another look at experimental estimates of legislator responsiveness". In: *Journal of Experimental Political Science* 1.2, pp. 159–169.
- Dorell, Christina, David Yankey, and Sheryl Strasser (2011). "Parent-reported reasons for nonreceipt of recommended adolescent vaccinations, National Immunization Survey—Teen, 2009". In: *Clinical pediatrics* 50.12, pp. 1116–1124.
- Dube, Eve et al. (2013). "Vaccine hesitancy: an overview". In: *Human vaccines & immunotherapeutics* 9.8, pp. 1763–1773.
- Edwards, Kathryn M et al. (2016). "Countering vaccine hesitancy". In: *Pediatrics*, e20162146.
- Fowler, Linda L and Robert D McClure (1990). *Political ambition: Who decides to run for Congress*. Yale University Press.
- Fox, Richard L and Jennifer L Lawless (2004). "Entering the arena? Gender and the decision to run for office". In: *American Journal of Political Science* 48.2, pp. 264–280.
- (2014). "Uncovering the origins of the gender gap in political ambition". In: *American Political Science Review* 108.3, pp. 499–519.
- Gelman, Andrew and Thomas C Little (1997). "Poststratification into many categories using hierarchical logistic regression". In: *Survey Methodology* 23.2, pp. 127–135.

- Gerber, Alan S et al. (2014). “Doctor knows best: physician endorsements, public opinion, and the politics of comparative effectiveness research”. In: *Journal of health politics, policy and law* 39.1, pp. 171–208.
- Gerber, Alan and Donald Green (1999). “Misperceptions about perceptual bias”. In: *Annual review of political science* 2.1, pp. 189–210.
- Gilens, Martin (2012). *Affluence and influence: Economic inequality and political power in America*. Princeton University Press.
- Green, Donald P, Anna Wilke, and Jasper Cooper (2017). *Reducing Intimate Partner Violence through Informal Social Control: A mass media experiment in rural Uganda*. Tech. rep. Working paper, Columbia University.
- Griffin, John D (2006). “Electoral competition and democratic responsiveness: A defense of the marginality hypothesis”. In: *Journal of Politics* 68.4, pp. 911–921.
- Hanretty, Chris, Benjamin E Lauderdale, and Nick Vivyan (2016). “Comparing strategies for estimating constituency opinion from national survey samples”. In: *Political Science Research and Methods*, pp. 1–21.
- Hersh, Eitan D and Matthew N Goldenberg (2016). “Democratic and Republican physicians provide different care on politicized health issues”. In: *Proceedings of the National Academy of Sciences* 113.42, pp. 11811–11816.
- Hertel-Fernandez, Alex, Matto Mildemberger, and Leah Stokes (2017). “Legislative staff and Representation in Congress”. Working Paper.
- Higgins, Michael J, Fredrik Savje, and Jasjeet S Sekhon (2016). “Improving massive experiments with threshold blocking”. In: *Proceedings of the National Academy of Sciences* 113.27, pp. 7369–7376.
- Holman, Mirya R and Monica C Schneider (2018). “Gender, race, and political ambition: how intersectionality and frames influence interest in political office”. In: *Politics, Groups, and Identities* 6.2, pp. 264–280.
- Hopkins, Daniel (2018). *The Increasingly United States*. University of Chicago Press.
- Horne, Zachary et al. (2015). “Countering antivaccination attitudes”. In: *Proceedings of the National Academy of Sciences* 112.33, pp. 10321–10324.
- Hornsey, MJ, EA Harris, and KS Fielding (2018). “The psychological roots of anti-vaccination attitudes: A 24-nation investigation”. In: *Health psychology* 37.4, pp. 307–315.
- Hough-Telford, Catherine et al. (2016). “Vaccine delays, refusals, and patient dismissals: a survey of pediatricians”. In: *Pediatrics*, e20162127.
- Kahn, Jessica A et al. (2005). “Pediatricians’ intention to administer human papillomavirus vaccine: the role of practice characteristics, knowledge, and attitudes”. In: *Journal of Adolescent Health* 37.6, pp. 502–510.
- Kalla, Joshua, Frances Rosenbluth, and Dawn Langan Teele (2018). “Are You My Mentor? A Field Experiment on Gender, Ethnicity, and Political Self-Starters”. In: *The Journal of Politics* 80.1, pp. 337–341.
- Kempe, Allison et al. (2015). “Physician response to parental requests to spread out the recommended vaccine schedule”. In: *Pediatrics*, peds–2014.

- Kim, Jeongeun and Sukwha Kim (2009). "Physicians' perception of the effects of internet health information on the doctor–patient relationship". In: *Informatics for Health and Social Care* 34.3, pp. 136–148.
- Kingdon, John W (1973). *Congressmen's voting decisions*. University of Michigan Press.
- Kitch, Edmund, Geoffrey Evans, and Robyn Gopin (1999). "U.S. Law". In: *Vaccines*. Ed. by Stanley A. Plotkin and Walter Orenstein. Philadelphia, PA: W.B. Saunders Company. Chap. 50, p. 1165.
- Kuklinski, James H.; Paul J. Quirk; Jennifer Jerit; David Schwieder; Robert F. Rich (2000). "The elusive backfire effect: Mass attitudes' steadfast factual adherence". In: *Journal of Politics* 62.3, pp. 790–816.
- Larson, Heidi J et al. (2014). "Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: a systematic review of published literature 2007–2012". In: *Vaccine* 32.19, pp. 2150–2159.
- Lawless, Jennifer L and Richard L Fox (2013). "Girls just wanna not run: The gender gap in young Americans' political ambition". In: *Women & Politics Institute*.
- Lax, Jeffrey R and Justin H Phillips (2009a). "Gay rights in the states: Public opinion and policy responsiveness". In: *American Political Science Review* 103.3, pp. 367–386.
- (2009b). "How should we estimate public opinion in the states?" In: *American Journal of Political Science* 53.1, pp. 107–121.
- Lewandowsky, Stephan et al. (2012). "Misinformation and its correction: Continued influence and successful debiasing". In: *Psychological Science in the Public Interest* 13.3, pp. 106–131.
- Lipsky, Michael (2010). *Street-level bureaucracy: Dilemmas of the Individual in Public Service*. Russell Sage Foundation.
- London, Bonita et al. (2012). "Gender-based rejection sensitivity and academic self-silencing in women." In: *Journal of Personality and Social Psychology* 102.5, p. 961.
- Majumder, Maimuna S et al. (2015). "Substandard vaccination compliance and the 2015 measles outbreak". In: *JAMA pediatrics* 169.5, pp. 494–495.
- Mansbridge, Jane (2003). "Rethinking representation". In: *American political science review* 97.4, pp. 515–528.
- Martin, Michael and Vahe Badalyan (2012). "Vaccination practices among physicians and their children". In: *Open Journal of Pediatrics* 2.03, p. 228.
- May, Robert (2000). "Simple rules with complex dynamics". In: *Science* 287.5453, pp. 601–602.
- Mayhew, David R (1974). *Congress: The electoral connection*. Yale University Press.
- Miler, Kristina C (2010). *Constituency representation in Congress: the view from Capitol Hill*. Cambridge University Press.
- Milkman, Katherine L, Modupe Akinola, and Dolly Chugh (2015). "What happens before? A field experiment exploring how pay and representation differentially shape bias on the pathway into organizations." In: *Journal of Applied Psychology* 100.6, p. 1678.
- Miller, Wakken E and Donald E Stokes (1963). "Constituency influence in Congress". In: *American political science review* 57.1, pp. 45–56.

- Motta, Matthew, Timothy Callaghan, and Steven Sylvester (2018). “Knowing less but presuming more: Dunning-Kruger effects and the endorsement of anti-vaccine policy attitudes”. In: *Social Science & Medicine* 211, pp. 274–281.
- Murray, Elizabeth et al. (2003). “The impact of health information on the Internet on health care and the physician-patient relationship: national US survey among 1,050 US physicians”. In: *Journal of medical Internet research* 5.3.
- Nabet, B et al. (2017). *Addressing vaccine hesitancy to protect children and communities against preventable diseases*. Tech. rep. [http://policylab.chop.edu/sites/default/files/pdf/publications/PolicyLab Evidence to Action Brief at Children’s Hospital of Philadelphia](http://policylab.chop.edu/sites/default/files/pdf/publications/PolicyLab%20Evidence%20to%20Action%20Brief%20at%20Children's%20Hospital%20of%20Philadelphia.pdf).
- Nickerson, David W (2005). “Scalable protocols offer efficient design for field experiments”. In: *Political Analysis* 13.3, pp. 233–252.
- Nyhan, Brendan and Jason Reifler (2015a). “Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information”. In: *Vaccine* 33.3, pp. 459–464.
- (2015b). “The effect of fact-checking on elites: A field experiment on US state legislators”. In: *American Journal of Political Science* 59.3, pp. 628–640.
- Nyhan, Brendan, Jason Reifler, et al. (2014). “Effective messages in vaccine promotion: a randomized trial”. In: *Pediatrics* 133.4, e835–e842.
- Opel, Douglas J et al. (2013). “The architecture of provider-parent vaccine discussions at health supervision visits”. In: *Pediatrics*, pp. 1–10.
- Ozawa, Sachiko et al. (2016). “Modeling the economic burden of adult vaccine-preventable diseases in the United States”. In: *Health Affairs* 35.11, pp. 2124–2132.
- Page, Benjamin I and Robert Y Shapiro (1992). *The rational public: Fifty years of trends in Americans’ policy preferences*. University of Chicago Press.
- Park, David K, Andrew Gelman, and Joseph Bafumi (2004). “Bayesian multilevel estimation with poststratification: state-level estimates from national polls”. In: *Political Analysis* 12.4, pp. 375–385.
- Phadke, Varun K et al. (2016). “Association between vaccine refusal and vaccine-preventable diseases in the United States: a review of measles and pertussis”. In: *Jama* 315.11, pp. 1149–1158.
- Pluviano, Sara, Caroline Watt, and Sergio Della Sala (2017). “Misinformation lingers in memory: Failure of three pro-vaccination strategies”. In: *PloS one* 12.7.
- Preece, Jessica Robinson and Olga Bogach Stoddard (2015). “Does the message matter? A field experiment on political party recruitment”. In: *Journal of Experimental Political Science* 2.1, pp. 26–35.
- Prior, Markus and Arthur Lupia (2008). “Money, time, and political knowledge: Distinguishing quick recall and political learning skills”. In: *American Journal of Political Science* 52.1, pp. 169–183.
- Prior, Markus, Gaurav Sood, Kabir Khanna, et al. (2015). “You cannot be serious: The impact of accuracy incentives on partisan bias in reports of economic perceptions”. In: *Quarterly Journal of Political Science* 10.4, pp. 489–518.

- Reavis, RD et al. (2017). “A self-affirmation exercise does not improve intentions to vaccinate among parents with negative vaccine attitudes (and may decrease intentions to vaccinate).” In: *PloS one* 12.7, e0181368.
- Reja, Ursa et al. (2003). “Open-ended vs. close-ended questions in web questionnaires”. In: *Developments in applied statistics* 19.1, pp. 160–117.
- Salmon, Daniel A et al. (2015). “Vaccine hesitancy: causes, consequences, and a call to action”. In: *Vaccine* 33, pp. D66–D71.
- Sanbonmatsu, Kira and Kathleen Dolan (2009). “Do gender stereotypes transcend party?” In: *Political Research Quarterly* 62.3, pp. 485–494.
- Schuman, Howard, Jacob Ludwig, and Jon A Krosnick (1986). “The perceived threat of nuclear war, salience, and open questions”. In: *Public Opinion Quarterly* 50.4, pp. 519–536.
- Schwartz, Jason L and Adel Mahmoud (2014). “A half-century of prevention: The Advisory Committee on Immunization Practices”. In: *New England Journal of Medicine* 371.21, pp. 1953–1956.
- Seither, Raneet et al. (2017). “Vaccination Coverage for Selected Vaccines, Exemption Rates, and Provisional Enrollment Among Children in Kindergarten–United States, 2016–17 School Year”. In: *MMWR. Morbidity and mortality weekly report* 66.40, p. 1073.
- Shen, Angela K et al. (2014). “How might immunization rates change if cost sharing is eliminated?” In: *Public Health Reports* 129.1, pp. 39–46.
- Shor, Boris and Nolan McCarty (2012). “The Ideological Mapping of American Legislatures”. In: *American Political Science Review*.
- Smith, Jean Clare, Alan R Hinman, and Larry K Pickering (2014). “History and evolution of the advisory committee on immunization practices—United States 1964–2014”. In: *MMWR. Morbidity and Mortality Weekly Report* 63.42, pp. 955–958.
- Smith, Philip J, Sharon G Humiston, et al. (2011). “Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the Health Belief Model”. In: *Public health reports* 126.2.suppl, pp. 135–146.
- Smith, Philip J, Allison M Kennedy, et al. (2006). “Association between health care providers’ influence on parents who have concerns about vaccine safety and vaccination coverage”. In: *Pediatrics* 118.5, e1287–e1292.
- Strolovitch, Dara Z (2006). “Do interest groups represent the disadvantaged? Advocacy at the intersections of race, class, and gender”. In: *The Journal of Politics* 68.4, pp. 894–910.
- Teele, Dawn (2014). “Reflections on the Ethics of Field Experiment”. In: *Field Experiments and Their Critics: Essays on the Uses and Abuses of Experiments in the Social Sciences*. Yale University Press.
- Teele, Dawn Langan, Joshua Kalla, and Frances Rosenbluth (2018). “The Ties that Double Bind: Social Roles and Women’s Underrepresentation in Politics”. In: *American Political Science Review*, pp. 1–17.
- Walton, L Reed, Walter A Orenstein, and Larry K Pickering (2015). “The history of the United States Advisory Committee on Immunization Practices (ACIP)”. In: *Vaccine* 33.3, pp. 405–414.

- Warshaw, Christopher and Jonathan Rodden (2012). “How should we measure district-level public opinion on individual issues?” In: *The Journal of Politics* 74.1, pp. 203–219.
- White, Ariel R, Noah L Nathan, and Julie K Faller (2015). “What do I need to vote? Bureaucratic discretion and discrimination by local election officials”. In: *American Political Science Review* 109.1, pp. 129–142.
- Wood, Thomas and Ethan Porter (2017). “The elusive backfire effect: Mass attitudes’ steadfast factual adherence”. In: *Political Behavior*.
- Zhou, Fangjun et al. (2014). “Economic evaluation of the routine childhood immunization program in the United States, 2009”. In: *Pediatrics* 133.4, pp. 577–585.