Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Commentary on "Different roles of interpersonal trust and institutional trust in COVID-19 pandemic control"

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A B S T R A C T

An increasing number of epidemiologic studies have identified trust as a social determinant of COVID-19 mortality. Trust influences public compliance with policies aimed at containing the pandemic through physical distancing, wearing masks, and vaccine uptake. However, whilst some forms of trust are public assets (e.g., trust in government), others might be liabilities (e.g., trust in close friends and family members). Contributing to this body of work, Lou et al. (2022) examined associations of trust with COVID-19 fatality rates and willingness to get tested for COVID-19. Using correlation analyses, behavioral experiments, and agent-based modeling, they found institutional trust predicted lower COVID-19 fatality rates and greater willingness to get tested. In contrast, interpersonal trust predicted the speed with which COVID-19 was controlled in the early stages of the pandemic and people's willingness to obey norms preventing the spread of the virus (e.g., decreased nonessential outdoor activity). Investigations such as this offer useful knowledge to public health officials on ways to mitigate a pandemic. This commentary examines the pivotal role of social science in pandemic control, which up to now has been underfunded and overshadowed by the race to develop vaccines. We also highlight the importance of theory, particularly in research on trust, to producing evidence that is replicable and meaningful for policy application.

One of the few bright points of the COVID-19 pandemic has been the rapid development of vaccines. But as the pandemic enters its third and deadliest year so far, driven by the highly contagious Omicron variant, public optimism for a quick end to the pandemic has waned. Particularly troubling from a public health perspective is that governments have grown weary of managing misinformation and distrust about vaccines. Unfortunately, some governments appear to shape their policy on intuition as much as scientific evidence. Worse still, when governments look to scientific evidence to inform public health measures, social science research is largely ignored.

As evidence, in a recent interview given to Public Broadcasting Service (PBS), Dr. Francis Collins, former director of the National Institutes of Health (NIH), acknowledged that NIH "underinvested in research on human behavior" (Just, 2021). Collins expressed surprise that over 60 million people in the US alone decided not to take advantage of the "fantastically safe and effective" vaccines that help the body develop an immunity to the SARS-CoV-2 virus. Presently, 1 in 4 adults in the US have yet to receive at least one COVID-19 vaccination dose (CDC, 2021) and polling by Monmouth University found that 21–34% report that they will never be vaccinated (Murray, 2021). Collins' admission underscores what social and behavioral scientists have tried to convey since the onset of the pandemic—insights from the social and behavioral sciences can help public health experts understand human behavior and support policy efforts to bring an end to the pandemic (Van Bavel et al., 2020).

Trust is key in public compliance with policies aimed at containing pandemics (e.g., physical distancing, vaccination). It is foundational to social interactions (Uslaner, 2002) and decision-making (Yamagishi and Kiyonari, 2000), especially in social dilemmas involving the common good (Dawes and Messick, 2000). In common goods dilemmas, people must decide how much to contribute to maintaining or improving the common good (e.g., clean air and water, public transportation, schools, or health care). When faced with such dilemmas, refusal to cooperate due to a lack of trust results in poorer outcomes than if everyone had cooperated (Kollock, 1998). In the COVD-19 context, a lack of trust may lead to a surge of cases from unvaccinated people who do not comply with preventative measures, and as a result overwhelm the health care system.

Trust is also multidimensional and germane to the concept of "social capital," which is a broad theoretical construct that describes shared social resources that stem from institutionalized relationships of mutual acquaintance and recognition (Bourdieu and Wacquant, 1992). Theories of social capital describe distinct yet related contextual factors (e.g., trust, social networks, norms of reciprocity) that run along strong social

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ties with family members and close friends and weak social ties with outside groups and institutions (Poortinga, 2012; Putnam, 2000). Some theorists further distinguish ties with outside groups of equal status from those with state institutions. Szreter and Woolcock (2004) identified three dimensions of social capital: *bonding* corresponds to relationships between people who are similar in some respect; it reinforces social identities and fosters trust and reciprocity; *bridging* is outward-looking and shared across groups that differ in some respect; *linking* pertains to trust and confidence in formal authority.

The point here is trust operates in at least three dimensions (between ingroup members, between outgroup members, and towards government institutions), and these dimensions may function independently or even antagonistically to one another. High trusting members of a tight-knit community may still hold distrustful, xenophobic views towards members of an outside group or distrust the health advice of government officials, or both.

Segmenting trust across different levels of social capital is useful to public health officials who are tasked with understanding and predicting popular opinion and behavior during an emergency such as COVID-19 (Koh and Cadigan, 2018). Whilst some forms of trust are public assets (e.g., trust in government), others might be liabilities (e.g., trust in close friends and family members). Compliance with public health measures and any new vaccine rollout require strong public confidence in government scientists and regulatory institutions. If the public does not trust the science that undergirds vaccine development or questions the motives of government officials for wanting the public to get vaccinated, uptake will be hampered, and the pandemic will last longer and claim more lives as a result.

Trust in friends, family, and neighbours also influences virus transmission and thus mortality, but for different reasons than trust in science and government. People assume that close others have their best interest at heart—an assumption that is not entirely unfounded. In fact, people are significantly more likely to help others whom they perceive as sharing the same social group (Levine et al., 2005). They are also more likely to accept help from fellow ingroup members (Haslam et al., 2011). Overall, social affiliations and connectedness have positive effects on health and wellbeing (Elgar et al., 2011; Haslam et al., 2018), so much so that Putnam (2000) argued that being a member of a social group can "cut your risk of dying over the next year in half" (p. 331). However, blind trust in who you know may also have a negative influence on attitudes and knowledge about COVID-19, proliferate misinformation and dismissive attitudes towards physical distancing or vaccines through behavioral contagion (Villalonga-Olives and Kawachi, 2017) and stand in the way of public health efforts.

The good news is that people are more likely to comply with regulations if they feel others are also complying. For example, perceived compliant behavior of close others (i.e., descriptive social norms) predicted people's compliance with pandemic regulations a few weeks later (Rudert and Janke, in press). Beliefs about others' willingness to comply with distancing rules predicts compliance with these rules (Twardawski et al., 2021). Trust in others and institutional trust during the COVID-19 pandemic were also central to a series of studies described by Lou et al. (2022). They examined whether COVID-19 cases and deaths in US states and worldwide are associated with trust in institutions and trust in unknown others (referred to as "interpersonal trust"). Using epidemiological and experimental methods, they found that institutional trust predicted lower COVID-19 fatality rate and greater willingness to get tested. In contrast, interpersonal trust predicted the speed with which COVID-19 was controlled in the early stages of the pandemic as well as people's willingness to obey norms preventing the spread of the virus.

Their contribution to the ever-growing body of social science research on COVID-19 is laudable but held back by its sparse conceptual framework and rudimentary measures of trust. In particular, the survey item "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" has been used in many social surveys but does not specify who these "people" are, and therefore is difficult to align their results with established theories of social capital. Evidence derived from a generic, single-item measure of trust that fails to distinguish ingroup and outgroup bonds makes it difficult to interpret trust's effects on attitudes and behaviors and obscures moderators of these effects. For instance, a recent study found that trust in government combined with greater educational attainment predicts higher vaccine rates in rural areas of the US (Sun and Monnat, 2021). Another study found feelings of moral reproach and distrust towards a vaccinated (outgroup) majority predicts more refusal to get vaccinated (Rosenfeld and Tomiyama, 2022). Our work found trust in close others, net of economic differences and other dimensions of social capital, predicted more COVID-19 deaths (Elgar et al., 2020).

That interpersonal (or bonding) trust may have deleterious consequences during a pandemic is consistent with social identity theory (SIT; Tajfel and Turner, 1986). SIT posits that a part of people's sense of self is derived from membership in groups and thus they are motivated to see these groups in a positive light. Moreover, perceptions of positive traits such as "trustworthiness" are more common among ingroup members than between groups (Brewer, 2000). This tendency is attributed to a process of "depersonalization" that occurs when a person identifies with a group, making self and other members of the group "interchangeable" (Abrams and Hogg, 2001; Turner and Reynolds, 2001). How might this manifest during a pandemic? Trusting members of one's own community becomes incongruent with public health guidelines while in their vicinity (e.g., not wearing a mask while visiting an extended family member).

Put simply, general social trust is agnostic to health promotion. Trust in people we know well to behave in ways that reduce the spread of COVID-19 leads to poor decision making. Indoor gatherings with people we trust seem less risky than gathering with strangers. Most people can tell at least one anecdotal story of a friend or family member who caught the virus because they let their guard down in the presence of a close other. Multidimensional assessments of trust and complementary research designs are needed to fully capture the social dynamics of the COVID-19 pandemic and to elucidate which types of trust promote and hinder pandemic response.

We applaud Luo et al.'s (2022) efforts to experimentally manipulate trust and we encourage replications and extensions of this line of inquiry to address COVID-19 directly. Unfortunately, the tools and methods used in Studies 2a and 2b do not mention COVID-19. Contrived scenarios described to MTurk participants (e.g., imagine an infectious disease outbreak in your community) are several steps removed from the real thing. Still, we appreciate the approach to triangulate results of correlational and experimental studies and agent-based modeling, as each addresses some of the shortcomings of the others.

The development of life-saving vaccines and antiviral medication were research priorities of the last two years. However, these are not sufficient to end COVID-19. This is because public health measures and vaccine uptake are influenced by social, cultural, and psychological factors. Only research from the social sciences can provide the evidence needed to correct misinformation shared through social media (Duffy, 2020), underestimation of COVID-19 severity (Küppers and Reiser, 2021), and distrust of authorities (Bodas and Peleg, 2021) and the very measures employed to combat the virus (Bogart et al., 2021). Although investigations like those described by Lou et al. (2022) offer useful knowledge about the social determinants of COVID-19 outcomes, such investigations must build upon previous theoretical and empirical work in the area to have the influence that social scientists desire and expect. As acknowledged by Dr. Collins, ignoring social and behavioral science may contribute to our own peril, as even the most effective vaccines are useless if people refuse to take them.

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