



How behavioral science can solve healthcare hurdles as large as vaccine hesitancy

By Jacob Braude



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The news about the [slowdown](#) in U.S. COVID-19 vaccination rates has given new urgency to motivate the remaining unvaccinated people to get their shots. The scientific consensus is clear: Only by immunizing the majority of the public can we hope to achieve herd immunity and contain the pandemic.

Research to test cognitive biases in vaccine hesitancy

I'm convinced that commercial behavioral science can point us to the right strategies. I lead a team focused on commercial applications of behavioral science. We often work with life sciences companies to improve patient care by identifying and incorporating key cognitive bias triggers into how they engage with customers. Vaccine hesitancy is a perfect illustration of how, even if we have all the information we need to make good health choices, cognitive biases can lead us astray and negatively impact personal and public health.

That's why we worked with our colleagues who run the [Vaccine Center of Excellence](#) at ZS to design and field 20 behavioral science experiments across more than 620 adults in the U.S. Each experiment was designed to test a separate cognitive bias to learn which tactics would actually change people from being hesitant to get a vaccine to being willing to receive one. Our study had two arms—one investigating COVID-19 vaccine hesitancy, and the other looking at adult vaccine hesitancy for proven vaccines, including shingles, human papilloma virus (HPV) and pneumococcal.

Cognitive biases are mental shortcuts people use to make thinking faster and cheaper for our brains to handle. These mental shortcuts work well to aid our cognition. But they become detrimental when we use them in the wrong settings, which can lead us to poor choices or unhealthy behaviors in ways we don't recognize.

Research to test cognitive biases in vaccine hesitancy

Commercial behavioral science is the application of behavioral science techniques and insights to the behaviors that are important to help companies and initiatives succeed. While many groups and organizations have tried to apply general best practices from behavioral and cognitive science, we have discovered that this approach is sorely lacking.

For example, many of the interventions we tested have been recommended by experts and are being used in vaccine persuasion work today. But in our tests, only six interventions moved the needle on COVID-19 vaccine hesitancy. What's more, just four interventions nudged people to change their minds about adult vaccines in general. And only two of the four adult vaccine interventions were also successful for COVID-19.

The 6 interventions that encouraged hesitant individuals to get the COVID-19 vaccine



Prospect Theory: Individuals place more emphasis on gains rather than losses and as a result, will try to make decisions that contribute to gains.



Effort Justification: Increasing the effort involved with achieving a goal will change the value we place on the goal itself.



Confirmation Bias: Our preconceived expectations or preferences influence our decision-making in new or ambiguous situations.



Halo Effect: People consistently make irrational associations and assumptions between things that feel like they should be related but are not.



Social Facilitation: The presence of others can promote accountability and improve judgment in given situations, versus how individuals perform when alone.



Anchoring Effect: Exposure to arbitrary numbers can influence peoples' number-based estimates or behaviors.

Source: ZS vaccine hesitancy research, 2021

The 4 interventions that encouraged hesitant people to get adult vaccinations



Social Norms: People take on accepted attitudes and behaviors within a particular group, community or culture.



Commitment Bias: Successful goal attainment should be anchored in specific triggers and responding behaviors.



Social Facilitation: The presence of others can promote accountability and improve judgment in given situations, versus how individuals perform when alone.



Confirmation Bias: Our preconceived expectations or preferences influence our decision-making in new or ambiguous situations.

Source: ZS Vaccine hesitancy research, 2021

What our research revealed about vaccine hesitancy in U.S. adults

The goal of our research was to identify the discrete mental shortcuts that, when built into how we engage with vaccine-hesitant people, can nudge them in positive ways toward a willingness to get vaccinated. Between March 25 and April 15, 2021, we surveyed 620 U.S. adults, including at least 100 people of African American and Hispanic descent, who represented a mix of age, race, gender, geographies, employment statuses and income levels. We also were mindful to include respondents who represented the spectrum of vaccine-hesitant to anti-vaccine opinions.

It's not surprising that many of our findings about COVID-19 vaccine wariness mirrored previous research, especially around the themes of safety, data and government influence.

- 46% strongly agree that **there isn't enough data** on the safety of COVID-19 vaccines
- 42% strongly agree that **they do not know enough** about COVID-19 vaccines
- 35% strongly agree that the **government is too involved** in vaccine decisions

Improving vaccine acceptance with targeted interventions

The 20 experiments we fielded were all grounded in significant literature from academia. In many cases, we replicated published study designs, rewritten for the vaccine decision. These behavior-change techniques are typical of what behavioral scientists and others have recommended to improve vaccine acceptance. Yet in our tests, many did not work.

Our experiments first assessed a baseline willingness for individuals to get vaccinated in the near future. Next, we exposed people, in a random order, to different scenarios designed around established behavior change techniques, and then reassessed their willingness to get vaccinated. We analyzed all of this data to determine which bias prompts caused a statistically significant change in the willingness to get vaccinated. All of the tests we cover here showed a significant change at the 90%–95% confidence level.



The 6 nudges that encouraged COVID-19 vaccination

Although these validated bias triggers should be layered into pro-vaccination efforts to achieve the biggest effect, we have isolated each test to help explain how the bias nudge works. To make it easy to see the potential of each trigger, we have reported the percentage of respondents in the test group who changed their willingness to the “very likely” or “extremely likely” range. In other words, these individuals transitioned from vaccine-hesitant or anti-vaccine, to willing to get vaccinated in the near future (within one month of the vaccine becoming available to them) after experiencing these nudges.

1. Prospect Theory: People value something more if they feel they have won it.

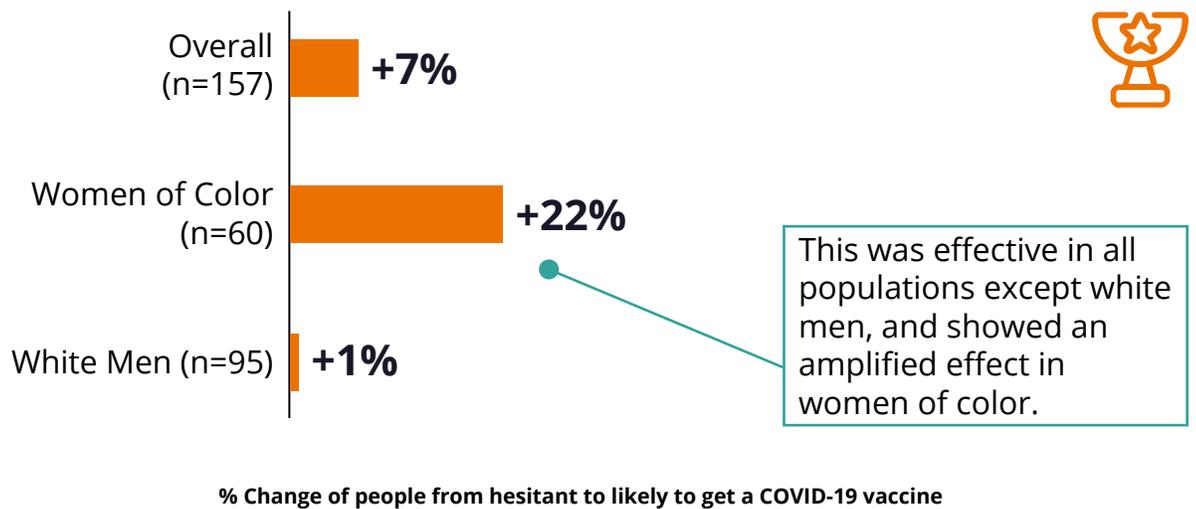
The vaccination connection: People are more likely to value getting the COVID-19 vaccine if it's perceived as a prize—or linked to one—rather than something made available to everyone.

What we found

Most of the vaccine-hesitant and anti-vaccination population is more likely to get vaccinated when the **COVID-19 vaccine as framed as a coveted prize**, except white men.

FIGURE 1:

Results from the Prospect Theory nudge



Example: *"My gym had a lottery for vaccinated people, and I'm psyched that I won a free month of membership."*

Source: ZS vaccine hesitancy research, 2021

Insights to apply

Recent findings from [UCLA](#) determined that offering financial incentives to people who have yet to receive a COVID-19 vaccine may be an effective way to encourage them to participate. Our research extends this further, opening up the possibility of using lotteries or contests to motivate people to act, helping reduce the financial burden on cities and states.

2. Effort Justification: People avoid activities that require a lot of effort.

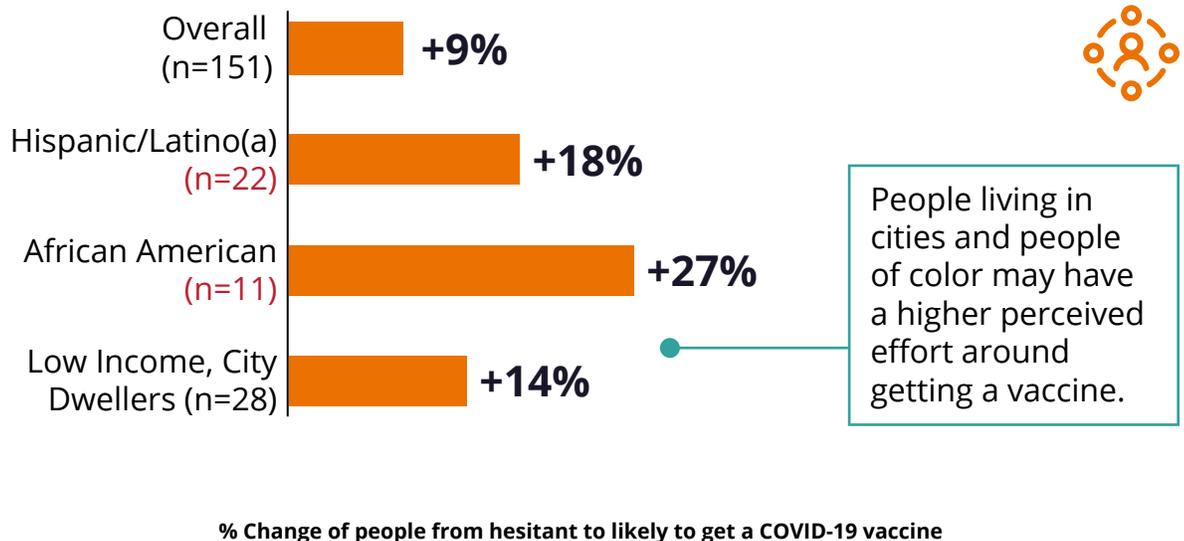
The vaccination connection: Making it seem easy to get the COVID-19 vaccine may motivate people to get on board, especially among people of color and low-income groups.

What we found

Communicating a simpler process to get a COVID-19 vaccine increases the likelihood of people of color and low-income groups to get vaccinated.

FIGURE 2:

Results from the Effort Justification nudge



Example: *"It only takes three steps to sign up for a COVID-19 vaccine."*

Source: ZS vaccine hesitancy research, 2021

Insights to apply

We can communicate how easy the process of getting vaccinated is by breaking it down into simple steps. Another option is to conduct outreach campaigns in low-income areas about the convenience of single-shot vaccines. Some groups are even having success bringing the vaccine to people (e.g., at the grocery store).

3. Confirmation Bias: People seek out information that reinforces what they already believe and ignore other perspectives.

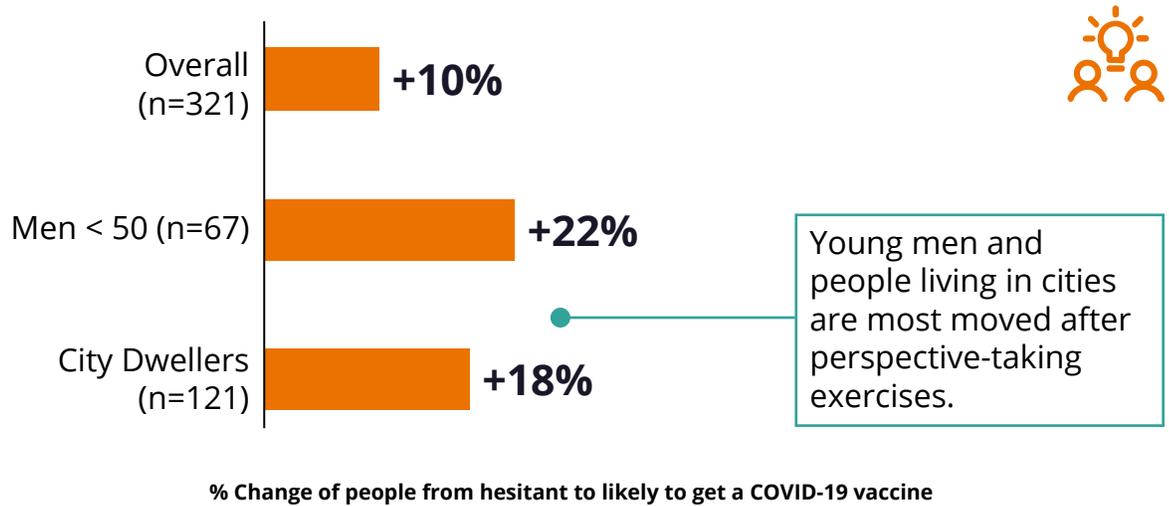
The vaccination connection: People are more likely to get a COVID-19 vaccine after writing down reasons why others would want to take the vaccine.

What we found

Young men, in particular, are most moved to change their views **after writing down reasons why someone would want to get the vaccine.**

FIGURE 3:

Results of the Confirmation Bias nudge



Example:

"Thinking things through from the perspective of others can subtly shift my own opinions."

Source: ZS vaccine hesitancy research, 2021

Insights to apply

We can encourage hesitant people to make a list of reasons why others would get vaccinated against COVID-19. We also can nudge participants to imagine being in other people's shoes to promote identifying with other perspectives. A sample prompt could be, "Why did your neighbor think it was important to get the COVID-19 vaccine?"

4. Halo Effect: People tend to associate positive impressions and feelings of one thing with another, even if they're not directly related. For example, people in expensive clothes are regularly judged to be more competent.

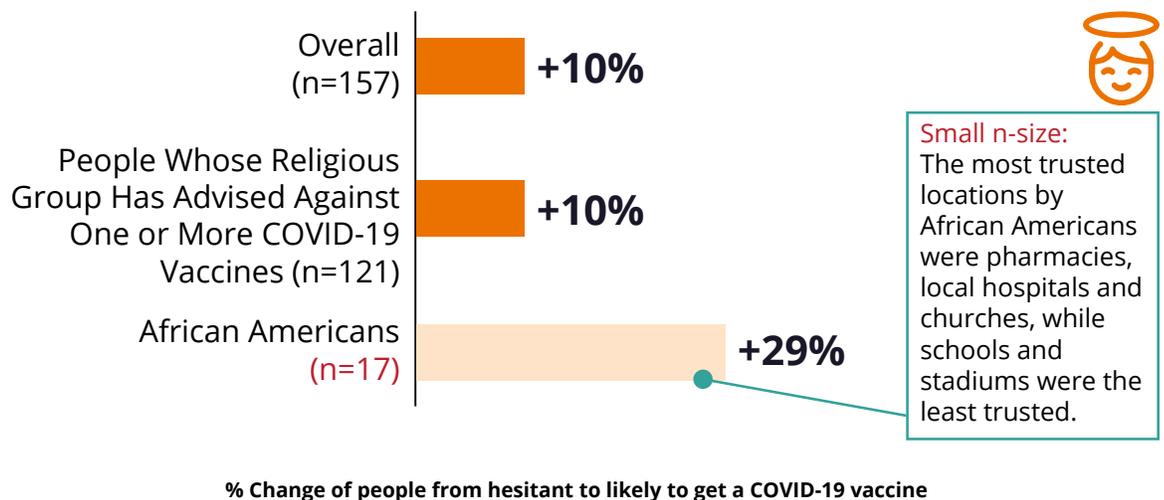
The vaccination connection: Offering vaccines in a place that people trust and have good feelings about can influence them to get the COVID-19 vaccine.

What we found

Using trusted locations such as pharmacies and churches can increase the likelihood of hesitant African Americans to get a COVID-19 vaccine

FIGURE 4:

Results of the Halo Effect nudge



Example: *"If the vaccine is being offered at my church, then I might consider getting it."*

ZS vaccine hesitancy research, 2021

Insights to apply

One way to take advantage of this effect is to offer the COVID-19 vaccine at locations where people have positive associations, such as worship centers, popular parks or community centers. This may be a particularly effective strategy to reach certain religious groups, for example.

5. Social Facilitation: People tend to behave differently when they're around other people.

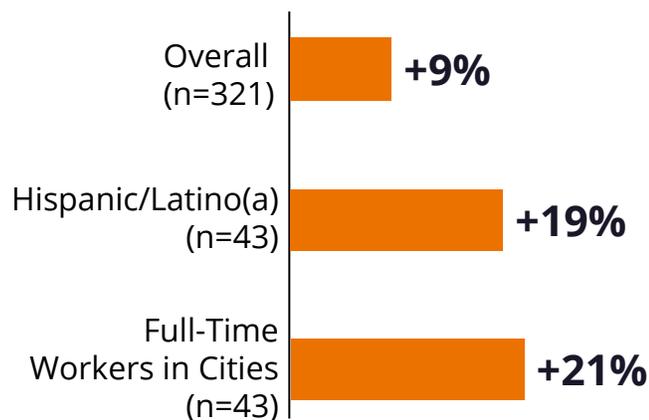
The vaccination connection: People are more likely to get a COVID-19 vaccine if they feel others are observing and judging their actions.

What we found

For full-time employees living in cities, threatening exclusion from social events affects their likelihood to get a COVID-19 vaccine.

FIGURE 5:

Results from the Social Facilitation nudge



% Change of people from hesitant to likely to get a COVID-19 vaccine

Example:

"I don't want to stand out to my friends on Facebook as the only person who won't get the vaccine."

Source: ZS vaccine hesitancy research, 2021

Insights to apply

Integrating simple visuals of people watching, or even icons of eyes, has been shown to facilitate pro-social decisions. Coordinating social outreach with simple messages like, "Just checking in on you. I hope you're staying well and were able to get vaccinated" can spur people's willingness to vaccinate.

6. Anchoring Effect: People judge things differently in isolation than they do side-by-side.

The vaccination connection: People who think about two brands of COVID-19 vaccines at the same time may be less willing to get one with lower efficacy numbers, slowing our ability to get to herd immunity.

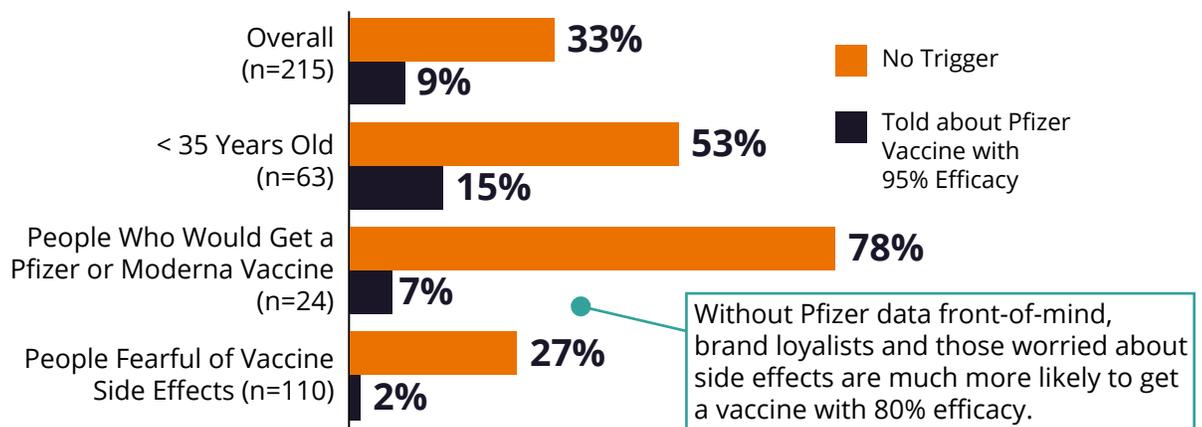
What we found

Priming people with higher vaccine efficacy numbers can decrease the likelihood to get a vaccine with lower efficacy.

FIGURE 6:

Results from the Anchoring Effect nudge

Test Design: All respondents were asked if they would get a vaccine with 80% efficacy. However, the trigger group was first told that Pfizer’s vaccine had 95% efficacy.



Example: *"I don't want to get the Johnson & Johnson vaccine when I'm told the Pfizer and Moderna ones work better."*

Source: ZS vaccine hesitancy research, 2021

Insights to apply

The risks associated with the COVID-19 pandemic put the onus on vaccination of any kind to aim for herd immunity to control the spread and mutation of COVID-19. Pro-vaccination efforts should emphasize the benefits of vaccination and avoid talking about more than one vaccine at a time, as this may cause a slowdown in vaccination rates while people wait for "the good one."



The bias triggers that work to encourage general adult vaccines

We previously noted that extrapolating from academic research can lead you down the wrong path—this is why it's important to test bias interventions for specific situations. For example, even though we tested the same 20 biases across COVID-19 and adult vaccines, we found only a partial overlap in successful approaches.

We found that four bias triggers had a strong impact on willingness to get an adult vaccine (shingles, HPV or pneumococcal). And only two of them were the same as what we found worked for COVID-19 vaccination: Social Facilitation and Confirmation Bias. Reminding people that others are watching and that their vaccination status can affect their social behaviors can motivate them to get vaccinated. Similarly, getting people to think about why someone would want to get vaccinated improves their own willingness to get vaccinated. This tactic had an even more dramatic effect for men under 50 and for respondents who described themselves as Black or Hispanic/Latino(a).

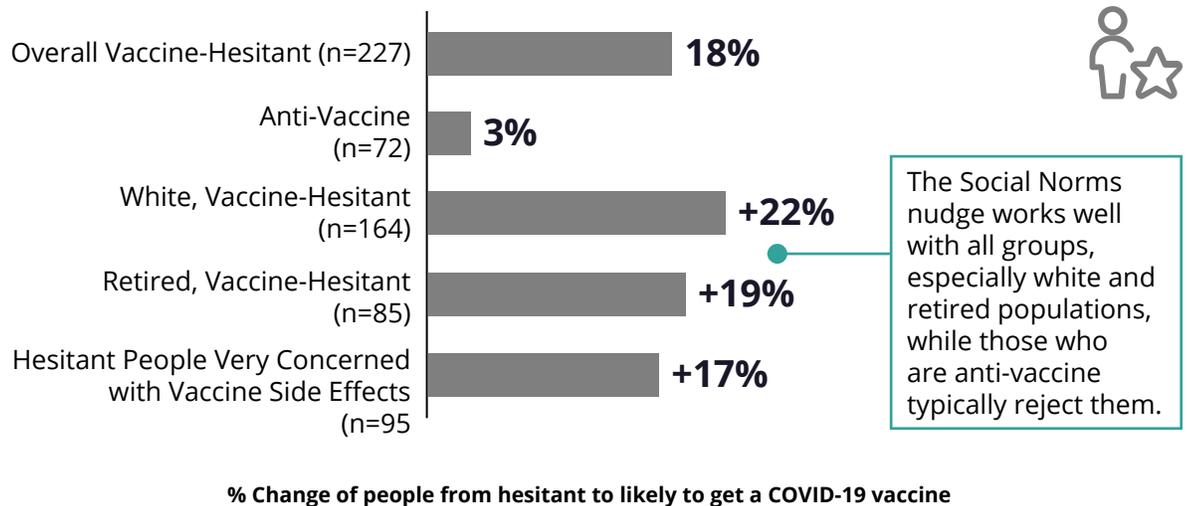
There were two bias interventions that did **not** work for COVID-19 vaccines but **do** work for adult vaccines: Social Norms and Commitment Bias.

1. Social Norms: People take on accepted attitudes and behaviors within a particular group, community or culture.

The vaccination connection: Most people believe that common social norms are good behaviors that they should follow. Describing vaccines as a norm makes hesitant people more likely to get them.

FIGURE 7:

Results form the Social Norms nudge



Example: *"I heard that 80% of adults in my community are vaccinated, so I should get vaccinated too."*

Source: ZS vaccine hesitancy research, 2021

Insights to apply

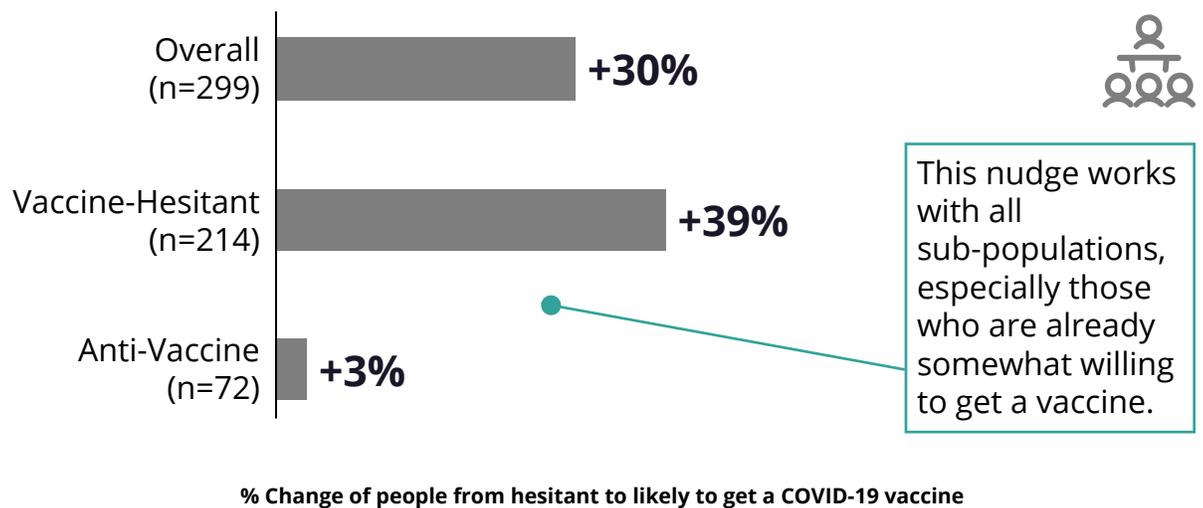
There are several ways to put these learnings into practice. First, you can achieve more effective results by connecting norms to local groups, such as specific ZIP codes, workplaces, ages or income bracket levels. Another approach is to frame general vaccines as "something most people do" rather than something that is "healthy for you" or "good for everyone." Finally, be wary not to trigger social norms in the opposite direction. Messaging focused on people not getting vaccinated can reinforce that behavior, even if the point of the messaging is to drive more urgency.

2. Commitment Bias: When people state a commitment publicly or verbally, they are more likely to keep it.

The vaccination connection: We found that this bias works with all populations, especially those individuals who are already somewhat willing to get a vaccine.

FIGURE 8:

Results from the Commitment Bias nudge



Example:

"I already told everyone about my new job, but I just realized I need a vaccine to start. So I guess I'll have to get it."

Source: ZS vaccine hesitancy research, 2021

Insights to apply

Workplace or community incentives and media messaging can help make it a public norm to ask people when they are getting their vaccines as a first step in helping them to commit to the idea. Groups including doctors, workplaces and local communities can nudge people to make a verbal commitment to their annual general vaccines and encourage follow-through. Finally, social media initiatives that reward or coerce people can help as a tool to get them to commit to their vaccination plans.

These common tactics failed to encourage COVID-19 vaccination

While we found several significant opportunities to improve willingness to get vaccinated, we also found that a few of the more common approaches did not work in our tests.

Failed – Authority Bias: This bias assumes that people are more likely to trust information coming from an authority figure. There is no need to continue to invest in campaigns that show famous individuals such as sports stars, politicians or celebrities getting COVID-19 vaccines, as we found those messages do not increase the likelihood that people will act.

Failed – Identifiable Victim Effect: When people hear a story about a specific individual's experience, they are more compelled to act than they would be if they heard statistics about anonymous people. Yet this approach did not inspire participants to get vaccinated. It's just as effective to use population-level statistics to explain who is hospitalized or suffering from COVID-19 than it is to refer to individual case studies about named patients who suffered severe complications from the disease.

Failed – Cognitive Fluency: This bias explains how those who hear messages that are simple, rhyming or repeated consider them to be more true, popular or safe. Taking their cue from common advertising techniques, these tactics did not make people more likely to get vaccinated. It would be more effective to promote clear messaging about safety and efficacy from a single, credible source.

The value of our research on vaccine hesitancy

Figuring out which nudges are effective is only half the battle. We need leaders to effectively use them. We are currently working to engage with healthcare and public health officials to incorporate these insights into policies and consumer outreach programs. I'm sharing the results of our research to encourage other stakeholders to embrace them, whether they are government leaders, healthcare professionals, religious authorities, teachers, neighbors or sons and daughters trying to persuade their parents that a COVID-19 vaccine is the safest and smartest way to protect themselves from this deadly disease.

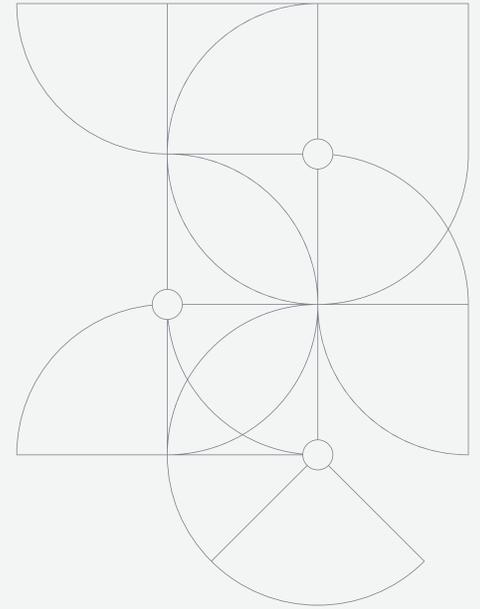
It's critical we embrace such insights now so we can stop doing what's not helping and quickly pivot to powerful data-backed strategies that work.

Our vaccine research shows the potential for behavioral science to make an impact when the stakes are high during a pandemic. But I also hope leaders will increasingly recognize its value to change people's actions in many areas of healthcare, whether it's pushing people to get a flu shot or colonoscopy, take their medications or go to the doctor. This is an important time to embrace a proven and robust discipline that will tell us more about ourselves than we ever knew.

About the authors



Jacob Braude is the founder of ZS's applied behavioral science group and has been the brand strategy lead for three of the top five best-selling pharmaceutical brands. Jacob's expertise is in commercial behavioral science, applying data and insights on how specific, well-understood cognitive biases invisibly influence our decisions and attitudes to help unlock new commercial behavioral opportunities. His applied behavioral science expertise ranges from marketing and sales to user experience design to clinical trial recruiting to helping employees improve their performance.



About ZS

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