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EXPERIMENTAL EVIDENCE ON THE EFFECTIVENESS OF NON-EXPERTS FOR IMPROVING VACCINE DEMAND

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ABSTRACT

We experimentally vary signals and senders to identify which combination will increase vaccine demand among a disadvantaged population in the United States – Black and White men without a college education. Our main finding is that laypeople (non-expert concordant senders) are most effective at promoting vaccination, particularly among those least willing to become vaccinated. This finding points to a tradeoff between the higher qualifications of experts on the one hand, but lower social proximity to lowsocio-economic status populations on the other hand, which may undermine credibility in settings of low trust.

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I Introduction

Preventive health investments can yield considerable benefits for individuals and society, yet are often adopted at low rates (see Newhouse 2020). Immunization against infectious diseases is a leading example of a measure that improves health and reduces employee absenteeism (CDC 2020; Nichol, Mallon and Mendelman 2003).[1] However, despite near universal recommendation of the seasonal influenza vaccine for individuals over the age of 6 months in the United States and federally mandated zero cost-sharing under the Affordable Care Act, take-up rates among adults average only 45% (CMS 2010; CDC 2021*a*). Take-up rates are particularly low among certain demographic groups, such as men, individuals without a four-year college degree, and non-Hispanic Black Americans (see Panel A of Appendix Figure A1; CDC 2018; Newhouse and Insurance Experiment Group 1993).

Among the groups with the lowest vaccination rates, the reasons frequently reported for not taking up flu vaccines relate to pessimistic beliefs on the benefits or non-pecuniary costs of vaccinations, as opposed to financial costs or lack of recommendation by a health professional.[2] These findings echo prior research on higher levels of medical mistrust among Black Americans as well as among individuals with less education (Blendon, Benson and Hero 2014; Kinlock et al. 2017; Nanna et al. 2018; Hammond et al. 2010; Idan et al. 2020). This mistrust likely has deep historical roots, including the government-led experiment in Tuskegee, Alabama, as well as contemporaneous racism in medicine (Alsan and Wanamaker 2018; Bajaj and Stanford 2021; Brandt 1978). The findings on beliefs also relate to growing scholarship on misperceptions in the net benefits of preventive care (i.e. behavioral hazard) leading to underutilization (Handel and Kolstad 2015; Bhargava, Loewenstein and Benartzi 2017; Ericson and Sydnor 2017; Handel and

[1]The seasonal influenza vaccine alone averts 3,500 to 12,000 deaths a year and reduces work loss due to the illness by nearly one-fifth (CDC 2020).

[2]See Appendix Figure A2, which explores reasons for not vaccinating among our sample. Note that vaccination take-up among Hispanic men is also relatively low, but this population was not included in this study.

Schwartzstein 2018; Chandra, Flack and Obermeyer 2021). There is scope, then, to change individuals' views on vaccination through the provision of credible and accurate information (Kamenica and Gentzkow 2011).

In this study, we aim to evaluate the effectiveness of messaging interventions designed to shift knowledge, beliefs, and take-up behavior regarding vaccines among low socio-economic status (SES) populations. We randomly assigned respondents recruited online to one of four video messages with information about flu vaccination. We then elicited beliefs and behaviors regarding flu vaccination as well as spillovers to COVID-19 vaccination, including at a follow-up survey a few weeks later. Our sample consists of 2,893 White and Black men without a college education who had not received their seasonal influenza vaccine at the time of recruitment.[3]

Understanding the determinants of demand for preventive health care, including vaccines, has been of great interest to researchers. Important experimental work has shown the effectiveness of celebrity messages (Alatas et al. 2019), cues and nudges (Milkman et al. 2011) or increased accessibility (Brewer et al. 2017; Banerjee et al. 2010), particularly among those planning to be vaccinated. There is limited evidence, however, on how to persuade those who are not already intending to be immunized (in our sample, nearly half of respondents report they are completely unwilling to receive an influenza vaccine). Which messages will resonate under such circumstances? And could some well-intentioned messages backfire? The urgency of answering such questions is underscored by the disproportionate impact of COVID-19 on disadvantaged communities and the unequal vaccination rates across racial and ethnic groups in the U.S.

Our videos, which were narrated by ten separate senders, held information about the safety and effectiveness of the influenza vaccine constant and varied along three policy-relevant dimensions: (1) the perceived medical expertise of the sender ("expertise"), (2) the admission/omission of acknowl-

[3]The education cutoff still represents a substantial fraction of US men (approximately 50% of Black men and 35% of Non-Hispanic White men in the US population (Health Day News 2021)).

edgement of past injustice committed by the medical community by discordant senders ("acknowledgement"), and (3) the race of the sender ("concordance"). We tailored the expertise and acknowledgement interventions to Black respondents since Black men continue to comprise less than three percent of the U.S. physician workforce, with their representation among admitted medical students stagnant since the late 1970s (Gallegos 2016; AAMC 2019). Understanding the potential of concordant community members to substitute for medical experts, as well as the role of acknowledgement of past injustice by discordant physicians may play in bridging trust gaps, holds relevance amidst challenges in diversifying the physician workforce and persistent racial health inequalities (Street et al. 2008; Williams and Rucker 2000).

The layperson sender intervention was motivated by the ambiguous effects expertise may have on belief and behavior change. Medical doctors, the relevant experts in our study, have specialized training and experience and may therefore be considered more credible sources of health information than peers, all else equal. They are, however, also more socially distant from those who are disadvantaged, and such class cleavages could engender skepticism (Gauchat 2012; Eichengreen, Aksoy and Saka 2021). Recent research in economics has revisited the role of expertise: Sapienza and Zingales (2013) find that providing ordinary Americans with information on the consensus opinions of academic economists does not move their beliefs, while DellaVigna and Pope (2018) document that non-experts perform similar to experts in forecasting the rank of interventions. Representative surveys on trust and credibility indicate that respondents find "a person like yourself" as credible as academic experts and show a growing gap in institutional trust between individuals of high and low SES (Ries 2016). Experimentally, the variation we induce is between senders wearing a white coat and stethoscope (expert condition) versus the *same* senders wearing a white short-sleeved shirt (layperson condition), narrating the same script.[4] In a separate survey conducted on Amazon Mechanical Turk (MTurk), senders

[4]In the remainder of the paper, we refer to senders in the expert condition as expert senders while senders in the layperson condition as layperson senders.

in layperson attire are rated by respondents as 1.7 standard deviation units less educated than those in a laboratory coat (Appendix Table B1), indicating that our experimental variation had the intended effect (i.e. a "first-stage").

The concordant expert arm was motivated by recent research showing that treatment by a race-concordant physician in an in-person setting can increase demand among Black Americans for preventive care as well as improve health outcomes (Alsan, Garrick and Graziani 2019; Greenwood, Carnahan and Huang 2018; Greenwood et al. 2020; Hill, Jones and Woodworth 2020). Evidence is limited, however, on whether these effects exist in one-way communication settings. In a pair of randomized evaluations of video messages recorded by physicians regarding mask-wearing and social distancing during the COVID-19 pandemic, the first such messaging study found small but robust sender concordance effects among Black respondents on information-seeking behavior (Alsan et al. 2020). However, the second study, by the same set of authors and using a more complicated design, failed to detect such effects (Torres et al. 2021). This paper builds on and extends the prior studies to include vaccination views and behavior.

The acknowledgement arm, in which some White senders acknowledge past breaches of trust committed by the medical community, could provide an alternative, scalable way to increase trust in medical recommendations amidst a largely non-Black physician workforce. While acknowledgement of historical medical injustice can be expressed through a variety of approaches, we developed a short statement corresponding closely to the one proposed for use by physicians in an *Annals of Internal Medicine* editorial on responding to vaccination concerns (Opel, Lo and Peek 2021). The proposed script from *Annals* reads *"I understand why you have a lot of mistrust. The government and research systems have not always treated your community fairly,"* and can be compared to our script found in Section II. Before distributing this type of message at scale, however, it is imperative to test its effectiveness, as unintended negative consequences are also conceivable.

We establish three main results. First, when comparing layperson to expert senders, we find that lay senders are rated by respondents as substantially *less* qualified (0.54 standard deviation units) to give medical advice. However, individuals in the non-expert condition exhibit greater recall of factual signal content and increase their willingness to receive the COVID-19 vaccine by 8.8 percentage points (20%). Furthermore, respondents assigned to lay senders were 15 percentage points (39%) more likely to report that they or their household members had received the flu vaccine in the weeks between the baseline and follow-up surveys. Indeed this is the only treatment condition that affects this outcome.

Second, we find concordance effects on sender and signal ratings are present exclusively among Black respondents, with no such effects evident among White respondents. We further find that acknowledgement of past breaches of trust by a race-discordant expert sender increases ratings of the signal by approximately the same magnitude as a race-concordant expert sender providing the standard signal without acknowledgement (an increase of 0.14 standard deviation units). Neither intervention, however, significantly affects vaccine take-up as measured in the follow-up survey, although coefficient estimates on intent to vaccinate against influenza and COVID-19 are weakly positive in both arms.

Third, we find striking heterogeneity by treatment arm across respondents with varying levels of vaccination reluctance. Viewing previous flu vaccination experience as a proxy for distance from a take-up "threshold," we divided the sample into never-takers, ever-takers, and recent-takers based on the date of a respondent's last influenza vaccine. We find that both the concordance and acknowledgement interventions demonstrated significant effects on flu and COVID-19 vaccination intent among recent takers, those who had received seasonal flu vaccines within the past two years (about a quarter of the sample). In sharp contrast, the effectiveness of non-experts was strongest among those who had *never* previously received a flu vaccine (another quarter of the sample), with individuals in this group rating the signal from a non-expert significantly higher than respondents who had previously taken up the flu vaccine and exhibiting substantial increases in flu and COVID-19 vaccination intent (by 47% and 49%, respectively).

Taken together, these findings represent a step towards identifying effective ways to influence immunization views and behaviors. While messages from concordant and empathetic experts may resonate most among individuals familiar with vaccination, our study suggests that peer figures, such as community health workers or citizen ambassadors, could play an important role in communicating benefits and dispelling myths about vaccines among those least inclined to receive one.

II Experimental Design

We collected data in two flu seasons: 2019-2020 and 2020-2021. Respondents were recruited via survey panels from Qualtrics, Lucid, CloudResearch, and Facebook and participated in the experiment through an online survey on Qualtrics. We timed the experiment so that it would fall into the middle of the flu season (between December to February in 2019-2020 and between late October to January in 2020-2021), so as to ensure recruitment of participants who would be unlikely to get the flu vaccine in the absence of our intervention.[5] Upon completing the consent process, participants answered a set of questions to determine eligibility based on self-identified gender (male), race (Black or White), age (25-51), education (no college), and flu vaccine status (had not yet been vaccinated for influenza in the current season).[6] Within each treatment condition, subjects were randomly assigned in equal proportions to one of five recorded senders of the assigned race. The randomization was stratified by season and recruitment platform.

Eligible respondents continued to answer basic demographic questions, reported their baseline attitudes and beliefs about the flu vaccine, and then

[5] By the fourth week of October 2020, flu shot distribution was on par with the first week of December 2019 (165 and 169 million doses, respectively), likely accelerated by the pandemic (CDC 2021*b*).

[6] We did not recruit participants aged older than 51 because a different vaccine than the one covered by our flu shot coupon is advised for older individuals. We also excluded those aged between 18 and 24 because we aimed to recruit individuals without a college education, and they may still be in college.

watched the video infomercial. After the infomercial, we gathered the main survey-based outcome measures and distributed a coupon for a free flu shot. We note that many places distribute free flu shots for indigent populations and that many insurance providers cover flu shots. However, in the event that cost was a barrier for a handful of individuals - the coupon removed it, thus leaving only non-monetary barriers to vaccination. At least two weeks later, participants were invited to complete a follow-up survey to measure medium-term impacts of our video treatment and to measure respondents' self-reported flu vaccination status. See Appendix Figure A3 for an overview of the study design. Participants received a financial incentive for completing the baseline and follow-up survey (between $5 and $20), in the form of an electronic gift card.

In order to test whether the expertise of the sender, race concordance, and acknowledgement statements influence the key outcomes of interest, we aimed to produce videos that held all other factors precisely constant. This required tight control over key features of the video, such as the lighting, script, intonation, speaking rate, and sender appearance (such as age, height, facial hair, and clothes). Ensuring such consistency necessitated the use of a professional recording studio, as well as the use of actors for the recording of the videos.[7]

We produced videos with a total of five Black and five White male actors ("senders"), recruited from the same casting agency. Each sender recorded the video in four variations, representing the experimental variation in expertise (expert vs. non-expert layperson) and signal content (standard vs. including an acknowledgement statement).[8] All senders wore the exact same

[7]In prior work (Alsan, Garrick and Graziani (2019); Alsan et al. (2020); Torres et al. (2021)), our team used licensed medical doctors for messaging. However, given the fine titration of all elements of the messaging and the need for the same person to play multiple roles, we used actors in this instance. Note that the same person who delivered the message as an expert recorded as a non-expert too, thus either experts would have had to have acted as non-experts or vice-versa. We debriefed respondents about the use of non-expert actors in the influenza infomercials as well as the tracking of coupons, per IRB guidance, at the end of the follow-up survey.

[8]Because of the low marginal cost of recording additional videos, we had each actor record all four video variations; however, for power considerations and because pipeline

clothes, provided by the research team. In the expert role, the senders wore a button-down blue shirt, striped tie, laboratory coat and stethoscope. In the layperson role, they wore a white short-sleeved shirt.

The standard signal (video script S1) was 40 seconds long and read:[9] *The Centers for Disease Control and Prevention, or CDC, recommends everyone 6 months and older get the flu shot. The shot protects you from getting sick by cutting your chance of catching the flu in half. It's also very safe: less than 1 in 100 vaccinated people experiences a side effect such as fever or chills. The flu shot does not contain an active flu virus, so you cannot get the flu virus from the shot. I get the flu shot every year to protect myself, my family, and my community. I recommend you look into getting vaccinated as soon as possible.*[10]

The script of acknowledgement signal (S2) was identical to the above, except that three sentences were added acknowledging historical injustices committed by the medical establishment. They were placed in between the first and second sentence of script S1, and read: *I know some people are nervous to follow medical advice about vaccines. In the past, there may have been times when the medical community broke your trust. But I hope that sharing some information with you can help you understand how important the flu shot is.*

We aimed for the two groups of actors to have a similar distribution of age and training in acting. We validated the former criterion via external MTurk ratings of each actor (in each role) on age and also collected perceptions of attractiveness and educational attainment from the MTurk sample. Columns (1) through (3) of Appendix Table B1 reveal that Black MTurkers rate lay senders as less educated, less attractive, and younger than the same set of senders wearing white coats. Such results support the notion that the senders in casual attire were perceived as less advantaged than expert senders.

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issues for medical professionals are not as relevant for White respondents nor the shameful history of medical exploitation, we only used the standard lay and standard expert videos for Black actors, and the standard expert and acknowledgement expert videos for White actors in the experiment.

[9]See Appendix Section D for links to the videos we recorded.

[10]In the layperson video, we replaced the word "cannot" with "can't" in the script.

There are no statistically significant differences in perceived age and education between concordant and discordant expert senders among Black MTurk respondents (Appendix Table B1, columns (4) to (5)). Black respondents do, however, rate Black expert senders as more attractive (column (6)).

Consistent with implicit bias, White MTurkers perceive Black expert senders wearing a white coat as 0.53 standard deviations younger and 2.84 standard deviations less educated than White senders in a white coat (columns (7) to (8)). These differences are statistically significant. They should be kept in mind when interpreting the (null) results among White respondents. Appendix Figure A4 presents perceived *within-sender* education differences (white coat vs. casual attire for Black vs. White senders). We observe that the penalty for a Black male wearing casual attire is much greater than for a White male, as they are perceived to be significantly less educated. These findings connect to a broader literature about stereotypes and the profiling of Black men in the U.S. (Hester and Gray 2018; Oliver 2003).

III Outcome Variables

We group the outcome variables into eight families described below. Appendix Section E presents survey question text for each outcome variable. For the first five families, we constructed one index that combines outcome variables within each family, weighting by the inverse of the covariance between variables, as described in Anderson (2008). The index is our main outcome of interest from each family. These outcomes follow our pre-analysis plan.

(1) Rating of sender: this outcome was comprised of responses to survey questions regarding whether the respondent was interested in further medical advice from the given sender, trusted advice from the sender, and the respondent's assessment of the sender's qualification to provide medical advice.

(2) Rating of signal: this outcome was comprised of responses to survey

questions on recommending the video to friends and family, recommending the flu shot to friends and family, and the respondent's assessment of the extent to which the information contained in the video was useful.

(3) Signal content recall: this outcome was comprised of responses to survey questions on the age group for whom the flu vaccine is recommended and whether the flu shot contains the flu virus (recall of information discussed in the video).

(4) Safety beliefs: this outcome was comprised of the point belief and certainty on the likelihood to contract the flu from the flu shot measured by a Likert scale and balls and bins method. The outcomes in this family were elicited twice, once before and once after the video message treatment.

(5) Coupon interest and redemption: We elicited two revealed preference measures of demand for a free flu shot coupon – willingness to pay (WTP) for the coupon and demand for information regarding locations to redeem the coupon. As seen in Appendix Figure A2, only 3% of individuals in our sample mention cost as a major barrier to vaccination take-up.

Pharmacies reported to TotalWellness, Inc., the coupon vendor, whether the coupon was used and shared this information with the study team. Because well below 1% of coupons were recorded as redeemed, we show results on redemption only in the appendix (Appendix Table B2). Low recorded redemption rates stand in contrast to self-reported usage rates of 15.5% as per our follow-up survey. The gap is likely due to pharmacists billing insurance instead of using coupons – 75% of respondents with discrepancies were insured. If we recode all inconsistencies as *not* having been vaccinated, the conclusions reported herein are unchanged.

(6) Flu vaccination intent: this refers to the respondent's likelihood to receive the flu vaccine before the end of the flu season. This was elicited on an 11-point Likert scale, once before and once after the video message treatment, but we present the results on the posterior intent. We re-scaled this outcome to have support 0 to 1.

(7) COVID-19 vaccination intent: this refers to the respondent's likelihood to take up the COVID-19 vaccine if made available free of charge. We

re-scaled this outcome to have support 0 to 1.

(8) Flu vaccine take-up: respondents reported in the follow-up survey whether they or their family members had received the flu shot or redeemed the coupon since the intervention.

IV Descriptive Statistics, Balance and Attrition

Our main sample includes all respondents who fulfilled our eligibility criteria (see Section II), passed our quality check, and completed the survey. Attrition after randomization was low: among all respondents who arrive at the video treatment stage of the survey, 89% completed the survey. Appendix Table B3 tests for imbalance in attrition by treatment status. The only statistically significant differential attrition we detect is among White respondents who were assigned to a Black sender: they exited the baseline survey at a higher rate (2.3 percentage points, p-value 0.09), suggesting those who remained were not as averse to discordant senders.

Summary statistics are presented in Appendix Table B4. We recruited approximately 400 Black respondents for each of the interventions (concordant expert, concordant lay, discordant expert, discordant expert plus acknowledgement) and approximately 600 White respondents for each of the two interventions to which White respondents were assigned (concordant expert, discordant expert). Respondents were on average 37 years old and about 53% reported an annual household income below $30,000. Approximately 27% of the sample had never received a flu vaccine, while 28% received one in the past two years and the remainder more than two years ago. Among the latter group, the majority (66%) received the flu vaccine more than five years ago. Before viewing the infomercial, respondents report a mean likelihood of receiving the flu vaccine of 2.57 on a 0-10 point scale.

We detect differences across racial groups that reflect broader social inequality: Black respondents report lower incomes, rates of high school completion, and health insurance coverage rates, although they express slightly higher average subjective health status. The relationship between COVID-

19 vaccination intent and flu vaccination intent (as measured following the video intervention) is strongly positive (correlation coefficient = 0.58, Appendix Figure A5), indicating there may be a generic aversion to immunization.

Observable characteristics and pre-intervention views are well-balanced across treatment assignment in the baseline survey (Appendix Table B5). As noted above, there was a lower response rate for the follow-up survey, though we do not detect differential response rates across study conditions. Characteristics are generally well-balanced across conditions in the follow-up survey although a handful of exceptions are observed (see Appendix Table B6).

V Results

A Main Treatment Effects

Results are organized corresponding to the four study arms (i.e. lay vs. expert sender among Black respondents, acknowledgement vs. standard signal among Black respondents, concordance vs. discordant expert senders for Black respondents, and concordance vs. discordant expert senders for White respondents). We report estimates with robust standard errors obtained from a linear regression of the variables described in Section III on treatment indicators. We include the stratifying variables of recruitment season and survey platform (combining the Facebook and CloudResearch platforms given their low recruitment numbers) in all regressions.

We present our main results from the baseline survey in Table 1. The columns correspond to the main outcome families: columns (1) to (5) are normalized to mean zero and standard deviation one, while columns (6) to (7) are the likelihood of flu and COVID-19 vaccination intent and column (8) is a binary outcome of flu vaccine take-up.

Results comparing concordant non-expert to concordant expert senders are displayed in Panel A of Table 1. Respondents randomized to the layper-

Table 1: Treatment Effects

	Effects of Video on: Ratings, Knowledge, and Beliefs				Effects of Video on: Vaccine Intent and Take-Up			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rating Sender	Rating Signal	Signal Content Recall	Safety Beliefs	Coupon Interest	Flu Vaccine Intent	COVID-19 Vaccine Intent	Flu Vaccine Take-up
PANEL A: Layperson vs. Expert (Concordant, Standard Signal) - Black Respondents								
Layperson Treat	-0.540	-0.081	0.117	-0.024	-0.016	0.019	0.088	0.150
	(0.071)	(0.067)	(0.067)	(0.068)	(0.069)	(0.025)	(0.030)	(0.083)
	[0.000]	[0.231]	[0.082]	[0.722]	[0.813]	[0.455]	[0.003]	[0.075]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.37	0.43	0.38
Observations	845	845	845	845	845	845	592	151
PANEL B: Standard vs. Acknowledgement Signal (Discordant, Expert) - Black Respondents								
Acknowledgement Signal Treat	0.100	0.142	0.004	-0.107	0.028	0.027	0.054	-0.120
	(0.068)	(0.069)	(0.069)	(0.069)	(0.069)	(0.025)	(0.031)	(0.085)
	[0.145]	[0.040]	[0.952]	[0.124]	[0.683]	[0.287]	[0.080]	[0.159]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.34	0.40	0.48
Observations	827	827	827	827	825	827	581	137
p-value	0.000	0.021	0.241	0.396	0.647	0.819	0.433	0.021
PANEL C: Concordant vs. Discordant Expert Sender (Standard Signal) - Black Respondents								
Concordance Treat	0.183	0.139	-0.006	-0.098	-0.008	0.026	0.035	-0.077
	(0.067)	(0.070)	(0.069)	(0.069)	(0.067)	(0.025)	(0.031)	(0.087)
	[0.007]	[0.049]	[0.928]	[0.155]	[0.907]	[0.302]	[0.254]	[0.378]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.34	0.40	0.48
Observations	832	832	832	832	831	832	587	139
PANEL D: Concordant vs. Discordant Expert Sender (Standard Signal) - White Respondents								
Concordance Treat	-0.075	-0.009	0.019	-0.028	-0.083	0.003	0.009	-0.014
	(0.057)	(0.057)	(0.057)	(0.058)	(0.056)	(0.021)	(0.025)	(0.049)
	[0.189]	[0.876]	[0.734]	[0.631]	[0.139]	[0.868]	[0.719]	[0.776]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.37	0.45	0.38
Observations	1221	1221	1221	1221	1221	1221	866	377
p-value	0.004	0.097	0.774	0.437	0.388	0.487	0.512	0.520

Notes: Table reports OLS estimates. Each dependent variable in columns (1) to (5) is an inverse-covariance-weighted index as described in Anderson (2008) and standardized to a mean of 0 and standard deviation of 1. Dependent variables in columns (6) to (7) are on a scale of 0 to 1. Dependent variable in column (8) is binary. COVID-19 vaccine Intent was asked during the 2020-2021 flu season only. Outcome variables are described in Section III and in Appendix Section E. The *p*-value in Panel (B) tests the null hypothesis that the acknowledgement signal treatment and layperson treatment effects are equal. The *p*-value in Panel (D) tests the null hypothesis that the concordance treatment effects are the same across Black and White respondents. Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regression of the take-up outcome which measures vaccination of self and/or others in household. Robust standard errors are in parentheses. *p*-values are in brackets.

son condition provide less favorable ratings of the sender, by 0.54 standard deviation units. The large negative effect on the rating of the sender lends credence to respondents paying attention: the measure includes a rating of the sender's qualification to give general medical advice. This finding also accords with the perception that senders wearing a white short-sleeved shirt are less educated and younger than those wearing a white coat (Appendix Table B1 columns (1)-(3)). Despite their lower perceived expertise, however, respondents absorbed more information on the flu vaccine from lay senders, as reflected by a sizable positive effect of the lay treatment on signal content recall (0.12 standard deviation units). This finding is consistent with patients experiencing increased anxiety levels when interacting with a doctor (which can sometimes raise blood pressure, a phenomenon in clinical medicine dubbed "white coat hypertension"), which may in turn impair the ability to retain information. The lower rating of lay sender qualifications, moreover, did not translate into significantly less favorable beliefs or attitudes, such as on the perceived safety of the flu vaccine, interest in a flu vaccine coupon, or stated interest in receiving the flu vaccine, compared to individuals randomized to an expert sender.

In addition, assignment to a non-expert sender significantly increased intent to receive the COVID-19 vaccine by 8.8 percentage points relative to an expert sender. A non-expert sender was the *only* condition to increase take-up of the vaccine: respondents assigned to lay senders were 15 percentage points more likely in our follow-up survey to report that they and/or another household member received the flu vaccine in the weeks since the baseline survey (a 39% increase). Demand bias is not a reasonable explanation for these patterns since *all* arms were "treated" in the study and there would need to be *higher* self-report bias among those viewing a signal from a non-expert versus a health authority figure, which seems very unlikely.

Panel B of Table 1 reports the main effect of the acknowledgement signal intervention among Black respondents. Recall this signal was only provided by White expert senders. On average, Black respondents assigned to the acknowledgement statement condition rate the statement 0.14 standard deviation units higher than the default statement conveyed by the same set of senders. They are also 5.4 percentage points more likely to intend to take up the COVID-19 vaccine. We do not detect statistically significant effects of the acknowledgement statement on flu vaccine take-up.

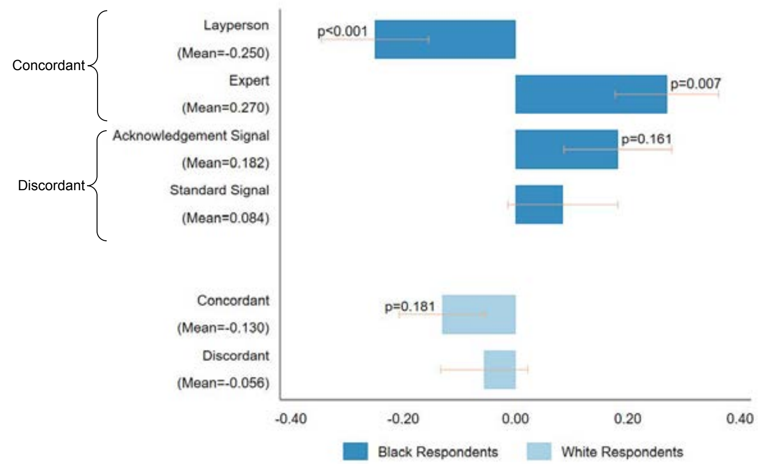
For Black respondents (Panel C), race concordance has a positive, sizeable effect on the respondent's ratings of the sender (0.18 standard deviation units), and on the rating of the signal itself (0.14 standard deviation units). By contrast, we do not detect concordance effects on sender or signal ratings among White respondents (Panel D).

Among both Black and White respondents, we find no meaningful effects of concordance on signal content recall or safety beliefs. Concordance is associated with weak positive effects on flu and COVID-19 vaccination intent for Black respondents, but these are not statistically significant.[11] As mentioned in Section IV, White respondents assigned a discordant sender attrited at higher rates, which we view as a relevant *outcome*. It does, however, suggest that estimates reported in Panel D are biased towards the (reported) null effect of concordance.[12]

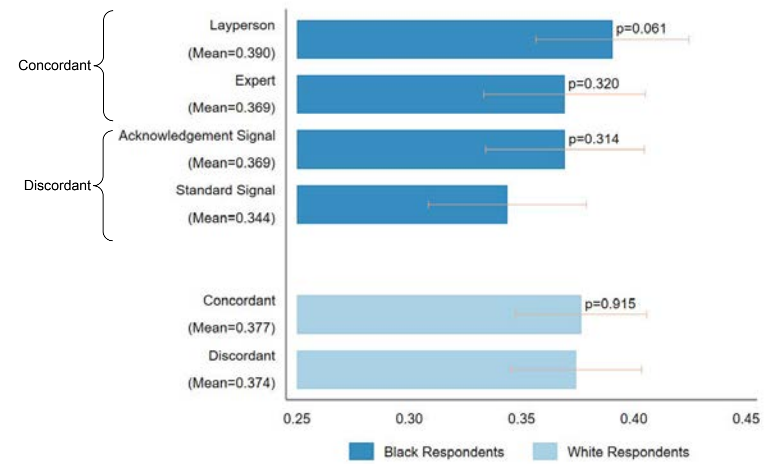
Figure 1 displays means of sender ratings, flu and COVID-19 vaccination intent, and flu vaccine take-up, as well as 95% confidence bands by treatment condition. Across all outcomes except sender ratings, the layperson treatment condition performs the best among Black respondents (dark blue bars), whereas discordant expert senders fare poorly among Black individuals. White respondent averages (light blue bars) across concordant and dis-

[11]There may be a concern that Black and White senders may differ along other characteristics besides race (e.g. Heckman 1998 and Pager 2007). We designed this experiment to minimize such concerns, by holding key other dimensions (e.g. sex, age, clothing, setting and script) constant. We also demonstrate that the effect of any given Black sender on most of the outcomes is indistinguishable from other Black senders in the concordance arm (see Appendix Table B8 for the rating outcomes). For one outcome (COVID-19 vaccine intent) we do reject the null; however, there are no concordance effects detected for this outcome (see column (7) of Table 1 Panel C). Similarly, we do not detect heterogeneity in the layperson treatment effect by sender (Appendix Table B7).

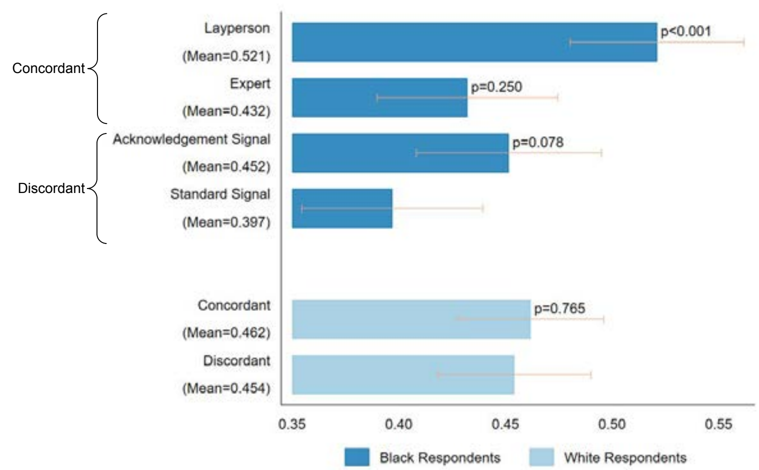
[12]Individual outcomes that comprise the indices can be found in Appendix Figure A6. Results for additional outcomes can be found in Appendix Table B2 and Appendix Figure A7. Specifications including LASSO-chosen controls can be found in Appendix Table B9. Estimates with Lee (2009) bounds, available on request, also fail to find an effect.



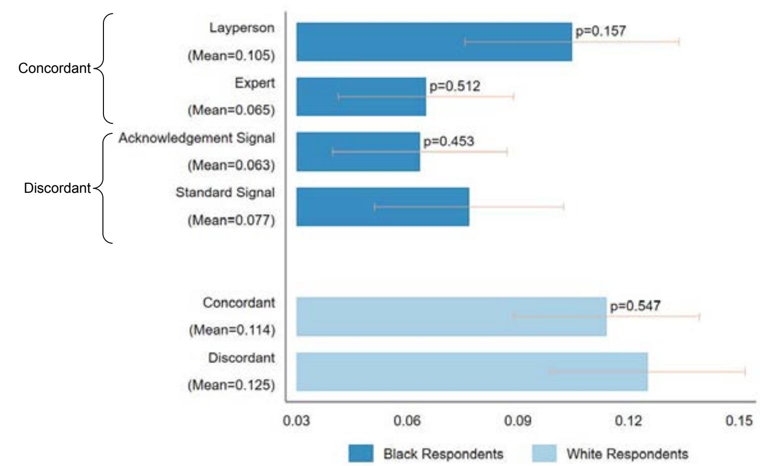
Panel (A): Sender Rating



Panel (B): Flu Vaccine Intent



Panel (C): COVID-19 Vaccine Intent



Panel (D): Flu Vaccine Take-up

Notes: Figure shows the mean of each outcome by treatment condition among the sample of Black respondents (dark blue bars), as well as among the sample of White respondents (light blue bars). Outcomes are ratings of the sender (Panel (A)), flu vaccine intent (Panel (B)), COVID-19 vaccine intent (Panel (C)), and flu vaccine take-up (Panel (D)). Sender rating is an inverse-covariance-weighted index as described in Anderson (2008). For dark blue bars, *p*-values test the null hypotheses that the concordant expert, concordant non-expert (standard signal condition), and discordant expert (acknowledgement condition) means each differ from the discordant expert (standard signal condition) among Black respondents. For light blue bars, *p*-values test the null hypothesis that the concordant expert (standard signal condition) mean differs from the discordant expert (standard signal condition) among White respondents. 95% confidence intervals using robust standard errors are shown.

Figure 1: Treatment Effects on Sender Ratings, Vaccine Intent and Take-up

cordant treatment conditions do not meaningfully differ. Soberingly, flu vaccine take-up and COVID-19 vaccination intent are significantly lower among Black respondents paired with a discordant expert sender than among White respondents paired with a concordant expert sender. As 85% of White patients in the U.S. have a concordant physician yet nearly 75% of Black patients do not, such a comparison mirrors the experience of many Black Americans in the U.S. healthcare system (Blewett et al. 2018). We find, however, that layperson senders shift Black respondents to levels of vaccination intent and take-up comparable to White respondents.

An assessment of the overall effect of any one signal on outcomes, relative to no signal at all, is of interest in itself as well. However, since the focus of this study is on testing the *differential* effectiveness of signal frames aimed at bridging trust gaps relative to a standard signal from a typical expert sender, we did not include a no-signal control group. Therefore, we cannot assess the impact of any one signal relative to a no-signal counterfactual directly, but differences between posterior and prior flu vaccination intent do provide some suggestive evidence (Appendix Figure A8). Reassuringly, we observe an increase or no change in flu vaccine intent among the vast majority (approximately 90%) of respondents.

B Heterogeneity

Responses to messaging may depend upon past experience with medical experts and vaccination. Those who elected to receive an influenza vaccine at some point in their lifetime may be less opposed to vaccines than those who never evinced a willingness to do so, all else equal.[13] We divided the sample into never-takers, ever-takers and recent-takers of the flu vaccine based on whether the respondent reported never receiving a flu vaccine, receiving a flu vaccine over two years ago (with the majority of these individuals receiv-

[13]Indeed, we find that 69% of never-takers state prior to the video treatment that they are "not at all likely" to receive the flu vaccine in the current season, compared to 54% of ever-takers and 20% of recent-takers. Appendix Figure A9 provides a histogram of prior flu vaccine intent by respondent vaccination experience.

Table 2: Heterogeneity by Vaccine Hesitancy

	Effects of Video on							
	Ratings, Knowledge, and Beliefs				Vaccine Intent and Take-Up			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rating Sender	Rating Signal	Signal Content Recall	Safety Beliefs	Coupon Interest	Flu Vaccine Intent	COVID-19 Vaccine Intent	Flu Vaccine Take-up
PANEL A: Layperson vs. Expert (Concordant, Standard Signal Condition) - Black Respondents								
Layperson Treat × Never Taker	-0.618	0.234	0.068	-0.051	-0.096	0.080	0.148	0.155
	(0.141)	(0.141)	(0.137)	(0.139)	(0.135)	(0.042)	(0.058)	(0.146)
	[0.000]	[0.097]	[0.621]	[0.716]	[0.479]	[0.054]	[0.011]	[0.290]
Layperson Treat × Ever Taker	-0.628	-0.226	0.092	-0.029	-0.064	0.002	0.070	0.084
	(0.107)	(0.109)	(0.095)	(0.116)	(0.111)	(0.035)	(0.046)	(0.127)
	[0.000]	[0.039]	[0.334]	[0.802]	[0.561]	[0.963]	[0.126]	[0.510]
Layperson Treat × Recent Taker	-0.385	-0.199	0.179	-0.022	0.093	-0.022	0.061	0.156
	(0.127)	(0.118)	(0.119)	(0.130)	(0.140)	(0.043)	(0.047)	(0.139)
	[0.002]	[0.092]	[0.134]	[0.864]	[0.506]	[0.613]	[0.192]	[0.264]
p-value: Never Taker=Recent Taker	0.217	0.019	0.541	0.881	0.332	0.089	0.247	0.994
Mean in control	0.00	0.00	0.00	0.00	0.00	0.17	0.30	0.18
Observations	845	845	845	845	845	845	592	151
PANEL B: Standard vs. Acknowledgement Signal (Discordant, Expert Condition) - Black Respondents								
Acknowledgement Signal Treat × Never Taker	0.155	0.015	0.029	-0.097	0.015	-0.013	0.006	-0.039
	(0.122)	(0.120)	(0.128)	(0.133)	(0.128)	(0.041)	(0.053)	(0.155)
	[0.202]	[0.900]	[0.821]	[0.467]	[0.907]	[0.744]	[0.915]	[0.801]
Acknowledgement Signal Treat × Ever Taker	0.013	0.204	-0.025	-0.063	-0.034	0.011	0.055	-0.323
	(0.098)	(0.103)	(0.098)	(0.104)	(0.114)	(0.037)	(0.046)	(0.120)
	[0.895]	[0.049]	[0.796]	[0.546]	[0.767]	[0.756]	[0.235]	[0.008]
Acknowledgement Signal Treat × Recent Taker	0.193	0.200	0.078	-0.173	0.172	0.101	0.154	0.010
	(0.126)	(0.126)	(0.128)	(0.125)	(0.153)	(0.048)	(0.057)	(0.151)
	[0.127]	[0.113]	[0.540]	[0.168]	[0.259]	[0.034]	[0.007]	[0.948]
p-value: Never Taker=Recent Taker	0.830	0.287	0.786	0.681	0.432	0.069	0.057	0.822
Mean in control	0.00	0.00	0.00	0.00	0.00	0.23	0.29	0.25
Observations	827	827	827	827	825	827	581	137
PANEL C: Concordant vs. Discordant Expert Sender (Standard Signal Condition) - Black Respondents								
Concordance Treat × Never Taker	0.283	-0.148	0.189	-0.164	0.001	-0.063	0.005	-0.031
	(0.126)	(0.129)	(0.131)	(0.127)	(0.130)	(0.041)	(0.056)	(0.149)
	[0.025]	[0.251]	[0.149]	[0.196]	[0.992]	[0.120]	[0.925]	[0.834]
Concordance Treat × Ever Taker	0.132	0.148	-0.135	-0.030	-0.065	0.017	-0.016	-0.125
	(0.094)	(0.101)	(0.098)	(0.102)	(0.112)	(0.036)	(0.046)	(0.131)
	[0.160]	[0.145]	[0.170]	[0.766]	[0.561]	[0.636]	[0.721]	[0.344]
Concordance Treat × Recent Taker	0.101	0.294	0.026	-0.131	0.017	0.086	0.111	0.004
	(0.122)	(0.118)	(0.124)	(0.134)	(0.140)	(0.047)	(0.053)	(0.160)
	[0.408]	[0.013]	[0.835]	[0.327]	[0.903]	[0.070]	[0.038]	[0.981]
p-value: Never Taker=Recent Taker	0.297	0.012	0.365	0.861	0.934	0.017	0.174	0.873
Mean in control	0.00	0.00	0.00	0.00	0.00	0.23	0.29	0.25
Observations	832	832	832	832	831	832	587	139
PANEL D: Concordant vs. Discordant Expert Sender (Standard Signal Condition) - White Respondents								
Concordance Treat × Never Taker	-0.012	0.155	-0.109	-0.065	-0.044	-0.016	0.009	-0.036
	(0.108)	(0.111)	(0.114)	(0.107)	(0.107)	(0.033)	(0.047)	(0.084)
	[0.912]	[0.163]	[0.341]	[0.548]	[0.683]	[0.623]	[0.855]	[0.672]
Concordance Treat × Ever Taker	-0.159	-0.088	0.106	-0.067	0.006	-0.012	0.025	0.047
	(0.088)	(0.085)	(0.083)	(0.091)	(0.095)	(0.029)	(0.037)	(0.070)
	[0.070]	[0.300]	[0.201]	[0.464]	[0.949]	[0.690]	[0.495]	[0.505]
Concordance Treat × Recent Taker	-0.006	-0.038	0.010	0.072	-0.305	0.050	-0.000	-0.031
	(0.107)	(0.092)	(0.113)	(0.106)	(0.127)	(0.037)	(0.044)	(0.101)
	[0.953]	[0.677]	[0.932]	[0.496]	[0.016]	[0.176]	[1.000]	[0.757]
p-value: Never Taker=Recent Taker	0.970	0.181	0.459	0.366	0.115	0.182	0.893	0.972
Mean in control	0.00	0.00	0.00	0.00	0.00	0.22	0.36	0.27
Observations	1221	1221	1221	1221	1221	1221	866	377

Notes: Table reports OLS estimates. Each dependent variable in columns (1) to (5) is an inverse-covariance-weighted index as described in Anderson (2008) and standardized to a mean of 0 and standard deviation of 1. Dependent variables in columns (6) to (7) are on a scale of 0 to 1. Dependent variable in column (8) is binary. COVID-19 vaccine Intent was asked during the 2020-2021 flu season only. Outcome variables are described in Section III and in Appendix Section E. *Never Taker* is a binary variable equal to 1 if the respondent has never received the flu shot. *Ever Taker* is a binary variable equal to 1 if the respondent received the flu shot more than 2 years ago. *Recent Taker* is a binary variable equal to 1 if the respondent received the flu shot within the past 2 years, not including the current season. The *p-value: Never Taker=Recent Taker* tests the null hypothesis that [*treatment*] × *Never Taker* = [*treatment*] × *Recent Taker*. Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regression of the take-up outcome. Robust standard errors are in parentheses. *p*-values are in brackets.

ing their last vaccine over five years ago), or receiving a flu vaccine recently (within the past two years exclusive of the current season).

We fully interact our treatment effects with never, ever and recent-taker indicator variables and report the results for each study arm in Table 2. We also test the null hypothesis that treatment effects for never- and recent-takers are equal. In column (1) of Panel A, non-experts are consistently judged as unqualified to provide medical advice and this does not vary by prior flu vaccination experience. However, the rating of the signal delivered by non-expert senders is *positive* and statistically significant among the never-takers, a result strikingly different from the perception among recent-takers (column (2)).[14] Moreover, the effect of non-expert senders on both influenza and COVID-19 vaccine intent is large, significant, and positive for never-takers, and in the former case statistically different from recent-takers. The positive effect of layperson senders on vaccine take-up is similar among all groups.

The positive effect of the acknowledgement intervention on signal ratings is driven by those who have ever received a vaccine, with the coefficient estimate among recent-takers large but imprecise (column (2) of Panel B). The acknowledgement signal increases flu and COVID-19 vaccination intent substantially among recent-takers of the flu vaccine, while effects on intent among never-takers are muted and significantly different from respondents with recent immunization experience. The effect of the acknowledgement condition is negative for the outcome of flu vaccine take-up for recent takers, which suggests a potential concern with this approach among some individuals.

Panel C demonstrates that among Black respondents, concordance effects on signal ratings and flu vaccination intent are positive and statistically significant only among those that have recently taken up the vaccine. There is no such heterogeneity among White respondents in Panel D.

[14] We present additional heterogeneity results along other margins in Appendix Figure A10.

VI Conclusion

Low demand for high-value preventive care is of interest to policymakers and a puzzle for researchers. In this paper, we examine the effect of various sender and signal combinations on vaccination outcomes in a sample of low SES men. Although race-concordant expert senders and race-discordant expert senders acknowledging past medical injustice earned higher ratings from Black individuals, we find that signals on vaccination delivered by a race-concordant layperson led to the greatest increases in health knowledge recall, intent to be vaccinated against influenza and COVID-19, and take-up of the flu vaccine. The effects of non-expert senders were concentrated among respondents with no prior experience with flu vaccination, a group that may be particularly difficult to persuade, whereas experts move vaccination intent most among those immunized in recent years.

These results are important in understanding how best to improve vaccination take-up rates and reduce health inequality. The effectiveness of non-expert senders relates to work by Larson (2020), who notes that individuals reluctant to vaccinate may be more moved by "heard truths" from proximate community members than elite experts. An alternative explanation is that medical doctors discussing the benefits of vaccination are viewed as agents not solely of the individual patient, but also of broader social interests or private interests such as insurers or pharmaceutical companies.[15] Through such a lens, professionals, though qualified, may also appear conflicted, whereas laypersons do not. More broadly, our results suggest a role for communicating information on preventive care through senders diverse both in racial background as well as level of expertise.

[15] One such comment from respondents was "*Medical industry using mind games to get people to buy their nonsense.*" We thank Keith Ericson for the interpretation of doctors as agents acting on behalf of potentially multiple principals.

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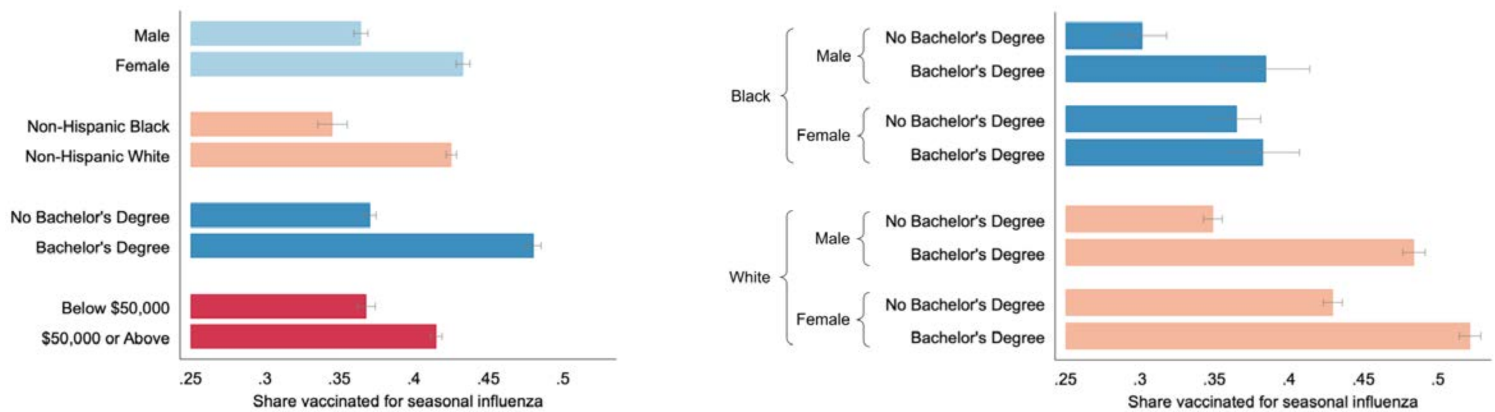
Appendix

Table of Contents

A Appendix Figures

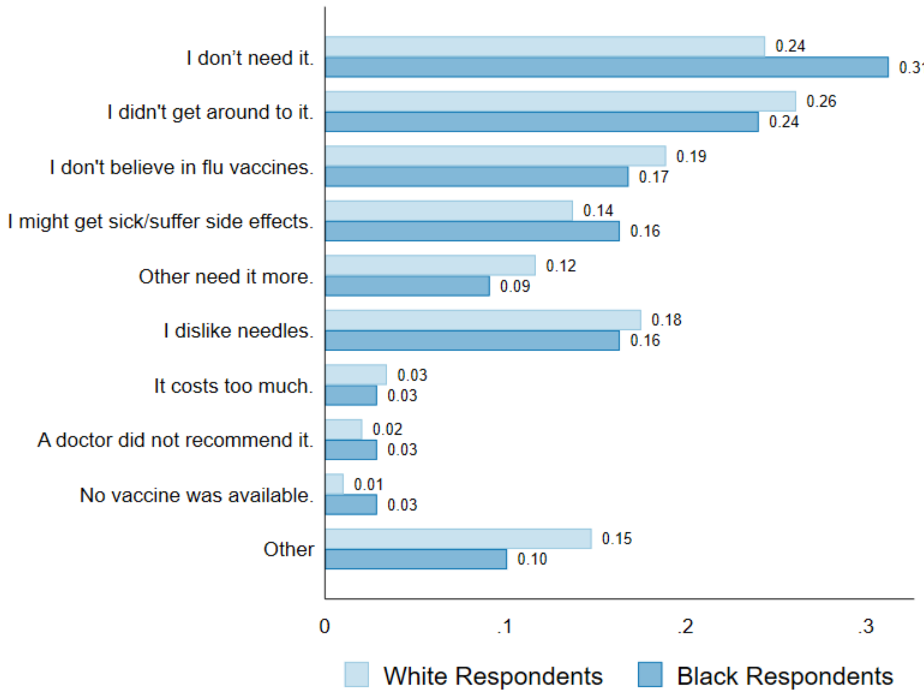


Panel (A): By Sex, Race, Education and Household Income

Panel (B): Intersectionality of race, sex and education

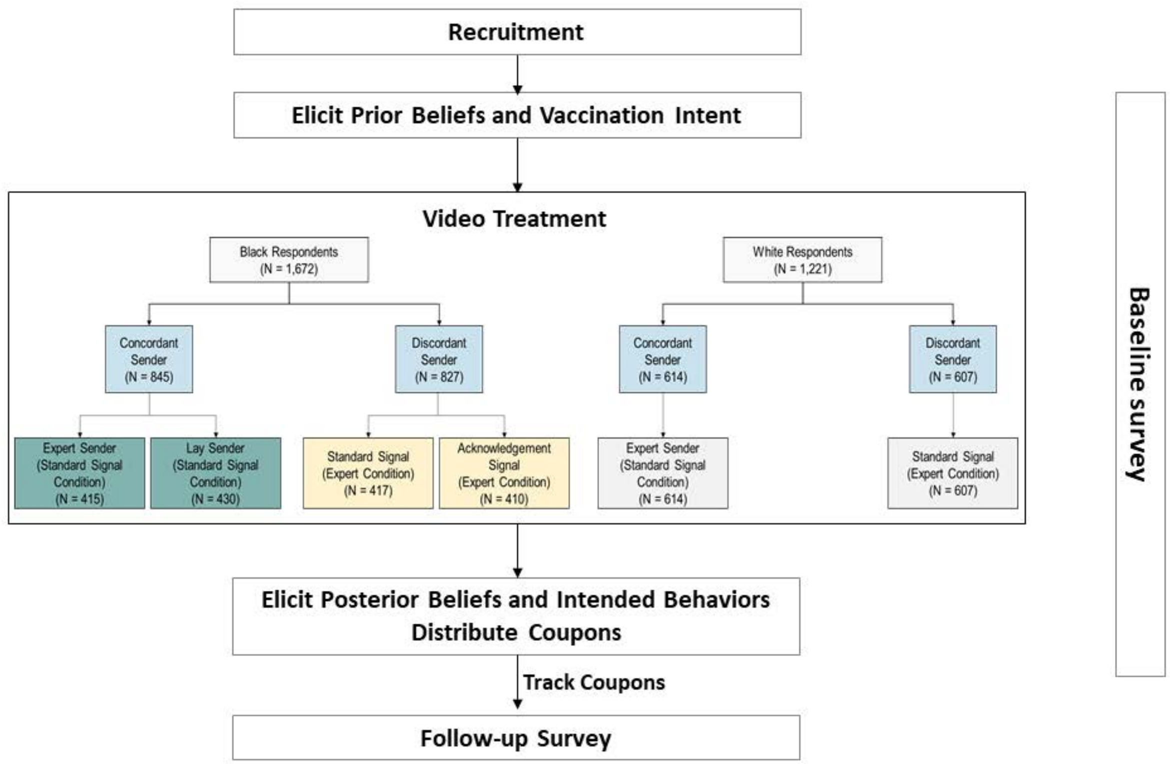
Notes: Figure is based on data from the 2017 Behavioral Risk Factor Surveillance System survey (Centers for Disease Control and Prevention 2018). Panel (A) reports means by sex, race, education level, and household income. Panel (B) reports the intersectionality of race, sex and education. Observations are weighted using survey sample weights. 95% confidence intervals are shown.

Appendix Figure A1: Seasonal Flu Vaccination Rates

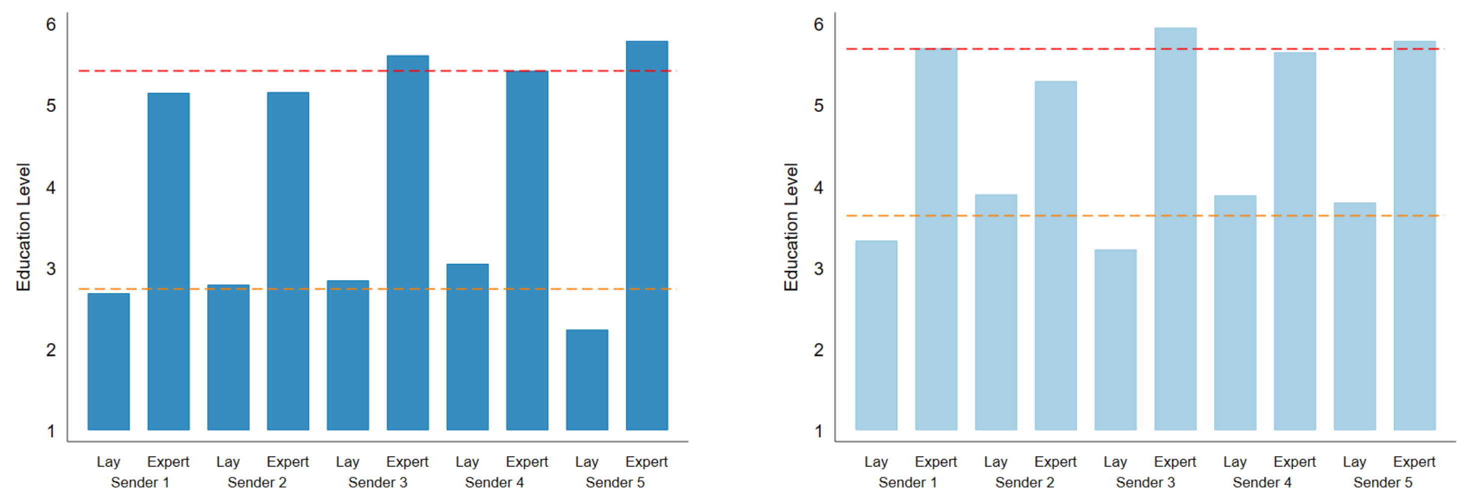


Notes: Figure is based on the follow-up survey sample, restricting to the respondents who indicated that they had not received a flu vaccine since the baseline survey (N=499). Respondents were asked the following question: *"You said that you did not get the flu shot. Why is that? Please see list below and check all reasons that apply."* The question on and list of reasons for not wanting an influenza vaccination were adopted from a 2010 RAND survey (Harris, Maurer and Uscher-Pines 2010).

Appendix Figure A2: Reasons for Not Vaccinating



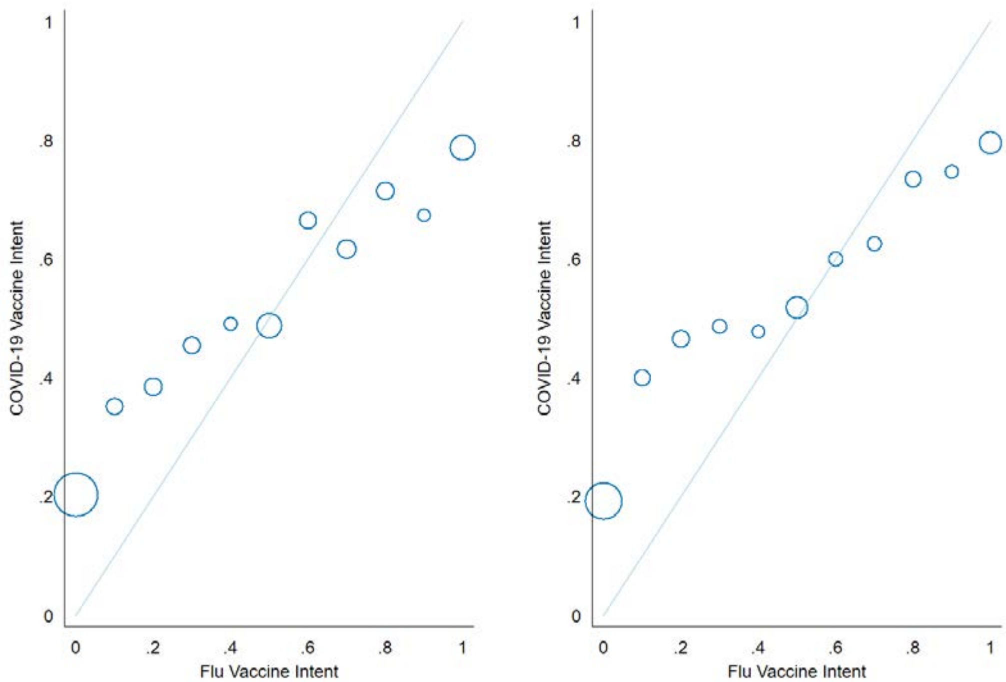
Appendix Figure A3: Study Design



Panel (A): Black Senders   Panel (B): White Senders

Notes: Figure displays the mean of MTurkers' ratings of sender education by race and role of senders based on a sample of 381 Mturkers. Each sender was rated on their level of education on a scale of 1 (lowest; less than high school education) to 6 (highest; a graduate degree), in both a layperson and expert role. The red lines represent the mean education rating in an expert role for all Black senders (Panel (A)) and White senders (Panel (B)). The orange lines represent the mean education rating in a layperson role for all Black senders (Panel (A)) and White senders (Panel (B)).

Appendix Figure A4: MTurkers' Ratings of Black and White Senders

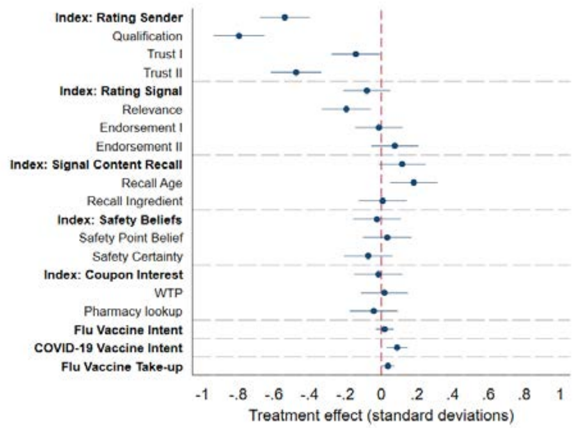


Panel (A): Black Respondents

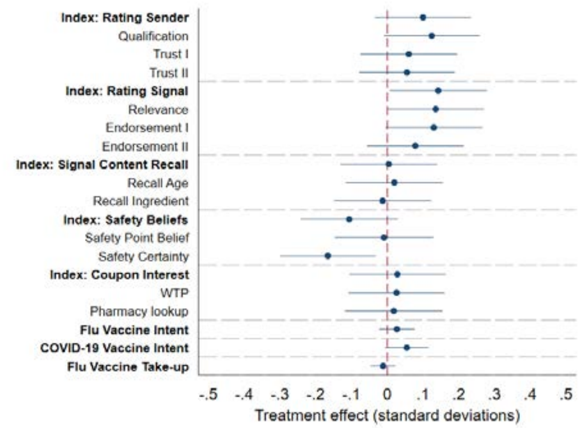
Panel (B): White Respondents

Notes: Figure shows the relationship between Flu Vaccine Intent (on a scale of 0 to 1) and COVID-19 Vaccine Intent (on a scale of 0 to 1). The size of dots represents the number of respondents in each bin of Flu Vaccine Intent. The figure is based on the sample of respondents from the 2020-2021 flu season, as the question about COVID-19 Vaccine Intent was not asked during the 2019-2020 flu season.

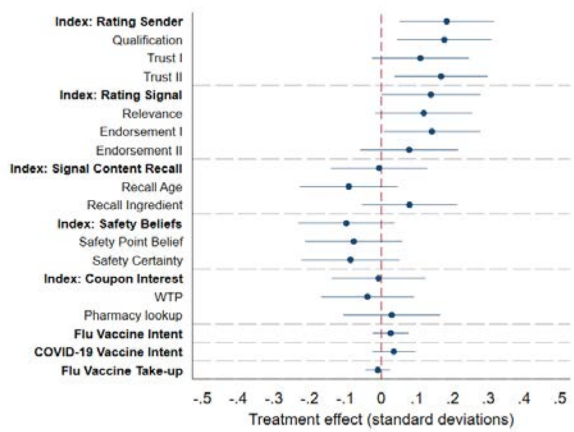
Appendix Figure A5: Relationship Between Flu Vaccine Intent and COVID-19 Vaccine Intent



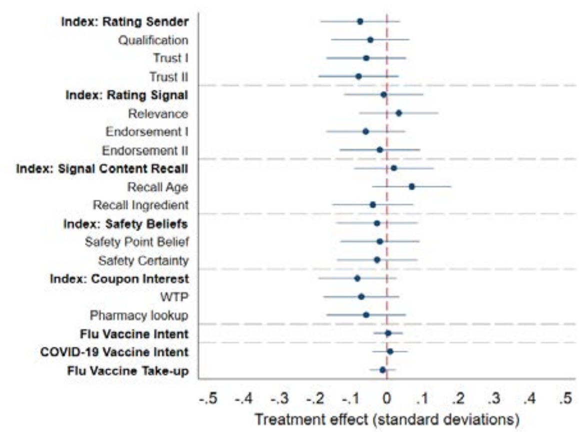
Panel (A): Layperson Treatment



Panel (B): Acknowledgement Signal Treatment



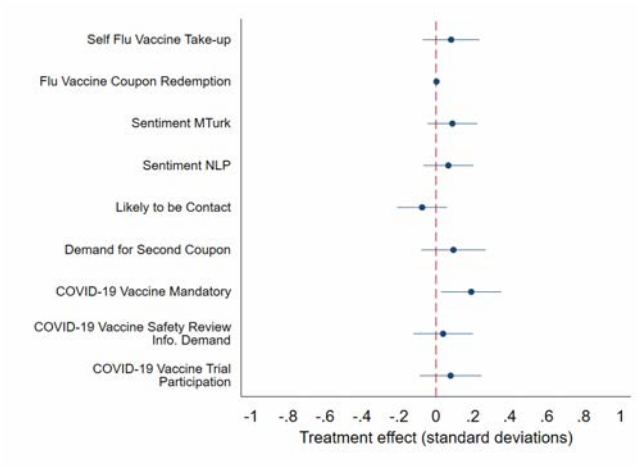
Panel (C): Concordance Treatment - Black Respondents



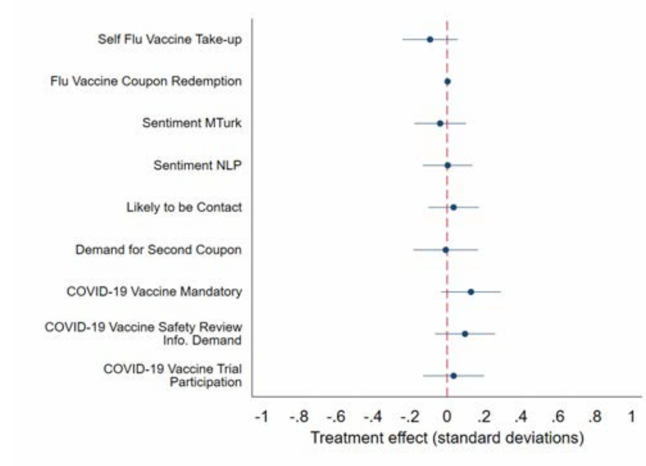
Panel (D): Concordance Treatment - White Respondents

Notes: Figure shows treatment effects on each individual outcome that enters a primary outcome, for each treatment comparison (A: layperson vs. expert sender; B: acknowledgement vs. standard message; C and D: concordant vs. discordant sender). Outcomes are described in Section III and in Appendix Section E. Outcomes are standardized except take-up and intent which are presented as in the main text. Dots represent coefficient estimates obtained from OLS regressions of each outcome of interest on the treatment indicator variable. Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regression of the take-up outcome. 95% confidence intervals using robust standard errors are shown.

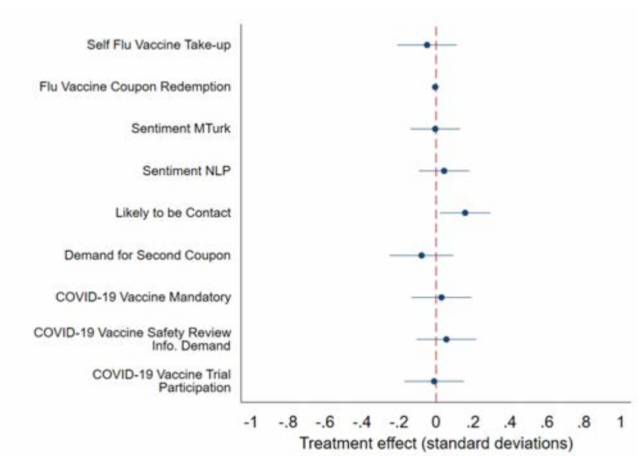
Appendix Figure A6: Treatment Effects For Each Component of the Primary Outcomes



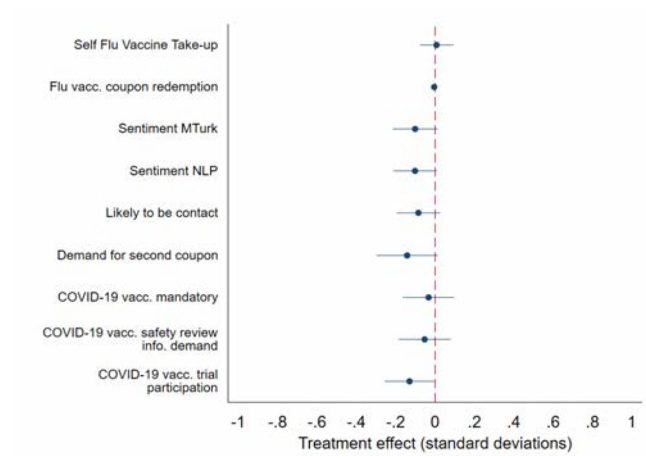
Panel (A): Layperson Treatment



Panel (B): Acknowledgement Signal Treatment



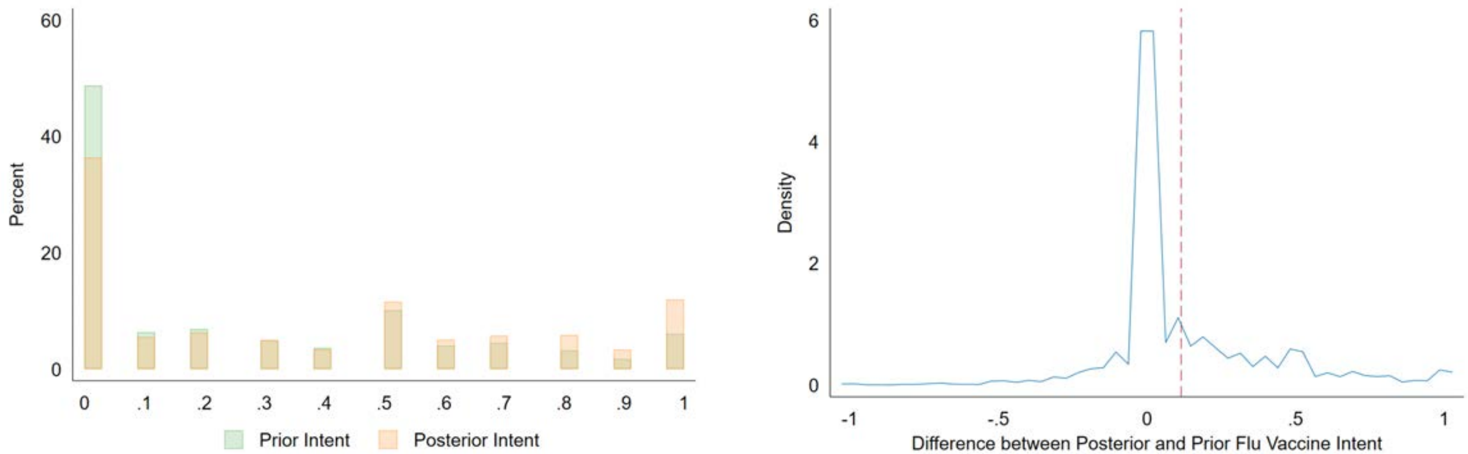
Panel (C): Concordance Treatment - Black Respondents



Panel (D): Concordance Treatment - White Respondents

Notes: Figure shows treatment effects on secondary outcomes that do not enter a primary outcome, for each treatment comparison (A: layperson vs. expert sender; B: acknowledgement vs. standard message; C and D: concordant vs. discordant sender). Outcomes are standardized except the flu vaccine coupon redemption and take-up outcome. Dots represent coefficient estimates obtained from OLS regressions of each outcome of interest on the treatment indicator variable. Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regressions of the redemption and take-up outcomes. 95% confidence intervals using robust standard errors are shown.

Appendix Figure A7: Treatment Effects For Additional Outcomes

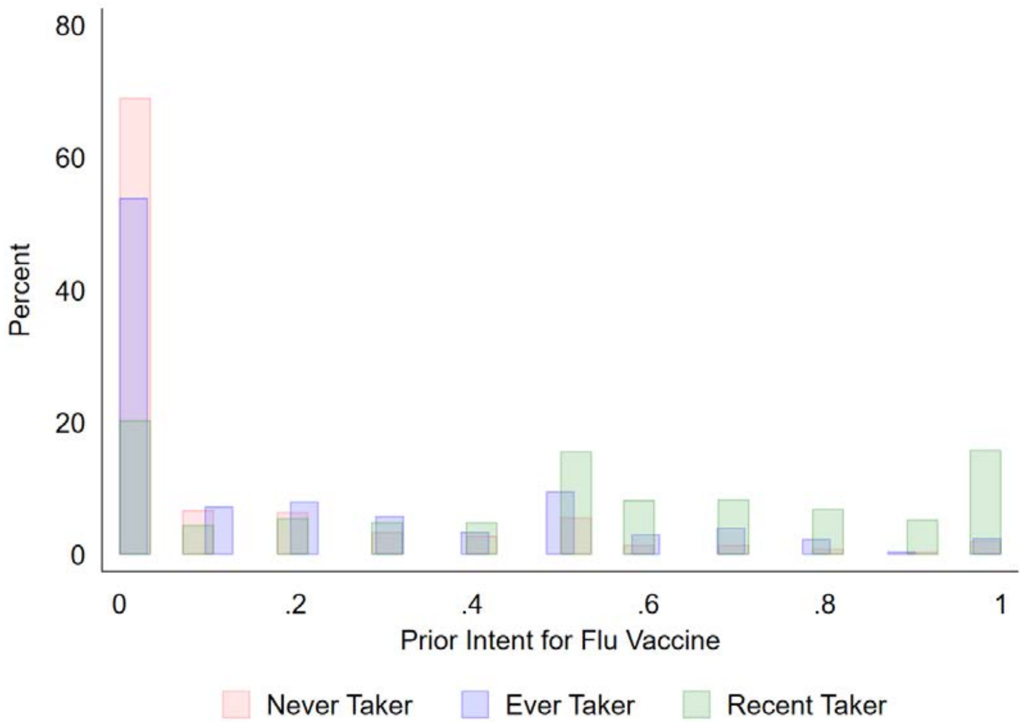


Panel (A): Histogram

Panel (B): Distribution of Difference

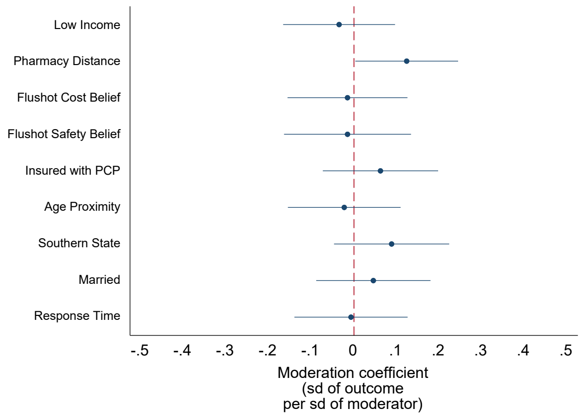
Notes: Panel (A) shows a histogram of prior and posterior flu vaccine intent. Panel (B) plots the histogram of the individual-level difference. See Appendix Section E for definitions.

Appendix Figure A8: Prior and Posterior Flu Vaccine Intent

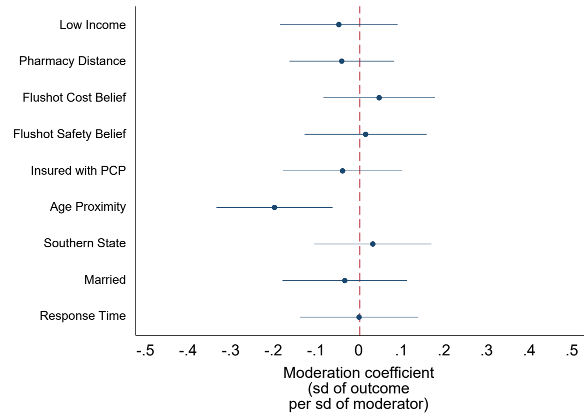


Notes: Figure shows the distribution of the variable *Prior Intent for Flu Vaccine* among never-takers, ever-takers and recent-takers of the flu vaccine. Never-takers of the flu vaccine are defined as respondents who reported having never received the flu vaccine. The ever-taker category encompasses respondents who reported having received their last flu vaccination over two years ago. Recent-takers include respondents who reported having received their last flu vaccination within the past two years but not in the current influenza season.

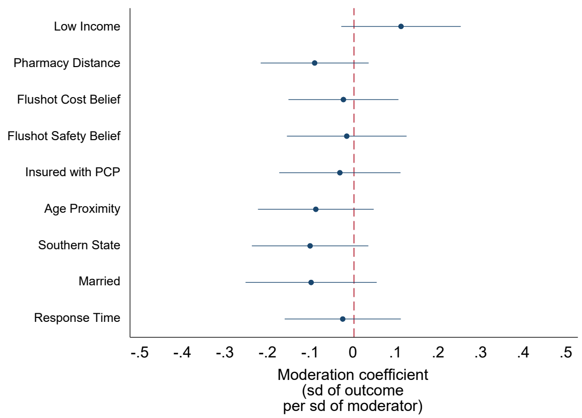
Appendix Figure A9: Histogram of Prior Flu Vaccine Intent by Vaccination Experience



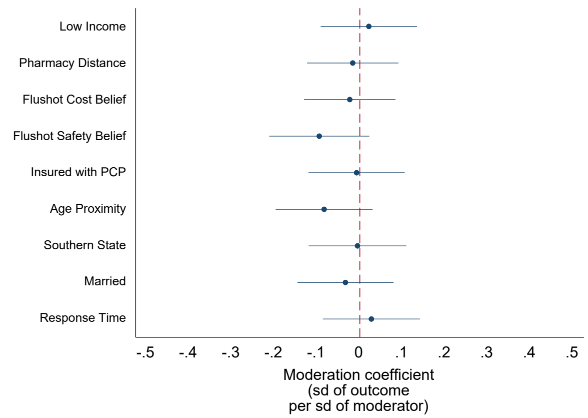
Panel (A): Layperson Treatment Heterogeneity



Panel (B): Acknowledgement Treatment Heterogeneity



Panel (C): Concordance Treatment Heterogeneity - Black Respondents



Panel (D): Concordance Treatment Heterogeneity - White Respondents

Notes: Figure reports heterogeneity in treatment effects for each treatment comparison (A: layperson vs. expert sender; B: acknowledgement vs. standard message; C and D: concordant vs. discordant sender). Estimates are obtained from a regression of the variable *Flu Vaccine Intent* on the treatment indicator, moderator, and their interaction. Both the outcome and the moderator are standardized to a mean of 0 and standard deviation of 1. Dots represent coefficient estimates on the interaction coefficient. Stratifying variables (platform and season) are included but not reported. Moderators (before standardization) are defined as: Low Income = 1 if the respondent's self-reported household income is less than or equal to the median income among Black respondents in the sample (=$30k); Pharmacy Distance = distance to nearest pharmacy in miles; Flushot Cost Belief = belief about own out-of-pocket cost for the flu shot in USD; Flushot Safety Belief = prior belief of fraction of individuals who get the flu from the flu shot; Insured with PCP = dummy for having a primary care provider and health insurance; Age Proximity = dummy equal to one if sender and receiver age difference is no more than ten years; Southern State = dummy for residence in the U.S. South; Married = dummy for being married; and Response Time = log of time in seconds that the respondent spent on the survey up to (but excluding) the video treatment screen. 95% confidence intervals using robust standard errors are shown.

Appendix Figure A10: Treatment Effect Heterogeneity

B Appendix Tables

Appendix Table B1: Sender Ratings by Study Arm

	Layperson vs. Expert - Black Rs			Concordant vs. Discordant - Black Rs			Concordant vs. Discordant - White Rs		
	(1) Age	(2) Education	(3) Attractiveness	(4) Age	(5) Education	(6) Attractiveness	(7) Age	(8) Education	(9) Attractiveness
Layperson Role	-0.300	-1.743	-0.584						
	(0.174)	(0.185)	(0.219)						
	[0.088]	[0.000]	[0.009]						
Black Sender				0.019	-0.153	0.349	-0.527	-2.841	-0.339
				(0.189)	(0.233)	(0.162)	(0.202)	(1.045)	(0.218)
				[0.918]	[0.512]	[0.034]	[0.010]	[0.008]	[0.124]
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	102	102	102	103	103	103	89	89	89

Notes: Table reports OLS estimates based on the MTurk sample. Dependent variables are perceptions of age, education and attractiveness. The outcomes are described in Appendix Section E and standardized to a mean of 0 and a standard deviation of 1. Columns (1) to (6) include ratings from Black Mturk respondents only. Columns (1) to (3) include sender fixed effects, thus comparing MTurkers' ratings of the same sender, assuming a different identity (lay vs. expert). Columns (4) to (9) compare MTurkers' ratings of Black vs. White experts. Columns (7) to (9) include ratings from white Mturk respondents only. The mean of each dependent variable for the omitted group is shown. Robust standard errors are in parentheses, and *p*-values are in brackets.

Appendix Table B2: Treatment Effects on Flu Vaccine Take-up

	Follow-up Sample		Full Sample		
	(1)	(2)	(3)	(4)	(5)
	Self Flu Vaccine Take-up	Flu Vaccine Take-up	Flu Vaccine Coupon Redemption	Self Flu Vaccine Take-up	Flu Vaccine Take-up
PANEL A: Layperson vs. Expert (Concordant, Standard Signal Condition) - Black Respondents					
Layperson Treat	0.082	0.150	0.002	0.018	0.037
	(0.078)	(0.083)	(0.002)	(0.016)	(0.019)
	[0.296]	[0.075]	[0.318]	[0.241]	[0.051]
Mean in control	0.26	0.38	0.00	0.05	0.07
Observations	151	151	845	845	845
PANEL B: Standard vs. Acknowledgement Signal (Discordant, Expert Condition) - Black Respondents					
Acknowledgement Signal Treat	-0.092	-0.120	0.003	-0.008	-0.012
	(0.076)	(0.085)	(0.006)	(0.014)	(0.018)
	[0.225]	[0.159]	[0.654]	[0.570]	[0.510]
Mean in control	0.30	0.48	0.00	0.05	0.08
Observations	137	137	827	827	827
p-value	0.102	0.021	0.983	0.210	0.060
PANEL C: Concordant vs. Discordant Expert Sender (with Standard Signal) - Black Respondents					
Concordance Treat	-0.049	-0.077	-0.005	-0.002	-0.010
	(0.082)	(0.087)	(0.004)	(0.015)	(0.018)
	[0.548]	[0.378]	[0.157]	[0.884]	[0.580]
Mean in control	0.30	0.48	0.00	0.05	0.08
Observations	139	139	832	832	832
PANEL D: Concordant vs. Discordant Expert Sender (Standard Signal Condition) - White Respondents					
Concordance Treat	0.007	-0.014	-0.005	-0.007	-0.012
	(0.043)	(0.049)	(0.006)	(0.015)	(0.018)
	[0.864]	[0.776]	[0.425]	[0.631]	[0.520]
Mean in control	0.23	0.38	0.01	0.08	0.13
Observations	377	377	1221	1221	1221
p-value	0.533	0.520	0.952	0.809	0.936

Notes: Table reports OLS estimates based on those who replied to the follow-up survey (columns (1) to (2)) and full sample (columns (3) to (5)). Columns (4) and (5) assume non-responders to the follow-up survey did not receive the vaccine. All outcome variables are binary and described in Section III and in Appendix Section E. The *p*-value in Panel (B) tests the null hypothesis that acknowledgement signal treatment and layperson treatment effects are the same. The *p*-value in Panel (D) tests the null hypothesis that the concordance treatment effects are the same across Black and White respondents. Stratifying variables (platform and season) and an indicator (=1) if the respondent is married are included but not reported. Robust standard errors are in parentheses. *p*-values are in brackets.

Appendix Table B3: Attrition from Baseline Survey

	(1) Black Respondents	(2) White Respondents
Expert Discordant	-0.006	0.023
	(0.022)	(0.014)
	[0.765]	[0.088]
Layperson Concordant	-0.000	
	(0.022)	
	[0.990]	
Acknowledgement Signal Discordant	0.021	
	(0.022)	
	[0.341]	
p-value	0.627	n.a.
Mean	0.13	0.05
Observations	1938	1307

Notes: Table reports OLS estimates on the baseline sample. The dependent variable is attrition from the baseline survey, which is an indicator variable equal to 1 if the respondent was randomized but did not complete the baseline survey and 0 otherwise. Column (1) corresponds to the sample of Black respondents. Column (2) corresponds to the sample of White respondents. The reported *p*-value at the bottom of the table tests the null hypothesis that the effect of all four treatments on attrition, among Black respondents, is the same. Stratifying variables (platform and season) are included but not reported. Robust standard errors are in parentheses. *p*-values are in brackets.

Appendix Table B4: Summary Statistics

	Scale	All			Black			White		
	(1)	(2) Mean	(3) SD	(4) N	(5) Mean	(6) SD	(7) N	(8) Mean	(9) SD	(10) N
Panel A: Demographic Characteristics										
Age	(C)	36.83	6.74	2893	35.87	6.56	1672	38.14	6.76	1221
Low Income	(B)	0.53	0.50	2893	0.60	0.49	1672	0.42	0.49	1221
Completed High School	(B)	0.88	0.32	2893	0.88	0.33	1672	0.89	0.31	1221
Married	(B)	0.25	0.43	2893	0.19	0.39	1672	0.32	0.47	1221
South	(B)	0.52	0.50	2879	0.58	0.49	1667	0.44	0.50	1212
Panel B: Health Characteristics										
Insured	(B)	0.63	0.48	2809	0.60	0.49	1602	0.66	0.47	1207
Subjective Health Status	[1,5]	3.47	1.03	2893	3.64	1.02	1672	3.23	0.99	1221
Subjective Flu Shot Cost	(C)	33.56	70.94	2893	39.71	82.60	1672	25.15	49.62	1221
Has Primary Care Provider	(B)	0.47	0.50	2893	0.44	0.50	1672	0.53	0.50	1221
Never Taker	(B)	0.27	0.45	2893	0.27	0.45	1672	0.28	0.45	1221
Ever Taker	(B)	0.45	0.50	2893	0.45	0.50	1672	0.45	0.50	1221
Recent Taker	(B)	0.28	0.45	2893	0.28	0.45	1672	0.28	0.45	1221
Panel C: Prior Elicitation										
Flu Vaccine Intent	[0,10]	2.57	3.23	2893	2.57	3.26	1672	2.56	3.19	1221
Likelihood of Contracting Flu	[0,10]	2.48	2.77	2893	2.21	2.83	1672	2.84	2.65	1221
Belief about Safety of Flu Vaccine	[0,100]	57.22	28.09	2893	54.45	27.86	1672	61.02	27.98	1221

Notes: Columns (2)-(4) show the mean, standard deviation, and sample size for all respondents. Columns (5)-(7) restrict the sample to Black respondents, and columns (8)-(10) restrict the sample to White respondents. *Low Income* is a binary variable equal to 1 if the respondent's self-reported household income is less than or equal to the median income of Black respondents in the sample (=$30k). *Subjective Health Status* is measured on a 5-point Likert scale (where 1 is poor and 5 is excellent). *Subjective Flu Shot Cost* is in US$; the values above the 99th percentile are set to the 99th percentile value. *Never Taker* is a binary variable equal to 1 if the respondent has never received the flu shot. *Ever Taker* is a binary variable equal to 1 if the respondent has received the flu shot more than 2 years ago. *Recent Taker* is a binary variable equal to 1 if the respondent has received the flu shot within the past 2 years. *Flu Vaccine Intent* is the respondent's prior intent to receive the flu vaccine before the end of the flu season elicited on an 11-point Likert scale. *Likelihood of Contracting Flu* is the respondent's subjective likelihood of contracting flu before the end of the flu season elicited on an 11-point Likert scale. *Belief about Safety of Flu Vaccine* is belief over how many individuals out of 100 will *not* contract the flu from the flu shot. (C) indicates that the variable is continuous; (B) indicates that the variable is binary. In cases when the variable is not binary or continuous, the scale of the raw variable is provided.

Appendix Table B5: Balance Table for Baseline Survey Sample

	Black Rs: Lay vs Expert			Black Rs: Acknow. vs Standard			Black Rs: Concor. vs Discor.			White Rs: Concor. vs Discor.			
	Coeff.	Mean	N	Coeff.	Mean	N	Coeff.	Mean	N	Coeff.	Mean	N	F-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel A: Demographic Characteristics													
Age	-0.381	35.920	845	-0.276	36.125	827	-0.258	36.125	832	-0.008	38.165	1221	0.766
	(0.438)			(0.458)			(0.452)			(0.353)			[0.513]
	[0.385]			[0.547]			[0.568]			[0.982]			
Low Income	-0.028	0.627	845	0.021	0.580	827	0.046	0.580	832	-0.015	0.432	1221	0.639
	(0.034)			(0.034)			(0.034)			(0.028)			[0.590]
	[0.411]			[0.543]			[0.179]			[0.597]			
Completed High School	0.019	0.865	845	-0.031	0.897	827	-0.032	0.897	832	0.024	0.878	1221	0.939
	(0.023)			(0.023)			(0.022)			(0.018)			[0.421]
	[0.416]			[0.167]			[0.157]			[0.176]			
Married	-0.027	0.754	845	0.021	0.715	827	0.040	0.715	832	-0.009	0.593	1221	0.629
	(0.030)			(0.031)			(0.031)			(0.028)			[0.596]
	[0.370]			[0.509]			[0.187]			[0.755]			
South	0.099	0.522	843	0.031	0.570	824	-0.049	0.570	828	-0.019	0.450	1212	3.166
	(0.034)			(0.034)			(0.035)			(0.028)			[0.024]
	[0.004]			[0.369]			[0.156]			[0.499]			
Panel B: Health Characteristics													
Insured	0.014	0.591	812	0.003	0.611	790	-0.020	0.611	797	0.010	0.653	1207	0.174
	(0.035)			(0.035)			(0.035)			(0.027)			[0.914]
	[0.695]			[0.939]			[0.566]			[0.719]			
Subjective Health Status	0.225	3.523	845	0.012	3.643	827	-0.117	3.643	832	-0.017	3.237	1221	3.637
	(0.069)			(0.072)			(0.070)			(0.057)			[0.012]
	[0.001]			[0.870]			[0.094]			[0.771]			
Subjective Flu Shot Cost	0.615	30.707	822	-2.866	28.691	811	2.015	28.691	811	-1.270	23.452	1215	1.381
	(3.425)			(3.035)			(3.378)			(2.111)			[0.247]
	[0.857]			[0.345]			[0.551]			[0.548]			
Has Primary Care Provider	-0.043	0.455	845	-0.043	0.460	827	-0.004	0.460	832	-0.009	0.532	1221	1.080
	(0.034)			(0.034)			(0.035)			(0.029)			[0.356]
	[0.212]			[0.215]			[0.904]			[0.762]			
Never Taker	-0.029	0.263	845	0.033	0.281	827	-0.019	0.281	832	0.004	0.275	1221	2.444
	(0.030)			(0.032)			(0.031)			(0.026)			[0.062]
	[0.322]			[0.305]			[0.528]			[0.867]			
Ever Taker	0.026	0.443	845	-0.045	0.468	827	-0.024	0.468	832	-0.003	0.446	1221	0.816
	(0.034)			(0.035)			(0.035)			(0.028)			[0.485]
	[0.455]			[0.196]			[0.486]			[0.902]			
Recent Taker	0.004	0.294	845	0.012	0.252	827	0.044	0.252	832	-0.001	0.278	1221	1.144
	(0.031)			(0.030)			(0.031)			(0.026)			[0.330]
	[0.899]			[0.690]			[0.156]			[0.976]			
Panel C: Prior Elicitation													
Flu Vaccine Intent	0.213	2.554	845	0.049	2.446	827	0.118	2.446	832	0.083	2.529	1221	0.859
	(0.224)			(0.223)			(0.225)			(0.181)			[0.462]
	[0.342]			[0.825]			[0.600]			[0.648]			
Likelihood of Contracting Flu	-0.279	2.342	845	0.167	2.144	827	0.202	2.144	832	-0.146	2.913	1221	0.949
	(0.194)			(0.197)			(0.196)			(0.151)			[0.416]
	[0.150]			[0.397]			[0.303]			[0.334]			
Belief about Safety of Flu Vaccine	1.704	44.978	845	2.228	44.180	827	0.896	44.180	832	1.882	38.021	1221	0.802
	(1.898)			(1.950)			(1.976)			(1.592)			[0.493]
	[0.370]			[0.254]			[0.650]			[0.237]			
Panel D: Follow-up Survey													
Completed Follow-up Survey	0.010	0.173	845	0.010	0.161	827	0.012	0.161	832	-0.016	0.318	1221	0.238
	(0.026)			(0.026)			(0.026)			(0.026)			[0.870]
	[0.714]			[0.701]			[0.630]			[0.536]			

Notes: Table reports estimates obtained from OLS regressions of each respondent characteristic (rows) on treatment variables by study arm. Columns (1) to (3) test the effects of the concordant non-expert (vs. concordant expert) treatment with the standard signal, among the sample of Black respondents. Columns (4) to (6) test the effects of the acknowledgement (vs. standard) signal treatment with discordant, expert senders, among the sample of Black respondents. Columns (7) to (9) test the effects of the concordant (vs. discordant) expert treatment with the standard signal, among the sample of Black respondents. Columns (10) to (12) test the effects of concordant (vs. discordant) expert treatment with the standard signal, among the sample of White respondents. See table notes of Appendix Table B4 for the definitions of each respondent characteristic. Total respondents completing the follow-up survey by experimental condition are as follows: 72 for concordant-Black respondents; 67 for discordant-Black respondents; 184 for concordant-White respondents; 193 for discordant-White respondents; 70 for acknowledgement signal treatment; 67 for standard signal treatment; 79 for non-expert treatment; and 72 for expert treatment. Stratifying variables (platform and season) are included but not reported. The reported *F*-statistics in Column (13) test the null hypothesis that the effects of all four treatments (i.e. concordant expert, discordant expert (standard signal), concordant non-expert, and discordant expert (acknowledgement signal) are the same, among the sample of Black respondents. Robust standard errors are in parentheses. *p*-values are shown in brackets.

Appendix Table B6: Balance Table for Follow-up Survey Sample

	Black Rs: Lay vs Expert			Black Rs: Acknow. vs Standard			Black Rs: Concor. vs Discor.			White Rs: Concor. vs Discor.			
	Coeff.	Mean	N	Coeff.	Mean	N	Coeff.	Mean	N	Coeff.	Mean	N	F-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel A: Demographic Characteristics													
Age	-0.313	36.653	151	-1.460	37.597	137	-0.926	37.597	139	0.033	39.518	377	0.627
	(0.978)			(1.169)			(1.103)			(0.634)			[0.598]
	[0.749]			[0.214]			[0.403]			[0.959]			
Low Income	0.000	0.583	151	0.020	0.493	137	0.095	0.493	139	-0.003	0.472	377	0.625
	(0.082)			(0.086)			(0.085)			(0.052)			[0.599]
	[0.995]			[0.819]			[0.267]			[0.960]			
Completed High School	0.022	0.889	151	0.019	0.881	137	0.009	0.881	139	0.009	0.891	377	0.147
	(0.050)			(0.054)			(0.056)			(0.032)			[0.932]
	[0.653]			[0.720]			[0.869]			[0.772]			
Married	-0.090	0.736	151	-0.002	0.657	137	0.078	0.657	139	-0.064	0.627	377	0.592
	(0.076)			(0.082)			(0.078)			(0.051)			[0.621]
	[0.239]			[0.983]			[0.316]			[0.210]			
South	-0.088	0.606	150	0.127	0.463	137	0.136	0.463	138	-0.005	0.398	375	1.186
	(0.082)			(0.085)			(0.085)			(0.051)			[0.315]
	[0.287]			[0.141]			[0.110]			[0.927]			
Panel B: Health Characteristics													
Insured	0.136	0.625	151	0.025	0.723	132	-0.100	0.723	137	-0.004	0.689	373	1.216
	(0.075)			(0.078)			(0.081)			(0.048)			[0.304]
	[0.073]			[0.746]			[0.221]			[0.927]			
Subjective Health Status	0.119	3.569	151	-0.108	3.582	137	-0.003	3.582	139	0.002	3.119	377	0.562
	(0.157)			(0.188)			(0.179)			(0.105)			[0.641]
	[0.449]			[0.567]			[0.985]			[0.982]			
Subjective Flu Shot Cost	-10.972	27.782	146	-3.985	28.136	135	0.490	28.136	135	-2.353	19.380	374	2.116
	(5.478)			(6.939)			(7.334)			(2.668)			[0.098]
	[0.047]			[0.567]			[0.947]			[0.378]			
Has Primary Care Provider	0.260	0.375	151	0.123	0.448	137	-0.071	0.448	139	-0.065	0.575	377	4.356
	(0.079)			(0.083)			(0.084)			(0.051)			[0.005]
	[0.001]			[0.143]			[0.399]			[0.206]			
Never Taker	-0.079	0.306	151	0.066	0.239	137	0.069	0.239	139	0.016	0.269	377	0.666
	(0.073)			(0.077)			(0.075)			(0.046)			[0.574]
	[0.279]			[0.391]			[0.363]			[0.735]			
Ever Taker	-0.001	0.417	151	-0.144	0.463	137	-0.043	0.463	139	0.042	0.435	377	0.972
	(0.080)			(0.083)			(0.085)			(0.051)			[0.406]
	[0.986]			[0.087]			[0.615]			[0.416]			
Recent Taker	0.081	0.278	151	0.078	0.299	137	-0.026	0.299	139	-0.057	0.295	377	0.655
	(0.074)			(0.080)			(0.078)			(0.045)			[0.580]
	[0.280]			[0.335]			[0.737]			[0.207]			
Panel C: Prior Elicitation													
Flu Vaccine Intent	1.109	2.861	151	0.420	3.269	137	-0.407	3.269	139	0.128	2.912	377	1.487
	(0.560)			(0.597)			(0.612)			(0.347)			[0.218]
	[0.050]			[0.483]			[0.507]			[0.713]			
Likelihood of Contracting Flu	0.698	2.667	151	0.001	2.552	137	0.121	2.552	139	-0.426	3.249	377	1.178
	(0.513)			(0.476)			(0.495)			(0.271)			[0.318]
	[0.176]			[0.998]			[0.807]			[0.116]			
Belief about Safety of Flu Vaccine	3.260	47.014	151	-1.570	44.239	137	2.863	44.239	139	3.503	34.005	377	1.096
	(4.600)			(4.802)			(4.751)			(2.851)			[0.351]
	[0.480]			[0.744]			[0.548]			[0.220]			

Notes: Table reports estimates obtained from OLS regressions of each respondent characteristic (rows) on treatment variables by hypothesis based on the follow-up survey sample. Columns (1) to (3) test the effects of the concordant non-expert (vs. concordant expert) treatment with the standard signal, among the sample of Black respondents. Columns (4) to (6) test the effects of the acknowledgement (vs. standard) signal treatment with discordant, expert senders, among the sample of Black respondents. Columns (7) to (9) test the effects of the concordant (vs. discordant) expert treatment with the standard signal, among the sample of Black respondents. Columns (10) to (12) test the effects of concordant (vs. discordant) expert treatment with the standard signal, among the sample of White respondents. See table notes of Appendix Table B4 for the definitions of each respondent characteristic. Stratifying variables (platform and season) are included but not reported. The reported *F*-statistics in Column (13) test the null hypothesis that the effects of all four treatments (i.e. concordant expert, discordant expert (standard signal), concordant non-expert, and discordant expert (acknowledgement signal) are the same, among the sample of Black respondents. Robust standard errors are in parentheses. *p*-values are shown in brackets.

Appendix Table B7: Test for Differential Sender Effects By Expertise - Black Respondents

	Effects of Video on							
	Ratings, Knowledge, and Beliefs				Vaccine Intent and Take-Up			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rating Sender	Rating Signal	Signal Content Recall	Safety Beliefs	Coupon Interest	Flu Vaccine Intent	COVID-19 Vaccine Intent	Flu Vaccine Take-up
Layperson Treat X Sender 5	0.283	0.052	-0.100	0.137	0.213	-0.024	-0.040	-0.411
	(0.214)	(0.228)	(0.220)	(0.210)	(0.236)	(0.080)	(0.095)	(0.266)
	[0.186]	[0.820]	[0.651]	[0.514]	[0.365]	[0.763]	[0.671]	[0.125]
Layperson Treat X Sender 8	0.197	0.093	0.064	0.064	0.176	-0.015	0.033	-0.443
	(0.211)	(0.219)	(0.215)	(0.226)	(0.231)	(0.077)	(0.094)	(0.259)
	[0.350]	[0.671]	[0.767]	[0.777]	[0.448]	[0.848]	[0.728]	[0.090]
Layperson Treat X Sender 9	-0.107	0.044	-0.011	-0.018	0.138	-0.027	-0.057	-0.457
	(0.207)	(0.214)	(0.206)	(0.247)	(0.233)	(0.080)	(0.094)	(0.258)
	[0.606]	[0.836]	[0.957]	[0.943]	[0.555]	[0.734]	[0.546]	[0.079]
Layperson Treat X Sender 10	0.247	0.109	-0.285	-0.195	0.615	-0.044	0.079	-0.126
	(0.200)	(0.214)	(0.210)	(0.230)	(0.226)	(0.078)	(0.090)	(0.248)
	[0.218]	[0.610]	[0.174]	[0.398]	[0.007]	[0.576]	[0.381]	[0.612]
p-value	0.249	0.988	0.462	0.670	0.091	0.987	0.600	0.255
Mean	0.00	0.00	0.00	0.00	0.00	0.38	0.48	0.52
Observations	845	845	845	845	845	845	592	151

Notes: Table reports OLS estimates among the sample of Black respondents who were assigned to either a layperson or expert Black sender, from a regression of each primary outcome on sender fixed effects, a layperson treatment indicator, and their interaction. Each dependent variable in columns (1) to (5) is an inverse-covariance-weighted index as described in Anderson (2008) and standardized to the mean of 0 and standard deviation of 1. Dependent variables in columns (6) to (7) are on a scale of 0 to 1. Dependent variable in column (8) is binary. COVID-19 vaccine Intent was asked during the 2020-2021 flu season only. Outcome variables are described in Section III and in Appendix Section E. The *p*-value tests the null hypothesis that all interaction terms are the same. The omitted sender is Sender 2. Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regression of the take-up outcome. Robust standard errors are in parentheses. *p*-values are shown in brackets.

Appendix Table B8: Test for Differential Sender Effects - Black Respondents

	Effects of Video on							
	Ratings, Knowledge, and Beliefs				Vaccine Intent and Take-Up			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rating Sender	Rating Signal	Signal Content Recall	Safety Beliefs	Coupon Interest	Flu Vaccine Intent	COVID-19 Vaccine Intent	Flu Vaccine Take-up
Sender 2 (B)	0.272	0.126	-0.010	0.057	0.025	0.006	-0.000	-0.391
	(0.161)	(0.163)	(0.157)	(0.145)	(0.143)	(0.055)	(0.065)	(0.181)
	[0.091]	[0.437]	[0.951]	[0.692]	[0.859]	[0.915]	[0.996]	[0.033]
Sender 3 (W)	-0.071	-0.138	0.116	0.333	-0.028	0.014	-0.097	-0.214
	(0.160)	(0.153)	(0.138)	(0.150)	(0.149)	(0.055)	(0.067)	(0.212)
	[0.656]	[0.367]	[0.402]	[0.027]	[0.849]	[0.803]	[0.150]	[0.314]
Sender 4 (W)	-0.263	-0.197	0.159	0.275	-0.085	-0.061	-0.067	-0.256
	(0.155)	(0.156)	(0.150)	(0.164)	(0.152)	(0.055)	(0.068)	(0.172)
	[0.091]	[0.206]	[0.290]	[0.093]	[0.577]	[0.271]	[0.327]	[0.140]
Sender 5 (B)	0.238	0.202	0.041	-0.046	-0.034	0.004	0.047	-0.340
	(0.157)	(0.164)	(0.157)	(0.145)	(0.151)	(0.057)	(0.072)	(0.182)
	[0.132]	[0.217]	[0.795]	[0.748]	[0.821]	[0.950]	[0.513]	[0.064]
Sender 6 (W)	0.418	0.196	0.131	0.133	-0.075	0.030	0.008	-0.297
	(0.161)	(0.159)	(0.152)	(0.153)	(0.147)	(0.054)	(0.071)	(0.200)
	[0.010]	[0.218]	[0.387]	[0.385]	[0.612]	[0.585]	[0.912]	[0.140]
Sender 7 (W)	0.184	0.075	0.230	0.223	-0.070	-0.045	-0.061	-0.317
	(0.160)	(0.159)	(0.149)	(0.154)	(0.149)	(0.056)	(0.067)	(0.195)
	[0.250]	[0.638]	[0.123]	[0.147]	[0.637]	[0.420]	[0.367]	[0.106]
Sender 8 (B)	0.205	0.034	0.035	-0.008	0.003	0.009	-0.012	-0.203
	(0.155)	(0.155)	(0.144)	(0.153)	(0.147)	(0.054)	(0.068)	(0.181)
	[0.187]	[0.828]	[0.806]	[0.956]	[0.984]	[0.874]	[0.864]	[0.263]
Sender 9 (B)	0.302	0.156	0.226	0.185	-0.035	0.054	0.066	-0.106
	(0.149)	(0.155)	(0.143)	(0.161)	(0.154)	(0.058)	(0.070)	(0.177)
	[0.043]	[0.315]	[0.115]	[0.252]	[0.819]	[0.350]	[0.347]	[0.549]
Sender 10 (B)	0.201	0.125	0.281	0.251	-0.230	-0.001	-0.121	-0.439
	(0.147)	(0.157)	(0.140)	(0.161)	(0.142)	(0.056)	(0.063)	(0.174)
	[0.172]	[0.425]	[0.045]	[0.119]	[0.106]	[0.987]	[0.057]	[0.013]
p-value: White Senders	0.001	0.108	0.641	0.213	0.977	0.432	0.489	0.431
p-value: Black Senders	0.955	0.891	0.160	0.277	0.407	0.893	0.035	0.306
Mean	0.00	0.00	0.00	0.00	0.00	0.36	0.44	0.69
Observations	832	832	832	832	831	832	587	139

Notes: Table reports OLS estimates among the sample of Black respondents, from a regression of each primary outcome on sender fixed effects. Each dependent variable in columns (1) to (5) is an inverse-covariance-weighted index as described in Anderson (2008) and standardized to the mean of 0 and standard deviation of 1. Dependent variables in columns (6) to (7) are on a scale of 0 to 1. Dependent variable in column (8) is binary. COVID-19 vaccine Intent was asked during the 2020-2021 flu season only. Outcome variables are described in Section III and in Appendix Section E. "(B)" indicates Black senders, while "(W)" indicates White senders. The *p*-value labeled "White Senders" tests the null hypothesis that the effect of all White senders is the same. The *p*-value labeled "Black Senders" tests the null hypothesis that the effect of all Black senders is the same. The omitted category is Sender 1 (W). Stratifying variables (platform and season) are included but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is included in the regression of the take-up outcome. Robust standard errors are in parentheses. *p*-values are shown in brackets.

Appendix Table B9: Treatment Effects on Ratings, Knowledge and Intent with PDS LASSO-Selected Controls

	Effects of Video on							
	Ratings, Knowledge, and Beliefs				Vaccine Intent and Take-Up			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rating Sender	Rating Signal	Signal Content Recall	Safety Beliefs	Coupon Interest	Flu Vaccine Intent	COVID-19 Vaccine Intent	Flu Vaccine Take-up
PANEL A: Layperson vs. Expert (Concordant, Standard Signal Condition) - Black Respondents								
Layperson Treat	-0.543	-0.097	0.120	0.019	-0.026	0.011	0.097	0.079
	(0.065)	(0.056)	(0.062)	(0.068)	(0.064)	(0.019)	(0.027)	(0.083)
	[0.000]	[0.082]	[0.053]	[0.780]	[0.688]	[0.568]	[0.000]	[0.339]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.37	0.43	0.38
Observations	845	845	845	845	845	845	592	151
PANEL B: Standard vs. Acknowledgement Signal (Discordant, Expert Condition) - Black Respondents								
Acknowledgement Signal Treat	0.093	0.134	0.028	-0.096	-0.016	0.021	0.055	-0.100
	(0.065)	(0.059)	(0.066)	(0.068)	(0.064)	(0.018)	(0.027)	(0.079)
	[0.151]	[0.022]	[0.667]	[0.157]	[0.803]	[0.251]	[0.040]	[0.202]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.34	0.40	0.48
Observations	827	827	827	827	825	827	581	137
p-value	0.000	0.004	0.311	0.230	0.913	0.686	0.266	0.112
PANEL C: Concordant vs. Discordant Expert Sender (with Standard Signal) - Black Respondents								
Concordance Treat	0.122	0.075	0.037	-0.092	-0.040	0.007	0.013	-0.044
	(0.063)	(0.059)	(0.063)	(0.067)	(0.062)	(0.019)	(0.027)	(0.088)
	[0.051]	[0.206]	[0.560]	[0.167]	[0.520]	[0.696]	[0.630]	[0.613]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.34	0.40	0.48
Observations	832	832	832	832	831	832	587	139
PANEL D: Concordant vs. Discordant Expert Sender (Standard Signal Condition) - White Respondents								
Concordance Treat	-0.102	-0.030	-0.007	-0.024	-0.121	-0.002	-0.003	0.015
	(0.052)	(0.045)	(0.053)	(0.058)	(0.052)	(0.015)	(0.022)	(0.049)
	[0.053]	[0.511]	[0.890]	[0.678]	[0.020]	[0.897]	[0.872]	[0.762]
Mean in control	0.00	0.00	0.00	0.00	0.00	0.37	0.45	0.38
Observations	1221	1221	1221	1221	1221	1221	866	377
p-value	0.007	0.155	0.593	0.445	0.317	0.698	0.634	0.551
PDS LASSO-Chosen Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Table reports OLS estimates including PDS LASSO selected controls. Each dependent variable in columns (1) to (5) is an inverse-covariance-weighted index as described in Anderson (2008) and standardized to the mean of 0 and standard deviation of 1. Dependent variables in columns (6) to (7) are on a scale of 0 to 1. Dependent variable in column (8) is binary. COVID-19 vaccine Intent was asked during the 2020-2021 flu season only. Outcome variables are described in Section III and in Appendix Section E. The *p*-value in Panel (B) tests the null hypothesis that discordant expert (acknowledgement signal) treatment and concordant non-expert (standard signal) treatment effects are equal. The *p*-value in Panel (D) tests the null hypothesis that concordance treatment effects are the same across Black and White respondents. Stratifying variables (platform and season) are forced to be included in the LASSO selection but not reported; an additional stratifying variable (an indicator (=1) if the respondent is married) is forced to be included in the LASSO selection for the take-up outcome. Robust standard errors are in parentheses. *p*-values are in brackets.

C Baseline Survey Questionnaire

The baseline survey questionnaire is available from this link.

D Videos and Scripts

Appendix Table D10: Treatment Videos

Role of Sender	Type of Signal	Race of Sender	Video URL
Expert	Standard	White	https://youtu.be/CxxWBT0ew-U
Expert	Acknowledgement	White	https://youtu.be/TlruIaBOk3o
Expert	Standard	Black	https://youtu.be/esU_77AjaX8
Layperson	Standard	Black	https://youtu.be/bASxTEbfNMA
Expert	Standard	White	https://youtu.be/Bt9kSpQf0so
Expert	Acknowledgement	White	https://youtu.be/140L1_V9A9g
Expert	Standard	White	https://youtu.be/PcDCkUPTBWA
Expert	Acknowledgement	White	https://youtu.be/kwbvYwW5S98
Expert	Standard	Black	https://youtu.be/ClLOGMctouE
Layperson	Standard	Black	https://youtu.be/202Xj9dWEFI
Expert	Standard	White	https://youtu.be/RaPLcepWRUo
Expert	Acknowledgement	White	https://youtu.be/V1j7E8aKAgA
Expert	Standard	White	https://youtu.be/JWTPr7UCcg4
Expert	Acknowledgement	White	https://youtu.be/du7J6tRZ75g
Expert	Standard	Black	https://youtu.be/2-yEncK0qtI
Layperson	Standard	Black	https://youtu.be/Vo3223_B_Es
Expert	Standard	Black	https://youtu.be/Ft-57zTr8Vg
Layperson	Standard	Black	https://youtu.be/UTKojGTRSu4
Expert	Standard	Black	https://youtu.be/YUNCUYWVXlQ
Layperson	Standard	Black	https://youtu.be/JTShSxUOFek

Appendix Table D11: Scripts

Standard Signal Script	Acknowledgement Signal Script
The Centers for Disease Control and Prevention, or CDC, recommends everyone 6 months and older get the flu shot.	The Centers for Disease Control and Prevention, or CDC, recommends everyone 6 months and older get the flu shot.
	I know some people are nervous to follow medical advice about vaccines. In the past, there may have been times when the medical community broke your trust. But I hope that sharing some information with you can help you understand how important the flu shot is.
The shot protects you from getting sick by cutting your chance of catching the flu in half. It's also very safe: less than 1 in 100 vaccinated people experiences a side effect such as fever or chills. The flu shot does not contain an active flu virus, so you cannot get the flu virus from the shot. I get the flu shot every year to protect myself, my family, and my community. I recommend you look into getting vaccinated as soon as possible.	The shot protects you from getting sick by cutting your chance of catching the flu in half. It's also very safe: less than 1 in 100 vaccinated people experiences a side effect such as fever or chills. The flu shot does not contain an active flu virus, so you cannot get the flu virus from the shot. I get the flu shot every year to protect myself, my family, and my community. I recommend you look into getting vaccinated as soon as possible.

E Outcome Measures: Question Wording

Family Name	Variable Name	Question Text	Response Options
Main Outcomes			
z-score: Rating Sender	Trust I	• If a person like the one in the video was located near you, would you want to ask him about other health issues?	[1: Yes, 0: No]
	Trust II	• How much do you agree or disagree with the following statements? I trust the person in the video to give me medical advice.	[1: Disagree strongly, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Agree strongly]
	Qualification	• How much do you agree or disagree with the following statements? The person in the video is qualified to give me medical advice.	[1: Disagree strongly, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Agree strongly]
z-score: Rating Signal	Endorsement I	• How likely are you to recommend this video to your friends or family?	[On a scale of 0 (Not at all likely) to 10 (Extremely likely)]
	Endorsement II	• How likely are you to recommend the flu shot to a family member or friend?	[On a scale of 0 (Not at all likely) to 10 (Extremely likely)]
	Relevance	• How much do you agree or disagree with the following statements? The information provided in the video applies to people like me.	[1: Disagree strongly, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Agree strongly]
z-score: Signal Content Recall	Recall Ingredient	• What did the person in the video say about what the flu shot contains?	[1: the respondent chose the option, "Contains no active flu virus", 0: the respondent chose either "Contains active flu virus" or "Don't know"]
	Recall Age	• What did the person in the video say about who should get the flu shot?	[1: the respondent chose the option, "Everyone 6 months and older", 0: the respondent chose either "Everyone 5 years and older", "Everyone 18 years and older", or "Don't know"]
z-score: Safety Beliefs	Safety Point Belief	• Safety Point Belief $= \frac{(100-\text{Posterior Belief})-(100-\text{Prior Belief})}{100}$ – Prior and posterior of a respondent's estimate of the question: Take 100 adult men from your community, selected at random. Let's say all of the 100 adult men selected at random from your community receive a flu shot at the start of the flu season. How many of them, do you believe, get the flu from the flu shot?	[On a scale of -1 to 1]
	Safety Certainty	• Safety Certainty $= \frac{\text{Posterior Number of Balls}-\text{Prior Number of Balls}}{10}$ – Prior and posterior of the number of balls placed in the "0-9" bin as a response to the question: Consider the group of 100 adult men selected at random from your community, and suppose all of them get the flu shot. You have 10 balls that you can put in 10 different bins, reflecting what you believe are the chances out of 10 that the number of men who get the flu from the flu shot falls in each bin. The more likely you think it is that the number of men who get the flu from the flu shot falls in a given bin, the more balls you should place in that bin. For example, if you put all the balls in one bin, it means you are certain the number of men that will get the flu from the flu shot is somewhere in that range.	[On a scale of -1 to 1]

Family Name	Variable Name	Question Text	Response Options
z-score: Coupon Interest	Willingness to pay (WTP)	• After completion of this survey, you will receive an email with a flu shot coupon that you can use at major pharmacies near you (including Walgreens, Rite-Aid, CVS, Walmart, Kroger, Costco and Albertsons). The coupon covers the full cost of the flu shot. In order to redeem the coupon, you just need to present it at the pharmacy, for example on your smart phone or printed out. You may be offered to trade in your flu shot coupon for an electronic cash gift card redeemable at Amazon.com and other online retailers. The gift card would be sent to you by email, within 5 business days of completing the survey. For each of the amounts listed below, please select whether, if you are offered that amount, you would prefer to keep your flu shot coupon, or receive the electronic cash reward instead. The computer will then randomly select a participant, and will randomly draw one price offer for the selected participant. If you are the randomly selected participant, we will implement the choice you made at the randomly selected price.	
		If the computer randomly selects me, and randomly selects a gift card in the amount of $1: I prefer to ...	[Option 1: ... keep the flu shot coupon and receive no cash gift card.; Option 2: ... give up the flu shot coupon and receive an electronic cash gift card in the amount of $1.]
		If the computer randomly selects me, and randomly selects a gift card in the amount of $2: I prefer to ...	[Option 1: ... keep the flu shot coupon and receive no cash gift card.; Option 2: ... give up the flu shot coupon and receive an electronic cash gift card in the amount of $2.]
		If the computer randomly selects me, and randomly selects a gift card in the amount of $5: I prefer to ...	[Option 1: ... keep the flu shot coupon and receive no cash gift card.; Option 2: ... give up the flu shot coupon and receive an electronic cash gift card in the amount of $5.]
		If the computer randomly selects me, and randomly selects a gift card in the amount of $10: I prefer to ...	[Option 1: ... keep the flu shot coupon and receive no cash gift card.; Option 2: ... give up the flu shot coupon and receive an electronic cash gift card in the amount of $10.]
	Pharmacy Lookup	• Would you like to receive information about where you can redeem your flu shot coupon? We can provide you with a link to look up participating pharmacies that accept the flu shot coupon and that are closest to you. The link would pop up on the final screen of the survey.	[1: Yes, 0: No]
n.a.	Flu Vaccination Intent	• How likely are you to get a flu shot between now and February 2020? (*2019-20 wave*)	
		• How likely are you to get a flu shot between now and February 2021? (*2020-21 wave*)	[On a scale of 0 (Not at all likely) to 10 (Extremely likely)]
n.a.	COVID-19 Vaccination Intent	• Suppose a vaccine against COVID-19 becomes available to everyone, at no cost. Would you or would you not get vaccinated against COVID-19?	[On a scale of 0 (Definitely not get vaccinated) to 10 (Definitely get vaccinated)]
n.a.	Flu Vaccine Take-up	• A binary variable equal to 1 if the respondent redeemed a flu vaccine coupon or the respondent answered "yes" to one of the questions in the follow-up survey: (1) “Did you get the flu shot since you completed our first survey?"; (2) “Did your spouse or partner get a flu shot this season?"; or (3) “Did your children get a flu shot this season?"	[1: Yes, 0: No]

Family Name	Variable Name	Question Text	Response Options
		Additional Outcomes	
n.a.	Self Flu Vaccine Take-up	• A binary variable equal to 1 if the respondent redeemed a flu vaccine coupon or answered "yes" to the question in the follow-up survey: “Did you get the flu shot since you completed our first survey?"	[1: Yes, 0: No]
n.a.	Flu Vaccine Coupon Redemption	• A binary variable equal to 1 if the respondent redeemed a flu vaccine coupon, and 0 otherwise.	[1: Yes, 0: No]
n.a.	Sentiment MTurk[a]	• What are your thoughts on the recommendation you just received in the video?	[Open-text response; then coded as -1: Negative, 0: Neutral, or 1: Positive]
n.a.	Sentiment NLP[b]	• Each open text response to the question “What are your thoughts on the recommendation you just received in the video?" rated through automated Natural Language Processing sentiment analysis.	[-1: Negative, 0: Neutral, 1: Positive]
n.a.	Likely to be Contact	• Would a person like the one in the video be a contact in your phone or a friend on social media?	[1: Yes, 0: No]
n.a.	Demand for Second Coupon	• Would you like to receive a second coupon for a free flu shot, to give to a friend or family member? It would be sent to you by email, just like your own coupon.	[1: Yes, 0: No]
n.a.	COVID-19 Vaccine Mandatory	• In your opinion, should vaccinations against COVID-19 be voluntary, or should they be mandatory (in other words, everyone would be required to receive the vaccine)?	[0: Should definitely be voluntary, 10: Should definitely be mandatory]
n.a.	COVID-19 Vaccine Safety Review Information Demand	• [If assigned into the FDA treatment] The Food and Drug Administration (FDA) has formed an advisory committee of experts, who will perform an independent review of the safety and efficacy of any COVID-19 vaccine approved by the FDA. Once a vaccine has been developed and the advisory committee has completed its review, would you like to receive an email notification with the results of the review? • [If assigned into the NMA treatment] The National Medical Association (NMA), which represents Black physicians and health professionals in the US, will perform an independent review of the safety and efficacy of any COVID-19 vaccine approved by the FDA. Once a vaccine has been developed and the NMA has completed its review, would you like to receive an email notification with the results of the review?	[1: Yes, 0: No] [1: Yes, 0: No]
n.a.	COVID-19 Vaccine Trial Participation	• The National Institutes of Health (NIH) is recruiting participants for COVID-19 vaccine trials. Are you interested in finding out more and potentially participating?	[1: Yes, 0: No]
n.a.	Ratings on Age	• This outcome is measured based on the MTurk survey sample. Each respondent was randomly shown one of ten portraits of senders and was asked to respond to the question: “How old do you think this person is?"	[Open-text response; then coded as 1: 18 ≤ rated age ≤ 24, 2: 25 ≤ rated age ≤ 34, 3: 35 ≤ rated age ≤ 44, 4: 45 ≤ rated age ≤ 54, 5: 55 ≤ rated age ≤ 64, 6: 65 ≤ rated age]
n.a.	Ratings on Education	• This outcome is measured based on the MTurk survey sample. Each respondent was randomly shown one of ten portraits of senders and was asked to respond to the question: “What is the highest degree or level of schooling that you think the person completed?"	[1: Less than a high school diploma, 2: High school diploma or equivalent (for example: GED), 3: Some college but no degree, 4: Associate’s degree, 5: Bachelor’s degree, 6: Graduate degree (for example: MA, MBA, JD, PhD)]
n.a.	Ratings on Attractiveness	• This outcome is measured based on the MTurk survey sample. Each respondent was randomly shown one of ten portraits of senders and was asked to respond to the question: “How attractive is this person?"	[1: Not at all attractive, 2: Somewhat unattractive, 3: Neither attractive nor unattractive, 4: Somewhat attractive, 5: Extremely attractive]

[a] 2,847 out of 2,893 responses were rated and coded; 46 responses were coded as missing because the responses did not include any information. Each response was rated by three different MTurkers.

[b] This method employs Python’s Sentiment Intensity Analyzer Polarity Score function from the NLTK package.