

COMMENT

Coproduction and the crafting of cognitive institutions during the COVID-19 pandemic

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Abstract

In response to Paniagua and Rayamajhee's (2021) proposal for a polycentric approach for pandemic governance, Frolov (2022) notes that their paper focuses on preventive measures, and neglects the deeper, cognitive dimension of coproduction. In this essay, we extend the notion of coproduction to analyze the cognitive institutions that underlie social behavior during a pandemic. We analyze the role of coproduction and polycentricity in the emergence and persistence of shared mental models, including counterproductive models such as virus skepticism, conspiracy theory beliefs, and antivaccine narratives.

Key words: Cognitive institutions; conspiracy theory; coproduction; pandemic governance; polycentricity

1. Introduction

In their recent works, Pablo Paniagua and Veeshan Rayamajhee argued that a monocentric approach to pandemic governance is unlikely to succeed because it cannot account for the diversity and nestedness of institutions working at different levels to overcome many pandemic challenges (Paniagua and Rayamajhee, 2021; Rayamajhee *et al.*, 2021).¹ They offered two main arguments. First, pandemic challenges are complex, and they manifest themselves in a variety of forms across different subpopulations. Communities develop a variety of new institutions or modify existing institutions to overcome these diverse challenges (see Rayamajhee *et al.*, 2022; Storr *et al.*, 2021). Thus, a uniform policy set by a singular governing authority is likely to generate policy mismatches and inefficiencies, especially when decision costs, monitoring costs, and sanctioning costs are high (Rayamajhee *et al.*, 2021). Second, many aspects of pandemic response – including the provision of many preventive measures such as mask wearing, social distancing, self-isolation, and vaccination – require a high degree of citizen compliance. Because different individuals and communities have different beliefs and follow different cognitive rules,² a one-size-fits-all policy to promote such measures can create resentment and defiance, especially when the measures are perceived as coercive or paternalistic.

In response to the proposed polycentric framework, Frolov (2022) presented the compelling case that the proposed approach is incomplete because it does not sufficiently address the cognitive dimension of institutions. The author contends that although the concept of coproduction is a useful tool

¹Nested social dilemmas can be understood as situations in which actions taken within one administrative or political unit generate costs and benefits for other units (for details, see Ostrom, 2012). An example of a nested dilemma is a systemic bank run, caused by different financial and liquidity problems occurring at different scales throughout the interbank network (Paniagua, 2020).

²Greif and Mokyr (2017) define cognitive rules as 'social constructs that convey information which distills and summarizes society's beliefs and experience' (p. 26). They include beliefs based on observed empirical regularities and on expectations about what is or is not socially accepted (p. 27).

with which to understand pandemic response, our analysis (focused on the production of preventive measures) does not adequately explain situations in which people adopt destructive social norms, beliefs, and practices such as conspiracy theories and participation in antivaccine campaigns. In other words, there is value in expanding the notion of coproduction to explore the dark side of coproduction, where citizens coproduce alternative cognitive institutions that undermine the governance of externalities. Indeed, extending the notion of coproduction to the analysis of cognitive institutions is a valuable line of inquiry that allows one to shed light on the dark side of coproduction and highlight the multifaceted challenges of pandemic governance. As Frolov (2022) points out, shared norms and mental models that underlie behavior and practices during a pandemic must be coproduced too.³ In other words, the case for a polycentric approach to pandemic governance can be strengthened by applying Ostrom's (1992) crafting-of-institutions approach to the cognitive institutions underlying social behavior.⁴

Thus, the lens of coproduction can be useful to analyze the emergence and proliferation of alternative and detrimental shared mental models during a pandemic such as conspiracy theory beliefs that promote pandemic denialism, superstitions, and antivaccine rhetoric. In other words, the concept of coproduction can help explain why competing, often-contradictory shared mental models coexist and why pernicious models persist despite governmental and nongovernmental efforts to counter them. This novel extension of the theory of coproduction (Parks *et al.*, 1981) to cognitive institutions highlights two crucial points: first, cognitive institutions are coproduced by citizens, communities, and organizations (governmental and nongovernmental); second, the crafting of cognitive institutions is a decentralized and competitive process in which cognitive and behavioral norms are coproduced by multiple actors 'with differing interests, values, and worldviews' (Frolov, 2022: 3). Thus, citizens are continually involved in the production, modification, contestation, and deterioration of different shared mental models. Some will be active coproducers of preventive measures and underlying social norms, whereas others will actively coproduce undesired norms and resist the adoption of public health measures to contain the spread of the virus.

Indeed, cognitive institutions matter for pandemic governance in more profound ways than most economists currently acknowledge. A lot of brainpower has been spent on quantifying the damages caused by the COVID-19 pandemic and on evaluating government policies' relative efficacy at mitigating such damages. These are important tasks that can inform many aspects of pandemic policy making, as is the study of scientific matters such as infection rates. However, very little attention has been dedicated to uncovering the institutional and cognitive facts that have shaped the trajectory of the pandemic. Specifically, scholars have paid meager attention to the cognitive institutions – or shared mental models – that individuals and communities develop. Illuminating these issues and delineating a theory of coproduction of cognitive institutions for pandemic governance are the core aims of this essay.

The essay proceeds as follows. Section 2 examines the role of coproduction in the crafting of cognitive institutions during a pandemic. Section 3 discusses the polycentric nature of cognitive institutions and illustrates how they compete with one another in the market for ideas. Section 4 concludes with some reflections regarding a cognitive-institutional research agenda going forward.

2. Coproduction of cognitive institutions during a pandemic

To promote social behavior conducive to containing the spread of infectious diseases, policy makers often try to persuade citizens to adopt new sets of underlying cognitive rules and beliefs. Although the policy goals are limited to behavioral outcomes such as mass vaccinations, social distancing, and mask wearing, policy makers must overcome cognitive barriers that determine behavioral attitudes and

³Frolov (2022: 2) emphasizes that cognitive institutions are 'not ready-made, complete, or static' but rather 'unfinished, ongoing shared mental models...constantly co-produced and reassembled by various actors' (p. 2).

⁴'Crafting of institutions' refers to the process of developing formal rules (legal codes) and informal rules (norms and conventions) that constrain human behavior. Successful crafting of institutions entails developing norms and rules that ensure effective mutual monitoring and enforcement (Ostrom, 1992).

practices.⁵ Thus, government programs – such as those communicating new facts about a virus and its contagion patterns to the public, recommending social guidelines, and other incentive-based strategies – can be viewed as attempts to create new cognitive institutions or shared mental models. However, although governments can play a critical role, they cannot generate such shared mental models alone. Citizens must also fulfill their coproductive roles by rightly interpreting and internalizing these models and modifying their behavior accordingly. Moreover, governments do not have a monopoly on crafting cognitive institutions. Competing models can and do arise from the bottom up.

In the face of viral externalities, governmental actors face a particular type of cognitive problem that requires drastic changes in human behavior and suppression of basic human instincts. For many pandemic policies to work, government actors must be able to not only alter the behavior of citizens but also suppress (at least temporarily) many of the underlying shared mental models that guide citizens' behavior – including the social norms and belief systems that guide citizens' interactions. Ethical considerations aside, this presents a feasibility challenge, given the nestedness of path dependency across cognitive and institutional levels. In other words, even if governmental actors are able to swiftly change formal rules to promote certain social behavior, they cannot alter shared mental models at the same pace. Consider, for instance, the adoption of social distancing, which continues to be a common policy goal of many governments. Successful social distancing requires suppressing or altering human prosociality, which is a herculean task even for oppressive governments experienced in mass suppression. Prosociality has deep social evolutionary roots (Dahl and Brownell, 2019; Molleman *et al.*, 2013) and serves the vital function of resolving collective-action problems in crisis situations (Rayamajhee and Bohara, 2021). Thus, even though governments can introduce new institutions (formal rules) suddenly, even minor changes in shared mental models will require concerted efforts from both citizens and governments.⁶

In other words, pandemic policies aimed at crafting or altering cognitive institutions require coproduction. This is true for both democratic and authoritarian regimes. Of course, one can find cases in which governments unilaterally promote cognitive rules and beliefs using propaganda and threats of imprisonment. For example, in Turkmenistan, no coronavirus cases exist officially because President Gurbanguly Bergymukhammedov said so (Abdurasulov, 2021). Whether or not citizens believe Bergymukhammedov's fabrications, their social behavior is dictated by the government-imposed shared mental models. Nevertheless, even in such extreme cases, cognitive rules are effective only because citizens choose to internalize them and adjust their behavior in social settings. That is, citizens are forced to coproduce or adjust their cognitive institutions to comply with governmental decrees.

In noncoercive cases, the role of coproduction in the emergence of cognitive institutions is more conspicuous. Cultural entrepreneurs can facilitate the coproduction process by presenting new cultural ideas and spearheading the much-needed changes (Mokyr, 2016). Cultural entrepreneurs can be real figures such as Francis Bacon or Isaac Newton, but they can also be anonymous, mythical figures such as QAnon.⁷ In many cases, no particular entrepreneur is required to push new ideas. Decentralized digital platforms such as Tiktok, Reddit, and 4chan can be just as, if not more, effective. Thus, the role of voluntary compliance or adherence becomes critical to eliciting desired behavioral attitudes and practices. In such noncoercible contexts, for government policies to be effective, they must

⁵In Paniagua and Rayamajhee (2021), we argue that the complementarity between inputs for co-governance is an important criterion with which to evaluate pandemic policies. For example, if governments employ measures that are complementary to citizen engagement (such as compiling and disseminating accurate information and providing reliable public health guidelines), they are likely to contribute to higher long-term compliance rates. We thank an anonymous referee for emphasizing this point.

⁶There is an additional consideration regarding which mental models can be altered, and which remain fixed. While it may be feasible to alter some beliefs about propriety and hygiene-related behavior, deeply rooted beliefs tend to exhibit high path dependency.

⁷QAnon (or Q) is an anonymous individual or a group of individuals, presumed by his or her followers to be a high-level US government official, who is behind viral conspiracy theories (QAnon conspiracies) widely circulated on the website 4chan.

focus on building trust and encouraging citizens to actively participate in the coproduction of cognitive rules.⁸ To be sure, such strategies might not work, but there is no way around it.

As Paniagua and Rayamajhee (2021) suggest, national and regional governments, various scientific communities, and nongovernmental organizations (such as the World Health Organization) are all crucial players in pandemic governance, generating new ideas and acting as focal points in the contestation among shared mental models. Families, neighborhoods, municipalities, schools, universities, businesses, and other organizations decide which of the competing models are winners and adjust their coping strategies accordingly. Leaders of both idea-generating and idea-implementing organizations thus become ‘big players’ who have significant discretionary power to influence social behavior (Koppl, 2002). They can persuade members to adopt certain beliefs and reject others. The big players are most effective when they advocate ideas and behavior that are consistent with people’s existing beliefs; people subscribe to models that closely align with their interests, values, and worldviews. Ultimately, citizens decide which behavioral norms to embrace; and they determine which policies and strategies will succeed and which will fail.

Thus, an important implication of the coproductive feature of cognitive institutions is that citizens can and often do actively coproduce pernicious belief systems such as pandemic denialism and anti-vaccination theories. As Frolov (2022: 2) puts it, they create imperfect, poorly coherent, and internally contradictory shared mental models, assembled and reassembled from multiple sources and without explicit performance criteria. This has been true since the dawn of human civilization but has become truer with the proliferation of anonymous online platforms with minimal or no accountability measures. While it may be comforting to believe that government strategies such as providing reliable facts and detailed and lucid explanations will persuade citizens to adopt better cognitive rules, the assumption is naive. Frolov (2022) is correct to note that the problem is not the quality of information or the dissemination strategy but lack of trust in our basic political and scientific institutions. Additionally, there is a deeper challenge of modifying human cognition and the fundamental social institutions humans built to overcome historical challenges. No governmental policy can do that.

Finally, it is worth reemphasizing that cognitive institutions do not have to be correct to be effective or to endure. As long as they are self-enforcing and self-correcting, they can guide human behavior and survive (Greif and Mokyr, 2017). For instance, the shared belief that turmeric root is an antidote to coronavirus can be self-confirming if someone infected by the virus recovers after consuming turmeric.^{9,10} Even if they do not recover – or worse, if they die – subscribers to such a belief system can maintain that the death or lack of recovery occurred despite the turmeric. When confronted with such tragedies, one may find it more convenient to seek out alternative (and false) explanations that blame outsiders than to correct one’s beliefs.¹¹ In some cases, shared mental models can take the form of a collective narrative to help strengthen social bonds and promote solidarity in order to cope with crises such as natural disasters and wars (Chamlee-Wright and Storr, 2011). Even if some elements of the collective narrative may be exaggerated claims about group solidarity and invincibility, and even when some members of the group understand that some facts of the narratives are exaggerated or

⁸The social capital literature is helpful to distinguish trust in government from trust in social and scientific institutions. There are three kinds of social capital: bonding, bridging, and linking. Bonding social capital refers to the ties between homogenous, like-minded individuals in a community, whereas bridging social capital links members across communities. Linking social capital refers to vertical ties that link households and communities to larger organizations and jurisdictions (e.g. churches and political parties). For further details, we direct the readers to Rayamajhee and Bohara (2021).

⁹This is not to suggest that turmeric is harmful as a treatment of or preventative against viral infection. We are not qualified to make such a claim. Although turmeric’s antioxidant and anti-inflammatory properties are well known, the belief that it can fight the coronavirus does not have a scientific basis, as far as we know. However, similar beliefs are widely embraced by the Ayurvedic/naturopathic community and by many on the Indian subcontinent. Our focus is on shared beliefs and their persistence, not on their scientific veracity.

¹⁰As an anonymous reviewer pointed out, false beliefs – such as ‘vaccination causes fertility problems’ – can be self-confirming despite contradicting credible research because they strike doubts and fears into people’s hearts.

¹¹An anonymous reviewer suggested that changing one’s mind puts a significant ‘burden on one’s consciousness’. Altering one’s beliefs can have high psychological costs.

false, the group can collectively agree on the veracity of the collective narrative because it serves a vital function.

In other cases, shared mental models take more sinister and destructive forms. For example, many QAnon followers share a mental model that considers coronavirus vaccines to be ‘bioweapons concocted by evil cabal of corrupt government officials and drug companies’ (Timberg and Dwoskin, 2021). Although obviously false, hundreds of thousands of individuals believe such falsities and participate in activities consistent with such beliefs. Such shared mental models, although continually contested, persevere because they provide avenues to channel group members’ frustration and skepticism about outsider experts, government actors, and elites. As suggested previously, one cannot assume that good cognitive institutions naturally dispel bad ones over time. Old cognitive rules, even false ones, have tendencies to become path-dependent and therefore inflexible. Thus, they can persist and coexist alongside disruptive new norms despite falsifying evidence if the rules are self-confirming and self-correcting.

3. Polycentrism of cognitive institutions

Given the coproductive nature of cognitive institutions, a polycentric approach is better suited to address the pandemic challenges posed by bad cognitive institutions – such as those that foster pandemic denialism, conspiracy theories, and antivaccination rhetoric. This is because cognitive rules are polycentric in nature and compete with one another in the market for ideas. Radical uncertainty posed by the pandemic manifests differently among different subpopulations. Therefore, individuals develop different mechanisms and beliefs to cope with diverse challenges. That is, individuals’ representations of their environment – their individual mental models – which are shaped by the peculiarities of their environments, also vary (Denzau and North, 1994).

Closely aligned individual mental models often converge to form a shared mental model that allows individuals and groups to make sense of the environmental peculiarities and cope with them together.¹² Shared mental models, especially false and rigid ones, provide a sense of stability and uniformity (Knight, 1997).¹³ False but nonfalsifiable models tend to be more stable than constantly evolving and unsteady but truer models presented by scientific (and political) actors. Moreover, such models offer simple interpretations, are catchy and easy to remember, and are likely to reach more people than the truth (Vosoughi *et al.*, 2018).¹⁴ Thus, various scientifically false institutional truths can emerge. In other words, the convergence of individual mental models upon a shared mental model occurs at a multitude of nodes and with the help of heterogeneous organizations at different scales. Each node (representing a shared mental model) can incorporate a certain set of self-confirming scientific facts and discard other facts that are irreconcilable with the model. Multiple nodes can coexist, representing not only a host of conspiracy theories but also numerous narratives consistent with scientific evidence. A cognitive norm that a government may advance occupies one of many such nodes.

The Internet has become fertile ground for various shared mental models to compete for dominance. While existing big players may use the Internet to propagate their models, the Internet also allows new big players to emerge by drastically reducing costs of entry.¹⁵ For instance, the Center for Countering Digital Hate reports that 12 individuals – the Disinformation Dozen – were responsible for the bulk of misleading claims and outright lies about COVID-19 vaccines on the Internet (Center for Countering Digital Hate, 2021). The report finds that the Disinformation Dozen produced 65 percent of all antivaccine content shared on Facebook and Twitter during the study period (*ibid.*: 5).

¹²Individuals with similar cultural and socioeconomic backgrounds and life experiences are more likely to have convergent individual models (Denzau and North, 1994).

¹³In an unstable environment, truth can be destabilizing and unsettling to many, whereas people may find simple narratives to be psychologically comforting.

¹⁴Vosoughi *et al.* (2018) suggest that people share false news on social media more than they share true news, because the former is more novel.

¹⁵The role of social media in spreading virus skepticism and conspiracy theory beliefs cannot be understated. It has never been easier to disseminate information or connect with individuals who share similar conspiracy theories.

What is more concerning is that despite repeated violations of terms-of-service agreements, nine of the dozen remain active on all leading social media platforms. This raises the new polycentric challenge of fighting misinformation on the Internet and brings forward new concerns regarding accountability, responsibility, and regulation of social media, all of which requires solutions and inputs from multiple actors at different levels.

Even if we leave aside the broader issue of digital governance, addressing pandemic-related misinformation on the Internet involves complex challenges that cannot be addressed by a singular governing authority. Moreover, a monocentric approach to combating antivax rhetoric can run the risk of delegitimizing and undermining private and bottom-up efforts to self-regulate and to develop methods of mutual monitoring and sanctioning (Ostrom, 2000). Besides fighting one set of shared mental models (misinformation) by disseminating another set of shared mental models (accurate information), there is another distinct role that national governments can play. This involves enabling citizens to coproduce desirable mental models by creating an institutional environment in which subnational, local, and private actors can participate in public discourses to design better methods of self-regulation and self-monitor. Specific rules and contents of the institutional environment can vary depending on the unique features of each digital platform, but it may be feasible to create a common framework to filter out bad actors disseminating harmful lies and pernicious shared mental models. Such a framework is more likely to adapt to changing circumstances, challenges, and technologies than a rigid regulatory framework handed down and enforced by a unitary authority.

4. Concluding remarks

In a world of perfect information and low transaction costs, optimal policies designed by a unitary government might stand a chance. But we do not live in such a world. Our world is rife with information asymmetries, high decision costs, and monitoring and enforcement problems. These problems interact daily with a wide range of subjective belief systems and take unpredictable forms. A pandemic further complicates these problems and multiplies the number of simultaneous challenges that we must deal with. Thus, even thinking through the matrix of challenges, let alone solving them, requires a polycentric approach. Acting on the false assumption that a public authority can singlehandedly design policies to overcome barriers presented by path-dependent cognitive and social institutions will lead us nowhere.

Throughout this essay, we have argued that creating and altering cognitive institutions are coproduction processes. The role of coproduction becomes even more critical for policy design when we consider the nested path dependence of cognitive rules and social institutions. Belief systems act as scaffolds that support the institutional infrastructure in which economic and political games are played. Both cognitive rules and the resulting institutions exhibit strong path dependence and are interlocked in a nested manner that makes them resistant to policy maneuvering by external authorities. This is the reason why changes in formal institutions do not necessarily lead to intended economic and social outcomes. Thus, to have any hope at altering existing cognitive institutions or creating new ones, one must account for their coproductive character. In other words, the crafting of institutions (cognitive and social) requires inputs from the intended beneficiaries (citizens) alongside the careful inputs from policy makers.

As Elinor Ostrom (1992) concludes from her studies of irrigation systems, while state and local bureaucrats often play productive roles as ‘catalysts’ and ‘generators of information’, the success of such systems depends on direct inputs from the local farmers themselves, who provide valuable inputs in the design, operation, and maintenance of their collective resources and in the creation and modification of rules to govern them. Still, many common-pool-resource systems do fail in the absence of effective conflict-resolution mechanisms and support and validation from governmental authorities (Ostrom, 1990). So our arguments should not be construed as a dismissal of the role of governmental authorities. Although governments are far from perfect, we do not live in a world where self-governing citizens can spontaneously create perfect institutions to overcome all collective-action problems. For example, the problem of sanctioning the Disinformation Dozen remains unsolved. The problems

we face are far too complex for any singular entity or class of entities – markets, states, or disorganized citizens – to solve unilaterally. Instead, our argument is that this complexity can be best addressed by embracing polycentricity and institutional diversity, in both our thinking and policy making.

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