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Weighing the Advice of Doctors Versus Online Strangers: A Socio-Demographic Profile

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Medical misinformation is ubiquitous online. Parents are left to navigate conflicting advice between formal healthcare providers (HCPs) and people who post in online forums such as "mommy groups". The purpose of this study was to develop a data-driven socio-demographic profile of people who weight the advice of online users either more than or equal to that of credentialed HCPs. We accomplished this, in part, by developing a new questionnaire representing people's attitudes towards "all natural" products and services. We conducted an online survey of 957 parents (or people who planned on becoming parents in the near future). Factor analyses revealed that the "all-natural" construct is multi-faceted. Contrary to popular stereotypes, affluent white women were not the ones who placed relatively more trust in online forum users compared to HCPs. In some cases, the opposite was true. Relative trust in HPCs (and problematic amounts of trust in online forum users) was not strongly associated with many demographic variables at all. Rather, these patterns of distrust were strongly related to complex attitudes towards what they perceive as "all natural" and with psychological reactance, a tendency to respond with oppositional behavior in response to perceived threats to their autonomy.

Keywords: trust in healthcare, online information seeking, reactance

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Misinformation about medical care has always been present, but with the rise of mass media, the internet, and social media, it can now spread more rapidly than ever before. This is unfortunate, given that nearly 7% of all Google searches relate to medical care (Murphy, 2019), and even well-intentioned websites deliver incorrect information about one third of the time (Hill et al., 2020). Around a third of cancer-related posts on leukemia forums on social media contain inaccurate or unproven health information (Gage-Bouchard et al., 2018). A sizable portion of popular social media articles about cancer treatment contain harmful

misinformation (Johnson et al., 2022). All told, roughly 10% of news websites disseminate problematic health-related information (Gregory, 2019).

These trends are worrisome enough when it comes to misinforming individuals, but they become more worrisome in the context of parents seeking health information on behalf of their children. After all, children are vulnerable, completely dependent on their parents' judgment and decision-making. Parents, understandably, tend to show heightened vigilance in regards to their children's health compared to their own. Unfortunately, parents can find online misinformation credible, and this misinformation can impact their actual behavior (Thompson et al., 2022). For instance, many online communities and influential social media personalities (i.e., "influencers") promote the "free-birth movement" (Zimbelman, 2020; Medaris & Cheong, 2023), where women are encouraged to give birth away from the resources of a hospital. In an emergency, where every second counts, this could prove to be a regrettable decision.

The goal of the present study is to explore the psychological and demographic profiles of parents (and people who plan on becoming parents) who have less than full trust in credentialed healthcare providers (HCPs, e.g., doctors, nurse practitioners) relative to online internet users. For brevity, we refer to individuals who report trusting advice from online internet users equally or more than advice from credentialed HCPs as "relative trusters". This term is intended to reflect a comparative judgment between sources, not wholesale trust or mistrust in one or the other. We also aim to examine popular perceptions and stereotypes surrounding relative distrusters, review existing empirical research on this topic, and synthesize these into a set of questionnaires. These questionnaires were distributed through an online survey to develop a data-driven psychological and socio-demographic profile of relative distrusters.

LITERATURE REVIEW

Popular Perceptions of Relative Distrusters (of HCPs)

Ruby Franke was a prominent YouTube personality whose content focused on parenting advice. At its height, her channel had over 2 million subscribers. Franke's advice focused on strictness, discipline, and negative reinforcement. Like many influencers, Franke's content also expressed negative attitudes towards law enforcement,

the healthcare industry, and government (Wending, 2024). In 2024, Franke was convicted for starving and abusing her children.

Franke's story might have been highlighted by the media because it contained human tragedy and hypocrisy, but also because it mirrored what many see as social media's pernicious effects on society (Auxier, 2022). It also exemplifies the ubiquitous and controversial practice of "sharenting", where parents and caregivers share media of their children online for an audience broader than their own immediate family, usually with the intention of attracting online engagement ("likes", comments, subscribers). This practice can be harmful to the children involved (Dogan Keskin et al., 2023).

The Reddit community r/ShitMomGroupsSay curates anonymized posts from "mommy groups", online groups meant for mothers to support each other with advice and suggestions. r/ShitMomGroupsSay users share mommy group posts they view as typical (and humorous) examples of problematic behaviors. As of this writing, r/ShitMomGroupsSay has over 400 thousand members. Posts frequently revolve around parents failing to provide adequate homeschooling for their children, overzealously promoting essential oils, misunderstandings of vaccines, bizarre health claims surrounding fecal matter, posts decrying pharmaceutical products, suggesting they should be replaced with abstract concepts like "forests", and shaming mothers who do not (or cannot) breastfeed. This is the first of many instances where health distrusters (especially parents) are implicitly female dominated.

The phrase "crunchy moms" is another example. Dictionary.com defines "crunchy mom" as "someone who practices a parenting style that typically avoids technology, modern medicine, processed food, and societal intrusions in favor of natural alternatives and personal choice." Stereotypically, "crunchy moms" are anti-vaccine, prefer natural home births, organic foods, and homeschooling. Commentators have characterized "crunchy moms" as affluent, high socio-economic status, white women (Gibson, 2019). An analysis of "mommy blogs" (Abetz & Moore, 2018) found that many bloggers idealize (or assume an audience of) white, middle class, heterosexual parents.

During the COVID-19 pandemic, women were more likely to engage in disease mitigation behaviors (self-quarantine, avoid large gatherings) compared to men (Gadarian et al., 2022). On the surface, these data might appear to support the notion that women

tend to be more vigilant about health threats compared to men. The same study also found that people with higher formal educational attainment were more likely to engage in disease mitigation behaviors. Thus, the "woman" and "affluent" components of the stereotype might appear to have some support. However, the study found no consistent difference between ethnic/racial groups (Gadarian et al., 2022), so the "white" component of the stereotype might be premature.

Despite how much popular discourse appears to implicate women, there is also a case to be made that plenty of men exhibit patterns of relative distrust in HCPs. Joe Rogan, host of the popular "Joe Rogan Experience", has an audience consisting mostly of young, male, white republicans ("Who is Joe Rogan's audience?", 2022). Rogan's show has a well-documented history of promoting health misinformation (Bond, 2022; Qiu, 2022), which made his $100 million contract with Spotify controversial (Bond, 2022). Rogan might only intend to explore unorthodox ideas but providing a platform (and credence) to these ideas for a wide audience has consequences. Rogan's listeners were less likely to vaccinate against COVID-19, even after statistically adjusting for socio-economic variables. This was especially true in relation to the time period where Rogan began speaking more often (and more critically) about the COVID-19 vaccines (Stecula & Motta, 2021).

So far, a few hypotheses have emerged that warrant empirical investigation. First, there is a popular perception that most relative distrusters (of HCPs) are white women. Thus, we formed the following two hypotheses.

H1. White participants will be relative distrusters (of HCPs) to a greater degree than non-white participants.

H2. Women will be relative distrusters (of HCPs) to a greater degree than men.

Note, however, we have discussed reasons to doubt H2 and further down we will discuss reasons to doubt H1. We also found reasons to expect, based on popular perceptions, that relative distrusters (of HCPs) will have higher socio-economic status. Thus, we formulated the following two hypotheses:

H3. Levels of formal educational attainment will be positively correlated with greater relative distrust (of HCPs).

H4. Income will be positively correlated with greater relative distrust (of HCPs).

These hypotheses represent the most salient demographic variables one would expect to see associated with relative distrust based on popular media depictions. However, we also measured several other socio-demographic variables, including age, religious beliefs, whether someone grew up in a rural, urban, or suburban environment, negative vaccine attitudes, and whether they homeschool(ed) (or plan to home school) their children. While we so far have mentioned some of these variables only in passing, we believe all of them are relevant and worth examining. At the very least, including them in the analyses will help examine the focal, hypothesized results while "adjusting for" these other variables.

Not all Peer-to-Peer Advice on Social Media is Problematic

Many self-educated, "highly online", information-seeking parents are likely to develop false health-related beliefs and have negative attitudes towards the healthcare industry (Sobo et al., 2016). Using the internet (and social media) to seek health information, though, is not inherently problematic. For instance, a small focus group study (Rupert et al., 2014) found that most parents only use online resources to supplement their interactions with their doctor, who they perceive as being too busy for more detailed discussions. In another focus group study (Benetoli et al., 2018), many parents reported using social media as a resource to facilitate efficient and informed communication with their healthcare providers. Thus, it is far from clear whether internet and social media use play an overall positive or negative role in healthcare distrust. Thus, we tested the following hypothesis.

H5. Online information-seeking behaviors will be positively associated with relative distrust (of HCPs).

So far, we have examined popular perceptions of relative distrusters and formulated hypotheses to test the veracity of these perceptions. In the next section we will turn to the empirical literature, which has not examined much (if any) of the possible trends covered so far, but has offered some deeper, more theory-driven hypotheses.

Empirical Research on Relative Distrusters (of HCPs)

People often engage in motivated reasoning, where they uncritically accept information that conforms to their pre-existing beliefs but reject and argue against information that contradicts such beliefs (Kunda, 1990). This has prompted many researchers to avoid asking *why* people believe something and instead ask why they would *want* to believe it (Hornsey et al., 2018). These belief motivations, which people do not necessarily have conscious awareness of, are referred to as "attitude roots" (Hornsey & Fielding, 2017).

One of these attitude roots might be reactance (Brehm, 1966), a psychological trait where people are motivated to respond strongly against perceived threats to their personal autonomy. Reactance is one of the highest predictors of vaccine hesitancy (Hornsey et al., 2018). Parents high in reactance tend to have less trust in doctors and more positive attitudes towards complementary and alternative medicine (CAM, Soveri et al., 2020). During the COVID-19 pandemic, people higher in reactance were less likely to adhere to recommended disease mitigation behaviors such as mask wearing (Young et al., 2022). Thus, we formulated the following hypothesis.

H6. Relative distrust (of HCPs) will be positively associated with individual differences in reactance.

Reactance is associated with political conservatism (Chan & Lin, 2022). This makes sense, given that conservatives value personal autonomy and freedom from government (or sometimes "expert") regulations of their behavior. Thus, we predicted the following.

H7. Relative distrust (of HCPs) will be positively associated with political conservatism.

Another attitude root might be general distrust in institutions. Recall in the Ruby Franke case described earlier that she often expressed negative sentiments towards formal healthcare systems, law enforcement, and government. This mirrors more general decreases in trust of institutions within the U.S. For instance, public trust in government is trending downward (Pew Research Center, 2024), so is trust in science and scientists (Kennedy & Tyson, 2023). Individual differences in institution-based trust are linked with people's health-related beliefs and behaviors (Jin et al., 2021). People who place more trust in traditional news outlets are more likely to avoid health misinformation, but placing

trust in social media sources is associated with lending credence to health misinformation (Wu et al., 2023). Thus, we formulated the following hypothesis.

H8. Relative distrust (in HCPs) will be positively associated with distrust in formal healthcare institutions.

Institutional distrust could have distinct meaning between people with different racial and ethnic identities. For instance, in the popular discourse described above, relative distrusters are often depicted as white. Distrust towards formal healthcare systems might manifest differently for Black participants though. Jaiswal and Halkitis (2019) found that distrust in formal healthcare institutions among black Americans focus on historical wrongdoings like the Tuskegee Syphilis Study.

While formal healthcare systems (hospitals, individual doctors, researchers) have historically done things to earn the distrust of people of all racial and ethnic identities, a disproportionate share of those harms were inflicted on Black communities. Black patients, on average, continue to face greater obstacles in obtaining consistent, high-quality medical treatment. 25% of COVID-19 deaths in the U.S. occurred among black Americans, who only make up 13% of the population (CDC, 2023). Black mothers are 4 times more likely to die during childbirth compared to white mothers (CDC, 2024). Mortality rates for unborn black babies are more than twice that of white babies (CDC, 2020). Discrepancies like these are less severe (or disappear altogether) when Black doctors care for Black patients (Greenwood et al., 2020). These trends are worth bearing in mind when interpreting healthcare distrust across multiple demographic groups.

Another attitude root could be a general preference for things perceived as "all-natural". We have already discussed how "crunchy moms" are depicted as preferring "free births", organic products, and the like. Aside from these stereotypes, research has shown that such attitudes about "all-natural" products and practices among new (and expecting) mothers is associated with beliefs in heath misinformation (Bradshaw et al., 2020). People in general show a variety of negative attitudes towards food technologies such as genetically modified (GM) foods, hormone implants, and the use of antibiotics on livestock (Davis et al., 2020). Thus, we predict the following.

H9. Relative distrust (in HCPs) will be positively associated with preference for "all-natural" products and practices.

We created a novel questionnaire for this study to measure the construct of "preference for all-natural". We selected items for the questionnaire, in part, to reflect general preference for organic foods, non-GM foods, etc., but we also included questions specifically aimed at investigating the veracity of "crunchy mom" stereotypes. For example, we included questions about home births, vaccines, and other opinions gathered from popular depictions of "crunchy moms". Our plan was to perform a factor analysis on participants' responses to these questions. This analysis by itself could reveal some important facets of "preferences for all-natural" products and services. In addition to this, we planned on using the scale as a predictor in our model of relative distrust.

In summary, the present study seeks to develop a data-driven socio-demographic profile of parents (and future parents) with relative mistrust in HCPs. Specifically, we asked participants to indicate which they trust more, formal HCPs (doctors, nurses, etc.) or people on the internet, with degrees of trust between the two. We created a predictive model to assess the likelihood that any given person will fall into one of these trust categories. The model's inputs included people's vaccine attitudes, trust in formal healthcare systems, online health information seeking behaviors, age, political affiliation, levels of reactance, gender, race, levels of formal education, income, religiosity, the environment they grew up in (rural, suburban, urban), and whether they homeschool, homeschooled, or planned to homeschool their children. Another of the model's inputs was a novel questionnaire assessing people's preference for "all-natural" products and services. We sought to examine the nuances of this construct by performing a factor analysis on participants' responses to the questionnaire.

METHODS

Participants

Participants were recruited from Prolific and paid $9 an hour for their time. The description of the survey read as follows. "This survey is intended for parents or for people who plan to be parents in the near future. If you are not a parent and do not plan on becoming a parent in the near future, please do not complete the survey." At the beginning of the survey, participants were asked to specify which category they fell into, a parent currently raising children, a parent whose children have moved out of the house, someone

who plans on becoming a parent in the near future, or someone who is not a parent and does not intend on becoming one in the near future. If they identified with the last category, they were not allowed to continue the survey. Depending on which of the three other categories they selected, the wording for certain questions in the rest of the survey were displayed with slight modifications. Of the 977 people who started the survey, 957 completed it.

The average age of the participants was 38.56 (SD = 12.12). Most (61.65%) were female, 37.10% were male, and 1.12% were either non-binary, a third gender, or chose not to specify. Most (65.94%) identified as white, 16.30% as Black, 7.84% as Asian, 5.02% chose multiple identities, 3.55 % chose other identities not listed (e.g., Pacific Islander), 1.36% chose not to specify. In addition to these identities, 10.24% of participants identified as Hispanic.

13.90% of participants had household income between $0 and $29,999 per year, 26.02% were between $30,000 and $59,999, 22.15% were between $60,000 and $89,999, 13.90% were between $90,000 and $119,000, and 23.72% made $120,000 or more per year. 11.18% of the participants had a high school diploma, an equivalent diploma, or less. 29.57% had completed some college but had no degree. 40.65% had a bachelor's degree, 13.48% had a master's, and 4.91% had an advanced degree such as a Ph.D. or M.D.

Materials

Relative Preference for the Advice of HCPs Versus Online Users. Our primary outcome variable was the degree to which participants weighed the advice of formal HCPs compared to online forum users. To measure this, we showed participants the sentence stem, "Between a healthcare provider and a group of users on an online parenting group, I…" The response options were "Mostly trust the healthcare provider", "Slightly favor the healthcare provider", "Weight the provider and the users' advice equally", "Slightly favor the online users", and "Mostly trust the online users". For the remaining questionnaires in the survey, unless otherwise noted, the responses were recorded on a 7-point Likert scale anchored at "Strongly disagree" and "Strongly agree".

General Vaccine Attitudes. To measure general vaccine attitudes, we drew primarily from the questionnaire used by LaCour and Davis (2020), which was adapted from Jolley and Douglas (2014). Specifically, we used an abbreviated version of the scale

used in LaCour et al. (2023). Example items include "People have been deceived about vaccine safety" and "The side-effects of vaccines are unforeseeable." Cronbach's alpha was 0.94.

Preference for "All-Natural". The research team examined a variety of sources depicting "crunchy moms", "mommy groups", etc. and synthesized a list of commonly occurring characteristics ascribed to members of these groups. We sought to create a questionnaire whose items would load onto a single latent variable, which might be called "crunchiness" or "preference for all-natural foods and products". However, we knew the factor structure could end up being more complicated. We therefore planned on conducting a factor analysis on the questionnaire items and incorporating the results into our primary research analyses. Before examining the factor structure, Cronbach's alpha for this scale was 0.89.

Online Health Information Seeking. To measure the degree to which people use the internet to seek health-related information, we adapted a 9-item questionnaire developed by Seçkin et al. (2021). Example items include "I seek information on the internet to diagnose my child/children" and "Information on the internet helps me to communicate more effectively with health providers during appointments". Cronbach's alpha for this scale was 0.90.

Distrust in Formal Healthcare Institutions. To measure the degree to which each participant trusted the healthcare industry, we used a 9-item scale developed by Shea et al. (2008). Example items include "The health care system covers up its mistakes" and "The health care system puts making money above patients' needs." Cronbach's alpha for this scale was 0.88.

Political Affiliation. To measure political affiliation we asked participants, "Which of these phrases best describes your political orientation?" The response options were "Very liberal", "Somewhat liberal", "Neutral", "Somewhat conservative", and "Very conservative".

Reactance. To measure reactance, we used a 14-item scale originally developed by Hong and Page (1989) and slightly re-worded by Hornsey et al. (2018). Example items include "I become frustrated when I am unable to make free and independent decisions"

and "I resist the attempts of others to influence me." Cronbach's alpha for this scale was 0.88.

Religion and Religiosity. We asked participants to identify which religion, if any, they practice (categorical) and to what degree they consider themselves to be religious (continuous). For the former, we asked, "Which of the following best identifies your religion, if any?" We listed several major word religions as well as "Not religious (Atheist)" and "Other", which allowed them to input their own categories. For religiosity, we asked participants to rate how strongly they agreed to the statement, "I would describe myself as 'very religious'".

Procedure

The survey began with an informed consent page and a CAPTCHA test, intended to detect bots. Participants were then asked to indicate their parenting status: whether they identified as a parent currently raising children, a parent whose children have moved out, or someone who plans on raising children in the near future. People who indicated they fit none of these categories were sent to an end-of-survey page. Depending on how participants answered this question, they completed a questionnaire about their opinions on parenting, not all of which are included in this report. The questions were reworded slightly depending on whether past, present, or future tense was appropriate.

These questions were followed by a few blocks of questions that were worded the same for all participants. These included the "all-natural" questions, general vaccine attitudes, some questions about parenting that are not included in this report, distrust in medicine, reactance, and demographics. The study was approved by the university's Institutional Review Board.

RESULTS

Before conducting the primary research analysis, we first performed a factor analysis on the "all-natural" questionnaire. We hoped that responses to each item on the questionnaire would load onto a single latent variable. This would indicate the questionnaire measures a single construct and simplify the primary research analysis. If, however, the results indicated the questionnaire measures multiple constructs, we wanted

to acknowledge this in our primary research analysis and discuss the theoretical implications of multiple constructs being reflected within a single questionnaire.

Psychometrics for the "All-Natural" Questionnaire. We conducted a factor analysis in R (R Core Team, 2021), using the 'psych' package (Revelle, 2022). First, we conducted a parallel analysis to explore how well different factor solutions fit the data. The first eigen value was quite large (5.60). The second one was smaller (0.89). By some criteria (Kaiser, 1960), this would suggest a 1-factor solution is appropriate. Going by the parallel analysis' criteria (number of factors outperforming randomly generated data), a 3-factor solution would be appropriate. The eigenvalue for the third factor though, was incredibly low (0.36). We decided to compromise between the two different standards, opting for a 2-factor solution, where the first factor accounts for the majority of the variance in the response data and the second factor accounts for relatively smaller amount. We fit the data to a 2-factor solution using oblique rotation and a criterion for minimizing residuals. The questionnaire items and their factor loadings can be seen in Table 1.

For the most part, questionnaire items loaded more strongly onto a single factor. The exceptions were items 4 and 15, neither of which is a particularly strong indicator of either factor. Aside from these, items 1 through 4 and 8 through 10 are strong (or moderately strong) indicators of the first factor. By contrast, items 5 through 7 and 12 through 14 are indicators of the second factor. Item 14 is barely above the traditional threshold of 0.30 to be considered non-trivial. Thus, it is a relatively weak reflection of the second factor.

The items that load onto the first factor appear to represent generic "pro nature" sentiments compared to the items loading on the second factor. The second factor appears to instead represent more specific (and more radical) manifestations of "pro nature" attitudes such as endorsements of home births, anti-vaccine attitudes, pro CAM attitudes, and negative attitudes toward the pharmaceutical industry. Because of this, we refer to the first factor as a generic "preference for all-natural" and the second factor as "radical all-natural". We used the "psych" package's "predict.psych" function to estimate each participants' factor scores based on the 2-facor solution presented above. These factor scores were used as predictors in our primary research analyses.

Table 1
Descriptive statistics and factor loadings related to the preference for "all-natural" questionnaire

Item content			Factor loading	
		M (*SD*)	1	2
1	I prefer organic products.	4.56 (*1.55*)	**0.74**	-0.05
2	I refuse to use any products with GM (genetically modified) ingredients.	3.17 (*1.72*)	**0.48**	0.26
3	My family eats chemical free foods.	3.98 (*1.67*)	**0.67**	0.07
4	I only use fluoride-free water.	3.08 (*1.80*)	**0.37**	0.27
5	Home births have benefits compared to hospital births.	3.54 (*1.63*)	-0.03	**0.53**
6	There are natural birth control methods that are superior to contraceptive pills.	3.35 (*1.73*)	0.01	**0.66**
7	Natural immunity is superior to vaccine-induced immunity.	3.1 (*1.90*)	-0.03	**0.74**
8	We use all natural products for our household items.	3.32 (*1.72*)	**0.76**	0.02
9	I make sure to buy products with no unnecessary chemicals or ingredients.	4.12 (*1.69*)	**0.86**	-0.06
10	I prefer all-natural products.	4.77 (*1.58*)	**0.81**	-0.03
11	There are certain ingredients my child/children cannot have (e.g., red dye).	4.07 (*1.85*)	**0.56**	0.15
12	I believe in complementary and alternative medicine (e.g., herbal treatments, chiropractic).	4.11 (*1.77*)	0.16	**0.57**
13	Natural remedies are better than drugs produced by the pharmaceutical industry.	3.73 (*1.69*)	0.00	**0.84**
14	The food at most restaurants is not good for us.	4.38 (*1.59*)	0.12	**0.31**
15	(R) We use name brand household items (Lysol, Clorox, etc.). (R)	3.09 (*1.50*)	0.19	-0.11

Primary Research Analysis

Our primary outcome variable was the degree to which people trusted formal HCPs relative to internet forum users. As can be seen in Figure 1, a plurality of participants (49.94%) said they mostly trust HCPs. Fewer participants said they only slightly favor HCPs (22.36%) or weighed the two equally (21.73%). A minority of participants said they slightly favored the opinions of the online users (4.91%) or mostly trusted the users (1.04%).

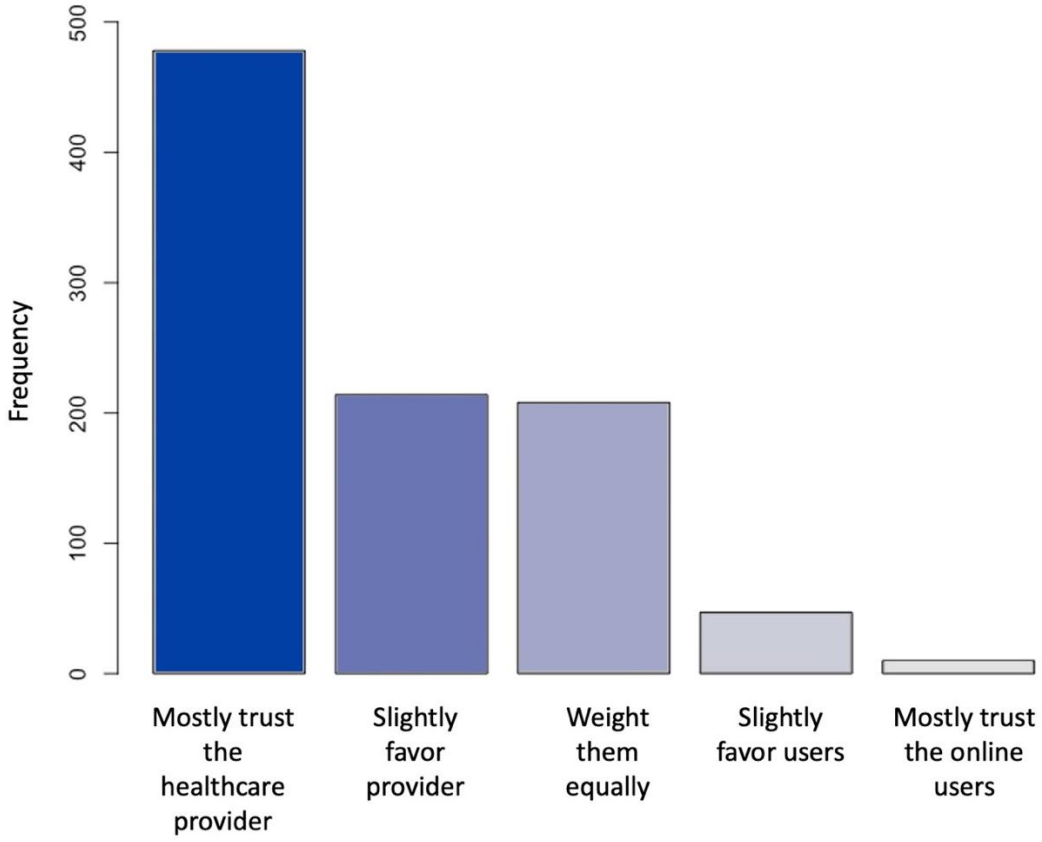

Figure 1. Frequency of participants endorsing levels of trust between formal healthcare providers and internet users.

Our plan was to create a regression model predicting levels of relative trust between formal HCPs and internet forum users. The predictor variables included generic preferences for "all-natural", radical preferences for "all-natural", negative vaccine attitudes, online health information seeking behaviors, age, political affiliation, reactance, gender, race (white/non-white), formal education, income, religiosity, environment growing up (rural, suburban, urban), whether they were non-religious, and whether they homeschool/homeschooled their children (or plan to). All categorical variables were dummy coded and all continuous variables were standardized, where 0 is the average with a standard deviation of 1.

We initially planned on using a general linear model (GLM). However, since the dependent variable is ordinal, we suspected the normal GLM assumptions would not be met, e.g., normally distributed residuals. This ended up being the case, so we instead used an ordered logistic regression model using the "polr" function from the "MASS" package

(Venables & Ripley, 2002). This resulted in better model fit indices (ΔAIC = 370.98, ΔBIC = 361.35). While the results were very similar across models, we report results from the ordered logistic regression because it fit the data better overall and matches the data's structure more closely. For more details, see the online analysis scripts at https://osf.io/2tdg7/. The full model output can be seen in Table 2.

Table 2
Ordinal logistic regression model output for provider-user preferences with standard errors (SE) in parentheses

		b (*SE*)	*t*	*p*	
Coefficients					
	All-natural	-0.05 (*.10*)	-0.51	.610	
	Radical all-natural	0.49 (*.13*)	3.70	<.001	*
	Negative vaccine attitudes	0.34 (*.11*)	3.06	.002	*
	Distrust in health care	0.66 (*.08*)	7.87	<.001	*
	Online health information	0.42 (*.08*)	5.67	<.001	*
	Age	-0.01 (*.01*)	-1.06	.288	
	Political affiliation	0.13 (*.09*)	1.56	.119	
	Reactance	0.17 (*.08*)	2.07	.038	*
	Gender (Male)	0.03 (*.15*)	0.22	.827	
	Race (White)	-0.35 (*.15*)	-2.30	.021	*
	Formal education	-0.15 (*.08*)	-1.95	.051	
	Income	-0.15 (*.06*)	-0.42	.677	
	Religiosity	-0.03 (*.11*)	-0.29	.771	
	Environment (Suburban)	-0.14 (*.18*)	-0.77	.444	
	Environment (Urban)	0.37 (*.21*)	1.74	.082	
	Not religious	-0.19 (*.22*)	-0.87	.384	
	Home school	-0.29 (*.23*)	-1.25	.211	
Intercepts					
	≤ Slightly favor provider	-1.20 (*.41*)	-2.92	.003	*
	≤ Weight the two equally	0.15 (*.41*)	0.36	.716	
	≤ Slightly favor online user	2.41 (*.43*)	5.66	<.001	*
	≤ Mostly trust online users	4.28 (*.51*)	8.35	<.001	*

Note. * indicates statistical significance at the .05 level.

Each coefficient (*b*) in Table 2 represents the predicted change in the log-odds of moving from one response category to the next (e.g., from "Trust mostly doctors" to "slightly favor doctors"). Specifically, for every standard deviation increase (or decrease) of a continuous predictor variable, the predicted odds of shifting to another response category

changes by a factor of e^b. For instance, the coefficient for reactance is 0.17. Thus, for each standard deviation increase in reactance, the predicted odds of shifting from one response category to the next increases by a factor of $e^{0.17}$ or 1.19.

There was no statistically significant relationship between generic preference for "all-natural" and patterns of trust. There was a tendency, though, for people who endorse "radical" all-natural preferences to have a greater likelihood of placing more trust in online forum users (or relatively less trust in HCPs). These results are partly consistent with H9. People with more negative vaccine attitudes were significantly more likely to place relatively more trust in the online users compared to formal HCPs. The same relationship held for distrust in formal healthcare systems (consistent with H8), online health information seeking behaviors (consistent with H5), and reactance (consistent with H6).

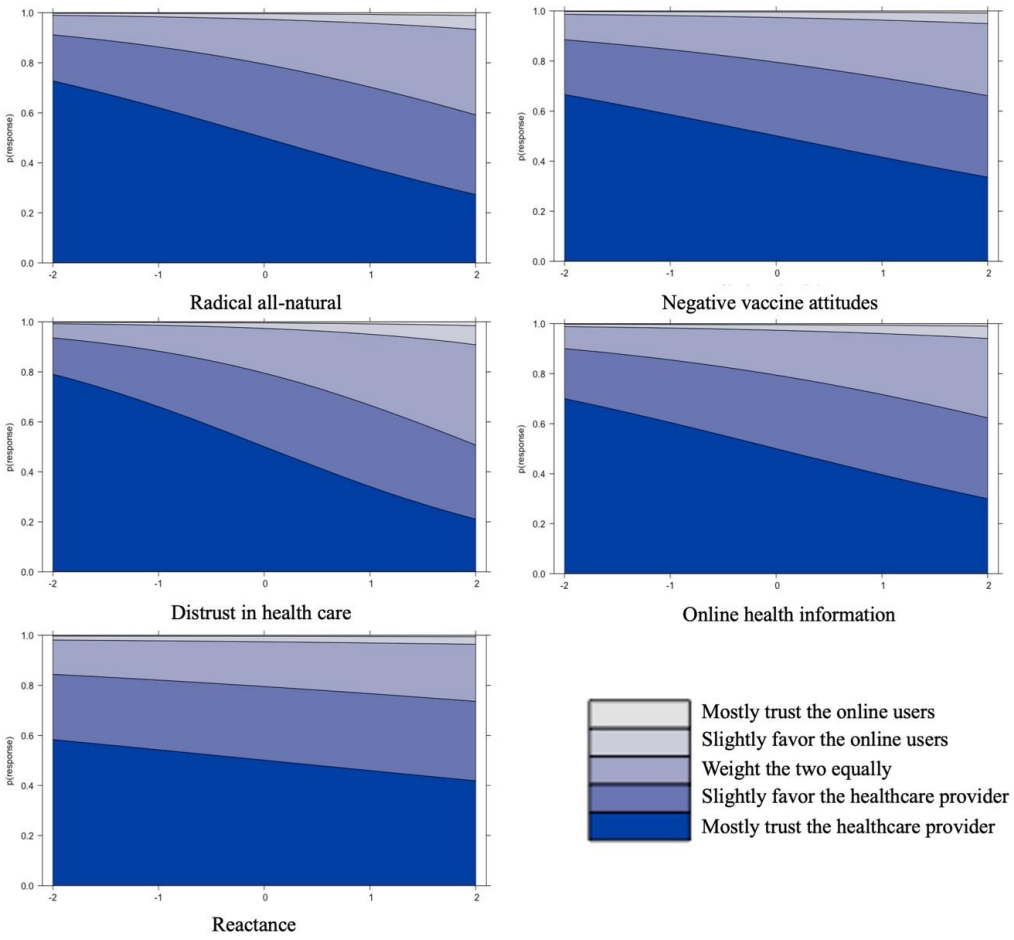

Figure 2. Predicted probability of falling into each category of trust depending on various predictor variables.

As can be seen in Figure 2, preference for "radical all-natural" and distrust in the healthcare system were associated with the greatest change in trust status. Online health information seeking was also associated with more relative distrust patterns and, to a lesser extent, so was negative vaccine attitudes and reactance. Where the x-axis equals 0, we see the model's predicted probability of falling into each trust category when the focal predictor is at its average and all other predictors are held constant at their own average. For each unit left or right on the axis, we see the predicted change in trust status associated with changes in the focal variable (in standard deviation units and when all other variables are held constant at their average).

There was no statistically significant effect of age, political affiliation (contrary to H7), gender (contrary to H1), formal education (contrary to H3), income (contrary to H4), religiosity, environment (rural, suburban, or urban), whether someone is religious (i.e., not an atheist), or whether they homeschool, homeschooled, or plan to homeschool their children. There was, however a statistically significant effect of race, where people who identified as white were more likely to relatively more trust in formal healthcare providers compared to online forum users. This latter finding runs contrary to H1, which predicted that white participants would have more relative distrust in HCPs compared to non-white participants.

Bayes Factors for Null Results

In the above model, some of the coefficients were not statistically significant. In some cases this might be because there is truly no (or very little) effect. In other cases, this could be because we had inadequate statistical power to detect the effect. To weigh in on these possibilities, we used a popular approximation of the Bayes' Factor (BF_{01}, Wagenmakers, 2007). BF_{01} represents the relative likelihood of the data when the null hypothesis is assumed to be true versus when the alternative hypothesis is assumed true (and when both are assumed *a priori* to be equally plausible). The larger BF_{01} is, the more the current data favors the null hypothesis over the alternative. For each predictor, we constructed a "null" model by excluding that variable while retaining all others, and compared it to the "alternative" model, which included the full set of predictors.

BF_{01} values below 10 are traditionally interpreted as weak evidence for the null, values above 10 as strong evidence, and values above 100 as decisive evidence in favor of

the null (Jarosz & Wiley, 2014). By these criteria, there is fairly strong evidence favoring the null hypothesis for generic preference for "all-natural" (BF_{01} = 26.53), age (BF_{01} = 17.12), gender (BF_{01} = 29.50), religiosity (BF_{01} = 14.16), environment (rural, suburban, or urban; BF_{01} = 12.59), whether someone identifies as non-religious (BF_{01} = 20.69), and whether someone (used to, or plans to) homeschool their children (BF_{01} = 13.68). However, there is still a chance that political affiliation (BF_{01} = 2.28) and levels of formal education (BF_{01} = 4.45) do impact trust patterns, but more evidence must be collected to draw more definitive conclusions. Thus, we can reject H2 (gender) with confidence. We can also reject the simplistic version of H9 with confidence, where "all-natural" is understood in the generic (not "radical") sense, but there currently is not enough evidence to strongly reject H7 (political affiliation) or H3 (formal education).

Exploring Patterns of Trust Among Distinct Racial and Ethnic Groups

Above, we found that "non-white" participants tended to place relatively more trust in online forum users compared to formal HCPs. This warranted some exploratory analyses to further unpack differences between people of distinct racial and ethnic identities. Judging from Figure 3, Asian, Hispanic, and participants who identified with multiple identities were somewhat similar to white participants in their trust patterns. Those who identified as Black appear to have different trust patterns compared to the other groups.

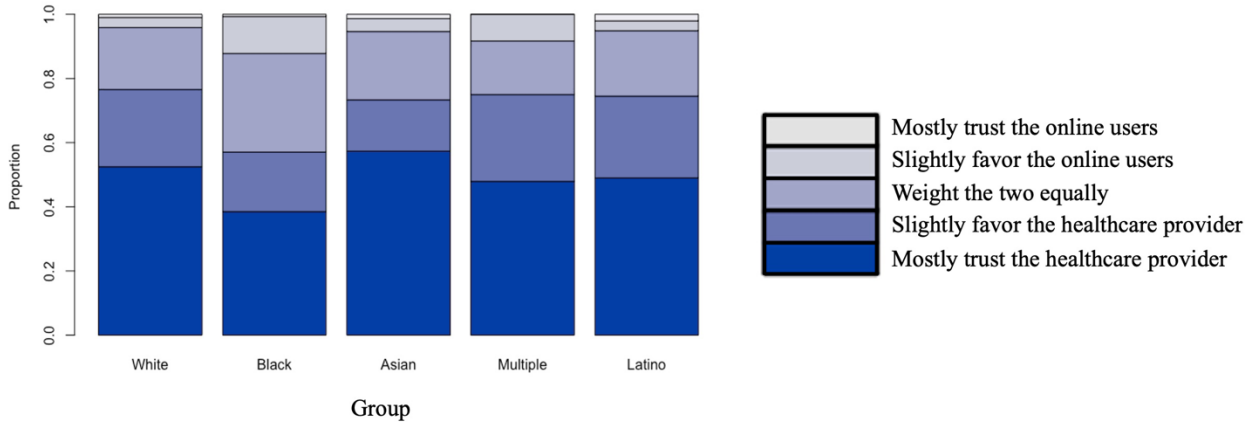

Figure 3. Levels of trust between HCPs and forum users between 5 racial and ethnic groups.

Note that some of these groups have small sample sizes. Thus, estimates of trust status across groups should be interpreted with caution. Also note that "Hispanic" is not mutually exclusive with other categories. Someone can identify as Hispanic and white, for instance. There could be many reasons for Black participants to place relatively less trust in HCPs compared to the other groups. To begin exploring some of these possibilities, we contrasted the three groups with large enough sample sizes along each variable used in the primary analysis above (see Table 3). A one-way ANOVA was performed for each variable and a Bonferroni correction was applied.

Black participants had the most favorable attitudes towards "all-natural" products and services, same for "radical all-natural". They also held the most negative vaccine attitudes, on average. Despite this, Black participants did not differ from White or Asian participants in terms of their distrust in formal healthcare systems. Black participants reported the least amount of online medical information seeking. They were also the most religious.

Table 3 *Comparisons between Asian, Black, and White participants on each variable used in the primary model*

Variable	Sub-sample			Test Statistic	
	Asian (n = 75)	Black (n = 156)	White (n = 631)		
All natural	-0.23[a]	0.44[b]	-0.08[a]	$F(2, 853) = 19.68$, $p < .001$	*
Radical all natural	-0.30[a]	0.55[b]	-0.11[a]	$F(2, 853) = 32.22$, $p < .001$	*
Negative vaccine attitudes	-0.39[a]	0.39[c]	-0.05[b]	$F(2, 844) = 19.62$, $p < .001$	*
Distrust in healthcare	0.05[a]	-0.08[a]	-0.03[a]	$F(2, 857) = 0.45$, $p = .639$	
Online health information	0.42[c]	-0.21[a]	0.01[b]	$F(2, 854) = 10.37$, $p < .001$	*
Age	33.03[a]	39.01[b]	39.75[b]	$F(2, 859) = 10.37$, $p < .001$	*
Political affiliation	-0.34[a]	-0.11[a]	0.09[b]	$F(2, 858) = 7.66$, $p < .001$	*
Reactance	-0.29[a]	.04[a,b]	.02[b]	$F(2, 846) = 3.55$, $p = .029$	*
Male	0.43[a]	0.37[a]	0.38[a]	$F(2, 859) = 0.43$, $p = .653$	
Education	4.08[b]	3.81[a,b]	3.66[a]	$F(2, 858) = 6.93$, $p = .001$	*
Income	3.72[b]	2.83[a]	3.09[a]	$F(2, 858) = 10.98$, $p < .001$	*
Religiosity	-0.22[a]	0.42[b]	-0.07[a]	$F(2, 859) = 17.70$, $p < .001$	*
Not religious	0.53[a]	0.20[a]	0.39[b]	$F(2, 859) = 15.13$, $p < .001$	*
Home school	0.05[a]	0.09[a]	0.10[a]	$F(2, 859) = 1.07$, $p = .345$	

Note. Superscripts are used to represent significant differences between sample means. Two groups with different superscripts are statistically significant from one another.

DISCUSSION

The people who trust online forum users more than (or as much as) HCPs in this study did not align with popular stereotypes. Popular depictions of young, white, affluent women who push homeschooling and essential oils are not found in the empirical data. Instead, we find that a wide variety of psychological variables (e.g., reactance) were associated with people's trust levels, over and above most demographic variables. Demographic variables largely had no association with relative trust between HCPs and online forum users. The only one that did had the opposite effect as the one "predicted by" popular stereotypes. Namely, white participants were not more likely to place relatively more trust in online forum users over HCPs.

While Black participants in our sample did not differ from other racial or ethnic groups in their general trust in healthcare systems, they reported significantly higher preferences for "all-natural" products and more negative attitudes toward vaccines. This combination of findings may initially appear puzzling. First, we consider some methodological features of the study that may have contributed to this pattern of results. We then turn to broader theoretical frameworks that may offer insight into how these attitudes can coexist.

First, Prolific users might overrepresent individuals with greater financial resources and higher educational attainment (Farzana et al., 2023; LaCour & Bell, 2024), though Cox (2024) found that Black Americans' negative attitudes toward the health system did not vary substantially by age, education, or income. Nevertheless, individual-level demographics may be insufficient for capturing the full complexity of these patterns, as resilience to racialized medical harm is shaped by neighborhood-level factors such as social cohesion and the frequency of social interaction (Taylor et al., 2020).

Having addressed these methodological considerations, we turn to broader theoretical perspectives that may help explain the results. First, it is entirely reasonable for Black Americans to hold skepticism toward the medical system, either writ large or toward more specific domains, given both historical (Jaiswal & Halkitis, 2019; Meghani et al., 2012) and ongoing (CDC, 2020, 2023, 2024; Greenwood et al., 2020) experiences of racialized medical harm. As Wilson (2022, p. S16) writes, "one cannot continue to breach trust and then get upset when people don't trust you." Even framing medical distrust as

something in need of explanation risks implying that Black patients must justify their concerns—a premise that treats justified mistrust as a puzzle to be solved, shifting the burden onto those most affected, as if their views require justification rather than recognition and redress.

It is also important to emphasize that trust is a multifaceted and dynamic process, continually shaped by personal experience and sensitive to the specific targets of that trust. Individuals may place greater or lesser trust in specific healthcare providers based on their interactions with them, while holding distinct attitudes toward the broader medical system or the particular interventions those providers recommend (Jacobs et al., 2006). In this way, trust in people, systems, and practices can be meaningfully dissociated, even when they operate within the same institutional context.

It may be useful to interpret the findings in terms spillover effects (specifically, their absence). In the context of attitudes and opinions, a "spillover effect" occurs when an attitude toward one object influences attitudes toward other, sometimes only loosely related, objects. For example, encouraging individuals to conserve energy at home has been shown to increase water conservation behaviors—an instance of a positive spillover, where engagement in one pro-social behavior extends to another behavior within a related domain (Maki et al., 2019). Spillover effects can also be negative. For instance, attitudes toward COVID-19 vaccines have likely influenced public sentiment toward other, unrelated vaccines, despite important differences in their development and mechanisms (LaCour & Bell, 2024). Such effects resemble inductive inferences (e.g., Davis et al., 2017) or associative learning processes. In other words, spillover effects can plausibly occur below the level of conscious reasoning.

The present results may reflect the absence of such generalization. Rather than broadly applying negative attitudes across the entire healthcare system, some participants appear to distinguish among its various components. In this domain, the presence or absence of spillover may depend on finer-grained distinctions—such as the characteristics of individual healthcare providers (e.g., their specialty or demeanor), the specific interventions being offered (e.g., injections versus lifestyle counseling), or the institutional setting (e.g., large hospitals versus community clinics).

Medical distrust is multifactorial and varies meaningfully across racial and ethnic groups (Jacobs et al., 2011). While trust is often shaped by perceptions of a provider's interpersonal and technical competence (Hall & Heath, 2020), this is distinct from attitudes toward the interventions those providers use or the institutional settings in which they work. Among Black patients, trust appears to be shaped relatively more by provider's values than by competence alone (Armstrong et al., 2008). Moreover, specific health conditions may elicit distinct attitudes and concerns. For instance, chronic conditions such as diabetes or hypertension (sometimes viewed as the cumulative result of lifestyle choices) may be psychologically distinguished from interventions like vaccines, which involve a singular, externally administered act. The former may be interpreted as consequences of omission (e.g., no exercise), while the latter is seen as an act of commission (e.g., receiving an injection). This distinction may reflect the influence of omission bias, where individuals prefer negative outcomes that result from inaction over those same outcomes resulting from action (Ritov & Baron, 1990). Further nuance comes from research suggesting that Black Americans may differentiate between various aspects of institutional trust. For example, Black Americans tend to express confidence in medical researchers' technical competence and their concern for the public good, while remaining more skeptical of the profession's disposition to police misconduct (Funk, 2022).

These and other factors may help explain the seemingly contradictory finding that Black Americans report levels of trust in the healthcare industry comparable to other groups, yet express distrust toward specific aspects of that system. For example, greater use of complementary and alternative medicine (CAM) might initially seem at odds with the fact that Black participants expressed similar levels of trust in the healthcare system as other demographic groups. However, CAM use can be understood as an adaptive supplementary resource developed in response to barriers to formal healthcare access. When conventional medical care has historically been inaccessible, inconsistent, or dismissive, individuals may develop parallel systems of health knowledge and care, such as CAM or traditional remedies. Chronic under-access to quality care can foster reliance on more accessible, familiar, or culturally resonant health strategies, including natural remedies and alternative medicine. Supporting this, Shippee et al. (2012) found that experiences of racial discrimination are associated with increased CAM use among Black

Americans, indicating that such experiences influence healthcare choices beyond mere access issues. Moreover, CAM practices are often transmitted generationally (Eiser & Ellis, 2007), reflecting what Shim (2010) describes as cultural health capital, i.e., community-based knowledge and survival strategies rooted in history. Preferences for "natural" products or skepticism toward vaccines may thus represent expressions of this cultural health capital, which coexist with, rather than contradict, generalized trust in healthcare institutions.

The measure of healthcare distrust used in this study (Shea et al., 2008) was not designed to capture the more nuanced distinctions discussed above. For example, only one of the nine items explicitly references racial and ethnic inequality, while others implicitly touch on related concerns (e.g., "The health care system experiments on patients without them knowing"). Three items focus on perceptions of overall quality of care (e.g., "The health care system gives excellent medical care"), two address medical errors, and two reference profit motives. Taken together, the content of these items suggest that the scale captures a broad range of distinct sources of distrust.

More broadly, across most demographic groups, factors such as insurance, billing, high caseloads, and other economic and bureaucratic issues contribute to the prevalence of negative and impersonal patient experiences (Pearl, 2021). Many promoters of CAM take advantage of this fact. They are trained to create an "anti-clinic", where patients feel "relaxed and pampered—and also listened to, in depth" (Beres et al., 2023, p. 123). While it might be impractical for many providers to increase the amount of time they spend with patients in formal settings, it could be beneficial for medical professionals to connect with the public through social media (Wu et al., 2018; Furstrand et al., 2021). Relatedly, there has been significant success in engaging minoritized communities, fostering productive dialogue, and promoting positive health behaviors through collaborations with trusted community leaders (Chen et al., 2022; Shen et al., 2023). This overall approach shows promise because it also leverages social norms, which is among the most influential factors impacting human behavior (Bradshaw et al., 2020; Farzana et al., 2023).

The results of the present study also suggest potential ways for customizing public health communications to enhance their effectiveness. According to the Deficit Model, audiences merely need to be "set straight", supplied with more information or correct

information to displace insufficient or incorrect information. This model is very popular and intuitive but has been roundly criticized as ineffective (Simis et al., 2016). The present results suggest that, instead of correcting people, communicators should tailor their messages to align with the psychological factors behind people's hesitancy. For instance, messaging framed around personal autonomy has been effective in encouraging vaccinations among people who were high in reactance (Soveri et al., 2023).

The null association between gender, race, income, and 'crunchiness' contradicts common stereotypes but may reflect features of our Prolific sample, which may tend to overrepresent individuals with higher income and education (Farzana et al., 2023; LaCour & Bell, 2024). This restricted variance could mask demographic differences present in the broader population. Alternatively, these results could challenge the assumption that 'crunchiness' is closely tied to demographic factors, suggesting instead that it is a manifestation of more complex cultural practices shaped by values and behaviors that cut across traditional social categories.

In light of these results, it may be valuable to reconsider the terminology commonly used in the academic study of belief systems. For example, the label "conspiracy theorist" is often employed pejoratively and tends to obscure important distinctions—such as between implausible claims (e.g., the moon landing was faked) and more grounded forms of democratic vigilance against state crimes (deHaven-Smith, 2013). Research suggests that belief in conspiracy theories is more prevalent among individuals with lower formal education and income, men, unmarried or unemployed individuals, members of minoritized groups, and those with weaker social networks (Douglas et al., 2019). When viewed alongside the present findings, such demographic patterns suggest that these individuals may warrant greater understanding and empathy, rather than dismissal or ridicule. Recent work in Bayesian computational modeling also suggests that the persistence of conspiracy beliefs in the face of counterevidence may not reflect poor reasoning per se (Poth & Dolega, 2023). Rather, these beliefs may emerge from networks of accumulated experiences that collectively foster distrust in specific institutions that facilitate attributions of malicious intent. This reframing offers a more nuanced lens through which to understand the psychological and cultural underpinnings of conspiracy

beliefs, and beliefs that run contrary to scientific consensus, moving beyond simplistic attributions of irrationality.

Limitations and Future Directions

The present study has some limitations, some of which have been noted above. Another limitations is that the current work is correlational, so we cannot draw firm, causal conclusions about the results. Granted, the goal of the present research was merely to explore socio-demographic correlates of relative trust between HCPs and internet forum users. Further research using experimental methods would nonetheless help provide converging evidence and greater understanding of the present results. For instance, future researchers might use the current findings to experimentally test the efficacy of different message framing (e.g., Soveri et al., 2023) on people with distinct racial and ethnic identities.

Future research should examine why people of distinct racial and ethnic identities distrust HCPs in more depth. This could be accomplished by collecting data that can support more fine-grained statistical analyses. In the current data, 65.94% of participants identified as white. While this is close to being proportionate with the U.S. general population, the remaining 34% of participants (n = 326) do not have enough observations per group to allow well-powered statistical analyses. Since participants recruited from platforms like Prolific and Mechanical Turk can sometimes overrepresent people of higher education and income levels (e.g., Farzana et al., 2023; LaCour & Bell, 2024), it would also be useful to recruit participants from social media and "snowball" community sampling. This would help assess the generality of the current findings.

Our exploratory findings reveal a number of possible follow-up studies. For instance, we found that Black participants tended to have higher preferences for "all-natural" products and services, including radical manifestations of "all-natural". However, they did not distrust formal healthcare systems any more than people of other racial or ethnic identities. Black participants also reported seeking health information on the internet less often than others. To better understand these findings, future studies should examine whether people of distinct racial and ethnic identities differ in how they seek health information. Perhaps social media, "mommy groups" in particular, consultation with friends and family, Google searches, and a variety of other information sources tend

to serve different functions among people of distinct groups. Future research would benefit from using these more fine-grained distinctions to help clarify how patterns of distrust emerge among different populations.

The present study highlights the complexity of people's preference for 'all natural' products and services, while underscoring the need for further research. We showed there is a dissociation between generic attitudes surrounding “all-natural” and more radical manifestations of these attitudes, where people favor home births, CAM, and “natural immunity”. More data is needed, however, to fully elucidate these constructs and unpack how they influence people’s behavior. Future work might endeavor to ground this distinction in theory and refine the questionnaire to have improved psychometric properties.

Future work should also examine how these findings relate to trait levels of conspiracy ideation. Some people tend to explain key events as resulting from intentional conspiracies. This cognitive disposition is associated with a greater likelihood of believing health misinformation online (Enders et al., 2023). Stronger tendencies toward conspiracy ideation are also linked with greater trust in social media as a news source over traditional media (Xiao et al., 2021).

Conclusion

Some individuals trust strangers on internet forums as much as, or even more than, credentialed healthcare professionals. This poses serious risks, given the widespread prevalence of medical misinformation online. Many parents turn to the internet to guide healthcare decisions for their children. While prevailing cultural stereotypes often characterize these parents as affluent white women, the present findings challenge that narrative. Instead, they underscore the importance of fostering trust in formal healthcare systems among minoritized communities. To that end, health communicators and community leaders should prioritize efforts to strengthen these relationships.

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