The pandemic and the problem of compliance with safety measures: The case of Egypt

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Abstract
Analysing data from a nationally representative sample of 3442 interviews conducted in Egypt in 2020, this study examines the influence of four sets of factors in predicting compliance with the advice of healthcare professionals to combat the spread of COVID-19: demographics, knowledge and values, fear of the disease and denial, and the pandemic as a foreign invasion. The findings show that a higher likelihood of compliance is linked to socioeconomic status, awareness of the pandemic, reliance on a plurality of information sources, adherence to liberal values, and fear of the disease, but being male, young, employed, religious, fatalistic, and in denial of the severity of the pandemic lower this likelihood – all consistent with the results reported in the literature. In addition, this study highlights the link between compliance and such attributes of nationalism as national identity, national pride, the perception of the pandemic as a national event, and the willingness to sacrifice one's human right to combat the spread of the disease. Drawing on these factors, this paper suggests building societal consensus around the theme of national unity against the microparasitic invasion is the key to an effective strategy to combat the spread of the virus.

Keywords
compliance, COVID-19, Egypt, pandemic, religiosity, values survey

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INTRODUCTION

Before vaccination becomes widely available, nonpharmaceutical interventions or mitigation strategies recommended by healthcare professionals are considered the most readily available option to control the spread of COVID-19. It is, however, a truism that compliance with the mitigation strategies varies noticeably across communities and among individuals. Some fully practice the safety measures, on one extreme, while others resist, claiming the threat of the virus is exaggerated, on another. Understanding this variability is important for both science and public policy. In the U.S., this understanding is complicated by the fact that the seriousness of the disease and how to combat it are turned into a subject of political debate between religious conservatives and secular liberals, those whose primary concern is public health and those preoccupied with the health of the economy, and the people who stress the healing power of prayer and those who rely on science (Franck, 2020; Gadarian et al., 2020; Oosterhoff & Palmer, 2020; Rothgerber et al., 2020). Similar political contentions over the pandemic are also waged in Europe (Bevins, 2020; Krastev & Leonard, 2020; Santora & Kwai, 2020; Youngs, 2020). It is thus difficult to separate the impact of the nationally specific political contentions over the pandemic from the broader sociological factors that would still affect individual compliance in the absence of such contentions.

The survey data collected in Egypt provides an opportunity to assess the effectiveness of pertinent sociological and social psychological factors in predicting compliance. Egypt is an important case to study because the ruling regime controls the narrative on the pandemic (Walsh, 2020). In May 2020, the regime amended the emergency law that granted the security agencies additional powers it claimed were needed to contain the spread of the virus (Aljazeera, 2020). However, like other countries, compliance variability poses a serious problem for healthcare professionals, where adherence to the guidelines by every individual is necessary to ensure the well-being of the entire society. What characteristics of the individuals are linked to compliance? Is it their ability to comply? Awareness or knowledge of the pandemic? Fear? Cultural values? Understanding the influence of these factors not only sheds lights on the relationship between society and health but serves public policy as well.

EXPLAINING COMPLIANCE

The social-scientific literature on medicine and society goes as far back in history as Engels' (1845) *The Condition of the Working Class in England*, linking disparities in healthcare access to unequally distributed wealth (Waitzkin, 1978). Following his approach, social scientists relate the harms of the current pandemic to economic inequalities, racial disparities, and government policies that tend to benefit the wealthy (Gostin & Friedman, 2020; Gravlee, 2020; Krishnan et al., 2020; Parthasarathy, 2020). The services provided by healthcare professionals are presumed essentially utilitarian, resting on the belief in the medical competence that these professionals have and the public does not (Parsons, 1947). The key variable is then social class or ethnic disparity that limits access to the services and the ability to comply with the recommendations.

Another perspective considers medical authority a contested terrain. This perspective originated from the Nazi killing “‘defectives’ of various kinds” and the concern over whether the present-day biomedical rationale of terminating the life of a patient in an irreversible vegetative state parallels the Nazi practice on a moral ground (Alexander, 1949, Hentoff et al., 1988, p. 29). More broadly, however, it also includes studies of challenges to medical authority in cases where there is little doubt in the moral certitude of the doctor’s prescription. Departing from Parsons’s asymmetrical conception of professional authority (Parsons, 1947; Stivers & Timmermans, 2020), this approach addresses the
transformation of this authority as a result of third-party interventions, patient empowerment, and the influence of culture on the conception of the acceptable medical practice (Davis, 2015; Ferguson & Candib, 2020; Kaba & Sooriakumaran, 2006; Light, 2010; Reich, 2016).

A growing scholarly literature on the pandemic shows the influence of both perspectives; how poverty and economic dislocation lessen the ability to comply (Durizzo et al., 2021; Wright et al., 2020), on the one hand, and how politics and ideology challenge medical authority, on the other (Gadarian et al., 2020; Rothgerber et al., 2020). This literature, however, portrays a more complex picture of the correlates of compliance, including factors like perception of the disease’s severity, self-efficacy, social responsibility, and the possibility of infecting others (Lunn et al., 2020, Bogg and Milad 2020, Oosterhoff & Palmer, 2020), emotionality and personality characteristics (Zettler et al., 2020); the sources of information (Bridgman et al., 2020; Durizzo et al., 2021); gender-based attitudes and age (Barcelo and Capraro, 2020, Zettler et al., 2020); and the fear of the disease (Harper et al., 2020).

We assess the linkages of similar factors with compliance, including demographics, awareness of the virus, information sources, values, and fear. We also consider the virus as a microparasitic invader analogous to foreign macroparasitic conquest (McNeill, 1976), begetting nationalist response, and thus assess the link between nationalist awareness and compliance. We argue that this assessment in turn provides a new framework for the formulation of a more effective policy to combat the pandemic. We measure these variables and estimate their links with compliance by analysing data from a nationally representative sample of 3,442 Egyptians collected in 2020. Finally, we make suggestions for public policy.

DEMOGRAPHICS

It is realistic to presume that everyone wishing to stay healthy would follow the safety measures, but the opportunity or inclination to comply is not uniformly distributed among all individuals (Durizzo et al., 2021; van Rooij et al., 2020, Wright et al., 2020). Because education expands health literacy (Hoenig & Wenz, 2020), the educated are more likely to comply than the less educated. Those with higher income are also better able to comply because they are less stressed to pay for the necessary materials (medical masks, hand gloves, etc.) or cover the cost of staying home. Conversely, for the employed, it is harder to stay home, avoid large crowd, or keep social distance than those unemployed. Women tend to observe the safety measure more closely than men because fewer among them have outside jobs, a higher percentage stay home and are thus less exposed to large crowds. Moreover, although gender difference in risk aversion has been the subject of debates (Nelson, 2014), evidence suggests that in patriarchal cultures women tend to be more risk-averse than men (Liu & Zuo, 2019), or men are more likely to avoid facemask than women because they tend to consider it as a sign of weakness (Barcelo and Capraro, 2020). Finally, the young, being more risk-prone and mobile and having a stronger sense of invincibility, are less likely to practice mitigation.

KNOWLEDGE AND VALUES

Compliance depends on the knowledge of the pandemic. The more people know about the disease, the higher is the likelihood that they comply. The source of one's knowledge is also crucial in affecting compliance. People hardly spend time and resources to conduct research on an issue. Rather, they take shortcuts to knowledge by relying on the opinion of the people or the sources of information they trust (Kinder, 1998; Kruglanski, 1989; Popkin, 1991; Sniderman et al., 1991). For example,
Americans who rely on the public health misinformation circulated in social media or promoted by a political party tend not to comply, but those relying on the news media display lower misperceptions and greater compliance (Bridgman et al., 2020; Durizzo et al., 2021; Gadarian et al., 2020; Rothgerber et al., 2020). Whether one's information source is monolithic or pluralistic also matters in shaping attitudes (Moaddel, 2005). In an authoritarian context, where the government controls the media, the latter gains a monolithic character, lessening people's trust. On the other hand, those who rely on more pluralistic sources of information are independently informed and are thus more likely to comply.

Next, values shape orientations towards science (Inglehart, 2018) and thus affect compliance. Conservative values are said to lower compliance (Gadarian et al., 2020; Rothgerber et al., 2020), but greater conscientiousness and self-efficacy tend to increase it (Bogg and Milad 2020, Zettler et al., 2020). Adherence to such liberal values as individual autonomy, gender equality, and secular politics may be linked to a stronger belief in science and healthcare professionals, prompting greater compliance. On the other hand, religious belief may be negatively linked to compliance, because it provides for the faithful an alternative venue of combating the disease – for example, through the prayers or seeking the interventions of what they believe to be supernatural forces. Fatalistic belief that one's destiny is sealed and that there is nothing that an individual can do to change it lowers personal efficacy in combating the disease and therefore diminishes compliance.

FEAR VERSUS DENIAL

People often obey the authorities for the fear of undesirable consequences should they act otherwise. The fear of punishment deters. “Punishment,” says Plato, “brings wisdom, it is the healing act of wickedness” (cited in Stark, 2007, p. 217). It is widely cited that the more certain, swift, and severe the punishment for a crime, the lower the likelihood that people commit that crime (Gibbs, 1968). The fear of repression also ensures conformity to authoritarian rule (Boswell & Dixon, 1990). Facing uncertainty, people tend to follow tight cultural norms (Gelfand, 2018); and if the threat perceived to be from outsiders, they may even sacrifice freedom to obey the leadership of a xenophobic demagogue (Inglehart et al., 2006).

The fear of getting infected, falling ill, and dying from the illness may have the same effect on the individual as the fear of punishment, the threat of repression, and the perils of foreign domination. In fact, the available empirical research shows that fear provokes compliance (Harper et al., 2020) but the fear that a treatment has side effects tends to prompt noncompliance (Stivers & Timmermans, 2020). We thus propose that the more fearful people are of catching the virus, the higher the likelihood of compliance. On the other hand, those who deny the severity of the pandemic are less likely to comply.

THE PANDEMIC AS MICROPARASITIC INVASION

Social scientists have theorised about the significance of major events in shaping attitudes, collective memory, politics and culture (Converse, 1987; Inglehart et al., 2006; Jennings, 1987; Moaddel, 2005; Pennebaker et al., 1997; Schuman & Rodgers, 2004; Sewell, 1996). As the world's worst infectious disease in the past one hundred years (Benziman, 2020) and the first truly global event (Keating, 2020), the pandemic may have similar effects on many domains of social life. One such effect would be to provoke nationalist awareness among the people infected by the virus. For McNeill (1976), it is not farfetched to establish a parallel between microparasitic invasion and the macroparasitism of a
military raid of an agricultural society. If the raid caused speedy death of the agricultural workforce, he says, it would create an unstable form of macroparasitism similar to the African rinderpest of 1891 that “destroyed the hosts in such numbers as to inhibit the establishment of any stable, ongoing infectious pattern” (p. 72). But when the raiders “learned how to rob agriculturalists in such a way as to take from them some but not all of the harvest... cultivators could survive such predation by producing more grain and other crops than were needed for their own maintenance. Such surpluses may be viewed as the antibodies appropriate to human macroparasitism” (p. 72).

We expand this analogy arguing that a microparasitic invasion may also provoke the subjective state in the infected population similar to the nationalist response provoked among a people subjugated by a colonial power, evoking an image of foreign invasion, a national crisis caused by a virus that had come from another nation and spread rapidly in their country, overwhelming the healthcare system, ending lives and destroying livelihoods. In the same way that foreign invasion stirs nationalism (Moaddel, 2005; Moaddel et al., 2008), the pandemic may arouse nationalist awareness. Lending credence to this argument is the use of such terminologies in the media and by politicians as “foreign virus”, “Chinese virus”, “battle against the disease”, or “beating the enemy”, which created a nationalist narrative on the pandemic (Benziman, 2020; Jaworsky & Qiaoan, 2020).

Moreover, just as foreign invasion prompts individuals to sacrifice their rights, resources, and lives for the sake of the motherland, we argue that a similar dynamic is at work concerning compliance, and people who are more willing to sacrifice their rights to combat the spread of the virus are more likely to comply. This argument parallels, for example, the efforts of pan-Arab nationalists to glorify the Arab people and subordinate the idea of individual freedom to the idea of self-sacrifice for the cause of national liberation (Cleveland, 1971).

SURVEY INSTRUMENT, DATA, AND METHOD

We use the survey data collected in Egypt to assess these propositions. The dataset comprising 3442 interviews is from the third wave of a panel survey carried out in the country. The first wave, conducted in 2011, used a nationally representative sample of 3496 respondents. The second was carried out in 2016 and re-interviewed 2430 of the original 3496 respondents (70% response rate). To compensate for sample attrition, 1428 additional interviews were conducted, bringing the total to 3858. In March 2020, 3442 of 3858 respondents were re-contacted and re-interviewed (89% response rate). All the interviews were conducted face-to-face at the respondents’ residence. Egyptian Research and Training Centre carried out the first wave. El-Zanaty and Associates carried out the second and the third waves.

The study questionnaire, consisting of over 250 items, measures values, beliefs, attitudes, and perceptions in such areas of human concerns as culture, religion, gender, family, politics, morality, trust, economics and demographics. A new set of items about the attitudes and orientations of the public towards the pandemic was developed and included in the survey instrument. Before data collection, the questionnaire, sampling procedure, the recruitment of the participants in the study were reviewed and approved by the University of Maryland’s IRB. In Egypt, there is a very limited access to IRB for social studies. Cairo University, which is one of the authors’ home university, does not have IRB. However, the survey instrument has been reviewed by Central Agency for Public Mobilization and Statistics (CAPMAS), part of the Egyptian government, whose approval was required to carry out the study in the country. CAPMAS also provided a sample of household addresses from the available census data.
VARIABLES AND MEASUREMENT

Dependent variable: compliance with mitigation strategies

Two sets of variables make a composite measure of compliance. The first consists of four self-rated activities the respondents conducted to protect themselves: “Since you became aware of the outbreak of the Coronavirus pandemic, on the scale of 1 (not at all taken) to 5 (definitely taken) how do you rate each of the followings that you have taken to protect yourselves from infection”: (i) try to stay home as much as possible, (ii) avoid large crowds in public places, (iii) try to maintain social distance – avoiding handshake or hugging people, and (iv) use disinfectants quite frequently? The mean responses to these questions ranged between 3.72 (stay home) and 3.83 (maintain social distance). The second set includes a series of yes-(coded as 5) or-no (coded as 1) questions on whether respondents practised the following safety measures: (i) using medical masks, (ii) wearing hand gloves, (iii) using hand sanitizer, (iv) washing hands more frequently, and (v) staying home/less social interaction. Those who said yes varied between 10% (hand gloves), 11% (facemask), 42% (stay home), 48% (sanitizers), and 78% (washing hands).

The correlation coefficients among all the items were significant, but the size of the coefficients varied depending on the pair of correlating variables. For example, those who stayed home were less likely to use mask or hand gloves. However, it is reasonable to argue that these items are coterminous and that those who scored higher on all the safety precautions displayed greater compliance. Using the factor analysis technique on the nine items, one factor with an eigenvalue of 3.57, counting 40% of the variance, and Cronbach’s reliability alpha 0.75 was extracted. For the dependent variable to make intuitive sense, the nine items are averaged to create a single measure of compliance, ranging from 1 to 5. A higher value indicates a higher compliance.

Predictors of compliance

(I) Demographics. Education is measured in nine categories ranging from no formal education (1) to university degree (9), household income from the lowest decile (1) to the highest (10), and financial satisfaction is used based on the respondents’ ranking of their financial situation between 1 (completely dissatisfied) and 10 (completely satisfied). Employment, gender, youth bulge, and religious affiliation are included as dummy variables; employed (=1, 0 = otherwise), male (=1, 0 = otherwise), and youth bulge (=1, age 18–29; 0 = age 30 and older), and Muslim (=1, 0 = Christian).

(II) Knowledge and values. One question measures awareness of COVID-19: “Have you heard anything about the spread of coronavirus in the world? (1) no, I haven't heard anything about it, (2) a little, (3) some, (4) a lot.” Sources of information are measured by asking respondents whether they relied (1) a great deal, (2) some, (3) not very much, or (4) not at all on (i) Newspapers, (ii) the Internet, and (iii) social media as sources of information. Responses are recoded so that a higher value indicates greater reliance. The three variables make a single factor (eigenvalue = 2.12 adding up about 71% of the variance, Cronbach alpha = 0.79). They are averaged to make an index of plurality of information sources.

Liberal values are measured by averaging three components: Expressive individualism averages three indicators: (i) basis for marriage, (ii) a woman’s right to dress as she wishes, and (iii) child qualities.
Response to the basis for marriage is coded as 4 for love and 1 for parental approval. Woman's right to dress is measured by whether respondents (4) strongly agreed, (3) agreed, (2) disagreed, or (1) strongly disagreed that it is up to a woman to dress as she wishes. Child qualities are measured by asking respondents to select five from a list of 10 qualities for children to have. The selection of “independence” or “imagination” is coded as “1”, and not the selection of “religious faith” or “obedience” are also coded as “1” (0 = otherwise). The sum of these variables is adjusted to range between 1 and 4 and used as a measure of child qualities. Gender equality is the average of five questions: “Do you (1) strongly agree, (2) agree, (3) disagree, or (4) strongly disagree that: (i) “It is acceptable for a man to have more than one wife,” (ii) “A wife must always obey her husband,” (iii) “Men make better political leaders,” (iv) “University education is more important for boys,” and (v) “When jobs are scarce, men should have more rights to a job.” This index varies between 1 and 4. Finally, Secular politics is the average of four questions: “Do you (4) strongly agree, (3) agree, (2) disagree, or (1) strongly disagree that Egypt would be a better place (i) if religion and politics were separated;” (ii) “if its government was similar to Western governments;” (iii) “Would it be (1) very good, (2) fairly good, (3) fairly bad, or (4) very bad for Egypt to have an Islamic government [Christian government for Christian respondents], where religious authorities have absolute power”; and (iv) “Is it (1) very important, (2) important, (3) somewhat important, (4) least important, or (5) not at all important for a good government to implement only the sharia (for Muslim respondents) or the laws inspired only by Christian values (for Christian respondents)?” Answers to the last question are adjusted to range between 1 and 4.3

Two measures of religiosity are used to reflect religious values: (i) prayer, ranging from (1) never, (2) once a year, (3) once or twice a month, (4) once or twice a week, (5) once a day, (6) two to four times a day to (7) five times daily; and (ii) mosque/church attendance, ranging from (1) I don't go to mosque/church, (2) rarely, (3) once a year, (4) only on religious events, (5) once a month, (6) once a week to (7) more than once a week. Fatalism is measured by asking respondents to choose a number between 1 for “people shape their fate themselves” and 10 for “everything in life is determined by fate.”

(III) Fear versus denial. Two questions measure fear. One is in a yes-or-no format: “are you worried about the spread of Coronavirus” (yes = 1, no = 0, Worry)? The other asks: do you (4) strongly agree, (3) agree, (2) disagree, or (1) strongly disagree that “I am afraid that either myself or someone in my family may actually catch the Coronavirus” (Fear). The first variable, worry, is intended to measure the perception of the pandemic as something that is generally worrisome. The latter, fear, measures the extent to which the pandemic is considered as a specific threat to the respondent or his/her family. One question measures denial: “Do you (4) strongly agree, (3) agree, (2) disagree, or (1) strongly disagree that the threat from the Coronavirus is exaggerated” (Threat exaggerated).

(IV) Pandemic as a microparasitic invasion. To assess how nationalism spurs compliance, five indicators of nationalist awareness are used: two indicators measure the perception of the eventfulness of the pandemic as a national and global event: (i) “What was the most important event that occurred in Egypt in the past five year?” (coded as 1 for those mentioned the spread of Coronavirus, 0 otherwise), and (ii) “What was the most important event that occurred outside Egypt in the past five years?” This variable is coded in the same manner. We suggest that the perception of the pandemic as a national event, being proximate to the respondents, is linked to compliance, while as a global event, being less proximate, is not. (iii) National pride is measured by whether respondents are (4) very proud, (3) proud, (2) not proud, or (1) not proud at all to be Egyptian; (iv) a measure of national identity is constructed by coding as 1 those defining themselves as Egyptians
or Arabs above all, and 0 those considered themselves as Muslims/Christians above all; and (v) and willingness to sacrifice rights by one question: “I am willing to sacrifice some of my human rights if it helps prevent the spread of the virus” (willingness to sacrifice rights). Responses are coded as 4 (strongly agree), 3 (agree), 2 (disagree), or 1 (strongly disagree).

STATISTICAL MODELS AND FINDINGS

Egyptians showed considerable awareness of the pandemic. Only less than 1% expressed that they never heard anything about the disease. A great majority, 91%, considered the pandemic as the most significant event that occurred in the country in the past five years. Fully 86% expressed trusting medical doctors, while 10% and 1.6% said religious and political leaders, respectively, and 2.5% did not know. Less than 7% believed a foreign force was behind the spread of the virus, 64% believed that the virus emerged naturally, and 29% said that they did not know. A sizable minority believed that the pandemic was “punishment from God” (39%). Others said that it was caused by “the failure of people to keep themselves clean” (40%), “the government's failure to keep people healthy” (16%) or did not know (4%). Finally, 75% believed that “only the will of God will stop the spread of Coronavirus,” while 25% said progress in the medical sciences. However, these beliefs had near zero relations with compliance (\(r = 0.005\) with pandemic as “punishment from God” [coded as 1, 0 otherwise] and \(r = -0.027\) with “the will of God” [coded as 1, 0 otherwise]) and no significant link with compliance in the regression model. While showing awareness of God, such beliefs appeared to have little effect on how Egyptians viewed compliance with the advice of healthcare professionals.

Table 1 reports the descriptions of the variables, and Table 2 shows zero-order bivariate correlation coefficients between these variables.

We estimated four regression models corresponding to the four sets of variables and a full model. The results, reported in Table 3, show the percent variation in compliance explained by each model. The baseline or demographic model explains almost 12% of the total variation in compliance (\(r^2 = 0.117\)). The knowledge and values model explains about 21% (\(r^2 = 0.206\)), an increase of about 9% over the baseline model; the fear-versus-denial model, 25% (\(r^2 = 0.253\)), an increase of about 14%; and finally, the foreign-invasion model, more than 20% (\(r^2 = 0.205\)), an increase of about 9%. In sum, the variables measuring fear and denial are the most significant in predicting compliance, followed by knowledge-and-value and foreign-invasion models that explain about the same amount of variation in the dependent variable. The full model estimates show that 20 of 21 predictors are significantly linked to compliance, explaining 33% of the variation.

Demographics

The full model estimates that income, financial satisfaction, and education are positively and being employed negatively linked to compliance (\(t = 8.82, 4.76, 1.94, -2.68\), respectively), supporting the proposition that compliance rests on one's capacity to follow the advice of medical authorities (van Rooij et al. 2020) and that this capacity is structured by social class (Durizzo et al., 2021; Hoenig & Wenz, 2020; Wright et al., 2020). Being less risk-averse (Liu & Zuo, 2019) and more mobile, men and youth are less likely to comply than women and the older age group (\(t = -3.21\) and -3.49, respectively), consistent with other studies (Barcelo and Capraro, 2020, Zettler et al., 2020). Muslims
are more likely to comply than Christians, but this link is weak and inconsistent across the models (t-value varies from −2.52 to 2.50).

Awareness of the pandemic and reliance on a pluralistic information source are linked to compliance (t = 3.82, 6.21, respectively). Liberal values are positively but prayer, mosque/church attendance, and fatalism negatively linked to the dependent variable (t = 5.54, −2.25, −2.01, −3.84, respectively). These findings are in accord with similar results cited in the literature (Bogg and Milad 2020; Gadarian et al., 2020; Rothgerber et al., 2020; Zettler et al., 2020).

Worrying about the pandemic and the fear of getting infected are positively linked to compliance (t = 5.90, 7.32, respectively). These findings are consistent with the view that the fear of punishment prompts conformity to law, of repression acquiescence to an authoritarian rule, of foreign interventions subservience to a nationalist demagogue, and uncertainty about the future taking refuge in a repressive culture (Boswell & Dixon, 1990; Cleveland, 1971; Gelfand, 2018; Gibbs, 1968; Inglehart et al., 2006), and the fear of the disease impels respondents to comply. On the other hand, those challenging medical authorities believing that the threat was exaggerated are less likely to comply (t = −7.69). Finally, compliance is positively linked to all indicators of nationalism; the pandemic as a national event, national pride, national identity, and willingness to sacrifice rights to combat the virus.
| Variable                        | Men    | Youth bulge | Muslim | Education | Income | Employed | Awareness of COVID | Plurality of info sources | Prayer | Mosque/church | Liberal values | Fatalism | Financial satisfaction | Worry | Fear | Threat exaggerated | Pandemic: national event | Pandemic: global event | National pride | National identity | Willingness to sacrifice |
|--------------------------------|--------|-------------|--------|-----------|--------|----------|-------------------|---------------------------|--------|---------------|----------------|----------|-----------------------|-------|------|----------------------|--------------------------|------------------------|---------------|---------------------|--------------------------|
| Compliance                     | -0.13  | -0.01      | -0.05  | 0.18      | 0.28   | -0.08    | 0.26             | 0.21                      | -0.05  | -0.12         | 0.22         | -0.08   | 0.15                  | 0.28  | 0.36 | -0.28                | 0.12                      | 0.08                  | 0.12          | 0.15                | 0.26                    |
|                               |        |             |        | -0.01     | 0.00   | 0.00     | -0.04            | 0.04                      | -0.07  | 0.68           | 0.21         | -0.28   | -0.02                 | 0.28  | 0.36 | -0.04                | -0.28                     | -0.04                 | 0.12          | -0.04               | -0.08                    |
|                               |        |             |        | 0.14      | 0.17   | -0.01    | 0.00             | -0.02                      | -0.05  | 0.01           | 0.12         | -0.03   | 0.01                  | 0.05  | 0.36 | 0.05                 | 0.01                      | 0.01                 | -0.08          | -0.08               | -0.04                    |
|                               |        |             |        | -0.09     | 0.14   | 0.00     | -0.13            | 0.04                      | 0.50   | -0.07          | 0.16         | 0.01   | 0.15                  | 0.12  | 0.27 | 0.26                 | 0.12                      | 0.01                 |               |         |                         |
The pandemic and the problem of compliance

Although the pandemic is a global event, the perception of it as such is not linked to compliance. The proximity of an event to people in time and space is thus crucial in shaping compliance, which is the case when perceived as a significant national event.

In sum, our analysis of a nationally representative sample of 3,442 interviews conducted in Egypt reveals a variety of factors predicting the likelihood of compliance. This likelihood increases by income, financial satisfaction, education, being Muslim in contrast to Christian, reliance on a plurality

TABLE 3 The predictors of compliance (t-values of regression estimates)

|                        | Demographics | Knowledge & values | Fear vs. denial | Foreign invasion | Full Model |
|------------------------|--------------|--------------------|-----------------|------------------|------------|
| Constant               | 30.52***     | 5.4***             | 7.04***         | 7.33***          | −0.18      |
| 1. Household income    | 12.32***     | 8.64***            | 11.87***        | 11.30***         | 8.82***    |
| 2. Financial satisfaction | 5.01***      | 5.17***            | −5.01***        | 3.98***          | 4.76***    |
| 3. Education           | 7.32***      | 1.50               | 6.79***         | 6.95***          | 1.94*      |
| 4. Employed            | −2.56*       | −3.81***           | −3.43***        | −1.31***         | −2.68**    |
| 5. Male                | −5.47***     | −2.34*             | −4.97***        | −6.50***         | −3.21***   |
| 6. Youth Bulge         | −1.64        | −3.20**            | −2.55**         | −1.39            | −3.49***   |
| 7. Muslim              | −2.52*       | −0.54              | −1.16           | −0.81            | 2.50*      |
| 8. Awareness of COVID  | 14.52***     |                    |                 |                  |            |
| 9. Plurality of info sources | 7.34***     |                    | 6.21***         |                  |            |
| 10. Liberal values     | 6.17***      |                    |                 | 5.54***          |            |
| 11. Prayer             | −0.36***     |                    | −2.25*          |                  |            |
| 12. Mosque/church      | −2.90**      |                    | −2.01*          |                  |            |
| attendance             |              |                    |                 |                  |            |
| 13. Fatalism           | −2.68***     |                    | −3.84**         |                  |            |
| 14. Worry              | 7.70***      |                    | 5.90***         |                  |            |
| 15. Fear of catching the virus | 11.56*** |                    | 7.32***         |                  |            |
| 16. Threat exaggerated | −7.64***     |                    | −7.69***        |                  |            |
| 17. Pandemic as national event | 5.89*** |                    | 3.72***         |                  |            |
| 18. Pandemic as global event | 2.85*** |                    | 1.41            |                  |            |
| 19. National pride     | 2.44*        |                    | 2.30*           |                  |            |
| 20. National identity  | 5.90***      |                    | 4.66***         |                  |            |
| 21. Willingness to sacrifice | 14.20*** |                    | 11.55***        |                  |            |

R²₁  = 0.117  0.206  0.253  0.205  0.331
SSR/df  = 284/7  498/13  575/10  428/12  673/21
SSE/3352  = 2120/3351  1891/3328  1677/3251  1626/2946  1332/2886
Total/N  = 2405/3358  2389/3341  2253/3261  2054/2958  2006/2907
F-value  = 64.34***  67.50***  111.52***  64.67***  69.49***
R²−R²baseline  = 0.089  0.136  0.088  0.214

*p < 0.05.; **p < 0.01.; ***p < 0.001.
of information sources, liberal values, awareness of the pandemic, worrying about the disease, fear of catching the virus, the perception of the pandemic as a national event, national identity, national pride, and the willingness to sacrifice one's rights to combat the disease. The factors that lessen the likelihood of compliance are being employed, male, and young; prayer and mosque attendance; fatalism; and the belief that the threat of the virus is exaggerated.

CONCLUSIONS

The effectiveness of nonpharmaceutical interventions to control the spread of COVID-19 depends on the compliance of the highest number of people. While it is reasonable to expect that everyone prefers to stay safe and uninfected by the virus, full compliance may not be forthcoming because people are subject to a variety of factors that shape their ability, rationale, and motivation to comply. This variability not only constitutes a core issue in the sociology of health and illness but also poses a serious problem for public policy.

The debate in the U.S. and Europe over how the virus spread and what to do to diminish its devastating impacts on the population is compounded by contentions for power between the conservative and liberal political parties. It is thus difficult to separate the influence of the frequent political bickering characterizing the current state of liberal democracies in the US and Europe from the broader social processes that would still produce social divisions over how to respond to the pandemic in the absence of rivalries between warring parties. The situation in Egypt is different because open political debates on significant socio-political issues are not allowed by the government. In fact, the government used the pandemic to expand the scope of the emergency law. The country thus provides a natural control for the influence of conflicting political parties on attitudes towards the pandemic.

The foregoing analysis identified four sets of factors that are linked to compliance. The first was demographics, including age, gender, social class, and employment status. The second was the knowledge of the pandemic that included the awareness of the disease and the sources of information people rely on. The third consisted of the fear of the virus and the denial of the seriousness of the pandemic. Finally, the fourth was the attributes of nationalist solidarity and patriotic sensibility. Although with cross-sectional data it may not be possible to establish causality, we postulate that these factors represent different systems of determination. Therefore, we may reasonably conclude that those less likely to comply are people of lower socioeconomic status because they have fewer opportunities to do so; men and youth because they are more risk-prone and mobile; the conservatives, people with a higher religiosity, and those less informed about the virus because they are more likely to question the legitimacy of medical authorities; individuals who are less fearful of the virus and more in denial of the severity of the disease; and those less committed to the ideals of nationalist solidarity. Because the ability, willingness, motivation, and rationale to comply are different among different segments of the population, the formulation of an effective policy to combat the pandemic requires overcoming the influence of these conflicting factors on compliance.

It may be easier for an authoritarian government like China to impose compliance on the people by mobilizing its repressive forces. The threat of punishment from the government and the fear of the virus are thus combined to produce an effective compliance outcome. Under liberal democracies, however, a more successful way of ensuring compliance would be to make a sustained effort at building consensus on a nationalist strategy. The question for a policymaker is how to mobilise the public to comply with the safety measures recommended by healthcare professionals. Drawing on the findings presented in this paper, we suggest, first and foremost, that policymakers must seriously consider the pandemic as a microparasitic invasion on a par with foreign macroparasitism. This conception, which
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requires evoking the discourse of nationalism to rally people's patriotic sensibility, if successful, may overcome many of those who tend to challenge the authority of healthcare professionals and deny the severity of the pandemic.

It is also important to activate informed individuals and groups to educate the public and promote the safety measures. Third, given that fear plays a key role in compliance, the public must be informed concerning the viciousness of the virus in destroying life and the ease with which it spread. Fear in fact ensures conformity to the rules governing the safety measures. Finally, a sound economic policy that pays the more vulnerable segment of the population to stay home, on the one hand, and lessens the financial burden on low-income people, on the other, may contribute to reducing the cost of compliance. The reorganization of the workforce that increases social distancing and decreases the frequency of face-to-face interactions among workers would make it easier for workers to comply. We certainly understand that these suggestions are easy said than done.

Again, fundamental to an effective strategy is building societal consensus around the theme of national unity to combat the disease. A successful government strategy rewards those who try hard to fight the disease and punishes those who aid the microparasitic invaders. Yet, the zeitgeist of nationalist sensibility and patriotic solidarity could be more effective in ensuring compliance than the employment of a repressive policy. The failure to do so, however, would lead to mass fatalities and the destruction of livelihood on a scale that is much higher than the casualties perpetrated on one's nation by macroparasitic invaders.

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AUTHOR CONTRIBUTION
Mansoor Moaddel: Conceptualization (lead); Data curation (lead); Formal analysis (lead); Funding acquisition (lead); Investigation (lead); Methodology (lead); Project administration (lead); Resources (lead); Supervision (lead); Writing-original draft (lead); Writing-review & editing (lead). Fatma El-Zanaty: Project administration (equal); Resources (supporting); Supervision (supporting). Rashad Hamed: Data curation (supporting); Resources (supporting). Abdelhamid Saeed: Data curation (supporting).

DATA AVAILABILITY STATEMENT
Data will be available at www.mevs.umd.edu

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ENDNOTES
1 Some argue that the use of war terminologies like “heroes,” “angels,” or “frontline workers” to characterize healthcare workers may create a dubious zeitgeist (Cox 2020; Stokes-Parish et al., 2020). Yet, such terminologies may provoke nationalist awareness and thus greater compliance.
2 This study is part of a larger panel survey project on values changes in Egypt, Tunisia, and Turkey. It started in Egypt in 2011 and Tunisia and Turkey in 2013. The questionnaire was developed in English, translated to the vernaculars,
and then back-translated to English by someone who had not seen the original English version. This process was reiterated back and forth until it was decided that the questions had the same meaning in all the languages. It was pre-tested in each country on diverse respondents. The sample was drawn using a multi-stage area probability sampling frame of households from census data by Central Agency for Public Mobilization and Statistics, the government agency that collects and disseminates such data. Kish table or “next birthday” method was used in selecting a respondent from each household for interview. Replacement at the household level was not permitted. The population consisted of those who were 18 years or older citizens of the country from all walks of life. Immigrant workers and those in prisons, nursing homes, student dormitories, and other institutional settings were excluded. Hard-to-reach areas like remote desert regions in Egypt were excluded because of fiscal constraints and security concerns. In training interviewers, well-established interviewer training protocols were used to reduce bias and differences in the delivery of questions before commencing data collection (de Jong and Young-DeMarco 2017).

3 For a more detailed discussion of these measures, see Moaddel (2020).

4 The belief in foreign conspiracies is an indicator of nationalism and positively correlated with compliance. But since the high percentage of “don’t knows” reduces considerably the sample size, this variable was not included in the statistical models.

5 Egyptian awareness of the pandemic might have been influenced by the government’s efforts to combat COVID-19, including: (1) paid subsidization of employment; (2) loans deferment; (3) partial lockdown; (4) closing cafeterias and theatres; (5) reducing employment at state agencies; (6) schools’ closures; (8) suspension of air traffic; and (9) awareness campaign (the list provided by El-Zanaty & Associates).

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