Incentivizing COVID-19 Vaccination in a Polarized and Partisan United States

Carlos Algara
Claremont Graduate University

Daniel J. Simmons
Saint Michael's College

Abstract

Context: As COVID-19 vaccines were rolled out in early 2021, governments at all levels in the United States experienced significant difficulty in consistently and efficiently administering injections in the face of vaccination resistance among a public increasingly politically polarized on vaccination preferences before the beginning of mass vaccinations.

Methods: Using an original conjoint experiment fielded to a nationally representative sample before the mass proliferation of COVID-19 vaccines, the authors examined how different incentives (e.g., employer mandates, state-organized or health care provider–organized vaccination clinics, and financial incentives) affect the public's preference to get vaccinated. They also tested how financial incentive preferences correlated with self-reported vaccination intention using observational data from the June 2021 Kaiser Family Foundation Health Tracking Poll.

Findings: The authors found financial incentives positively influenced vaccine preferences among the mass public and all partisan groups, including Republicans who were initially "unlikely" to be vaccinated. The authors used the observational data to replicate their experimental findings, showing positive financial incentive attitudes positively correlated with self-reported vaccination disclosures.

Conclusions: These results provide support for direct financial incentives, rather than other incentives, as being a valuable tool for policy makers tasked with alleviating vaccination resistance among a US mass public increasingly polarized along partisan lines.

Keywords public health, public policy, public opinion, COVID-19, partisan politics

> *Vaccines are the most effective strategy at stopping the spread of COVID-19 and preventing serious illness. I urge all Ohio employers to encourage their employees to get vaccinated, whether that's through financial incentives, paid leave programs, or other incentives.*
> —Ohio Republican Governor Mike DeWine (ODAS 2021)

Journal of Health Politics, Policy and Law, Vol. 48, No. 5, October 2023
DOI 10.1215/03616878-10637717

> *It's kind of a shame to think that we have to do something to incentivize someone to get vaccinated to be able to save their lives or their families or friends or whoever it may be. It's a shame we have to go to that, but we'll do anything and everything to get people across the finish line.*
> —West Virginia Republican Governor Jim Justice (Adams 2021)

Since the start of the COVID-19 pandemic in early 2020, partisan polarization of attitudes toward public health policies and officials has been a recurring obstacle to mitigating the virus's impact. Republican elites have not only repeatedly downplayed the severity of the crisis but also have often directly contradicted public health officials in discussing the efficacy of mitigation policies. Some have gone so far as to use their governing authority to prevent local officials from following public health guidance. Not surprisingly, some Republicans in the mass public have followed the lead of the most vocal Republican elites in protesting and resisting compliance with policies designed to curtail the spread of COVID-19.

The creation of such a polarized partisan environment surrounding all things associated with COVID-19 has also shaped attitudes about the best tool available to end the pandemic: vaccines. Republicans in the mass public have repeatedly self-reported they are less likely to get vaccinated than Democrats or independents, leading to a partisan gap in vaccination coverage and fueling a surge of Delta-variant COVID-19 cases and deaths in the latter half of 2021. The persistence of the polarization is all the more remarkable because Republican elites, in contrast to their earlier messaging about virus mitigation policies, have generally been supportive of vaccines and have recommended using them to quell the pandemic. Despite the generally unified messaging coming from Republican elites regarding vaccination, Republican partisans in the mass public continue to resist vaccination. If the messaging of in-group elites cannot alter the attitudes and behaviors of their copartisans, what can?

We argue when rhetorical persuasion fails, incentives will succeed in reducing the negative effects of partisan polarization. We conducted a conjoint experimental study to test how effective various incentives are at breaking through the polarized division and persuading the vaccine-hesitant and vaccine-resistant to get vaccinated. We examined three different types of incentives, each of which was suggested and implemented throughout the United States in the summer and fall of 2021. The first is a financial incentive, wherein individuals are paid, either in direct cash or through a gift card, upon getting vaccinated. A second incentive emphasizes accessibility. This type of incentive focuses on making vaccination

convenient, thus minimizing the costs to any individual seeking vaccination. A third incentive takes the form of a stick rather than a carrot. Mandates, such as those imposed by an employer, require individuals to get vaccinated in order to participate in some aspect of society.

Our results demonstrate polarization around vaccination is not implacable. Incentives can provide the nudge necessary to persuade some individuals to get vaccinated who, absent the incentive, would otherwise be unlikely to do so. Financial incentives, in particular, are the most effective at accomplishing this goal. More specifically, direct cash transfers of as little as $20 not only increase the likelihood of vaccination but also are the only incentive we examined that significantly increased likelihood among vaccine-hesitant or vaccine-resistant Republicans. Our research provides important findings for those seeking to depolarize American attitudes in public health and more broadly. Sometimes talk is insufficient to change hearts and minds. In such a scenario, an incentive to prime the pump may be all that is needed to motivate meaningful change in attitudes and, perhaps, behaviors.

A Polarized Pandemic

Multiple studies have confirmed Democrats are more likely than Republicans to engage in pandemic mitigation behaviors such as mask wearing, social distancing, and reducing discretionary travel (Allcott et al. 2020; Bisbee and Lee 2022; Clinton et al. 2021; Druckman et al. 2021; Gadarian, Goodman, and Pepinsky 2021b; Jiang et al. 2020; Kerr, Panagopoulos, and van der Linden 2021). Democrats and Republicans are also polarized in their attitudes toward the pandemic and the policies implemented to mitigate it. In contrast to Republicans, Democrats are more critical of a government response viewed as insufficient to combat the pandemic, express greater support for mitigation policies, and are more likely to view the pandemic as a threat to their personal well-being (Druckman et al. 2021; Jiang et al. 2020; Kerr, Panagopoulos, and van der Linden 2021). Polarization of attitudes and behaviors related to the pandemic has not been unique to the mass public. Elite responses have also been polarized, particularly in how state governors and elected officials choose to implement or reject statewide mitigation policies (Adolph et al. 2021; Fowler, Kettler, and Witt 2021).

Increased polarization within the mass public on political issues is nothing new. Scholars have repeatedly noted that both political elites and the mass public are more polarized today (Abramowitz and Saunders 2008; Fiorina

and Abrams 2008; Hetherington 2001; Hetherington and Rudolph 2015; Nicholson 2012; Poole 1984). Notably, Barber and Pope (2019) show polarization is not simply a result of ideological sorting; rather, it is an indication of intense partisan loyalty. Thus, when parties stake out positions on issues, the trend in a more polarized America is for partisans within the mass public to follow. As Republican and Democratic political elites staked out different positions with respect to pandemic mitigation policies, it is regrettable, although not surprising, that the mass public became polarized in their own views on how to address the COVID-19 crisis.

What is notably different about this situation is a pandemic is not an obviously political issue. Viral mutations and outbreaks are not inherently the result of political decisions; indeed, such evolutionary changes occur regardless of which political party leads the US federal government. Scholars have previously found that growing polarization, both in the mass public and among political elites, affects issues that are not inherently political (Alford et al. 2011; Baum 2011; Huber and Malhotra 2017; Iyengar, Sood, and Lelkes 2012). Additionally, as affective polarization has increased and partisans view the out-group party with greater animosity, events that occur while one party is in power are increasingly likely to become polarized (Abramowitz and Webster 2018; Hetherington and Rudolph 2015; Webster 2020).

In the early months of the pandemic, for example, Democrats and Republicans responded to the pandemic differently based on the position of Republican President Donald Trump. Democrats were more critical and less trusting of government in those early months, in part because of their antipathy toward the Republican president (Kerr, Panagopoulos, and van der Linden 2021). Republicans, initially resistant to any mitigation policies, made a short-lived change in their behavior once President Trump made statements highlighting the risks posed by COVID-19 (Bisbee and Lee 2022). Throughout the pandemic, partisans in the mass public have continually been presented with polarized narratives from elites regarding how to interpret everything from mitigation policies and vaccinations to the operating decisions of private businesses (Haselswerdt and Gollust 2023; Gollust, Nagler, and Fowler 2020; Walter, Ophir, and Jamieson 2020). Even voting decisions in the 2020 presidential race were made based in part on polarized interpretations of the pandemic's economic impact (Algara et al. 2022).

Public health crises in the recent past have demonstrated signs of the polarization that was fully manifest during the COVID-19 pandemic. During the Zika virus outbreak in 2015–2016, the Republican-controlled

Congress delayed acting on Democratic President Barack Obama's request for funds to help prepare the public health infrastructure to mitigate the spread of the mosquito-borne virus (Greer and Singer 2017). Polarized political responses and actions were also seen during the H1N1 swine flu epidemic in 2009 (Baum 2011), childhood vaccination programs since the erroneous publication of a link between vaccinations and autism (Estep et al. 2022; Schmidt et al. 2018), and debates over the administration of the HPV vaccination (Abiola, Colgrove, and Mello 2013).

Countering this polarization has been an acute priority for public health researchers and Democratic leadership. Failure to do so, they caution, could undermine collective efforts to curtail the pandemic's impact on society. Scholars have examined how polarization can be reduced, both generally and specifically with respect to COVID-19 policies. The good news is research has consistently shown there are limits to political polarization. The bad news is the research does not clearly show whether these limits would necessarily work in favor of increased adherence to and support of public health policies.

First the good news: political polarization is not an absolute. Partisans can be persuaded to abandon the party line. Boudreau and Mackenzie (2014) find Americans who are given a compelling reason to support a position counter to their party's stated preference will abandon the party's position. Kam (2005) demonstrates greater political awareness can lead the public to engage in more systematic processing, thus decreasing reliance on heuristics like partisan cues. If the public is more aware and informed about a relevant issue, they are less likely to simply adopt and support their party's views. A core finding of the literature on increased polarization in the mass public is this trend is often accompanied by a significant decline in the public's trust in government (Hetherington and Rudolph 2015). If trust in government could be increased, that may also decrease polarization.

Two recent studies also highlight limits to polarization. Mummolo, Peterson, and Westwood (2021) show a commitment to partisan allegiance tolerates only so much disagreement. If a voter and a copartisan candidate hold different preferences on four or more salient issues, the voter is unlikely to support the candidate, even as an act of partisan loyalty. Finally, Jensen and colleagues (2021) find voters who are polarized on national issues still share similar preferences on local issues. If a crisis, such as the COVID-19 pandemic, is presented as a local issue, perhaps more cooperation in adopting local mitigation policies could succeed.

Can these limits to polarization inform public health advocates in making policies that will avoid the polarized battlefield? Unfortunately, the

evidence is rather mixed. Baumgaertner, Carlisle, and Justwan (2018) found while lower levels of trust in government did lead to less support of vaccinations for flu, pertussis, and measles, political ideology mediated the effect. In short, conservative respondents were more likely than liberal respondents to express less trust in government and thus were also less likely to support vaccinations (Baumgaertner, Carlisle, and Justwan 2018). Simply increasing trust in government, assuming that was a simple endeavor to undertake, is a polarized initiative. Trust itself is a polarized position, and any attempts to improve trust would by necessity need to overcome polarization simultaneously.

Perhaps the solution is to get partisan elites to take the first step at depolarizing. If leaders demonstrate unity with respect to public health policy, partisans in the mass public may also depolarize their own attitudes toward such policies. One reason to doubt the likelihood of such an outcome is the increased bellicosity of the rhetoric political elites use against their opponents of the opposite party. If political elites are hostile to the other side, will their voters accept a message of unity? Westwood, Peterson, and Lelkes (2019) show such a possibility exists, as the public was no more polarized after the bruising 2016 presidential election than they were at the time of the 2014 midterm election. If polarization was not magnified by such a vitriolic campaign, perhaps elite unity on public health messaging could still break through the polarized divide.

Unfortunately, the damage may already be too great for elite messaging to fix. Using an experiment at the start of the pandemic in the United States, Gadarian, Goodman, and Pepinsky (2021a) found no statistically significant evidence that partisan endorsements or messaging from President Trump could alter public attitudes on a range of public health policies and suggested mitigation behaviors. As the public was initially presented with polarized views regarding the pandemic, including President Trump's initial rhetoric downplaying the threat posed by COVID-19, any subsequent attempts by copartisan elites to depolarize the public appear unlikely to succeed.

If the source of the message cannot significantly depolarize attitudes toward public health, maybe the content of the message can. Motta and colleagues (2021) tested multiple messages aimed at increasing COVID-19 vaccination intention, with two messages—those that highlighted personal or collective health risks and consequences—succeeding. If the risks of refusing vaccination are highlighted, the public is more likely to say they will choose to get vaccinated. Yet here, too, the research is not definitive. Simas, Clifford, and Kirkland (2020) show dispositional empathic concern—the trait that would likely be associated with those who

respond to a message highlighting collective risks from low vaccination rates—is associated with higher levels of affective polarization. In short, the empathetic are also among some of the most polarized individuals in the mass public. Messages highlighting collective risk may persuade them, or it may lead to a hardening of polarized attitudes, as seen in recent news articles questioning whether to ration health care for the intentionally unvaccinated.[1]

Providing financial incentives has been a common tool for encouraging public health practices, especially vaccination (Higgins, Klemperer, and Coleman 2021; Klüver et al. 2021; Taber et al. 2021). Indeed, many state officials have recently organized financial incentives to encourage vaccination, most notably in the form of lotteries wherein getting a COVID-19 vaccine qualifies a person to receive a potential financial reward as large as $1 million. Initial research has shown mixed evidence on the effect of financial incentives on COVID-19 vaccination rates, at least in part as a result of insufficient data from state and national sources (Duch et al. 2021; Walkey, Law, and Bosch 2021). Importantly, many studies also do not distinguish between incentives like a lottery, where few people will actually receive the incentive, and direct payments in the form of cash or vouchers. The latter incentive is generally receivable immediately upon getting vaccinated and is universally provided, potentially making it a more attractive option than a lottery. Notably, Fuller and colleagues (2022) comprehensive evaluation of state lottery programs found they were highly effective at encouraging initial vaccination but had no impact on the likelihood of completing the two-shot series or getting a booster shot. Regardless of the form they take, financial incentives have been a useful tool for public health policy makers in the past, and they may hold the key to overcoming partisan polarization with respect to COVID-19 vaccination in the present.

Hypotheses

At a time when political polarization has sharply divided partisans with respect to getting a COVID-19 vaccine, we argue incentivizing vaccination will succeed in overcoming this polarized division. Not all incentives, however, are equally likely to nudge individuals toward the desired prosocial behavior. Some incentives emphasize what individuals can gain by getting vaccinated, while other incentives emphasize what individuals will lose by rejecting vaccination. We argue incentives emphasizing gains will

1. See Wikler 2021.

be more likely to encourage vaccination than incentives emphasizing losses, particularly among the vaccine-hesitant and vaccine-resistant.

Throughout 2021, US policy makers focused on providing three different types of incentives. First, financial incentives were offered in many states to encourage COVID-19 vaccination. The financial incentives were provided in many forms, including million-dollar lotteries, savings bonds, gift cards, and direct transfers through prepaid debit cards. The primary goal of financial incentives is to persuade individuals to get vaccinated in order to also receive a financial benefit, or an opportunity to receive one. Second, incentives were offered to increase accessibility to vaccination. Some examples include offering vaccines without a required appointment, vaccinating patrons and fans at shopping centers or sports stadiums, respectively, or organizing officewide vaccination clinics. The objective of these incentives is to make vaccination convenient, thus eliminating any potential loss of time or resources for an individual otherwise willing to be vaccinated. The third incentive is in the form of a mandate. Some employers and businesses mandated proof of vaccination for employees to remain employed or for patrons to enter the business; others offered an alternative of a strict testing regimen in lieu of vaccination. This incentive seeks to encourage vaccination by restricting access to locations to the vaccinated. Thus, financial incentives emphasize gains; accessibility incentives act as a hybrid that emphasizes gains achieved as well as losses avoided; and mandate incentives emphasize losses.

We expect all three of these incentives will encourage individuals to get vaccinated against COVID-19; however, we expect some incentives to be more successful in encouragement than others. Because financial incentives emphasize additional gains for individuals in excess of vaccination, we expect these to be more likely to encourage vaccination than other incentives.

* $\boldsymbol{H}_1$: Financial incentives will be more likely than accessibility or mandate incentives to encourage COVID-19 vaccination among the general public.

Accessibility incentives provide easier access to vaccination, but they do not directly highlight an additional gain for an individual who chooses to get vaccinated. While such a person will not lose as much time or resources by getting vaccinated in this scenario, they also will not gain anything other than vaccination. Thus, we expect accessibility incentives to have a modest impact on encouraging vaccination, with the effect primarily concentrated among those who desire to be vaccinated.

* $\boldsymbol{H}_2$: Accessibility incentives will encourage COVID-19 vaccination, but mostly only among those who already favor vaccination.

Mandate incentives emphasize what a person stands to lose by refusing vaccination. These losses are not simply risks to personal or collective health but also loss of access to employment or leisure activities, and potentially to travel. Because mandate incentives highlight the additional costs of remaining unvaccinated, we expect they will especially encourage those who are unlikely to vaccinate to change their minds. Whereas financial incentives promote vaccination across the board, mandate incentives are specifically targeted toward those who would otherwise choose to reject vaccination. It is the potential for experiencing losses because of that refusal to vaccinate that will motivate this particular group.

* $\boldsymbol{H}_3$: Mandate incentives will be more likely than financial or accessibility incentives to encourage COVID-19 vaccination at higher rates among those who are otherwise unlikely to vaccinate.

Finally, as the push for vaccination is occurring in a politically polarized environment, we expect these incentives will affect people differently based on their partisanship. We expect financial and mandate incentives will be most effective at encouraging Republicans and independents, the two groups who are less likely to support vaccination. These two incentives promote either additional gains or additional losses conditioned on whether or not one is vaccinated. Thus, we expect one or the other type of mandate will be persuasive to individuals who are not intrinsically inclined to be vaccinated. Democrats, in contrast, will be more responsive to accessibility incentives because they are already more likely to support vaccination; they are simply looking for an easier way to do what they were inclined to do.

* $\boldsymbol{H}_4$: Republicans and independents will be more likely to get vaccinated if presented with a financial or mandate incentive, while Democrats will be more likely to get vaccinated if presented with an accessibility incentive.

Experimental Design and Methods

We specified a conjoint experimental framework to assess how incentives affect COVID-19 vaccination likelihood, especially among polarized partisans.[2] Employing a conjoint experimental framework offers several

2. This experiment was reviewed and approved by the institutional review board of the funding institution.

advantages over factorial experimental designs. First, conjoint experiments allow for the varying of all potential treatments simultaneously. For example, this design can allow for the random varying of key vaccine attributes that may influence vaccination intention, such as the number of doses (Motta 2021), potential brand bias (i.e., Pfizer, Moderna, Oxford/AstraZeneca), and context regarding how much of the population is vaccinated (Leng et al. 2021). For our purposes, this conjoint framework is also useful in isolating the effect of varying potential incentives along with the above potential variable influences on vaccination likelihood. Secondly, by varying these key characteristics, conjoint experiments allow researchers to avoid the problems of sample size that plague more traditional factorial designs. This "small cell" problem would arise when asking respondents to evaluate hypothetical vaccine profiles with six trichotomous characteristics, for instance. In this example, there would be a total of 729 vaccine types that would require a large sample to adequately populate each cell corresponding to a specific combination of candidate considerations under a traditional factorial design.

To alleviate this problem, we draw from the conjoint framework increasingly used in political science (Hainmueller and Hopkins 2015; Hainmueller, Hopkins, and Yamamoto 2014). This design allows researchers to estimate the causal effects of various additive and interactive variables of interest on a baseline outcome variable without sacrificing much statistical power (Hainmueller, Hopkins, and Yamamoto 2014). By randomly varying each characteristic within the variable profile, this design mitigates social desirability bias and potential confounders (i.e., question wording), and it allows for the causal estimation of average marginal component effects (AMCEs). This last point, following the same approach as Hainmueller, Hopkins, and Yamamoto (2014), averages the causal treatment of each of the characteristics over all possible combinations of other variable profiles.[3]

We present each respondent with a series of hypothetical vaccination profiles, with the full list of the six attributes and corresponding levels listed in table 1. One of our key attributes of interest, financial incentives, contains three levels articulating whether the vaccine candidate profile received no incentive (the baseline), a $20 cash incentive, or a $20 gift card incentive that may only be used at a local business. This gift card approach mimics

3. In our subsequent analysis, we use AMCEs to articulate all figures assessing the effect of vaccine characteristics and incentive programs on the probability of choosing to get vaccinated. In subsequent analysis of partisan variation, we report conditional AMCEs resulting from an interaction of respondent partisanship and a given vaccine attribute's levels of interest.

Table 1 List of Feature Attributes and Levels Used in Hypothetical Vaccine Profiles

	Attributes	Levels
Coronavirus (COVID19) Vaccination Profile	Name of vaccine	(1) Pfizer/BioNtech (2) Moderna (3) AstraZeneca/Oxford
	Number of doses required	(1) 1 dose (2) 2 doses
	Percentage of US population vaccinated	(1) 5% (2) 25% (3) 50% (4) 80%
	Accessibility incentive	(1) Health care provider appointment required (2) State walk-ins, no appointment required (3) State walk-ins, appointment required (4) Health care provider will contact when eligible
	Mandate incentive	(1) Employer required (2) Employer not required
	Financial incentive	(1) $0 (no incentive) (2) $20 (3) $20 gift card only usable at local businesses

the incentives created by localities, such as Porterville, California, which offered gift cards to local business for those willing to be vaccinated (McAndrew 2021). A second key attribute, accessibility incentives, includes four levels: requiring (or not requiring) an appointment to get vaccinated at a state-run clinic, requiring an appointment at an individual's primary health care provider, or waiting for the primary health care provider to contact an individual when they are eligible for vaccination.[4] Our final key attribute, mandate incentives, includes two levels: having an employer-mandated vaccination requirement or not. Across all attributes and levels, there are a total of 576 possible total vaccination profiles.

Figure 1 presents an example of one set of 10 experimental rounds shown to our respondents, with the top text displaying the instructions to

4. We designed the fourth level of the accessibility incentive attribute to mimic a potential policy proposal suggested in the early days of the COVID-19 vaccination rollout. As many states were trying to determine the most efficient and effective method to administer a small supply of vaccines, some proposed distributing vaccines to primary health care providers and having those providers contact patients based on state-provided eligibility criteria.

the respondent and the panel articulating two hypothetical vaccine profiles. Each respondent is asked to select their preferred hypothetical vaccine candidate. Respondents repeat this process 10 times, encountering two randomly selected vaccine candidate profiles in each round and indicating their preference for one vaccine profile over another.

We used a nationally representative sample collected by Lucid, which draws from online panels to produce representative samples consistent with demographic and geographic benchmarks provided by the US Census Bureau. While Lucid is a relatively new firm, researchers are increasingly turning to the firm to procure high-quality online survey samples used in notable publications assessing political behavior (Coppock and McClellan 2019; Graham 2020; Munis 2022).[5] We administered the experiment to 1,006 respondents before the beginning of mass vaccinations, from January 28, 2021, to February 2, 2021. Respondents participated in 10 rounds of the study, with each respondent evaluating a total of 20 hypothetical vaccine profiles (i.e., two in each round).[6] Our key outcome variable of interest is a binary variable coded as 1 if a respondent chose a given vaccine profile and 0 otherwise. We estimate our vaccine attribute effects on likelihood of vaccine preference following the same approach as Hainmueller, Hopkins, and Yamamoto (2014) by calculating AMCEs for each attribute level. We estimate these AMCEs using the cjoint R statistical package developed by Strezhnev and colleagues (2015), and we cluster our standard errors by respondent, given the "long" nature of the data structure, where the unit of observation is respondent-vaccine profile evaluation, and the dependence of observations inherent across our respondent-choice unit of observation.[7]

Before the respondents engaged with our experimental treatments, we asked them their likelihood of taking the vaccine when eligible, rated on a seven-point scale from (1) very unlikely to (7) very likely. We specified two models: an ordinary least squares regression leveraging the seven-point outcome measure, and a collapsed dichotomous variable coded 1

5. See Coppock and McClellan (2019) for a comprehensive validation of Lucid online convenience samples against more robust conventional samples, such as the American National Election Studies. Our Lucid sample is nationally representative in terms of both partisan preference for vaccination intention and the persistent polarization in these partisan preferences. Moreover, our Lucid sample is also consistent with national demographic US Census Bureau benchmarks on education, race, and gender.

6. Underscoring the fact that our study took place before mass vaccination, we note the national vaccination rate stood at 1.3% (6.6% with at least one dose) on the first day of data collection and 1.8% (8.1% with at least one dose) on the last day.

7. In other words, we cluster our standard errors by respondents given that each individual respondent appears twenty times (i.e., evaluating two vaccine profiles per 10 rounds of the study) in our analysis of hypothetical vaccine preference.

As you may know, there are several coronavirus (COVID-19) vaccines that have been approved by the Federal Drug Administration for distribution to the public. Please consider the hypothetical scenarios in the table below.

After considering the scenarios, please select the vaccine profile that you would be most likely to take.

Step 1 of 10

Name of vaccine:	Pfizer/BioNtech	Pfizer/BioNtech
Number of vaccine doses required:	2	2
Percentage of U.S. public already vaccinated:	80%	25%
How vaccine is administered:	The state has created walk-in clinics where you can receive the vaccine only with an appointment.	The state has created walk-in clinics where you can receive the vaccine without an appointment.
Employers require employees to be vaccinated:	No	No
Compensation for getting vaccinated:	$20	$0
	◯	◯

Figure 1 Example of the conjoint experiment design.

if respondents said they were likely to be vaccinated and 0 otherwise, accounting for other salient predictors of intention.[8] We compared our sample with the national panel sample from the Understanding America Study (UAS) to validate that our national sample is reflective of the overall partisan divide in vaccination intention. The UAS survey panel provides a sample of approximately 6,000 respondents nationwide who are asked about vaccine intention in 20 survey waves from April 1, 2020, to July 21, 2021. Figure 2 shows the partisan divide among vaccination preferences in our pretest. Our Lucid sample (N = 1,006) matches the UAS survey wave (N = 5,975) corresponding to our data collection period, with 78% of Democrats and 67% of the overall sample in the Lucid data being likely to get vaccinated, while 80% of Democrats and 67% of the overall sample in the UAS sample indicated the same preference. While there is minimal convergence in the probability of vaccination intention for Republicans (59% Lucid, 51.5% UAS) and independents (60% Lucid, 65.4% UAS), our data is congruent with the general vaccination trend captured by the reputable (and larger N) UAS survey. Our data also articulates a similar partisan gap in vaccination intention.

Results

Figure 3 articulates our AMCEs in the form of point estimates of each of our vaccine attribute levels on the probability of preferring a hypothetical vaccine profile. We also specify levels of uncertainty for our effect point estimates with 90% and 95% confidence intervals. There is clear evidence a two-dose vaccine reduces the probability of vaccine preference by 9% relative to a single-dose vaccine. Moreover, and perhaps owing to negative press regarding the brand abroad, an AstraZeneca vaccine lowers the probability of vaccination preference by 6% relative to a Pfizer vaccine. In contrast, there is no significant difference in preferring a Moderna or Pfizer vaccine. We also find respondents are more likely to be vaccinated as vaccines become more prevalent in the country. Relative to a national 0% vaccination rate, which is comparable to the time period of the study, respondents were 7%, 15%, and 21% more likely to choose a vaccine if presented with a contextual national vaccination rate condition of 25%, 50%, and 80%, respectively.

8. In this coding, we include as part of the "not likely" group the approximately 8% of respondents stating they are "neither unlikely nor likely" to take the vaccine once available. The forthcoming results are not sensitive to this coding choice.

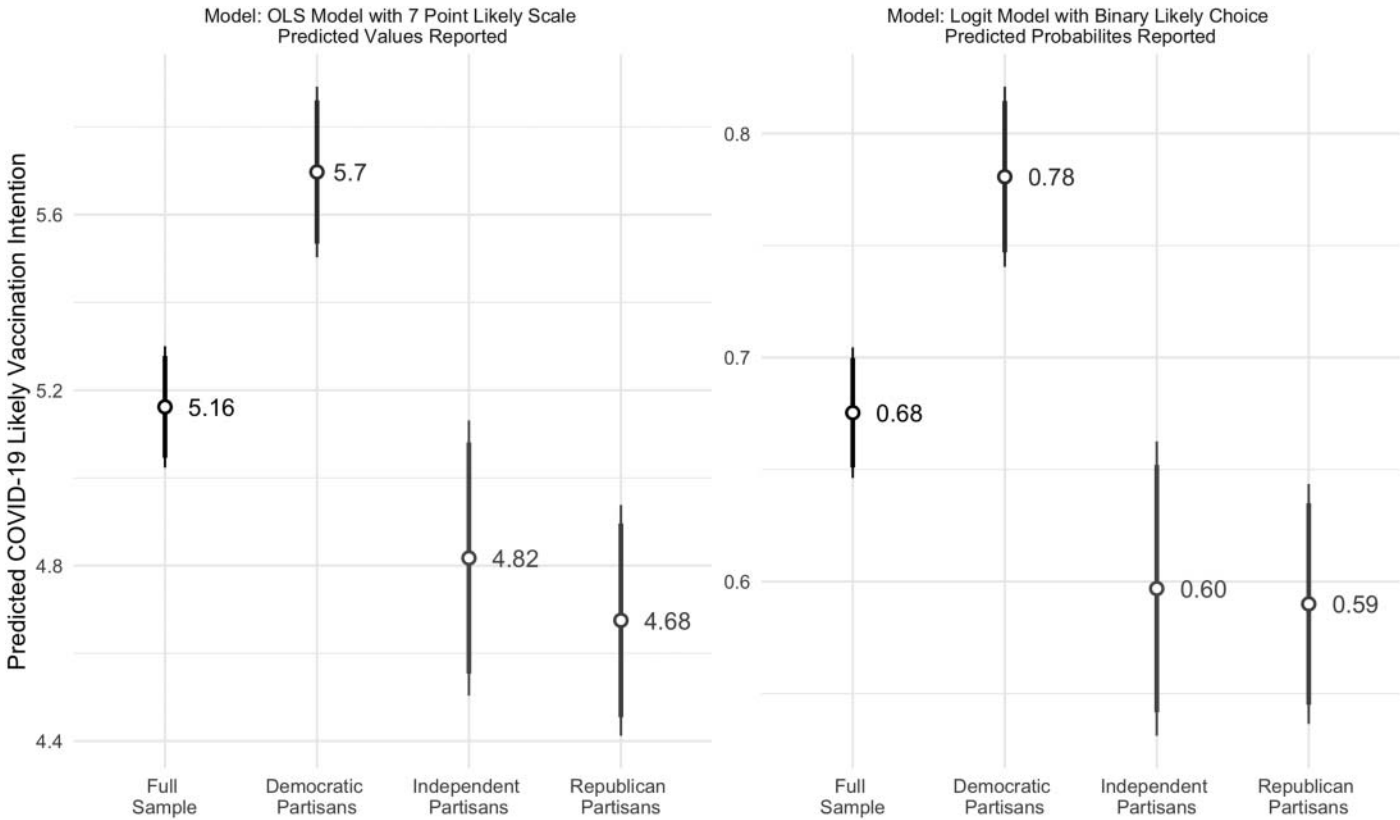

Figure 2 Pretreatment partisan divide in the Lucid national sample.

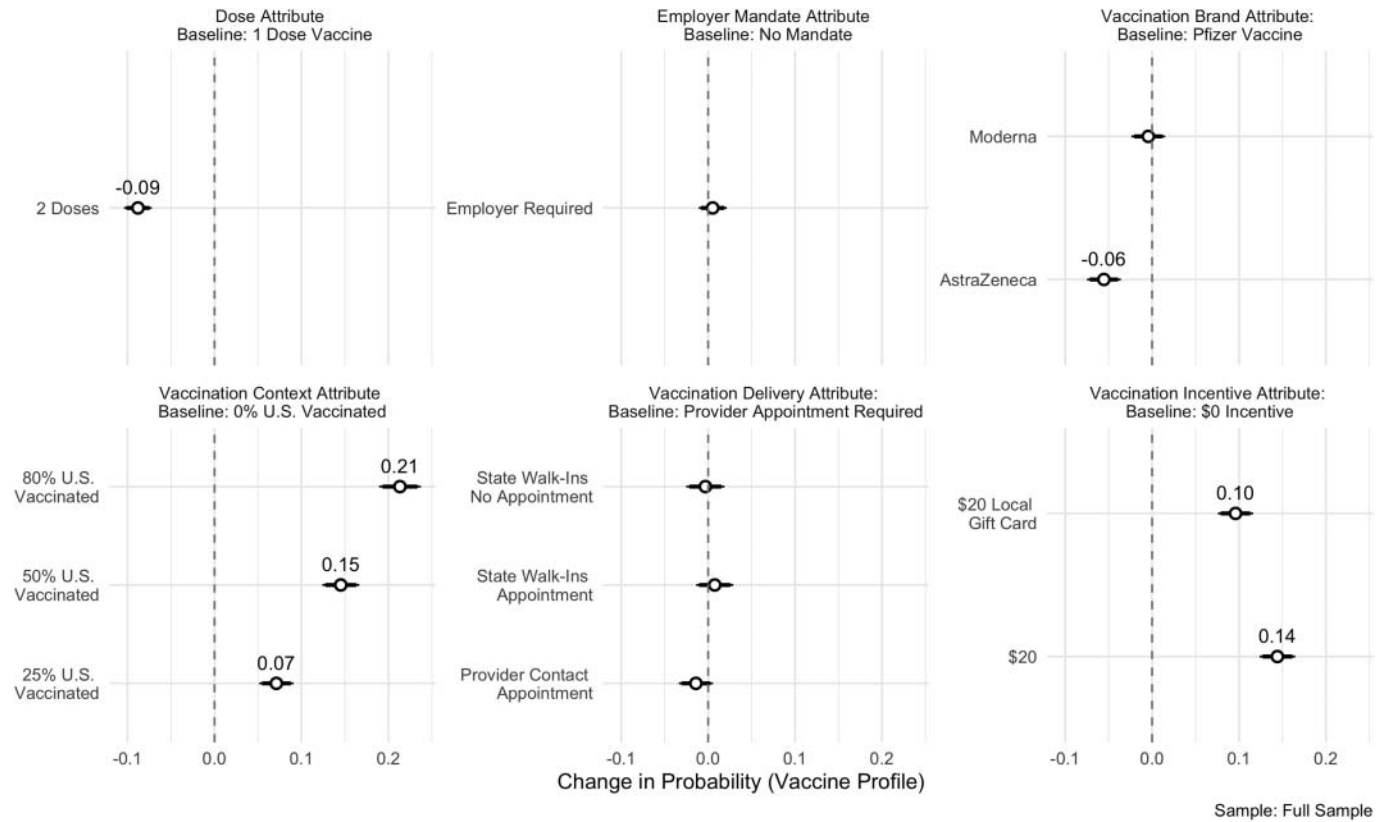

Figure 3 Additive effects of various COVID-19 vaccine attributes on vaccination choice.

Contrary to our expectations, we find no evidence that mandate incentives or accessibility incentives have a significant effect on vaccine choice. This result suggests the mass public is unmoved in their vaccine preferences based on either a public health system that incentivizes vaccination through ease of access or on a more punitive employer mandate measure. However, we find strong evidence financial incentives increase vaccine preference. Relative to vaccines offered with no financial incentive, vaccines with a $20 local gift card were 10% more likely to be preferred, while those associated with a $20 cash incentive were 14% more likely to be preferred. The difference in these two attribute level effects are significantly different from one another ($p < 0.05$), with respondents being more likely to prefer a vaccine with a $20 cash incentive ($\beta = 0.144$ [95% CI: 0.124, 0.165]) than one with a $20 local gift card incentive ($\beta = 0.096$ [95% CI: 0.076, 0.116]).

Our initial baseline analysis provides strong evidence Americans in general may be motivated to take the COVID-19 vaccine based on targeted, direct financial incentives rather than incentives focused on ease of access or based on mandates. Our theory also posits that financial incentives may have a stronger effect on Republicans and independents, serving as a potential way of bridging the stark partisan gap with Democrats in being vaccinated for COVID-19. We respecified the baseline model and interacted partisanship with each attribute level to evaluate potential heterogeneity in our vaccination attribute effects across partisan groups. Figure 4 articulates these estimated heterogeneous effects by party.

We find strong evidence financial incentives raise vaccine preference across all partisans. Relative to no financial incentive, a $20 local gift card significantly raises the probability of vaccine preference by 4% among Republicans, 13% among independents, and 11% among Democrats.

These effects are also statistically indistinguishable for Democrats and Republicans, suggesting the local gift card incentive works similarly for both partisans. There is a significant difference, however, in the local gift card effect between independents ($\beta = 0.135$ [95% CI: 0.099, 0.171]) and Republicans ($\beta = 0.039$ [95% CI: 0.002, 0.076], $\rho = 0.039$). Relative to no financial incentive, a $20 cash incentive significantly raises the probability of vaccine preference by 11% among Republicans, 16% among independents, and 16% among Democrats.

Contrary to $\boldsymbol{H}_4$, these effects are also statistically indistinguishable from one another across partisanship, suggesting financial incentives raise the probability of vaccine preference across all partisan groups by a similar

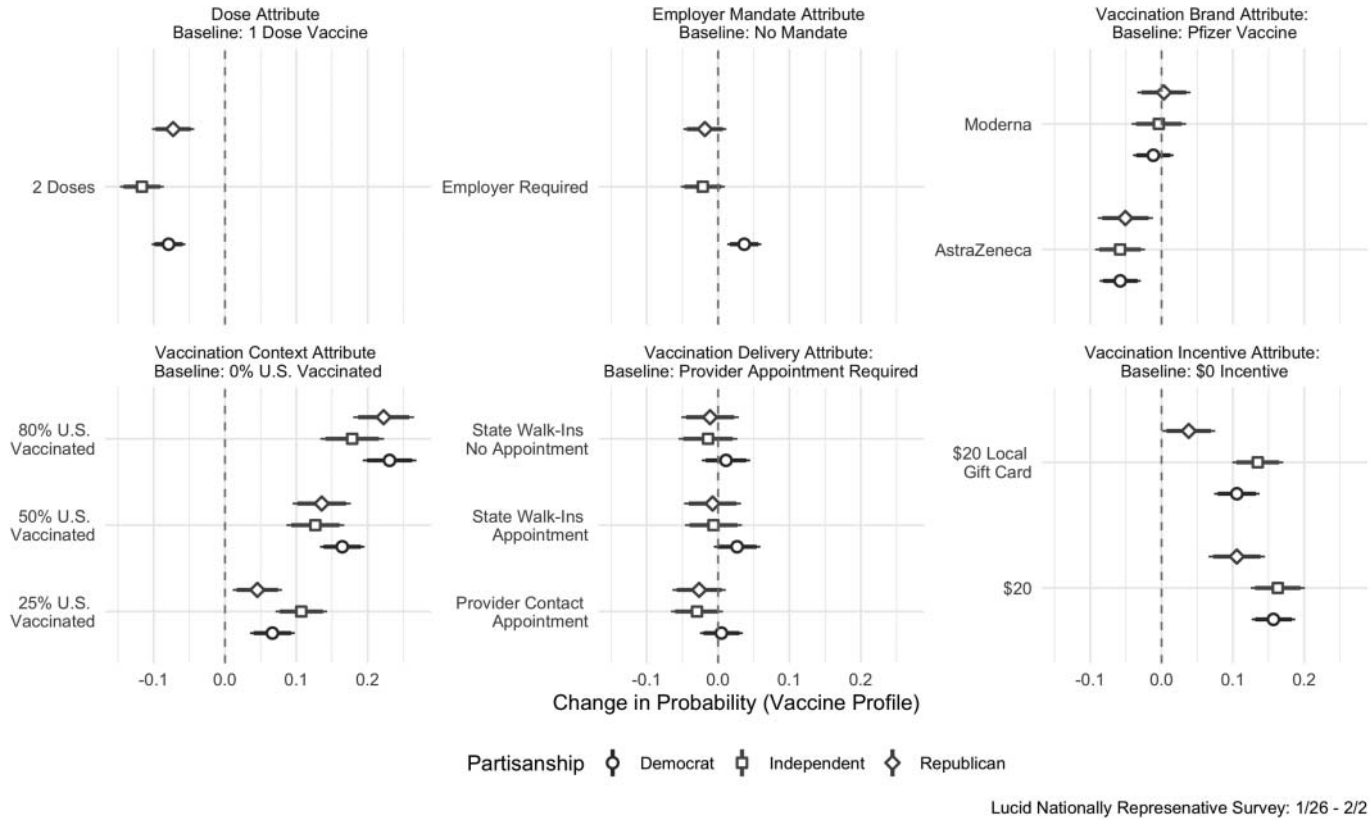

Figure 4 Effects of various COVID-19 vaccine attributes on choice subset by party.

magnitude. Among Democrats, and especially among Republicans, we note a $20 cash incentive significantly raises the probability of choosing a vaccine to a greater degree than a $20 local gift card.[9] This finding suggests both partisan groups are more motivated by cash financial incentives than by redeemable gift cards.

We again find mandate incentives and accessibility incentives have an insignificant effect on vaccine preferences for Democrats, Republicans, and independents. Congruent with the additive experimental results of the full sample, this provides additional evidence that neither mandate incentives nor accessibility incentives may be adequate tools to alleviate the partisan polarization apparent in COVID-19 vaccination intention and self-reported vaccination.

Lastly, we examined a more critical test of our theory by considering whether the financial incentive effects vary by both partisanship and initial pretreatment likelihood of vaccination. Recall that before the experimental rounds, we asked respondents their likelihood of taking the COVID-19 vaccine once they were eligible for it, rated on a seven-point scale from (1) very unlikely to (7) very likely. To critically test whether we observed within-party variation, we interacted a variable combining partisanship and prior vaccination likelihood with each of our vaccine profile attributes. This new variable creates three distinct partisan types based on being "likely," "neutral," or "unlikely" initial vaccinators. For example, this variable captures variation within Democratic partisans by classifying Democrats as being likely Democratic vaccinators, neutral Democratic vaccinators, or unlikely Democratic vaccinators. In total, this specification creates three categories within each partisan group and nine total discrete partisan groups, based on pretreatment vaccination intention.[10] Our expectation is that financial incentives should increase vaccine preference across all levels of pretreatment vaccination likelihood within each of the three partisan types.

9. To this point, we note that the point estimate on the AMCE for the $20 cash effect (0.158 for Democrats, 0.106 for Republicans) lies outside the 95% confidence interval for the $20 gift card effect for both Democrats and Republicans (95% CI for Democrats: 0.075, 0.139; 95% CI for Republicans: 0.002, 0.076), suggesting that $20 cash is a more effective treatment than a $20 local gift card for getting respondents vaccinated.

10. The distribution of this variable combining partisanship and initial pretreatment vaccination likelihood is as follows for each partisan group. Among Democrats, approximately 18.5% are identified as unlikely vaccinators, 5.0% as neutral vaccinators, and 76.5% as likely vaccinators. Among Republicans, approximately 29.6% identified as unlikely vaccinators, 9.0% as neutral vaccinators, and 61.4% as likely vaccinators. Lastly, among independent partisans, approximately 28.5% identified as unlikely vaccinators, 12.4% as neutral vaccinators, and 59.1% as likely vaccinators.

Figure 5 presents the effects of each vaccine attribute among partisan likely vaccinators, partisan neutral vaccinators, and partisan unlikely vaccinators. Confirming our previous results, figure 5A finds no evidence mandate incentives or accessibility incentives influence vaccine preferences based on partisanship and pretreatment vaccination likelihood. Figure 5A provides clear evidence, however, that both $20 cash and $20 local gift cards raise the probability of vaccine preference among Republicans, Democrats, and independents eager to receive the vaccine. Among likely vaccinating Democrats, independents, and Republicans a $20 cash incentive ($20 gift card incentive) raises vaccine preference by 18% (12%), 17% (14%), and 12% (5%), respectively. Turning to figure 5B, we find, contrary to our expectation, incentives of any kind do not influence vaccine preferences among neutral vaccinators who are Democratic or Republican partisans. We find evidence, however, suggesting financial incentives influence neutral independent vaccinators, with both a $20 gift card and a $20 cash incentive raising the probability of vaccine preference by 9% ($p < 0.10$) among this group. This finding suggests the small sliver of the population (about 8.3%) who are ambivalent about being vaccinated for COVID-19 are unmoved by incentives if they have partisan preferences.[11]

Lastly, figure 5C evaluates our attribute effects among initially unlikely vaccinators across partisan groups. We find that a $20 cash incentive, relative to no financial incentive, raises the probability of vaccination among unlikely vaccinators regardless of partisanship. A cash incentive increases vaccine preference by 12%, 19%, and 10% among unlikely vaccinators who are Democrats, independents, and Republicans, respectively. This finding is strong evidence targeted cash incentive programs amounting to as little as $20 per incentive may move the nearly 25% of Americans who say they are unlikely to be vaccinated for COVID-19, as opposed to being ambivalent about it. We also find significant evidence a $20 gift card influences vaccine preference by 8% among Democrats and 15% among independents relative to no incentive; unlikely Republicans are not influenced by such an incentive. In all, we find fairly robust experimental evidence for our theoretical framework: financial incentives are not only effective at influencing the vaccine preferences of Americans but also are effective across all partisans, even among partisans who state an unlikeliness to be vaccinated before our experimental treatments.

11. We find a similar dynamic when interacting pretreatment neutrality and vaccination financial incentives, with these financial incentives still not influencing the vaccine preferences of ambivalently neutral prospective vaccinators.

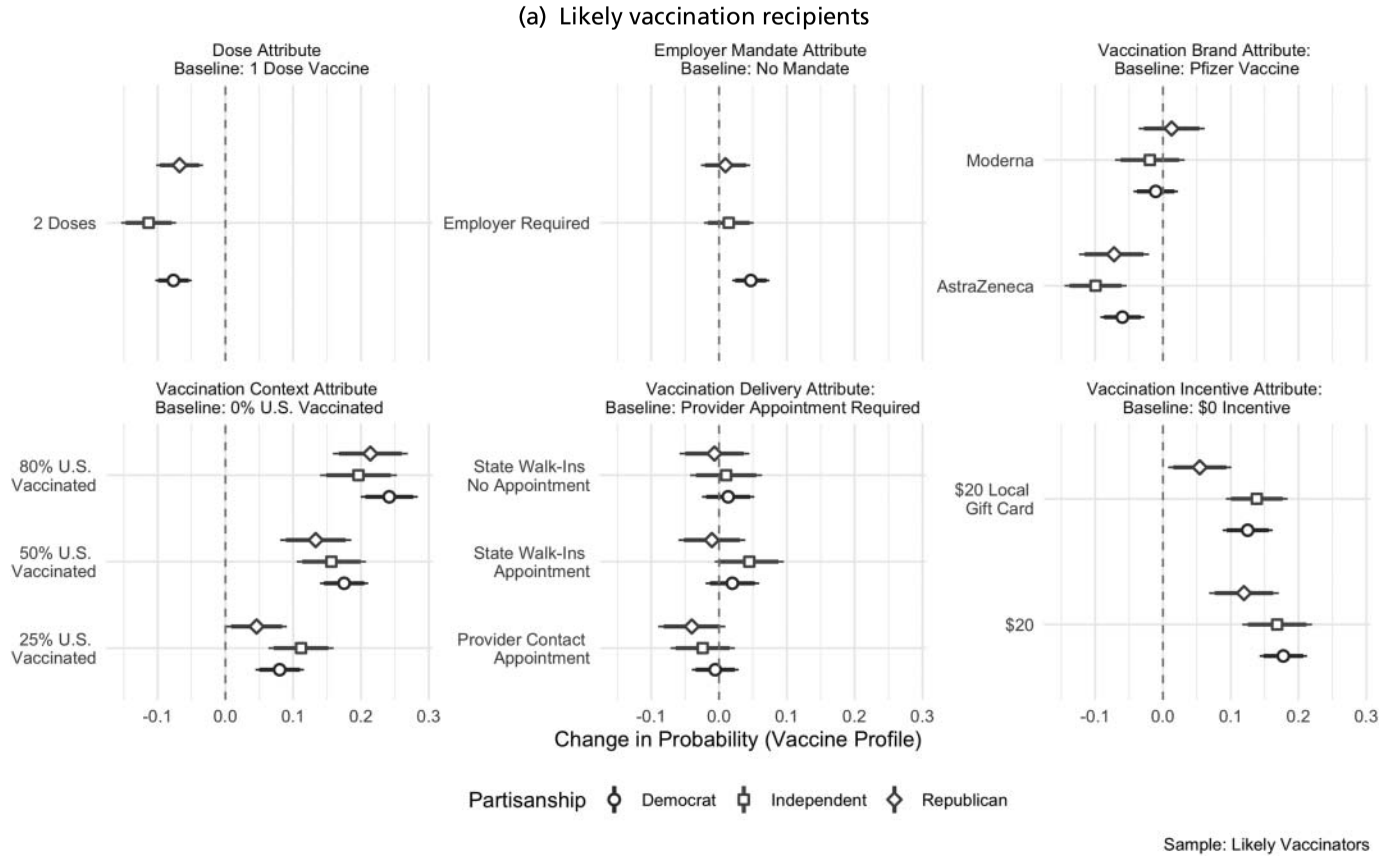

Figure 5 Effects of various COVID-19 vaccine attributes on choice by party and pretreatment likelihood.

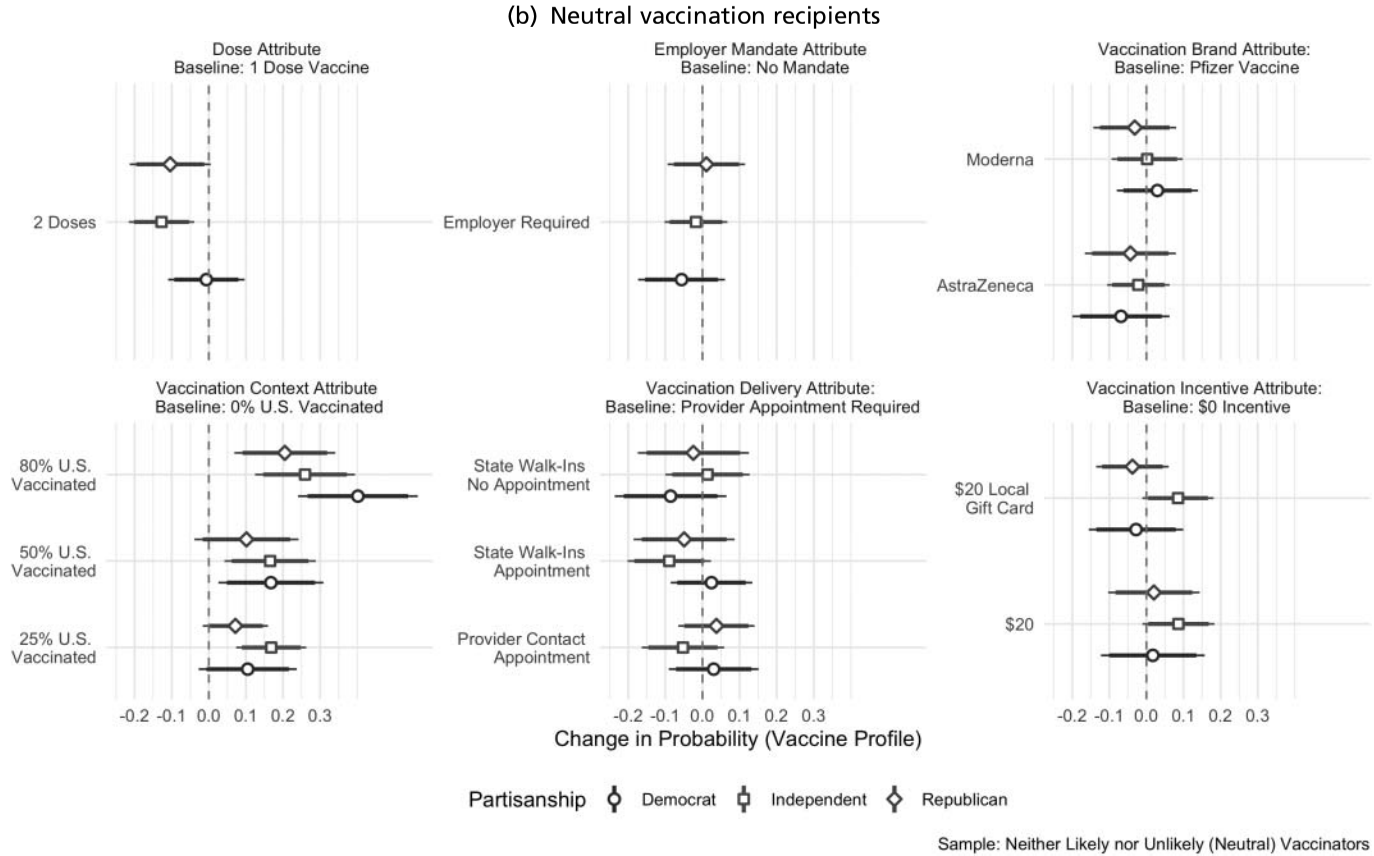

Figure 5 (*continued*)

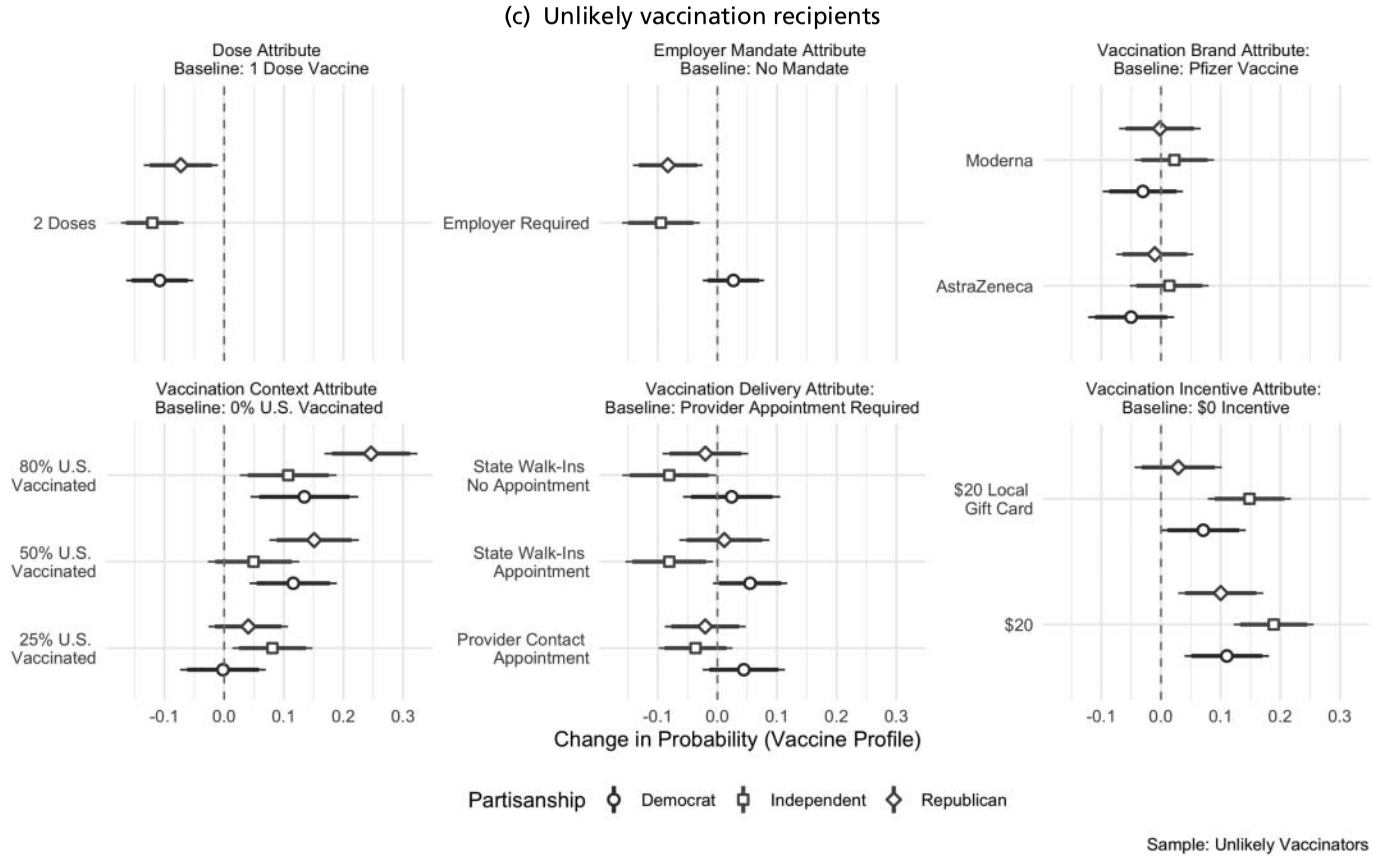

Figure 5 (*continued*)

Replication in the Kaiser Family Foundation Poll

While our experimental study provides internal validity to our theoretical argument that financial incentives positively influence vaccine preferences, our study is limited as a result of being fielded before mass vaccinations and, therefore, measuring prospective vaccination intention rather than vaccination status. Additionally, we lack observational evidence assessing the relationship between incentive preferences and propensity to be vaccinated in a nationally representative sample. To further test our claims and address these limitations, we used the nationally representative Kaiser Family Foundation Health Tracking Poll from June 2021. As part of the COVID-19 Vaccine Monitor poll, the survey was fielded June 8–21, 2021, after the US government granted universal access to the COVID-19 vaccine.[12]

We measured preference for financial incentives from a question asking if respondents supported or opposed a cash incentive being offered for receiving a COVID-19 vaccine.[13] Responses are coded 1 if the respondent supports the incentive and 0 if not. We specified an additive model estimating the baseline effect of financial incentive support on the probability of self-reporting being vaccinated for COVID-19, and an interactive model interacting partisanship and financial incentive support to estimate the relationship among Democrats, independents, and Republicans.[14]

Figure 6 presents additional support for our theoretical framework. In the additive model, support for a financial incentive is associated with a predicted probability of vaccination of 74%, while opposing a financial incentive is associated with a predicted probability of vaccination of 61%. The marginal effect of supporting a financial incentive on probability of vaccination is 13%. In terms of heterogeneity in the relationship between supporting financial incentives and probability of vaccination by partisanship, we find evidence that supporting financial incentives is associated with a 9%, 20%, and 18% increase in the probability of COVID-19 vaccination among Democratic, independent, and Republican partisans,

12. To our knowledge, and according to the Roper Center survey repository, this is the only survey to measure preferences on vaccination incentives among both the vaccinated and unvaccinated population. While other surveys may measure preferences on vaccination incentives, these are only asked of unvaccinated respondents and within the context of whether one would be more likely to be vaccinated in the event of a state implementation of a vaccination program, such as a state lottery. Moreover, no other surveys directly ask about targeted private financial incentives, which is the focus of our study.

13. We note that the results of our models replicate when specifying an outcome variable measuring the likelihood of vaccination among unvaccinated respondents, which are the only respondents asked about the likelihood of vaccination given the lack of vaccination.

14. The additive model measuring the baseline relationship between financial incentive support and probability of vaccination treats partisanship as a control variable.

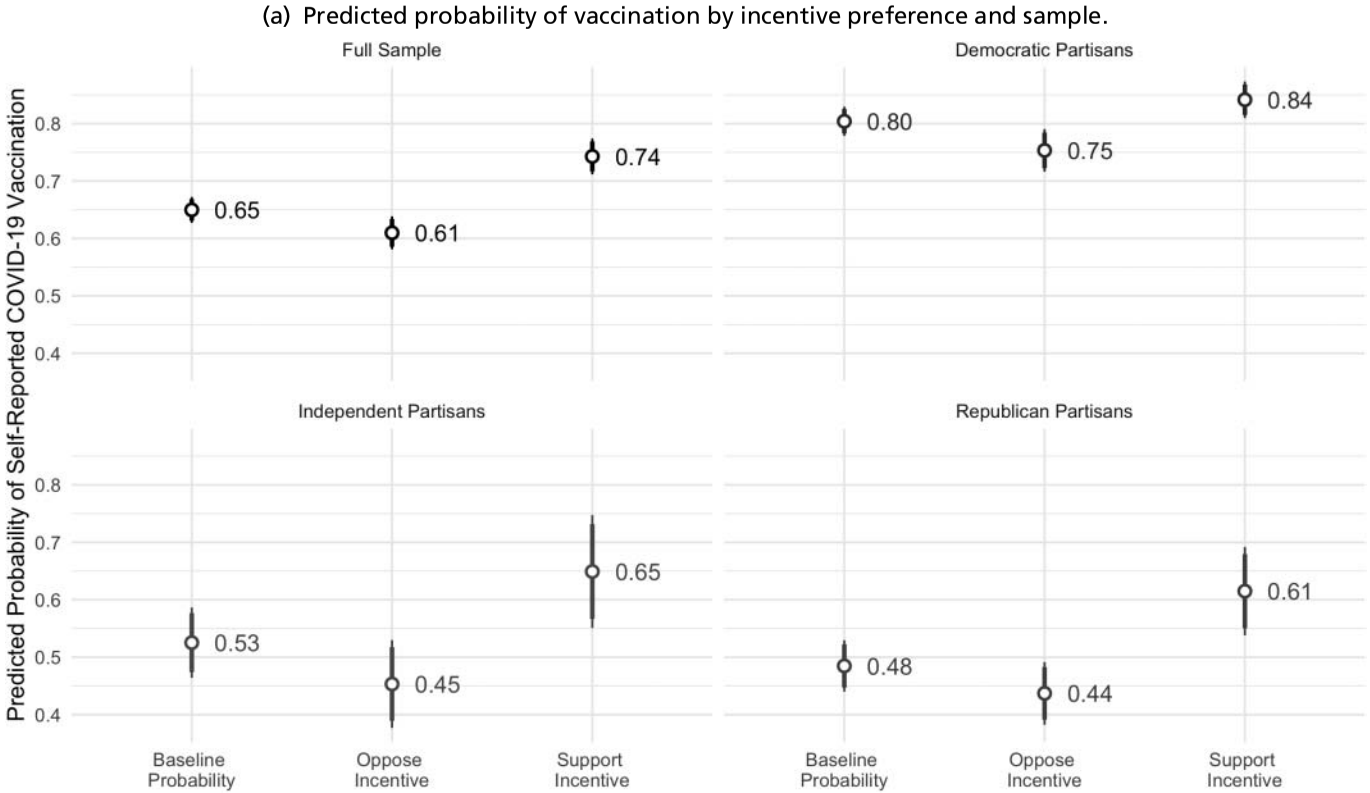

Figure 6 Observational relationship between incentive preferences and probability of vaccination.

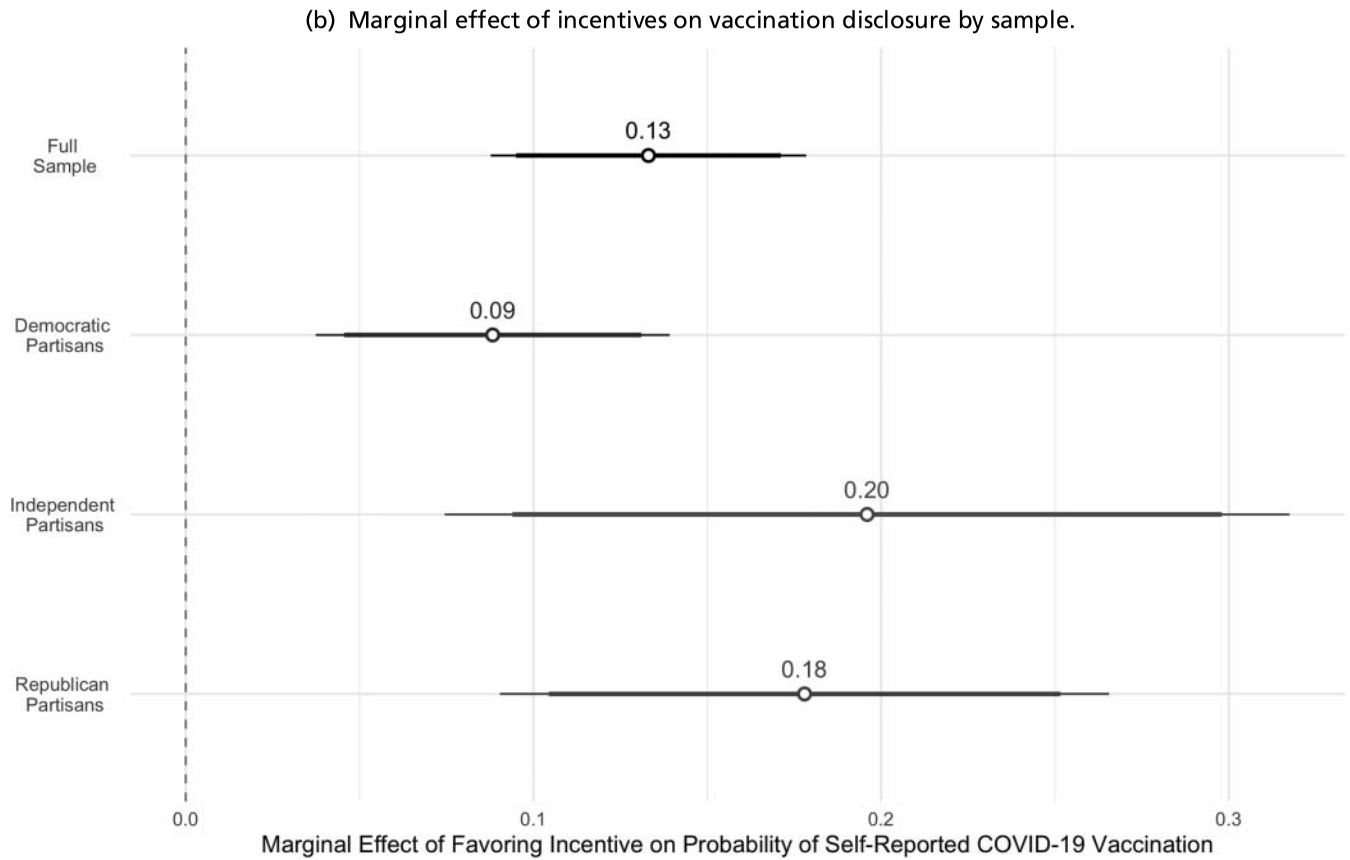

Figure 6 (*continued*)

respectively. These results provide further confirmation of the positive effect financial incentives can have on vaccination likelihood.

Discussion

Our article makes several important contributions to the literature on polarization and incentives to promote prosocial behavior as well as the ongoing discussion on public health policy in the midst of a pandemic. First, our experimental results demonstrate polarization on vaccination can be counteracted, at least to a point. Financial incentives can increase the likelihood of vaccine preference, including among the most resistant Republicans and independents. Admittedly, this increase is not a dramatic shift that catches Republicans and independents up to equal levels with Democrats; no incentive we examined achieves that lofty goal. Moving the needle at all, however, is an important development. As polarization with respect to attitudes toward vaccination has not only persisted but also deepened throughout the course of the pandemic, the finding a financial incentive can increase vaccine preference among the most resistant groups is notable and important. Indeed, as the United States lags behind other wealthy countries in receiving booster shots for COVID-19, our research suggests meaningful financial incentives could improve those rates if policy makers viewed it as a goal worth pursuing. In short, polarization on public health policy does have its limits; individuals are persuadable and can change their views if provided with the right incentive.

Second, not all incentives are equally effective. Indeed, of the various incentives we tested, only financial incentives had a consistent and meaningful positive effect on vaccine preference and, in our observational replication, likelihood. Even then, only direct cash transfers motivated unlikely vaccinators; gift cards were insufficiently motivating for Republicans predisposed to reject vaccination. While some incentives can persuade individuals to change their attitudes and support more prosocial behavior, not all incentives will. The right incentive targeted at the right group will have the greatest success in promoting prosocial behavior. While this finding adds an extra layer of complication for policy makers in a pandemic, it also highlights the importance of adopting an "all of the above" strategy. There likely is not a single policy, incentive, or other tool that will universally appeal to all Americans and encourage prosocial behavior. This statement is even more true given the increasing polarization we observe in the mass public on political and seemingly nonpolitical issues alike. Thus, even if a single policy only makes incremental progress in, for example, persuading more people to vaccinate, adopting multiple

policies that are designed and targeted to persuade specific groups will be more likely to achieve the desired aggregate effects.

One concern about providing incentives, especially financial ones, is they may discourage those who are motivated by altruism from participating. Such individuals do not want to suggest their altruism is for sale, or they may believe their prosocial actions are cheapened when offered payment. While the research on this topic is somewhat mixed, the general consensus suggests at worst, financial incentives may discourage a small proportion of altruistic individuals from participating. In general, modest financial incentives have been shown to have little or no impact on the behavior of altruistic individuals (Anesi 2008). Lacetera and Macis (2010) found with respect to financial incentives, direct cash payments may discourage altruistic individuals, but cash vouchers do not. Thus, the type of financial incentive used can be modified to appeal to both altruistic individuals and those who can be motivated by a financial nudge toward prosocial behaviors.

A potential criticism of our study concerns our outcome variable. By only asking respondents to choose whether they support profile A or profile B in a given round, one concern could be we are missing responses that would demonstrate a universal rejection of all vaccination profiles, regardless of incentives. We agree this would be a limitation of our design, but only if we were solely interested in whether or not actual vaccination increases with respect to one profile or another. When considering public health policy making, those involved have a responsibility to craft the conditions most likely to induce and promote prosocial behavior. Even in those conditions, however, there will still be those who choose to reject the prodding and purposefully choose the antisocial behavior. This reaction is not new; some religious groups have long rejected vaccinations or other safe medical procedures. That the COVID-19 vaccination campaign has been complicated through stubborn partisan refusal on the part of a small but significant segment of the US population is regrettable, but it is not unexpected or unprecedented. Regardless of the presence of respondents who will always reject vaccination, it is still beneficial to policy makers, and scholars of public opinion and political behavior, to know which conditions will maximize the likelihood of vaccination preference among the full population to create that "most likely" environment. Young children may always refuse to eat vegetables, but that does not preclude the value of parents learning their children are more resistant to steamed broccoli than to honey-covered carrots. We believe the same concept holds true for vaccination: policy makers glean valuable insight by learning which incentives can make vaccination more tolerable, even if an individual still ultimately chooses to not get vaccinated.

One notable finding is the impact of being told a large percentage of the population has already been vaccinated. Our results demonstrate respondents increase their likelihood of getting vaccinated if they are told a supermajority of the population has already received a shot. What our study cannot explain is why this reaction occurs. One reason could simply be peer pressure; as more people in one's social network get vaccinated, the pressure to conform increases too. Alternatively, as large proportions of the population are vaccinated safely, concerns about adverse side effects might be effectively ameliorated. Further research should investigate the motivation for this change.

Another important result concerns the lack of significant impact from mandate incentives. Instead of increasing the likelihood of vaccination, employer-mandated vaccination policies hardened resistance to vaccination if it had any effect at all. This result demonstrates further evidence of polarization, as Democratic respondents, particularly likely Democratic vaccinators, were slightly more likely to say they would get vaccinated if a mandate was present, while Republicans and independents were less likely to get vaccinated under a mandate. An important caveat to keep in mind is our experiment measures attitudes, not actual behavior. While respondents may say they are less likely to get vaccinated under a mandate, it seems unlikely so many would actually follow through with their opposition and risk their employment. This is particularly important within the context of unlikely Republican and independent vaccinators, which we found to respond significantly and negatively to a vaccine associated with an employer mandate.

Such an assumption, however, does not render our study meaningless with respect to mandate incentives. Even if respondents are understating their likelihood of changing their behavior, they are likely accurately reporting their attitudes toward a mandate. Unlikely vaccinators may grudgingly get vaccinated, but their resentment at being "forced" into such a behavior from a mandate may have long-term political effects. Politicians who endorse or enforce mandates may find themselves having to wrestle with a nontrivial portion of their constituency who are fired up about this issue and who vote accordingly. Such votes may not only threaten mandate-supporting politicians but also assist candidates who are less supportive of public health measures and policies generally. Policy makers should tread carefully in considering mandate policies. While they may promote short-term changes in behavior with corresponding benefits for public health, the long-term political costs might be more devastating for long-term public health. Now that mandates have been imposed, follow-up research testing these assumptions is ripe for study.

Our study provides compelling evidence that while the public is polarized with respect to COVID-19 vaccination, they are not intractable. Small, direct cash payments can motivate and incentivize a sizable portion of the population, including the most resistant, to potentially roll up their sleeves and get vaccinated. Instead of being patient and waiting for the vaccine-hesitant or vaccine-resistant to come around, policy makers should consider the benefits of providing effective and efficient incentives to nudge these groups to join their neighbors in getting vaccinated.

■ ■ ■

Carlos Algara is the Mary Toepelt Nicolai and George S. Blair Assistant Professor of Politics and Government at Claremont Graduate University and a faculty affiliate at the Center of Effective Lawmaking. His research agenda focuses broadly on the nature of ideological representation, electoral accountability, voter decision rules in legislative elections, and legislative elite behavior within Congress.
carlos.algara@cgu.edu

Daniel J. Simmons is an assistant professor of political science at Saint Michael's College. His teaching and research examine the intersection between how the law functions and how people react to the law. His research uses survey experiments to examine how controversial policing affects the US public's opinion of the police and local government as well as the US public's attitudes toward policing policy. He also uses experiments to examine various aspects of public opinion and its effect on policy making, including the areas of foreign policy, democratization, and public health.

Acknowledgments

We thank Bill Weaver and the Patti and Paul Yetter Center for Law at the University of Texas at El Paso for financial support of this research. We also thank panelists and audience members at the 2021 American Political Science Association annual meeting in Seattle, Washington, for helpful comments and suggestions. This research was reviewed and approved by the Institutional Review Board of the University of Texas at El Paso (IRB-1704950).

References

Abiola, Sara E., James Colgrove, and Michelle M. Mello. 2013. "The Politics of HPV Vaccination Policy Formation in the United States." *Journal of Health Politics, Policy and Law* 38, no. 4: 645–81.

Abramowitz, Alan I., and Kyle L. Saunders. 2008. "Is Polarization a Myth?" *Journal of Politics* 70, no. 1: 542–55.

Abramowitz, Alan I., and Steven W. Webster. 2018. "Negative Partisanship: Why Americans Dislike Parties but Behave like Rabid Partisans." *Advances in Political Psychology* 39, no. 1: 119–35.

Adams, Steven Allen. 2021. "West Virginia Governor Jim Justice Details New COVID-19 Vaccine Incentives." *Intelligencer/Wheeling News-Register*, August 21. https://www.theintelligencer.net/news/top-headlines/2021/08/west-virginia-governor-jim-justice-details-new-covid-19-vaccine-incentives/.

Adolph, Christopher, Kenya Amano, Bree Bang-Jensen, Nancy Fullman, and John Wilkerson. 2021. "Pandemic Politics: Timing State-Level Social Distancing Responses to COVID-19." *Journal of Health Politics, Policy and Law* 46, no. 2: 211–33.

Alford, John R., Peter K. Hatemi, John R. Hibbing, Nicholas G. Martin, and Lindon J. Eaves. 2011. "The Politics of Mate Choice." *Journal of Politics* 73, no. 2: 362–79.

Algara, Carlos, Sharif Amlani, Samuel Collitt, Isaac Hale, and Sara Kazemian. 2022. "Nail in the Coffin or Lifeline? Evaluating the Electoral Impact of COVID-19 on President Trump in the 2020 Election." *Political Behavior*, October 23. https://link.springer.com/article/10.1007/s11109-022-09826-x.

Allcott, Hunt, Levi Boxell, Jacob C. Conway, Matthew Gentzkow, Michael Thaler, and David Y. Yang. 2020. "Polarization and Public Health: Partisan Differences in Social Distancing during the Coronavirus Pandemic." *Journal of Public Economics*, August 6. https://doi.org/10.1016/j.jpubeco.2020.104254.

Anesi, Vincent. 2008. "Incentives and Prosocial Behavior in Democratic Societies." *Journal of Economic Psychology* 29, no. 6: 849–55.

Barber, Michael, and Jeremy C. Pope. 2019. "Does Party Trump Ideology? Disentangling Party and Ideology in America." *American Political Science Review* 113, no. 1: 38–54.

Baum, Matthew A. 2011. "Red State, Blue State, Flu State: Media Self-Selection and Partisan Gaps in Swine Flu Vaccinations." *Journal of Health Politics, Policy and Law* 36, no. 6: 1021–59.

Baumgaertner, Bert, Juliet E. Carlisle, and Florian Justwan. 2018. "The Influence of Political Ideology and Trust on Willingness to Vaccinate." *PLoS ONE* 13, no. 1: 1–13.

Bisbee, James, and Diana Da In Lee. 2022. "Objective Facts and Elite Cues: Partisan Responses to Covid-19." *Journal of Politics* 84, no. 3: 1279–91.

Boudreau, Cheryl, and Scott A. MacKenzie. 2014. "Informing the Electorate? How Party Cues and Policy Information Affect Public Opinion about Initiatives." *American Journal of Political Science* 58, no. 1: 48–62.

Clinton, Josh, Jon Cohen, John S. Lapinski, and Marc Trussler. 2021. "Partisan Pandemic: How Partisanship and Public Health Concerns Affect Individuals' Social Mobility during COVID-19." *Science Advances* 7, no. 2: 1–8.

Coppock, Alexander, and Oliver A. McClellan. 2019. "Validating the Demographic, Political, Psychological, and Experimental Results Obtained from a New Source of Online Survey Respondents." *Research and Politics*, January 28. https://doi.org/10.1177/2053168018822174.

Druckman, James N., Samara Klar, Yanna Krupnikov, Matthew Levendusky, and John Barry Ryan. 2021. "Affective Polarization, Local Contexts, and Public Opinion in America." *Nature Human Behaviour* 5, no. 1: 28–38.

Duch, Raymond M., Adrian Barnett, Maciej Filipek, Laurence Roope, Mara Violato, and Philip Clarke. 2021. "Cash versus Lotteries: COVID-19 Vaccine Incentives Experiment." MedRxiv, July 28. https://www.medrxiv.org/content/10.1101/2021.07.26.21250865v1.

Estep, Kevin, Annika Muse, Shannon Sweeney, and Neal D. Goldstein. 2022. "Partisan Polarization of Childhood Vaccination Policies, 1995–2020." *American Journal of Public Health* 112, no. 10: 1471–79.

Fiorina, Morris P., and Samuel J. Abrams. 2008. "Political Polarization in the American Public." *Annual Review of Political Science* 11: 563–88.

Fowler, Luke, Jaclyn J. Kettler, and Stephanie L. Witt. 2021. "Pandemics and Partisanship: Following Old Paths into Uncharted Territory." *American Politics Research* 49, no. 1: 3–16.

Fuller, Sam, Sara Kazemian, Carlos Algara, and Daniel J. Simmons. 2022. "Assessing the Effectiveness of COVID-19 Vaccine Lotteries: A Cross-State Synthetic Control Methods Approach." *PLoS ONE* 17, no. 9: article ID e0274374.

Gadarian, Shana Kushner, Sara Wallace Goodman, and Thomas Pepinsky. 2021a. "Partisan Endorsement Experiments Do Not Affect Mass Opinion on COVID-19." *Journal of Elections, Public Opinion, and Parties* 31, suppl. 1: 122–31.

Gadarian, Shana Kushner, Sara Wallace Goodman, and Thomas B. Pepinsky. 2021b. "Partisanship, Health Behavior, and Policy Attitudes in the Early Stages of the COVID-19 Pandemic." *PLoS ONE* 16, no. 4: article ID e0249596.

Gollust, Sarah E., Rebekah H. Nagler, and Erika Franklin Fowler. 2020. "The Emergence of COVID-19 in the US: A Public Health and Political Communication Crisis." *Journal of Health Politics, Policy and Law* 45, no. 6: 967–81.

Graham, Matthew H. 2020. "Self-Awareness of Political Knowledge." *Political Behavior* 42, no. 1: 305–26.

Greer, Scott L., and Phillip M. Singer. 2017. "Addressing Zika in the United States: Polarization, Fragmentation, and Public Health." *American Journal of Public Health* 107, no. 6: 861–62.

Hainmueller, Jens, and Daniel J. Hopkins. 2015. "The Hidden American Immigration Consensus: A Conjoint Analysis of Attitudes toward Immigrants." *American Journal of Political Science* 59, no. 3: 529–48.

Hainmueller, Jens, Daniel J. Hopkins, and Teppei Yamamoto. 2014. "Causal Inference in Conjoint Analysis: Understanding Multidimensional Choices via Stated Preference Experiments." *Political Analysis* 22, no. 1: 1–30.

Haselswerdt, Jake, and Sarah Gollust. 2023. "Awareness of COVID-19 at the Local Level: Perceptions and Political Consequences." *Journal of Health Politics, Policy and Law* 48, no. 3: 351–78. https://doi.org/10.1215/03616878–10351896.

Hetherington, Marc J. 2001. "Resurgent Mass Partisanship: The Role of Elite Polarization." *American Political Science Review* 95, no. 3: 619–31.

Hetherington, Marc J., and Thomas J. Rudolph. 2015. *Why Washington Won't Work*. Chicago: University of Chicago Press.

Higgins, Stephen T., Elias M. Klemperer, and Sulamunn R. M. Coleman. 2021. "Looking to the Empirical Literature on the Potential for Financial Incentives to Enhance Adherence with COVID-19 Vaccination." *Preventive Medicine*, January 8. https://doi.org/10.1016/j.ypmed.2021.106421.

Huber, Gregory A., and Neil Malhotra. 2017. "Political Homophily in Social Relationships: Evidence from Online Dating Behavior." *Journal of Politics* 79, no. 1: 269–83.

Iyengar, Shanto, Gaurav Sood, and Yphtach Lelkes. 2012. "Affect, Not Ideology: A Social Identity Perspective on Polarization." *Public Opinion Quarterly* 76, no. 3: 405–31.

Jensen, Amalie, William Marble, Kenneth Scheve, and Matthew J. Slaughter. 2021. "City Limits to Partisan Polarization in the American Public." *Political Science Research and Methods* 9, no. 2: 223–41.

Jiang, Julie, Emily Chen, Shen Yan, Kristina Lerman, and Emilio Ferrara. 2020. "Political Polarization Drives Online Conversations about COVID-19 in the United States." *Human Behavior and Emerging Technologies* 2, no. 3: 200–211.

Kam, Cindy D. 2005. "Who Toes the Party Line? Cues, Values, and Individual Differences." *Political Behavior* 27, no. 2: 163–82.

Kerr, John, Costas Panagopoulos, and Sander van der Linden. 2021. "Political Polarization on COVID-19 Pandemic Response in the United States." *Personality and Individual Differences* 179: article ID 110892. https://doi.org/10.1016/j.paid.2021.110892.

Klüver, Heike, Felix Hartmann, Macartan Humphreys, Ferdinand Geissler, and Johannes Giesecke. 2021. "Incentives Can Spur COVID-19 Vaccination Uptake." *Proceedings of the National Academy of Sciences* 118, no. 36: article ID e2109543118.

Lacetera, Nicola, and Mario Macis. 2010. "Do All Material Incentives for Pro-Social Activities Backfire? The Response to Cash and Non-Cash Incentives for Blood Donations." *Journal of Economic Psychology* 31, no. 4: 738–48.

Leng, Anli, Elizabeth Maitland, Siyuan Wang, Stephen Nicholas, Rugang Liu, and Jian Wang. 2021. "Individual Preferences for COVID-19 Vaccination in China." *Vaccine* 39, no. 2: 247–54.

McAndrew, Dom. 2021. "$100 Gift Card for a COVID-19 Vaccine? Porterville Asks Residents to Get Vaccinated." KSEE/KGPE, August 18. https://www.yourcentralvalley.com/life-health/health/coronavirus/100-gift-card-for-a-covid-19-vaccine-porterville-asks-residents-to-get-vaccinated/.

Motta, Matt. 2021. "Can a COVID-19 Vaccine Live Up to Americans' Expectations? A Conjoint Analysis of How Vaccine Characteristics Influence Vaccination Intentions." *Social Science and Medicine* 272, no. 1: 1–8.

Motta, Matt, Steven Sylvester, Timothy Callaghan, and Kristin Lunz-Trujillo. 2021. "Encouraging COVID-19 Vaccine Uptake through Effective Health Communication." *Frontiers in Political Science*, January 28. https://doi.org/10.3389/fpos.2021.630133.

Mummolo, Jonathan, Erik Peterson, and Sean Westwood. 2021. "The Limits of Partisan Loyalty." *Political Behavior* 43, no. 3: 949–72.

Munis, B. Kal. 2022. "Us over Here versus Them over There . . . Literally: Measuring Place Resentment in American Politics." *Political Behavior* 44: 1057–78.

Nicholson, Stephen P. 2012. "Polarizing Cues." *American Journal of Political Science* 56, no. 1: 52–66.

ODAS (Ohio Department of Administrative Services). 2021. "State of Ohio Employees to Receive Vaccine Incentive." July 28. https://das.ohio.gov/home/media-center/all-news/state-of-ohio-employees-to-receive-vaccine-incentive.

Poole, Keith T. 1984. "Least Squares Metric, Unidimensional Unfolding." *Psychometrika* 49, no. 3: 311–23.

Schmidt, Ana Lucía, Fabiana Zollo, Antonio Scala, Cornelia Betsch, and Walter Q. Jattrociocchi. 2018. "Polarization of the Vaccination Debate on Facebook." *Vaccine* 36, no. 25: 3606–12.

Simas, Elizabeth N., Scott Clifford, and Justin H. Kirkland. 2020. "How Empathic Concern Fuels Political Polarization." *American Political Science Review* 114, no. 1: 258–69.

Strezhnev, Anton, Elissa Berwick, Jens Hainmueller, Daniel Hopkins, Teppei Yamamoto, and Maintainer Anton Strezhnev. 2015. "cjoint: A Package for Estimating Average Marginal Component-Specific Effects for Conjoint Survey Experiments." https://search.r-project.org/CRAN/refmans/cjoint/html/cjoint-package.html (accessed April 17, 2023).

Taber, Jennifer M., John A. Updegraff, Pooja G. Sidney, Abigail G. O'Brien, and Clarissa A. Thompson. 2021. "Experimental Tests of How Hypothetical Monetary Lottery Incentives Influence Vaccine-Hesitant US Adults' Intentions to Vaccinate." PsyArXiv, July 23. https://doi.org/10.31234/osf.io/ux73h.

Walkey, Allan J., Anica Law, and Nicholas A. Bosch. 2021. "Lottery-Based Incentive in Ohio and COVID-19 Vaccination Rates." *JAMA* 326, no. 8: 766–67.

Walter, Dror, Yotam Ophir, and Kathleen Hall Jamieson. 2020. "Russian Twitter Accounts and the Partisan Polarization of Vaccine Discourse, 2015–2017." *American Journal of Public Health* 110, no. 5: 715–24.

Webster, Steven W. 2020. *American Rage: How Anger Shapes Our Politics*. New York: Cambridge University Press.

Westwood, Sean J., Erik Peterson, and Yphtach Lelkes. 2019. "Are There Still Limits on Partisan Prejudice?" *Public Opinion Quarterly* 83, no. 3: 584–97.

Wikler, Daniel. 2021. "When Medical Care Must Be Rationed, Should Vaccination Status Count?" *Washington Post*, August 23. https://www.washingtonpost.com/outlook/2021/08/23/refuse-covid-treatment-unvaccinated-triage/