

Research Article

A Novel Strategy for Communication to Drive Voluntary Compliance with Social Distancing in COVID-19 across Religious-Cultures in Mumbai India – The Case of ‘Cognitive Polyphasia’

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Abstract

Aims: Social distancing contains the coronavirus but compliance with social distancing is challenging. Previous studies called to enhance compliance by culturally adaptive messages. We fill the gap in the state of the art testing the power of specific messages as drivers of willingness to comply.

Methods: The sample comprised 277 residents of Mumbai India, who self-classified themselves into one of four religious-cultural groups. A conjoint-based experimental-design was applied with willingness to comply as the dependent variable and contributors to compliance as independent variables.

Results: Regression coefficients for the total panel suggested minor differences in the power of messages. Commonalities in response patterns yielded three distinct mindsets transcending cultures: people seeking to assure compliance; people focusing on the policy communicator; and people focusing on risks of coronavirus. Different messages drive willingness to comply among members of each mindset.

Conclusions: A web-based prediction tool enables to identify the mindset-belonging of individuals/groups and use mindset-tailored messaging to enhance compliance.

Keywords: COVID-19; India; Messaging; Mindset-segments; Religious-culture; Social distancing; Social representation theory; Voluntary compliance

Introduction

Under the complexity and uncertainty of the COVID-19 pandemic, social distancing was found to be effective in containing the Coronavirus [1,2]. Social distancing entails isolation of people with symptoms of COVID-19; quarantines for people with confirmed COVID-19; prohibition congregations, and maintaining physical distance. Social distancing is a central non-pharmaceutical intervention for breaking the chain of infection transmission [3-6]. But compliance with social distancing is poor among members from different cultures compared to the general population [7,8]. Health authorities aspire to optimize compliance with social distancing [9,10]. Optimal compliance with social distancing emerges from personal responsibility for the greater good [11].

In India the COVID-19 pandemic started on 30 January 2020. Within 8 months, India reported 78,761 new cases; 3,542,733 cumulative cases; and 63,498 cumulative deaths on 30 August 2020 [12,13]. Health authorities in India were early to adopt non-

pharmaceutical interventions to contain the spread of the Coronavirus slowing the spread of the epidemic [14]. The government of India implemented sought to understand the impact of social distancing interventions on the dynamics of the daily rates of COVID-19 infections, by estimating rates across 7 periods of the pandemic (Pre-lockdown, Lockdown Phases 1 to 4 and Unlock 1-2), and phased relaxations [1]. Interventions were estimated using Google mobility data, estimates at the national level and for 12 Indian states [1].

Data collection in this current study was from May 20 to July 28th, 2020, which was parallel to the third and fourth strict Lockdown from May 18th to May 31st and to the first and second unlock phases from 1 June to 31 July 2020 in which a conditional relaxation was allowed where the virus spread was contained. A study performed in April 2020 with 2164 participants from India through social networks and WhatsApp found that 61% of participants had heard details about COVID-19 from the social media, 89% knew all ways of coronavirus transmission, 40% felt that COVID-19 is a serious disease, and 78% agreed with the lockdown intervention, 85% believed that lockdowns

help reduce the rate of infection, 89% reported following lockdown guidelines, and 87% reported maintaining social distancing [15]. Data, however, indicated that knowledge about the virus and positive attitudes towards social distancing did not enhance compliance with it [1]. In Mumbai as well, poor compliance with social distancing was evident resulting in a severe outbreak of COVID-19 [10,16,17].

Social distancing is challenging as it alters norms (e.g., personal space, transportation, gender relations within the family), particularly in heavily populated crowded living conditions as in Mumbai [3,18]. Health authorities acknowledge that communication is essential to voluntary compliance [3,8]. People may comply better with social distancing if messages are crafted to promote voluntary rather than mandatory compliance [2,19]. To protect the vulnerable population, in the absence of an effective treatment and a vaccine, social distancing will continue as the non-pharmaceutical intervention, especially in a populous crowded country as India [14,20].

Health authorities have a critical role in designing messages clearly and consistently to enhance willingness to comply (hereafter: WTC) with social distancing [7,21-23]. Culture was found to be central designing messages to shape behavior [24]. The social representation theory stresses that messages regarding social distancing need to be adapted to religious cultures so they reflect the shared reality of group members of each religious culture yielding higher WTC [24-26]. Health authorities were called upon to consider the unique characteristics, needs, and behaviors, of members of distinct religious cultures in designing messages to contain the spread of the virus. Since WTC is strongly related to compliance behavior, identifying messages that drive WTC with social distancing is essential to higher WTC across religious cultures [2,27,28]. Research on the effect of specific messaging on WTC with social distancing in the COVID-19 context is scant. This study responds to previous calls to discover messages that influence WTC particularly necessary for those whose compliance with preventive measures is lower [1,2,24,29-31]. This study seeks to start closing the gaps in state-of-the-art by applying novel strategy for communication to enhance WTC with social distancing.

This study tests the power of messages as drivers of WTC with social distancing From May 18th 2020 to July 31st, 2020 across religious cultures in Mumbai, India [32]. Perceived benefits of social distancing and its practices predict WTC with social distancing [23]. Likewise, trust in the agent communicating the social distancing policy enhances compliance [33]. Some messages may have greater power in driving WTC. Membership in a religious culture relates to shared history, myths, beliefs, language, values, which may not be a matter of personal choice but rather be shared by all members of that religious culture [25].

According to the social representation theory, one's inner world encompasses both the collective and the personal, creating a shared reality among members of a religious-cultural group [25]. The shared religious-culture may transcend the individual so that one's identity accords with perceptions, beliefs, and norms of the religious-cultural group, ignoring dimensions that are inconsistent with them [34]. The influence of messages on WTC with social distancing may depend,

in part, on how people from different religious cultures identify with the different messages [35]. Individuals may differ from each other in many other ways but will share a common response to the messaging on social distancing.

Hypothesis 1: Groups of People Will Respond Similarly to Different Messages on Social Distancing, by Their Religious-Cultural Belonging, Revealing ‘Cultural-Mindsets’

In a pandemic, individuals may have low exposure to mass communication and to networks, they may lack information, or may have different individual experiences (e.g., being infected, quarantined, or hospitalized), all creating a different psychological impact [36]. It is therefore possible that messages regarding social distancing may center the individual, transcending cultural differences.

Hypothesis 2: Groups of People Will have Similar Response Patterns to Different Messages Regarding Social Distancing, Transcending Religious-Cultural Belonging

We explore the effectiveness of messages to drive WTC with social distancing across religious-cultural groups in Mumbai, India. The exploratory research questions are a). Do responses to messaging differ by religious-cultural group? b). What patterns of response are there to different messages?

Subjects and Methods

Ethics

This study is part of a multi-national research project on WTC with social distancing during the second wave of COVID-19 in Canada, the US, Hungary, Italy, Turkey, England, Australia, India, and Israel. This study protocol was approved by the Ryerson University Research Ethics Board (#2020-149). Participants were informed that participation is anonymous and confidential. Participants signed an informed consent regarding participation and publication.

Sample

Respondents were 277 residents of various neighborhoods of Mumbai. Respondents were recruited through social networks and were not paid for their participation. The sample size is acceptable for conjoint-based studies, particularly when aiming for stable coefficients [37]. Based on the concept of religiousness as a universal four-dimensional structure which was recently validated as encompassing the four dimensions of religiousness for cross-cultural and cross-religious research applications in India, participants self-classified themselves to one of the four groups: believing (orthodox), bonding (conservative), behaving (liberal), and not belonging (no religion) [16,38].

Procedure

We utilized an experimental design in which we allocated participants to different groups using repeated measures, where the same participants took part in each condition of each of the independent variables (within groups, or within-subjects design). In this experimental design, participants rated a series of different

combinations of messages with the same rating question. This way, participants did not complete “parallel measures” but were repeatedly exposed to the same question in relation to different aspects of physical distancing. To control the results, we alternated the order by which participants performed in different conditions of an experiment. This experimental design enabled higher variation, randomization, analysis of co-variance and control than in typical observational studies [39]. Considering our complex reality, in which many stimuli may interact with one another, we utilized well known conjoint-based experimental design methodology known for testing the power of messages which has been used to test the power of messages in a great variety of topics [40,41]. With 277 participants and 16 messages in 24 vignettes presented to each participant, 4432 messages were tested with no limitation of degrees of freedom while bypassing typical biases of surveys [37]. A digital link for this online study was distributed through social networks and snowball sampling.

Instrument

The dependent variable is ‘WTC with social distancing, independent variables in conjoint analysis are four categories, each acknowledged as a driver of WTC with social distancing [23,33]. Each category contained four messages, strictly one from each category, all together sixteen different messages. Messages were created based on elements we identified in a thorough literature review on drivers of compliance with social distancing [41]. Participants were instructed to rate each vignette as a unity [37]. The rating question was: “To what extent does the following vignetter drive your WTC with social

distancing?” The rating question appeared on each screen above the vignette. The rating scale ranged on a scale of 1 (Does not at all drive my WTC with social distancing) to 9 (Strongly drives my WTC with social distancing).

The order of the vignettes was dictated by a well-crafted mathematical method called an ‘experimental design’ which structures the 24 vignettes to ensure statistical independence of the predictor variables for subsequent regression at both the individual and group levels [26,29] The vignettes generated a compound message, pulling in different directions, forcing the respondents to evaluate the vignette using their intuition reducing typical biases of surveys [29]. Instrument reliability was tested by comparing data for the total sample with data for half of the sample (0.70; 0.76). Table 1 presents the study instrument.

Data Analysis

The experimental design enabled the deconstruction of responses to the messages by ordinary least-squares regression (OLS) [37]. We created 277 models for WTC using OLS, one for each respondent, each with an additive constant and 16 coefficients, one coefficient for each message. The additive constant is the intercept in a linear equation that may be interpreted as the predisposition of the group to agree to a set of messages in the absence of any specific message. High additive constants (60+) represent groups of people who are likely to agree with the messages. Low additive constants (<35) represent groups of people for whom specific messages drive agreement, not the general proclivity to agree.

Table 1: The Instrument with Messages according to the Four Independent Variables.

Code	Message
Category A: The perceived risk of the COVID-19	
A1	The COVID-19 is a dangerous virus spreading wildly.
A2	Health experts suggest what to do, but government is reactive rather than proactive.
A3	The COVID-19 is not a dangerous virus, but the media dramatizes its strain.
A4	Experts suggest what to do, but the government is reactive rather than proactive
Category B: Preferences of social distancing practices	
B1	To practice social distancing, everyone should work only from home on internet, e.g., Zoom/Skype
B2	To practice social distancing, everyone stays 2 meters apart.
B3	To practice social distancing, everyone is to be confined to within 100 meters from home.
B4	To practice social distancing, everyone should wear a mask everywhere.
Category C: Ways to ensure social distancing	
C1	To assure social distancing, we need a military lockdown.
C2	To assure social distancing, food shopping should be limited to 3 people at a time and pharmacy shopping to 1 person at a time.
C3	To assure social distancing, only age 60+ are allowed to buy groceries during first 2 hours of store day.
C4	To assure social distancing, designated young volunteers should shop for elderly and disabled.
Category D: The agent communicating the social distancing policy	
D1	Provincial/State Government should communicate the social distancing policy.
D2	Federal Government should communicate the social distance policy.
D3	Religious Clergy should communicate the social distancing policy.
D4	The media should communicate the social distancing policy.

We performed OLS to generate individual level equations for each respondent relating to the presence/absence of the sixteen messages [40]. The OLS model was written as follows: $\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$, where \hat{Y} is the predicted or expected value of P_{WTC} (here, the transformed, binarized ratings), X_1 through X_p are distinct independent or predictor variables. β_0 is the value of Y when all of the independent variables, (X_1 through X_p), are equal to zero, and β_1 through β_p are the estimated regression coefficients. The OLS coefficient is the conditional probability that the specific message adds to the perceived driving power of the message for WTC. A coefficient of six or higher is statistically significant, given the standard error of about 4 for the coefficient [40]. A higher coefficient means higher WTC. OLS was run for the total panel, for each religious-culture and for key subgroups (gender, age), incorporating all relevant data into one regression model for the sample. The response to the vignettes, uncovered by OLS, reveals the part-worth contribution of each message to WTC [40].

Since the self-ratings of respondents are not calibrated, following OLS the rating was transformed to a categorical variable (1-6=0; 7-9=1) enabling reduction of variability and crystallization of the strongest drivers of WTC. Next, we analyzed response patterns to each message, using *k*-means clustering algorithm with 1 Pearson’s R distance measure. Fundamental groups, ‘mindsets,’ emerged. ANOVA and Post Hoc tests indicated that differences among mindsets are significant and different specific messages drive 1 WTC for each group. The pattern of positive high coefficients across the mindsets guided the assignment of respondents to mindsets. Last, to translate the knowledge to policy implementation, we developed a prediction tool, the personal viewpoint identifier (PVI). The PVI enables health authorities to may assign a person in the population to a mindset based on the summary data, converting the six strong distinguishing messages to binary questions (agree or disagree). The six messages were chosen using a Monte-Carlo simulation. Each of the 64 possible patterns of responses to the set of six messages is best associated with one of the three mindsets. Based on answers to the six questions in the PVI, the individual or group is assigned to one of the three mindsets, and thus, the appropriate messages may be established for individuals or groups.

Table 2: Sample Demographic Composition.

Variable	Level	Size (n)
Affiliation	Liberal	202
	Conservative	41
	Orthodox	19
	No religion	15
Gender	Female	130
	Male	147
Age	18-24	53
	25-34	167
	35-44	33
	45-54	13
	55-64	9
	65+	2

Results

Preliminary Analysis

Participants were 202 Liberals, 41 conservatives, 19 orthodox, and 15 with no religion belonging, ages 18 to 70. The sample comprised 130 females and 147 males. The response rate was 48% (Out of 573 people that started the online-study, 277 completed it). Table 2 presents the sample demographics.

Hypotheses Testing

To simplify the analysis, we present only messages with positive regression coefficients, driving WTC with social distancing. There were no significant differences in the driving power of messages for the total panel and subgroups. Significant differences emerged when respondents were clustered by the commonality in the patterns of their responses to the individual messages. Analysis of variance and post hoc tests indicate that the distinct mindsets that emerged from are significantly different, highlighting the different messages that impact WTC with social distancing for members of each mindset. The pattern of positive high coefficients across different mindsets guided the assignment of respondents to a mindset. Mindsets are “Pandemic Observers”, who pay close attention to the news; “Obedient Followers”, who expect to be told EXACTLY what to do; and “Sensitive Interpreters” who are attentive to what the government decides. The names of the mindsets were determined by the dominant messages in each. Table 3 presents the additive constant, coefficients, p values, and post hoc results of the mindset-segmentation.

Translating Knowledge to Practice

The three mindsets transcend religious-culture, age, and gender as seen in Table 4. To identify the belonging of individuals in the population to a mindset-segment a PVI is required. We generated 64 patterns, mapping each of the three mindset-segments. We identified six messages that best differentiate among the mindset-segments, based on a two-point scale. Figure 1 presents the web based PVI. The link of the PVI for Mumbai is: <https://www.pvi360.com/TypingToolPage.aspx?projectId=223&userid=2018>

Key Messages

- Compliance with social distancing is challenging.
- To enhance compliance, research suggests using culture-adaptive messages
- Findings suggest that responses to messages depend on one’s thinking not on cultural belonging.
- Three mindsets, each driven by different messages, transcending religious cultures emerged.
- A prediction-tool determines one’s mindset-belonging.
- Authorities may communicate mindset-tailored messages.

Figure 1: Personal Viewpoint Identifier for Assigning Individuals to Sample Mindsets.

Table 3: Mindset segments by ANOVA and Post Hoc Tests for Messages Driving WTC.

Group	Total	Segment 1 of 3	Segment 2 of 3	Segment 3 of 3	
Base Size	277	92	81	104	
Additive Constant	52	58	49	49	
Code Category A: The perceived risk of the COVID-19 virus					
A1	The COVID-19 is a dangerous virus spreading wildly.	0	-12 ^a	-6 ^a	14 ^b
A2	The COVID-19 is not a dangerous virus, but the media over dramatizes its strain.	-1	-12 ^a	-3 ^b	10 ^c
A3	Health experts suggest what to do but government is reactive rather than proactive.	-2	-17 ^a	-5 ^b	13 ^c
A4	The COVID-19 is not dangerous, but all news seems to be about it.	-2	-15 ^a	-1 ^b	11 ^c
Category B: Preference of social distancing practices					
B1	To practice social distancing everyone should work only from home on internet, e.g., Zoom/Skype	-3	-11 ^a	5 ^b	-4 ^a
B2	To practice social distancing, everyone stays 2 meters apart.	-3	-12 ^a	6 ^b	-3 ^a
B3	To practice social distancing, everyone should be confined to within 100 meters from home.	-3	-10 ^a	6 ^b	-3 ^a
B4	To practice social distancing, everyone should wear a mask everywhere.	-4	-16 ^a	8 ^c	-2 ^b
Category C: Ways to ensure social distancing					
C1	To assure social distancing, we need a military lockdown.	3	15 ^c	-11 ^a	3 ^b
C2	To assure social distancing food shopping is to be limited to 3 people at a time and ...pharmacy shopping to 1 person at a time	2	12 ^c	-12 ^a	3 ^b
C3	To assure social distancing only age 60+ are allowed to buy groceries during first 2 hours of store day	1	8 ^c	-9 ^a	3 ^b
C4	To assure social distancing, designated young volunteers should shop for elderly and disabled.	2	15 ^c	-12 ^a	2 ^b
Category D: The agent communicating the social distancing policy					
D1	Provincial/State Government should communicate the social distancing policy.	0	3 ^b	10 ^c	-9 ^a
D2	Federal Government should communicate the social distance policy.	-2	2 ^b	5 ^b	-12 ^a
D3	Religious Clergy should communicate the social distancing policy.	0	1 ^b	11 ^c	-10 ^a
D4	The media should communicate the social distancing policy.	0	2 ^b	9 ^c	-10 ^a

Analysis of variance (ANOVA) showed significance differences (p<0.05) between mind-sets for all elements. Letters indicate homogenous subsets determined by Tukey test.

Table 4: Cross Tabulation among Mindsets.

	Total	MS1 Strong Controller	MS2 Religious Attentive	MS3 Pandemic Observer
Total	277	92	81	104
Male	147	54	43	50
Female	130	38	38	54
20-29	157	52	50	55
30-49	100	33	24	43
50- 50 Plus	20	7	7	6
Orthodox	19	5	7	7
Conservative	41	18	9	14
Liberal	202	65	60	77
No religion	15	4	5	6

Conclusion

This study applied a novel mindset-tailored communication strategy which tested the power of specific messages as drivers of WTC with social distancing through the second wave of the COVID-19 pandemic, across religious-culture groups in Mumbai, India. Theoretically, this study extends the knowledge suggesting that in an extreme health crisis, commonality is based on one's thinking rather than on one's belonging to a religious-cultural group. Methodologically, this study used a conjoint-based experimental

design, overcoming typical biases of surveys, and simultaneously testing numerous messages with no limit of degrees of freedom. Practically, this study presents a novel strategic approach of specific mindset-tailored messaging to enhance WTC with social distancing during future waves of COVID-19.

Hypothesis 1, stating that people from religious-cultural groups will respond similarly to messages on social distancing was not corroborated. Findings contradict the social representation theory and indicate that members of religious-cultural groups have differential

sensitivities to messages [25]. Hypothesis 2, stating that messages transcend religious-cultural belonging, was corroborated. Responses to messages transcended demographics and cultural differences. Findings may be explained by the ‘cognitive polyphasia’ phenomenon [42]. Accepted social representations regularly shared by members of a cultural group, may be challenged in a health crisis creating ‘cognitive polyphasia’, the coexistence of several incongruent social representations at both the group and the individual level, despite their inconsistency with the traditional social representation of the religious-cultural group [34]. Even within one culture, there may be different sources of information about social distancing, generating a variety of ways that people process the information and only then connect it to the social context of the culture.

Members of the four religious-cultural groups may have obtained different information because of who they are as a group (i.e., lack of information, little exposure to mass communication and to networks), and because of their individual experiences in the situation, (i.e., being infected, quarantined, or hospitalized), illustrating ‘cognitive polyphasia’ [42]. Thus, ‘cognitive polyphasia’ may account for the three mindsets emerging *across* religious cultures rather than *within* religious cultures [42]. The emergence of three mindsets revealed the strong messages for each mindset. The proper messages, by mindset, may encourage WTC with social distancing in a pandemic [2,3]. ‘Strong controllers’, (33%), are driven to WTC through messages detailing ways to assure compliance with social distancing: “A military lockdown”; and “Designated young volunteers to shop for the elderly and disabled.” ‘Strong controllers’ prefer harsher measures to assure compliance with social distancing. ‘Religion Attentive’, (29%), are driven to WTC by the agent communicating the message. They prefer that religious leaders communicate the policy. ‘Pandemic Observers’, (38%), pay close attention to the news and are influenced by messages describing the dangers of infection that affect their attitudes and behaviors.

Findings may prompt health officials in Mumbai, India to use the novel strategy of mindset-tailored communication to effectively optimize WTC with social distancing across religious-culture groups, rather than use the same messages for everyone. Recognizing the existence of mindsets and identifying them within the population will allow health officials to communicate through mindset-tailored messaging using the PVI we developed. To assign individuals to a mindset, individuals may be led to a video or a ‘landing page’ on a website creating a base line of mindset-belonging for groups and individuals [2].

Study Limitations and Future Directions

The independent variables of this study are based on recent literature, omitting variables that may not yet be acknowledged as drivers of WTC with social distancing. Also, participants may have been exposed to messaging regarding social distancing before participating in the study, perhaps influencing the rating of the vignettes. Further, the study used a convenience sample, and was conducted in English, perhaps limiting the sample to English speakers in India. Future studies may test the effect of mindset-tailored messaging on WTC with social distancing and examine the effect of previous exposure to messages, the prime effect of messaging, and their effect on WTC.

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