

# Who are the “experts” in Covid-19?

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This contribution is on Naturalistic Decision Making (NDM) and Resilience Engineering (RE) perspectives on the Covid-19 pandemic. What do these perspectives entail?

NDM is a movement that studies expert decision making in real-life situations, in contrast to laboratory situations using naïve participants. The real-life situations studied by NDM researchers are characterized by time pressure, uncertainty, ambiguity, multiple, conflicting goals, multiple stakeholders, and high stakes.

RE studies how to cope with surprise situations, such that we can sustain required operations. It is a dynamic process representing positive adaptation to adversity.

So how do these perspectives illuminate the Covid-19 pandemic?

First, many governments rely on experts in their decision-making process these days. State virologists and epidemiologists have acquired the status of ‘rock stars’ in a matter of a few months. They have become household names in each country. But they themselves acknowledge the lack of scientific evidence for much of their advice. So what is their expert advice based on? Should we just trust the experts? No, it’s clear that this monodisciplinary approach based on medical advice only is not sustainable in the long run and that we need multidisciplinary and even citizen-empowered approaches.

Second, the corona virus presents us with a lot of novelty, uncertainty, and surprise. We just don’t know much about this virus. As our prime minister, Mark Rutte, said: “we need to take 100 % of the decisions based on 50% of the knowledge”. RE should be able to inform us how to cope with this surprise situation. But should we merely adapt to this adversity? Just dig deep and get on with things? Be tough and hardy? No, it’s clear that this individual approach is not sustainable in the long run and that we need comprehensive systems of support.

I just gave two brief answers to two questions, based on the two perspectives of NDM and RE. Let me elaborate on those two answers in the rest of this talk.

In order to understand what expertise is, we need to take a step back in time. The classic study of expertise emerged in the early 1970s with the work by Herbert Simon and Bill Chase on expertise in chess. Simon and Chase found that grandmaster chess players could immediately recognize patterns on a chess board and could associate effective moves with these patterns. Expertise, in their view, was largely pattern recognition: you recognize a familiar pattern and you immediately know what to do. This immediacy of knowing is also known as ‘intuition’, but it is not magical or mysterious intuition: it is merely pattern recognition. It should not be confused with a vague gut feeling, as it is based on a large store of knowledge and experience. Expertise, in this classic view, is highly domain-specific and does not transfer to other domains: a chess grandmaster is not by definition also a checkers grandmaster, let alone a Go grandmaster.

Now, it is clear that this is not the complete story. When grandmasters play against each other, the situation is entirely different compared to when they play speed chess against 50 lesser players: they each present the other with surprise moves that go beyond the textbook moves. Now, they can’t just rely on pattern recognition. Rather, they need to plan and consider alternative moves.

The Covid-19 pandemic is like playing against an expert opponent. So the recognition part of expertise is hardly relevant in this case. I am not attributing any intelligence to this virus, mind you. Rather, the virus itself is new, even the experts don't know how contagious it is, whether we develop immunity and to what extent, why some are more susceptible than others, etc. We are playing an expert opponent in the sense of being confronted with novel situations all the time. We cannot simply rely on pattern recognition. We need to plan and consider alternative moves.

Fortunately for us, the classic view of expertise is not the complete story. If it were, we would not be able to rely on experts when they are confronted with surprise situations. All the novelty of the corona virus does not prevent virologists and epidemiologists from giving advice. Why is that? It shows that experts, apart from their highly domain-specific knowledge, also have acquired lots of general knowledge and general strategies that they can apply. For one thing: a virus, any virus, spreads through particles in the air as well as direct contact. Hence, the experts advised on social distancing measures. This is sound advice, even in the absence of detailed knowledge of the size of the particles involved or the longevity of the virus on surfaces. General knowledge and general strategies have replaced specific knowledge and strategies, in the absence of further scientific evidence. This is why policy makers can make 100% of their decisions based on 50% of the knowledge.

And this is also why they are navigating by sight rather than on a fixed compass. Navigating by sight means: changing course, looking at how the ship responds to all external effects of wind and current, assessing whether the ship's response meets pre-established criteria, and then either continuing or correcting. Expert harbor pilots navigate like this: their advantage is primarily to know **when** to change course, due to their familiarity with the specific environment in which they operate. Take away that environment, have a Rotterdam harbor pilot operate in the Singapore straits, and you take away a lot of their expertise (based on pattern recognition). Yet, they would still basically navigate by sight: initiate an action and observe its effects. This is a general strategy. And they still have general knowledge on how particular classes of ships respond to particular actions.

Our prime minister has also said he and his cabinet navigate by sight. It means they critically assess the experts' advice, take a decision on the measures proposed, assess their effects, and then continue or correct. Policy makers are basically harbor pilots controlling their ship of state. The added difficulty is that they are sailing along in a thick fog and their ship is very slow to respond. The fog is so thick because many parameters can only be assessed in hindsight; for instance, the reproducibility factor (R), can only be assessed indirectly and after a few weeks, based on hospital admissions. But if someone is admitted to the hospital, they have been infected a while ago. The ship is so slow to respond, like an oil tanker, because it takes a while for measures to have an effect, and also because so many measures are taken at the same time that they may cancel each other out, or amplify each other, in interaction with unforeseen behavioral responses by the population at large. Dealing with these added difficulties of fog and a slow ship response, a proven strategy is to implement measures piecemeal. For instance, opening up schools partially and with half the number of pupils at first, or opening up only a small number of nursing homes for visitors and assessing its effects. Piecemeal implementation is the same as navigating by small changes in course rather than large ones, with the risk of having to overcorrect. It is a strategy of 'low-cost probing' that has been proven effective in highly dynamic environments.

So far, I have deliberately simplified the problem by comparing policy making to controlling a ship—a ship of state, but a ship nonetheless. The metaphor is overly simplified in that a society is not a ship in the sense of a single entity being controlled and evaluated by simple input parameters. The metaphor may have had some validity in the early stages of the pandemic, when governments

primarily controlled on the basis of a small number of medical parameters, such as ICU capacity available, number of new hospital admissions or number of deaths. These are the parameters that are updated on a daily basis and that we seem to live by. However important they are, they present a partial picture of the complexity that we all need to deal with. This pandemic has huge repercussions for both health and the global economy, as well as for our personal well-being. There is death and massive unemployment, and also resulting poverty, hunger, domestic abuse, and social inequality. Any government finding a way out, designing an exit-strategy, will not only need to rely on medical experts, but will also have to take into account other areas of expertise. Multiple stakeholders with sometimes conflicting goals will have to be taken into account. In order to maintain levels of trust by the general population, governments have to be transparent in what they know and don't know, what consequences have to be taken into account and how options have been weighed.

But expertise is even broader than that in this pandemic. At some point, we all become experts in ways to reorganize our society. Local situations differ a lot, and governments need to take this into account. There may be differences in demographics, levels of infection, and mentality. At a local level there is expertise that may be tapped and brought to bear in field labs and shared through social media. Deferring to expertise has proven to be a successful strategy for High-reliability organizations; flattening of networks has proven to be a successful strategy for teams in critical situations. At a national level as well, decentralizing decision making so as to be able to take into account local differences is essential. Citizens, shop owners, restaurant owners, hairdressers, public transport companies, airlines: they are all experts in how to manage social distance in their respective domains. Tapping into this expertise is crucial for tuning solutions to local situations, and also for giving local interests a voice.

So what's the take-home message? Expertise is a social phenomenon; resilience is a network phenomenon. Expertise is distributed broadly and needs to be tapped broadly. In the end, it's all about people, and about connecting people and knowledge. We may not know everything, but we know sufficiently for getting us out of this pandemic.