

# Leveraging Religiosity Against COVID-19 Misinformation: Experimental Evidence from India<sup>\*</sup>

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## Abstract

Misinformation about covid-19 dilutes beliefs in science and increases social tensions. How can this misinformation be corrected, especially when it is rooted in long-standing belief systems and group identities? We answer this question with a unique experiment in India that uses the mechanisms of belief in misinformation to develop a novel correction strategy. Since people with higher levels of religiosity and support for nationalist parties are more likely to believe covid-related misinformation, we use verses from religious scriptures that exhort people to believe in the truth, alongside corrections, to reduce the uptake of these falsehoods. Using an experiment (N=1600), we demonstrate that this technique is significantly effective at improving information processing, even beyond the specific story corrected. We further show that while targeting religious dissonance helps to change beliefs in one type of misinformation (conspiracy theories), targeting group norms is more effective at reducing another type (medical misinformation). Overall, we demonstrate the importance of religiosity in fueling beliefs in misinformation in India, and underscore that the efficacy of corrective interventions depends on the type of misinformation being corrected.

**Keywords:** COVID-19, Misinformation, WhatsApp, Religion, India

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# 1 Introduction

As the covid-19 pandemic spread across the globe, images of funeral pyres and cries for oxygen became emblematic of the crisis in India. But the country was fighting another battle: it was at war with an epidemic of misinformation. On the one hand, conspiracy theories abounded. Misinformation suggesting that minority groups were intentionally conspiring to spread the virus resulted in discrimination, harassment and violence towards India's Muslim community, intensifying an already fraught communal divide ([Yasir 2020](#)). On the other hand, medical misinformation escalated. In march 2020, a Hindu religious group in New Delhi, India, organized a 200-person event to encourage drinking cow urine to cure the virus. Cow urine and other herbal forms of medicine do not cure covid-19 or other illnesses. But their ties to ancient Indian culture have led many to believe in their miraculous properties, often at the expense of scientific advice. As one attendee at the event put it, "We have never felt the need to consume English medicine" ([Siddiqui 2020](#)).

Beliefs in miracle cures are dangerous if even a fraction of those succumbing to them ignore best practices like social distancing ([Bridgman et al. 2020](#)); beliefs in narratives that scapegoat minorities can in turn pave the way for polarization and violence. How can we effectively correct misinformed beliefs, particularly when they are rooted in tradition and difficult to change? Nearly all of the existing literature on misinformation focuses on developed countries, where both the modes of dissemination and the drivers of belief in falsehoods are different from low-income countries. In India, as in many developing economies, misinformation is largely spread via encrypted platforms such as WhatsApp, such that the burden of fact-checking falls on users. Further, in contexts like India where religion is instrumental in promoting the popularity of miracle cures and home remedies, and where religious divides are salient societal cleavages, religiosity and religious identity might fuel beliefs in misinformation. In such contexts, fighting misinformation should involve dislodging the linkages between (religious) identities and

false claims.

In this study we undertake one such effort to counter covid-19 misinformation by targeting the mechanisms that drive beliefs in falsehoods. We posit that those with high levels of religiosity and those who support religious nationalist parties are more likely to endorse conspiracies and miracle belief misinformation. We theorize that such endorsement arises from adherence to longstanding societal belief systems as well as pressures to conform to salient group identities in society. We then hypothesize that relieving the mechanisms driving this belief-group conformity pressures and adherence to belief systems—should help correct misinformation.

We test our hypotheses with an online experiment in India (N=1600). Respondents are shown hypothetical conversations on WhatsApp, a platform popular for its intimacy, homophilic groups, and consequently, the viral proliferation of falsehoods (Davies 2020). Respondents read conversations with a misinformation stimulus and targeted correction designed to displace associations between group identities and misinformation (Nyhan 2021). To do this, our corrections draw on unlikely sources: just as when Democrats contradicting Democrats is effective (Porter and Wood 2019; Berinsky 2017), we use Hindu religious texts as unlikely sources in order to correct religiously-motivated misinformation. We unearth verses from the Mahabharata and the Bhagavad Gita—two ancient Hindu religious texts—that speak about the virtue of “having correct beliefs” and the virtue of “not slandering one’s neighbor”. We present these verses to our respondents, along with corrections to misinformation, in the hope that seeing a religious source linked to a correction will help dislodge religiously-motivated misinformation. In addition, we provide corrections to group-congruent misinformation from ingroup members. We measure the effect of these treatments on perceived accuracy of stories on two issues: covid-19 conspiracy theories and unproven miracle beliefs.

Our study yields three main empirical findings. First, we confirm that religiosity is strongly associated with beliefs in covid-19 misinformation. Those who are highly

religious believe twice as many false stories relative to less religious individuals. Further, we find that religious affective polarization is also correlated with false beliefs. Hindu respondents who say they are less comfortable having Muslim friends or would feel more upset if a friend married a Muslim are also significantly more likely to believe conspiratorial and miracle cure misinformation. These results confirm that not only is religiosity is correlated with misinformation consumption in this context, but also that religious group identity and polarization are associated with beliefs in religiously-motivated misinformation.

Second, we show that our experimental treatments are effective at reducing beliefs in misinformation. Relative to the control condition, receiving a corrective treatment leads to a significantly greater number of accurate beliefs and consequently a significant reduction in vulnerability to misinformation. Importantly, we show improvements in respondents' ability to detect misinformation that extend beyond the specific misinformation stimulus used in our treatments. Respondents are able to learn from the treatments and accurately identify additional falsehoods as well. That is, issuing a correction to a story claiming that Ayurveda—a traditional Indian alternative medicine system—can cure covid-19 leads to respondents being able to identify a host of other miracle beliefs as being false, such as the false claim that nigella seeds can cure covid.

Third, we demonstrate that there is considerable variation in efficacy for the type of corrective treatment employed, as well as the type of misinformation being corrected. We demonstrate that treatments that draw on surprising sources—Hindu religious texts—to provide corrections are particularly effective at dislodging conspiracy theories. Such corrections are able to double the effect of a simple correction that does not draw on a religious source. On the other hand, treatments that target the mechanism of group conformity by providing a correction alongside a group norm to share accurate information appear particularly effective at dislodging beliefs in medical misinformation.

Beyond the context of our study, these findings underscore that corrective in-

formation must be targeted and tailored to the type of misinformation at hand. We posit that the two types of misinformation we study are fundamentally different: while conspiracy theories surrounding covid-19 are situational and stemmed only during the pandemic, miracle cures such as beliefs in Ayurveda are deep-rooted and have existed well before the pandemic. Thus situational misinformation appears easier to correct, but long-standing narratives are harder to dislodge and require more bundled treatments. In our experiment, treatment groups that layer a correction, an accuracy nudge, and a nod to group norms are the only treatments able to correct long-standing beliefs such as beliefs in traditional Hindu cures.

Overall, these findings point to the salience of group identity and conformity behavior as being instrumental to beliefs in and corrections for misinformation. We also demonstrate the importance of religiosity and show that in certain contexts the basis for motivated reasoning can be religion. Finally, we underscore that corrective treatments should take into account both the mechanism of belief in falsehoods and the type of misinformation being corrected.

## 2 Religion, religious identities and covid-19 misinformation in India

While social media misinformation is not new in India, fact-checkers note that the volume of misinformation they encountered during the covid-19 crisis was unparalleled ([Pundir 2020](#)). False stories during this period appear to fall into two broad categories: conspiracy theories about the creation and spread of the virus, and medical misinformation purporting miracle cures for covid.

We argue that conspiracy theories scapegoating minorities as well as miracle beliefs are both linked to beliefs in religion and support for religious nationalist parties in India. A well-established finding in the literature on American political behavior is

that partisan motivated reasoning affects how individuals react to new stimuli (Nyhan and Reifler 2012; Flynn, Nyhan, and Reifler 2017). In India, however, while evidence about the role of partisanship as a mediator of political beliefs is mixed (Guess et al. 2020; Badrinathan and Chauchard 2020; Badrinathan 2021), the importance of religion is indisputable. Indian politics has been dominated by a fundamental cleavage between Hindus and Muslims, and the prominence of religion as a social identity has been central. It is the basis of political mobilization, the rise of nationalism, and the origin of religiously-motivated political parties (Brass 2005).

The Bharatiya Janata Party (BJP), the current ruling party in India, is one such organization that champions the Hindu cause with campaigns to create a Hindu nation and an ideology that focuses on Hindu supremacy (Chatterji, Hansen, and Jaffrelot 2019). Like other religious nationalists, the BJP's movement contains rhetoric based on puritanical elements and moral appeals (Chatterji, Hansen, and Jaffrelot 2019). Such rhetoric embraces Hindu symbols and personalities for political gains, and can often rely on false information. A recent example is a BJP leader's claim that the discoveries of modern science and technology were known to the people of ancient India, such that the Hindu God Ganesh's elephantine head proves that plastic surgery was prevalent 2,000 years ago. The movement is also a form of majoritarian nationalism, aiming to establish a national identity that excludes and marginalizes religious minorities, specifically, Muslims. Thus, religious beliefs are often instrumentalized by political parties like the BJP, and hence partisanship and strength of religious identity in India likely influence each other (Heath, Verniers, and Kumar 2015; Chhibber and Verma 2019). Consequently, conspiratorial misinformation during the covid crisis in India is often congruent with beliefs touted by religious nationalist parties such as the BJP.

In addition to conspiracies, covid-19 has also allowed for the proliferation of medical misinformation in India, including homespun remedies and miracle preventive cures for the virus. Pseudoscientific remedies for covid-19 such as Homeopathy and Ayurveda

have roots in traditional Hindu religion and culture, and belief in such remedies is often fueled by an inclination to uphold ancient religious wisdom at the expense of modern scientific knowledge (Dore 2020). Recently, a state governed by the BJP said it would hand out herbal medicine to covid-19 patients, underscoring an association between religion, politics, and covid-19 misinformation in India (Mishra 2021). Thus, there is a fundamental link between Hindu religion and beliefs in longstanding ancient miracle cures in India. This link is further entrenched in Hindu nationalism, often forming the basis of vote-seeking by nationalist parties. As Kumar (2019) notes, in India "Hindu pride boosts pseudoscience."

Given the nexus between religiosity, religious nationalist partisanship and falsehoods in India, we argue that individuals who are highly religious and individuals who support the BJP are more likely to believe covid-19 medical misinformation and conspiracy theories (**H1a** and **H1b**).

## 2.1 Correcting Misinformation in India

A large research agenda has measured and tested interventions to combat misinformation. These include providing fact-checks and labeling misinformation as false (Clayton et al. 2019), priming the concept of accuracy to shield against misinformation (Pennycook and Rand 2019), and inoculating users before misinformation is seen (Vraga, Bode, and Tully 2020; Hameleers 2020). More recently, studies have looked at strategies to combat covid-19 misinformation and vaccine hesitancy in particular in Western democracies (Loomba et al. 2021; Suthaharan et al. 2021), with insights on how social science can help influence human behavior during the pandemic (Van Bavel et al. 2020).

But evidence on the effectiveness of corrections is mixed, since they appear to only partly diminish the prevalence of misinformation even when beliefs are measured immediately after exposure (Chan et al. 2017). Motivated reasoning is a primary explanation for the persistence of misinformation and the limited effectiveness of corrections

on some issues (Taber and Lodge 2006; Flynn, Nyhan, and Reifler 2017). Individuals choose to believe information that aligns with their predispositions, and these predispositions are often culturally-based and oriented around social and group identities (Kahan et al. 2017; Benegal and Scruggs 2018). At times of crises and change such as covid-19, humans seek security in groups, and this may make them eager to consume information—including falsehoods—that strengthen belonging with the in-group and increase distance from the outgroup (Tajfel et al. 1979).

Group identities, primarily those formed along religious lines, are already strong social cleavages in India. However, the online environment of WhatsApp exacerbates these cleavages even further. Unlike in the United States, where information sharing on social media takes place on public sites such as Twitter and Facebook, the more popular medium in India is the chat application WhatsApp. India is the world's biggest market for WhatsApp and the app is now the country's most popular social media platform. On WhatsApp, users can join private group chats, oftentimes created around political, religious, or other social causes. Using public WhatsApp data on India, Saha et al. (2021) demonstrate that such groups are often divided along religious lines, and hate and fear speech targeting minorities is prevalent in these groups.

Further, what compounds the misinformation problem is the private nature of the platform. Since messages on WhatsApp are encrypted, platform-based interventions such as debunking misinformation by adding a false label are not possible. Thus, solutions to correct misinformation must necessarily stem from users correcting each other. In addition, the insular nature of private chat groups on WhatsApp also aids in vulnerability to misinformed beliefs. As Davies (2020) writes, the intimacy that WhatsApp offers creates a haven for misinformation. WhatsApp groups are created for seemingly innocuous motives – parent teacher associations, neighborhood residents groups, mutual aid – but they can promote a sense of solidarity, making the misinformation on them more likely to be trusted. Indeed, research finds that homophily in networks is associated

with greater misinformation sharing (Acemoglu, Ozdaglar, and Siderius 2021), and as Tufecki (2018) notes, “belonging is stronger than facts”.

In sum, India suffers from the compounded problems of a dangerous proliferation of misinformation during covid-19, private information sharing, and socially polarized group identities. While a large and robust literature studies strategies to combat misinformation in developed contexts, only a handful study the problem in developing contexts. In Brazil, Pereira et al. (2021) and Rossini et al. (2020) look at corrections to political misinformation, while Carey et al. (2020) look at conspiracy theories and misperceptions during the Zika epidemic. In Zimbabwe, Bowles, Larreguy, and Liu (2020) run a study countering misinformation via WhatsApp, and in Kenya, Nigeria and South Africa, Wasserman and Madrid-Morales (2018) describe exposure to disinformation measured through surveys. Finally, in India, Garimella and Eckles (2020) use machine learning algorithms to analyze WhatsApp messages; Badrinathan (2021) and Guess et al. (2020) design in-person interventions to combat misinformation, and Badrinathan and Chauchard (2020) use online corrections designed for WhatsApp.

This paper adds to the literature on misinformation in developing contexts by designing a novel strategy that tailors solutions to misinformation to appeal to the same psychological traits that make people vulnerable to falsehoods to begin with (Nyhan 2021). We posit that motivated reasoning may affect individuals through two distinct mechanisms: cognitive dissonance with new information or social pressure to conform to group norms. If misinformation is congruent with longstanding religious practices such as reliance on homemade remedies, receiving scientific but incongruent information may cause cognitive dissonance. To eliminate this dissonance, highly religious individuals might adopt misinformation that reconciles the conflict. Second, believing information incongruent with group beliefs might lead to fear of alienation from the in-group. In this case respondents might engage in identity protective cognition, a type of motivated reasoning that increases pressure to form group-congruent beliefs (Sherman and Cohen

2006).

These hypothesized mechanisms have implications for the effectiveness of potential corrections, our focus in this study. If dissonance between priors and new information, or conformity pressures caused by shared group identity drive beliefs in misinformation, it follows that corrections that relieve dissonance and/or conformity pressures should reduce the prevalence of these beliefs. Building on this rationale, we hypothesize that corrections relieving the dissonance between priors and true information will be effective in reducing rates of belief in misinformation. We further see this as especially likely among highly religious respondents, who would be more likely to pay attention to a religious frame or more likely to be affected by it (**H2**).

Drawing on a large literature on perceived norms and conformity effects (Asch 1961; Tankard and Paluck 2016), we additionally argue that relieving the pressure to conform to in-group norms (by changing the perception of a group norm to one that primes accuracy) constitutes an effective strategy among individuals whose beliefs are most likely to be driven by shared group identity. Specifically, we hypothesize that changing perceptions of in-group norms should be effective among highly religious individuals when the in-group is defined in religious terms (**H3**) and effective among strong supporters of the BJP when the in-group is defined in partisan terms (**H4**).

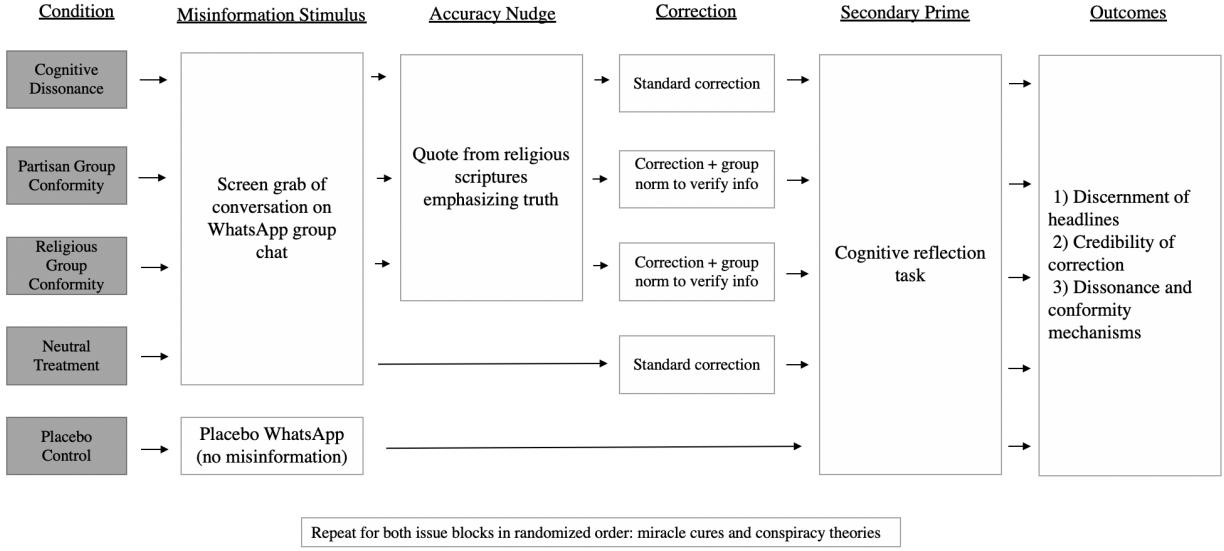
### 3 Methods

To test these hypotheses, we fielded an online experiment in India (N=1600)<sup>1</sup>. In our experiment, respondents are randomly assigned to one of five conditions in a between-subjects design (see Figure 1). Four of our treatments contain an intervention designed to ease religious or partisan dissonance or group conformity pressure. We compare these to a correction condition without any religious or partisan accuracy norms ("neutral

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<sup>1</sup>Preregistered at <https://osf.io/vtbw8/>

Figure 1: Experimental Flow



treatment”). Finally, our last group is a placebo control.

The treatment intervention asks respondents to read a conversation between two peers on a WhatsApp group chat. We create hypothetical but realistic WhatsApp screenshots shown to respondents as part of the treatment.<sup>2</sup> The screenshots display a conversation between two users in a private WhatsApp chat group. In this exchange, the first user posts a piece of misinformation. In response, the second user uses a variety of correction strategies corresponding to our different treatment groups.

### 3.1 Treatment Conditions

Our experiment includes four treatment conditions. In the “cognitive dissonance” treatment, we include a correction accompanied by an accuracy nudge. Since the goal of this treatment is to relieve dissonance with longstanding religious beliefs, our accuracy nudge draws on Hindu religious scriptures that discuss either the truth as an important

<sup>2</sup>WhatsApp messages are protected by encryption which means that only peers can correct or respond to each other by design, hence reading a conversation between two peers adds external validity to our design (rather than having respondents merely read the text of our intervention directly on their survey screen).

virtue or the imperative not to slander. Specifically, the user in the conversation who corrects misinformation also posts verses from Hindu religious scriptures (the Bhagavad Gita and the Mahabharata) that rely on religious quotes or Hindu religious iconography that exhort people to consider the truth. By doing so, we subtly induce the concept of accuracy, previously shown to reduce the likelihood of belief in misinformation (Pennycook and Rand 2019).

This technique builds on prior work emphasizing that unlikely sources are more effective, as when Democrats contradict Democrats (Porter and Wood 2019). False messages about miracle cures in India often exhort readers to believe in homespun remedies since they uphold sacred truths from religious scriptures (Sachdev 2017); conspiracy theories targeting minorities often seek to further entrench religious divides. In our treatment, we leverage this frequent recourse to religion by demonstrating that religious sources emphasize restraint from slander and value the truth.

Next, our “partisan conformity” and “religious group conformity” treatments test whether relieving perceived pressures to conform to the ingroup can attenuate belief in misinformation. To manipulate ingroup membership, these WhatsApp groups signal the purpose and identity of the group: the name of the group chat is revealed so as to prime membership to a specific religious (Hindu) or partisan (BJP) group.<sup>3</sup> These treatments involve a correction to misinformation along with the correcting user highlighting a group norm to verify questionable information before posting. Importantly, the corrective treatment in these experimental groups build upon the “cognitive dissonance” treatment by adding the group norm and group name aspects to the treatment.

Thus, these are additive treatments and bundled interventions by design. Their goal is to measure whether religious corrections alone can correct misinformation, or whether additionally manipulating ingroup conformity pressures is necessary to correct beliefs. This treatment adds to a growing body of research in information processing

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<sup>3</sup>In all other experimental groups, (neutral treatment, dissonance treatment and placebo), the group name is blanked out.

that shows how structured online networks can be used to improve people's capacity to accurately interpret information. Structured communication networks can significantly enhance social learning, leading to the elimination or reduction of partisan biases on contentious political topics (Becker, Brackbill, and Centola 2017; Guilbeault and Centola 2020; Vraga and Bode 2017). Here, we build on this prior work in our group identity treatments to determine whether in-group social networks can improve covid-19 information processing by alleviating pressures to conform.

Further, we include a "neutral treatment" with a standard correction, i.e. a correction that does not include a religious quote, accuracy nudge, or group norm. In this treatment, the correction by the second user is simple and minimal: the second user simply says that the first user's claim is incorrect. Since our treatments are bundled and additive, we include this condition to separate whether the corrective effects they observed are due to the religious/conformity treatments or simply exposure to corrective information.

Finally, we compare these treatment conditions to a placebo control condition. In this condition respondents read a WhatsApp conversation about a neutral topic such as wildlife or sports; the conversation does not contain a misinformation stimulus.<sup>4</sup>

After respondents read the WhatsApp screenshots, they are asked to reflect on the material they were exposed through a cognitive reflection task where respondents are asked to write a brief paragraph about the conversation they saw. This gives a two-part prime: respondents read a conversation; its point is reinforced by the reflection task. This ensures that the targeted mechanism introduced in our treatments has been effectively primed (Levendusky 2018). We repeat this experimental flow for two issue blocks, conspiracy theories and miracle beliefs. All treatment stimuli are available in Online Appendix C.

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<sup>4</sup>We intentionally did not include a condition that had a misinformation stimulus but no correction. We do this to minimize the adverse effects of not having an immediate correction for misinformation at a contentious time in the country. Thus in every condition that we introduce a misinformation stimulus, respondents simultaneously see a correction.

## 3.2 Outcomes

We measure the effect of these additive treatments on the perceived accuracy of two sets of headlines: COVID-19 conspiracy theories and miracle medical beliefs. Each set contains two true headlines and four false headlines, presented in randomised order. Importantly, the headlines in our outcome measure include the misinformation corrected in the treatment, as well as 3 additional misinformation headlines, along with 2 true headlines. Thus we are able to measure whether the treatment reduced belief in false headlines beyond the specific story corrected.<sup>5</sup>

Relying on these data, our outcome of interest is a count of respondents' ability to discern true from false stories in a set of six stories. Within each issue block we provide respondents with 6 real headlines, both true and false. We measure respondents' perceived accuracy of each headline on a four-point scale ranging from very accurate to not at all accurate. The list of headlines that comprise this measure as well as rationale for their selection is available in Online Appendix D.

Importantly, respondents encounter each of these two issues in a randomised order and remain in the same condition for both issues.

## 3.3 Sample Characteristics

We recruited 1600 adult respondents in India through an online panel maintained by one of India's leading online polling firms, Internet Research Bureau (IRB). Respondents were selected to be as representative as possible of the Indian adult population by age, gender and region.<sup>6</sup>

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<sup>5</sup>Our headlines, both true and false, were selected from a list of several stories that we pretested. Of these stories, we selected six headlines for each issue on the basis of how widely they were believed and the potential harm they could cause. Since Indian respondents report high levels of trust in search engines such as Google and Yahoo (Aneez et al. 2019), we present each story in the form of an actual headline mimicking the style of stories on Google News, with a headline, subheadline, source, and image. We block out the source so as to maintain symmetry across stories (See online Appendix D).

<sup>6</sup>As with most online panels in India, our sample is not representative of the Indian population, despite our efforts in this direction. It should however be more closely representative of India's online population,

We limit our sample to Hindu respondents to maximize statistical power, as the number of non-Hindu respondents would not have allowed us to make meaningful inferences (82% of Indians are Hindu). Further, we control for partisan imbalance in the sample by using a randomized block design where the sample is divided into two blocks based on support for the BJP. Within each block, respondents are assigned to one of the five experimental conditions with equal probability.

## 4 Results

We first discuss descriptive statistics on the prevalence of misinformation in our sample. In the second subsection, we demonstrate correlations between such prevalence and religiosity, partisanship, and polarization. Next, we present the main effect of our treatments on discernment between true and false headlines. Finally, we provide additional tests to compare the relative effectiveness of our different treatment conditions.

### 4.1 Descriptive Data: the Prevalence of Misinformation

Figure 2 lists the 12 stories used in the dependent variable measure in this study, true and false. This figure plots the share of respondents in the sample who believed the misinformation in each story. For false stories, this is the share believing the headline was true; for true stories, this is the share believing the headline was false. Two aspects of this figure are striking. First, general belief in misinformation in our sample is high. Over 50% of all respondents in the sample believed every single false headline containing misinformation, with rates of belief in some stories even higher. Amongst conspiracy theories, over three quarters of the sample believed the headline that covid is a Chinese biowarfare weapon. Amongst miracle cures, about 65% of the sample believed that homeopathy – an alternative medicine system with roots in traditional Hindu culture which is highly skewed towards educated, wealthy, pro-BJP and upper-caste male respondents.

– can cure covid-19. These strikingly high levels of belief in misinformation are in line with previous research on India (Guess et al. 2020). Second, respondents were more vulnerable to false stories than they were to true headlines, with a much lower fraction of the sample wrongly believing that a true headline was false.<sup>7</sup>

Overall, across the 12 headlines respondents correctly classified an average of 6.02 stories, alluding to both the challenging nature of the dependent variable measure, as well as the prevalence of misinformation in the country.

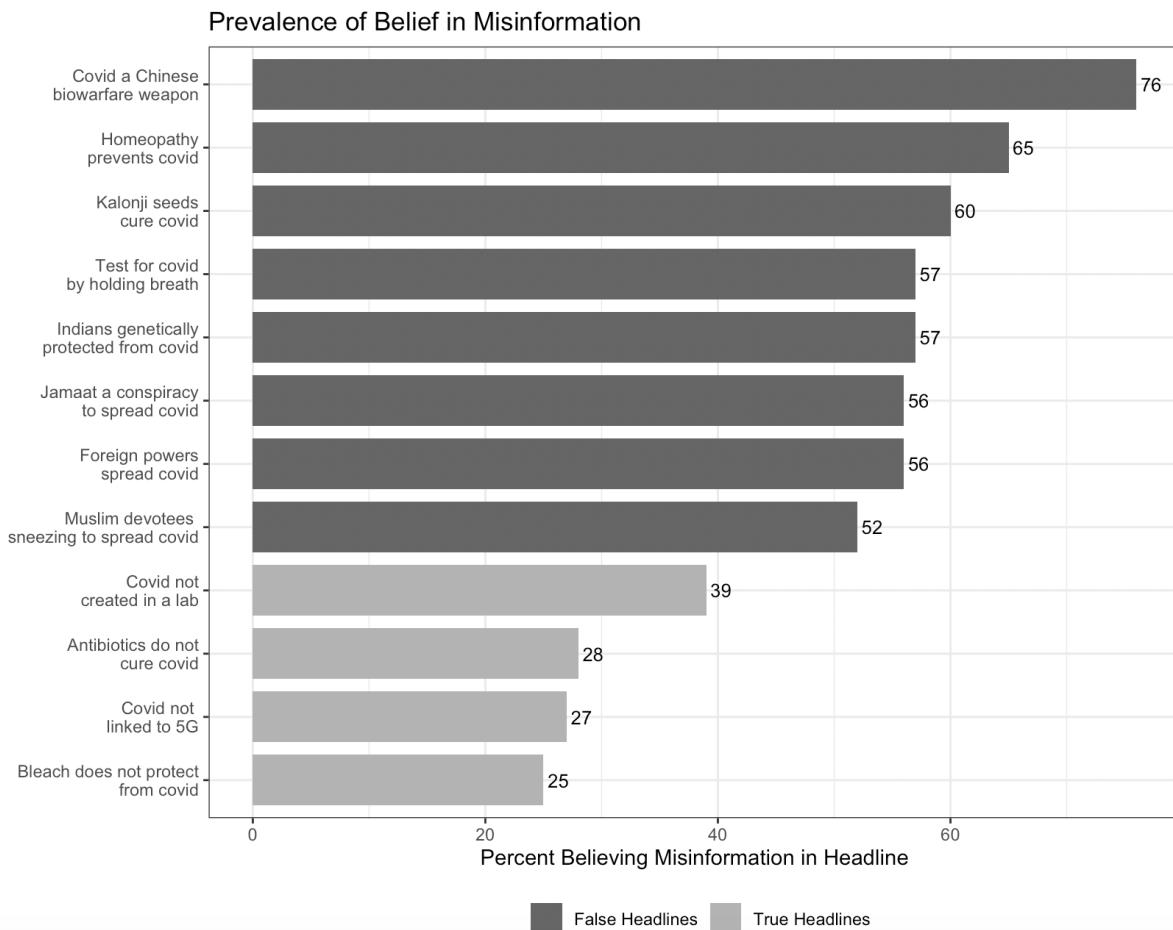


Figure 2: Prevalence of Misinformation

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<sup>7</sup>We note here that our true headlines are all negations of false stories by design, since there is no direct opposite of a conspiracy theory or medical misinformation in the Indian context. Thus, it is possible that a lower rate of belief in the true headlines, relative to false, is a function of the true stories being easier to detect and acquiescence response bias (Winkler, Kanouse, and Ware 1982). Despite this, we underscore that high rates of belief in false stories is not unusual for Indian samples, as demonstrated by previous research in this context (Guess et al. 2020).

Given the high prevalence of misinformation in this sample, we are interested in understanding which subpopulations are most vulnerable to fake news. In H1a and H1b we hypothesized that high levels of religiosity and religious nationalist partisanship should be highly correlated with misinformed beliefs, and hence that individuals with these characteristics should be especially likely to believe misinformation.

To test these hypotheses, we count the number of headlines that respondents correctly classified as true or false. This constitutes our outcome measure. We regress this outcome on two variables. First, a categorical variable that captures the strength of respondent support for the BJP on a 4-point scale ranging from strongly support to strongly oppose. Second, a continuous variable capturing respondent religiosity, where the most religious respondent has a score of 1 and the least religious respondent has a score of 0. To measure religiosity, we use a battery of eight items adapted from [Verghese \(2020\)](#). We score each of the items such that higher values indicate that someone is more religious; we then add the eight scores and standardize the measure such that we have a scale of religiosity with mean 1 and standard deviation 0. These items include questions that measure the practice of Hindu religion on a quotidian basis, including frequency of prayer, the need to consult an astrologist before fixing a wedding date, the need to fast for religious purposes, etc.<sup>8</sup>

These analyses provide empirical support for both of our hypotheses. As seen in Figure 3, support for the BJP is strongly and significantly correlated with a greater vulnerability to covid-19 misinformation in India. We plot the predicted number of headlines accurately discerned as true or false by respondents strength of support for the BJP. While partisans who oppose or somewhat support the BJP are not more or less likely to be vulnerable to misinformation, we find that strong supporters of the BJP correctly identify significantly fewer stories.

Further, religiosity is strongly correlated with vulnerability to misinformation.

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<sup>8</sup>The items included in the scale are included in our survey instrument (Appendix K).

Figure 3: Belief in Misinformation, By Party

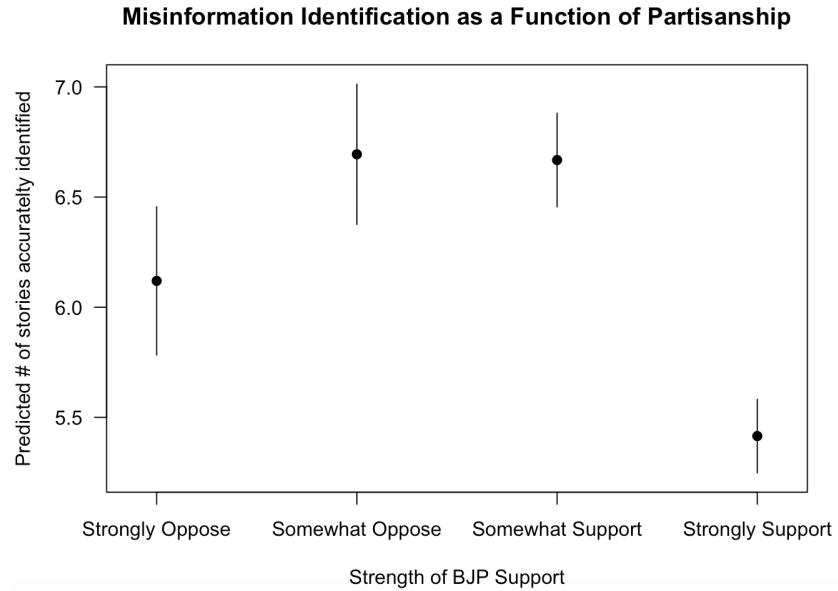


Figure 4: Hypothesis 1b

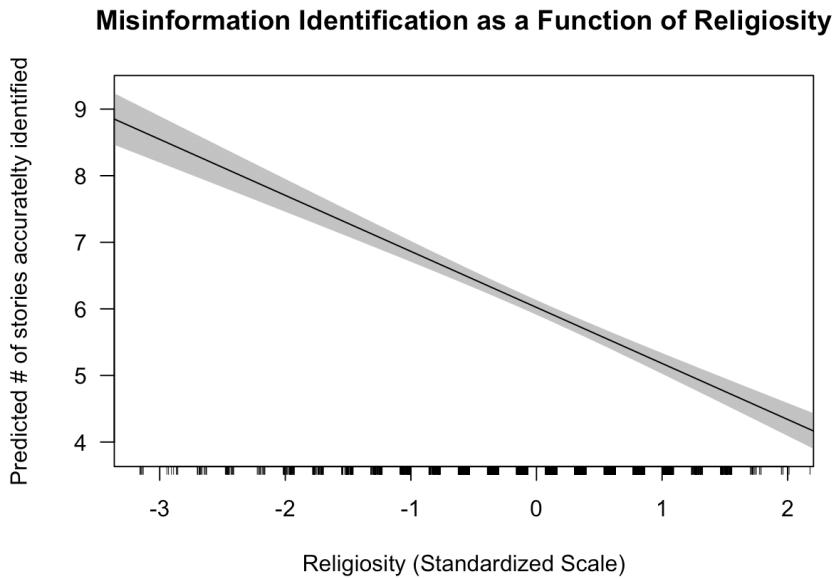


Figure 4 graphs the predicted number of stories accurately classified as a function of religiosity. Those who score low on the religiosity scale are significantly better at identifying misinformation relative to those who score high on the religiosity scale. In fact, respondents with the lowest levels of religiosity are able to correctly classify double

the number of headlines (about 9 headlines) relative to respondents with the highest levels of religiosity (about 4.5 headlines).

We also examine whether religious affective polarization is linked to belief in misinformation. We measure religious polarization by asking respondents whether they would be upset if a friend married someone of the other religion. We find that those who say they would be very upset or somewhat upset are significantly more vulnerable to beliefs that miracle cures can be effective against covid-19. Specifically, respondents in this group classify 1.1 fewer headlines correctly, relative to respondents who say they would not be upset if a friend married someone of the other religion.

These descriptive findings underscore that religious practice is highly associated to covid-19 misinformation in India, and that antipathy towards religious outgroups also conditions belief in misinformation.

## 4.2 Experimental Results

We now move to discussing experimental results. We estimate effects of the treatments on outcomes in a between-subjects design. All estimates are ordinary least square (OLS) regressions, and empirical models are specified relying on random treatment assignment to control for potential confounders. First we analyze data for the main effect of the different treatments on ability to discern misinformation. Our results are visualized in Figures 5 and 6 and presented in Table 1.

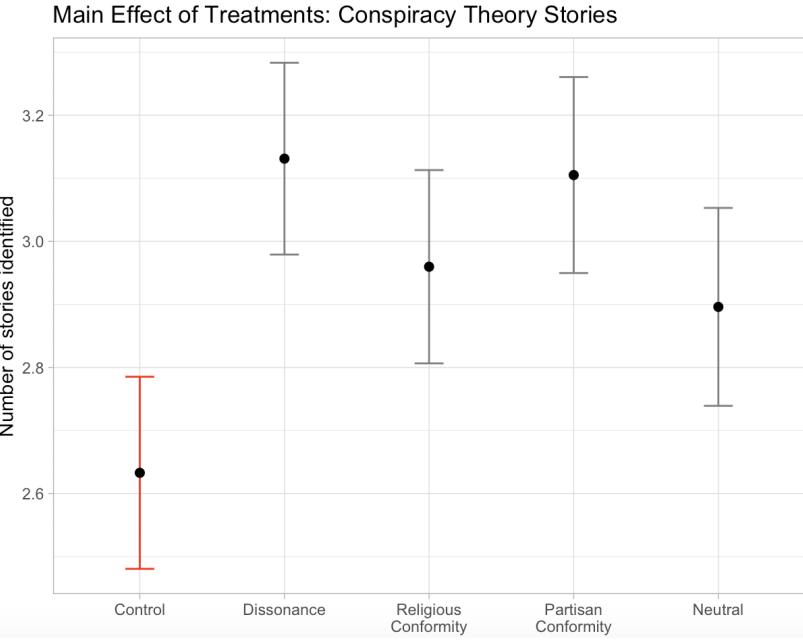


Figure 5: Main Effect: Conspiracy Theory Stories

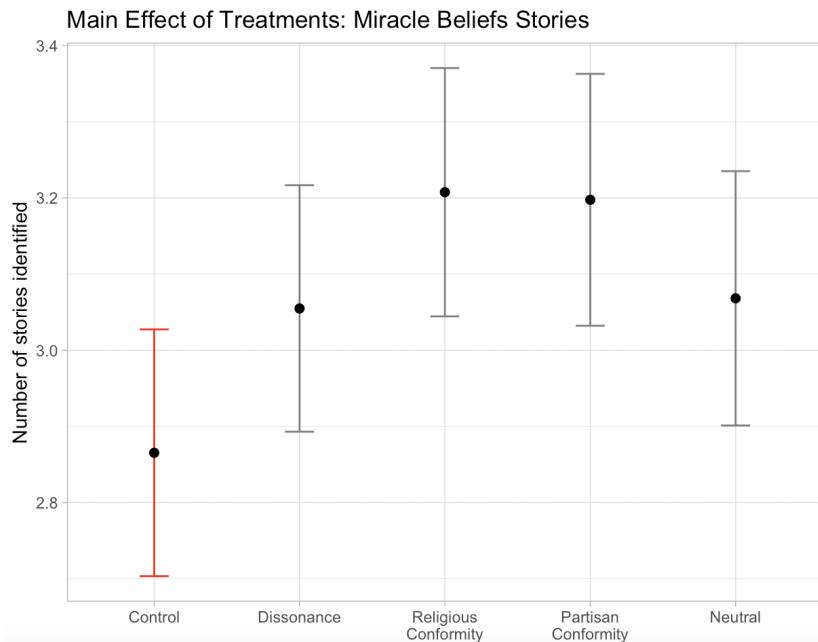


Figure 6: Main Effect: Miracle Belief Stories

Here we compare estimates from each of the different treatment groups to the placebo control group. Our outcome variable measures discernment between true and false headlines and is a count of the number of headlines correctly classified. We estimate

the effect of each treatment separately for conspiracy theory misinformation (column 1) and miracle cure misinformation (column 2).

Results demonstrate that when it comes to conspiracy theories, all of our treatments are able to significantly improve information processing. Respondents who are assigned to any of the treatment groups are able to discern misinformation significantly better relative to those assigned to the control group. In addition, these effects are substantively large, with those assigned to the Dissonance or Partisan Conformity treatment group demonstrating a 15% increase in discernment capacity relative to control. Lastly, although smaller in magnitude, we also see a significant effect of receiving the Neutral treatment with a standard correction, demonstrating that even minimal corrections may be able to improve information processing in this context, mirroring existing findings ([Badrinathan and Chauchard 2020](#)).

On the other hand, when it comes to misinformed beliefs about miracle cures, we find that while respondents in the conformity treatments are able to learn from the treatment and improve their discernment relative to control, this effect does not obtain for the other treatments. In particular, the dissonance treatment, which produced the largest positive effect for conspiracy theories, appears to have no impact in the case of miracle cures: the average treatment effect is indistinguishable from zero. It is important to note that these are additive treatments, hence the conformity treatment stimuli adds an additional layer to the information being presented in the dissonance stimuli, by revealing group norms and the group name. Thus, it appears that this additional layer of information was what moved respondents towards accurate beliefs in the case of miracle medical beliefs.

These results suggest that different types of misinformation (here, conspiracies vs. medical beliefs) condition effective strategies to correct it. We show that the mechanisms of belief in conspiracy theories and in medical misinformation are distinct, and thus distinct approaches must be adopted to correct them. Covid-19 conspiracy theory mis-

Table 1: Main Effect of Treatments

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	CuresMisinfo
	(1)	(2)
Dissonance Treatment	0.498*** (0.110)	0.189 (0.117)
Religious Conformity	0.327* (0.110)	0.342* (0.117)
Partisan Conformity	0.472*** (0.111)	0.332* (0.118)
Neutral Treatment	0.263* (0.112)	0.203 (0.119)
Constant	2.633*** (0.078)	2.865*** (0.083)
Observations	1,600	1,600
R <sup>2</sup>	0.016	0.007
Adjusted R <sup>2</sup>	0.014	0.004
Residual Std. Error (df = 1595)	1.405	1.494
F Statistic (df = 4; 1595)	6.592***	2.784*

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

information is new and situational. Stories that foreign governments or minority groups are deliberately conspiring to spread the virus or that the virus is a biowarfare weapon constitute novel narratives that emerged in the wake of the pandemic. On the other hand, covid-19 medical misinformation in India comprises largely of miracle cures, such as the reliance on homeopathy, ayurveda, or home remedies. These alternative medicinal systems have existed long before covid-19, and hence the misinformation that stems from them, while related to covid, also taps into longstanding belief systems in society. Thus we posit that miracle cure misinformation is harder to correct to begin with. This is evidenced by a worse discernment in the control group for miracle cure headlines, relative to conspiracy headlines.

Thus, situational misinformation is easier to correct. Our findings demonstrate that even standard corrections work to dislodge these beliefs in India, though corrections that draw on religious sources to relieve dissonance and provide accuracy nudges are able to achieve effects of greater magnitude. But for misinformation relying on longstanding belief systems, in addition to religious messaging, tapping into group identity appears crucial. These findings reinforce the idea that misinformation is believed to a greater extent in insular networks; but when elites in those networks signal otherwise or when group norms are fostered with a focus on veracity, information processing can improve.

We confirm the robustness of the results in Table 1 by controlling for key demographic and pre-treatment covariates (Table G.1 of Appendix G). Our key result remains unchanged. We also replicate these findings controlling for respondent attention during the survey (see Appendix I for a discussion of the attention check questions used as well as results).

We now briefly discuss heterogeneous effects of religious and partisan identity. Since highly religious respondents are more likely to pay attention to a religious frame, we hypothesized that corrections relieving the dissonance between religious misinfor-

mation and the truth should be especially effective at reducing the rate of belief in falsehoods among highly religious people. To test this hypotheses, we compare our outcome of interest in the dissonance treatment group relative to the control group and interact our continuous religiosity measure with a dummy variable indicating assignment to treatment. We present results in Table 2. Our findings demonstrate that treatment effects do not differ as a function of religiosity. In other words, respondents with both high and low levels of self-reported religiosity are able to learn from the treatment.

Table 2: Hypothesis 2: Heterogeneous Effect of Religiosity

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	CuresMisinfo
	(1)	(2)
Dissonance Treatment	0.476*** (0.101)	0.173 (0.112)
Religiosity	-0.400*** (0.073)	-0.306*** (0.081)
Treatment x Religiosity	-0.079 (0.101)	0.013 (0.112)
Constant	2.650*** (0.071)	2.878*** (0.079)
Observations	655	655
R <sup>2</sup>	0.135	0.046
Adjusted R <sup>2</sup>	0.131	0.042
Residual Std. Error (df = 651)	1.290	1.434
F Statistic (df = 3; 651)	33.871***	10.472***

*Note:*

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

Similar to this, we also hypothesized that those who have stronger religious or partisan group identities will be more receptive to messaging that calls on group norms. However, similar to the results in Table 2 we find that treatment effects do not differ as a function of religiosity or partisanship measured by strength of support for the BJP.

Thus while our treatments are able to achieve large effects on average relative to control, we do not detect heterogeneous effects of religiosity or partisanship (results in Online Appendix J). This suggests that our treatments may be even more effective than expected, as their effect is not limited to a specific sub-population of respondents.

Finally, we ascertain whether our religious and conformity treatments performed better than the standard correction. We want to be able to test whether corrective effects we observe are due to the religious or partisan elements of the treatments, or simply exposure to corrective information. We therefore add a condition in which respondents are exposed to a standard correction without any reference to religious texts or group norms, which we refer to as a standard Neutral correction. In Table 3 we compare each of our conditions to this Neutral condition, instead of comparing them to the placebo control group.

Looking at conspiracy theories (column 1), we find that the Dissonance treatment is the only one able to improve upon the standard correction issued in the Neutral treatment. This is a crucial finding: while all of our experimental treatments performed better than the control, when comparing to a standard correction only the Dissonance religious treatment achieves an effect. Interestingly, we show that the group conformity treatments are no different from standard corrections, demonstrating that the mechanism of relieving dissonance with religious beliefs improves beliefs about conspiracy theories.

On the other hand, looking at miracle cures (column 2), we find that the standard correction is no different from any of the other treatment groups. However, as we note in Table 1, for miracle cures our standard correction does not improve discernment relative to control. Only the group conformity treatments are able to achieve a significant effect.

This result underscores that the mechanisms of belief in conspiracy theories and cures are vastly different. We posit that beliefs in conspiracy theories can be altered by issuing religious treatments that have moral messages. Our Dissonance treatment contains a message with a moral imperative – only believe the truth or do not slander others

– and such messaging is effective at reducing beliefs in conspiracy theories. Covid-19 conspiracy theories in the Indian context target other groups in society, often minorities, and hence we argue that messaging that has a more society-oriented moral framing can be effective in this case. Similar to research showing that heightening a sense of civic duty (i.e., citizens have an obligation to get the facts right) can reduce partisan motivated reasoning (Mullinix 2018), we demonstrate that moral imperatives about other groups in society are effective in combating conspiracy theory misinformation.

Reducing beliefs in miracle cures, on the other hand, benefits the most from our conformity treatments. Miracle cures are tied to social norms in the Indian context: the idea that home remedies and alternative medicinal systems can cure diseases is passed down the generations in Indian society. These ideas are so firmly entrenched that disbelief in them may come with social stigma or fear of alienation. Further, because these are longstanding beliefs not specific to the covid-19 crisis, they are also more salient. For such salient and deep-rooted beliefs, moral messaging ("believe only the truth") is not effective relative to social nudges. We show that activating group norms to verify information and making group identity salient during corrections can move such beliefs.

## 5 Conclusion

In this paper, we present new evidence on ways to reduce the uptake of covid-19 misinformation in contexts in which this misinformation is driven by traditional religious beliefs and group identities. We design a unique experiment that targets the mechanisms of belief in covid-19 misinformation. Specifically, we posit that dissonance from new information, and pressures to conform to the ingroup drive misinformed beliefs, and our treatments consequently relieve these dissonance and conformity pressures. We argue that religiosity is associated with beliefs in both covid-19 conspiracy theories and medical misinformation. Beliefs in conspiracy theories scapegoating religious minori-

Table 3: Comparisons with Neutral Treatment

	<i>Dependent variable:</i>	
	ConspiracyMisinfo	CuresMisinfo
	(1)	(2)
Dissonance	0.235* (0.111)	-0.013 (0.119)
Religious Conformity	0.064 (0.112)	0.139 (0.119)
Partisan Conformity	0.209 (0.113)	0.129 (0.120)
Placebo Control	-0.263* (0.112)	-0.203 (0.119)
Constant	2.896*** (0.080)	3.068*** (0.085)
Observations	1,600	1,600
R <sup>2</sup>	0.016	0.007
Adjusted R <sup>2</sup>	0.014	0.004
Residual Std. Error (df = 1595)	1.405	1.494
F Statistic (df = 4; 1595)	6.592***	2.784*

*Note:*

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

ties are often touted by religious nationalist parties, while beliefs in home remedies and miracle cures for covid are fueled by an inclination to uphold ancient religious wisdom. Employing treatments specifically designed for the Indian context, such as using Hindu religious scriptures to provide accuracy nudges alongside corrections, our study yields three important findings.

We first find a strong connection between religiosity and belief in covid-19 misinformation. Those who score high on our religiosity scale, support religious nationalist parties, and display religious affective polarization are significantly more vulnerable to misinformation. Second, our corrective treatments are effective at reducing the uptake of misinformation. Moreover, respondents are able to learn from the treatment and apply it to identify additional falsehoods as well. Third, we demonstrate a substantive difference in efficacy for the type of corrective treatment employed, as well as the type of misinformation being corrected. Treatments that use religious texts to relieve dissonance are most effective at dislodging conspiracy theories, while treatments that tap into group norms alongside corrections are most effective at dislodging miracle cure misinformation.

While the root causes of vulnerability to misinformation appear entrenched in long-standing beliefs and societal identities, we show hopeful evidence that targeting these same causes can significantly improve information processing. But despite these positive findings, we consider some limitations of the study and avenues for future research.

First, it is worth noting that while we focus on religiosity in this paper, we cannot truly disentangle the causal effects of religiosity and partisanship as drivers of beliefs. In the Indian context, while religion itself has been a long-standing social cleavage, parties tap into religious beliefs in order to further their own causes. In our data, too, religiosity is correlated with increasing support for the BJP. Thus while it is theoretically likely that religiosity drives beliefs in misinformation, it is empirically difficult to determine whether this relationship is orthogonal to party identity, or whether partisanship itself

increases the strength of Hindu religious beliefs. While our paper focused on correcting misinformation, future research should look into the precise factors that cause citizens to believe falsehoods in the first place.

Next, we underscore that the particular treatment we used - Hindu religious texts - is necessarily context-specific. However, we believe the premise of our study, the idea that treatments should target mechanisms and identities that drive belief in falsehoods in the first place, is applicable to several other contexts. Specifically, we note several other developing countries that have had an uptick in the spread of miracle cure misinformation during covid-19. Countries such as Afghanistan, Madagascar, Mali, Mexico and Brazil not only share commonalities in the type of misinformation that spread during covid, but also have social media environments similar to India that rely heavily on encrypted platforms such as WhatsApp. Further, as [Nyhan \(2021\)](#) notes, such an approach would also do well to reduce the uptake of misinformation in the Western world.

In addition, we underscore that more work needs to be done to understand how those identifying with other religious identities respond to such treatments. We focused in this study on Hindu respondents, who make up a very large share (82%) of the population in India and importantly, an overwhelming majority of online samples. Because of power and funding concerns, as well as restrictions on travel allowing for online sampling only, we were unable to sample beyond this subgroup. In our own future work, we aim to extend this research to make it representative of religious diversity in India.

Finally, we acknowledge that WhatsApp screenshots constitute respondents witnessing a correction rather than being corrected themselves. But the encrypted nature of WhatsApp poses logistical and ethical problems in conducting such a study within actual WhatsApp groups. Given these constraints, we attempt as far as possible to have treatments that maximize external validity (for example, having respondents read a WhatsApp conversation so as to approximate the environment of a social media group chat, rather than see corrections on their screen devoid of that context). While we cannot

fully approximate the environment of a WhatsApp group chat, we believe this approach has the most utility relative to labeling or correcting misinformation on platforms like Facebook or Twitter, as most Indian citizens do not use these apps. We hope that future research will continue to find ways to make studying encrypted platforms more externally valid, an especially pressing concern to gain insights into misinformation in the developing world.

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**Online Appendix for**  
*Leveraging Religiosity Against COVID-19 Misinformation:*  
*Experimental Evidence from India*

## **Contents**

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## A Pretest Data

We pretested a selection of 43 stories, 23 false and 20 true, on a sample of 400 Indian adults recruited via Mechanical Turk in June 2020. These stories were real headlines shared on Indian social media during the early months of the pandemic.

We used Google News to pick the true stories. The false stories were rated false by at least one third-party fact-checking organization such as [altnews.in](http://altnews.in) or [boomlive.in](http://boomlive.in). For each story we asked respondents to rate its perceived accuracy on a 4-point scale (very accurate, somewhat accurate, not very accurate, not at all accurate). In the graphs below we plot the share of respondents in the pretest sample who said each story was either very accurate or somewhat accurate.

We subsequently used these data to select stories for our actual study (whose results are presented in the main paper). Our final selection of stories reflects false stories believed the most and true stories believed the least, so as to maximize the effect of the treatment on headlines where there is a lot of scope to move beliefs towards the truth.

In each case, we roughly classified each story in a given category of claims: claims about miracle cures ("cure"), claims invoking a conspiracy in the development or the spreading of COVID-19 ("conspiracy"), and claims about transmission modes of the disease ("transmission").

Figure A.1: Belief in False Pretest Stories

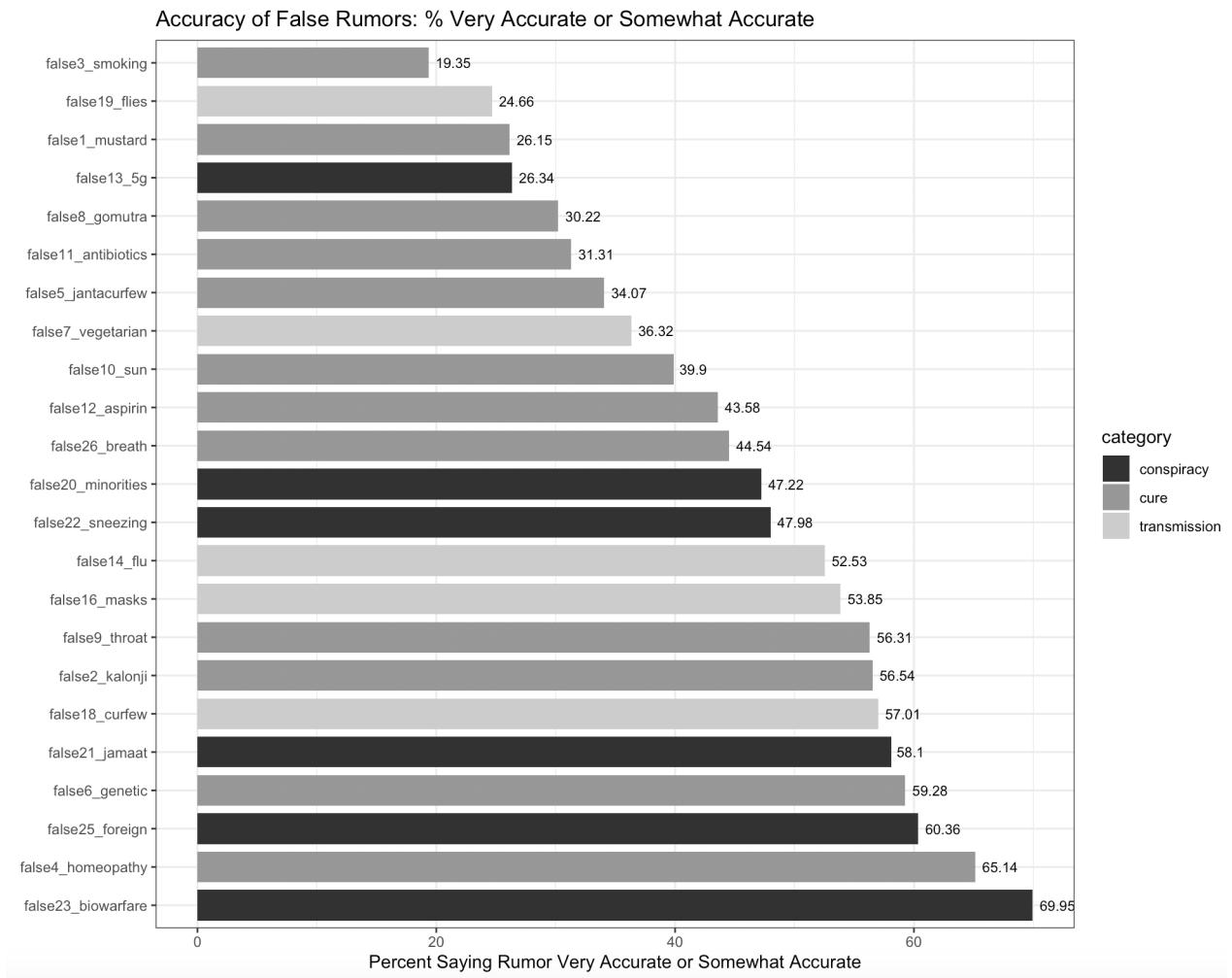


Figure A.2: Belief in True Pretest Stories

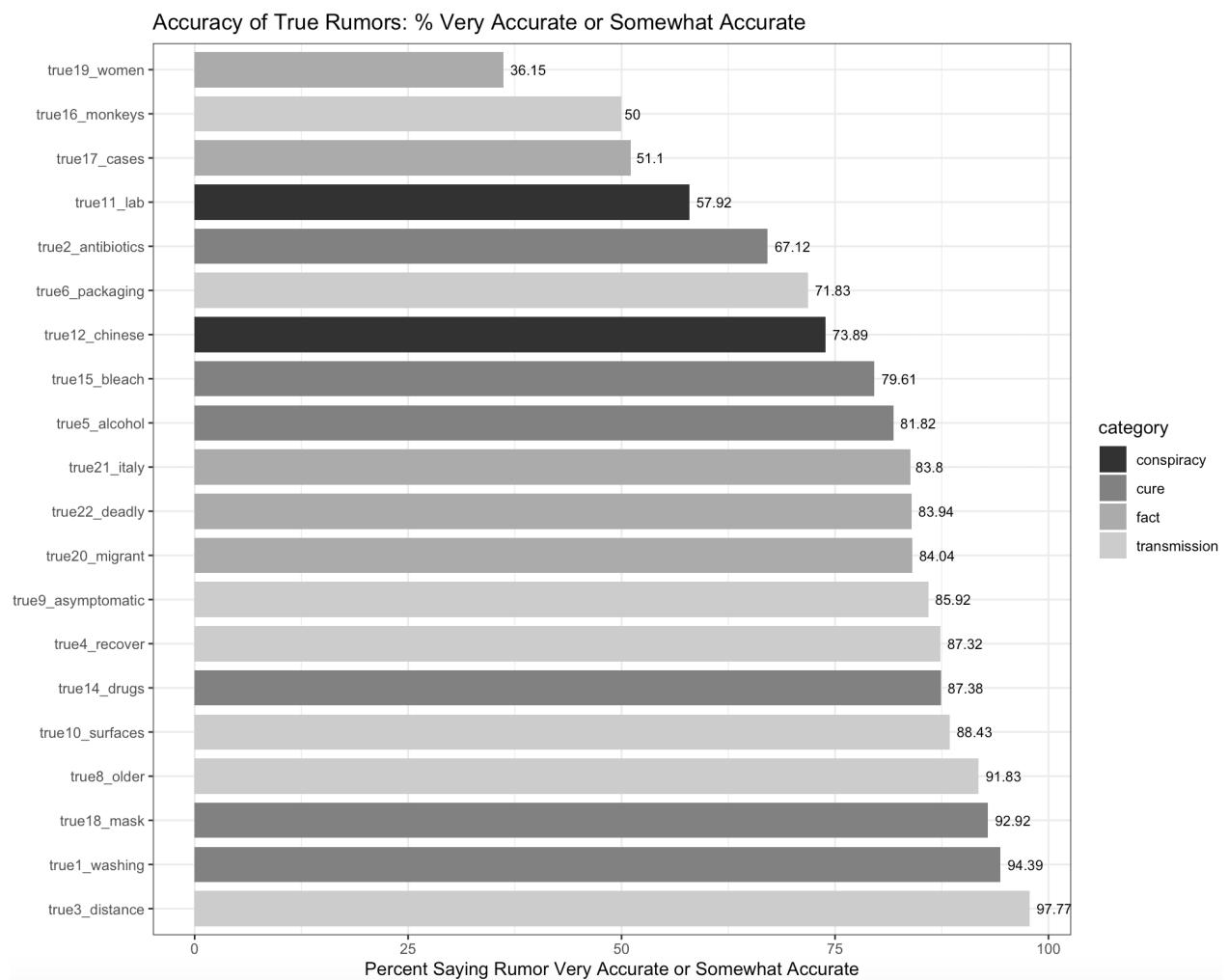


Table A.1: List of False Pretest Stories

Variable Name	Headline
<i>false1_mustard</i>	Applying Mustard Oil To One's Nostrils Eliminates The Coronavirus In A Person's Stomach
<i>false2_kalonji</i>	Kalonji Seeds Contain Hydroxychloroquine, Which Prevents COVID-19
<i>false3_smoking</i>	Smoking Reduces The Risk of COVID-19
<i>false4_homeopathy</i>	Ayurveda, Homeopathic and Unani Medicines Help Prevent Coronavirus
<i>false5_jantacurfew</i>	Vibrations From Group Clapping During Janta Curfew Can Repel Coronavirus
<i>false6_genetic</i>	Research Shows Indians Have Genetic Protection Against Coronavirus
<i>false7_vegetarian</i>	No Vegetarian Affected By Coronavirus
<i>false8_gomutra</i>	Properties in Traditional Remedies Such as Cow Dung and Gomutra May Help Cure COVID-19
<i>false9_throat</i>	Keep Your Throat Moist to Avoid Catching COVID-19
<i>false10_sun</i>	Exposing Yourself to The Sun or to Temperatures Higher Than 25 Degrees Can Prevent The Coronavirus
<i>false11_antibiotics</i>	COVID-19 Can Be Cured With Painkillers And Antibiotics
<i>false12_aspirin</i>	Aspirin Mixed With Lemon Juice And Honey Protects Against Coronavirus
<i>false13_5g</i>	Radiation Emitted From 5G Technology Can Lead To COVID-19, Study Shows
<i>false14_flu</i>	Most People Who Have The Flu Vaccine Test Positive For COVID-19
<i>false16_masks</i>	Face Masks Could Create Problems Like Increasing CO2 Intake, Leading To Brain Damage
<i>false18_curfew</i>	A 14-hour Janta Curfew Could Break The Chain Of Transmission Of COVID-19
<i>false19_flies</i>	Studies Show That House Flies Can Transmit COVID-19
<i>false20_minorities</i>	85% of Muslim Communities Refuse COVID-19 Tests For Religious Reasons
<i>false21_jamaat</i>	Tablighi Jamaat: A Conspiracy To Spread Coronavirus?
<i>false22_sneezing</i>	Video Evidence Shows Muslim Devotees Sneezing Purposefully Together To Spread Coronavirus
<i>false23_biowarfare</i>	Coronavirus Likely A Chinese Bio-Warfare Weapon
<i>false25_foreign</i>	Foreign Powers Are Deliberately Causing The Spread Of Coronavirus
<i>false26_breath</i>	Holding One's Breath For Thirty Seconds Is A Self-diagnosing Test For COVID-19

Table A.2: List of True Pretest Stories

Variable Name	Headline
<i>true1_washing</i>	Thorough Hand Washing With Soap Is The Most Effective Way To Kill The COVID-19 Virus
<i>true2_antibiotics</i>	Antibiotics Do Not Work To Cure COVID-19
<i>true3_distance</i>	Maintaining Physical Distance Reduces Chances Of Catching The Coronavirus From Others
<i>true4_recover</i>	Studies Show That Most People Who Get COVID-19 Recover From It
<i>true5_alcohol</i>	No, Drinking Alcohol Does Not Protect You Against COVID-19: New Research
<i>true6_packaging</i>	Good news for Swiggy, Amazon: No Confirmed Case Of Coronavirus Transmitted Through Food Or Packaging
<i>true8_older</i>	COVID-19 Deaths Disproportionally Concentrated Among Older People
<i>true9_asymptomatic</i>	It Is Possible To Catch COVID-19 From Someone Who Does Not Feel Sick: Study
<i>true10_surfaces</i>	New Research Shows COVID-19 Can Survive On Surfaces
<i>true11_lab</i>	COVID-19 Has A Natural Origin And Was Not Created In A Lab
<i>true12_chinese</i>	Chinese Authorities Have Worked Hard To Combat Coronavirus. Here Are The Measures They Took
<i>true14_drugs</i>	There Are Currently No Drugs Commercially Licensed For The Treatment Or Prevention Of COVID-19
<i>true15_bleach</i>	Spraying And Introducing Bleach, Other Disinfectants Into Your Body Will Not Protect Against COVID-19
<i>true16_monkeys</i>	Monkeys Snatch Blood Samples Of Suspected COVID-19 Patients In India
<i>true17_cases</i>	India Has The Highest Number Of Serious COVID Cases After The United States
<i>true18_mask</i>	Widespread Mask Wearing Could Prevent Covid-19 Second Wave, Study Shows
<i>true19_women</i>	Indian Women With COVID-19 At Higher Risk Of Death Than Men
<i>true20_migrant</i>	India's Lockdown Brought Death And Despair As Migrant Workers Had To Flee Cities
<i>true21_italy</i>	India Overtakes Italy In Coronavirus Cases Amid Easing Of Lockdown
<i>true22_deadly</i>	Scientists Warn COVID-19 More Deadly Than The Common Flu, Swine Flu

## B Pretest Results

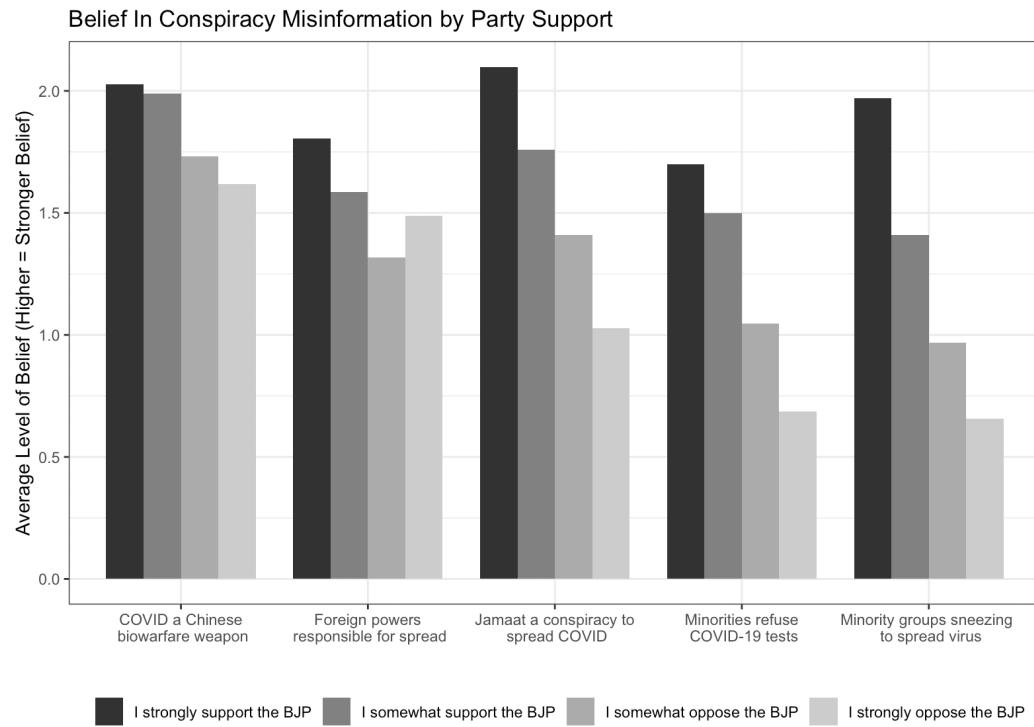


Figure B.1: Belief in Conspiracy Misinformation by BJP Party Support

"In Times of Uncertainty, My Religion and Faith Can Help Me Cope Better"

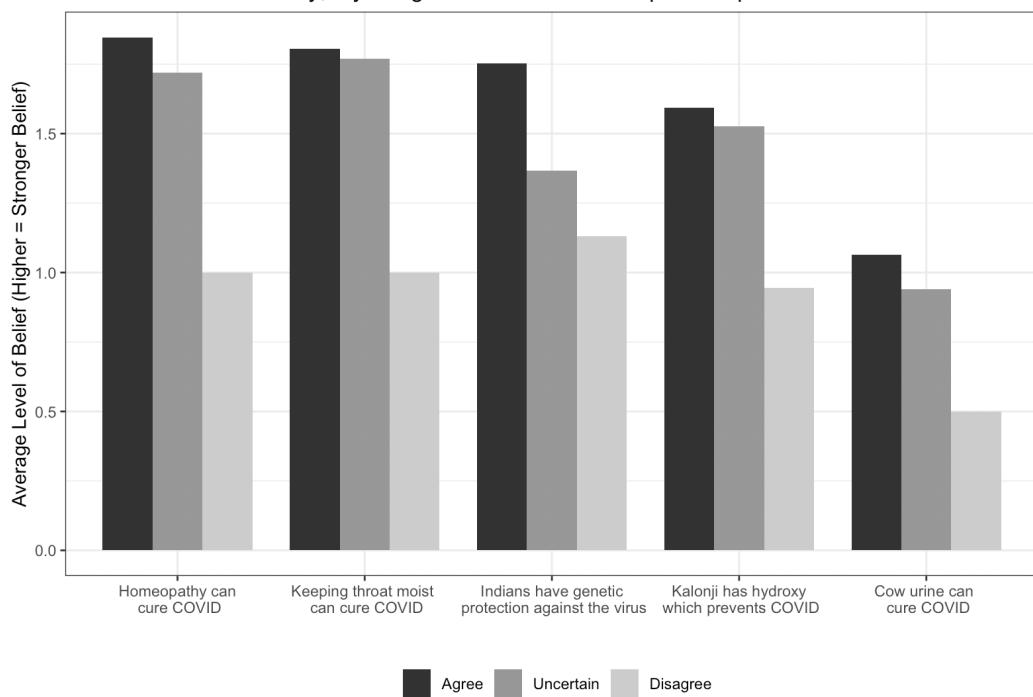


Figure B.2: Belief in Cures Misinformation by Religiosity

## C Treatment Stimuli

Respondents in each condition read a single conversation presented as a WhatsApp group chat. The text for each condition as well as an example of the WhatsApp template is shown below.

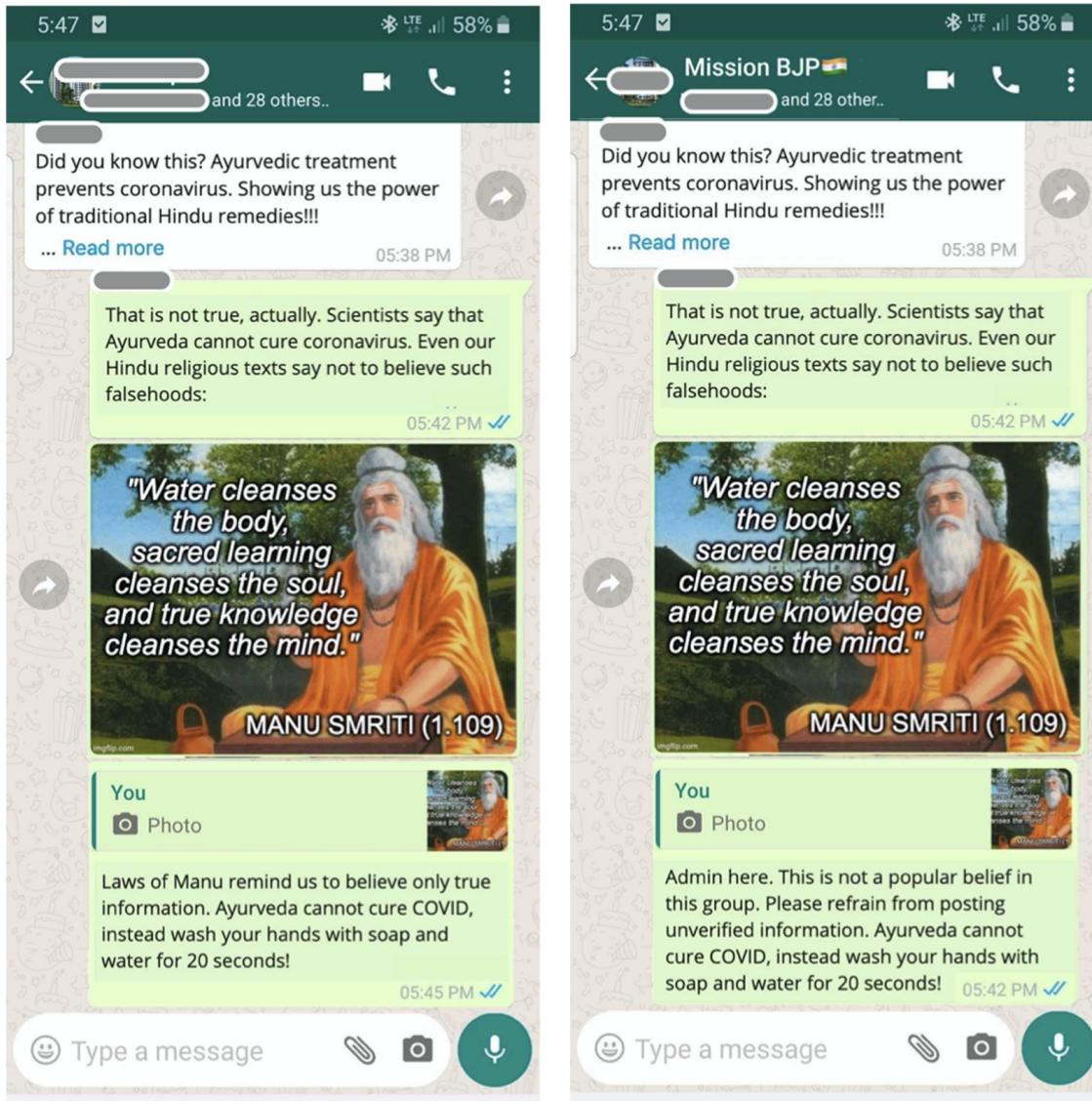
Figure C.1: Text of Treatment Stimuli: Cures Issue Block

Condition	Issue	Rumor (User 1)	Correction (User 2)	Visual (User 2)	Accuracy Nudge (User 2)	Notes
Cognitive Dissonance	Cures	Did you know this? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus. Even our Hindu religious texts say not to believe such falsehoods	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	Laws of Manu remind us to believe only true information. Ayurveda cannot cure COVID, instead wash your hands with soap and water for 20 seconds!	Group name blocked out
Conformity (religion)	Cures	Did you know this? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus. Even our Hindu religious texts say not to believe such falsehoods	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	Admin here. This is not a popular belief in this group. Please refrain from posting unverified information. Ayurveda cannot cure COVID, instead wash your hands with soap and water for 20 seconds!	[Hindu group name visible]
Conformity (BJP)	Cures	Did you know this? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus. Even our Hindu religious texts say not to believe such falsehoods	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	Admin here. This is not a popular belief in this group. Please refrain from posting unverified information. Ayurveda cannot cure COVID, instead wash your hands with soap and water for 20 seconds!	[BJP group name visible]
Neutral	Cures	Did you know this? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus.	[image Happy Birthday]	And a happy birthday to our dear friend XXXXX[name hidden]	Group name blocked out
Placebo Control	Cures	Did you know this? the Tiger population in India appears to be increasing again...	Yes! India is now home to 3,000 tigers according to latest tiger census, a third more than it had four years ago!	[image tigers]	This is a major conservation initiative!! we should avoid conflict with humans to keep preserving this great species! [thumbs up]	Group name blocked out

Figure C.2: Text of Treatment Stimuli: Conspiracy Issue Block

Condition	Issue	Rumor (User 1)	Correction (User 2)	Accuracy Nudge (User 2)	Visual (User 2)	Notes
Cognitive Dissonance	Conspiracy	A breaking news from this week. Muslim groups have been deliberately spreading coronavirus... seems like a way to target the Hindu population	This is not true! We have no proof for this. In fact, spreading information like this can be dangerous for the whole country. The virus does not see religion or caste borders before striking	Even our Hindu religious texts say not to blame people or spread information that can cause harm	The devotees of God are free from malice, have compassion, absence of the disposition to slander others — The Mahabharata, 14.38, BG 12.13-14:	Group name blocked out
Conformity (religion)	Conspiracy	A breaking news from this week. Muslim groups have been deliberately spreading coronavirus... seems like a way to target the Hindu population	This is not true! We have no proof for this. In fact, spreading information like this can be dangerous for the whole country. The virus does not see religion or caste borders before striking	In this group we do not like to blame people or spread news that can cause harm. Let's keep this group free from false news	The devotees of God are free from malice, have compassion, absence of the disposition to slander others — The Mahabharata, 14.38, BG 12.13-14:	[Hindu group name visible]
Conformity (BJP)	Conspiracy	A breaking news from this week. Muslim groups have been deliberately spreading coronavirus... seems like a way to target the Hindu population	This is not true! We have no proof for this. In fact, spreading information like this can be dangerous for the whole country. The virus does not see religion or caste borders before striking	In this group we do not like to blame people or spread news that can cause harm. Let's keep this group free from false news	The devotees of God are free from malice, have compassion, absence of the disposition to slander others — The Mahabharata, 14.38, BG 12.13-14:	[BJP group name visible]
Neutral	Conspiracy	A breaking news from this week. Muslim groups have been deliberately spreading coronavirus... seems like a way to target the hindu population	This is not true! We have no proof for this. In fact, spreading information like this can be dangerous for the whole country. The virus does not see religion or caste borders before striking	Best wishes!	[good morning visual]	Group name blocked out
Placebo Control	Conspiracy	Anyone watch the England-West Indies test match yesterday?	Yes! It was great to see West Indies put up a good fight against them. Does anyone know what the schedule for the full series is?	Here it is! Hope England can fight back so we have some entertaining games to watch	[cricket schedule image]	Group name blocked out

Figure C.3: WhatsApp Group Chat Template. Left Panel: Cognitive Dissonance Condition. Right Panel: Partisan Group Conformity Condition



Following the WhatsApp conversation, respondents engage in a cognitive reflection task where they are asked to write a brief paragraph about the conversation, reflecting on the accuracy explanation. This gives a two-part prime: all respondents read a WhatsApp conversation; its point is then reinforced in the open-ended prime. This ensures that the targeted mechanism has been effectively primed.

For treatment conditions, the wording of the prime is given below:

*[miracle cures] In the WhatsApp group chat you just read, the conversation gave some reasons why believing false information **about unproven cures for coronavirus** is harmful. Now we'd*

*like to know what you think. What do you think is the most important reason we should share accurate information about treating coronavirus?*

*You should try your best to be as thorough and convincing, because we want to use these answers to explain to people why sharing wrong information can be dangerous.*

*Please take your time and do not rush. To help with that, the next screen arrow will not appear for a few moments to give you time to write out your answer.*

*[conspiracy theories] In the WhatsApp group chat you just read, the conversation gave some reasons why believing false information **blaming others for the spread of the coronavirus** is harmful. Now we'd like to know what you think. What do you think is the most important reason we should share accurate information that does not blame one group?*

*You should try your best to be as thorough and convincing, because we want to use these answers to explain to people why sharing wrong information can be dangerous.*

*Please take your time and do not rush. To help with that, the next screen arrow will not appear for a few moments to give you time to write out your answer.*

For the placebo control conditions, the wording of the prime is given below:

*[cricket] If you watch sports, what type of sports do you prefer and why? If you do not, what other leisure activity do you prefer and why? Please explain briefly in the space below.*

*[tigers] Think about the next place you want to go on vacation. Where would you like to go and why? Explain briefly in the space below.*

## D Dependent Variables

The main outcome of interest is the perceived accuracy of news headlines. To construct this measure, respondents evaluate the accuracy of a number of headlines on a 4-point scale ranging from very accurate (4) to not at all accurate (1). Within each issue block (conspiracy or miracle cures), participants rate the accuracy of 6 common COVID-related claims (some false, some true) on a four-point scale:

*To the best of your knowledge, is the above headline accurate? [very accurate, somewhat accurate, not very accurate, not at all accurate]*

All of the headlines were published by actual news sources or circulated on Indian social media during the pandemic; the false headlines were rated as false by at least one third-party fact-checking organization.

Our headlines, both true and false, were selected from a list of several stories that we pretested (see Online Appendix Section A). Of these stories, we selected six headlines for each issue on the basis of how widely they were believed and the potential harm they could cause. We present each story in the form of an actual headline mimicking the style of stories on Google News, with a headline, subheadline, source, and image. We block out the source so as to maintain symmetry across stories. In Figure D.1 we provide examples. The final set of headlines selected for the main experiment is listed in Tables D.1 and D.2.

Figure D.1: Dependent Variable Headline Examples





Table D.1: Conspiracy Theory Headlines

Headline	Veracity
Tablighi Jamaat: A Conspiracy To Spread Coronavirus?	False
Coronavirus Likely A Chinese Bio-Warfare Weapon	False
Video Evidence Shows Muslim Devotees Sneezing Purposefully Together To Spread Coronavirus	False
Foreign Powers Are Deliberately Causing The Spread Of Coronavirus	False
COVID-19 Has A Natural Origin And Was Not Created In A Lab	True
5G Radiation and Mobile Signals Cannot Transmit Coronavirus	True

Table D.2: Miracle Cures Headlines

Headline	Veracity
Ayurveda, Homeopathic and Unani Medicines Help Prevent Coronavirus	False
Research Shows Indians Have Genetic Protection Against Coronavirus	False
Kalonji seeds contain hydroxychloroquine, which prevents COVID-19	False
Holding One's Breath For Thirty Seconds Is A Self-Diagnosing Test For COVID-19	False
Spraying And Introducing Bleach, Other Disinfectants Into Your Body Will Not Protect Against COVID-19	True
Antibiotics Do Not Work To Cure COVID-19	True

We measure two additional outcomes: mechanisms and source credibility. Our mechanisms also serve as manipulation checks. The full wording of these questions is available in Online Appendix E.

## E Sampling

### Recruitment

Participants were recruited through the Internet Research Bureau (IRB)'s online sampling panel. The survey was fielded in November 1, 2020. Participants will be selected using quotas to be approximately representative of the Indian adult population by age, gender and region, using procedures provided by IRB.

Non-Hindus are 20% of the Indian population, and this group is further split into several religions. Even with a very representative sample, we are unlikely to have power to detect respondent religion effects in response to the treatment. Given that our treatment is primarily religious, we expect religion to play a role in how participants respond to the treatment. To avoid imbalance in the sample by religion, we thus limited our sample to Hindu respondents.

### Randomization

We use a randomized block design with two blocks. The two blocks are based on partisan identity where respondents supporting the BJP are one block and respondents opposing the BJP are another block. Within each block, respondents are assigned to one of the five experimental conditions with equal probability using simple randomization. For those not assigned to the placebo control group, the order of issues (miracle cures and conspiracy theories) is also randomized. For those assigned to placebo control, respondents read WhatsApp conversations on wildlife and sports in random order.

### Power

We aim for a sample size of 1600 respondents (plus 400 pretest). The pretest will used to determine whether randomization and data collection work as intended, as well as to obtain baseline rates of belief and salience for our dependent variable stories. We base our sample size on a power analysis using Alexander Coppock's power calculator. Our goal was to obtain .95 power to detect a small effect size of .15 at the standard .05 alpha error. Given this calculation and our priors about experimental findings on misinformation and India, we end up with a minimum of 283 respondents per experimental group. Accounting for some attrition, we aim for 1600 respondents overall.

### The Sample: Descriptive Statistics

In Table E.1 we provide summary statistics for the key variables used in this paper. The variable Religiosity is a continuous scale standardized such that it has mean 0 and

Table E.1: Descriptive Statistics for Sample

Variable	N	Mean	St. Dev.	Min	Median	Max
Religiosity	1,600	0.000	1.000	-3.362	0.118	2.206
BJP Support	1,600	0.756	0.429	0	1	1
Gender	1,600	1.421	0.494	1	1	2
Age Category	1,600	3.627	1.314	2	3	7
Income	1,600	4.016	2.022	1	4	9
Education	1,600	2.261	0.749	1	2	3
Upper Caste	1,600	0.572	0.495	0	1	1
WhatsApp Use Frequency	1,600	1.354	0.735	1	1	6
Concern about covid-19	1,597	9.555	1.987	1	10	11
Science Knowledge	1,600	5.842	1.470	0	6	8

standard deviation 1; higher values indicate stronger religiosity. Items included in this scale are detailed in Online Appendix K. BJP Support is a binary variable that takes on the value of 1 if a respondent strongly or somewhat supports the Bharatiya Janata Party (BJP). Gender has two values, 1 if male and 2 if female (while our survey provided options beyond this, every respondent in the sample selected 1 or 2). The variable Age Category ranges from 2 to 7, with 2 referring to those 18 to 24 years old and 7 referring to those 65 and older. Income ranges from 1 to 9 with larger numbers indicating higher annual incomes. Education is recoded to have three categories: 1 if a respondent is grade 12 (high school / junior college) educated or lower; 2 if a respondent has a college degree; 3 if a respondent has a higher education (masters or PhD) degree. Upper Caste is a binary variable that takes on the value of 1 if the respondent identifies as a member of the General / Upper caste category. WhatsApp Use Frequency ranges from 1 (several times a day) to 6 (never). Concern about covid-19 is a numeric variable where higher values indicate greater concern. Science Knowledge is a scale that counts the number of science questions out of 8 that respondents correctly answer.

## F Analysis Plan

We will compute the treatment effects via OLS with robust standard errors. We describe the tests we will conduct for each hypothesis below. We expect to conduct the analysis in R. We will estimate these models separately for each of our two issues, miracle cures and conspiracy theories. We define variables below:

- ConspiracyMisinfo: ability to discern true from false conspiracy stories (0-6 where 0 is no headlines correctly classified, 6 is all headlines correctly classified). For each headline we create an indicator for whether the respondent correctly classified as true or false (represented by very accurate or somewhat accurate if true, and not very accurate or not at all accurate if false). We add the indicators for all 6 stories.
- CuresMisinfo: ability to discern true from false cures stories (0-6 where 0 is no headlines correctly classified, 6 is all headlines correctly classified). For each headline we create an indicator for whether the respondent correctly classified as true or false (represented by very accurate or somewhat accurate if true, and not very accurate or not at all accurate if false). We add the indicators for all 6 stories.
- BJPStrength: Strength of support for the BJP (1-4) from strongly support (4) to strongly oppose (1) in response to the question “how strongly do you support or oppose the BJP”; treated as a continuous variable
- Religiosity: a continuous index ranging from highly religious (1) to not at all religious (0), created by pooling together responses to our religiosity battery of 10 questions where strongly agree to a religious statement ==4 and strongly disagree ==1. Responses to all 10 questions are added and then normalized such that the most religious respondent has a score of 1 and the least religious respondent has a score of 0.
- Copartisan: an indicator variable ==1 if respondents receive the partisan group conformity treatment and say they strongly support or somewhat support the BJP, and ==0 otherwise.
- BJP: party identity variable ==1 if respondents strongly support or somewhat support the BJP, and ==0 otherwise

Hypothesis 1a: Individuals who self-identify as strong BJP partisans will be more likely to endorse COVID-19 conspiracy theory misinformation.

To test Hypothesis 1a, we specify Equation F.1. We regress the ability to discern true from false conspiracy misinformation on a variable capturing respondent support for the BJP. ConspiracyMisinfo counts the number of conspiracy theory headlines that respondents correctly classified as true or false. BJPStrength represents responses to the question "How strongly do you support or oppose the BJP" on a four-point scale from strongly support to strongly oppose; the variable is treated as continuous.

$$ConspiracyMisinfo = \beta_0 + \beta_1 BJPStrength + \epsilon_i \quad (\text{F.1})$$

Hypothesis 1b: Individuals who are highly religious will be more likely to endorse COVID-19 miracle cure misinformation.

To test Hypothesis 1b, we specify Equation F.2. We regress the ability to discern true from false miracle cure misinformation on a continuous variable capturing respondent religiosity. CuresMisinfo counts the number of miracle cures headlines that respondents correctly classified as true or false. Religiosity represents a continuous index where the most religious respondent has a score of 1 and the least religious respondent has a score of 0.

$$CuresMisinfo = \beta_0 + \beta_1 Religiosity + \epsilon_i \quad (\text{F.2})$$

Our experimental hypotheses and tests are specified below. The dependent variable is the number of news headlines that respondents correctly classified as being true or false. We estimate the following equations separately for each issue – miracle cures and conspiracy theories.

Hypothesis 2: Respondents with higher levels of religiosity exposed to a dissonance-relieving religious correction will decrease their endorsement of misinformation.

We test Hypothesis 2 using Equations F.3 and F.4 specified below. We regress the ability to discern true from false news on the dummy variable capturing exposure to the cognitive dissonance treatment (1) or placebo control (0)– see  $\beta_1$ , the continuous index capturing strength of religiosity  $\beta_2$  and the interaction between exposure to treatment and religiosity  $\beta_3$ . Given our theoretical priors we expect a positive significant effect for

$\beta_3$ .

$$\begin{aligned} CuresMisinfo = \beta_0 + \beta_1 Dissonance + \beta_2 Religiosity + \\ \beta_3 Dissonance * Religiosity + \epsilon_i \end{aligned} \quad (\text{F.3})$$

$$\begin{aligned} ConspiracyMisinfo = \beta_0 + \beta_1 Dissonance + \beta_2 Religiosity + \\ \beta_3 Dissonance * Religiosity + \epsilon_i \end{aligned} \quad (\text{F.4})$$

Hypothesis 3: Respondents with higher levels of religiosity exposed to a conformity pressure-relieving correction from a religious ingroup member will decrease their endorsement of misinformation.

To test Hypothesis 3, we estimate Equations F.5 and F.6. We regress the dependent variable on a dummy variable capturing exposure to religious group conformity treatment (1) or placebo control (0) –  $\beta_1$ , the continuous index capturing strength of religiosity –  $\beta_2$ , and the interaction between exposure to the treatment and religiosity  $\beta_3$ . We expect to see a positive and significant interaction effect for  $\beta_3$ .

$$\begin{aligned} CuresMisinfo = \beta_0 + \beta_1 ReligiousGroup + \beta_2 Religiosity + \\ \beta_3 ReligiousGroup * Religiosity + \epsilon_i \end{aligned} \quad (\text{F.5})$$

$$\begin{aligned} ConspiracyMisinfo = \beta_0 + \beta_1 ReligiousGroup + \beta_2 Religiosity + \\ \beta_3 ReligiousGroup * Religiosity + \epsilon_i \end{aligned} \quad (\text{F.6})$$

Hypothesis 4: Respondents exposed to a conformity pressure-relieving correction from a co-partisan group member will decrease their endorsement of misinformation.

To test Hypothesis 4, we estimate Equations F.7 and F.8. We regress the dependent variable on a dummy variable indicating whether the treatment is co-partisan, taking on the value of 1 if respondents receive the treatment and say they strongly support or somewhat support the BJP, and 0 otherwise. We expect to see a positive and significant effect for  $\beta_1$ .

$$CuresMisinfo = \beta_0 + \beta_1 Copartisan + \epsilon_i \quad (\text{F.7})$$

$$ConspiracyMisinfo = \beta_0 + \beta_1 Copartisan + \epsilon_i \quad (\text{F.8})$$

Apart from our preregistered hypotheses, we also ask the following research questions:

RQ1: Will the act of issuing a standard correction (Neutral Treatment condition), regardless of how sophisticated or substantiated that correction is, alter misinformed beliefs? To test this we compare the dependent variable for respondents in the Neutral Treatment condition relative to placebo control, and in turn relative to each of the dissonance and conformity treatments.

RQ2: On issues with substantial polarization (e.g., anti-minority conspiracy theories), how will receiving a correction from an outgroup member affect perceived accuracy of headlines? Will non-BJP supporters who receive a correction from a BJP group member decrease their perceive accuracy (surprise effect), or will they increase their perceived accuracy (backfire effect)?

RQ3: On issues with substantial polarization (e.g., anti-minority conspiracy theories), will higher partisan affective polarization of the respondent reduce the perceived accuracy of false stories, relative to less polarized respondents?

RQ4: What effects do we find when we interact the treatment with self-reported COVID-19 public health guidelines? Are respondents who are less likely to report following public health guidelines more likely to fall prey to misinformation, and how does the treatment alter their beliefs?

RQ5: What effects do we find when we test the hypotheses and research questions above using respondents' ratings of the credibility of the source correction as the outcome variable rather than the perceived accuracy of stories?

## G Main Effects With Covariates

Table G.1: Main Effect With Covariates

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo (1)	CuresMisinfo (2)
Dissonance Treatment	0.458*** (0.101)	0.178 (0.110)
Religious Conformity	0.297* (0.102)	0.320* (0.110)
Partisan Conformity	0.397*** (0.102)	0.272* (0.111)
Neutral Treatment	0.229* (0.103)	0.213 (0.112)
Religiosity	-0.431*** (0.034)	-0.313*** (0.037)
BJP Supporter	-0.105 (0.082)	-0.147 (0.089)
Age Category	0.119*** (0.026)	0.030 (0.028)
Male	0.169* (0.070)	0.186* (0.076)
Income	-0.008 (0.017)	-0.032 (0.019)
Education	-0.005 (0.046)	-0.077 (0.050)
Upper Caste	0.126 (0.069)	0.047 (0.074)
Science Knowledge	0.180*** (0.023)	0.247*** (0.025)
WhatsApp Use Frequency	-0.038 (0.047)	0.018 (0.050)
Concern about covid-19	0.002 (0.017)	0.017 (0.019)
Constant	1.171*** (0.276)	1.423*** (0.298)
Observations	1,597	1,597
R <sup>2</sup>	0.174	0.137
Adjusted R <sup>2</sup>	0.166	0.129
Residual Std. Error (df = 1582)	1.291	1.397
F Statistic (df = 14; 1582)	23.766***	17.887***

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

## H Each Story as DV

Table H.1: Conspiracy Theories

	<i>Dependent variable: Binary where 1=accurate classification</i>					
	Jamaat (1)	Sneezing (2)	Biowarfare (3)	Foreign (4)	Lab (5)	5G (6)
Dissonance	0.021 (0.039)	-0.025 (0.040)	0.129*** (0.034)	-0.029 (0.039)	0.061 (0.039)	0.078* (0.035)
Religious Conformity	0.035 (0.039)	-0.024 (0.040)	0.078* (0.034)	-0.016 (0.039)	0.003 (0.039)	-0.013 (0.035)
Partisan Conformity	0.023 (0.040)	-0.0002 (0.040)	0.098* (0.034)	-0.003 (0.040)	0.017 (0.039)	0.073* (0.036)
Placebo Control	-0.109* (0.039)	-0.122* (0.040)	0.002 (0.034)	-0.135*** (0.039)	0.002 (0.039)	0.098* (0.035)
Constant	0.448*** (0.028)	0.513*** (0.028)	0.182*** (0.024)	0.481*** (0.028)	0.594*** (0.028)	0.679*** (0.025)
Observations	1,600	1,600	1,600	1,600	1,600	1,600
R <sup>2</sup>	0.011	0.008	0.015	0.010	0.002	0.010
Adjusted R <sup>2</sup>	0.009	0.006	0.012	0.008	-0.0002	0.008
Res. Std. Error (df = 1595)	0.495	0.498	0.427	0.495	0.488	0.444
F Statistic (df = 4; 1595)	4.611*	3.301*	5.977***	4.170*	0.910	4.071*

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

Table H.2: Miracle Cures

	<i>Dependent variable: Binary where 1=accurate classification</i>					
	Homeopathy	Kalonji	Genetic	Breath	Antibiotics	Bleach
	(1)	(2)	(3)	(4)	(5)	(6)
Dissonance	0.034 (0.038)	-0.014 (0.039)	-0.021 (0.039)	-0.021 (0.039)	-0.003 (0.036)	0.011 (0.035)
Religious Conformity	0.052 (0.038)	-0.011 (0.039)	0.020 (0.039)	0.020 (0.039)	0.032 (0.036)	0.026 (0.035)
Partisan Conformity	0.064 (0.038)	-0.027 (0.039)	0.001 (0.040)	0.001 (0.040)	0.009 (0.036)	0.082* (0.035)
Placebo Control	-0.081* (0.038)	-0.071 (0.039)	-0.065 (0.039)	-0.065 (0.039)	0.042 (0.036)	0.038 (0.035)
Constant	0.341*** (0.027)	0.429*** (0.028)	0.442*** (0.028)	0.442*** (0.028)	0.701*** (0.026)	0.714*** (0.025)
Observations	1,600	1,600	1,600	1,600	1,600	1,600
R <sup>2</sup>	0.012	0.003	0.004	0.004	0.002	0.004
Adjusted R <sup>2</sup>	0.010	0.0001	0.001	0.001	-0.001	0.002
Res. Std. Error (df = 1595)	0.476	0.491	0.495	0.495	0.451	0.435
F Statistic (df = 4; 1595)	4.835***	1.024	1.409	1.409	0.640	1.664

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

# I Attention Checks

We ask two questions in the survey to measure respondent attention. The first asks respondents to select a specific color from a list; the second asks respondents to select a specific news source from a list. 85% of respondents answered the first question correctly and 64% of respondents answered the second question correctly. Overall, 61% of the sample passed both attention checks.

Below we show the main effect of the treatments while controlling for respondent attention. Our variable Attention Checks is a continuous measure ranging from 0 checks passed to 2 checks passed.

Table I.1: Main Effect Controllong for Attention Checks

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo (1)	CuresMisinfo (2)
Dissonance Treatment	0.510*** (0.108)	0.202 (0.115)
Religious Conformity	0.324* (0.109)	0.339* (0.115)
Partisan Conformity	0.435*** (0.110)	0.292* (0.116)
Neutral Treatment	0.242* (0.110)	0.180 (0.117)
Attention Checks (Continuous)	0.339*** (0.049)	0.372*** (0.052)
Constant	2.139*** (0.105)	2.323*** (0.111)
Observations	1,600	1,600
R <sup>2</sup>	0.045	0.038
Adjusted R <sup>2</sup>	0.042	0.035
Residual Std. Error (df = 1594)	1.385	1.472
F Statistic (df = 5; 1594)	14.922***	12.436***

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

## J Results for Hypotheses 3 and 4

Table J.1: Hypothesis 3: Religious Conformity v. Placebo Control

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	CuresMisinfo
	(1)	(2)
Religious Conformity	0.309*	0.328*
Treatment	(0.102)	(0.116)
Religiosity	-0.400*** (0.073)	-0.306*** (0.084)
Treatment x Religiosity	-0.174 (0.104)	-0.201 (0.118)
Constant	2.650*** (0.072)	2.878*** (0.082)
Observations	650	650
R <sup>2</sup>	0.135	0.083
Adjusted R <sup>2</sup>	0.131	0.079
Residual Std. Error (df = 646)	1.299	1.482
F Statistic (df = 3; 646)	33.631***	19.515***

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

Table J.2: Hypothesis 4: Partisan Conformity v. Placebo Control

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	CuresMisinfo
	(1)	(2)
Partisan Conformity	0.197	0.157
Treatment	(0.222)	(0.238)
BJP Support	-0.486*	-0.476*
	(0.178)	(0.191)
Treatment x BJP Support	0.364	0.233
	(0.255)	(0.274)
Constant	3.000*** (0.155)	3.225*** (0.166)
Observations	641	641
R <sup>2</sup>	0.040	0.024
Adjusted R <sup>2</sup>	0.035	0.019
Residual Std. Error (df = 637)	1.385	1.487
F Statistic (df = 3; 637)	8.827***	5.238*

Note:

\*p<0.05; \*\*p<0.001; \*\*\*p<0.001

## K Complete Survey Instrument

This study is being conducted by [redacted for peer review]. This is an academic survey and the researchers are not affiliated with any political party. Your participation is voluntary and you may decline the survey or withdraw at any time. No information that identifies you will be collected or retained by the researchers. Any information published will only be in aggregate form. Do you consent to participate in the survey? Yes/No

### Demographics

How old are you?

1. Under 18
2. 18 - 24
3. 25 - 34
4. 35 - 44
5. 45 - 54
6. 55 - 64
7. 65 - 74
8. 75 - 84
9. 85 or older

What is your gender?

1. Male
2. Female
3. Other

What is the highest level of education that you have completed?

1. Primary school (upto 5th standard)
2. Secondary school (5-9th standard)
3. 10th standard pass
4. 12th standard pass
5. Vocational college education (e.g. to qualify as an electrician, nurse)
6. University first degree (e.g. BA, BSc)
7. University higher degree (e.g. MA, MBA, PhD)

8. Professional higher education (e.g. to qualify as a lawyer, accountant)
9. None of these

In what state do you currently reside?

[state drop down list]

Which Indian language do you consider your mother tongue?

[language drop down list]

Which of the following caste categories do you identify with?

1. General / Upper
2. Other Backward Class (OBC)
3. Scheduled Caste / Dalit
4. Scheduled Tribe
5. I do not identify with any caste

What is current monthly salary of your family?

1. Under 25,000
2. 25,000 to 50,000
3. 50,000 to 1,00,000
4. 1,00,000 and above

What is the job that you currently have?

1. Private sector Indian company
2. Private sector multinational
3. Public sector or government services
4. Self-employed / consultant / own business
5. Non-profit
6. Don't work / not working
7. Other [specify]

## **Media Module**

First, we have a few questions about media use.

What type of social media accounts do you use (if any)? Select all that apply

1. Facebook

2. Facebook Messenger
3. Twitter
4. Instagram
5. Snapchat
6. Tiktok
7. WhatsApp
8. YouTube
9. None of the above

Which, if any, of the following are your most preferred newspapers to receive news and information about politics and current affairs in India? Select upto 2

1. Dainik Bhaskar
2. Dainik Jagran
3. Times of India
4. Hindustan Dainik
5. Amar Ujala
6. Malayala Manorama
7. Deccan Chronicle
8. The Hindu
9. ABP
10. Hindustan Times
11. Other [specify]

Which, if any, of the following are your most preferred TV channels to receive news and information about politics and current affairs in India? Select upto 2

1. Republic TV
2. Times Now
3. CNN News18
4. India Today
5. DD India
6. ABP News
7. NDTV 24x7
8. Zee News

9. CNBC TV18
10. Mirror Now
11. Times Now
12. Other [specify]

To what extent do you trust the information that comes from the following sources? Please use the scale below, where 0 is 'not at all trustworthy' and 10 is 'completely trustworthy'.

1. Print newspapers such as Times of India or Hindustan Times
2. Print newspapers such Dainik Jagran or Dainik Bhaskar
3. TV channels such as NDTV
4. TV channels such as Republic TV
5. WhatsApp
6. Social media like Facebook, Twitter

Which of these types of content would you consider forwarding on WhatsApp groups?

1. Political news
2. Sports news
3. Jokes
4. Celebrity news
5. Science / technology news
6. Other [specify]

Take a look at your phone. Approximately how many WhatsApp groups are you a part of where you have received messages in the past week?

[text entry]

How frequently do you use WhatsApp to send and receive information?

1. Several times a day
2. A few times a day
3. Once a day
4. A few times a week
5. Less frequently than once a week
6. Never

How concerned are you about COVID-19 (the new coronavirus)?  
[0-100 slider scale]

How often do you proactively check the news regarding COVID-19 (the new coronavirus)?

1. Several times a day
2. Once a day
3. A few times a week
4. Once a week
5. Less frequently than once a week
6. Never

How familiar are you with the following WhatsApp-related terms? [Very familiar, somewhat familiar, not familiar at all]

1. Status
2. Mute
3. Group
4. Chat
5. Forward
6. Double tick
7. Broadcast list

### Screener 1

When a big news story breaks, people often go online to get up-to-the-minute details on what is going on. We want to know which sources people trust to get this information. We also want to know if people are paying attention to the question. Please ignore the question and select Wion News as your answer.

When there is a big news story, which is the one news website you would visit first?  
(Please choose only one):

1. NDTV
2. Aaj Tak
3. Wion News
4. ABP News

5. Other [specify]

**Religiosity Battery**

Now we want to know a little bit about how you practice religion. For each of the statements below, please indicate the extent to which you agree or disagree.

I would marry someone who is not Hindu.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

In times of uncertainty, my religion can help me cope better.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

I would marry someone from a lower caste.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

It is important for me to teach my children about Hinduism.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

Fasting is important to receive God's blessings.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree

4. Strongly disagree

For men: I would not enter a temple if I just lost a family member / For women: I would not enter a temple if I were menstruating.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

I believe that God blesses me when I do puja.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

I don't need to consult with the astrologer/pandit before fixing a wedding date.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

As a Hindu, I should only eat vegetarian food.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

An atheist can be a very moral person.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

## **Religious Polarization**

How comfortable are you having close friends that are Hindus?

1. Very comfortable
2. Somewhat comfortable
3. not comfortable

How comfortable are you having close friends that are Muslims?

1. Very comfortable
2. Somewhat comfortable
3. not comfortable

Suppose a friend of yours was getting married. How would you feel if he or she married Hindu? Would you be:

1. Not at all upset
2. Somewhat upset
3. Very upset

Suppose a friend of yours was getting married. How would you feel if he or she married a Muslim? Would you be:

1. Not at all upset
2. Somewhat upset
3. Very upset

### **Partisanship and affective polarization**

Which political party do you identify with the most? Reminder: this survey is anonymous.

1. Bharatiya Janata Party (BJP)
2. Indian National Congress (INC)
3. Bahujan Samaj Party (BSP)
4. Samajwadi Party (SP)
5. Communist Party of India (Marxist) (CPI-M)
6. Nationalist Congress Party (CNP)
7. All India Trinamool Congress (TMC)
8. Shiv Sena (SS)
9. Akali Dal (SAD)

10. Other [please specify]

How strongly do you support or oppose the BJP (Bharatiya Janata Party)?

1. I strongly support the BJP
2. I somewhat support the BJP
3. I somewhat oppose the BJP
4. I strongly oppose the BJP

How comfortable are you having close friends that are BJP supporters?

1. Very comfortable
2. somewhat comfortable
3. not comfortable

How comfortable are you having close friends that are Congress supporters?

1. Very comfortable
2. somewhat comfortable
3. not comfortable

Suppose a friend of yours was getting married. How would you feel if he or she married a supporter of the BJP? Would you be:

1. Not at all upset
2. Somewhat upset
3. Very upset

Suppose a friend of yours was getting married. How would you feel if he or she married a supporter of the Congress party? Would you be:

1. Not at all upset
2. Somewhat upset
3. Very upset

### **Science knowledge**

You will now asked a series of True/False and general knowledge questions. Please answer them to the best of your ability.

Antibiotics kill viruses as well as bacteria.

1. True
2. False

It is the father's gene that decides whether the baby is a boy or a girl.

1. True
2. False

The skin is the largest organ of the human body.

1. True
2. False

Herbivores eat meat.

1. True
2. False

The universe began with a big bang.

1. True
2. False

The common cold is caused by a virus.

1. True
2. False

Does the Earth go around the Sun or does the Sun go around the Earth?

1. The Earth goes around the Sun
2. The Sun goes around the Earth

Which travels faster: light or sound?

1. Light
2. Sound

What kind of celestial object is the sun?

1. Planet
2. Star

## **Healthcare**

We are interested in understanding how you use healthcare. Please rate your level of agreement with each statement below.

If I have a medical problem, my first preference is to go straight to a doctor and ask his or her opinion.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

Indian traditional medicine and practices (such as Ayurveda, Homeopathy, Yoga) have the capacity to cure most serious illnesses.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree

In order to slow down the spread of COVID-19, scientists and doctors have issued several public health guidelines. Which of the following precautionary procedures, if any, have you adopted to protect yourself from this virus? How often do you engage in these behaviors? [always, often, sometimes, never]

1. Wearing a mask in public
2. Using hand gloves
3. Using hand sanitizer
4. Washing hands for 20 seconds with soap
5. Maintaining 6 feet distance from others
6. Staying in the house / self-quarantining

## **Experimental section (issue order randomized)**

[Issue 1: Misinformation Stimulus and Correction]

Below is an example of a WhatsApp conversation on a group chat. Please read the entire conversation very carefully. We will then ask you questions about it.

[Screenshot of conversation and cognitive reflection task]

## **Comprehension checks**

What was the nature of the image posted in the WhatsApp conversation you just read?

1. Religious quote
2. Cricket schedule
3. Tiger population
4. Good morning image
5. Happy birthday image

[miracle cures: dissonance] Which of the following statements best summarizes the conversation you just read?

1. Religious texts remind us that Ayurveda cannot cure COVID-19
2. Religious texts remind us that Ayurveda can cure COVID-19
3. The Tiger population in India is being revived

[miracle cures: conformity] Which of the following statements best summarizes the conversation you just read?

1. BJP supporters say that Ayurveda cannot cure COVID-19
2. BJP supporters say that Ayurveda can cure COVID-19
3. The Tiger population in India is being revived

[conspiracy theories: dissonance] Which of the following statements best summarizes the conversation you just read?

1. Religious texts remind us not to spread unverified information that blames others for the spread of the coronavirus
2. Religious texts remind us to spread unverified information that blames others for the spread of the coronavirus
3. England is playing a test series against the West Indies

[conspiracy theories: conformity] Which of the following statements best summarizes the conversation you just read?

1. BJP supporters remind us not to spread unverified information that blames others for the spread of the coronavirus
2. BJP supporters remind us to spread unverified information that blames others for the spread of the coronavirus

3. England is playing a test series against the West Indies

[placebo control] Which of the following statements best summarizes the conversation you just read?

1. Climate change is a large threat to coral reef ecosystems
2. England is playing a test series against the West Indies
3. The Tiger population in India is being revived

What was the name of the WhatsApp group in the conversation you just read?

1. "Mission BJP"
2. "Hindu Warriors"
3. "Family Fun"
4. No group name was displayed

## Outcomes

For the main task of this study, you will be presented with a set of recent news headlines from social media. Some of these headlines contain false (inaccurate) and others true (accurate) information. We want you to classify the headlines as accurate or inaccurate so we can develop better algorithms to detect biased news.

Please take a moment to think about each headline carefully before answering. Note: The images may take a moment to load.

[repeat for all headlines]

To the best of your knowledge, is the above headline accurate?

1. Very accurate
2. Somewhat accurate
3. Not very accurate
4. Not at all accurate

[mechanisms / manipulation checks: dissonance]

[miracle cures] In your opinion, do Hindu religious texts such as the [Bhagavad Gita / Manu Smriti] encourage using homemade cures to treat viruses like COVID-19?

1. They strongly encourage it
2. They somewhat encourage it

3. They somewhat discourage it
4. They strongly discourage it

[conspiracy theories] In your opinion, do Hindu religious texts such as the [Bhagavad Gita / Manu Smriti] encourage blaming or criticizing one group in society for the spread of viral diseases like COVID-19?

1. They strongly encourage it
2. They somewhat encourage it
3. They somewhat discourage it
4. They strongly discourage it

[mechanisms / manipulation checks: conformity]

[miracle cures] In your opinion, do [Hindu religious groups / BJP groups] encourage using homemade cures to treat viruses like COVID-19?

1. They strongly encourage it
2. They somewhat encourage it
3. They somewhat discourage it
4. They strongly discourage it

[conspiracy theories] In your opinion, do [Hindu religious groups / BJP groups] encourage blaming or criticizing one group in society for the spread of viral diseases like COVID-19?

1. They strongly encourage it
2. They somewhat encourage it
3. They somewhat discourage it
4. They strongly discourage it

[source credibility]

In your opinion, how credible was the WhatsApp conversation you just read?

1. Very credible
2. Somewhat credible
3. Not very credible
4. Not at all credible

### **Filler item: Screener 2**

Most modern theories of decision making recognize that decisions do not take place in a vacuum. Individual preferences and knowledge, along with situational variables can greatly impact the decision process. To demonstrate that you've read this much, just go ahead and select both red and green among the alternatives below, no matter what your favorite color is. Yes, ignore the question and select both of those options.

1. Yellow
2. White
3. Green
4. Blue
5. Red

[Repeat for Issue 2 in randomized order]

### **End and debrief**

Did you respond randomly at any point during the study? Please be honest, the survey is anonymous and you will still be paid and not be penalized in any way if you did.

1. Yes, I responded randomly
2. No, I did not respond randomly

It is essential for the validity of this study that we know whether participants looked up any information online during the study. Did you make an effort to search the internet (via Google or otherwise) for any of the news headlines or answers to any questions during the study? Please be honest; you will still be paid and you will not be penalized in any way if you did.

1. Yes, I looked up information
2. No, I did not look up information

Thank you for answering these questions. The purpose of this study is to understand how effective different types of corrective information are at countering misinformation about COVID-19. We showed you a variety of headlines about the Coronavirus during this study. Some of the headline were true, and some others were false. Below, you can see all of the TRUE headlines. Any headlines not shown here were FALSE. [list of true headlines] Thank you again for your participation. Should you have any questions about this study, please contact [redacted].