

# The Religious Roots of Belief in Misinformation: Experimental Evidence from India\*

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## Abstract

Misinformation has emerged as a key threat worldwide, with scholars frequently highlighting the role of partisan motivated reasoning in this process. Yet the mechanisms enabling the endorsement of misinformation likely differ where partisanship plays a more diffuse role. This study explores whether religiosity drives the endorsement of misinformation in India. Using original data, we first show that individuals with high levels of religiosity and religious polarization endorse more misinformation. Next, to understand the causal mechanisms through which religiosity operates, we field an experiment where corrections appear alongside religious verses, and/or originate from religious ingroups. We find that corrections including religious frames (1) are significantly effective at reducing the endorsement of misinformation; (2) are sometimes more effective than standard corrections; and (3) work beyond the specific story corrected. These findings highlight the religious roots of belief formation and provide hope that social identities can be marshaled to counter misinformation.

**Keywords:** India, Religion, Norms, Misinformation, Polarization, Experiments

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# 1 Introduction

Canonical works in political science recognize the role of religion as a prominent political force in society (Putnam 2000; Verba, Schlozman, and Brady 1995). Scholars point to religion's influence on public policy (Grzymała-Busse 2015), public opinion (Pepinsky, Liddle, and Mujani 2018), and social cohesion (Nellis 2023), underscoring its potential to shape beliefs, identity, and behavior. Simultaneously, the last decade has seen a proliferation of scholarly work focusing on understanding why people believe misinformation, and ways to counter and correct it (Wittenberg and Berinsky 2020; Ecker et al. 2022). However, work linking the two strands of research remains largely neglected: because scholarship on misinformation has so far predominantly focused on advanced democracies (Blair et al. 2023), it has paid inadequate attention to developing countries, regions where religion may play a key role in the diffusion and adoption of beliefs. How does religion – understood broadly as identity, informal institution, social position, or social norms – shape the endorsement of misinformation?

To explain the prevalence of misperceptions, misinformation scholars have frequently highlighted the pivotal role of partisan motivated reasoning (Flynn, Nyhan, and Reifler 2017). However, we argue that the modes of dissemination and the drivers of belief in falsehoods likely differ wherever partisanship plays a more diffuse role (Guess et al. 2020; Badrinathan 2021). In much of the world outside of western democracies, religion and ethnicity are comparatively more salient social identities than partisanship. In many countries, religious cleavages determine the results of elections, participation in politics, and other outcomes (Sircar 2022; McClendon and Riedl 2019; Smith 2019).

Based on these observations, we ask two key questions. First, are religious beliefs and identity descriptively associated with the endorsement of misinformation? Given a general lack of empirical evidence on misinformation and religion, and further on misinformation outside of Western contexts, establishing whether there exists a relationship between these variables is paramount. Next, if religious beliefs do drive the endorsement

of misinformation, through what mechanisms do they operate, and can these processes be leveraged for good? We answer these questions in the context of India, a country where religion has long been the basis for political mobilization and the formation of political parties (Chhibber and Verma 2018; Brass 2005). More recently, religious cleavages have resulted in riots as well as vigilante violence in the country, often fueled by misperceptions and rumors (Wilkinson 2006; Banaji et al. 2019).

We rely on a combination of original descriptive data and experimental evidence, focusing on the covid-19 pandemic which saw a proliferation of medical misinformation and conspiracy theories (Motta, Stecula, and Farhart 2020; Brennen et al. 2020), alongside a catastrophic number of deaths in India. To answer our descriptive question, we employ a scale of Hindu religiosity with items measuring religious beliefs, practices, and norms, drawing on work by Verghese (2020). We then show that belief in misinformation in India is strongly correlated with religiosity: those with higher levels of religiosity appear significantly more vulnerable to misinformation. Further, those who are more vulnerable to misinformation are also more likely to display affective polarization towards the religious outgroup.

Next, to understand causality between belief in misinformation and religion, we field an experiment. We argue that the link between religion and belief in misinformation may arise from two similar but distinct mechanisms: adherence to longstanding religious beliefs, or alternatively, pressures to conform to salient (often religious) group identities. We accordingly manipulate both the presence of a religious frame in messages and the religious identity of groups where messages are shared. To do so, we recruit a sample of Indian adults representative of the online population most often exposed to misinformation in the country (N=1600). Respondents are shown WhatsApp conversations with a misinformation stimulus, and in treatment conditions, a correction to that misinformation by another user. We manipulate the content and/or the source of this social correction. Crucially, in some conditions, to test whether framing misinformation as

problematic from a religious standpoint helps dispel falsehoods, we use original verses from ancient Hindu religious texts to back up corrections. In other cases, we also manipulate the religious identity of the group chat to signal a religious ingroup, to test whether religious group disapproval of misinformation dispels its endorsement. We measure the effect of these treatments on the two types of popular falsehoods which circulated in India during and after the pandemic: conspiracy theories and medical misinformation.

Our results show that religiously-framed corrections are successful at shifting misinformed beliefs, in some cases outperforming standard corrections, but also that the efficacy of religious frames varies by type of misinformation. First, with regards to conspiracy theories, treatments relying on religious messaging as well as treatments highlighting group identities were successful at correcting misinformation, compared to a placebo control condition. Importantly, we show improvements in respondents' ability to detect misinformation beyond the specific misinformation stimulus used in our treatments. Respondents are able to take cues from the treatment and accurately identify additional falsehoods. Next, we compare these treatments to a standard correction, to evaluate whether the corrective effects we observe are due to the religious components of the treatment or simply to any corrective information. When compared to a standard social correction, including a religious quote increases the effectiveness of corrections. Further, we show that only religious corrections significantly reduce endorsement of additional falsehoods beyond the story corrected. By contrast, for medical misinformation, we find that religious frames alone have no impact on vulnerability to misinformation, but that additionally manipulating group identities (thereby manipulating perceived group norms) produces an effect. This effect does not, however, significantly improve upon the effect of a standard correction.

These findings have a number of implications for scholarship and policy. Most importantly, they confirm the notion that religious beliefs and identities are important drivers of the endorsement of misinformation. They also highlight the persistent nature

of more deep-rooted misinformed beliefs. Recently viral (and thereby perhaps more salient) misinformation – such as conspiracy theories specifically about the pandemic, in this context – might be easier to correct: we find that more treatments are able to effectively attenuate these beliefs, even beyond a standard correction. However, deep-rooted beliefs which have existed since before covid-19, such as reliance on traditional medicine, might be harder to dislodge, including when corrections invoke religion. Our experiment also confirms previous work on the efficacy of social corrections (Bode and Vraga 2018; Badrinathan and Chauchard 2023), and suggests that further attention to the role of religion and the mechanisms through which it operates in polarized systems is warranted in the misinformation literature. Our findings provide hope that social identity can impact — and therefore be marshaled to improve — vulnerability to misinformation, and pro-democratic outcomes more generally.

## 2 Theoretical Expectations

During the covid-19 crisis in India, misinformation abounded (Malhotra 2020). On the one hand, conspiracy theories suggesting that minority groups were intentionally conspiring to spread the virus resulted in discrimination 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. But their ties to ancient Indian culture have led many to believe in their miraculous properties, often at the expense of scientific advice (Siddiqui 2020). Beliefs in medical misinformation like 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

(Banaji et al. 2019). With about one of five people in the world living in India and one of two in developing countries, India is a particularly important case.

Both conspiracy theories scapegoating minorities as well as medical misinformation draw on religious beliefs and identities. Suppliers of these kinds of misinformation arguably seek to either entrench religious cleavages with threats of violence, or seek to deepen (Hindu) religious sentiment by reinforcing the idea that India, a diverse and constitutionally secular nation, is primarily a Hindu country (Baishya 2022). On the other hand, consumers who believe or share such stories do so because they might be congruent to their religious beliefs, or conform to majority norms (Davies 2020).

In cultures across the world, religious identity binds people together and creates moral community, shared values, and connection. However, scholars of the psychology of religion have long postulated that the cohesiveness and trust stemming from membership in religious communities may come at the expense of rationality (Haidt 2012). The processes of embeddedness in religious groups may increase the endorsement of false beliefs and faulty reasoning, thereby indicating that religious motivated reasoning might drive belief in misinformation, especially for those demonstrating high levels of religiosity. This is the premise we explore in this study.

## 2.1 The Indian Context

Indian politics has long 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, nationalism, and the formation of religiously-motivated political parties (Brass 2005). In 2021 a Pew Research Center survey found that Hindus tend to link their religious identity to national identity: 81% of Hindus said it was important to be Hindu to be truly Indian, while a significantly smaller proportion of respondents from other religious groups felt the same. More generally, religious divides in India have historically determined not only electoral results (Chandra 2007; Sircar

2022) but also patterns of violence (Wilkinson 2006; Jha 2013).

Key to understanding the prominence of religion as an identity in modern India is the ruling Bharatiya Janata Party (BJP), that epitomizes the importance of religion, and specifically Hinduism, in popular discourse. The party frequently relies on rhetoric based on puritanical elements and moral appeals (Jaffrelot 2021), often embracing Hindu symbols and personalities for political gains and relying on false information. Since its ascent to power in 2014, leaders from the party have often endorsed pseudoscientific remedies such as Homeopathy and Ayurveda over science, underscoring the roots of these practices in traditional Hindu religion. In addition, since the party's stated aim is to establish a national identity that excludes and marginalizes religious minorities, specifically Muslims (Jaffrelot 2021), journalistic accounts note that conspiratorial misinformation targeting minorities in India during the covid crisis in India has sometimes stemmed from BJP-aligned sources (Yasir 2020).

In sum, both India's longstanding religious divides and the ruling party's religious activism underscore the possibility of a fundamental association between religion and misinformation in India (Mishra 2021). However, empirical scholarship to date has yet to test whether such an association exists. A well-established finding in the literature on American political behavior is that motivated reasoning affects how individuals process information (Flynn, Nyhan, and Reifler 2017). With misinformation in particular, scholars underscore the importance of partisanship as the basis for motivated reasoning: even when misinformation is corrected, we are more likely to believe it if it aligns with our partisan priors. Evidence on the role of partisanship as a pivotal identity in India, however, is mixed. India's party system is not historically viewed as ideologically structured: parties are not institutionalized (Chhibber, Jensenius, and Suryanarayan 2014), elections are highly volatile (Heath 2005), and the party system itself is not ideological (Chandra 2007; Kitschelt and Wilkinson 2007). The recent nature of the BJP's appeals combined with the historical importance of religion in India give credence to the idea

that it is not partisanship, but perhaps religion, that might drive belief in misinformation.

Given the apparent nexus between religious beliefs and identities in India, and findings from previous literature about the role of religiosity in promoting belief in non-rational explanations (Haidt 2012), our descriptive analysis hypothesizes that individuals who are highly religious are more likely to endorse misinformation (**Hypothesis 1**).

## 2.2 Mechanisms of Belief in Misinformation

To determine the causal pathways through which religion operates, we field an experiment. Since we cannot manipulate religious identity or belief itself, we manipulate whether religious frames for messages affect the expression of beliefs. Given our priors that religion plays a central role in belief in misinformation, we do this in the context of a correction experiment. That is, we vary whether religious frames accompany corrections to misinformation, allowing us to test whether religious frames can discourage belief in misinformation and thereby shed light on the religion-misinformation causal link.<sup>1</sup>

In doing so, we build on a large literature on corrective interventions to combat misinformation. In Western contexts where misinformation spreads on public social media such as Facebook, solutions include providing fact-checks and labeling misinformation as false (Porter and Wood 2021; Clayton et al. 2019), inoculating users (Hameleers 2020; Roozenbeek and van der Linden 2019), and priming the concept of accuracy (Penneycook and Rand 2019). However in India as in much of the developing world, information is largely spread through encrypted platforms such as WhatsApp (Gil de Zúñiga, Ardèvol-Abreu, and Casero-Ripollés 2019; Valeriani and Vaccari 2018). Consequently, platform-based interventions such as debunking misinformation by adding a false label are not easily applicable in this context, and solutions to correct misinformation must

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<sup>1</sup>We do so for ethical reasons: to avoid further spreading misinformation during a fraught time and reinforcing false beliefs, our default is to pair every misinformation statement with a correction, and use those corrections to manipulate the variations central to our theory. Our design does not include a condition where misinformation is uncorrected.



necessarily stem from users correcting each other (Badrinathan 2021; Vraga, Bode, and Tully 2020; Badrinathan and Chauchard 2023). Accordingly, we focus on social or peer corrections in this study.

Group identities, primarily those formed along religious lines, are already strong social cleavages in India. However, the online environment of WhatsApp exacerbates these divides even further. Users on WhatsApp join private group chats, oftentimes created around political, religious, or other social causes (Chauchard and Garimella 2022). Using public WhatsApp data on India, Saha et al. (2021) demonstrate that such groups are often divided along religious lines. In addition, the insular nature of private chats on WhatsApp may increase vulnerability to misinformed beliefs (Kalogeropoulos and Rossini 2023). The intimacy that WhatsApp groups offer creates a haven for falsehoods (Davies 2020): 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 belief (Acemoglu, Ozdaglar, and Siderius 2021).

The link between religious identity and misinformation became apparent in interview data we gathered during fieldwork. In one case, we asked a respondent why she believed a piece of medical misinformation she received on a WhatsApp group. Her response pointed to the central role of religion in driving information processing: *"It is the right thing to do. Our Hindu religion teaches us that it is the right thing to do – and this is what it truly means for me to be a part of Hindu history and culture, and to pass it down to my children."*

In several other cases, respondents pointed to group identity and ingroup norms as fueling their need to share information. One participant noted: *"Sometimes even if I'm not sure if something is true or not, I don't want to be the only person not sharing something on the group. So I find any message I think will be popular, I forward it to the [Hindu religious] group. Then if many people like it, I come to know it is true."*

These examples demonstrate that religious identity can serve as the basis for endorsing misinformation as well as justifying such beliefs. Moreover, conformity to religious ingroup norms can additionally fuel pressures to share and endorse information. Then, dispelling the notion that religion requires holding on to these ideas, or that being a 'good' member of one's religion implies a certain set of ideas, could help reduce endorsement of misinformation. We thus sought to design corrections that are meant to appeal to the same psychological traits that make people vulnerable to falsehoods to begin with (Nyhan 2021).

This reflection informs the design of our experiment. We posit that religion may shape endorsement of misinformation through two distinct pathways. First, it may result in the endorsement of falsehoods because such misinformation is congruent with longstanding religious beliefs. Religious individuals may endorse misinformation to avoid cognitive dissonance as they may experience moral pressure to conform (Taber and Lodge 2006). Second, expressing misinformed beliefs may owe to perceived group norms: individuals may endorse misinformation because they think others believe it, and fear of alienation from the in-group may increase pressure to express group-congruent beliefs (Kahan et al. 2017). Because WhatsApp group chats are often organized around social and political causes (Davies 2020), they may be formed around unwritten norms and values that increase such pressures to conform to ingroups (Chadwick, Vaccari, and Hall 2023; Kalogeropoulos and Rossini 2023). For example, research demonstrates that genuine prejudices and hateful rhetoric are often constrained by values and norms, until the situation allows for the justification of their expression (Crandall and Eshleman 2003). Conversely, information changing perceived group norms around a belief may reduce the endorsement of such beliefs. This is in line with recent calls from misinformation scholars to focus on norm changing as a technique towards building better online communities (Blair et al. 2023).

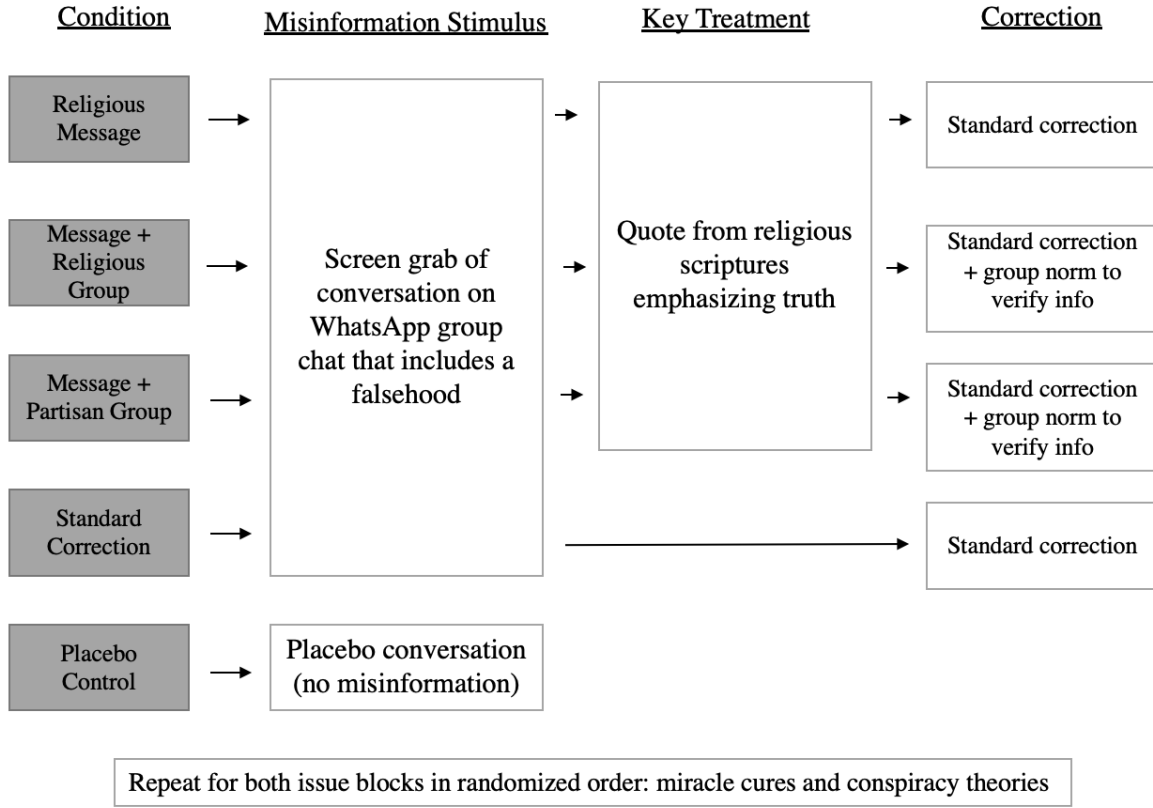
Since both these mechanisms may lead individuals to endorse misinformation,

we contend that relieving potential cognitive dissonance, as well as changing perceived group norms, should curb the endorsement of misinformed beliefs. We accordingly hypothesize that corrections that use religious messaging and framing will be effective in reducing the endorsement of misinformation relative to a control condition (**Hypothesis 2a**). Relatedly, we also hypothesize that corrections seeking to shift perceived group norms will be effective in reducing the endorsement of misinformation relative to a control condition (**Hypothesis 2b**). In addition, we believe the efficacy of such corrections is a function of the strength of religiosity. Specifically, since highly religious respondents would be more likely to pay attention to a religious frame and be affected by it, we hypothesize that the efficacy of corrections increases with increasing levels of religiosity (**Hypothesis 3**). Finally, apart from these main effects and religiosity subgroup hypotheses, we explore one pre-registered research question. In order to benchmark the effect of religiously-framed corrections, we explore whether corrections that use religious frames perform more effectively than a standard social correction that does not include a religious frame (**RQ 1**). Doing so helps us understand the relative efficacy of different types of corrections compared to each other, and not merely to a control group.

### 3 Method and Design

To test these hypotheses, we collected original survey data in India (N=1600) after the second wave of the covid-19 pandemic in 2021. The first goal of our survey was to field an extensive module of attitudes and perceptions to descriptively evaluate the correlation between religious beliefs and misinformation. Key in our descriptive measures is an index of Hindu religiosity. We build on [Verghese \(2020\)](#) in conceptualizing Hinduism as practice-centered, and consequently operationalize religiosity as a function of rites and rituals, including features of everyday life such as attire, food habits and adherence to norms. To measure religiosity, we constructed a scale of eight items with questions

Figure 1: Experimental Flow



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, frequency of religious fasting, and others.<sup>2</sup>

Next, our survey included a pre-registered experiment. In our experiment, respondents were randomly assigned to one of five conditions in a between-subjects design (see Figure 1), of which four were treatment conditions and the fifth was a placebo control condition.

### 3.1 Treatment Conditions

In all conditions respondents read (and reacted to) fictional but realistic screenshots of conversations on WhatsApp. The screenshots displayed a conversation between two

<sup>2</sup>Appendix K describes all the items included in the scale.

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.

In the *Religious Message* treatment, the social correction of the second user relies on a religious frame. To craft this message, we found real quotes from ancient Hindu religious scriptures that discuss either the truth as an important virtue or the imperative not to slander. The user in the conversation who corrects misinformation posts a verse from these Hindu religious scriptures (the Bhagavad Gita and the Mahabharata) alongside Hindu religious iconography, that together exhort people to consider the truth.<sup>3</sup>

This technique builds on prior work on the importance of framing issues to align with one’s audience, shown to be successful in using religious frames to shape responses to climate change and other polarizing issues (Goldberg et al. 2019). It also builds on work emphasizing that unlikely sources are more effective, as when Democrats contradict Democrats or when Republicans endorse vaccines (Larsen et al. 2023; 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). In our treatment, we leverage this frequent recourse to religion by demonstrating that religious sources themselves may emphasize restraint from slander and value the truth.

Next, our *Message + Religious Group* and *Message + Partisan Group* treatments test whether additionally relieving perceived pressures to conform to the ingroup can attenuate endorsement of 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 religious partisan (BJP) group.<sup>4</sup> These treatments involve a correction to misinformation along with the correcting user highlighting a group norm to verify questionable information before

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<sup>3</sup>All treatment stimuli are available in Online Appendix B.

<sup>4</sup>In all other experimental groups, the group name is blanked out, under the pretense of anonymity.

posting. Importantly, the corrective treatment in these experimental groups is additive: we build upon the Religious Message by adding the group norm and group name aspects to the treatment. Their goal is to measure whether religious messages alone can correct misinformation, or whether additionally manipulating ingroup norms is necessary to correct beliefs. These treatments add to a growing body of research showing that 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; Vraga and Bode 2017).

To test our hypotheses, we compare the effect of these treatments to two groups. First, a *Standard Correction* treatment group provides respondents with a social correction but does not include a religious quote nor attempts to shift group norms. In this treatment, the correction by the second user is direct and minimal: the second user simply says that the first user’s claim is incorrect. We include this condition to separate whether corrective effects observed are due to the religious messaging, or simply exposure to any social correction. Finally, we compare these treatment conditions to a placebo control condition where respondents read a WhatsApp conversation about an apolitical topic such as wildlife or sports, with no misinformation stimulus.<sup>5</sup>

We repeat this experimental flow for two issue blocks, conspiracy theories and medical misinformation. We randomize both the block and statement order within each block. Thus respondents see two successive conversations on WhatsApp, each followed by outcome measures pertaining to one issue. They remain in the same randomized condition throughout the experiment. All treatment stimuli are available in Online Appendix B.

We underscore here that our key outcome in this study is not to change misinformed beliefs per se, but rather to affect the expression of beliefs. A body of empirical

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<sup>5</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.

work demonstrates the prevalence of this kind of expressive responding in surveys in the United States (Bullock et al. 2015; Prior, Sood, and Khanna 2015). Our treatments do not provide citizens with tools to better discern true from false; rather, they seek to provide a framework that can shift thinking and norms around belief expression and thereby reduce endorsement of misinformation.

### 3.2 Outcomes

We measure the effect of these treatments on the perceived accuracy of two sets of headlines: conspiracy theories and medical misinformation. Importantly, the headlines in our outcome measure include the specific piece of misinformation corrected in the treatment, as well as 3 additional misinformation headlines, along with true headlines. Thus we are able to measure whether the treatment reduced belief in false headlines beyond the specific story corrected.<sup>6</sup>

Relying on these data, our main outcome of interest, in line with our pre-analysis plan as well as previous research in this context (Badrinathan 2021), is a count of respondents' ability to correctly identify true and false stories.<sup>7</sup> Importantly, because we measure respondents' endorsement of the claim that was discussed in the treatment, as well as their endorsement of other claims, we are additionally able to evaluate whether each correction's effect extends beyond the specific story corrected in the treatment. The list of headlines that comprise this measure as well as rationale for their selection is available in Appendix C.

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<sup>6</sup>Our headlines 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 pretest data on how widely they were believed. 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. But simultaneously, we block out the source so as to mimic the context of WhatsApp messaging where users receive forwarded text messages without a source, brand, or a URL, with the text of the news/information copied in the body of the WhatsApp message.

<sup>7</sup>As detailed below, as a robustness test we also re-analyze our data with a discernment measure.

### 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. As with most online panels in India, while our sample is not representative of the entire Indian population, it is representative of the subset that has Internet access, which is skewed towards educated, wealthy, pro-BJP and upper-caste male respondents. These online respondents are also most likely to be victims of political or other disinformation campaigns spread on the internet, as they are the population often recruited into WhatsApp groups (Chauchard and Garimella 2022). Thus, the online Indian population is an ideal target to test our hypotheses. Finally, because of medical concerns during the pandemic, we determined that the safest way to run such a study would be with an online panel and a firm that had an existing database of users, so as to not put any potential survey enumerators in harm’s way. Key demographics of the sample are in Appendix D.

We limit our sample to Hindu respondents to maximize statistical power, as the small number of non-Hindu respondents would not have allowed us to make meaningful inferences (around 80% of Indians are Hindu).

## 4 Results

We first discuss descriptive findings on the prevalence of misinformation in our sample, and crucially, whether religiosity correlates with belief in misinformation. Next, we present the main effect of our experimental treatments on vulnerability to misinformation. Finally, additional tests compare the relative effectiveness of different treatment conditions, including robustness checks.



## 4.1 Descriptive Findings

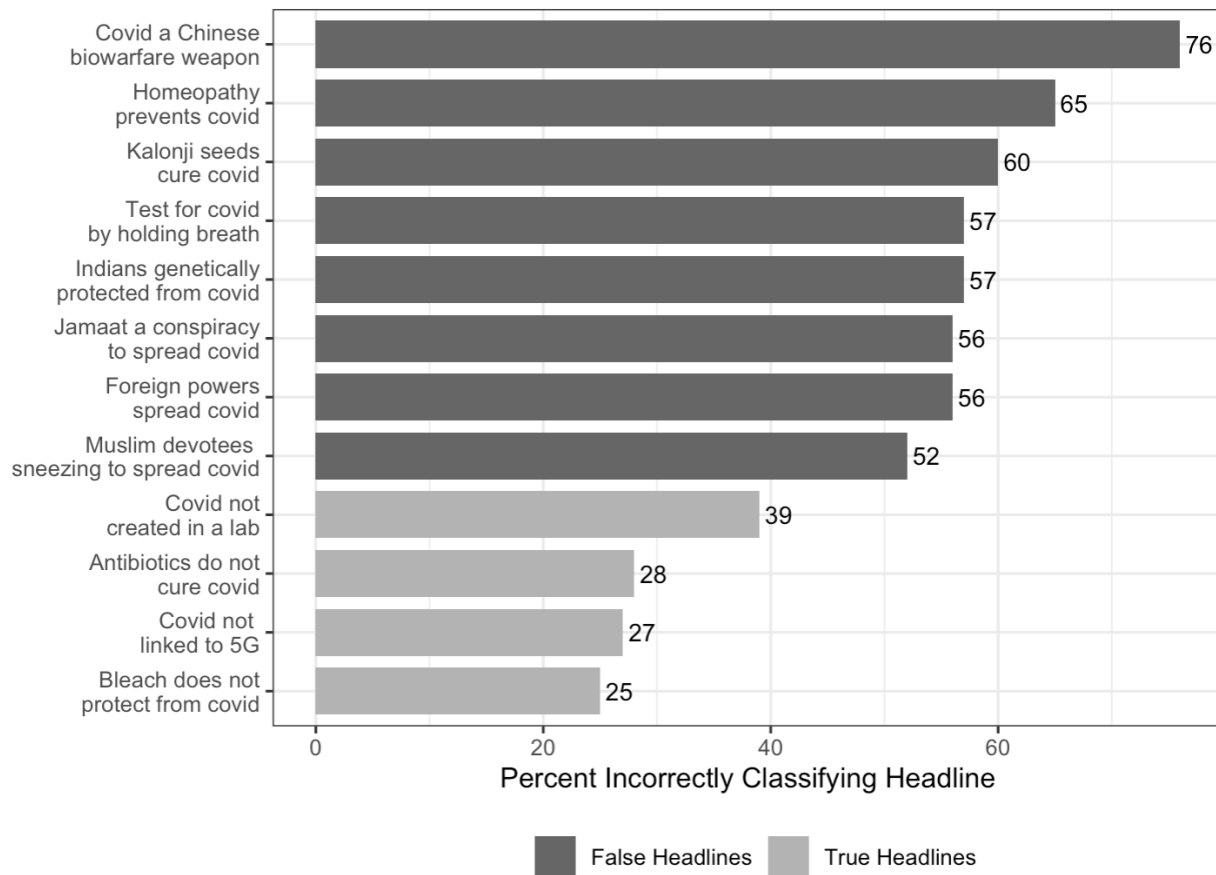
Figure 2 lists the 12 stories that comprise our misinformation outcome measure. The figure plots the share of respondents in the sample who incorrectly assessed the headline in each story, i.e., the figure demonstrates vulnerability to misinformation. For false stories, this is the share of respondents expressing that the headline was true; for true stories, this is the share expressing that the headline was false.

Two aspects of this figure are striking. First, respondents endorse misinformation in our sample at high rates. Every false headline containing misinformation was endorsed by over 50% of respondents, with rates of endorsement in some stories even higher. Amongst conspiracy theories, over three quarters of the sample reported believing the story that covid is a Chinese biowarfare weapon. Amongst miracle cures, about 65% of the sample agreed that homeopathy – an alternative medicine system with roots in traditional Hindu culture – can cure covid. These strikingly high levels of endorsement of misinformation are in line with previous research on India (Guess et al. 2020). Second, respondents were less likely to mis-classify false stories than they were to mis-classify true headlines, with a much lower fraction of the sample wrongly endorsing a true headline as false. Overall, respondents correctly classified an average of 6.02 stories out of 12, alluding to the prevalence of misinformation in this context.

Next, we sought to determine to what extent vulnerability to misinformation is correlated with respondents' religiosity. To measure vulnerability to misinformation, we count the number of headlines that respondents correctly classified as true or false. To measure religiosity, we create a continuous scale using the battery of eight Hindu religiosity items described in the previous section. 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.

In Figure 3 we graph the predicted number of stories accurately classified as a

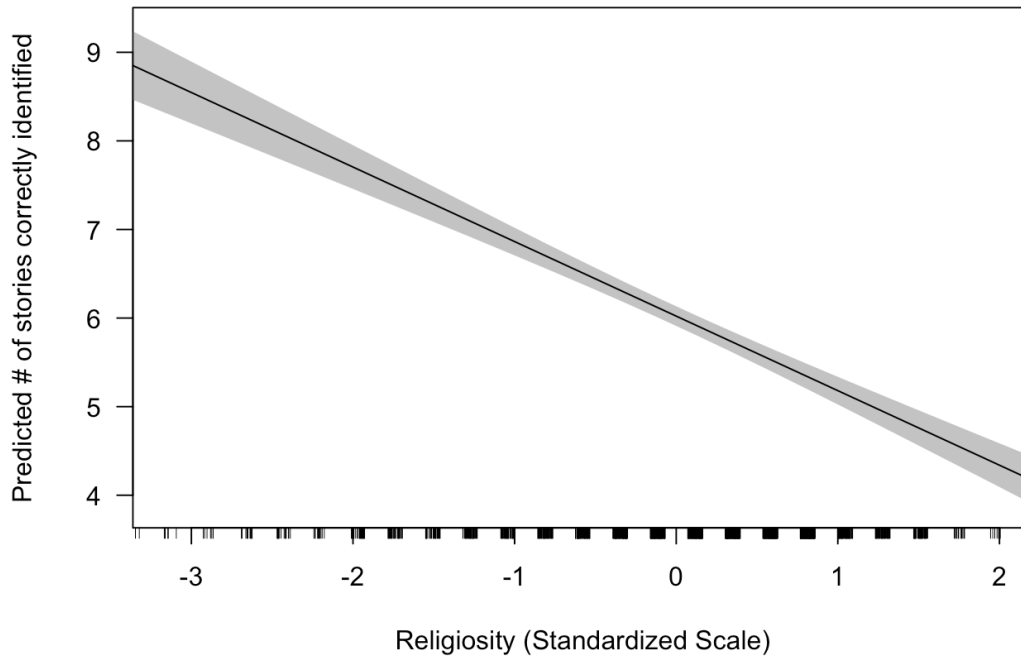
Figure 2: Belief in Misinformation in our Sample



function of religiosity and demonstrate that 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 almost double the number of headlines (about 9 headlines) relative to respondents with the highest levels of religiosity (about 4.5 headlines). Further, religiosity is positively correlated with accurate identification of true stories, but negatively correlated with accurate identification of false stories (see Appendix H). In line with [Haidt \(2012\)](#)'s argument, this finding highlights that religious respondents tend to be more gullible of information in general, and falsehoods in particular.

We thus find extremely strong support for our expectation that religiosity predicts endorsement of misinformation. The most religious subset of our sample appears to be

Figure 3: Belief in Misinformation By Religiosity



almost 200% worse off in terms of vulnerability to misinformation. We also find that the robust relationship between religiosity and belief in misinformation holds controlling for several other covariates, most crucially party identity (see Appendix H).

Further, we examine whether religious affective polarization is linked to endorsement of misinformation. We measure religious polarization by asking respondents whether they would be upset if a friend married someone who was a Muslim. We find that as respondents get less upset (or are less affectively polarized) on this measure, they are more likely to significantly identify misinformation. That is, those who are less religiously polarized are also less vulnerable to misinformation (see Appendix J for results). These descriptive findings underscore that religious practice is linked with misinformation endorsement, and that antipathy towards religious outgroups is also associated with the endorsement of misinformation.

In sum, these analyses give weight to the notion that vulnerability to misinformation has religious roots. Endorsing misinformation is a function not just of individuals'

religious beliefs, but also of their affect towards religious outgroups.

## 4.2 Experimental Findings

Since religiosity strongly correlates with the endorsement of misinformation, can religious beliefs and identities be leveraged for good? We now move to discussing experimental results. All estimates are ordinary least square (OLS) regressions and empirical models are specified relying on random treatment assignment to control for confounders.

To test H2a and H2b, we first evaluate the effect that the different treatments have on respondents' endorsement of misinformation. Results are presented in Table 1. Here we compare estimates from each treatment group to placebo control. Our main outcome of interest is a count of respondents' ability to classify true and false stories in a set of six stories. Per our pre-registration, we estimate the effect of each treatment separately for conspiracy theory misinformation (column 1) and medical misinformation (column 2).

Results in Table 1 demonstrate that when it comes to conspiracy theories, all of our treatments significantly decrease the extent to which our respondents express belief in misinformation. Respondents who are assigned to any of the treatment groups are able to identify misinformation significantly better relative to those assigned to control. In addition, these effects are substantively large, with those in the Religious Message treatment group demonstrating about a 16% increase in identification capacity relative to control. Lastly, although smaller in magnitude, we also see a significant effect of receiving the Standard Correction, demonstrating that even minimal corrections may be able to improve information processing, mirroring existing findings from this context (Badrinathan and Chauchard 2023).

On the other hand, when it comes to medical misinformation, we find that while respondents in the Message + Religious Group, and Message + Partisan Group treat-

ments are significantly better at identifying misinformation, this effect does not obtain for the Religious Message treatment. While this treatment produced the largest positive effect for conspiracy theories, its impact appears to remain below significance level in the case of medical misinformation: the average treatment effect is indistinguishable from zero. It is important to note that these are additive treatments, hence the religious and partisan group treatments add an additional layer to the information being presented in the Religious Message treatment, by revealing group norms and the group name.

Table 1: Main Effect of Treatments

	<i>Dependent variable: Number of stories correctly identified</i>	
	Conspiracy Misinformation	Medical Misinformation
	(1)	(2)
Religious Message	0.498*** (0.110)	0.189 (0.117)
Message + Religious Group	0.327* (0.110)	0.342* (0.117)
Message + Partisan Group	0.472*** (0.111)	0.332* (0.118)
Standard Correction	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

These results suggest that different types of misinformation (here, conspiracies vs. medical falsehoods) condition effective strategies of correction. From our findings, it appears that the mechanisms of endorsement of conspiracy theories and of medical misinformation may be distinct, and thus distinct approaches must be adopted to correct

them. Covid-19 conspiracy theory misinformation is new and situation-specific: 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, medical misinformation in India comprises largely of claims about miracle cures or home remedies, often associated with broader beliefs about the efficiency of homeopathy or ayurveda. These alternative medicinal systems have existed long before covid-19, and hence the misinformation that stems from them taps into longstanding belief systems in society. Thus we posit that the endorsement of medical misinformation may be harder to move to begin with.

Our findings demonstrate that even standard corrections work to reduce the expression of conspiracy theory beliefs in India, though corrections that draw on religious sources 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 information processing can be affected by elites in networks, or when group norms are fostered with a focus on veracity (Blair et al. 2023). These findings also confirm our own qualitative evidence that users in homophilic groups might be pressured into saying they believe certain types of information, whether or not they actually do so. For such deep-rooted misinformation, shifting the norms of information sharing in such contexts appears crucial.

In addition to these main results, we find that some treatments work even beyond the specific story corrected. That is, on receiving a correction for one story, we find a spillover effect that carries forward to other stories. To analyze this, we recalculate our count outcome measure omitting the specific story that was corrected in the treatment. Crucially, this analysis demonstrates that for for conspiracy theories, every treatment except the standard correction achieves a significant effect. While the standard correction worked on the specific story that was corrected, spillover effects for non-corrected stories are only seen with the religious message treatments. These results suggest that

the religious treatments have a comparatively stronger effect overall than the standard correction, and that their effects have a lasting value. Results are presented in Appendix I.

We confirm the robustness of the results in Table 1 by controlling for key demographic and pre-treatment covariates (Appendix E). Our key results remain unchanged. We also replicate these findings controlling for respondent attention during the survey (Appendix F). Further, as an additional robustness check, we re-run our analyses with a discernment outcome, which calculates the difference between the average accuracy rating for true and false stories. We find that main results hold: religious treatments overall improve respondents' ability to discern true from false. While signs point in the same direction, significance levels are, however, slightly smaller in this configuration, implying that some of the effects detected in Table 1 fall into insignificance. This is, for instance, the case for the effect of our Message + Religious Group treatment on belief in conspiracies. Interestingly, this is the case for both estimates on our standard corrections, implying that only our religious messages did move the needle in the right direction, once again underscoring the power of religious frames in this context. Appendix I presents results.

Next, we test the hypothesis that religious frames are especially effective for highly religious respondents (H3). To test this, we interact our continuous religiosity measure with a dummy variable indicating assignment to treatment. Findings demonstrate that treatment effects do not differ as a function of religiosity: respondents are moved to change priors despite religiosity level. These findings underscore the potential moral weight of religious imperatives amongst self-reported Hindus, regardless of their degree of religiosity. Similarly, 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, here too we find that treatment effects do not differ as a function of religiosity. Thus while our treatments are able to achieve large effects on average relative

to control, we do not detect heterogeneous effects of religiosity (see results in Appendix G). These findings again suggest that our treatments may be even more effective than expected, as their effect is not limited to a specific sub-population of respondents.<sup>8</sup>

Finally, in line with RQ1 and to benchmark the effect of the main treatments, we ascertain whether religious and conformity treatments performed better than the standard correction. This allows us to evaluate whether the corrective effects we observe are due to the religious elements of the treatments, or simply to exposure to any corrective information. In Table 2, we switch the reference (omitted) category in the OLS specification to the Standard Correction treatment to test whether religious treatments perform significantly better than a standard social correction.

Looking at conspiracy theories (Column 1), we find that the Religious Message treatment is the only one able to improve upon the standard correction. This is a crucial finding: while all of our experimental treatments performed better than the placebo control, when comparing to a standard correction only the Religious Message treatment achieves a statistically significant effect. Interestingly, we show that the additive treatments invoking group norms are statistically indistinguishable from the standard correction, even if the Quote + Partisan group treatment comes very close to traditional significance levels. Moreover, as shown in Appendix I, both the Religious Message treatment and the Quote + Partisan group treatment significantly improve on the standard correction when it comes to spillover effects (endorsement of misinformation claims other than the one corrected in the treatment). This finding underscores that religious corrections reduced endorsement of conspiracies at greater rates than standard corrections.

On the other hand, looking at medical misinformation (Column 2), we find that the three treatment groups remain statistically indistinguishable from the standard correction. Echoing findings from Table 1, these results suggest that for misinformation

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<sup>8</sup>While we do not detect heterogeneous effects by religion, we cannot exclude the possibility that religiosity would interact with our treatment among specific caste subgroups. In the Indian context, this might be the case among highly religious upper caste respondents. Running such a triple interaction, however, returns insignificant results, though we note that this may merely reflect low statistical power.



Table 2: Comparisons with Standard Correction

	<i>Dependent variable: Number of stories correctly identified</i>	
	Conspiracy Misinformation (1)	Medical Misinformation (2)
Religious Message	0.235* (0.111)	−0.013 (0.119)
Message + Religious Group	0.064 (0.112)	0.139 (0.119)
Message + Partisan Group	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&lt;0.05; \*\*p&lt;0.001; \*\*\*p&lt;0.001

that has been around in public discourse for a longer period, the mechanism of shifting group norms appears to be the most effective strategy to dispel falsehoods. While our relatively small N may constrain our ability to identify such differences between corrective treatments, these findings suggest that relying on religious frames alone may not strongly improve on standard corrections for this type of deep-rooted and more salient information.

Consequently, we may take these findings to mean that the mechanisms through which religious identity operates are different depending on the type of misinformation at hand. We posit that beliefs in conspiracy theories can be altered via religious frames which include a moral message. Our Religious Message treatment is centered around a message with a moral imperative: believe the truth and do not slander others. While

additional analyses will need to confirm this intuition, this may suggest that simple, moral messaging is most effective at reducing the endorsement of recent and more topical misinformation. 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 medical misinformation, on the other hand, benefits the most from treatments focusing on group norms, even if the difference between the standard correction and the "group" treatments remain below significance levels in Table 2 and in Appendix I. 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 (Malhotra 2023). 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 may also be generally more salient. For such deep-rooted beliefs, moral messaging ("believe only the truth") may be less effective, relative to shifting norms and group pressure.

## 5 Discussion and Conclusion

In this paper, we present new evidence on the religious roots of misinformation as well as ways to mobilize religious identity for social good. We first find a strong connection between religiosity and belief in covid-19 misinformation. Those who score high on the religiosity scale and display religious affective polarization are significantly more likely to endorse misinformation. Second, in the context of an experiment, we show that corrective treatments including religious frames are effective at reducing the endorsement of misinformation, sometimes more effective than standard corrections, and work beyond the specific story corrected. This suggests that religion and endorsement

of misinformation are causally related, and more importantly, that religious beliefs and identities may provide a promising basis on which to build more effective corrections.

These findings indicate that many Indians, and especially Hindus (who comprise around 80% of the Indian population), are willing to view health crises through a religious lens. That religious messages framing misinformation as problematic works even among highly religious respondents in this context is particularly novel and important. Susceptibility to misinformation appears malleable to new information that leverages religious messaging, marking a divergence from previous findings on the potency of motivated reasoning to limit the effectiveness of misinformation countermeasures (Flynn, Nyhan, and Reifler 2017). These positive findings also point to the broader benefits of issue framing and its capacity to potentially alter downstream public opinion (Druckman and Nelson 2003; Jerit 2008). Further, they highlight the efficacy of shifting group norms among polarized and homophilic groups, underscoring the potential of such strategies to affect future political behavior (Dinas, Martínez, and Valentim 2023).

That respondents are able to use cues from the treatment and apply it to identify additional falsehoods is consequential. As argued by Kahneman and Tversky (1984), individuals express opinions readily and engage in discriminatory discourse when provided the opportunity. In light of this, our treatments provide respondents with a framework that prompts them to pause, deliberate, and contemplate what they express within group settings. We do not equip individuals with tools to enhance scientific aptitude: our treatments do not teach critical thinking skills or techniques to spot misinformation. Rather, we underscore that our treatments likely alter social norms and leverage respondents' moral religious sensibilities. Since our focus is on modifying the expression of beliefs rather than beliefs themselves, this further allows us to be less concerned about social desirability bias. If respondents do indeed change their responses purely to appear more socially desirable, we see this as a worthy outcome: shifting what citizens think is acceptable to state publicly in a group setting is consequential, especially in polarized

societies.

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. 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 (Wilkinson 2006). 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.

Next, we underscore that a core element of our treatment – verses from 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. Other developing countries such as Afghanistan, Madagascar, Mali, Mexico, and Brazil not only share commonalities in the type of misinformation, but also have social media environments 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. Indeed, recent data demonstrate that evangelical Christians in the United States are not only more likely to believe in QAnon narratives, but also in conspiracies about the 2020 election, vaccines, or the moon landing (O'Donnell 2021). Highly religious individuals are also found to perceive more social threat from scientists (Chinn et al. 2023). Across contexts, the least religious appear to be the least credulous. As polarization intensifies around the world, there are lessons to be drawn from these data for developing countries and Western contexts alike.

Finally, we acknowledge that in our design respondents witnessed a correction rather than were corrected themselves. 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 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.

Despite these limitations, we believe our results to have important implications. Of practical and policy importance, these findings suggest that public health campaigns that use social identity-based frames and messaging to counter misinformation or increase the uptake of health measures may be particularly effective because they resonate with existing values that citizens may have. Contentious issues surrounding crises like the covid-19 pandemic such as vaccine uptake and reliance on scientific information require the long-term and large-scale engagement of citizens. Messages designed to resonate with social and religious identities hold promise as a means to build belief in accurate news over misinformation.

From the standpoint of understanding behavior in polarized societies, our results have implications for the formation of and adherence to group norms. We demonstrate that even the most religious respondents are willing to abandon their (misinformed) priors when prompted to do so. Such changes do not constitute a fundamental transformation of political or social culture, but they do show that modest interventions, at least in the short term, can have significant affects in changing the public expression of beliefs. At scale, this may decrease the amount and prevalence of misinformation in an informational ecosystem, thereby providing a greater frequency of trustworthy sources accessible to individuals ([Allen et al. 2020](#)). Increasing the quality of one's news diet

may then in turn have downstream consequences on attitudes and behaviors.

Ultimately, we hope this work can contribute to scholarship on the malleability of political norms (Paluck and Green 2009; Green et al. 2023) as well as to literature on how trusted elites can shift perceptions of norms, eventually paving the way for behavioral change (Boyer et al. 2022). Norm perception is often shifted by signals from influential community members, especially crucial in our context where WhatsApp groups are curated by local political elites who gain power within communities (Chadwick, Hall, and Vaccari 2023). In polarized societies, this may further shed light on whether the expression of misinformed beliefs is tied to majoritarian religious groups perceiving less fear of sanction from the state, or favoritism from local authorities (Jaffrey 2021). In contexts where the roots of belief formation and expression are tied to religion, these findings provide hope that social identities can be marshalled to improve misinformation as well as other democratic outcomes more broadly.

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Online Appendix for  
*The Religious Roots of Belief in Misinformation*

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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. 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 main study. 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 medical misinformation and 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

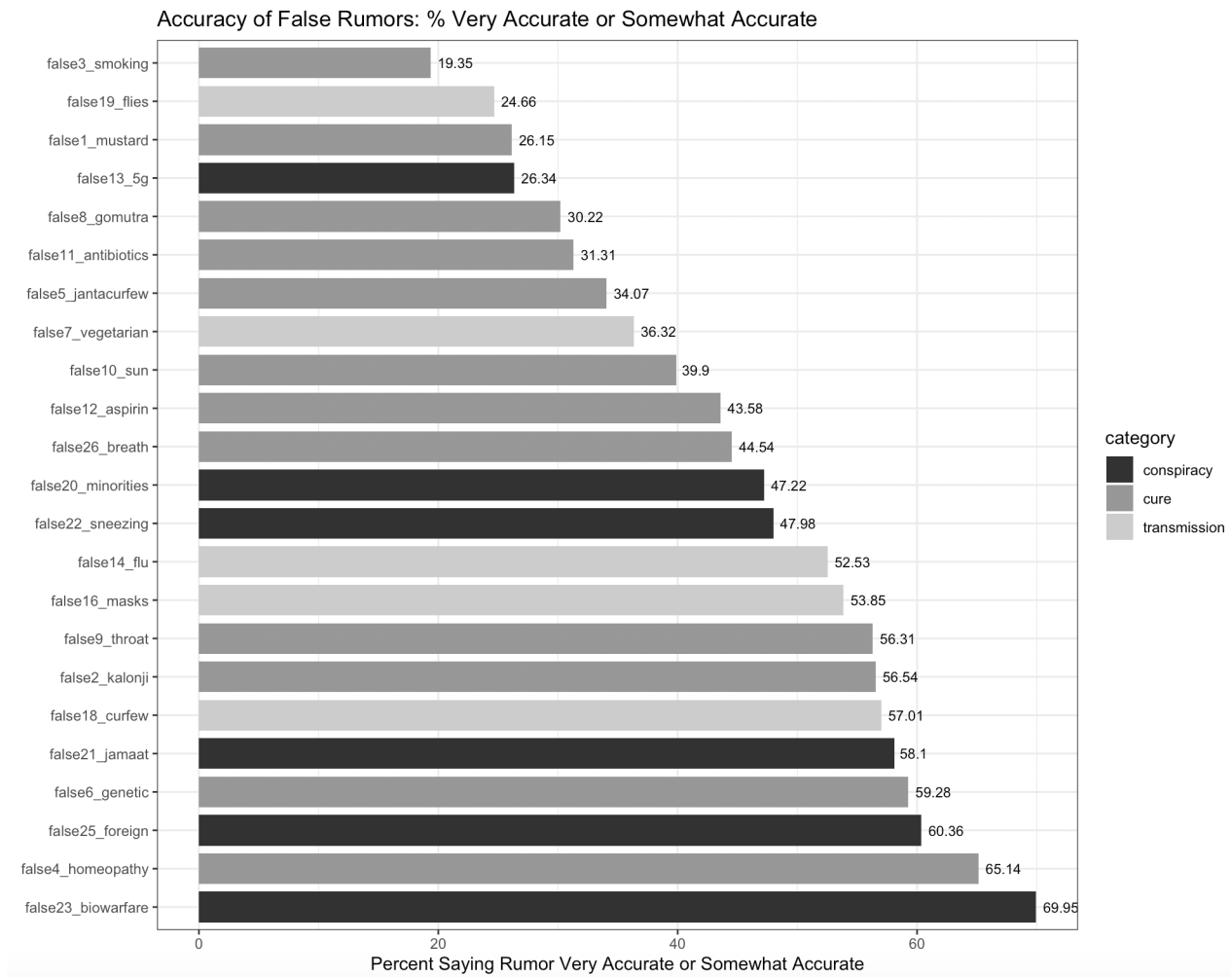


Figure A.2: Belief in True Pretest Stories

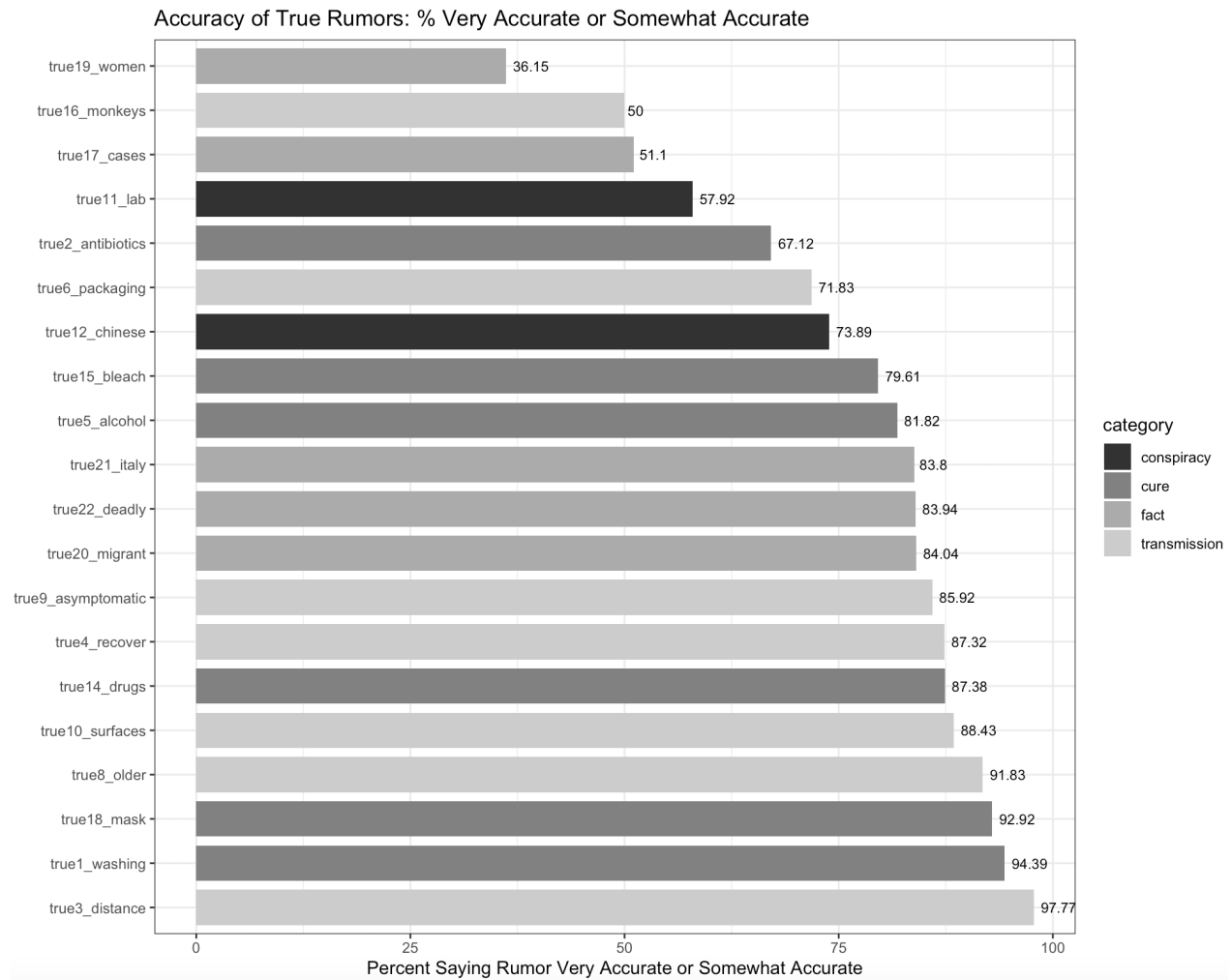




Table A.1: List of False Pretest Stories

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 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.

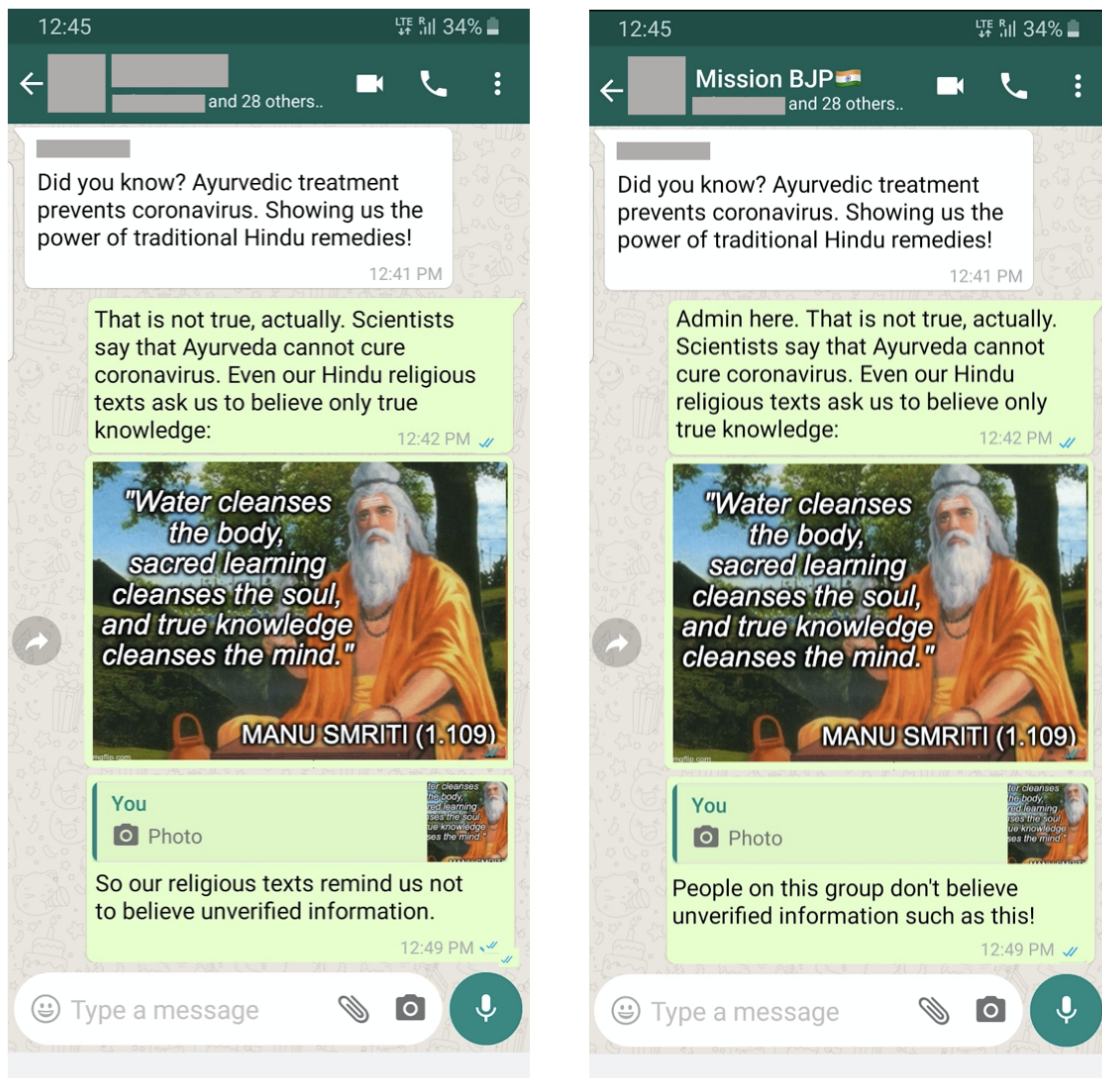
Figure B.1: Text of Treatment Stimuli: Medical Misinformation Issue Block

Condition	Issue	Rumor (User 1)	Correction (User 2)	Visual (User 2)	Message (User 2)
Religious Quote	Medical Misinfo	Did you know? 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 ask us to believe only true knowledge.	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	So our religious texts remind us not to believe unverified information.
Quote + Religious Group	Medical Misinfo	Did you know? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	Admin here. That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus. Even our Hindu religious texts ask us to believe only true knowledge.	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	People on this group don't believe unverified information such as this!
Quote + Partisan Group	Medical Misinfo	Did you know? Ayurvedic treatment prevents coronavirus. Showing us the power of traditional Hindu remedies!	Admin here. That is not true, actually. Scientists say that Ayurveda cannot cure coronavirus. Even our Hindu religious texts ask us to believe only true knowledge.	[paste on photo] Manu Smriti (1.109): Water cleanses the body, sacred learning cleanses the soul, and true knowledge cleanses the mind.	People on this group don't believe unverified information such as this!
Standard Correction	Medical Misinfo	Did you know? 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]
Placebo Control	Medical Misinfo	Did you know? 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]

Figure B.2: Text of Treatment Stimuli: Conspiracy Theory Issue Block

Condition	Issue	Rumor (User 1)	Correction (User 2)	Visual (User 2)	Message (User 2)
Religious Quote	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 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:
Quote + Religious Group	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 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:
Quote + Partisan Group	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 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:
Standard Correction	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 before striking	Best wishes!	[good morning visual]
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]

Figure B.3: WhatsApp Group Chat Template. Left Panel: Religious Message Condition. Right Panel: Message + Partisan Group Condition



## C 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 medical misinformation), participants rate the accuracy of 6 misinformation 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 mimic WhatsApp conversations where messages are often received without a source. In Figure C.1 we provide examples. The final set of headlines selected for the main experiment is listed in Tables C.1 and C.2.

Figure C.1: Dependent Variable Headline Examples



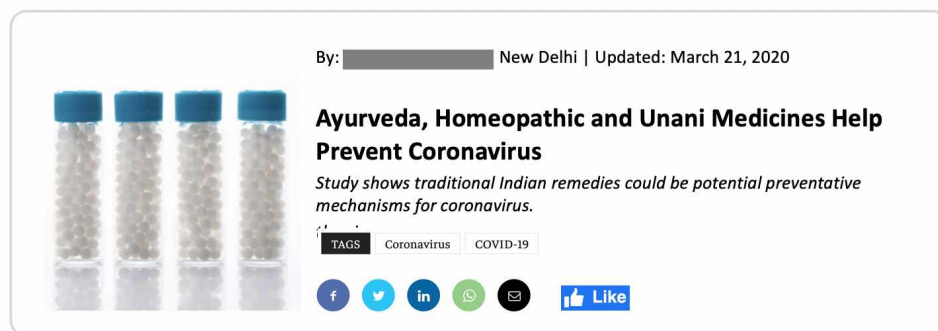


Table C.1: Conspiracy Theory Headlines

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 C.2: Medical Misinformation 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



## D Sampling

### Recruitment

The experiment was fielded in November 2021. Participants were recruited through the Internet Research Bureau (IRB)’s online sampling panel and were selected using quotas to be approximately representative of the Indian adult population by age, gender and region.

Non-Hindus are less than 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 (medical misinformation and conspiracy theories) is also randomized. For those assigned to placebo control, respondents read WhatsApp conversations on wildlife and sports in random order.

### Power

Our sample size was 1600 respondents. 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 sampled 1600 respondents overall.

### The Sample: Descriptive Statistics

In Table [D.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 standard deviation 1; higher values indicate stronger religiosity. Items included in this



Table D.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

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.

## E Main Effects With Covariates

Table E.1: Main Effect With Covariates

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo (1)	MedicalMisinfo (2)
Religious Message	0.458*** (0.101)	0.178 (0.110)
Message + Religious Group	0.297* (0.102)	0.320* (0.110)
Message + Partisan Group	0.397*** (0.102)	0.272* (0.111)
Standard Correction	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***
<i>Note:</i>		
*p<0.05; **p<0.001; ***p<0.001		

## F 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 F.1: Main Effect Controlling for Attention Checks

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo (1)	MedicalMisinfo (2)
Religious Message	0.510*** (0.108)	0.202 (0.115)
Message + Religious Group	0.324* (0.109)	0.339* (0.115)
Message + Partisan Group	0.435*** (0.110)	0.292* (0.116)
Standard Correction	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

## G Results for Heterogeneous Effects Hypotheses

Table G.1: Religious Message x Religiosity

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	MedicalMisinfo
	(1)	(2)
Religious Message	0.476*** (0.101)	0.173 (0.112)
Religiosity	−0.400*** (0.073)	−0.306*** (0.081)
Religious Message 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

Table G.2: Message + Religious group × Religiosity

	<i>Dependent variable: Number of stories correctly identified</i>	
	ConspiracyMisinfo	MedicalMisinfo
	(1)	(2)
Message + Religious Group Treatment	0.309* (0.102)	0.328* (0.116)
Religiosity	−0.400*** (0.073)	−0.306*** (0.084)
Message + Religious Group × 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

## H Hypothesis 1

We hypothesized that religiosity 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 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. We also replicate these results controlling for demographic and pre-treatment covariates.

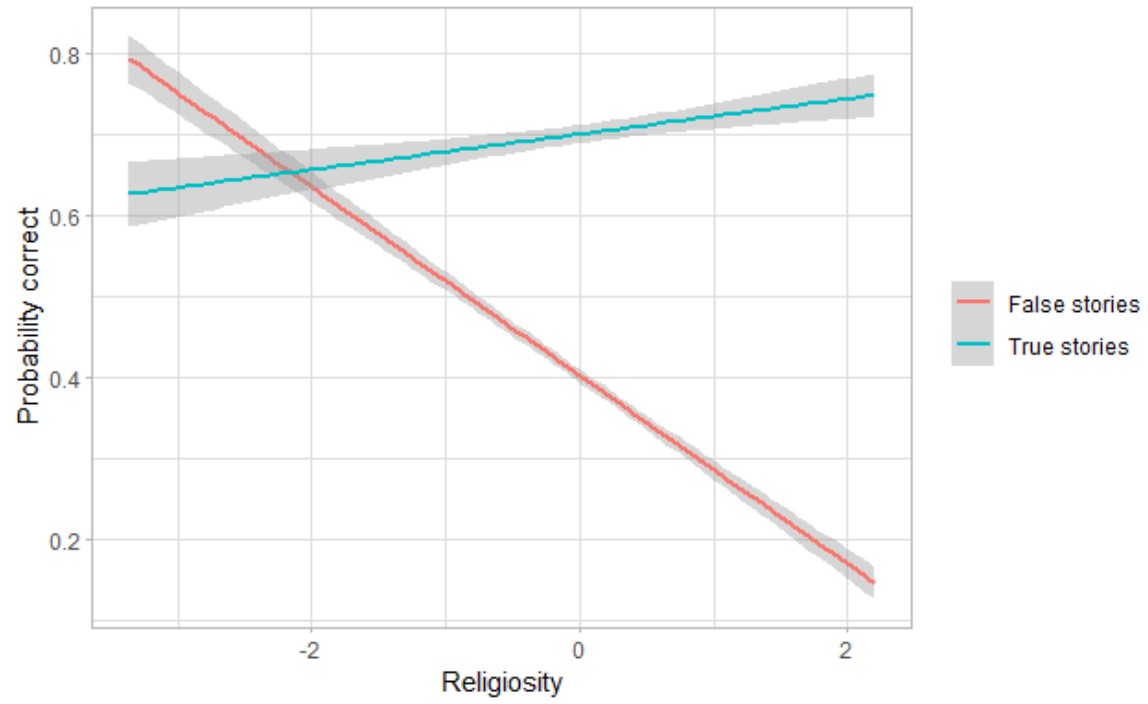
Table H.1: Hypothesis 1

<i>Dependent variable: Number of stories correctly identified</i>	
	AllMisinfo
Religiosity	−0.841*** (0.056)
Constant	6.022*** (0.056)
Observations	1,600
R <sup>2</sup>	0.123
Adjusted R <sup>2</sup>	0.122
Residual Std. Error	2.250 (df = 1598)
F Statistic	223.555*** (df = 1; 1598)
<i>Note:</i>	
*p<0.05; **p<0.001; ***p<0.001	

Table H.2: Hypothesis 1 With Covariates

	<i>Dependent variable: Number of stories correctly identified</i>
	AllMisinfo
Religiosity	−0.750*** (0.057)
BJP Support	−0.247 (0.136)
Age Category	0.158*** (0.043)
Male	0.370* (0.116)
Income	−0.044 (0.029)
Education	−0.080 (0.076)
Upper Caste	0.177 (0.114)
Science Knowledge	0.426*** (0.038)
WhatsApp Use Frequency	−0.023 (0.077)
Concern about covid-19	0.018 (0.029)
Constant	3.051*** (0.445)
Observations	1,597
R <sup>2</sup>	0.206
Adjusted R <sup>2</sup>	0.201
Residual Std. Error	2.145 (df = 1586)
F Statistic	41.081*** (df = 10; 1586)
Note:	*p<0.05; **p<0.001; ***p<0.001

Figure H.1: Belief in True vs. False Stories By Religiosity





# I Robustness Checks

## I.1 Treatment Spillover

We recalculate our count outcome measure omitting the specific story that was corrected in the treatment. For example, if the treatment corrected the misinformation headline that reliance on homeopathy and ayurveda can cure covid, we now omit this story and calculate a count measure of the remaining 5 miracle cure stories. On doing this, we find that for conspiracy theories, every treatment except the standard correction achieves a significant effect. While the standard correction works on the specific story that was corrected, spillover effects for non-corrected stories are only seen with the religious quote treatments. For medical misinformation, only the religious group treatment has a significant effect. Further, while Table I.1 compares each condition to the control, on comparing them to the standard correction (I.2) we find that for conspiracy theories the Religious Message treatment still does better than the standard correction.

Table I.1: Treatment Works Beyond Specific Story Corrected

	<i>Dependent variable: Number of spillover stories correctly identified</i>	
	ConspiracyMisinfo (1)	MedicalMisinfo (2)
Religious Message	0.402*** (0.088)	0.074 (0.098)
Message + Religious Group	0.229* (0.088)	0.209* (0.098)
Message + Partisan Group	0.351*** (0.089)	0.187 (0.099)
Standard Correction	0.142 (0.089)	0.122 (0.099)
Constant	2.242*** (0.062)	2.606*** (0.069)
Observations	1,600	1,600
R <sup>2</sup>	0.017	0.004
Adjusted R <sup>2</sup>	0.014	0.001
Residual Std. Error (df = 1595)	1.124	1.251
F Statistic (df = 4; 1595)	6.707***	1.495

Note:

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

Table I.2: Treatment Spillover: Comparison to Standard Correction

	<i>Dependent variable: Number of spillover stories correctly identified</i>	
	ConspiracyMisinfo	MedicalMisinfo
	(1)	(2)
Religious Message	0.259* (0.089)	−0.039 (0.099)
Message + Religious Group	0.085 (0.089)	0.092 (0.099)
Message + Partisan Group	0.208* (0.090)	0.074 (0.100)
Placebo Control	−0.142 (0.089)	−0.114 (0.099)
Constant	2.384*** (0.064)	2.719*** (0.071)
Observations	1,603	1,603
R <sup>2</sup>	0.017	0.004
Adjusted R <sup>2</sup>	0.014	0.001
Residual Std. Error (df = 1598)	1.123	1.252
F Statistic (df = 4; 1598)	6.711***	1.470

Note:

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

## I.2 Discernment DV

To calculate discernment between true and false stories, we compute averages for true stories (on 4-pt scale where higher = more accurate) and averages for false stories separately. Then we calculate the z-scores for true stories and false stories. Discernment is computed by subtracting z-scores for fake news from z-scores for true news. This measure is the dependent variable in Table I.3.

Table I.3: Discernment as Outcome

	<i>Dependent variable: Discernment</i>	
	ConspiracyMisinfo (1)	MedicalMisinfo (2)
Religious Message	0.330*** (0.086)	0.117 (0.085)
Message + Religious Group	0.136 (0.086)	0.213* (0.086)
Message + Partisan Group	0.302*** (0.086)	0.196* (0.086)
Standard Correction	0.110 (0.087)	0.077 (0.087)
Constant	−0.176** (0.061)	−0.121* (0.060)
Observations	1,598	1,598
R <sup>2</sup>	0.013	0.005
Adjusted R <sup>2</sup>	0.010	0.003
Residual Std. Error (df = 1593)	1.093	1.090
F Statistic (df = 4; 1593)	5.166***	2.083
<i>Note:</i> *p<0.05; **p<0.01; ***p<0.001		

## J Affective Polarization

We measure affective polarization with the question “Suppose a friend of yours was getting married. How would you feel if he or she married a Muslim?”. Responses include 1=very upset, 2=somewhat upset, 3=not very upset, 4=not at all upset. Results show that respondents who are less polarized towards Muslims are also less vulnerable to misinformation.

Table J.1: Religious Affective Polarization

<i>Dependent variable: Number of stories correctly identified</i>	
Marrying a Muslim (higher = more comfortable)	0.729*** (0.048)
Constant	4.046*** (0.142)
Observations	1,601
R <sup>2</sup>	0.126
Adjusted R <sup>2</sup>	0.125
Residual Std. Error	2.246 (df = 1599)
F Statistic	230.129*** (df = 1; 1599)
Note:	*p<0.05; **p<0.01; ***p<0.001

## K Religiosity Index

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