

Using Panel Data to Analyze Partisan Changes in Vaccine Opinions

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Abstract

For at least the first half of the 2010s, vaccine skepticism appeared to be either uncorrelated with partisanship, or slightly more associated with the cultural left. But in the early 2020s, vaccine skepticism is significantly more prevalent in the Republican Party than among Democrats. Standard theories of partisan elite cue-taking (e.g., Druckman, Peterson, and Slothuus 2013) do not provide a satisfactory explanation for these changes. For one thing, elite cues in the Republican Party have been far from clear. These nuanced changes in partisan divisions on vaccine skepticism raise several questions. First, did the timing of these partisan shifts on vaccines coincide with the COVID pandemic, or may they have been precipitated by events prior to 2020? Second, to what extent are these shifts driven by individual members of each partisan group actually changing their vaccine views, as opposed to aggregate shifts in the membership of each party? Third, to the extent that individual opinions changed, are these changes attributable to demographic or attitudinal characteristics of each party, or is partisanship fundamentally important even after controlling for these factors? Existing vaccine opinion studies cannot systematically address these questions because they employ either cross-sectional data or they employ panel data starting *after* the appearance of COVID. This study gains greater analytical leverage by employing data from the 2016-2020 ANES Panel, supplemented by contemporaneous time series from Gallup and Pew.

Understanding how, why, and when public opinions change is a central concern in political science because opinions shape policy preferences, influence political and social behavior, and ultimately affect democratic governance. While much political science research on opinion change has focused on high-salience political issues like abortion or social welfare, less attention has been paid to lower-salience issues such as how people form and revise beliefs about medical science or public health. In part, this may be a result of more limited survey data on such topics. This study seeks to better understand the operation and application of theories of opinion change to less salient issues by using panel data to analyze partisan patterns of opinion change regarding vaccines.

For at least the first half of the 2010s, vaccine skepticism appeared to be either uncorrelated with partisanship (e.g., Kahan 2014; Pew 2015), or slightly more associated with the cultural left (e.g., Reich 2016). But in the early 2020s, vaccine skepticism is significantly more prevalent in the Republican Party than among Democrats (Jones 2024). Standard theories of partisan elite cue-taking (e.g., Druckman, Peterson, and Slothuus 2013) do not provide a satisfactory explanation for these changes. For one thing, elite cues in the Republican Party have been far from clear (KFF Health News 2023). Secondly, such theories cannot explain why independents—who don't have party leaders to follow—also seem to have become more skeptical of vaccines during this period, similar to Republicans.¹

These nuanced changes in partisan divisions on vaccine skepticism raise several questions. First, did the timing of these partisan shifts on vaccines coincide with the COVID pandemic, or may they have been precipitated by events prior to 2020? Second, to what extent are these shifts driven by individual members of each partisan group actually changing their vaccine views, as opposed to aggregate shifts in the membership of each party? Third, to the extent that individual opinions changed, are these changes attributable to demographic or attitudinal characteristics of each party, or is partisanship fundamentally important even after controlling for these factors?

Because vaccines are a lower-salience topic, I begin this study by briefly reviewing the context surrounding the topic of vaccines during the past quarter century. Having set the stage, I then review relevant theoretical literature on opinion stability and change. I then discuss the data and methods used to analyze this study's central questions, before presenting the analysis. I conclude with a discussion of the key findings and their relevance for the literature and for the polity.

Background: The Vaccine Information Environment 1998-2020²

1998-2015

Vaccine skepticism has been around as long as vaccines. However, a review of the modern era of vaccine skepticism begins with the publication in 1998 of Andrew Wakefield and coauthors' (since discredited) *Lancet* study purporting to show that gut inflammation caused by the childhood vaccine for measles, mumps, and rubella (MMR) increased the incidence of autism. Fears stoked by this study were subsequently amplified by other activists appearing in the media. In 2005, two left-leaning outlets, *Rolling Stone* and *Salon*, simultaneously published Democrat Robert F. Kennedy Jr's article, "Deadly Immunity." The article accused government agencies of colluding with pharmaceutical companies to

¹ This latter observation has not been widely reported, but is clear in publicly available data and the ANES, as presented later in the paper.

² The reason that this review ends in 2020 is that the key data utilized for this paper's analysis has 2020 as the endpoint in its measurement of vaccine attitudes.

cover up the dangers of thimerosal, a preservative used in some vaccines. Around this same time, Hollywood celebrity Jenny McCarthy broadcast her belief that vaccines caused her son's autism with appearances on *Oprah* and *Larry King Live* and publication of her book (2007), *Louder than Words: A Mother's Journey in Healing Autism*. In 2010, it was widely reported that British medical authorities found Wakefield guilty of professional misconduct, and that the *Lancet* officially retracted the article. In 2011, *Salon* retracted Kennedy's article, citing factual inaccuracies.

Also during this period, in 2006, Texas's Republican Governor Rick Perry issued an executive order mandating that girls receive the newly approved human papilloma virus (HPV) vaccine in order to enroll in sixth grade. The order sparked a backlash in the state and was overwhelmingly overridden by bipartisan majorities in the state legislature. This issue resurfaced in 2011 during a nationally televised debate among candidates—including Perry—for the 2012 Republican presidential nomination. Representative Michelle Bachman suggested that the HPV vaccine had caused mental retardation in the son of one of her supporters. That same year an anti-vaccine documentary, *The Greater Good*, appeared in multiple film festivals and then gained traction online.

Declines in vaccine uptake in the US began to produce more outbreaks of diseases. In 2010 and again in 2014, California experienced record numbers of cases of whooping cough, leading to twelve infant deaths. News outlets reported on studies attributing the outbreaks to lowered rates of vaccine uptake, particularly in wealthy, liberal communities such as Marin County.³ In turn, this coverage helped fuel a common stereotype of vaccine skeptics as being concentrated in left-leaning, New Age, "Whole Foods" communities.⁴

In 2014 and early 2015 there were two large measles outbreaks in the US. The first occurred in an Amish Community in Ohio, representing the nation's largest outbreak in nearly two decades. The second occurred at Disneyland in California. These events called national attention to the fact that MMR vaccination rates were declining and highlighted the risks this posed. Addressing the California outbreak on NBC's *Today* show, President Obama commented, "The science is, you know, pretty indisputable. We've looked at this again and again. There is every reason to get vaccinated — there aren't reasons to not."⁵ California legislators responded to this outbreak by enacting an unprecedented law eliminating all nonmedical (including religious) exemptions from the state's MMR vaccine requirement to attend public schools. Final votes in both the State Assembly and State Senate were largely along party lines, with most Democrats in favor and most Republicans opposed.

Publicity surrounding California's legislative plans activated the attention of those in the parental rights movement. Possibly as a result, some politicians seemed to try to curry favor with this constituency. This was particularly noticeable among those vying for the Republican presidential nomination. Amid public discussion of the Disneyland outbreak in 2015, New Jersey Governor Chris Christie said, "Parents need to have some measure of choice." Kentucky Senator Rand Paul suggested most vaccines "ought to be

³ <https://www.ibtimes.com/marin-county-californias-measles-outbreak-look-epicenter-anti-vaccination-trend-1808182>

⁴ <https://www.washingtonpost.com/news/energy-environment/wp/2015/01/26/the-biggest-myth-about-vaccine-deniers-that-theyre-all-a-bunch-of-hippie-liberals>

⁵ <https://www.cnn.com/2015/02/02/politics/christie-vaccination-london>

voluntary” and indirectly linked them to “profound mental disorders.”⁶ In response, Democratic presidential hopeful Hillary Clinton tweeted, “The science is clear: The earth is round, the sky is blue, and #vaccineswork. Let's protect all our kids.” Her main rival, Independent Senator Bernie Sanders, did not comment.

In a Republican presidential debate in September 2015, Donald Trump said, “Just the other day, two years old, a beautiful child, went to have the vaccine, and came back and a week later got a tremendous fever, got very, very sick, now is autistic.” Senator Paul and Dr. Ben Carson also questioned childhood vaccine schedules. While these Republican voices received considerable attention, they did not represent the bulk of opinion within the GOP presidential field. During this same year, Republican presidential candidates Marco Rubio, Ted Cruz, Bobby Jindal, Scott Walker, Mike Pence, Rick Perry, and Jeb Bush all urged greater uptake of childhood vaccines.⁷

2016-2020

During the mid- to late-2010s, Russian trolls and bots helped produce a high volume of vaccine misinformation in social media settings (Broniatowski et al 2018), and MMR vaccination rates continued to lag. In late 2018 and early 2019, large outbreaks of measles cases took place in the state of Washington and in ultra-Orthodox Jewish communities in New York City and surrounding areas. By April, outbreaks had spread to 22 states and the number of cases nationwide exceeded those in 2014-15. After initial silence on the issue, in late April President Trump responded to a reporter’s question by saying, “They have to get the shots. The vaccinations are so important. This is really going around now. They have to get their shots.”⁸ Lawmakers in thirteen states proposed legislation to actions to narrow or eliminate MMR vaccine exemptions, with measures passing in Washington, New York, and Maine. At the same time, legislation to expand exemptions was introduced in seven states, but none passed. For those legislative measures that received votes, the pattern was notably more partisan (Democrats more likely to support, Republicans more likely to oppose) than for vaccine legislation in years past (Estep et al 2022).

With the onset of the COVID-19 pandemic in the US in 2020, there was speculation about the possibility of a future COVID vaccine. As early as April, conspiracy theories began to circulate that Bill Gates planned to implant microchips in people via COVID vaccines, and that the vaccine would make people sterile. President Trump’s public position related to COVID vaccination displayed two divergent facets. On the one hand, he regularly promoted his “Operation Warp Speed” initiative to develop a vaccine and touted its expected safety and benefits: “America’s brilliant doctors and scientists have been working around the clock... The vaccines are going through a historic groundbreaking initiative... A safe and effective vaccine in record time... we will save millions and millions of lives, both in our country and all over the world.”⁹ On the other hand, perhaps seeking to deflect blame for the pandemic, he often appeared to minimize the threat of COVID—a message that may have indirectly led some to believe that a vaccine wouldn’t provide any useful benefit. For example, in an interview on *Fox & Friends* in mid-

⁶ <https://www.cnn.com/2015/02/02/politics/christie-vaccination-london>. The same article notes that the Democratic National Committee quickly knocked Christie for putting on a “tin foil hat” and “bowing to junk science.”

⁷ <https://www.politico.com/story/2015/02/ted-cruz-vaccinations-114862>.

⁸ <https://www.cnn.com/2019/04/26/trump-says-people-must-get-vaccinated-amid-measles-outbreaks.html>

⁹ <https://trumpwhitehouse.archives.gov/briefings-statements/remarks-president-trump-vaccine-development/>

September, Trump said, “We’re rounding the corner — with or without a vaccine — they hate it when I say that, but that’s the way it is.”¹⁰ During this period of the Trump presidency, Democratic politicians were nearly uniform in expressing the dangers of COVID and promoting the expertise of scientists and virologists. At the same time, they also displayed concern over whether vaccine approval might be rushed for political purposes by Trump’s executive branch. In September, Biden stated: “Let me be clear: I trust vaccines, I trust scientists, but I don’t trust Donald Trump... We can’t allow politics to interfere with a vaccine in any way.”¹¹ This caution regarding the COVID vaccines seemed to fade for Democratic politicians after Biden was declared the winner of the presidential election on November 7.

Literature & Theory

Timing of Partisan Shifts

The initial question posed in the introduction relates to the timing of the shifts in vaccine opinions. Specifically, we know that the COVID pandemic in 2020 was the most salient vaccine event to occur during the period studied here, but we also know that several other important events occurred in the years prior to COVID. So, either one or both might play a role. In an unpublished analysis of publicly available survey data, Jones and McDermott (2022b) find evidence that a divergence between Democrats and Republicans on vaccine attitudes was already underway prior to 2020. However, this study has two key weaknesses. First, at the time the paper was written, key opinion series ran only up to 2019. This leaves some uncertainty about the extent to which current partisan patterns of vaccine attitudes are more a product of the earlier events or events since the pandemic. Second, the study does not look at opinion change among Independents. Without this baseline, it is more difficult to tell whether the opinion shifts are clearly partisan in nature. And, it is difficult to discern the degree to which any partisan changes are symmetric or asymmetric.

Changing Minds or Changing Parties?

A second question posed in the introduction is whether the aggregate shifts in vaccine attitudes among partisan subgroups reflect real changes in individual opinions within each subgroup (e.g., a Republican becoming more skeptical of vaccines), or merely reflect temporal changes in the composition of each party, either through generational replacement (e.g., a new voter who is vaccine-skeptical deciding to identify as a Republican) or party switching (e.g., a skeptical Democrat switching to Republican identification).

The latter scenario has echoes of the literature on party sorting (e.g., Fiorina, Abrams, and Pope 2006). This is not to suggest that the issue of vaccines is necessarily a cause of party sorting. However, research does show that in recent years the Democratic Party has increasingly become the home of Americans with college degrees, while the Republican Party has become the home of those without college degrees (Zingher 2019). Since education is negatively correlated with vaccine skepticism, this demographic shift alone could theoretically produce some decrease in skepticism in the Democratic Party and some increase in skepticism in the Republican Party, even if no one is actively thinking about vaccines.

¹⁰ <https://abcnews.go.com/Politics/trump-calls-handling-pandemic-phenomenal-death-toll-nears/story>

¹¹ <https://www.reuters.com/article/world/democrat-biden-warns-against-rushing-out-coronavirus-vaccine-says-trump-cannot-idUSKBN2671R8/>

The literature on party identification suggests that it is highly stable in individuals and exhibits strong intergenerational transmission (Campbell et al 1960; Green, Palmquist, and Schickler 2002; Jennings and Niemi 1981). When generational replacement or individual changes in party identification are do occur, such changes are extremely slow. So, while compositional change in the parties could theoretically account for the aggregate shifts in partisan vaccine attitudes over the course of a decade, the short time frame makes this somewhat unlikely.

In contrast to party identification, specific issue attitudes—such as towards vaccines—tend to be more weakly held and therefore generally more subject to potential change over time (Converse 1964). As such, individual-level change in vaccine attitudes among stable partisans is the more likely proximate explanation for aggregate shifts in vaccine attitudes among partisan subgroups. But parsing out precisely how much of these shifts are due to individual-level change requires analysis of panel data extending back before the pandemic—something which existing studies have yet to examine.

Models of Opinion Formation and Change

Assuming that individual opinions on vaccines have been shifting, what is the best way to theorize about the causes of such shifts? Zaller's (1992) Receive, Accept, Sample (RAS) model provides a clear way of thinking about how individuals arrive at their judgements. The basic idea is that at any given point in time, a person's opinion is based on the balance of considerations that happen to be most immediately accessible in their memory. To be a possible consideration, information needs to be both received and accepted. The reception of information depends on a person's attention to news, both in general and regarding that issue in particular. The acceptance of (received) information depends on the strength of a person's predispositions and the degree to which the information conflicts with those predispositions. People with weak predispositions are more likely to accept received information uncritically, while those with strong predispositions may reject information that conflicts. Finally, the accessibility of accepted considerations (and thus their likelihood of being sampled) depends largely on their recency.

The logic of Zaller's model suggests that there are two key avenues through which a person might change their opinion on a given topic, all else being equal. First, *reception* of information could change. Second, *acceptance* of received information might change. Each of these avenues touches on other, related literatures, as discussed below.

The first avenue--reception of information—could change over time for a few different reasons. For example, information about the topic might become newly available or more readily available. Or, a changing media landscape might make it easier (or harder) for individuals to come across a particular type of information. Or, contextual events might prompt a more active search for information on the topic. Note that if any of these sorts of changes occur, the new pattern of received information will be more recent than the old pattern, and therefore is likely to be more accessible.

In the case of vaccines, there is a strong case to be made that anti-vaccine misinformation became increasingly more readily available over the course of the 2010s, particularly during the outbreaks of 2015 and 2019. Not only was this information theoretically available, social media algorithms became increasingly sophisticated about feeding it to people who might not otherwise encounter it in the older, traditional media environment (Kata 2012; Schmidt et al 2018; Alcott, Gentzkow, and Yu 2018; Gunaratne et al 2019; Stecula, Kuru, and Jamieson 2019; Broniatowski et al 2018).

The other avenue of opinion change—increased or decreased acceptance of received information—is all about how people process information. The way that a person processes information is related, in large part, to their predispositions—such as one’s attachment to a party, ideology, or other core value. Research on directionally motivated reasoning suggests that people do not simply process information in an unbiased manner. Instead, they selectively and unconsciously accept or reject information in a way that protects their deeply held identities or core beliefs (Taber and Lodge 2006). While these predispositions themselves are generally stable, it is possible that over time a person’s party, ideology, or core value may become more closely associated with one side of an issue. In this case, someone who holds that identity will become less accepting of received information that conflicts with the issue position now associated with their cherished identity.

In particular, relevant to vaccines, over the course of the 2010s, the Democratic Party became more clearly associated with uncritical support for scientific expertise and rejection of rhetoric deemed to be “anti-scientific” (Krause et al 2019).¹² Furthermore, although Democratic elites’ pro-science rhetoric was initially focused on the issue of climate change, as events raised the salience of vaccines, this pro-science association expanded to apply also to vaccines (Oreskes and Conway 2021). As a consequence, rank-and-file Democrats who may otherwise have uncritically accepted new vaccine misinformation may have become less likely to do so because adopting the pro-science position on vaccines is now more closely tied to their Democratic party identity.¹³

Note that for opinion differences to emerge among partisan subgroups, it is not necessary for the *opposite* association to take hold among Republicans or Independents. Even if members of these groups have *no* strong feelings about science, the very fact that they feel no identity-protective need to reject negative vaccine information means that they will accept more of this negative information than Democrats do. As a result, opinions would be expected to begin to diverge.

Another reason why subgroups might differ in acceptance of received information, besides identity-based motivated reasoning, is that members of that group may be hard-wired to employ a different cognitive style. For example, research suggests that conspiratorial thinking is a stable personality trait or worldview organized around institutional distrust (Uscinski, Klobstad, and Atkinson 2016). When processing information, those who possess this trait are less likely to accept information from official or mainstream sources, and more trusting of alternative narratives. In the case of vaccines, this would mean more ready acceptance of vaccine misinformation. So, if this trait is distributed less heavily within the Democratic Party than among Republicans and Independents, it would cause a divergence in partisan vaccine opinions following an uptick in the reception of vaccine misinformation.

A second type of hard-wired cognitive style is the tendency to engage in effortful thinking in order to arrive at an unbiased or “correct” decision (e.g., Cacioppo and Petty 1982). Studies show that people who intrinsically enjoy sifting through and rationally evaluating relevant information are less likely to have their opinions swayed by misinformation (Pennycook & Rand 2019). While such traits are thought to be somewhat uncommon in the population, there is some evidence that it may be more common among liberals (e.g., Pennycook & Rand 2019). Since liberals are more Democratic, one reason why

¹² “Notably, the gap between political partisans expanded sharply between 2016 and 2018, growing from a 5-point gap to an 11-point gap” (Krause et al 2019, 821).

¹³ Alternatively, Democrats who already held strong pro-science views about topics such as climate change might have increasingly seen a connection between these views and the topic of vaccines.

Republicans and Independents may appear to have shifted more negatively towards vaccines is that the greater proportion of effortful thinkers in the Democratic Party led to more reflective resistance to the influx of vaccine misinformation.

This review of the literature does not cover every possible explanation for diverging vaccine opinions among partisan subgroups, but it does help to highlight some key alternative hypotheses grounded in theory.

Data and Method

This paper's analyses are divided into three sections, addressing the three questions posed in the introduction regarding (a) the timing of partisan shifts, (b) the degree to which the partisan shifts are from changing minds versus changing party composition; (c) whether partisan differences in individual-level shifts are attributable to demographic or attitudinal characteristics of each party, or are robust to these controls.

The main data used in all three analyses come from the American National Election Study's (ANES) 2016 and 2020 Time Series Studies, particularly the embedded 2016-2020 Panel Study (N=2,590). Detailed information about these surveys and their methodology is available on the ANES website.¹⁴ For the analysis of timing of vaccine shifts, I also employ data collected by Gallup in three fresh-sample surveys conducted February 28-March 1, 2015 (N=1,015), December 2-19, 2019 (N=1,025), and July 1-21, 2024 (N=1,010). Data from the 2019 and 2024 surveys come from crosstabulations published by Gallup because they have not made the raw data available.

Two key variables are featured in all analyses: vaccine skepticism and partisanship. I measure vaccine skepticism in the ANES surveys using the question, "Do the health benefits of vaccinations generally outweigh the risks, do the risks outweigh the benefits, or is there no difference?" In order to make interpretation of the analysis more straightforward, I recode the three possible responses to this question into two categories. Respondents who say that vaccine benefits outweigh risks are coded 0, as non-skeptics. All respondents who do *not* say that vaccine benefits outweigh risks ("risks outweigh" or "no difference") are coded 1, as vaccine skeptics.¹⁵ Non-responses are omitted from the analysis. In Gallup, I use the question, "Do you think vaccines are more dangerous than the diseases they are designed to prevent, or not?" (No middle category is offered.) Respondents who answer "no" are coded 0, as non-skeptics, while those who answer "yes" are coded 1, as skeptics.

In terms of face validity, the Gallup question is more of a blunt instrument than the ANES measure. First, the one-sided nature of the question plus, the fact that there is no middle category, may lead respondents who are unsure about the relative safety of vaccines (fitting our definition of skeptical) to answer "no," thus grouping them with non-skeptics and artificially suppressing the measured proportion of skeptics. Second, the question is framed primarily on vaccine safety, such that those who are mainly skeptical regarding vaccine benefits (e.g., preferring "natural immunity"), not vaccine safety, would be incorrectly coded as non-skeptics. Nevertheless, the core issue at the heart of both questions is highly

¹⁴ <https://electionstudies.org/data-center/>

¹⁵ Supplemental analyses (not shown here) employing all three response categories produce results that are substantively similar to those presented in this paper.

similar. So, while their marginal values are not directly comparable, comparing the temporal patterns of the two measures is still valuable.

For partisanship, I categorize respondents into Democrats, Republicans, and Independents. In the ANES, Democrats are those who identify with or feel closer to the Democratic Party, Republicans are those who identify with or feel closer to the Republican Party, and Independents are those who do not identify with or feel close to either party (“pure” independents). Although allocating partisan leaners is standard practice in political science, the crosstabulations by party available from Gallup do not allocate partisan leaners, leaving them categorized as Independents for this analysis. This is another notable difference from the ANES that is important to keep in mind when comparing trends, particularly among independents.

For the analysis of changes in individual-level vaccine skepticism, I control for other variables thought to affect information processing in general and vaccine attitudes in particular. (All explanatory variables are measured in the 2016 wave.) The likelihood of receiving information—in this time period, an influx of vaccine misinformation—related to one’s attention to news media. In the ANES this is commonly with an index capturing respondents’ ability to correctly identify various public figures in the news. (Note, however, that increased knowledge is also associated with stronger predispositions and thus greater ability to resist new information that conflicts with current opinions, so it is unclear which aspect will matter more.) Reception of information is also influenced by the type of news outlets a person uses. Mainstream outlets tend to present more factual information on the relative benefits and low risks of vaccines, while less reliable outlets with a right-leaning bent have been more likely to give voice to vaccine conspiracies. In 2016, ANES asked respondents whether they got news from each of 49 different outlets. Using reliability and left-right bias coding from *Ad Fontes Media*¹⁶, I coded respondents for whether or not they accessed mainstream news outlets and whether or not they accessed unreliable right-leaning outlets.

Factors influencing acceptance of received information include motivated reasoning based on core dispositions. Aside from partisan predispositions, discussed above, I also control for predispositions emanating from ideology and from affect towards scientists. Previous research has associated conservatism with negative vaccine attitudes (e.g., Butler and Shaw 2015), and pro-science orientations with positive vaccine attitudes (e.g., Jones and McDermott 2022a). Key personality traits may also affect acceptance of vaccine misinformation. The trait of conspiratorial thinking should make individuals more likely to accept vaccine misinformation (e.g., Jones and McDermott 2022a). I measure this with an index capturing respondents’ conspiratorial beliefs about 9/11 and about Obama being a Muslim. On the other hand, those who are oriented towards carefully evaluation information (e.g., Cacioppo and Petty 1982) should be less likely to blindly accept vaccine misinformation. As a rough proxy for this orientation, I employ the ANES Wordsum index—a ten-item vocabulary test sometimes used to measure cognitive complexity (Gooch 2015).

Finally, certain demographic variables have previously been associated with vaccine attitudes. Due to the unique history of Black people in America—including a history of medical exploitation and abuse—Black Americans tend to be significantly more skeptical of vaccines than other races are. Conversely,

¹⁶ <https://app.adfontesmedia.com/chart/interactive>

Americans over 65 years of age, those with incomes above the median, and education tend to be less skeptical (e.g., Jones and McDermott 2022a).¹⁷

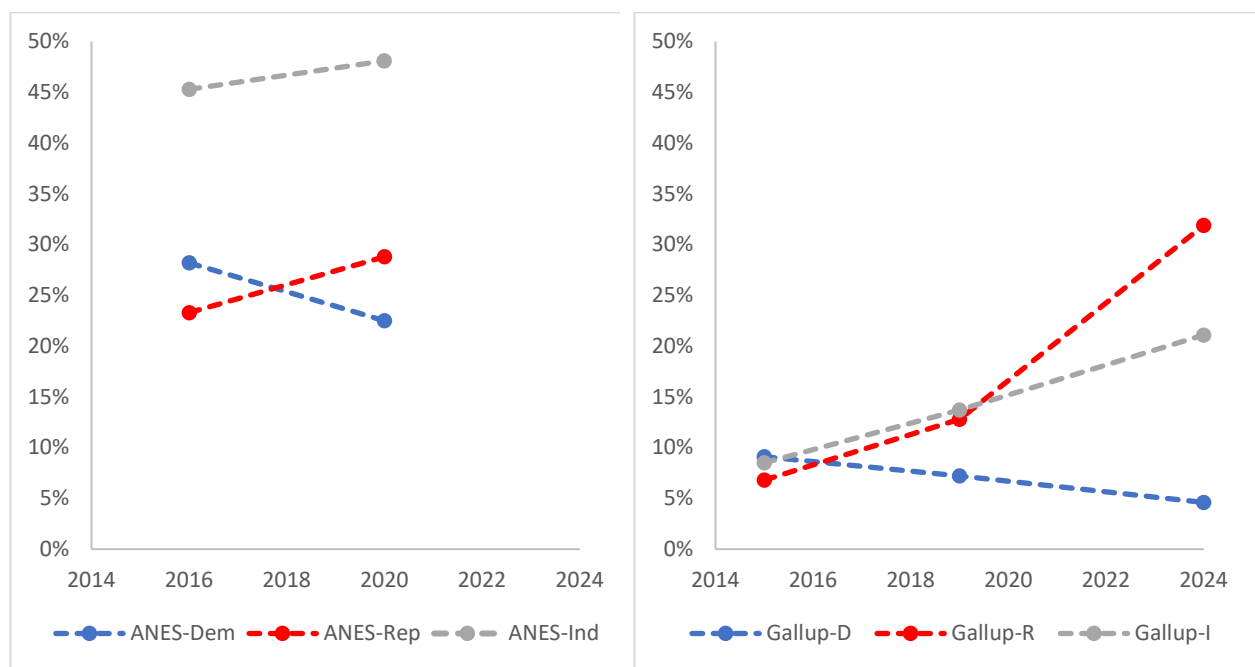
Details on specific methods will be discussed in each analysis subsection.

Analysis

Timing of Partisan Shifts

Figure 1's panel A presents the change in vaccine skepticism over time among Democrats (blue line), Republicans (red line), and pure independents (grey line) in the ANES Time Series data from 2016 and 2020. For this portion of the analysis, the marginal values are based on the full sample in each year (not restricted to panel participants). Data are weighted to be representative of American adults. The figure illustrates that in 2016, only a minority of Americans in each partisan category could be fairly classified as vaccine skeptics—those who see benefits as no greater than risks. However, pure independents were the most skeptical (45%) and Democrats were five points more skeptical than Republicans (28% to 23%; $p<.001$). By 2020, skepticism had increased among both independents and Republicans, but decreased among Democrats. As a result, the rank ordering of the two main parties reversed. Democrats became 6 points *less* skeptical than Republicans (23% to 29%; $p<.001$).

Figure 1: Vaccine Skepticism by Party in ANES (Panel A) and Gallup (Panel B)



With only two data points in the time series, it is hard to pin down exactly when the ordering of the two main parties reversed (the dotted lines help highlight the direction of change over the four years, but are not reflective of specific values in between). From our timeline, the two salient vaccine-related events that might conceivably have spurred significant change are the measles outbreaks and political

¹⁷ Sex has sometimes been associated with vaccine attitudes, but shows no effect when added to this paper's model, so it is not included here.

responses of early 2019 or the vaccine speculation following the COVID pandemic in 2020. Fortunately, Gallup asked its vaccine question in late 2019—following the measles-related events, but predating any COVID-related events—providing some leverage on this question.

Figure 1's panel B presents the partisan breakdown in the Gallup data—based on the alternative vaccine question—in 2015, 2019, and 2024. In 2015, Gallup's data find Democrats (9%) and independents (9%) expressing slightly more skepticism than Republicans (7%)—though none of these differences are statistically significant. More important than these marginal values (given the survey differences from ANES) is the fact that the Gallup data's trend is highly similar to that in the ANES. Specifically, by late 2019 in the Gallup data, skepticism had increased among both independents and Republicans, but decreased among Democrats. As a result, Democrats became 6 points less skeptical than Republicans (7% vs 13%, $p < .001$). By 2024, following the events of the COVID pandemic, this party gap had further increased to 27 points (5% vs 32%).

Comparing the two datasets yields three key takeaway points. First, key trends from this period that are apparent in the ANES data—increases in skepticism among Republicans and independents, decreases among Democrats, reversal in the ordering of the two main parties—are also present in the Gallup data, providing some confidence that they are not methodological artifacts. Second, these trends appear to have already been substantially underway prior to COVID, suggesting that the measles outbreaks and responses in 2019 played an important role. Third, the observed changes were not temporary, continuing to hold true four years after the onset of COVID. So, rather than being a quirk of this period, they represent a meaningful shift worthy of scholarly analysis.

Changing Minds or Changing Parties?

In this portion of the analysis, I attempt to parse the degree to which the aggregate changes in each partisan group observed above are the result of actual attitude change among individuals or whether they are merely the byproduct of changes in the membership of each party.

Regarding changes in the membership of each party, the main focus of this analysis is on the relative impact of citizens changing their party identification. However, another type of change in the parties is generational turnover. Traditionally, nested decomposition analyses such as the type performed here do not account for generational turnover. A common justification is that the slow pace of generational change means that any impact would usually be small. Before moving to the standard decomposition analysis, I provide a simple test of this assumption. Specifically, I aim to demonstrate that the shifts in vaccine skepticism seen in Figure 1, panel A, are not merely an artifact of generational turnover. Figure 2 compares the relative increase (or decrease) in vaccine skepticism between 2016 and 2020 among (a) the full ANES cross-sections in each year (as visually represented in Figure 1, panel A), and (b) only members of the ANES Panel who participated in both waves. Consistent with expectations, the data show that both the direction and relative magnitude of changes are similar for each subgroup, even when the sample is restricted to panel respondents. Therefore, the remainder of this subsection focusses on the source of change among these panel cases.

Table 1: Comparing Shifts in Vaccine Skepticism Measured Using Full Samples vs. Panel Only

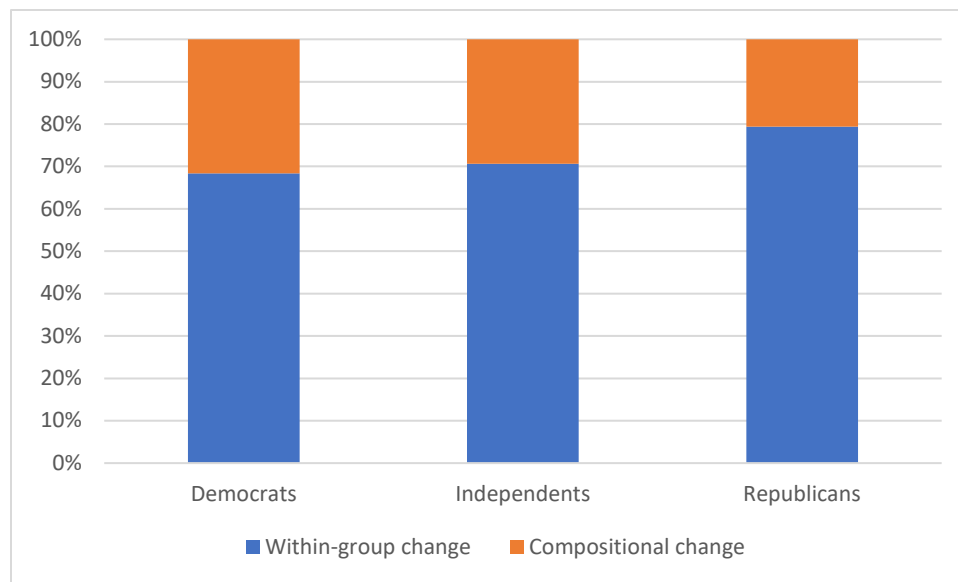
	Full cross sections	Panel only
Democrats	-6%	-6%
Independents	+3%	+2%
Republicans	+6%	+7%

My method of decomposing over-time change into components representing within-group change vs compositional change follows the basic process pioneered by Kitagawa (1955).¹⁸ The shifts to be decomposed for each partisan group are those presented in the second data column of Table 1. Using Democrats as an example, the process of decomposition is as follows. The overall shift in vaccine skepticism to be explained among Democrats is a decrease of 6.34 percentage points. I begin by restricting the sample to “consistent Democrats”—those who retained Democratic party identification across both periods. I calculate the exact percentage-point shift in vaccine skepticism among these consistent Democrats (-5.1). I then compute an average of the proportion these consistent Democrats are among all Democrats in 2016 and 2020 (.849). I then multiply the point shift among consistent Democrats by their average proportion among all Democrats ($-5.1 * .849 = -4.33$). This product represents the number of points from the overall shift that is attributable to actual opinion change among individual Democrats. Any remaining change from the overall total ($-6.34 - -4.33 = -2.01$) is necessarily attributable to compositional change—the party losing individuals who originally identified as Democrats in 2016, or gaining individuals who newly identified as Democrats in 2020. As a percentage of the total shift to be explained among Democrats, opinion change accounts for 68% ($4.33/6.34$) and compositional change accounts for the remaining 32%.

Figure 2 presents the results of repeating this decomposition technique for all three of the partisan groups. The main takeaway from these results is that actual change in individuals’ vaccine attitudes—not party switching—is responsible for the vast majority of the overall temporal shifts found in each party. Specifically, they account for more than two-thirds of the overall shift within each party.

¹⁸ Prominent applications to political science include Goren (2005) and Layman and Carsey (2002), and Lelkes (2016).

Figure 2: Decomposing Overall Shifts into Within-Group vs. Compositional Change



Having found that the biggest reason for shifts within each partisan grouping are individual level changes, I now turn to a detailed analysis of these individual-level changes.

Explaining Individual-Level Opinion Change

In this section, my focus is on how individuals in each partisan group changed their views towards vaccines, and whether any differences in patterns of individual change across these partisan groups are truly partisan, or merely artifacts of other group characteristics.

To analyze individual-level change, I turn again to the 2016-2020 ANES Panel, restricting the analysis to those who maintained the same partisan identification in both waves. Among these consistent partisans, I look at whether each individual switched from being non-skeptical of vaccines to skeptical, skeptical to non-skeptical, or did not change views between 2016 and 2020. As such, my dependent variable takes on three possible values: a shift from non-skeptical to skeptical is coded 1; no change in views is coded 0; a shift from skeptical to non-skeptical is coded -1.

Table 2 presents an overview of the dependent variable, broken down by party. The far-right column shows that among everyone included in the table, most people did not change views between 2016 and 2020. Among those that did, roughly an equal proportion became skeptical as became non-skeptical. However, this balanced pattern of change overall masks key partisan differences below the surface. Specifically, Democrats were significantly more likely than Independents and Republicans to keep their 2016 vaccine views (82% vs. 73%, 73%), and significantly *less* likely to become a vaccine skeptic (7% vs. 15%, 17%). Notably, there is no significant difference between Independents and Republicans in any category.

Table 2: Change in Vaccine Views from 2016 to 2020, by Party (Consistent Partisans)

	Democrats	Independents	Republicans	All
Switch to non-skeptic	12%	12%	10%	11%
No change	82%*	73%	73%	77%
Switch to skeptic	7%*	15%	17%	12%

*Percentages that are significantly different from others in that row.

Having found significant partisan differences—particularly for Democrats—in individuals’ changing views of vaccines, the final task is to probe whether these differences are truly attributable to party attachments—and thus predispositions—or whether these differential patterns of change are largely explained by key attitudinal or demographic characteristics of the individuals in each group. Certainly, there are examples where observed party differences in opinions have been substantially explained away after controlling for other individual-level characteristics (e.g., see Kinder and Sanders 1996).

With three ordered values in the dependent variable, it is appropriate to use ordered logistic regression for this portion of the analysis. Because a person who is already skeptical cannot shift upward on this scale and a person who is already non-skeptical cannot shift downward (ceiling and floor effects), it is necessary for this model to control for each person’s baseline vaccine skepticism from 2016. In addition, the model includes all of the attitudinal and demographic control variables discussed in the Data and Methods section.

The key variables of interest in the model are the dummy variable for individuals who identified with or leaned toward the Democratic Party, and the dummy variable for those who identified with or leaned toward the Republican Party. Pure independents are the reference category (no variable). All else being equal, if both Democrats and Republicans are responding to divergent cues about vaccines from their party’s respective leaders, then we would expect to find that Democrats are significantly less likely than pure independents (who have no party predispositions) to become skeptical (negative coefficient), and Republicans are significantly more likely than pure independents to become skeptical (positive coefficient). If only Democrats are sending clear signals—which seems consistent with the historical record—then only the coefficient for Democrats will be significant, while Republicans will have no significant difference from pure independents (neither is responding to party cues, so individual-level characteristics are the drivers of change). Finally, if the control variables in the model are the main explanation for all individuals’ shifts in vaccine skepticism, not party cues, then neither of the party coefficients will be statistically significant.

Table 2 presents the regression results. The negative and significant coefficient for the Democratic dummy variable indicates that being a Democrat still helps predict a lower likelihood of having shifted to vaccine skepticism (and/or higher likelihood of shifting to non-skepticism) than is the case among pure independents. This is true even after controlling for a wide array of variables related to opinion change and vaccine attitudes. On the other hand, the results provide no evidence that Republicans are more likely to have shifted to vaccine skepticism than independents did. Specifically, the coefficient for being a Republican is not statistically significant (and not even in the expected direction).

Table 2: Explaining Change in Individuals' Vaccine Skepticism, 2016-2020

Variable	Estimate	Significance
Democrat/lean	-0.772	0.000
Republican/lean	-0.354	0.120
News-unreliable right	0.361	0.019
News-mainstream	-0.378	0.004
Political awareness	-0.110	0.024
Conservatism	0.081	0.167
Scientists affect	-0.008	0.016
Conspiratorial	1.786	0.000
Vocabulary	-0.086	0.005
Black	1.063	0.000
Elderly	-0.520	0.001
Income high	-0.493	0.000
Bachelor's degree	-0.206	0.179
Baseline hesitancy	-23.009	0.000

Note: DV: 1=shift to skeptic; 0=no shift; -1=shift to non-skeptic. Estimates are ordered logit coefficients; significance is two-tailed p-values. N = 1,872. Nagelkerke R² = .51.

Though not explicitly tested in this model, alternative models confirm that the difference between Democrats and Republicans is statistically significant: Democrats are significantly less likely to have shifted to vaccine skepticism than are Republicans. However, it is important to emphasize that the explanation for this difference is not symmetrical. The results are consistent with the hypothesis that cues from party elites mattered for Democrats, but there is no evidence that cues from Republicans led to shifts in opinion that were any different from those among pure independents.

While it remains possible that the significant results for Democrats are due to some omitted control variable, the model does provide a high level of explanatory power, with a Nagelkerke Pseudo-R² of .51, and most of the controls are behave as expected.

Discussion

The literature on partisan differences in American public opinion has traditionally focused on issues that have been highly salient over a long period, and scenarios in which elite cues on that issue from Democratic and Republican elites clearly diverge. In contrast, this project focusses on a lower salience issue, vaccines, and a situation in which opinion cues are clear on one side of the aisle, but not the other. The results provide useful insights both for theories of elite cue taking and for understanding the nuanced dynamics of public opinion about an issue with important public health consequences.

One key takeaway is that in the specific issue of vaccine skepticism, we do not have a classic case of partisan polarization brought about by cue taking from both Democrats and Republicans. Rather, the belief that vaccines are more beneficial than risky was and is a majority opinion across all partisan groups in society. Differences between Democrats and Republicans emerged by late 2019. But these differences are of a more nuanced nature, caused by changes among a small subset of each party.

More importantly, the results here suggest that the mechanism of opinion change was not symmetrical across parties. The findings are consistent with partisan cue taking only among Democrats, not Republicans. Republicans' increased skepticism was likely caused by the same factors that led to similar shifts among independents. One version of this story, consistent with the historical record and this paper's analysis, is that by late 2019 access to vaccine misinformation had dramatically increased across the population and the issue of vaccines became more salient. One party, Democrats, had established a consistent message from its elites about devaluing anti-science rhetoric and information and this message extended naturally to vaccines. But no such cues counteracted uptake of negative vaccine information by Republicans (because party cues were not clear), or independents (because no party cues existed).

An interesting side note is that the phrase "asymmetric polarization" is generally associated with more extreme shifts/signals from Republican Party elites than among Democrats (Poole and Rosenthal 1997). Here, however, it is Democrats elites who are a prime driver of growing party differences.

Even though the COVID pandemic is officially over, the topic of vaccines continues to be in the headlines and to have important health consequences. The US is currently experiencing surges in measles outbreaks, and Secretary Robert F. Kennedy's Department of Health and Human Services is scaling back vaccine research and outreach. One of the implications of this project for vaccines specifically is that the findings complement existing experimental studies suggesting that clear pro-vaccine messaging from Republican elites would help to increase vaccine uptake among Republicans in the electorate. Additionally, the results help place the problem of vaccine misinformation into somewhat of a new light. Contrary to some journalistic accounts (Parker 2023), such misinformation is not just problematic among Republicans in particular. Instead, the results support the idea that both Republicans and independents may have been similarly affected.

The main weakness of the project is that it employs observational data. Future research should build upon these findings by designing experiments to allow for more precise causal tests of the mechanisms that are suggested by these findings, but not explicitly tested here.

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