



# SFI TRANSMISSION

## COMPLEXITY SCIENCE FOR COVID-19

**STRATEGIC INSIGHT:** In a Complex Crisis, Scientists Cannot Avoid Making Value Judgments

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The rapidly unfolding COVID-19 pandemic has brought the interface between scientists and policymakers directly into the public eye. Examples include the role of Anthony Fauci in daily White House press briefings and the impact of a report by Neil Ferguson and his Imperial College London colleagues on decisions by several national governments. One might hope that this ongoing interaction between scientists and policymakers would respect a certain division of labor. Policy-facing scientists would provide politicians with decision-relevant facts, and in turn politicians would make decisions that require them to assess the value to society of different possible policy outcomes. As clean and compelling as this division of labor is, I don't believe that it is achievable, especially when dealing with a system as complex as a pandemic. In responding to this crisis, scientists must embrace the fact that they are being called upon to make ethically-loaded decisions, including in cases where this may not be immediately obvious.

The idea that science ought to be free of value judgments has a rich history. As early as the nineteenth century, **W.E.B. Du Bois** (1898, cf. **Bright 2018**) argued that public trust in science could only be preserved if science was insulated from social and political concerns. In the twentieth century, the decision theorists **Richard Jeffrey** (1956) and **Issac Levi** (1960) put forward mathematically precise frameworks for formalizing the division of labor between scientists and policymakers. According to them, scientists should provide policymakers with an empirically-supported assignment of probabilities to different relevant outcomes under a set of policy alternatives. It is then incumbent upon policymakers to do the value-laden work of evaluating the desirability and probability of each outcome under each policy, and formulating a decision rule that outputs an optimal policy. In the context of the current crisis, this division of labor would proceed as follows. Scientists would provide policymakers with an assignment of probabilities to the various possible public health and economic consequences of policies such as extreme social distancing, gradual de-quarantining, and the isolation of vulnerable populations.

Elected policymakers would then use these probabilities, along with their own normative judgments, to arrive at a decision as to the optimal policy.

However, as the Australian National University's **Katie Steele** argues in a 2012 paper, scientists rarely possess an evidence base that allows them to be confident in a single assignment of probabilities to different possible outcomes. Much more often, and especially in the face of significant uncertainty about the behavior of a system, the best that scientists can offer is a range of probabilities that a given outcome will occur. Here, scientists face a clear tradeoff. Wide ranges are much more likely to be correct, but can offer limited guidance to policy makers. Narrow ranges facilitate political decision-making, but are more likely to be wrong. Thus, when scientists decide how to report results to policymakers, they have to balance the need for action-guiding advice against the risk of their advice being wrong. These are value-laden decisions that cannot be outsourced to policymakers. Thus, as politicians continue to call on the expertise of scientists in order to respond to the current pandemic, scientists must embrace the fact that they are being asked to make ethical decisions. This may not be the ideal role for a scientist, but it is one that each epidemiologist, virologist, economist, and anyone else in a position to provide scientific advice to policymakers finds themselves in, like it or not. Likewise, the public must accept that even though scientific policy advisors have not been popularly elected, we have no choice but to grant them a certain level of value-laden decision-making power, or else abandon the idea of scientifically-informed policymaking entirely.

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