



# On masks and masking: epistemic harms and science communication

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## Abstract

During emerging public health crises, both policymakers and members of the public are looking to scientific experts to provide guidance. Even in cases where there are significant uncertainties, there is pressure for experts to “speak with one voice” to avoid confusion, allow officials to make evidence-based decisions rapidly, and encourage public support for such decisions. This can lead experts to engage in masking of information about the state of the science or regarding assumptions involved in policy recommendations. Although experts might have good reasons for masking disagreements, uncertainties, or assumptions when offering policy advice, we argue that this strategy can result in epistemic harms. Using the case of the COVID-19 pandemic, we show that public health authorities masked two types of information necessary for laypersons to evaluate public health recommendations: (1) experts’ disagreements about the scientific evidence and (2) the role of values in making inferences from the science to policy positions. We contend that this resulted in epistemic harms against laypeople that provide a pro tanto case against masking information. We further argue that when the science is in flux and policies need to be implemented despite significant uncertainties, there is an all-things-considered case against masking the types of information discussed.

**Keywords** Masking disagreements · Values in policymaking · COVID-19 · Epistemic harms · Science and policy

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## 1 Introduction

When dealing with public health matters, scientists and health professionals are not merely communicating facts about some threat but are also making or supporting public health recommendations. During the COVID-19 pandemic, and despite the presence of significant uncertainties, experts faced pressure to offer clear, consistent, information and recommendations. Large-scale public action was urgently needed to avoid disastrous consequences, including overwhelmed healthcare systems and high mortality. In these contexts, where both policymakers and members of the public are looking to scientific experts to provide guidance, there is an interest in avoiding confusion to allow policymakers to make evidence-based decisions rapidly and to foster the public's support for such decisions. Instead of, for example, acknowledging and communicating disagreements and uncertainties regarding the scientific evidence, scientists and public health professionals often mask or omit such information. Here we focus on how experts can mask information that is relevant to the assessment of particular public health policies in a context where there is significant scientific disagreement and uncertainty, but also a need for large-scale rapid decision-making.

Although there might be good reasons for public health authorities to sometimes mask disagreements, uncertainties, and complexities of science and policy despite their relevance to decision-making, we argue that this strategy can result in significant epistemic harms. This article proceeds as follows. We first clarify what we mean by masking as well as why we focus on its epistemic harms. Using the case of the COVID-19 pandemic, we then show that experts masked two types of information that were relevant to assessing policy decisions: (1) experts' disagreements about the scientific evidence, and (2) the role of values in making inferences from scientific claims to policy options. We show that this resulted in epistemic harms against laypersons, both members of the public and non-expert policymakers. Given these epistemic harms, there is a pro-tanto case against masking such information. We then argue that while open and honest communication about the types of information we discuss might similarly involve epistemic costs, at least in contexts where the science is in flux and policies need to be implemented despite significant uncertainties, there is also an all-things-considered case against masking the types of information addressed here.

## 2 Preliminary clarifications

Masking, as we will use it here, involves a failure to provide information that is particularly relevant to judgments about the justification of certain public health recommendations. Although a variety of information might be pertinent to such judgments, we focus on two types of information that are clearly relevant to science-based policy assessments: evidentiary disagreements by experts and the role of values driving policy decisions. It seems uncontroversial that information about evidentiary disagreements among experts is relevant to assessing the soundness of science-based policy recommendations. If reasonable scientific disagreements about the evidence for the efficacy of masks, for instance, exist, this is important for assessing whether a recommendation to wear masks is justified. Similarly, information regarding the necessary

role that values play in grounding particular policies or actions is pertinent to assessing whether the values at stake provide compelling reasons to warrant adopting those policies or actions. Despite the insistence of various government and health officials that their recommendations are simply “following the science,” public policy choices also require value judgments (de Melo-Martín & Intemann, 2018; Goldenberg, 2021). What these value judgments are affects whether one believes the appropriateness of following certain advice or whether policy makers should implement specific policies. For instance, vaccine mandates are grounded not simply on the fact that vaccines are safe and effective but also on value judgments involving, for example, the importance given to health protections over individual liberty claims.

Masking can occur either through the commission of false or misleading statements or the omission of pertinent contextualizing information that inhibits a laypersons’ ability to rationally assess policy choices. Such masking can be done by individual experts but can also be done by institutions or organizations engaged in science communication. Beatty (2006), for example, has shown how groups of scientists can mask disagreements by deciding to withhold certain information and communicating only about simplified, broad claims for which there *is* agreement.

Masking can be intentional or unintentional. There can be, for instance, a deliberate decision to omit relevant information for fear that it will confuse people or lessen their will to follow health recommendations. Motivations for masking information can be reprehensible, such as the presence of conflicts of interest, but they can also be well-intended, such as trying to keep the public safe or avoiding confusion. In some cases, masking may be unintentional, as even experts are not always aware when they are failing to report information that is relevant to policy assessment. Masking of the role of values in policy and the ways in which different values support various policies, for example, is likely to be the result of experts themselves being unaware of, or inattentive to, the relationships between science-informed policy and values.

Even though the reasons experts might have for masking information relevant to policy assessment might be more or less defensible, our concern here is not primarily with the motivations experts have for masking but with whether it took place and with the effects of such masking on the public. Such effects are conceptually and practically distinguishable from the intentions scientists and health authorities might have had when communicating with laypersons.

Masking information relevant to science-based policy choices can contribute to a variety of harms to individuals, e.g., harms to health, if recommended actions turn out to be unsafe, harms to autonomy, if one is required to partake in certain activities. However, we focus here on the epistemic harms of masking. Masking makes people worse off from the perspective of epistemic normativity by hindering inquiry, impeding knowledge, leading to error, undermining justification, and the like (Fleisher & Šešelja, 2023; Goldberg, 2016). We focus on epistemic harms for two reasons. First, even though masking can result in harms to health, for instance, it does so by hindering people’s ability to form correct beliefs or make sound judgments. Second, the epistemic harms produced by masking can occur, even if no other harm obtains. Arguably, a practice that produces misleading evidence or contributes to false or inaccurate beliefs is epistemically harmful even if those false beliefs have no practical consequences

leading to other harms. Misleading evidence and false beliefs are obstacles to finding the truth, which we can value for its own sake (McHugh, 2012; Mitova, 2021).

Although some of the epistemic harms of masking might also involve epistemic wrongs (Kidd et al., 2017), determining whether or not they do so is beyond the scope of this paper. In particular, we do not claim, that the types of epistemic harms discussed here necessarily amount to epistemic injustices (Dotson, 2011, 2014; Fricker, 2007; Medina, 2012). Epistemic injustices involve wronging one in one's capacity as a knower because of an identity prejudice (Fricker, 2007). Hence, though clearly some types of masking could constitute epistemic injustices, they need not. Although there has been attention in the literature to the epistemic—and non-epistemic harms—of disclosing uncertainties or reporting scientific disagreements regarding evidence (Ding et al., 2011; Han et al., 2018; van der Linden et al., 2015), we believe that attention to the epistemic harms of masking has been neglected. As we argue below, the existence of these harms provides a pro-tanto reason against the types of masking discussed here.

### 3 Masking and its epistemic harms

In what follows, we use the case of the COVID-19 pandemic to show that health authorities masked two types of information relevant to making judgments about the justification of certain policy decisions: (1) experts' disagreements about the scientific evidence, and (2) the role of values in grounding policy positions. In each case, we argue that this resulted in epistemic harms against laypersons, including members of the public and non-expert policymakers. Admittedly, the two kinds of masking we identify are often entangled. That is, in some cases experts may disagree about what weight to give to existing empirical evidence precisely because they are assuming different values. Nonetheless, we think it is conceptually useful to distinguish these disagreements here in order to identify various epistemic harms.

#### 3.1 Masking disagreements about empirical data

Some clarifications are in order before discussing how scientific disagreements were masked during the COVID-19 pandemic. First, the evidence and uncertainties regarding the nature of SARS-CoV-2 and its effects changed over time. Hence, evidentiary disagreements that were present at some point, later disappeared, with new agreements and different disagreements taking their place. Therefore, the examples discussed here will be time-specific, that is, based on the evidence that was available at the time. Second, our concern is with the masking of what were arguably reasonable disagreements among experts regarding what the scientific evidence said, how best to interpret its significance, and how to manage uncertainties. We are not concerned with the masking of disagreements about COVID-19, SARS-CoV-2, or particular interventions to control the pandemic, that were not grounded on any scientific evidence (e.g., that the pandemic was created and planned by a large government conspiracy or that COVID-19 vaccines contained tracking chips). Third, some of the disagreements we discuss were well known among scientific experts. Hence, although those following scientific

debates might have been well-aware of the existence of some of these disagreements, both national and local public health officials failed to communicate them and their relevance to the public. It is this masking to laypeople that is our concern.

Scientists or public health experts might disagree about empirical evidence in various ways. They might disagree about what data to collect, whether the collected data constitutes evidence for a particular hypothesis, or whether existing evidence is sufficient to support certain recommendations given uncertainties. During the COVID-19 pandemic, these kinds of disagreements were often interrelated and, as we show, were often masked when communicating with laypersons.<sup>1</sup>

Some of the disagreements that public health officials masked pertained to whether there was sufficient evidence to support particular recommendations. For example, at the beginning of the pandemic, US public health experts—including CDC Director Robert Redfield, NIAID Director Anthony Fauci, and White House COVID Response Coordinator Deborah Birx, presented a united front regarding the ineffectiveness of masks as protection against SARS-CoV-2. Healthcare authorities strongly advised Americans not to buy masks (Wright, 2021). They insisted that sick people should wear masks, but that they were unnecessary for everyone else. This united front, however, obscured the scientific uncertainty regarding who could transmit SARS-CoV-2 and how it was transmitted, and thus conflicts in the scientific community about the usefulness of masks in controlling the pandemic (Peeples, 2020; Wright, 2021). If, as some scientists believed, the virus spread via aerosols and asymptomatic transmission was possible, then masks could be an important strategy in managing the virus. Indeed, while the U.S. and WHO officials strongly opposed universal use of face masks, masks were ubiquitous in Asia including Hong Kong and Taiwan, where at that time the virus seemed well-controlled.

As early as January 2020, some peer-reviewed evidence indicated that asymptomatic individuals could spread the virus (Rothe et al., 2020), and more appeared in February, and March 2020 (Bai et al., 2020; Kimball et al., 2020; Nishiura et al., 2020; Zou et al., 2020). Health authorities in most western countries, however, presented a united front contending that people were contagious only when they had symptoms (Apuzzo et al., 2020). In June 2020, WHO officials were still insisting that asymptomatic transmission was very rare despite the accumulating evidence (Gandhi et al., 2020; Oran & Topol, 2020).

A similar masking of scientific disagreements occurred with regards to the mode of SARS-CoV-2 transmission. For months, U.S. and WHO health officials insisted that the virus was transported only through droplets when people coughed or sneezed.

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<sup>1</sup> Quite likely at least some of the disagreements about evidence were the result of different value judgments (which were also masked). Some of them were likely related to differences in inductive risk assessments, others to diverse conceptions of safety or of what risks were thought to take precedence. There is a large body of literature on science and values that discusses the unavoidable and desirable role of values not just on questions about what projects to fund, or how to apply scientific results, but also on decisions regarding experimental design, choice of methodologies, characterization of the data, and interpretation of results (e.g., Anderson, 2004; Brown, 2014; Douglas, 2000; Dupré, 2007; Elliott, 2017; Intemann and de Melo-Martin, 2010; Kourany, 2010; Lacey, 2005; Longino, 1990; Wylie and Nelson, 2007). However, our concern here regarding evidentiary disagreements is centered on the existence of such disagreements—and their being masked—rather than on the reasons for the disagreements and the masking of such reasons (likely involving value judgments).

However, some scientists argued that there was preliminary evidence that the virus could travel in much smaller particles from exhaled air (Morawska & Milton, 2020; Nishiura et al., 2020; Tang, 2021). If so, strategies such as increasing ventilation indoors and using masks could reduce the risk of infection (Lewis, 2020). It took WHO and the CDC many months to officially acknowledge that aerosols could transmit the virus long-range and remain in the air (Lewis, 2022; Samet et al., 2021).

Disagreements about what constituted evidence for decreased immunological protection were also masked in recommending vaccine boosters for the general population. In November 2021, the FDA authorized the use of booster shots for all adults, and shortly after, the CDC made recommendations to expand access to boosters for anyone over 18 years of age (CDC, 2021). These recommendations were made without reference to significant disagreements in the scientific community (Guerrera et al., 2021; Mandavilli, 2021; Offit, 2022; Rubin, 2021). Although the experts who disagreed with the recommendations acknowledged that anti-SARS-CoV-2 antibodies waned over time, they believed there was uncertainty regarding the levels of antibodies needed for protection. They also argued that immunological memory—and not simply neutralizing antibodies—was important in providing protection against serious disease and death (Guerrera et al., 2021; Rubin, 2021), such that an additional booster might do little to improve these health outcomes.

Likewise, public health recommendations about school closures masked various disagreements in the scientific community. By March 2020, 169 countries had implemented school closures, with 1.5 billion learners affected (Buonsenso et al., 2021). In the US, by March 30, 2020, all but one US public school districts were closed and at least half of them remained closed for the rest of the spring semester (Zviedrite et al., 2021). In many countries, at least partial school closures continued during the 2020–2021 academic year (Hale et al., 2021). Evidence supporting the effectiveness of school closures in controlling the COVID-19 pandemic came initially from assumptions about influenza outbreaks (Viner et al., 2020). The evidence for the effectiveness of school closures even in the context of influenza outbreaks was however ambiguous (Auger et al., 2020; Viner et al., 2020). Nonetheless, public health officials at the local and national levels presented a united front about the efficacy of school closures in controlling the spread of the virus and ultimately in preventing harms. This united front, however, masked significant disagreements about the strength of the evidence and about what evidence was relevant to evaluate the effectiveness of school closures. For instance, some researchers contended that school closures could be effective for infection control if infection rates were higher in children than in adults (Esposito & Principi, 2020). From the beginning, though, there was evidence that children were less likely to become infected than adults, and not likely to be super-spreaders (Nikolopoulou & Maltezou, 2022). By summer 2020, various reviews indicated that children were unlikely to be drivers of the pandemic (Ludvigsson, 2020; Munro & Faust, 2020). For others, the relevant evidence for the effectiveness of school closures was related to whether children were more likely to become infected or infect others in educational settings than they were at home (Macartney et al., 2020; Xu et al., 2020). Others focused on evidence about risks to children's wellbeing (Pfefferbaum, 2021; Thomas et al., 2020) and to their families, particularly those belonging to minority

populations (Prime et al., 2020; Ursache et al., 2022) and those with healthcare workers (Bayham & Fenichel, 2020). Yet despite disagreement about what data might be relevant, school closures were often presented as the only option given the science.

Masking evidentiary disagreements carries potential epistemic harms. First, when disagreements about the existence of uncertainties or the significance of the empirical evidence are masked, it denies laypeople access to contextualizing information that may be relevant to their decisions about how to act or what policy to adopt. Knowing, for example, that there was significant debate about the virus mode of transmission and who could transmit it might have altered how individuals assessed the potential benefits of mask wearing. Similarly, the masking of evidentiary disagreements relevant to school closures may have obscured policy options or strategies that school boards might have adopted. Indeed, insofar as decisionmakers were not aware of disagreements, their reasons for adopting particular policies or actions were not fully informed. Masking disagreements about the scientific evidence thus can deprive decisionmakers of relevant information.

Second, lacking information that may be epistemically relevant can give rise to other false beliefs. Because the view that the virus spread by droplets was presented with such confidence early in the pandemic, it may have shaped behaviors and practices that people thought were safe (such as standing 6 ft. apart or taking off a mask to eat or drink) even after the scientific consensus on how the virus was transmitted shifted.

Third, masking relevant scientific disagreements when proposing recommendations can damage warranted epistemic trust. For example, the insistence, early in the pandemic, that masks were ineffective in protecting against COVID-19 despite uncertainty about how SARS-CoV-2 was transmitted, undermined the public's ability to believe in justifications for future recommendations. Indeed, evidence shows that the backtrack by U.S. health authorities in April 2020 regarding the importance of masks in the management of the pandemic is one reason that public resistance to wearing masks increased (Wright, 2021). Problems could have been limited also when policy recommendations changed regarding testing of asymptomatic individuals (Oran & Topol, 2021). Recognition of uncertainty and dissenting opinions from experts would have allowed health authorities to offer good reasons for changing course. Instead, it appeared to many that policy recommendations were simply arbitrary. Furthermore, masking evidentiary disagreements can undermine public confidence in science or science-based policy recommendations even more broadly than just with respect to the issue about which the obscuring occurred. Warranted epistemic trust in science requires not only the belief that experts are epistemically reliable, but also that they are working in the public interest (de Melo-Martin and Intemann 2018; Goldenberg, 2021). If laypersons come to (rightly) believe that scientific disagreements are being masked, or that scientists are not being transparent about uncertainties and limitations of current evidence, it can also provide good reason to wonder whether scientists genuinely have the interests of the public at heart.

Damages to warranted epistemic trust constitutes an epistemic harm because epistemic trust is significant to the multitude of interactions between science and society (Anderson, 2011; Grasswick, 2010; Scheman, 2001; Wilholt, 2013). Scientific knowledge is complex, abstract, and reliant on intricate technological devices and cognitive tools such as models. Making sense of scientific phenomena requires a significant



amount of expertise. To understand particular phenomena, then, members of the public must trust scientific experts and rely on the information they provide. But they must also rely on such information in order to participate in democratic discussions that implicate scientific knowledge, such as whether vaccines are safe and effective, what the impacts of nuclear waste might be, how global warming can affect food production, and so on. Lack of warranted trust on the side of the public regarding scientific testimony can thus be an obstacle to peoples' ability to use scientific information in ways that allow them to enjoy the benefits that science provides.<sup>2</sup>

### 3.2 Masking the role of values in policy decisions

Public health officials' recommendations are normative in nature and this was no exception during the COVID-19 pandemic. To be sure, what the scientific evidence shows is relevant to the advice given. Nonetheless, despite the insistence of various government and health officials that their recommendations were simply "following the science," public policies also require value judgments (de Melo-Martín & Intemann, 2018; Goldenberg, 2021). Specifically, whether to make or adopt particular policies requires value judgments about the state of affairs that we think *should* be brought about and about whether a particular action or policy is the *best or better* way to accomplish that goal (all things considered).

Vaccine requirements, for instance, involved scientific evidence about safety and effectiveness. They also involved a variety of value judgments, including that serious risks to some were worth the many lives saved by mass vaccinations, that the time lost, inconvenience, and mild side effects to a significant amount of the population were balanced by the benefits to themselves and others, that infringements on individual liberty were justified, and that mandating vaccination was better than other policy alternatives in advancing the desired goal of saving lives and controlling the pandemic.

Likewise, public health officials often casted the decision to require masks as following directly from the scientific evidence regarding their effectiveness in preventing COVID-19 infections, but value judgments were also involved. Officials had to make judgments regarding the significance of the burden of wearing masks, particularly in relation to the potential benefits (e.g., fewer infections, protection of those at high risk), or whether certain public health goals, such as protecting vulnerable groups or decreasing illness were more important than infringements on individual or parental liberties.

Policy decisions about implementation of lockdowns of countries or regions also required more than scientific evidence about the severity of COVID-19 and the safety and effectiveness of this strategy. It involved ethical, social, or political judgments about, among other things, the importance of human life and health, the significance of civil liberties, the relevance of the financial recovery, the distribution of risks, and the proper role of government. Likewise, school closures did not follow only from the science but involved judgments about whether the harms to children were outweighed by lives

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<sup>2</sup> Undermining trust could also constitute an epistemic harm to the scientists if mistrust or distrust of their testimony is unwarranted (Grasswick, 2014). Our concern here is with epistemic harms that accrue to laypeople.



saved or about the fairness of imposing burdens on younger people in order to benefit older or more vulnerable groups.

In presenting policies as following directly from the science, experts masked the role of value judgements in reaching conclusions and their relevance in the justification of different policies. Such actions resulted in various epistemic harms. First, it denied laypersons the opportunity to assess how alternative value judgments might lead to different conclusions. For example, if school board officials are told that the scientific evidence calls for limiting in-person learning, it makes it difficult to identify policy alternatives produced by different value judgments. For instance, it prevents them from attending to fairness in risk distribution (e.g., whether low-income students and families bore a disproportionate burden).

Second, masking the role of values in policy decisions deprived individuals of rational grounds for rejecting or following various recommendations depending on their own values. Believing that one ought to wear or not wear masks, accept or refuse vaccines, or defend or oppose school closures simply because the science says so, is to lack sound justification for one's beliefs. At most, science provides information regarding the safety and efficacy of these interventions. It cannot tell us, by itself, what behaviors should be promoted or whether some policy for doing so is more justified than alternatives, all things considered.<sup>3</sup>

Third, for those with concerns regarding some policy recommendations, e.g., to get vaccines or boosters, stay at home, etc. believing that recommendations were just following the science left them with no epistemic resources to make sense of their concerns other than to challenge or altogether disregard the science. This could lead people to turn towards unreliable sources of information to try to make sense of their own—perhaps appropriate—objections to certain policies. This is a particularly serious epistemic harm not just for the individual but also for society in general, as it can drive or support agnotological practices that seek to create doubt and confusion by challenging scientific claims (de Melo-Martin and Intemann 2018).

Fourth, if only science is relevant for public policy, then those who refuse masks, are vaccine-skeptical, or dispute other policy recommendations can be treated as irrational, or anti-science (Goldenberg, 2021). Their challenges can only be the result of ignorance, cognitive biases, or a disregard for scientific expertise. Not only can their concerns be ignored, but their status also as rational agents can be called into question or denied.

Fifth, masking the role of values in adopting or rejecting particular policies, risks undermining warranted trust in experts. It can do so in two ways. Insofar as at least some members of the public would be aware that values do play a role in policy recommendations, public health officials' mantra that they were simply following the science, constituted evidence that experts were not being honest. Likewise, those

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<sup>3</sup> This does not mean, of course, that science is value-free. As we indicated earlier, contextual values play roles in all aspects of the scientific process. Our discussion here, however, is focused not on the influence of values in science production, but on their role in guiding scientifically informed public policy. Thus, although non-epistemic values have effects on, for instance, how data regarding the safety of vaccines has been interpreted, that the vaccines are considered safe does not entail that they should be mandated. The recommendation to mandate vaccines is grounded also on various ethical, social, or political values and not just on the, also value-laden, scientific information.

believing the claim that science alone was relevant for policy decisions, had reasons to be skeptical of changes in policies that did not track changes in the evidence. For instance, in the US, different states proposed different recommendations regarding school closures, use of masks, vaccine mandates, etc. It was certainly difficult for people to make sense of those differences under the assumption that experts were all simply following the science. Legitimate concerns about the competency or the honesty of experts would undermine warranted public trust in their testimony. As mentioned before, undermining warranted epistemic trust on scientific testimony can be an obstacle to peoples' ability to use scientific information in ways that allow them to enjoy the benefits that science provides.

#### 4 All-things-considered reasons against masking

We have argued that during the COVID-19 pandemic experts masked disagreements about empirical evidence and the role of values in driving policy recommendations and that this resulted in epistemic harms to laypersons. These harms provide a pro tanto case against masking.

Still, it might be that even when the epistemic harms of masking provide pro tanto reasons against it, there is still an all-things-considered case against open and honest communication of the types of information discussed here. According to a plausible account of how non-experts learn from experts, transparency and honesty about knowledge production is unlikely to further non-experts epistemic interests (John, 2018). This is so because many people presuppose a 'folk philosophy of science' that does not have much to do with the reality of scientific practice. Informing people about disagreements, uncertainties, or values can lead not to understanding, but confusion (John, 2018). Moreover, open and honest communication might result in unwarranted distrust, leading people to reject well-founded scientific and policy claims. Hence, if scientific communication is, at least in great part, about promoting true beliefs, then demanding transparency and honesty from experts would be misguided (John, 2018).

Putting aside whether this might be the case in contexts where a scientific consensus exists,<sup>4</sup> it is not obvious that demands for transparency and honesty in a context where the scientific evidence is in flux and a consensus has not been achieved are mistaken. Indeed, the presupposition that transparency and honesty should not guide scientific communication is grounded on the belief that institutional structures of scientific communities aim to ensure that experts assert scientific claims only when those claims meet relevant standards for proper acceptance (John, 2018). But when the science is changing and significant uncertainty exists, it is at least not obvious that such standards are met and thus, it is not clear that scientists should assert certain claims without providing context, i.e., disagreements, uncertainties, for such claims. On the contrary, insofar as the standards of evidence for proper acceptance are not met, scientists arguably have obligations to be honest and transparent about the limits of their assertions.

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<sup>4</sup> John's claims about transparency and openness presuppose the existence of a scientific consensus, whether natural or artificial (John 2018).

Nevertheless, even if there is a presumption in favor of open and transparent scientific communication at least in contexts where the science is not settled, the epistemic—and social—harms that can occur from unmasking evidentiary disagreements and value implications underlying policy recommendations might just be too costly. Indeed, at least some evidence shows that disclosing uncertainties and scientific disagreements about the evidence might result in confusion and lower support for relevant public policies (Ding et al., 2011; Han et al., 2018; van der Linden et al., 2015). Often communicating uncertainty or disagreements opens the door to political manipulation (Biddle & Leuschner, 2015; Harker, 2015; Oreskes & Conway, 2010). If this is correct then, masking existing disagreements might facilitate citizens and policymakers' decision-making and limit confusion. Furthermore, to the extent that communicating disagreements might engender skepticism among laypeople about scientists' competency, it can contribute to undermining warranted trust in experts.

We do not want to disregard the possible epistemic and social harms of communicating disagreements. However, the evidence on the effects of communicating uncertainty, disagreements, and dissenting views is at best ambiguous, with some studies showing negative effects and other showing positive or neutral effects (Gustafson & Rice, 2020; Kreps & Kriner, 2020; Nakayachi et al., 2018; van der Bles et al., 2020). At least some evidence indicates that even if communicating disagreements and uncertainty has some negative effects on trust or on people's willingness to follow certain recommendations, the negative epistemic and social long-term effects of failing to communicate them can be more significant (Kreps & Kriner, 2020), particularly if people are exposed to changes and reversals of claims (Batteux et al., 2022). According to this evidence, scientific communication that emphasizes agreement and masks uncertainty may produce short-term gains in trust and may lead to people following recommendations. However, such short-term benefits come at a longer-term cost when those prognostications are shown to be incorrect. Such changes can undermine warranted epistemic trust in scientific testimony. When multiple reversals aggregate, the negative effects on trust can also increase. Recent evidence regarding the case of masks-wearing, for instance, also shows that laypersons found experts more trustworthy when they highlighted disagreements and uncertainties than when they did not (Hendriks et al., 2022). Given the conflicting evidence, it is difficult to assess the seriousness of concerns regarding the consequences of masking relevant information on trust and on people's willingness to follow some recommendation.

Furthermore, even if it were the case that masking disagreements regarding whether the scientific evidence is sufficient or not to assert a claim (e.g., that masks are ineffective; that boosters provide additional protection, etc.), made it more likely that people would trust experts' testimony, such trust would be unwarranted. That is, the trust would be based on a mistaken perception of how certain the conclusions are, given the evidence. We are, after all, discussing a context of emerging evidence, one in which even those asserting some scientific claim, acknowledge that the evidence is at best uncertain. Thus, insofar as scientists are misrepresenting the state of affairs, trusting their testimony would be unwarranted. Likewise, concerns about whether communicating evidentiary disagreements and the role of values in policy making might decrease people's willingness to follow certain policy recommendations presupposes

that good reasons exist for people to follow them. But that is what is at stake in situations like the ones presented by the pandemic. Of course, it might be appropriate for governments to impose some intervention or another (e.g., lock downs, masks, vaccines) despite insufficient evidence or the fact that existent evidence can support various courses of action, but that hardly means that it is best for experts to mask relevant information.

If this is correct then, the evidence that the balance of risks and benefits favors masking evidentiary disagreements and value implications is at best ambiguous. Even if the evidence regarding the benefits of open and honest communication is also ambiguous, the presumption in favor of such communication adds to the balance. Furthermore, although the evidence for the epistemic harms of masking is contested, some of the epistemic harms of masking do not depend on what the empirical evidence says. Whether the information is or not dispositive, it is in fact the case that masking—be it scientific disagreements or the role of values in policy recommendations—prevents people from accessing information that is relevant to their decision making. Additionally, masking fails to respect people as rational agents, as it treats them merely as means to someone else's ends and disrespects individuals' autonomy rather than allowing them to make informed decisions.

## 5 Conclusion

Science communication is always complicated, but it is particularly challenging at times of public health crises, where the science is emerging, and significant uncertainties exist. We have argued that during the COVID-19 pandemic public health experts often masked scientific disagreements related to the empirical evidence as well as information regarding the role of values judgements necessary to ground policies.

Now, anyone following debates during the pandemic might be puzzled by our assertion that scientists and public health authorities spoke with one voice or masked empirical disagreements. Indeed, mixed and contradictory communications, including discrepancies between the federal and state presentations of data on infections and mortality, different messages from various officials at the national, state, and local levels about the seriousness of the threat posed by the virus, inconsistent recommendations about masking, vaccines dose, boosters and so on coming from various national and international public health authorities were common during much of the pandemic (Lancet, 2020; Noar & Austin, 2020; Rafkin et al., 2021). The highly publicized nature of such disagreements was often blamed for causing confusion and resistance to interventions such as masks and vaccines (Isaacs, 2021; Noar & Austin, 2020; Ruiu, 2020).

This is true. Evidence shows that communication from health authorities was not particularly consistent or effective and that a significant portion of the public perceived that there was conflicting information about COVID-19. For example, a study of about 1000 U.S. adults conducted in April 2020 found that nearly 75% of participants had reported hearing conflicting information from health experts, politicians, and/or others (Nagler et al., 2020). However, this study also showed that participants perceived the disagreement to occur more among politicians than among public health experts. In addition, there was evidence that participants who reported relying on direct health

sources (such as WHO and the CDC or local health organizations) reported perceiving *less* disagreement than those who received their information from political sources (such as White House or Gubernatorial press briefings), which suggests that health experts communicated in ways that masked disagreements more so than politicians. In addition, the disagreements that the public perceived were largely about the *recommendations proposed*, e.g., to wear or not masks; to get or not boosters; to close or not schools, etc. We do not deny that these disagreements were often communicated. Our claim is that what was masked were how the disagreements were relevant to grounding the different recommendations, i.e., different interpretations of the scientific evidence or of what the relevant evidence should be, and different value judgments. Even in cases when the disagreements focused on the effectiveness (e.g., masks) or safety (e.g., Johnson and Johnson vaccine) of interventions, the underlying disagreements among scientists were often not communicated. People were simply presented with diverse—and indeed, often inconsistent—recommendations by various health authorities. Furthermore, the fact that “mixed messaging” was blamed for the public’s resistance to public health recommendations evinces our interpretation that scientists and health authorities were under enormous pressure to speak with one voice even when relevant disagreement existed.

Masking evidentiary disagreements deprived laypersons of information that was relevant to making rational decisions, gave rise to false beliefs, and eroded laypersons’ warranted trust in experts. Masking information about the role of values pertinent to science-based policies made it difficult for laypersons to identify and assess alternative policies that might have been supported by different value judgments, deprived laypersons of rational grounds for following or rejecting public health recommendations, denied them epistemic resources for objecting to particular policies, and caused some laypersons to be incorrectly dismissed as irrational or anti-science. The risk of these harms provides a pro tanto reason against masking these types of information.

Moreover, we acknowledge that open and honest communication also presents epistemic costs. However, at least in contexts like the one discussed here, where science is influx, uncertainty is high, and public policies need to be implemented quickly, there is also an all-things-considered case against masking. This is so because of the presumption in favor of honest and open communication coupled with the ambiguity regarding the epistemic harms of unmasking information and the clear existence of epistemic harms of masking.

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## Declarations

**Conflict of interest** The authors have no conflict of interests to declare.

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